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) _____

pCS1831153318

*** 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: Enduring Resources IV, LLC (For multiple operators attach page with information) OGRID #: 372286
Address: 200 Energy Court, Farmington, NM 87401
Facility or well name (include API# if associated with a well): Rincon 2706-32F
OCD Permit Number: 3RF-38 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr S/E NW/4 Section 32 Township 27N Range 6W County: San Juan
Surface Owner: ☐ Federal ☐ State ☑ Private ☐ Tribal Trust or Indian Allotment

2.
☑ **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 36.531477 Longitude -107.495610 NAD83
Proposed Use: ☑ Drilling* ☐ Completion* ☐ Pi

DENIED
X Does Not meet Siting Criteria

**The re-use of produced water may NOT be used u*
☐ Other, *requires permit for other uses. Describe u* *nsure there will be no adverse impact on groundwater or surface water.*

BY: Cory Smith
DATE: 11/7/18 (505) 334-6178 Ext. 115

DTW = 32'

NMOCD
OCT 17 2018
DISTRICT III

☐ Fluid Storage
☐ Above ground tanks ☐ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type _____
☐ Activity permitted under 19.15.36 NMAC explain type: _____ ☐ Other explain _____
☐ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date: _____

3.
☑ **Recycling Containment:**
☑ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 36.531477 Longitude -107.495610 NAD83
☑ For multiple or additional recycling containments, attach design and location information of each containment
☐ Lined ☑ Liner type: Thickness 45 mil ☑ LLDPE ☐ HDPE ☐ PVC ☐ Other _____
☑ String-Reinforced
Liner Seams: ☑ Welded ☑ Factory ☐ Other _____ Volume: 300,226 bbl Dimensions: L 300' x W 400' x D 25'
☐ Recycling Containment Closure Completion Date: _____

115

Smith, Cory, EMNRD

From: Smith, Cory, EMNRD
Sent: Wednesday, November 7, 2018 3:47 PM
To: 'Andrea Felix'
Cc: Powell, Brandon, EMNRD; Fields, Vanessa, EMNRD; Jacob Ellis; Eric Stevens; James McDaniel
Subject: RE: Rincon 2706-32F Recycling Containment Additional Ground water information

Categories: Ground Water Investigation

Andrea,

After waiting 24 hours to let any ground water to equalize GeoMat measure the well today with a conductivity probe and found a water level at 32'. The recycling containment unfortunately does not meet the siting requirements as specified in 19.15.34.11.A(1) NMAC and therefore has been Denied.

The facility does not have an API# so I have assigned it Recycling Facility Admin Order 3RF-38 the denied application will be scanned into the online system as soon as possible for your records.

If you have any additional questions or concerns please contact me at your convenience.

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

From: Andrea Felix <AFelix@enduringresources.com>
Sent: Friday, November 2, 2018 9:53 AM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>
Cc: Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; Fields, Vanessa, EMNRD <Vanessa.Fields@state.nm.us>; Jacob Ellis <JEllis@enduringresources.com>; Eric Stevens <EStevens@enduringresources.com>
Subject: [EXT] RE: Rincon 2706-32F Recycling Containment Additional Ground water information

Good morning Cory,

We have scheduled GEO Mat for Tuesday November 6th, 2018 at 10am to drill in the vicinity of BH-8 to a depth of at least 70' to provide sufficient ground water data as required.

Thank you,

Andrea R Felix, RWA
Regulatory Manager
Enduring Resources
200 Energy Court
Farmington, NM 87401

Office: 505-636-9741
Cell: 505-386-8205

From: Smith, Cory, EMNRD [mailto:Cory.Smith@state.nm.us]
Sent: Friday, November 02, 2018 8:45 AM
To: Andrea Felix <AFelix@enduringresources.com>
Cc: Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; Fields, Vanessa, EMNRD <Vanessa.Fields@state.nm.us>
Subject: Rincon 2706-32F Recycling Containment Additional Ground water information

Good morning Andrea,

While reviewing Enduring's Recycling Containment application for the Rincon 2706-32F there is some concerns in regards to the ground water information.

Enduring provided SJ-00061 and GeoMat Bore Holes for use as determination for Depth to water. Upon review SJ-00061 indicates depth to water is ~301' Below Grade Surface (BGS) after reviewing the online log available through the Iwater portal the well was cased from the Surface to 445' and with perforation at 282'-445'. Bore hole 6-7 from the GeoMat report were drilled with a 7.25" OD hollow stem auger and no casing. The bores were all consistent and indicated damp soil conditions between 20'-30' BGS. BH-8 drilling log indicates damp soils at 20' and a wet zone between 23'-25' BGS.

Due to the data provided, OCD is requiring Enduring to verify the depth to groundwater is greater than 50' from the bottom of the proposed containment. If Enduring wishes to continue with this location a test well will need to be drilled in the vicinity of BH-8. The test well will need to be drilled down to the depth of 70' BGS (50ft of separation and a 20' containment) and left open for 24 hours prior to testing due to the wet zone indicated on BH-8. Enduring will need to provide OCD DIII at least 48 hour notice prior to the drilling of the test well.

If you have any questions please let me know.

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

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.

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): Andrea Felix Title: Regulatory Manager

Signature: Date: 10-16-2018

e-mail address: afelix@enduringresources.com Telephone: (505) 386-8205

11.
OCD Representative Sign

Title:

☐ OCD Conditions
☐ Additional OCD (

DENIED

Approval Date:

OCD Permit Number: 3RF-38

C-147 Registration Package

Prepared for

Enduring Resources IV, LLC
200 Energy Court
Farmington, NM 87401
(505) 386-8205

Developed by

EIS
Energy Inspection Services
479 Wolverine Drive
Bayfield, Colorado 81122
Phone: (970) 881-4080

Table of Contents

1. Introduction

Applicant	Enduring Resources IV, LLC
Project Name	Rincon 2706-32F
Project Type	Recycling Containment Registration
Legal Location	S/E NW/4, Section 32, T27N, R6W, San Juan County, NM
Lease Number(s)	Private

In accordance with NMAC 19.15.34, Enduring Resources IV, LLC (Enduring) requests the registration of the proposed Recycling Containment 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 Enduring Resources IV, LLC completion activities.

This package contains the C-147 form and associated documents for registration of the Rincon 2706-32F Recycling Containment.

A copy of the C-147 has been submitted to the land owner, Enduring Resources IV, LLC.

2. Variance Explanation

All requested variance provide equal or better protection of fresh water, public health, and the environment.

C-147 #5 Fencing

19.15.34.12.D(1) NMAC states "Recycling containments shall be fenced with a four foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level."

Enduring will install an eight (8) foot chain link fence with one strand of barbed wire around the facility as requested by the surface owners to allow for greater protection to the facility than the requirements of 19.15.34.12.D(1)

3. Siting Criteria

3.1. Distance to Groundwater

The NM State Engineers Office iWaters Database shows a water well within section 32 of township 27N and range 6W. The elevation of the iWaters Data Point SJ00213 is 6634′ with a groundwater depth of 485′. The Rincon 2706-32F has an elevation of 6627′ which is an decrease of 7′ establishing the estimated groundwater depth for the Rincon 2706-32F to be greater than 478′. Therefore the groundwater depth is greater than 50 feet below the bottom of the recycling containment.

3.2. Distance to Surface Water

There are not any continuously flowing watercourses within 300' nor any other significant watercourse and lakebed or playa lake within 200' of the recycling containment as shown on the Aerial or Topo maps provided.

3.3. Distance to Structures

There are no permanent residence, school, hospital, institution or church at the time of initial registration within 1000' of the recycling containment as shown on the Aerial and Topo maps provided.

3.4. Distance to Non-Public Water Supply

There are no springs or fresh water wells used for domestic or stock water purposes within 500' in existence at the time of initial registration as shown on the Aerial and Topo maps provided.

3.5. Distance to Municipal Boundaries and Defined Fresh Water Fields

The recycling facility is not within any incorporated municipal boundaries within a defined municipal fresh water well field covered by a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978, as amended.

3.6. Distance to Subsurface Mines

The recycling containment is not located in an "unstable" area. The location is not over a mine and is not on the side of a hill. The location of the excavated surface material will not be located within 100 feet of a continuously flowing or significant watercourse. According to the NM EMNRD Mining and Mineral Divisions database there are no subsurface mines in Section 32, Township 27N, Range 6W of San Juan County.

3.7 Distance to 100-Year Floodplain

The Rincon 2706-32F proposed recycling containment is not located within a 100-year floodplain as demonstrated on the FEMA Map.

4. Design and Construction Plan

In accordance with Rule 19.15.34 the following information describes the design and construction of the recycling containment on Enduring's locations.

The Enduring Design and Construction Plan assists Enduring personnel in ensuring compliance with the minimum design and construction requirements for recycling containments as defined by the NMOCD outlined in 19.15.34.12 NMAC. The plan applies to any Enduring Employee(s) and subcontractor(s) whose job requires them to assist with the design and construction of the recycling facility. The plan is designed to ensure compliance with the minimum design and construction requirements for recycling facilities as defined by the NMOCD outlined in 19.15.34.12 NMAC.

Enduring shall design and construct a recycling containment in accordance with the following specifications.

4.1. Foundation Construction

Approximately 6" of topsoil will be stripped and stockpiled for final cover at the time of closure. The topsoil will be stored on the perimeter of the permitted facility.

The recycling 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. The containment will ensure confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall. A geotextile under the liner will be used, if needed, to reduce the localized stress-strain or protuberances that otherwise may compromise the liner's integrity. The final sub grade shall be scarified to a minimum depth of 12 inches, moisture conditioned to near Optimum Moisture and compacted to 95% of maximum dry density as determined by a Standard Proctor (ASTM 698).

Positive draining should be provided during construction and maintained throughout the life of the proposed project to prevent surface runoff from entering the pond. Protective slopes should be provided with a minimum grade of approximately 5 percent for at least 10 feet from the structures. Backfill against footings, exterior walls, and in utility trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

The pond inside Levey grade will be constructed no steeper than 2H:1V grade and the pond outside Levey grade will be constructed no steeper than 3H:1V grade.

4.2. Liner Construction

Enduring's recycling containment shall incorporate, a primary (upper) liner and a secondary (lower) liner with a leak detection system. The primary (upper) liner will be a 45-mil LLDPE string reinforced liner resistant to UV light, petroleum hydrocarbons, salt and acidic/alkaline solutions with a single sided texture to increase traction for emergency escape from the pit and shall cover the bottom and sides of the pit including the minimum three (3) feet of freeboard per NMOCD 19.15.17.11.G.9. Integrity of the primary liner shall be tested using the Dipole Method - Water Covered Geomembrane (ASTM D7007). The secondary liner will be a 45-mil LLDPE string reinforced liner with a single sided conductive coating for initial leak detection and shall cover the bottom and sides of the pit including the minimum three (3) feet of freeboard per NMOCD 19.15.17.11.G.9. Integrity of the secondary liner shall be tested using the Conductive-Backed Geomembrane Spark Testing Method (ASTM D7240).

A secondary leak detection system will be installed at the designated corner of each pit. The pit bottom will be sloped to the detection system that will be comprised of SDR-17 HDPE solid and perforated pipe with 1-1/2" Type F coarse drain rock bedding. Enduring will install manufacturer recommended Geoconduct 250 geocomposite with a conductive grid between non-woven needle-punched geotextiles produced by Afitex Texel. The product consists of two geotextile layers comprised of short synthetic fibers of 100% polypropylene or polyester which are needle punched together with a structural conductive grid. The conductive grid comprises two conductive inox

cables forming a 50 mm x 50 mm network. Geoconduct is compatible with geoelectrical leak location surveys.

Enduring shall ensure the subcontractor installing the recycling containment minimized liner seams and orient them up and down, not across, a slope of the levee. Enduring shall ensure that factory welded seams shall be used where possible. Enduring shall ensure the subcontractor installing the recycling containment ensures field seams in the geosynthetic material are thermally seamed and that prior to any field seaming, the installer overlaps the liners four to six inches. The subcontractor installing the liner shall minimize the number of field seams and corners and irregularly shaped areas. Enduring will only hire qualified personnel to perform field welding and testing.

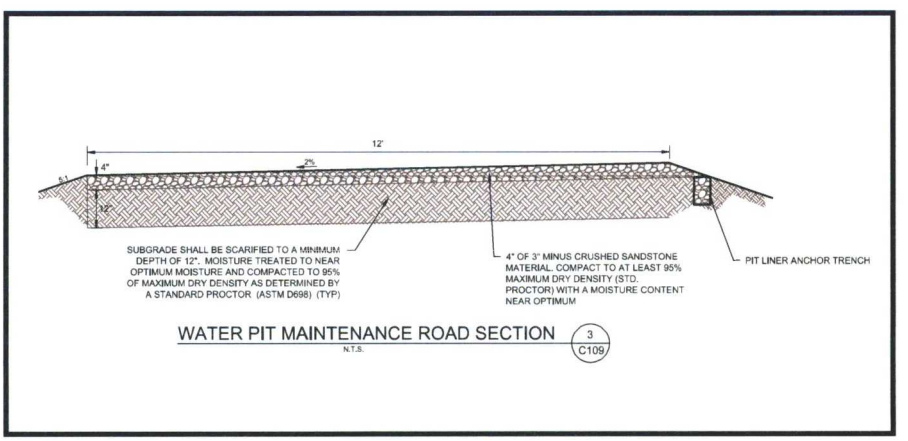
Enduring shall install manufacturer recommended DrainTube gas ventilation geocomposite grid produced by Afitex Texel. This layer is intended to vent in situ gases that have potential to create "whale" in the produced water pit that would decrease storage capacity. The product consists of a drainage layer and a filter layer comprised of short synthetic staple fibers of 100% polypropylene needle-punched together with perforated corrugated polypropylene pipes regularly spaced, up to 4 pipes per meter, inside. The pipes have two perforations per corrugation at 180 degrees and alternating at 90 degrees. https://www.draintube.net/docs/en/download/technical_data_sheet/draintube_300p_st_series_fos.pdf

The liner system shall be anchored as designed in a 2 FT x 2.5 FT anchor trench and topped with 6 inches of road base.

At the point of discharge into or suction from the recycling containment, Enduring will insure that the liner is protected from excessive hydrostatic force and potential mechanical damage. External discharge and/or suction lines will not penetrate the liner.

4.3. Leak Detection System

Enduring shall place a leak detection system between the upper and lower geomembrane liners that shall consist of a 200-mil genet to facilitate drainage. The leak detection system shall consist 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. A 3 foot wide by 3 foot long by 2 foot deep depression will be contracted to allow for collection of any leaking liquid. A 4 inch PVC liner will be installed in between the primary and secondary liners from the top of the tank to the depression to allow for detection and removal of liquid.



4.4. Signage

Enduring will sign the containment with an upright sign no less than 12″ by 24″ with lettering not less than 2″ in height in a conspicuous place near the containment. Enduring will provide the operator's name, location of the containment by quarter-quarter or unit letter, Section, Township, Range and emergency telephone numbers.

4.5. Entrance Protection

Enduring will surround the containment with an eight foot chain link fence. All gates leading in and out of the containment will be closed and locked when personnel are not on-site. The fencing will be kept in good repair, and shall be inspected as part of the weekly inspection performed at the containment facility.

4.6. Wildlife Protection

Enduring will install a bird deterrent system pursuant to the attached *Migratory Bird Mitigation Plan*. The containment will be inspected weekly for dead migratory birds and will be reported accordingly.

5. Maintenance and Operating Plan

In accordance with Rule 19.15.34 the following information describes the operation and maintenance of recycling containments on Enduring's locations.

5.1. Inspection Timing

Enduring shall inspect the recycling containment and associated leak detection systems weekly while it contains fluids. A current log of inspections will be maintained and the log will be made available for review upon division request. If fluids are found in the sump, a primary liner test utilizing the Dipole Method - Water Covered Geomembrane (ASTM D7007) will be conducted. In addition to human monitoring the pond fluid level will be determined via two (2) hydrostatic pressure gauges and a float gauge. At a fluid height of 22′, an automated valve will close and prevent any more fluid from entering the containment.

5.2. Maintenance

1. Enduring shall maintain and operate the recycling containment as follows:
   A. Removing any visible lay of oil from the surface of the containment.
   B. Maintaining at least 3′ of freeboard at each containment
   C. The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets, or impact from installation and removal of hoses and pipes
   D. If the containment's primary liner is compromised above the fluid's surface, Enduring will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension from the division district office.

E. If the primary liner is compromised below the fluid's surface, Enduring will remove all fluid above the damage or leak within 48 hours of discovery, notify the divisions distraction office and repair the damage or replace the primary liner.
F. The containment will be operated to prevent the collection of surface water run-on with containment walls of 9.5' height.
G. Enduring will install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.
H. Enduring will not store or discharge any hazardous waste at the facility or within the containment.

5.3. Cessation of Operations

Enduring will report the cessation of operations or if less than 20% of the total fluid capacity is used every six months following the first withdrawal of produced water for use to the appropriate division district office. If additional time is needed for closure, Enduring will request an extension from the appropriate division district office prior to the expiration of the initial six month time period.

6. Closure Plan

In accordance with Rule 19.15.34 the following information describes the closure requirements of recycling containments on Enduring's locations.

All closure activities will include proper documentation and be available for review upon request and will be submitted to the OCD within 60 days of closure. Closure report will be filed on C-147 and incorporate the following:

- Details on capping and covering, where applicable
- Inspection Reports
- Sampling Results

Once Enduring has ceased operations, all fluids will be removed within 60 days and the containment shall be closed within six months.

6.1 Fluid Removal

The containment will be closed by first removing all fluids, contents and synthetic liners and disposed of in a division-approved facility or recycle, reuse or reclaim the liquids in a manner that the appropriate division district office approves.

6.2 Soil Sampling

Enduring will test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I below:

Components	Test Method	51' - 100' GW Depth Limit (mg/kg)	>100' GW Depth Limit (mg/kg)
Chloride	EPA 300.0	10,000	20,000
TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500	2,500
GRO + DRO	EPA SW-846 Method 8015M	1,000	1,000
BTEX	EPA SW-846 Method 8021B or 8260B	50	50
Benzene	EPA SW-846 Method 8021B or 8260B	10	10

a. If any containment concentration is higher than the parameters listed in Table I, Enduring will receive approval before proceeding with closures as the division may required additional delineation upon review of the results.
b. If all contaminant concentrations are less than or equal to the parameters listed in Table I then Enduring will proceed to backfill with non-waste containing, uncontaminated, earthen material.

6.3 Reclamation

The topsoil and subsoil will 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.

Enduring will reclaim and reseed the recycling containment area pursuant to the requirements listed in 19.15.34.14. Once Enduring has closed the recycling containment, we will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area and matches the existing grade. Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to prevent ponding and erosion. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment. Enduring will restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

Reclamation of all disturbed areas no longer in use shall be considered completed when 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 plug 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.

The re-vegetation and reclamation obligations imposed by federal, state trust land or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of any operator subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment. Enduring will notify the OCD district office when reclamation and revegetation have been completed.

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)

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

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
SJ 00061		SJ	RA	3	3	3	32	27N	06W	276278	4044923*	445	301	144
SJ 00062		SJ	RA	3	3	3	32	27N	06W	276278	4044923*	452	301	151
SJ 00213		SJ	RA	4	4	1	32	27N	06W	276897	4045750*	1308	485	823
SJ 02403		SJ	RA	3	1	3	30	27N	06W	274714	4047115*	505	300	205
SJ 03001		SJ	RA	1	2	2	07	27N	06W	276165	4052831*	141	41	100
SJ 04031 POD1		SJ	RA	4	4	2	12	27N	06W	284287	4052043	515	224	291

Average Depth to Water: **275 feet**
Minimum Depth: **41 feet**
Maximum Depth: **485 feet**

Record Count: 6

PLSS Search:

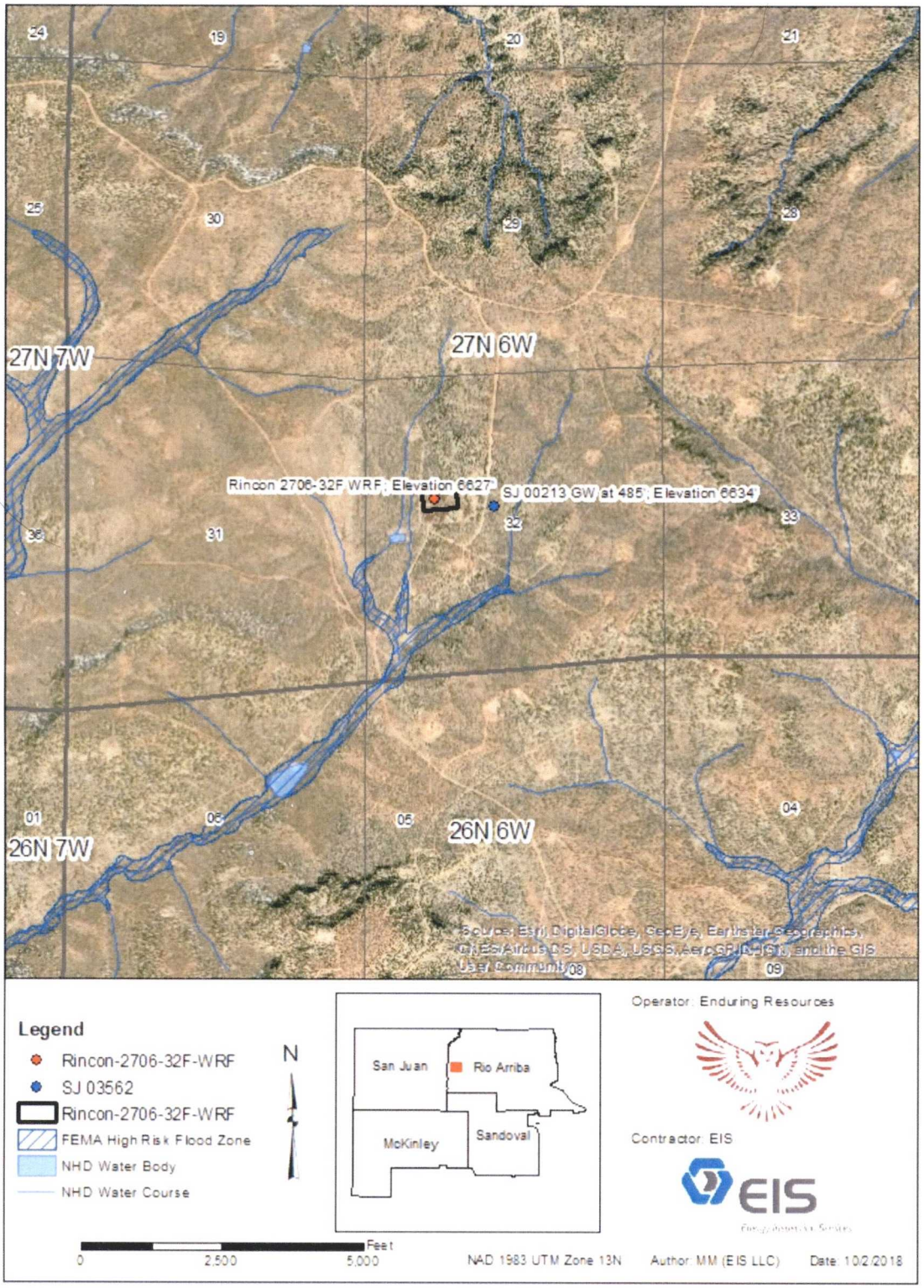
Township: 27N **Range:** 06W

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

10/2/18 9:48 AM

WATER COLUMN/ AVERAGE DEPTH TO WATER

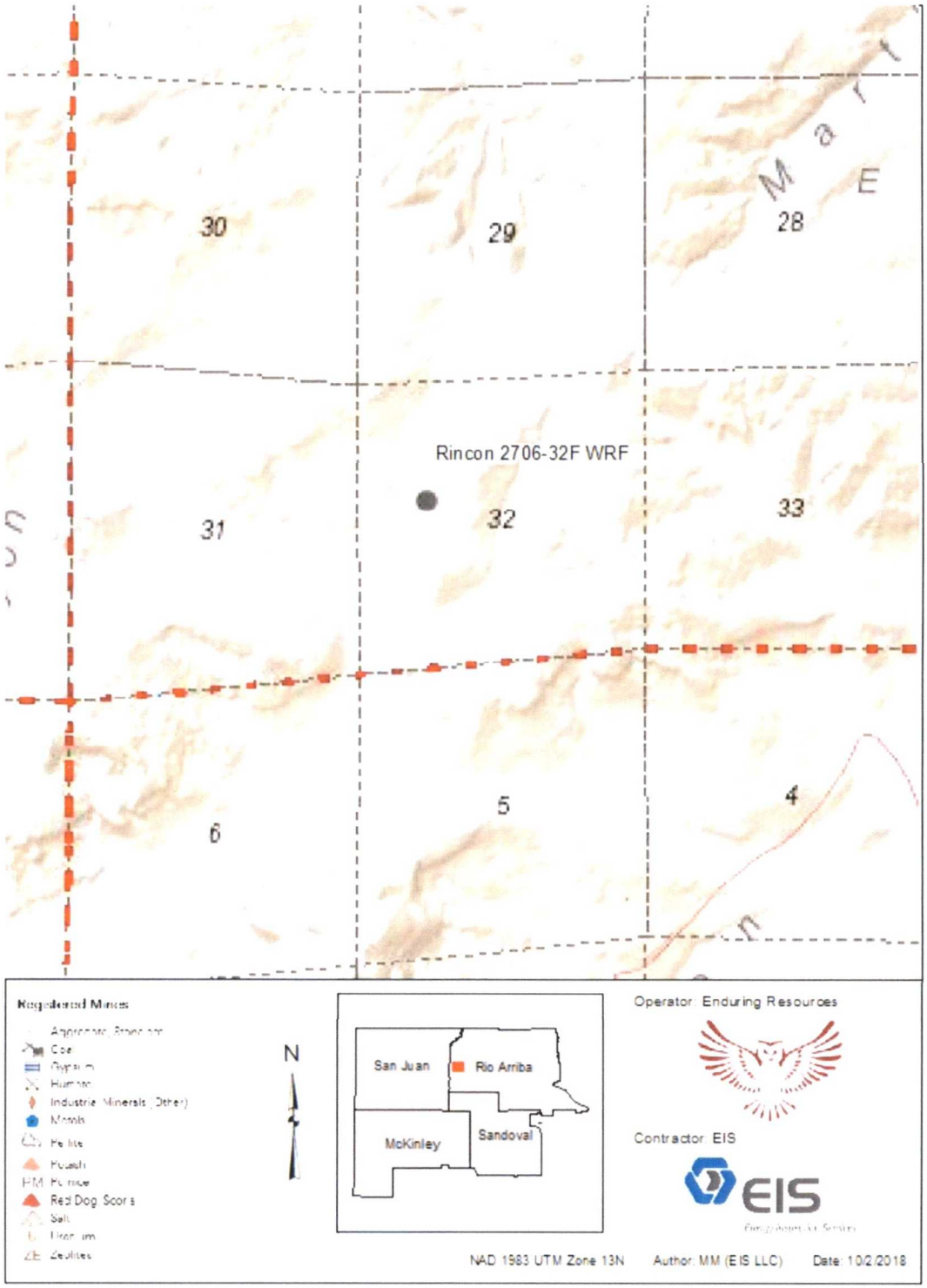
8. Aerial Map


24
19
20
21
25
30
29
28
27N 7W
27N 6W
Rincon 2706-32F WRF, Elevation 6627
SJ 00213 GW at 485', Elevation 6634
36
31
32
33
01
06
05
04
26N 7W
26N 6W
08
09
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Legend
Rincon-2706-32F-WRF
SJ 03562
Rincon-2706-32F-WRF
FEMA High Risk Flood Zone
NHD Water Body
NHD Water Course
N
San Juan
Rio Arriba
McKinley
Sandoval
Operator: Enduring Resources
Contractor: EIS
EIS
Feet
0
2,500
5,000
NAD 1983 UTM Zone 13N
Author: MM (EIS LLC)
Date: 10/2/2018

9. Topo Map


27N 7W
27N 6W
26N 7W
26N 6W
Rincon 2706-32F WRF; Elevation 6627'
SJ 00213 GW at 485'; Elevation 6634'
Copyright © 2013 National Geographic Society, i-cubed.
Legend
Rincon-2706-32F-WRF
SJ 03562
Rincon-2706-32F-WRF
FEMA High Risk Flood Zone
NHD Water Body
NHD Water Course
N
San Juan
Rio Arriba
McKinley
Sandoval
Operator: Enduring Resources
Contractor: EIS
0
2,500
5,000
Feet
NAD 1983 UTM Zone 13N
Author: MM (EIS LLC)
Date: 10/2/2018

10. Mines Mills Map



11. FEMA MAP


Rincon 2706-32F WRF
AREA OF MINIMAL FLOOD HAZARD
Zone X
N
San Juan
Rio Arriba
McKinley
Sandoval
Operator: Enduring Resources
Contractor: EIS
NAD 1983 UTM Zone 13N
Author: MM (EIS LLC)
Date: 10/2/2018

12. HYDROLOGY REPORT

Hydrogeological report for Rincon 2706-32F

Regional Hydrogeological context:

The San Jose Formation of Eocene age occurs in New Mexico and Colorado, and its outcrop forms the land surface over much of the eastern half of the central basin. It overlies the Nacimiento Formation in the area generally south of the Colorado-New Mexico State line and overlies the Animas Formation in the area generally north of the State line.

The San Jose Formation was deposited in various fluvial-type environments. In general, the unit consists of an interbedded sequence of sandstone, siltstone, and variegated shale. Thickness of the San Jose Formation generally increases from west to east (200 feet in the west and south to almost 2,700 feet in the center of the structural basin).

Ground water is associated with alluvial and fluvial sandstone aquifers. Thus, the occurrence of ground water is mainly controlled by the distribution of sandstone in the formation. The distribution of such sandstone is the result of original depositional extent plus any post-depositional modifications, namely erosion and structural deformation. Transmissivity data for San Jose Formation are minimal. Values of 40 and 120 feet squared per day were determined from two aquifer tests (Stone et al, 1983, table 5). The reported or measured discharge from 46 water wells completed in San Jose Formation ranges from 0.15 to 61 gallons per minute and the median is 5 gallons per minute. Most of the wells provide water for livestock and domestic use.

The San Jose Formation is a very suitable unit for recharge from precipitation because soils that form on the unit are sandy and highly permeable and therefore readily adsorb precipitation. However, low annual precipitation, relatively high transpiration and evaporation rates, and deep dissection of the San Jose Formation by the San Juan River and its tributaries all tend to reduce the effective recharge to the unit.

Stone et al., 1983, Hydrogeology and Water Resources of the San Juan Basin, New Mexico: Socorro, New Mexico Bureau of Mines and Mineral Resources Hydrologic Report 6, 70 p.

Enduring Resources, LLC's

Recycling Containment
Migratory Bird Mitigation Plan

Enduring Resources, LLC (Enduring) is proposing this Migratory Bird Mitigation Plan (Mitigation Plan) in compliance with the New Mexico Oil Conservation Division (NMOCD) Rule 19.15.34.12.E Enduring shall ensure that the recycling containment is protective of wildlife by implementing the following proposed Mitigation Plan. Enduring employees will inspect the containment weekly 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. This Mitigation Plan will utilize a combination of visual and audio deterrents to discourage wildlife, particularly birds and bats, from the recycling containment in order to mitigate potential impacts. This Mitigation Plan would be implemented while the Recycling Containment is active and in use, as to not desensitize birds to the deterrents.

The following mitigations will be implemented to reduce any wildlife impacts that may occur from the Recycling Containment:

- The following visual bird deterrents will be installed (Appendix A):
    - Bird-X Prowler Owl decoys will be installed at all four corners of the Containment.
    - Scare-Eye Balloons will be installed along the perimeter of the Containment.
- A Bird-X BroadBand PRO System will be installed at the Containment facility. It utilizes sonic (naturally-recorded bird destress calls & predator cries) to deter birds; as well as, ultrasonic high-frequency sound waves to deter bats. Bird propane cannons were avoided, so as not to disturb other wildlife species.
- The containment will be inspected on a monthly basis when water is present in the containment. All inspectors will insure the containment is receiving only filtered produced water with no hydrocarbons, as well as being trained to inspect the premises for, and respond to any wildlife incident, should it occur.
- Inspection will include:
    - An inspection of the filtration system and all visual and audio deterrents to insure they are in working order and functioning properly.
    - A thorough search of the entire containment facility, and just beyond, for the presence of any wildlife (entrapped, injured, dead, etc.).
- In the event a wildlife incident should occur, James McDaniel with Enduring will be contacted immediately and he will notify the appropriate wildlife agency and division district office. Enduring, appropriate wildlife agency, and division district office will then work collaboratively to address the incident appropriately to insure the incident does not reoccur.

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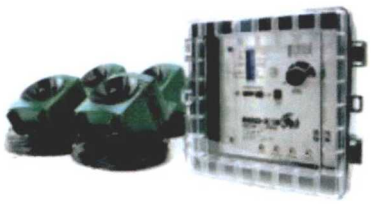

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Backed by our 30 Day Electronics Performance Satisfaction Guarantee AND our 6-Month Manufacturer's Warranty Against Material Defects

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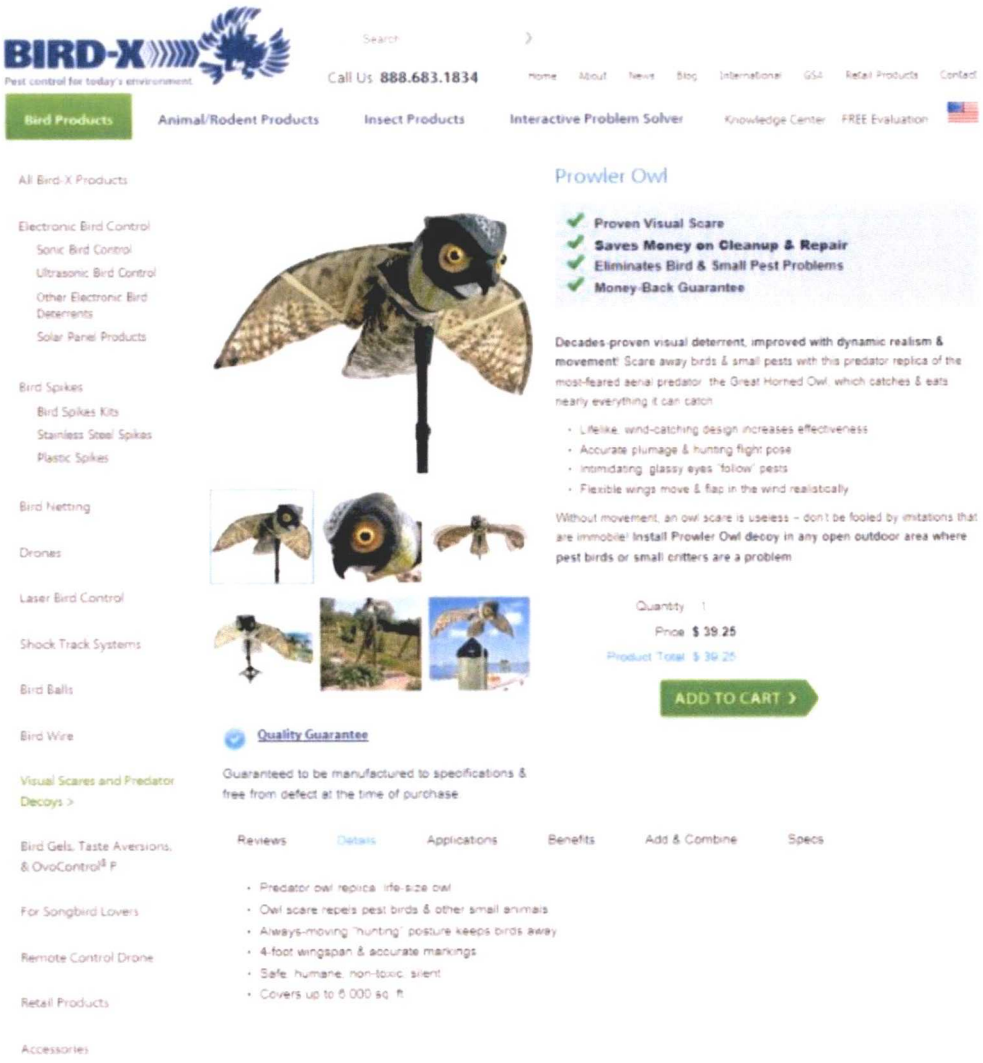
- 4 speakers included – 4 independent speakers with 100 ft. of wire each
- Fully programmable – control volume, sound delays, & daylight / night operation
- Weather resistant – NEMA type box is designed to withstand outdoor use
- Option to add an assortment of three (3) high-quality visual scare products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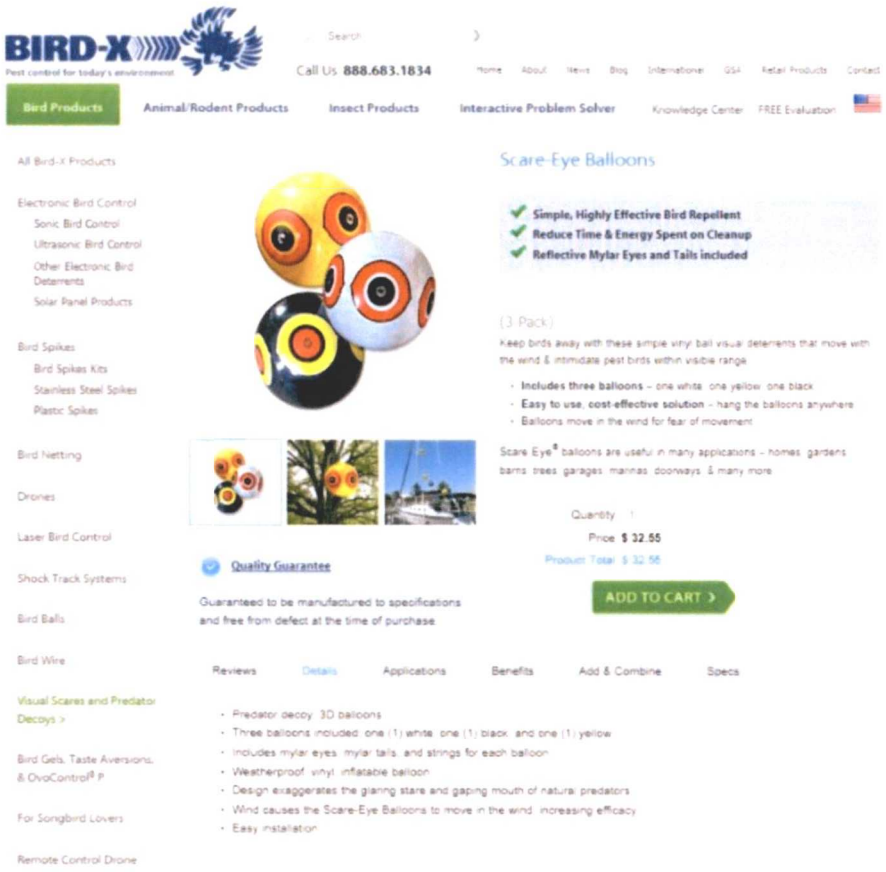
Stainless Steel Spikes
Plastic Spikes
Bird Netting
Drones
Laser Bird Control
Shock Track Systems
Bird Balls
Bird Wire
Visual Scares and Predator Decoys >
Bird Gels, Taste Aversions, & OvoControl® P
For Songbird Lovers
Remote Control Drone
Retail Products
Accessories
Prowler Owl
Proven Visual Scare
Saves Money on Cleanup & Repair
Eliminates Bird & Small Pest Problems
Money-Back Guarantee
Decades-proven visual deterrent, improved with dynamic realism & movement! Scare away birds & small pests with this predator replica of the most-feared aerial predator: the Great Horned Owl, which catches & eats nearly everything it can catch.
• Lifelike, wind-catching design increases effectiveness
• Accurate plumage & hunting flight pose
• Intimidating, glassy eyes "follow" pests
• Flexible wings move & flap in the wind realistically
Without movement, an owl scare is useless – don't be fooled by imitations that are immobile! Install Prowler Owl decoy in any open outdoor area where pest birds or small critters are a problem.
Quantity 1
Price $ 39.25
Product Total: $ 39.25
ADD TO CART >
Quality Guarantee
Guaranteed to be manufactured to specifications & free from defect at the time of purchase.
Reviews Details Applications Benefits Add & Combine Specs
• Predator owl replica: life-size owl
• Owl scare repels pest birds & other small animals
• Always-moving "hunting" posture keeps birds away
• 4-foot wingspan & accurate markings
• Safe, humane, non-toxic, silent
• Covers up to 6,000 sq. ft.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For Songbird Lovers
Remote Control Drone
Scare-Eye Balloons
Simple, Highly Effective Bird Repellent
Reduce Time & Energy Spent on Cleanup
Reflective Mylar Eyes and Tails included
(3 Pack)
Keep birds away with these simple vinyl ball visual deterrents that move with the wind & intimidate pest birds within visible range.
Includes three balloons – one white, one yellow, one black
Easy to use, cost-effective solution – hang the balloons anywhere
Balloons move in the wind for fear of movement
Scare Eye® balloons are useful in many applications – homes, gardens, barns, trees, garages, marinas, doorways, & many more.
Quantity 1
Price $ 32.55
Product Total $ 32.55
ADD TO CART
Quality Guarantee
Guaranteed to be manufactured to specifications and free from defect at the time of purchase.
Reviews
Details
Applications
Benefits
Add & Combine
Specs
Predator decoy, 3D balloons
Three balloons included: one (1) white, one (1) black, and one (1) yellow
Includes mylar eyes, mylar tails, and strings for each balloon
Weatherproof, vinyl, inflatable balloon
Design exaggerates the glaring stare and gaping mouth of natural predators
Wind causes the Scare-Eye Balloons to move in the wind, increasing efficacy
Easy installation

ATTACHMENT B - CONTAINMENT CONSTRUCTION PLANS

ENDURING RESOURCES
32F RECYCLING CONTAINMENT PIT PROJECT
CONSTRUCTION PLANS

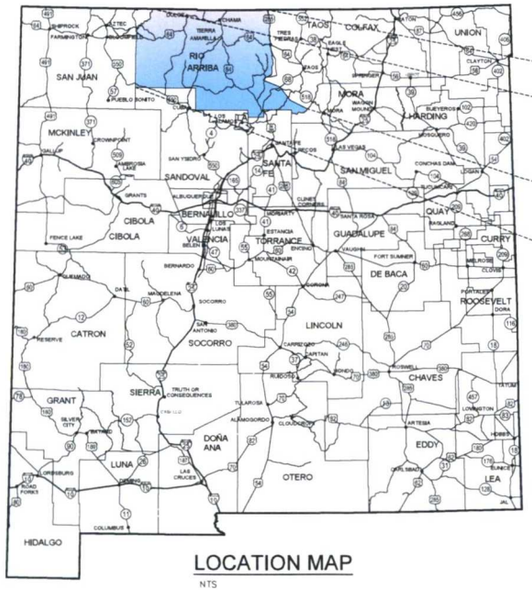
SITE CONTROL

CENTER OF PRODUCED WATER PIT Lat 36°31'53"N Long 107°29'44"W

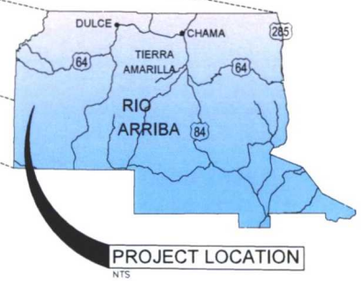
SECTION 32, TOWNSHIP 27 NORTH, RANGE 6 WEST, NEW MEXICO PRINCIPAL MERIDIAN,
RIO ABBRIBA COUNTY, NEW MEXICO

RIO ARRIBA COUNTY, NEW MEXICO
October 2018

PROJECT DESCRIPTION:
RINCON RECYCLING PIT



LOCATION MAP
NTS



NTS

VICINITY MAP
NTS

Sheet List Table

Sheet Number	Sheet Title
G100	COVER
G101	GENERAL NOTES AND LEGEND
C101	SITE MAP
C102	SITE GRADING AND DRAINAGE PLAN
C103	SITE PROFILE AND ACCESS ROAD PROFILE
C104	SITE CROSS-SECTIONS
C105	HORIZONTAL CONTROL PLAN
C106	LINER BALLAST TUBES AND PIT GEOCOMPOSITE VENTILATION GRID LAYOUT
C107	GEOCOMPOSITE DETAILS
C108	LINER AND BALLAST TUBE DETAILS
C109	LEAK DETECTION SYSTEM DETAILS
C110	ROAD AND DRAINAGE DETAILS
C111	CHAIN LINK SECURITY FENCE DETAILS
C112	SITE EROSION CONTROL PLAN
C113	SITE EROSION AND SEDIMENTATION CONTROL DETAILS

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION ON BEHALF OF SOUDER, MILLER & ASSOCIATES.

Heather D. McDaniel 10-9-2018

HEATHER D. MCDANIEL, P.E. NM #22047 DATE
PROJECT MANAGER

Rev #	Date	Description	By	Chk'd

SOUDER, MILLER & ASSOCIATES
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Lakewood, CO 80214
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GENERAL NOTES:

1. SIGNED AND SEALED CONSTRUCTION DRAWINGS ARE PREPARED BASED ON EXISTING SITE CONDITIONS AND REGULATIONS PER THE SEALED DATE ON THE PLANS. DUE TO POSSIBLE CHANGES TO THE SITE, CODES, REGULATIONS, UNDERGROUND UTILITIES, ETC. BETWEEN THE SEALED DATE ON THE PLANS AND DATE OF CONSTRUCTION COMMENCEMENT, THE DESIGN AND RECOMMENDATIONS PROVIDED ARE LIMITED TO THE SEALED DATE ON THE PLANS. IF CHANGES TO ANY SITE CONDITIONS AND/OR REGULATIONS OCCUR BEFORE THE PROJECT CONSTRUCTION DATE, THE OWNER SHALL NOTIFY ENGINEER OF SUCH CHANGES AND OBTAIN THE ENGINEER'S OPINION AS TO THE COMPLETENESS OF THE PLANS AND SPECIFICATIONS, ANY SUCH CHANGE IN FIELD CONDITIONS AND/OR REGULATIONS MAY REQUIRE ADDITIONAL DESIGN SERVICES AND COMMENSURATE FEE INCREASE TO ACCOMMODATE SUCH CHANGES.

2. CLARIFICATIONS AND/OR REQUESTS REGARDING PROJECT INTENT AND MODIFICATIONS SHALL BE SUBMITTED TO THE ENGINEER PRIOR OR DURING CONSTRUCTION IN A FORMAL WRITTEN REQUEST FOR INFORMATION (RFI). THE ENGINEER SHALL NOT BE HELD LIABLE IF RECOMMENDATION(S) ARE ALTERED BY OTHERS.

3. SITE CONDITIONS, EACH SUBCONTRACTOR DOING WORK ON THE PROJECT SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE SAFETY OF ALL PERSONS AND PROPERTY WITHIN THEIR WORK AREAS, DAY AND NIGHT, DURING BOTH WORKING AND NONWORKING HOURS; AND, SHALL PROVIDE ALL BARRICADES, SHORING, FLAG MEN, SIGNS, LIGHTING AND OTHER DEVICES REQUIRED THEREOF.

4. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR AND/OR REPLACEMENT OF ANY DAMAGE DETERMINED TO BE CAUSED BY THE CONSTRUCTION OF THIS PROJECT TO ROADS, FENCES, DRAINAGE'S, DRAINAGE STRUCTURES, UTILITIES, INCLUDING CONDUIT, WIRING, EQUIPMENT, AND FIBER-OPTICS. THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ALL DESTROYED OR DAMAGED SURFACE IMPROVEMENTS WITH IMPROVEMENTS EQUAL TO THOSE REMOVED.

5. STOCKPILING OF TOP SOIL: CONTRACTOR SHALL SEGREGATE AND STOCKPILE ALL TOPSOIL OUTSIDE OF THE CONSTRUCTION AREA WITH APPROPRIATE SEDIMENT CONTROL. TOP SOIL SHALL BE REDISTRIBUTED ON THE OUTSIDE OF CONSTRUCTED BERMS, AND EITHER SEEDED, AND MULCHED OR PROTECTED WITH EROSION CONTROL BLANKETS. REFER TO CONSTRUCTION PLANS FOR DETAILS.

6. ALL EXISTING TRAFFIC SIGNS, MILEPOST MARKERS AND DELINEATORS WITHIN CONSTRUCTION LIMITS SHALL BE REMOVED OR OFFSET BY THE CONTRACTOR AS DIRECTED BY THE OWNER'S DESIGNEE. INFORMATION SIGNS ARE TO BE OFFSET, AND ALL OTHERS ARE TO BE REMOVED. THIS WORK WILL BE INCLUDED IN THE UNIT BID PRICE FOR REMOVAL OF STRUCTURES AND OBSTRUCTIONS.

7. THE CONTRACTOR SHALL MAINTAIN REASONABLE ACCESS TO ALL ADJACENT PROPERTIES BY PROVIDING EASY RIDING CONNECTIONS TO TURNOUTS AND DRIVEWAYS AS DETERMINED ACCEPTABLE BY THE OWNER'S REPRESENTATIVE OR DESIGNEE. THIS WORK WILL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO MEASUREMENT OF PAYMENT WILL BE MADE THEREFORE.

8. THE CONTRACTOR IS HEREBY ADVISED THAT UTILITY RELOCATION BY UTILITY COMPANIES WILL BE DONE CONCURRENTLY WITH CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE FOR UTILITY WORK IN CONJUNCTION WITH CONSTRUCTION OPERATIONS AND SHALL COORDINATE THE SCHEDULING OF WORK WITH THE RESPECTIVE UTILITY COMPANIES IN ORDER TO AVOID DELAYS DUE TO UTILITY WORK. THE CONTRACTOR SHALL PROVIDE FOR THESE CONTINGENCIES WHEN BIDDING THE PROJECT. NO CLAIM FOR DELAYS DUE TO UTILITY WORK WILL BE ALLOWED.

9. THERE IS NO CONSTRUCTION CLEAR ZONE FOR THIS PROJECT. THE CONTRACTOR SHALL NOT STORE EQUIPMENT OR MATERIAL OUTSIDE OF THE PROJECT BOUNDARIES ON THIS PROJECT. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE. CONTRACTOR TO COORDINATE WITH OWNER ON SITE STORAGE.

10. EMERGENCY ACCESS SHALL REMAIN OPEN AT ALL TIMES.

11. THE CONTRACTOR WILL REMOVE AND PROTECT ROAD NAME SIGNS DURING CONSTRUCTION AND REPLACE AS SOON AS POSSIBLE AFTER CONSTRUCTION.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING AND CLEAN UP OF SPILLS ASSOCIATED WITH PROJECT CONSTRUCTION AND SHALL REPORT AND RESPOND TO SPILLS OF HAZARDOUS MATERIAL SUCH AS GASOLINE, DIESEL, MOTOR OILS, SOLVENTS, CHEMICALS, TOXIC AND CORROSIVE SUBSTANCES, AND OTHER MATERIALS WHICH MAY BE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPORTING PAST SPILLS ENCOUNTERED DURING CONSTRUCTION AND OF CURRENT SPILLS NOT ASSOCIATED WITH CONSTRUCTION. REPORTS SHALL BE MADE IMMEDIATELY TO THE ENVIRONMENTAL EMERGENCY SPILL REPORTING LINE AT 1-866-428-6535 AND TO THE OWNER'S REPRESENTATIVE OR DESIGNEE. ANY UNREPORTED SPILLS IDENTIFIED AFTER CONSTRUCTION AND ASSOCIATED WITH PROJECT CONSTRUCTION SHALL BE CLEANED UP BY THE CONTRACTOR IN ACCORDANCE WITH THE CONTRACT. THE CONTRACTOR SHALL BEAR THE FULL COST OF CLEANUP OF SUCH UNREPORTED SPILLS.

13. FINAL PAYMENT OF CONCRETE AND REINFORCING BARS SHALL BE BASED ON PLAN QUANTITIES. IF THE DESIGN IS REVISED DURING CONSTRUCTION OR IF A QUANTITY CHANGE IS REQUIRED DUE TO ERRORS ON THE PLANS, THE PAYMENT SHALL BE BASED ON COMPUTED FIELD QUANTITIES MEASURED TO NEAT LINES.

14. EXISTING FENCE, SIGNS AND OTHER ITEMS OF PRIVATE PROPERTY FOUND TO BE WITHIN THE RIGHT-OF-WAY ARE TO BE REMOVED AND REPLACED AT THE EDGE OF RIGHT-OF-WAY, BY THE CONTRACTOR. THIS WORK WILL BE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO MEASUREMENT OF PAYMENT WILL BE MADE THEREFORE.

15. THROUGHOUT THE LIFE OF THE PROJECT THE CONTRACTOR SHALL KEEP LOCAL OPERATORS AND LANDOWNERS INFORMED IN TIMELY FASHION AS DETERMINED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE, OF ANY LANE CLOSURES WHICH WILL RESTRICT THE NORMAL FLOW OF TRAFFIC. THERE WILL BE NO DIRECT PAYMENT FOR THIS WORK.

16. THE CONTRACTOR SHALL MAINTAIN UP TO DATE SETS OF AS-BUILT PLANS FOR THE PROJECT. THESE PLANS SHALL BE KEPT CURRENT, WITHIN FIFTEEN (15) DAYS, AT ALL TIMES AND SHALL BE SUBJECT TO REVIEW BY THE OWNER'S REPRESENTATIVE OR DESIGNEE THROUGHOUT THE PROJECT AND WILL BE REVIEWED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE FOR ACCURACY AND COMPLETENESS AT LEAST ONCE EVERY 15 DAYS. THE FINAL AS-BUILT PLANS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE OR DESIGNEE PRIOR TO FINAL PAYMENT.

17. ALL WORK IN THE VICINITY OF LIVE STREAMS, WATER IMPOUNDMENTS, WETLANDS OR IRRIGATION SUPPLIES SHALL BE AFFECTED IN SUCH A MANNER AS TO MINIMIZE VEGETATION REMOVAL, SOIL DISTURBANCE AND EROSION. CROSSINGS OF LIVE STREAMS WITH HEAVY EQUIPMENT SHALL BE MINIMIZED, AS DETERMINED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE. EQUIPMENT REFUELING, MAINTENANCE AND CEMENT DUMPING IN THE VICINITY OF WATER COURSES IS STRICTLY PROHIBITED AND SHALL BE PERFORMED IN PROPER CONTAINMENT AREAS.

18. TOPOGRAPHY SHOWN ON THESE PLANS IS ACCORDING TO FIELD LOCATION BY NCE SURVEYS, INC. JAMES C. EDWARDS P.L.S. #15269, DATED AUGUST 5, 2018 AND SEPTEMBER 26, 2018.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REMOVALS REQUIRED TO COMPLETE THE PROJECT. ADDITIONAL REMOVALS NOT SHOWN ON THE PLANS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE OR DESIGNEE. THIS WORK WILL BE CONSIDERED AS INCLUDED IN THE CONTRACT PRICE FOR REMOVAL OF STRUCTURES AND OBSTRUCTIONS AND THE CONTRACTOR WILL NOT RECEIVE ADDITIONAL COMPENSATION FOR UNLISTED REMOVALS.

20. UNSUITABLE CONSTRUCTION MATERIALS AND DEBRIS FROM CLEARING AND GRUBBING ARE TO BE PLACED IN AN ENVIRONMENTALLY SUITABLE DISPOSAL SITE.

21. UTILITY LOCATIONS SHOWN WITHIN THE PROJECT BOUNDARY ARE BASED UPON THE BEST AVAILABLE EVIDENCE, BUT THE POSITIONS ARE NOT WARRANTED TO BE ACCURATE. CONTACT UTILITY PROVIDERS BEFORE STARTING ANY EXCAVATION WORK. SHOULD CONFLICTING INFORMATION OR INTERFERENCE PROBLEMS APPEAR IN THE CONSTRUCTION DRAWINGS THE CONTRACTOR SHALL BRING THAT INFORMATION TO THE ATTENTION OF THE ENGINEER IMMEDIATELY PRIOR TO INSTALLATION. FAILURE TO DO SO SHALL NOT BE A BASIS OF EXTRA PAYMENT TO THE CONTRACTOR.

22. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR COMPLYING WITH NEW MEXICO ONE-CALL PROCEDURES. ANY DAMAGE TO EXISTING UTILITIES MUST BE IMMEDIATELY REPORTED TO THE APPROPRIATE UTILITY COMPANY.

23. NEW MEXICO 811 LOCATES SHALL BE FIELD VERIFIED BY THE CONTRACTOR THROUGH POTHOLING AND COORDINATION WITH UTILITY OWNER.

24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE RESPECTIVE UTILITY COMPANIES PRIOR TO GRADING OR TRENCHING.

25. THE CONTRACTOR SHALL REVIEW AND FOLLOW THE RECOMMENDATIONS PROVIDED IN THE "GEOTECHNICAL ENGINEERING REPORT W ESCAVADA UNIT & LOWRY CAMP RINCON FRACKING WATER PONDS, SANDOVAL & RIO ARRIBA COUNTIES, NEW MEXICO", PREPARED BY GEOMAT INC., DATED MAY 16, 2018, AND IN THE "GEOTECHNICAL ENGINEERING STUDY - ADDENDUM NO. 1 LOWRY CAMP RINCON UNIT FRACKING WATER POND SANDOVAL COUNTY, NEW MEXICO GEOMAT PROJECT NO. 182-2962" PREPARED BY GEOMAT INC., DATED OCTOBER 8, 2018 FOR MOISTURE CONTENT, MAXIMUM COMPACTED LIFT DEPTHS, AND MINIMUM COMPACTION REQUIREMENTS FOR THE PROJECT.

26. THE CONTRACTOR SHALL CONFORM TO ALL REQUIREMENTS SET FORTH BY THE TECHNICAL SPECIFICATIONS LOCATED IN THE PROJECT MANUAL.

27. TRENCHES DEEPER THAN 5' IN DEPTH MUST BE SHORED, SLOPED, OR SHIELDED PER OSHA REGULATIONS.

28. EARTHWORK ESTIMATES ARE BASED ON COMPACTED AND IN-PLACE MATERIAL. CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE REQUIRED MATERIAL AND HAUL ASSETS TO EMPLACE AND REMOVE THE CORRECT VOLUMES USING LOOSE SOIL CORRECTION FACTORS. NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.

29. PLACE AND COMPACT FILL IN HORIZONTAL LIFTS, USING EQUIPMENT AND PROCEDURES THAT WILL PRODUCE RECOMMENDED MOISTURE CONTENTS AND DENSITIES THROUGHOUT THE LIFT.

    UN-COMPACTED FILL LIFTS SHOULD NOT EXCEED 10 INCHES LOOSE THICKNESS.

    MATERIALS SHOULD BE COMPACTED TO THE FOLLOWING:

    MINIMUM PERCENT

MATERIAL	(ASTM D698)
LINER SUBGRADE	PER LINER MANUFACTURER'S RECOMMENDATIONS
SUBGRADE SOILS BENEATH FILL AREAS	95
ON SITE OR IMPORTED SOIL FILLS:	
BENEATH FOOTINGS AND SLABS ON GRADE	95
AGGREGATE BASE BENEATH SLABS AND PAVEMENTS	95
MISCELLANEOUS BACKFILL	90

    ON-SITE AND IMPORTED SOILS SHOULD BE COMPACTED AT MOISTURE CONTENTS NEAR OPTIMUM.
    EMBANKMENT FILLS SHOULD BE COMPACTED TO A MINIMUM 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 AT NEAR OPTIMUM MOISTURE CONTENT IN LIFTS NOT EXCEEDING 10-INCHES IN LOOSE THICKNESS.

30. BACKFILL MATERIALS TO BE PLACED UNDER CONCRETE SLABS SHALL COMPLY WITH ALL APPLICABLE TECHNICAL SPECIFICATIONS. EXPANSIVE TYPE SOILS ARE PROHIBITED AS BACKFILL MATERIALS.

31. THE EARTHWORK HAUL ON THIS PROJECT WILL BE CONSIDERED AS INCLUDED IN THE CONTRACT PRICE FOR UNCLASSIFIED EXCAVATION AND BORROW AS APPLICABLE, AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.

32. THE PROJECT WILL HAVE ALTERATION, VERIFICATION, AND SUBGRADE DENSITY TESTS COMPLETED BY A GEOTECHNICAL ENGINEERING COMPANY TO VERIFY COMPACTION. PROOF ROLLING WILL BE COMPLETED ALONG THE PROJECT SUBGRADE AND ANY SOFT SPOTS WILL BE REMOVED AND RECONSTRUCTED BEFORE THE CONTRACTOR BEGINS WORK.

33. NOTWITHSTANDING THE APPROVAL OF THESE GRADING PLANS, THE CONTRACTOR IS RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO ADJACENT PROPERTY. NO PERSON SHALL EXCAVATE ON LAND SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY SUCH PROPERTY FROM SETTLING, CRACKING, EROSION, SILTING, SCOUR OR OTHER DAMAGE, WHICH MIGHT RESULT FROM THE GRADING DESCRIBED ON THE PLAN.

34. SPECIAL CONDITION: IF ANY ARCHEOLOGICAL RESOURCES ARE DISCOVERED ON THE SITE OF THIS GRADING OPERATION, SUCH OPERATION WILL CEASE IMMEDIATELY, AND THE CONTRACTOR WILL NOTIFY THE OWNER'S REPRESENTATIVE.

35. ALL PROJECT LIMITS AND CONSTRUCTION AREAS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION AND/OR GRADING.

36. DURING ROUGH GRADING OPERATIONS AND PRIOR TO THE CONSTRUCTION OF ANY PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO CONTIGUOUS PROPERTIES.

37. NO OBSTRUCTION OF FLOOD PLAINS OR NATURAL WATER COURSES WILL BE PERMITTED.

38. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST CONTINUE TO FUNCTION DURING STORM CONDITIONS. PROTECTIVE MEASURERS AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT CONTIGUOUS PROPERTIES DURING GRADING OPERATIONS.

39. THE FINISHED GRADE SHALL BE SLOPED AWAY FROM ALL EXTERIOR BUILDING WALLS AND FACILITIES TO PROMOTE POSITIVE DRAINAGE AWAY FROM FOUNDATIONS.

40. RIO ARRIBA COUNTY SHALL BE NOTIFIED 72 HOURS PRIOR TO COMMENCING ANY WORK IN THE PUBLIC RIGHT OF WAY.

41. ROADWAY SECTION REPLACEMENT SHALL MEET CURRENT RIO ARRIBA STANDARDS FOR DEPTH OR MATCH EXISTING DEPTH, WHICHEVER IS THICKER.

42. RECORD DRAWINGS OR WORK COMPLETED SHALL BE SUBMITTED TO OWNER PRIOR TO FINAL ACCEPTANCE OF THE INSTALLATIONS.

43. IN THE EVENT A SERVICE OUTAGE IS REQUIRED, CONTRACTOR WILL NOTIFY ALL AFFECTED PARTIES WHEN AND HOW LONG THEY WILL BE WITHOUT SERVICE.

44. OWNER WILL ENSURE THAT ALL INSTALLED EROSION & SEDIMENTATION CONTROL MEASURES COMPLY WITH THEIR EXISTING ASSET STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

45. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED AND SHALL BE KEPT IN PLACE UNTIL EROSION AND SEDIMENTATION POTENTIAL IS MITIGATED. REMOVAL OF SILT AND SEDIMENT IS REQUIRED ONCE SILT AND SEDIMENT HAS REACHED HALF THE HEIGHT OF THE SILT FENCE. EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE CHECKED AND MAINTAINED PER THE OWNERS PERMIT.

46. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD.

47. THE CONTRACTOR SHALL COORDINATE STRUCTURAL DRAWINGS WITH OTHER DRAWINGS FOR INDIVIDUAL ITEMS. DISCREPANCIES UNCOVERED, IF ANY, SHALL BE REPORTED BEFORE PROCEEDING WITH THE WORK SO THAT PROPER ADJUSTMENT CAN BE MADE.

48. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE AND ADEQUATE SHORING FOR ALL PARTS OF THE PROJECT DURING CONSTRUCTION. ALL STRUCTURES SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED FOR STABILITY UNDER FINAL CONFIGURATION.

49. THE OWNER WILL PROVIDE CONSTRUCTION OBSERVERS AND MATERIAL TESTERS TO OBSERVE AND TEST ALL CONTROLLED EARTHWORK. THE CONSTRUCTION OBSERVERS AND MATERIAL TESTERS SHALL PROVIDE CONTINUOUS ON-SITE OBSERVATION AND TESTING DURING CONSTRUCTION OF CONTROLLED EARTHWORK. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION OBSERVERS AND MATERIAL TESTERS AT LEAST TWO WORKING DAYS IN ADVANCE OF ANY FIELD OPERATIONS OF THE CONTROLLED EARTHWORK.

50. CONTRACTOR SHALL COMPLY WITH ANY AND ALL CONDITIONS OF APPROVALS ISSUED BY THE REGULATORY AGENCIES AS DETERMINED BY OWNER.

51. ENGINEER HAS NO CONTROL OVER COST OF LABOR, MATERIALS, EQUIPMENT OR SERVICES FURNISHED BY OTHERS, COMPETITIVE BIDDING OR MARKET CONDITIONS.

52. OVERALL DIMENSIONS, TOPOGRAPHY ARE BASED UPON TOPOGRAPHIC SURVEY PROVIDED BY NCE SURVEYS ON AUGUST 5, 2018 AND SEPTEMBER 26, 2018, AND DESIGN IS BASED UPON THIS INFORMATION. THE RELATIVE BOUNDARIES SHOWN ON THESE PLANS ARE ACCORDING TO INFORMATION PROVIDED BY ENDURING RESOURCES AND INFORMATION PERTAINING TO THE MONUMENTATION PLANS FOR THIS PROJECT MAY BE OBTAINED BY THE OWNER. SPECIFIC BEARINGS AND BOUNDARY CORNERS TO LOCATE THE SITE WILL BE THE SOLE RESPONSIBILITY OF ENDURING RESOURCES.

OWNER

ENDURING RESOURCES
332 COUNTY ROAD 3100
AZTEC, NEW MEXICO, 87410
(505) 386-8887

CIVIL ENGINEER

HEATHER D. MCDANIEL, P.E.
SOUDER, MILLER & ASSOCIATES (SMA)
8000 WEST FOURTEENTH AVENUE
LAKEWOOD, COLORADO 80214
(303) 239-9011

SURFACE OWNER

ENDURING RESOURCES
332 COUNTY ROAD 3100
AZTEC, NEW MEXICO, 87410
(505) 386-8887

ABBREVIATIONS

CMP	CORRUGATED METAL PIPE	MIN.	MINIMUM
CU. FT.	CUBIC FEET	N.T.S.	NOT TO SCALE
CU. YD.	CUBIC YARDS	O.C.	ON CENTER
DIA.	DIAMETER (Ø)	RT.	RIGHT
ELEV.	ELEVATION	SQ. FT.	SQUARE FEET
EX	EXISTING	SQ. YDS.	SQUARE YARDS
FG	FINISH GRADE	STA.	STATION
FL	FLOWLINE	TOE	TOE OF BANK
FT	FEET	TOP	TOP OF BANK
HORIZ	HORIZONTAL	TYP	TYPICAL
LF	LINEAR FEET	w/	WITH
LLDPE	LINEAR LOW-DENSITY POLYETHYLENE		
LT.	LEFT		
MAX.	MAXIMUM		
ME	MATCH EXISTING		
MCC	MECHANICAL CONTROL CENTER		
MIL or MM	MILLIMETER		

LEGEND

- EXISTING POWERPOLE
- SSCO EXISTING CLEANOUT
- EXISTING WATER SPIGOT
- EXISTING ELECTRIC BOX
- OHE EXISTING OVERHEAD ELECTRIC
- EXISTING INDEX CONTOURS
- EXISTING INTERMEDIATE CONTOURS
- PROPOSED INDEX CONTOURS
- PROPOSED INTERMEDIATE CONTOURS
- PROPOSED DRAINAGE PIPE
- PROPOSED CHAIN LINK FENCE
- PROPOSED MAN WAY PEDESTRIAN GATE
- PROPOSED FLOWLINE

nm811 Know what's below. Call before you dig.

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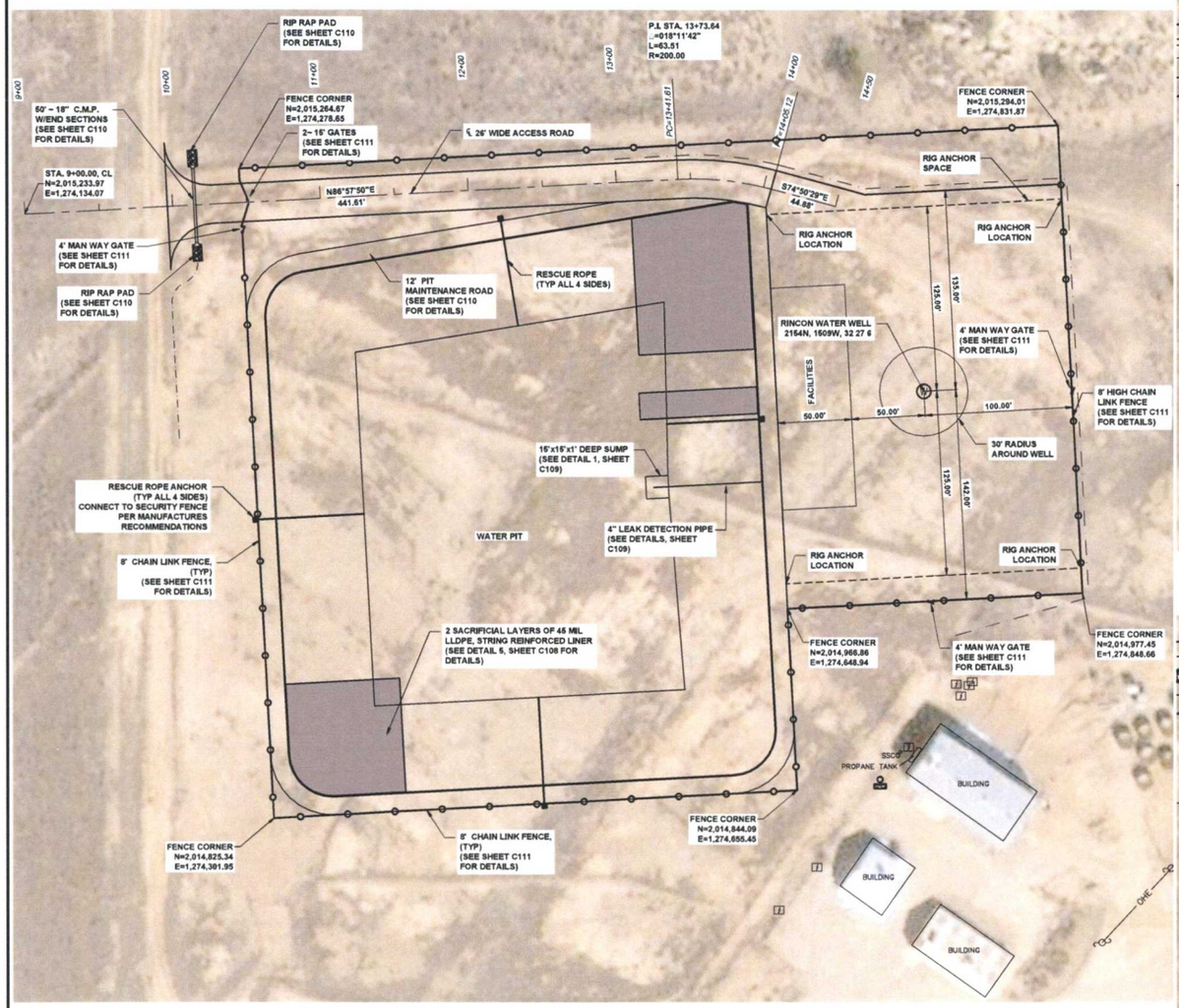
ENDURING RESOURCES — RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
GENERAL NOTES AND LEGEND

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED.

Designed	Drawn	Checked
HDM	JTN	HDM

Date: October 2018
Scale: Horiz: 1" = 60' Vert: N/A
Project No: 9127383
Sheet: G101

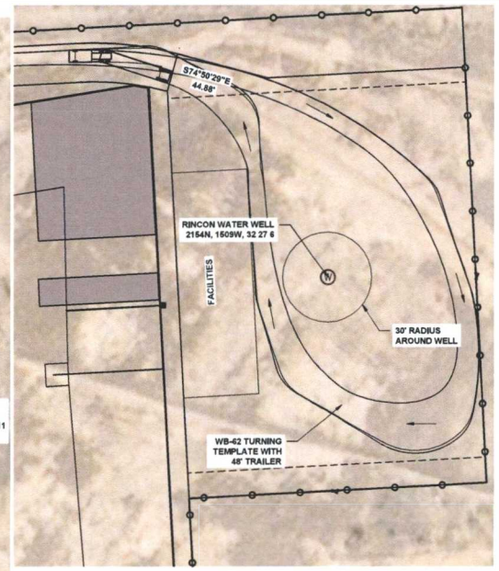


SITE MAP (1 / C101)

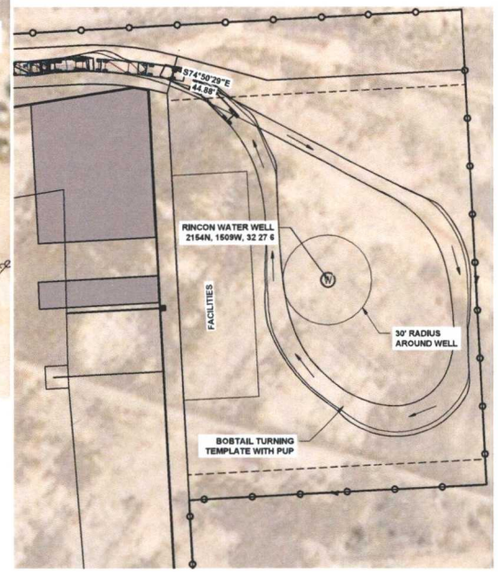
NOTE:
STOCKPILING OF TOP SOIL: CONTRACTOR SHALL SEGREGATE AND STOCKPILE ALL TOPSOIL OUTSIDE OF THE CONSTRUCTION AREA WITH APPROPRIATE SEDIMENT CONTROL. TOPSOIL SHALL BE REDISTRIBUTED ON THE OUTSIDE OF CONSTRUCTION BERMS, AND EITHER SEEDED AND MULCHED OR PROTECTED WITH EROSION CONTROL MEASURES. REFER TO CONSTRUCTION PLANS FOR DETAILS.

PROPOSED POND INFORMATION:

TOP OF BERM ELEVATION :	6605.00
MAXIMUM WATER SURFACE ELEVATION:	6601.67
MAXIMUM WATER SURFACE AREA (ELEV. 6602.00)	110,675 SQ. FT. (2.56 ACRES)
POND STORAGE VOLUME:	62,436 CU. YD. (300,226 BBLS)



WB-62 TURNING TEMPLATE (2 / C101)



BOBTAIL AND PUP TURNING TEMPLATE (3 / C101)

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ENDURING RESOURCES
RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE MAP

Professional Engineer — State of New Mexico — 22047 — 12-9-2018

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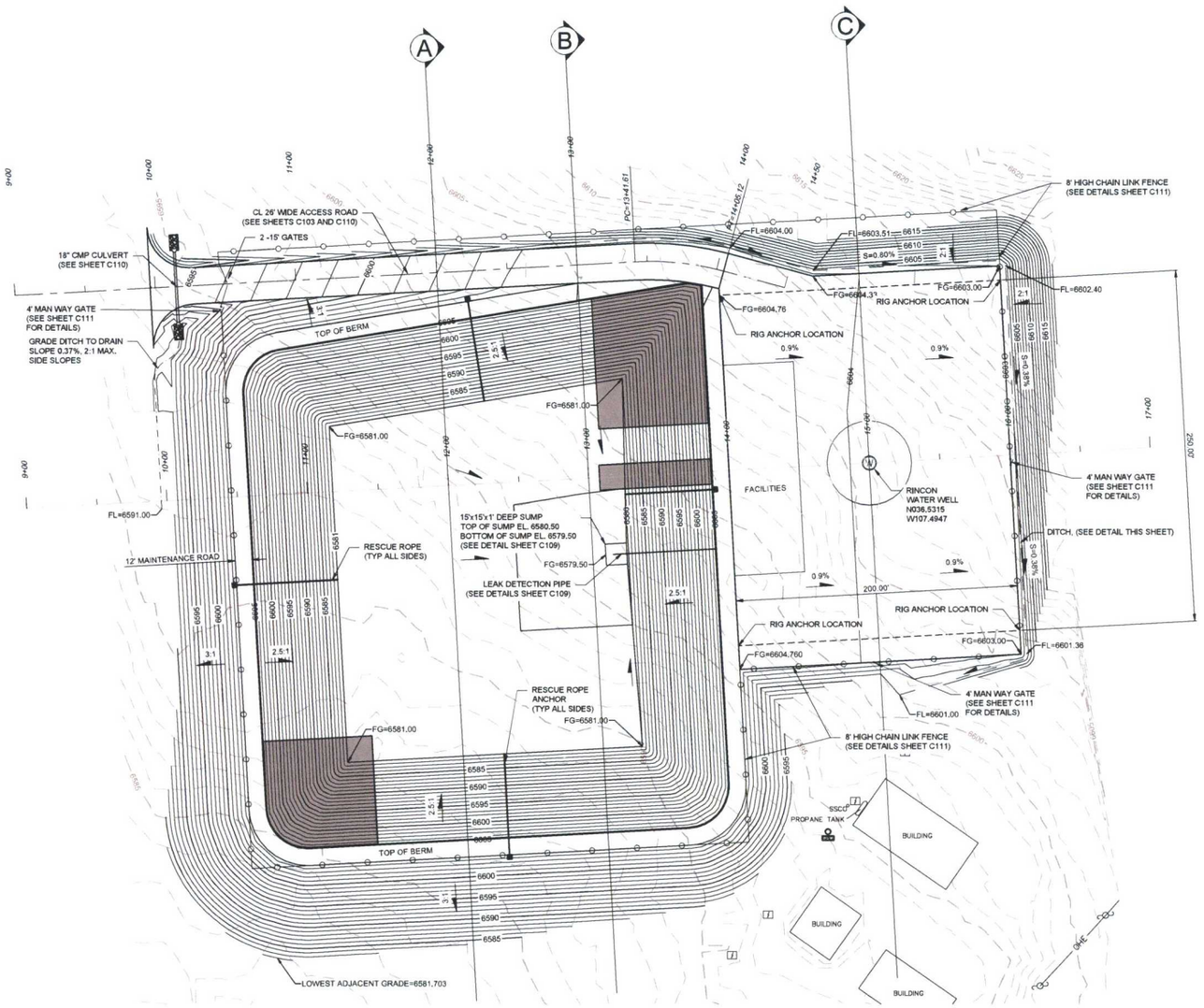
Designed	Drawn	Checked
HDM	JTN	HDM

Date: October 2018
Scale: Horiz: 1" = 40' Vert: N/A
Project No: 9127383
Sheet: C101



0 40' 80'
SCALE: 1" = 40'

NOTE:
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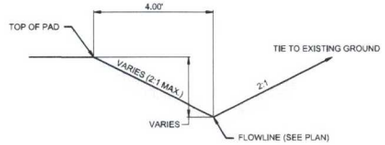

TYPICAL DITCH SECTION (1 / C102)
N.T.S.

PROPOSED SITE EARTHWORK:

APPROXIMATE CUT:	44757 CU.YD.
APPROXIMATE FILL:	31500 CU.YD.
APPROXIMATE NET CUT:	13257 CU.YD.

On-Site Drainage	Area (ACRES)	NRCS Soil Types	Percent Imperviousness	Methodology for Analysis	Time of Concentration (MINUTES)	2-Year, 24-Hour Flow Rate (CFS)	5-Year, 24-Hour Flow Rate (CFS)	10-Year, 24-Hour Flow Rate (CFS)	25-Year, 24-Hour Flow Rate (CFS)	50-Year, 24-Hour Flow Rate (CFS)	100-Year, 24-Hour Flow Rate (CFS)	NOTE
Pre-Development Area	6.9	D	2	Rational Method	15.99	0.10	0.68	2.33	6.53	9.18	12.84	Historical
Post-Development Pad Area	3.7	D	50	Rational Method	23.3	1.77	2.74	3.74	5.57	6.86	8.45	Post Development

Rainfall Impact on Pit Freeboard			
Storm Event	Stormwater Volume (CF)	Pit Volume Increase (CF)	Impact on Freeboard (FT)
Maximum Storage	1,717,067.99	0	0.000
25-Yr, 24-Hr	12,856.59	1,729,919.58	0.110
50-Yr, 24-Hr	14,813.01	1,744,732.59	0.127
100-Yr, 24-Hr	16,956.00	1,761,688.59	0.145

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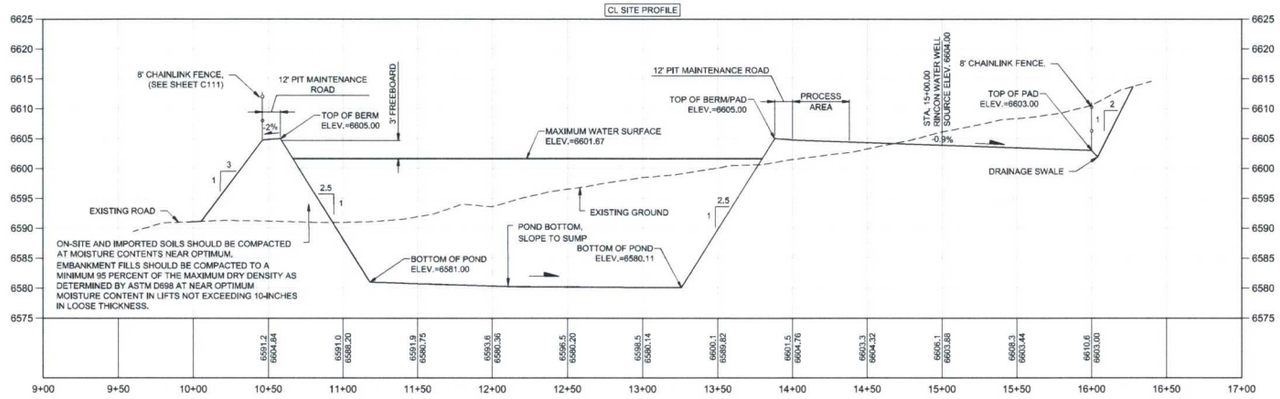
ENDURING RESOURCES — RIO ARRIBA COUNTY, NM

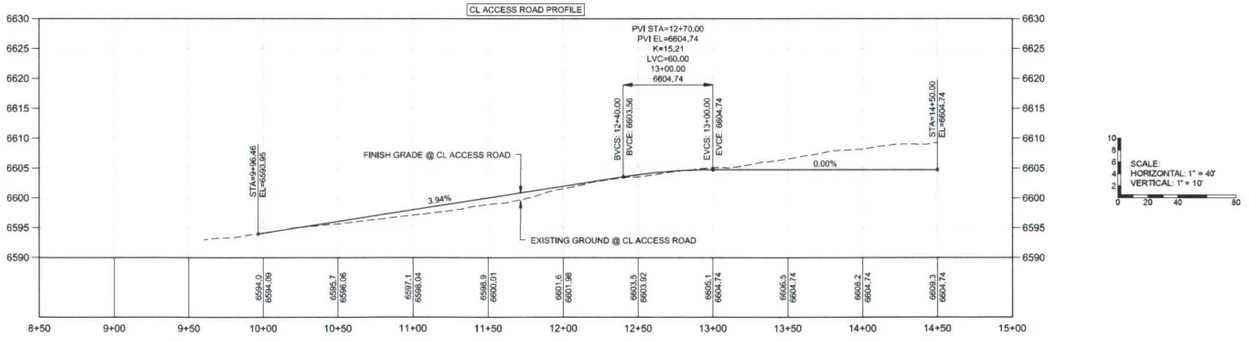
32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE GRADING AND DRAINAGE PLAN

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
HDM	JTN	HDM

Date: October 2018
Scale: Horiz: 1" = 60' Vert: N/A
Project No: 9127383
Sheet: C102





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ENDURING RESOURCES

RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE PROFILE AND ACCESS ROAD PROFILE

Rev #	Date	Description	By
			CMcd

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Designed	Drawn	Checked
HDM	JTN	HDM

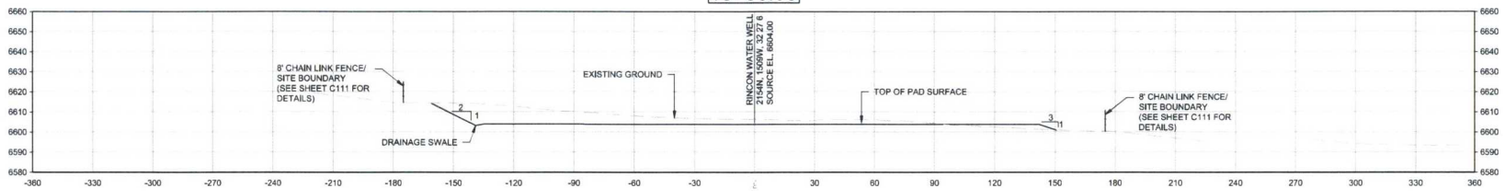
Date: October 2018

Scale: Horiz 1" = 40' Vert 1"=10'

Project No: 9127383

Sheet: C103

15+00.00



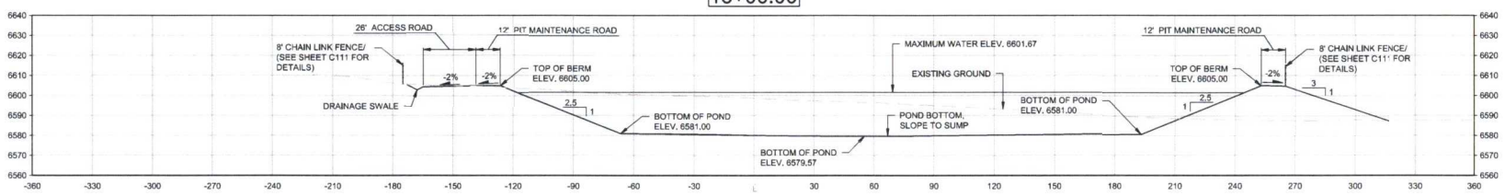
SECTION C
STA. 15+00

SCALE:
HORIZONTAL: 1" = 30'
VERTICAL: 1" = 30'

NOTE:

1. **ON-SITE AND IMPORTED SOILS SHOULD BE COMPACTED AT MOISTURE CONTENTS NEAR OPTIMUM. EMBANKMENT FILLS SHOULD BE COMPACTED TO A MINIMUM 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 AT NEAR OPTIMUM MOISTURE CONTENT IN LIFTS NOT EXCEEDING 10-INCHES IN LOOSE THICKNESS.**
2. **EXCESS CUT NOT USED IN CONSTRUCTION OF THIS SITE TO BE DISPOSED OF BY OWNER.**

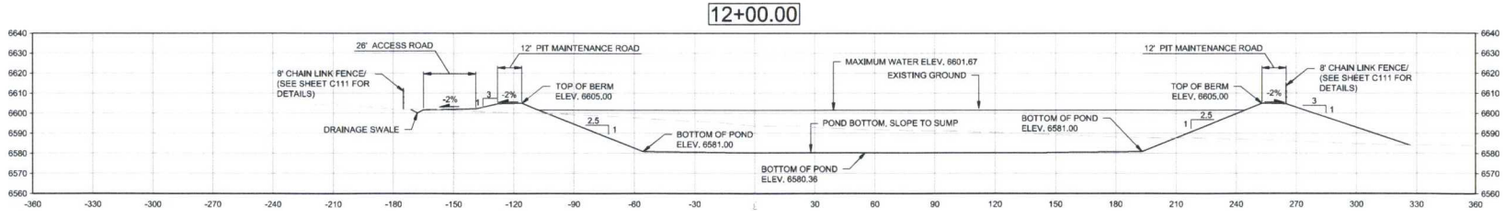
13+00.00



SECTION B
STA. 13+00

SCALE:
HORIZONTAL: 1" = 30'
VERTICAL: 1" = 30'

12+00.00



SECTION A
STA. 12+00

SCALE:
HORIZONTAL: 1" = 30'
VERTICAL: 1" = 30'

P:\5-Enduring Resources - 16B Pond Design (5127383)\CAD\Civil\RINCON\5127383 RNC CROSS SECTIONS.dwg, 10/9/2018 1:25:38 PM JTN

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ENDURING RESOURCES

RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE CROSS-SECTIONS

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

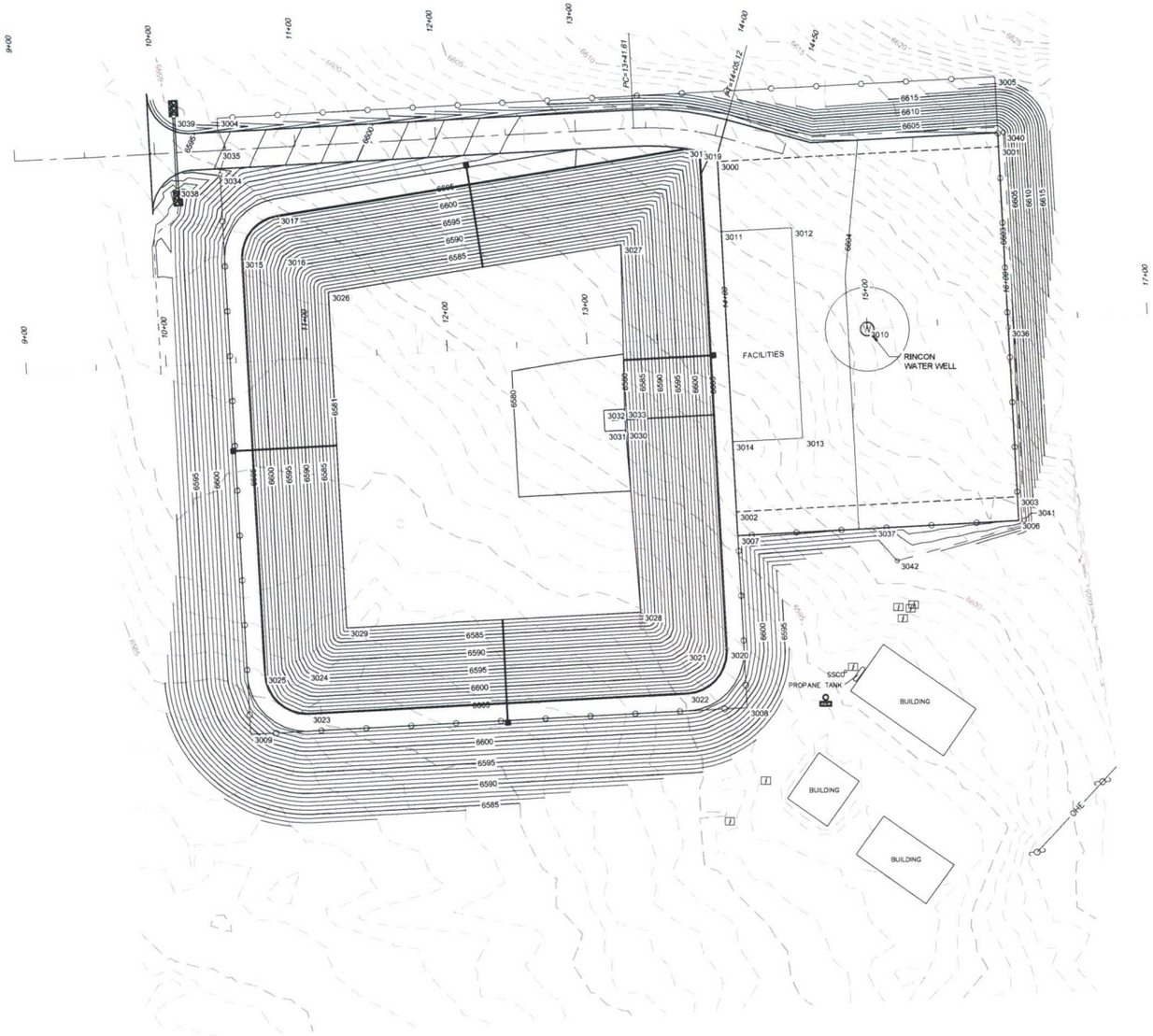
Designed	Drawn	Checked
HDM	JTN	HDM

Date: October 2018

Scale: Horiz: 1" = 30'
Vert: 1" = 30'

Project No: 9127383

Sheet: C104



0 40' 80'

SCALE: 1" = 40'

Point Table				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
3000	2015233.49	1274634.80	6604.76	RIG ANCHOR
3001	2015244.08	1274834.52	6603.00	RIG ANCHOR
3002	2014983.84	1274648.04	6604.76	RIG ANCHOR
3003	2014994.43	1274847.76	6603.00	RIG ANCHOR
3004	2015264.67	1274278.65	6596.14	FENCE CORNER
3005	2015294.01	1274831.87	6618.87	FENCE CORNER
3006	2014977.45	1274848.66	6603.00	FENCE CORNER
3007	2014966.86	1274648.94	6604.76	FENCE CORNER
3008	2014844.09	1274655.45	6598.86	FENCE CORNER
3009	2014825.34	1274301.95	6598.72	FENCE CORNER
3010	2015113.96	1274741.28	6603.88	WATER WELL
3011	2015183.56	1274637.45	6604.76	FACILITY
3012	2015186.20	1274687.38	6604.37	FACILITY
3013	2015036.42	1274695.32	6604.32	FACILITY
3014	2015033.77	1274645.39	6604.76	FACILITY
3015	2015164.09	1274296.00	6605.00	TOP OF POND
3016	2015165.68	1274325.96	6594.77	30' RADIUS POINT
3017	2015195.29	1274321.13	6605.00	TOP OF POND
3018	2015242.73	1274612.25	6605.00	TOP OF POND
3019	2015240.99	1274622.38	6605.00	TOP OF POND
3020	2014885.39	1274641.25	6605.00	TOP OF POND
3021	2014883.80	1274611.29	6595.07	30' RADIUS POINT
3022	2014853.84	1274612.88	6605.00	TOP OF POND
3023	2014839.54	1274343.25	6605.00	TOP OF POND
3024	2014869.50	1274341.67	6595.07	30' RADIUS POINT
3025	2014867.91	1274311.71	6605.00	TOP OF POND
3026	2015140.40	1274357.34	6581.00	PIT BOTTOM
3027	2015174.36	1274565.75	6581.00	PIT BOTTOM
3028	2014912.17	1274579.67	6581.00	PIT BOTTOM
3029	2014901.05	1274370.03	6581.00	PIT BOTTOM
3030	2015042.14	1274569.09	6579.50	TOP OF SUMP
3031	2015041.34	1274554.11	6579.50	TOP OF SUMP
3032	2015056.32	1274553.32	6579.50	TOP OF SUMP
3033	2015057.12	1274568.30	6579.50	TOP OF SUMP
3034	2015223.72	1274280.82	6596.00	GATE
3035	2015241.70	1274279.86	6595.91	GATE
3036	2015114.52	1274841.39	6603.00	GATE
3037	2014972.02	1274746.16	6603.90	GATE
3038	2015214.69	1274250.25	6591.51	18" CMP INVERT
3039	2015264.62	1274247.60	6592.01	18" CMP INVERT
3040	2015254.28	1274837.98	6602.40	FL DITCH
3041	2014977.67	1274852.66	6601.36	FL DITCH
3042	2014948.80	1274762.46	6601.00	FL DITCH

NOTE:
DATUM COORDINATES ARE NAD83, STATEPLANE, NEW MEXICO CENTRAL.

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ENDURING RESOURCES — RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
HORIZONTAL CONTROL PLAN

Professional Engineer — 22047 — 10-9-2018

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Designed	Drawn	Checked
HDM	JTN	HDM

Date: October 2018
Scale: Horiz: 1" = 40' Vert: N/A
Project No: 9127383
Sheet: C105

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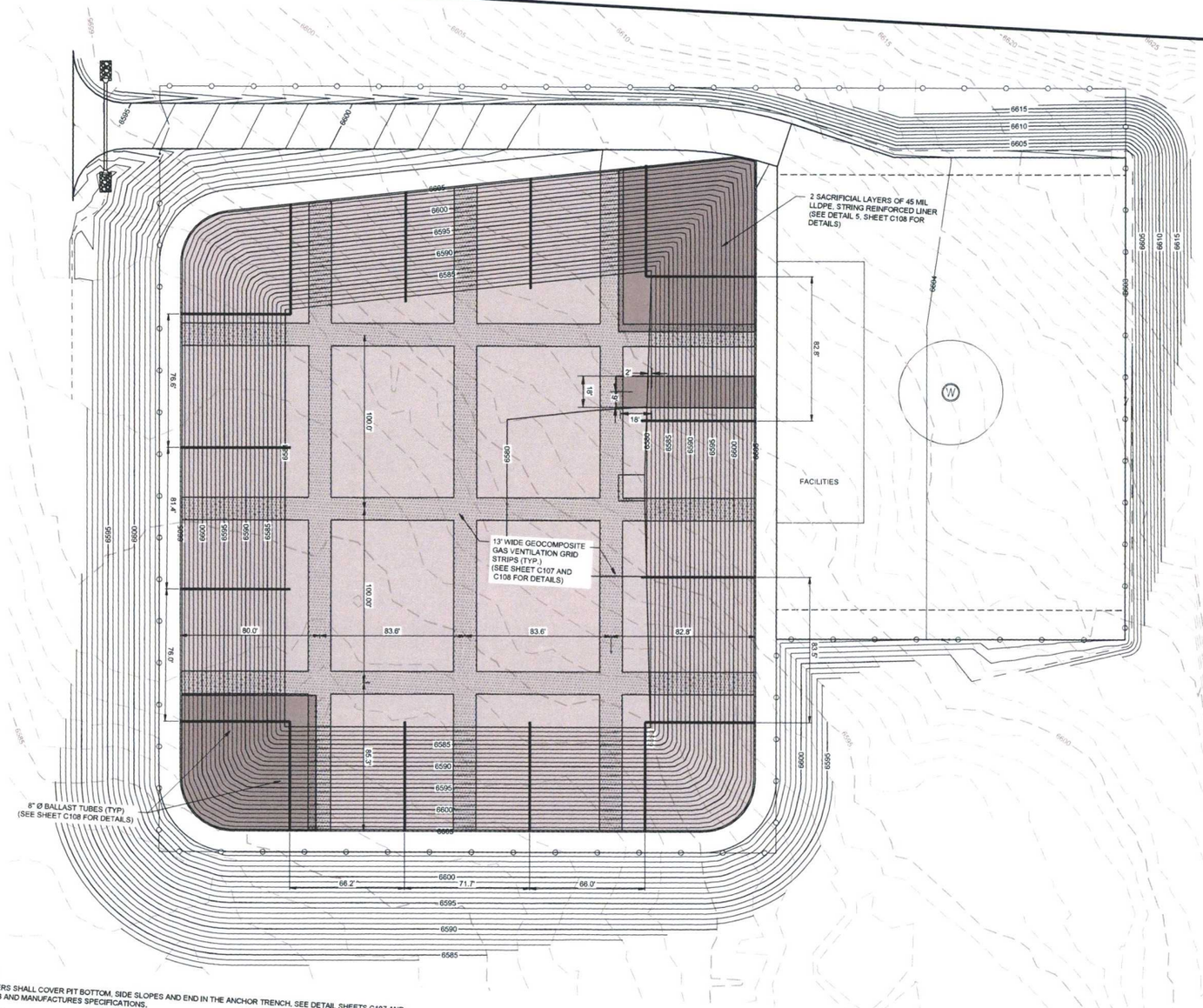

NOTES:

1. LINERS SHALL COVER PIT BOTTOM, SIDE SLOPES AND END IN THE ANCHOR TRENCH. SEE DETAIL SHEETS C107 AND C108 AND MANUFACTURES SPECIFICATIONS.
2. 8" Ø BALLAST TUBES SHALL BE PLACED EVERY 100'± AND SET 50' FROM THE PIT GEOCOMPOSITE GAS VENTILATION GRID WHERE POSSIBLE.
3. THE PIT GEOCOMPOSITE GAS VENTILATION STRIPS SHALL BE INSTALLED 100' PARALLEL AND 100' PERPENDICULAR TO EACH OTHER IN A GRID PATTERN ACROSS THE PIT, ENDING IN THE ANCHOR TRENCH. THEY SHALL BE PLACED 50' FROM THE 8" Ø BALLAST TUBES.

LEGEND

LINERS

8" Ø BALLAST TUBE

GEOCOMPOSITE GAS VENTILATION GRID STRIPS

QUANTITIES:

2~45 MIL LLDPE LINERS:	16,950 SQ.YDS. X 2 = 33,900 SQ.YDS.
2~45 MIL SACRIFICIAL LINERS:	2616 SQ. YDS. X 2 = 5,232 SQ.YDS.
CONDUCTIVE GEOCOMPOSITE LAYER	16,950 S.Y.
BALLAST TUBES:	934 LF
GEOCOMPOSITE VENTILATION GRID:	2,274 LF
ANCHOR TRENCH:	1,361 LF

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ENDURING RESOURCES
RIO ARRIBA COUNTY, NM

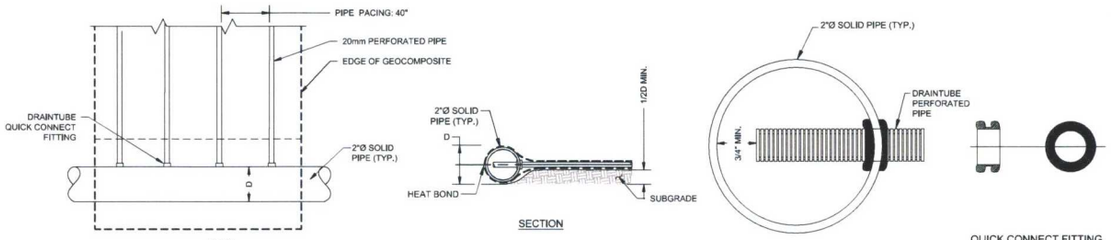
32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
LINER BALLAST TUBES AND PIT
GEOCOMPOSITE VENTILATION GRID LAYOUT

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
HDM	JTN	HDM

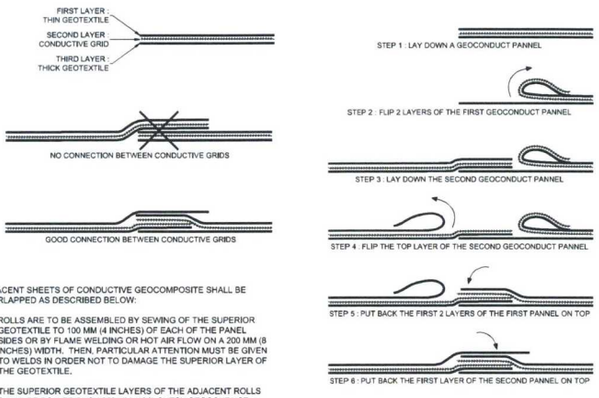
Date: October 2018
Scale: Horiz: 1" = 60'
Vert: N/A
Project No: 9127383
Sheet: C106

P:\5-Enduring Resources - 16B Pond Design (5127383)\CAD\Civil\RINCON\5127383 RNC LNR BLLST & GEOGRID.dwg, 10/9/2018 1:26:19 PM JTN



BERM VENT SIMPLE CONNECTION TO PIPE

N.T.S. (1 / C107)

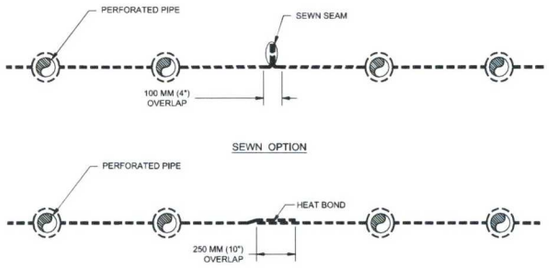


ADJACENT SHEETS OF CONDUCTIVE GEOCOMPOSITE SHALL BE OVERLAPPED AS DESCRIBED BELOW:

1. ROLLS ARE TO BE ASSEMBLED BY SEWING OF THE SUPERIOR GEOTEXTILE TO 100 MM (4 INCHES) OF EACH OF THE PANEL SIDES OR BY FLAME WELDING OR HOT AIR FLOW ON A 200 MM (8 INCHES) WIDTH. THEN, PARTICULAR ATTENTION MUST BE GIVEN TO WELDS IN ORDER NOT TO DAMAGE THE SUPERIOR LAYER OF THE GEOTEXTILE.
2. THE SUPERIOR GEOTEXTILE LAYERS OF THE ADJACENT ROLLS SHALL BE ROLLED BACK 250 MM (10 INCHES). GEOCONDUCT CONDUCTIVE GEOCOMPOSITE SHALL BE OVERLAPPED SUCH AS THE CONDUCTIVE GRIDS MUST BE IN DIRECT CONTACT ON A MINIMUM OF 200 MM (8 INCHES).

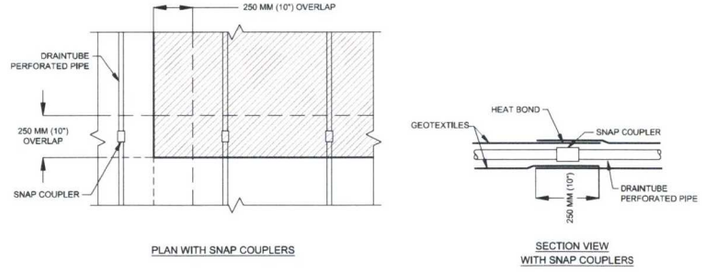
CONDUCTIVE GEOCOMPOSITE DETAILS

N.T.S. (2 / C107)



GAS VENTING GEOCOMPOSITE PANEL JOINING OPTIONS FOR SIDE

N.T.S. (3 / C107)



NOTE:
DETAILS SHOWN ON THIS PAGE ARE FOR COORDINATION PURPOSES ONLY AND PER MANUFACTURE.

GAS VENTING GEOCOMPOSITE PANEL JOINING OPTIONS FOR END

N.T.S. (4 / C107)

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ENDURING RESOURCES — RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
GEOCOMPOSITE DETAILS

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
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Date: October 2018
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Project No: 9127383
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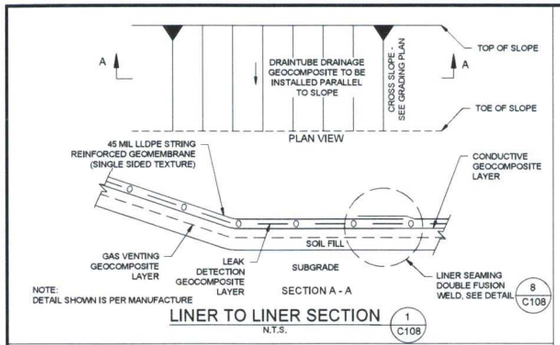
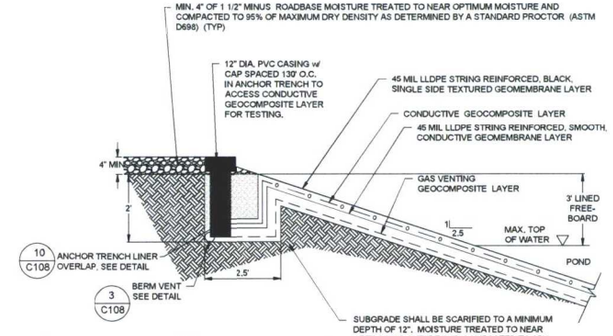
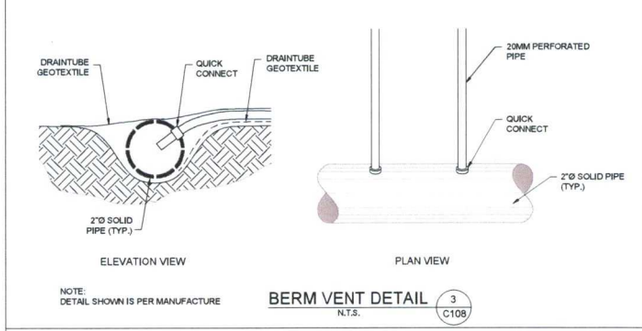


NOTE:
DETAIL SHOWN IS PER MANUFACTURE

LINER TO LINER SECTION (1 C108)
N.T.S.

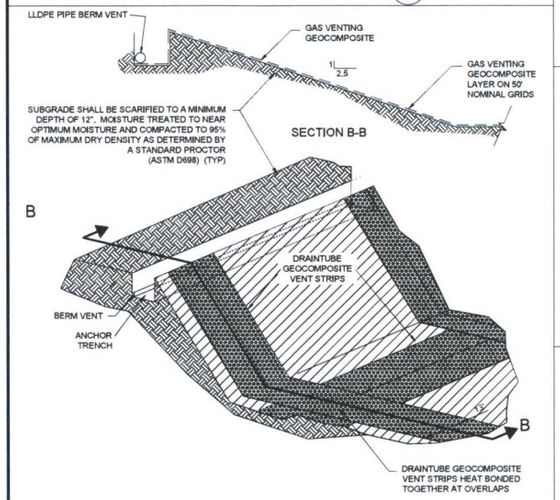


TYPICAL ANCHOR TRENCH DETAIL (2 C108)
N.T.S.

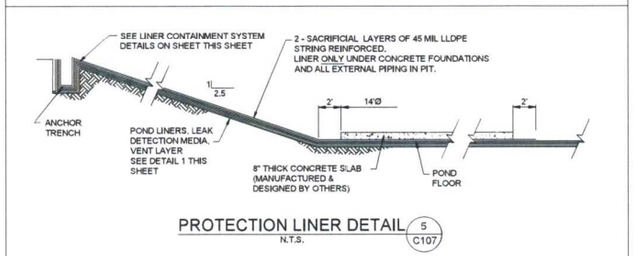


NOTE:
DETAIL SHOWN IS PER MANUFACTURE

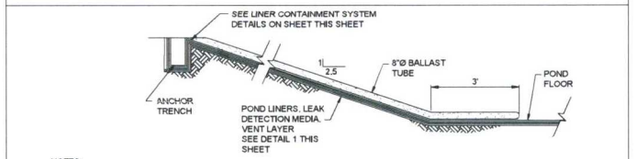
BERM VENT DETAIL (3 C108)
N.T.S.



GEOCOMPOSITE GAS VENTILATION LAYER DETAIL (4 C108)
N.T.S.

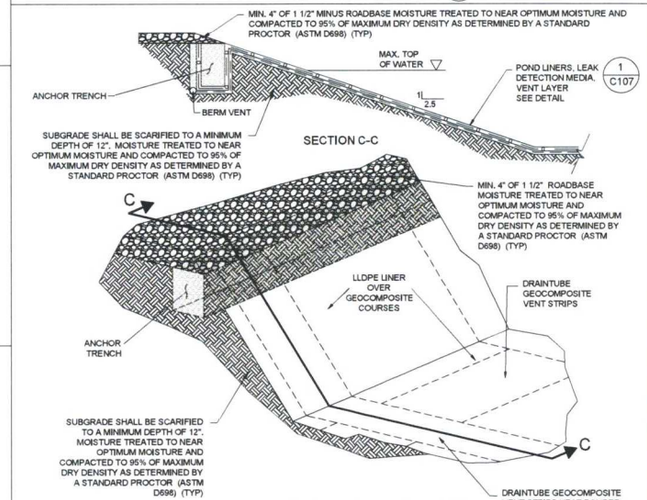


PROTECTION LINER DETAIL (5 C107)
N.T.S.

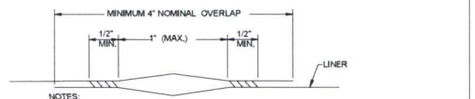


NOTES:
1. BALLAST TUBES TO BE 45-MIL LLDPE OR APPROVED EQUAL.
2. FILL 8"Ø BALLAST TUBES WITH SAND, ANCHOR IN LINER TRENCH AND EXTEND SEVERAL FEET ONTO POND FLOOR AS NOTED.

BALLAST TUBE DETAILS (6 C108)
N.T.S.

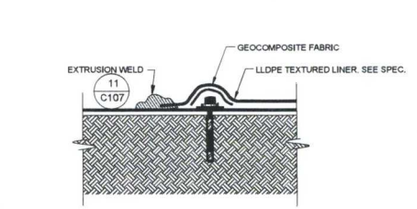


FINISHED GEOCOMPOSITE GAS VENTILATION LAYER WITH GEOMEMBRANE LINER SYSTEM AND BERM VENT DETAIL (7 C108)
N.T.S.



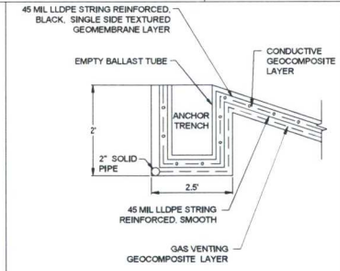
NOTES:
1. LINER SHEETS SHALL BE TACK WELDED TOGETHER AT OVERLAP TO FORM TEMPORARY BOND PRIOR TO WELDING.
2. DOUBLE FUSION WELDING SHALL BE THE PRIMARY SEAMING TECHNIQUE USED.
3. GRINDING NOT TO EXCEED 1/4" PAST "SQUEEZE-OUT" ON EITHER SIDE. PROPER CARE SHOULD BE TAKEN TO INSURE THAT VERY LITTLE MATERIAL IS TAKEN WHEN GRINDING.
4. AIR PRESSURE OR VACUUM TESTING SHALL BE THE NON-DESTRUCTIVE SEAM TEST METHODS FOR DOUBLE FUSION WELDS.
5. SUBGRADE PREPARATION, SELECT FILL (IF REQUIRED) SHALL BE PER LINER MANUFACTURES REQUIREMENTS.
6. DETAIL SHOWN IS PER MANUFACTURE

LINER SEAMING DOUBLE FUSION WELD DETAIL (8 C108)
N.T.S.

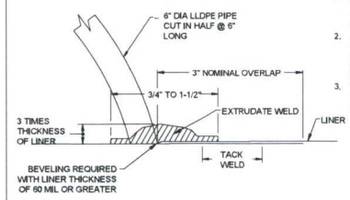


EXTRUSION WELD AT ANCHOR DETAIL (9 C108)
N.T.S.

NOTE:
DETAIL SHOWN IS PER MANUFACTURE



ANCHOR TRENCH LINER OVERLAP DETAIL (10 C108)
N.T.S.



NOTES:
1. LINER SHEETS TACK WELDED TOGETHER AT OVERLAP TO FORM TEMPORARY BOND PRIOR TO WELDING.
2. GRINDING NOT TO EXCEED 1/4" PAST "SQUEEZE-OUT" ON EITHER SIDE. PROPER CARE SHOULD BE TAKEN IN NOT REMOVING TOO MUCH MATERIAL WHEN GRINDING.
3. VACUUM TESTING IS THE NON-DESTRUCTIVE SEAM TEST METHOD FOR EXTRUSION WELDS.

EXTRUSION WELD DETAIL (11 C108)
N.T.S.

NOTE:
DETAIL SHOWN IS PER MANUFACTURE

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RIO ARRIBA COUNTY, NM

ENDURING RESOURCES

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
LINER AND BALLAST TUBE DETAILS

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
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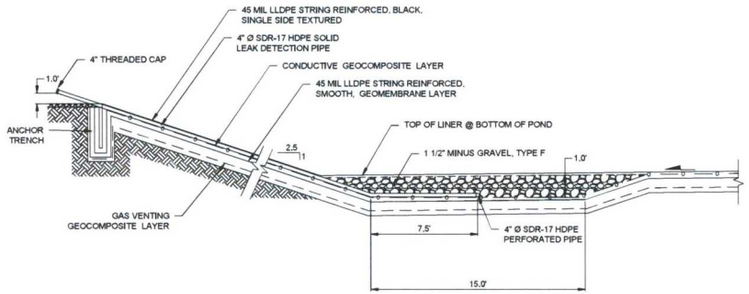
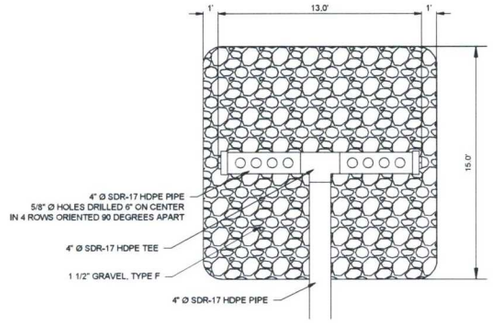
Date: October 2018
Scale: Horiz: N/A Vert: N/A
Project No: 9127383
Sheet: C108



PRODUCED WATER PIT LEAK DETECTION (1 / C109)
N.T.S.



LEAK DETECTION SYSTEM PIPE DETAIL (2 / C109)
N.T.S.

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ENDURING RESOURCES
RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
LEAK DETECTION SYSTEM DETAILS

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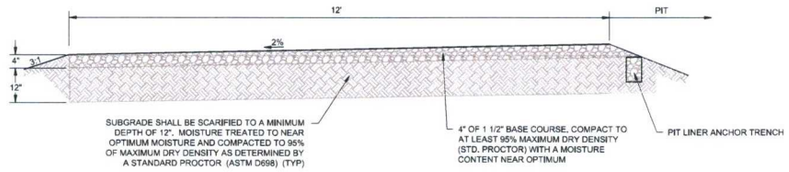
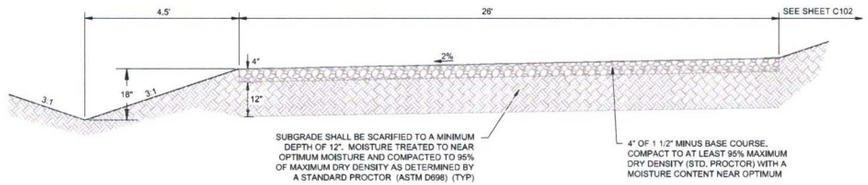
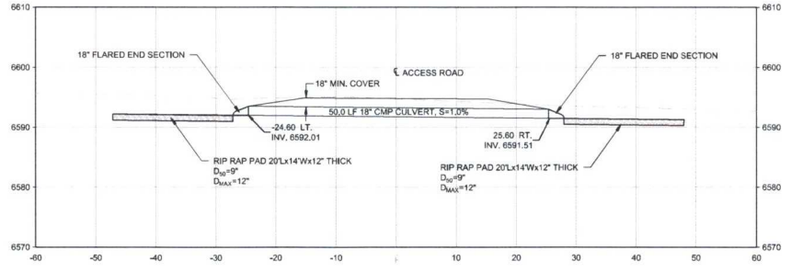
Project No: 9127383
Sheet: C109



PIT ACCESS ROAD SECTION (1 / C110)
N.T.S.



SITE ACCESS ROAD SECTION (2 / C110)
N.T.S.



SITE ACCESS ROAD STA. 10+15 (3 / C110)
CULVERT DETAIL
SCALE: 1"=10'

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ENDURING RESOURCES
RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
ROAD AND DRAINAGE DETAILS

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Vert: N/A
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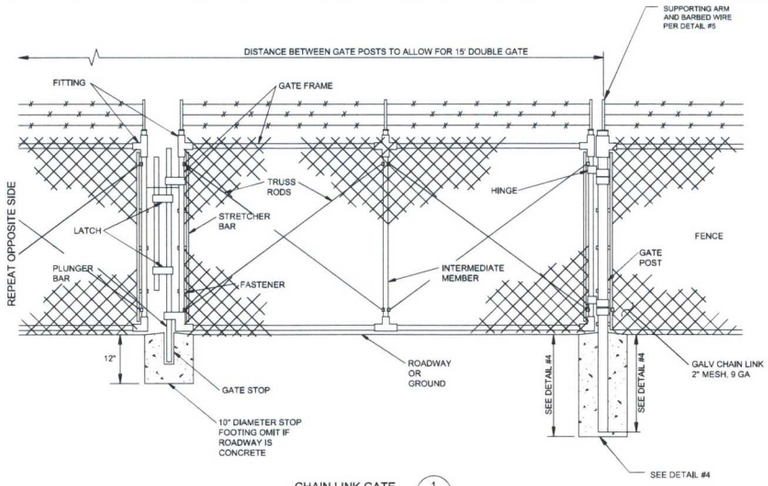
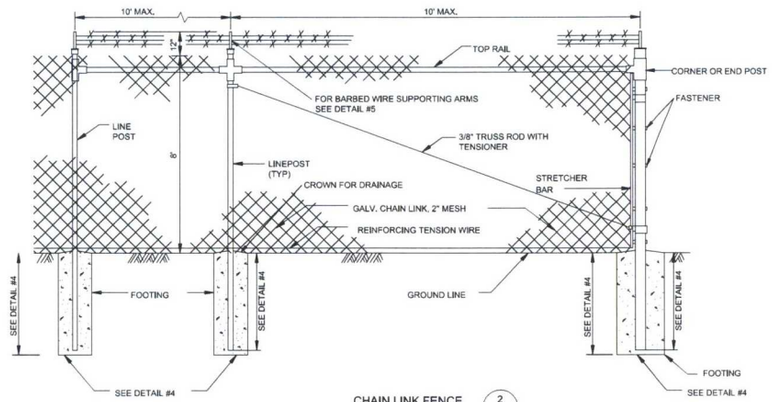
Sheet: C110

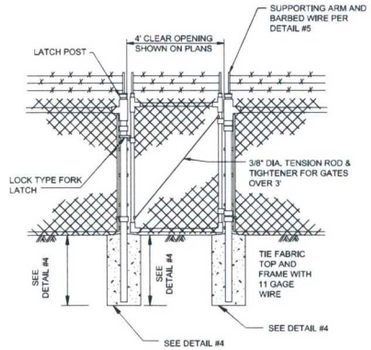


CHAIN LINK GATE 1 / C111
N.T.S.

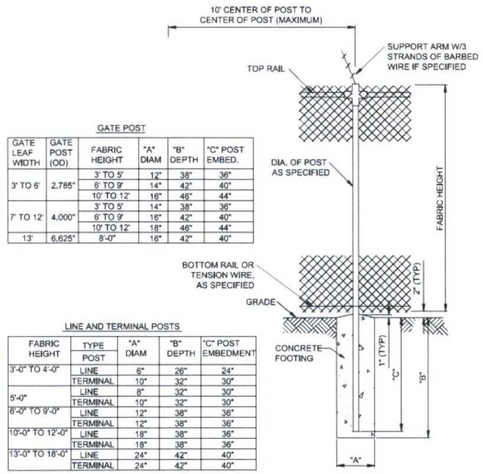


CHAIN LINK FENCE 2 / C111
N.T.S.

NOTE:
AT BROW CROSSING, EMBED ON 6" CENTERS, 4 - 1/2"X24" GALVANIZED RODS WITH 2" HOOKED END INTO BROW DITCH CONCRETE. EXPOSED END OF ROD SHALL BE WOVEN INTO FENCE FABRIC.



PEDESTRIAN GATE 3 / C111
N.T.S.



GATE POST

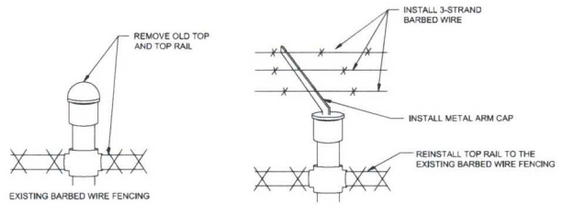
GATE LEAF WIDTH	GATE POST (OD)	FABRIC HEIGHT	"A" DIAM	"B" DEPTH	"C" POST EMBED.
3' TO 6'	2.785"	3' TO 5'	12"	38"	36"
		6' TO 9'	14"	42"	40"
		10' TO 12'	16"	46"	44"
7' TO 12'	4.000"	3' TO 5'	14"	38"	36"
		6' TO 9'	16"	42"	40"
		10' TO 12'	18"	46"	44"
13'	6.625"	8'-0"	16"	42"	40"

LINE AND TERMINAL POSTS

FABRIC HEIGHT	TYPE POST	"A" DIAM	"B" DEPTH	"C" POST EMBEDMENT
3'-0" TO 4'-0"	LINE	6"	26"	24"
	TERMINAL	10"	32"	30"
5'-0"	LINE	8"	32"	30"
6'-0" TO 9'-0"	TERMINAL	10"	32"	30"
	LINE	12"	38"	36"
	TERMINAL	12"	38"	36"
10'-0" TO 12'-0"	LINE	18"	38"	36"
	TERMINAL	18"	38"	36"
13'-0" TO 18'-0"	LINE	24"	42"	40"
	TERMINAL	24"	42"	40"

NOTE: TERMINAL POSTS INCLUDE END, CORNER, AND PULL POSTS SEE SPECIFICATIONS

CHAIN LINK FENCE FOUNDATION 4 / C111
N.T.S.



NOTE:
ADD SUPPORTING ARM AND BARBED WIRE TO NEW AND EXISTING CHAINLINK FENCE POSTS AND GATES

SUPPORTING ARM & BARBED WIRE 5 / C111
N.T.S.

WARNING SIGN 6 / C111
N.T.S.

WARNING SIGN 7 / C111
N.T.S.

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32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
CHAIN LINK SECURITY FENCE DETAILS

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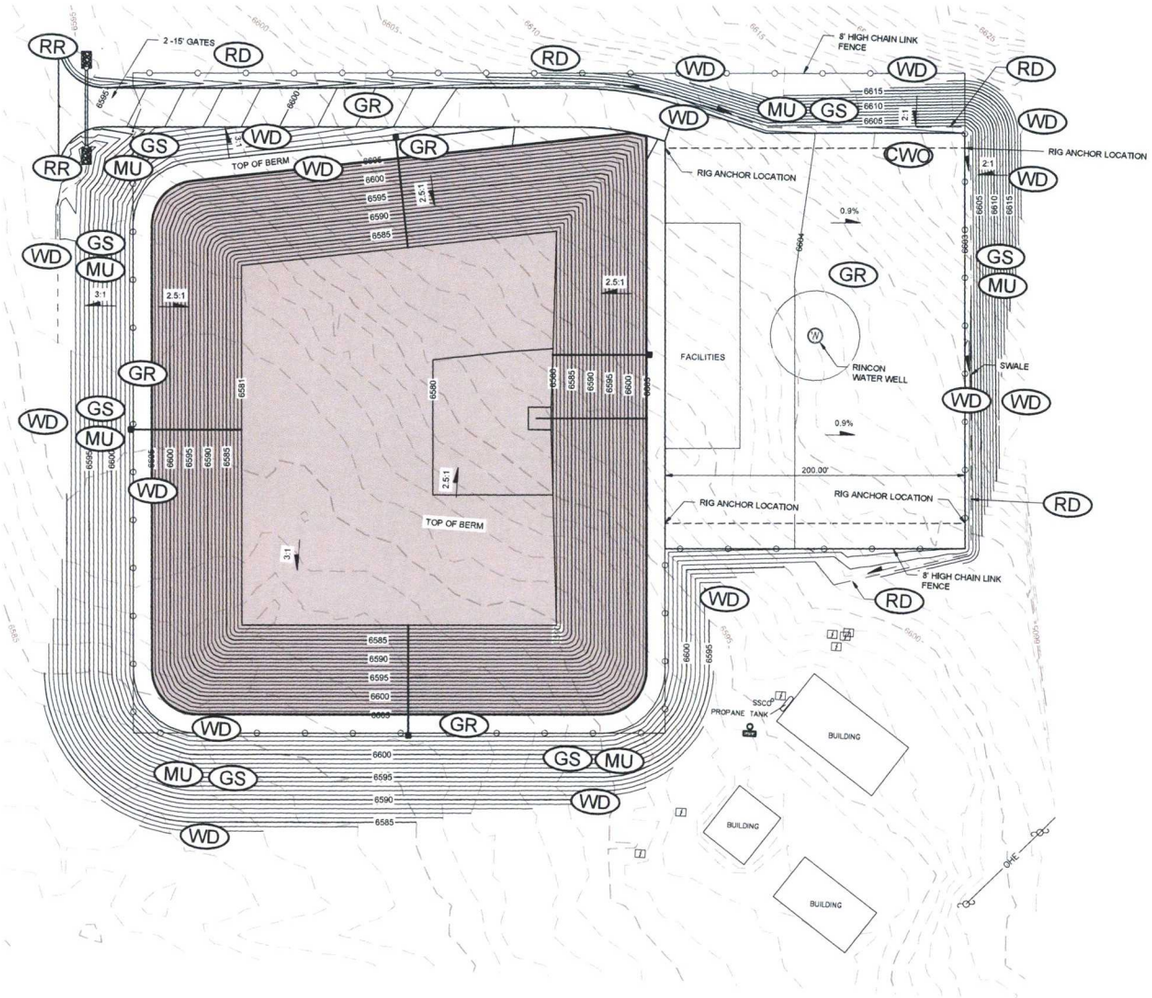

SCALE: 1" = 40'

PERMANENT BMPs

GS	GRASS SEEDING
MU	MULCH
RR	RIP RAP
RD	ROCK CHECK DAM
GR	GRAVEL

TEMPORARY BMPs

WD	10" DIA WADDLE/FIBER ROLL
CWO	CONCRETE WASHOUT

NOTES:

1. ALL FACILITY INFORMATION CAN BE FOUND ON SHEETS C101 AND C102.
2. ALL SLOPES SHALL HAVE WADDLES PLACED AT TOP OF SLOPE AND TOE OF SLOPE PARALLEL TO CONTOURS.
3. CONTRACTOR SHALL ADD GRASS SEED AND MULCH TO ALL UNPAVED/UNGRAVELED SURFACES THROUGHOUT THE SITE.
4. ALL SOIL STOCKPILES ARE TO HAVE WADDLE/FIBER ROLL PLACED AROUND THEM.

NOTE:
STOCKPILING OF TOP SOIL: CONTRACTOR SHALL SEGREGATE AND STOCKPILE ALL TOPSOIL OUTSIDE OF THE CONSTRUCTION AREA WITH APPROPRIATE SEDIMENT CONTROL. TOPSOIL SHALL BE REDISTRIBUTED ON THE OUTSIDE OF CONSTRUCTION BERMS, AND EITHER SEEDED AND MULCHED OR PROTECTED WITH EROSION CONTROL MEASURES. REFER TO CONSTRUCTION PLANS FOR DETAILS.

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ENDURING RESOURCES

RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE EROSION CONTROL PLAN

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Sheet: C112

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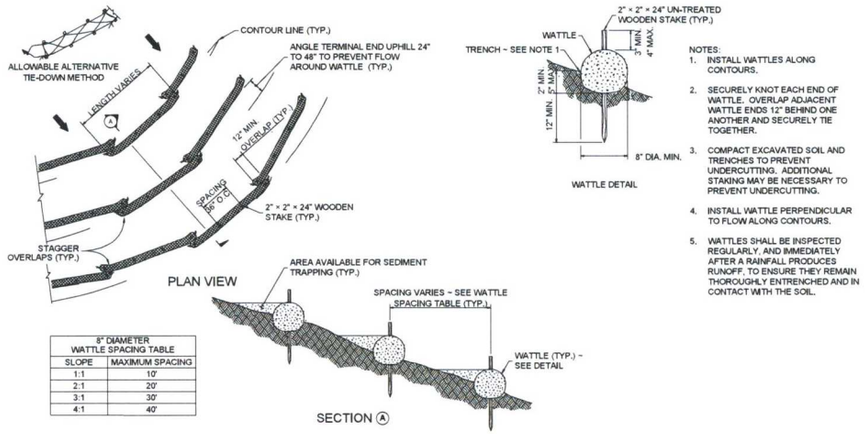
GENERAL NOTES

1. SEE SHEET C112 FOR SITE SPECIFIC APPLICATION OF EROSION CONTROL.
2. EROSION & SEDIMENTATIONCONTROL PLAN WILL COMPLY WITH OWNER'S EXISTING ASSET SWPPP.
3. THE CONTRACTOR SHALL SET, LOCATE, AND MAINTAIN EROSION CONTROL MEASURES PER THE EROSION CONTROL PLAN, AND THE OWNER'S EXISTING ASSET STORMWATER POLLUTION PROTECTION PLAN. (SWPPP)
4. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AND SHALL BE KEPT IN PLACE UNTIL EROSION AND SEDIMENTATION POTENTIAL IS MITIGATED. REMOVAL OF SILT AND SEDIMENT IS REQUIRED PER SWPPP.
5. EROSION CONTROL DEVICES SHALL BE CHECKED AFTER EVERY STORM. REPAIRS OR REPLACEMENT TO THE EROSION CONTROL MEASURES SHALL BE MADE AS REQUIRED BY THE OWNERS PERMIT TO MAINTAIN PROPER PROTECTION.
6. SWPPP SHALL BE MODIFIED TO CONTROL EROSION AND SEDIMENT. TRANSPORT BY USING ANY MEANS SHOWN ON THIS PLAN OR IMPLEMENTING OTHER CONTROL MEASURES.
7. PERMANENT BEST MANAGEMENT PRACTICES (BMP'S) (I.E. SEEDED, MULCH) MUST BE IMPLEMENTED WITHIN 14 DAYS OF LAST CONSTRUCTION ACTIVITY IN THE AREA, AS REQUIRED PER THE SWPPP.
8. THE CONTRACTOR/OWNER SHALL UPDATE OR MODIFY THIS PLAN AS NEEDED TO COMPLY WITH THE APPLICABLE POLLUTANT DISCHARGE ELIMINATION SYSTEM REQUIREMENTS.
9. CONTRACTOR SHALL BE REQUIRED TO HAUL EXCESS CONCRETE AND WASHOUT OFF-SITE TO AN APPROVED/PERMITTED DISPOSAL SITE.
10. CONTRACTOR SHALL SPREAD STOCKPILED TOPSOIL BEFORE PLACING GRASS SEED AT CUT AND FILL LOCATIONS USING OWNER APPROVED MIX.
11. CONTRACTOR SHALL PLACE MULCH IN CONJUNCTION WITH GRASS SEEDING.



8" DIAMETER WATTLE SPACING TABLE	
SLOPE	MAXIMUM SPACING
1:1	10'
2:1	20'
3:1	30'
4:1	40'

WATTLE DETAIL

NOTES:
1. INSTALL WATTLES ALONG CONTOURS.
2. SECURELY KNOT EACH END OF WATTLE. OVERLAP ADJACENT WATTLE ENDS 12" BEHIND ONE ANOTHER AND SECURELY TIE TOGETHER.
3. COMPACT EXCAVATED SOIL AND TRENCHES TO PREVENT UNDERCUTTING. ADDITIONAL STAKING MAY BE NECESSARY TO PREVENT UNDERCUTTING.
4. INSTALL WATTLE PERPENDICULAR TO FLOW ALONG CONTOURS.
5. WATTLES SHALL BE INSPECTED REGULARLY, AND IMMEDIATELY AFTER A RAINFALL PRODUCES RUNOFF. TO ENSURE THEY REMAIN THOROUGHLY ENTRENCHED AND IN CONTACT WITH THE SOIL.

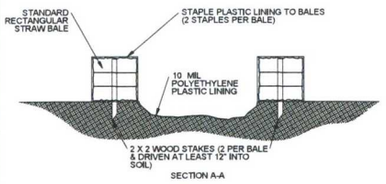
WADDLE INSTALLATION ON SLOPES (WD)
N.T.S.

TEMPORARY BMPs

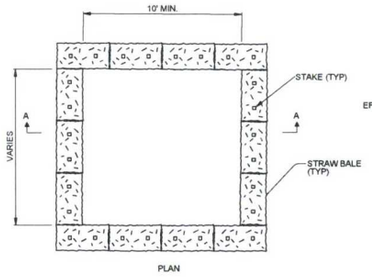
WD	10" DIA WADDLE/FIBER ROLL
CWO	CONCRETE WASHOUT

PERMANENT BMPs

GS	GRASS SEEDING
MU	MULCH
RR	RIP RAP
RD	ROCK CHECK DAM
GR	GRAVEL

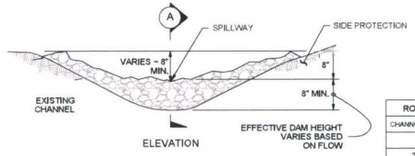


SECTION A-A



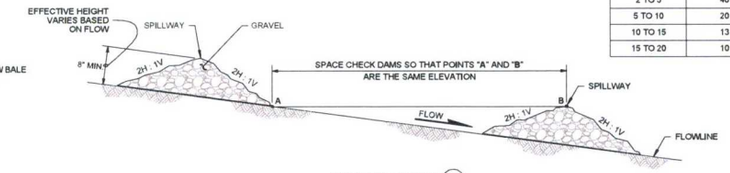
PLAN

CONCRETE TRUCK WASH OUT FACILITY (CWO)
N.T.S.



ELEVATION

ROCK CHECK DAM SPACING	
CHANNEL SLOPE (%)	SPACING (FEET)
< 2	100
2 TO 5	40
5 TO 10	20
10 TO 15	13
15 TO 20	10



EXTENDED SECTION (A)

ROCK CHECK DAM (RD)
N.T.S.

SOUDER, MILLER & ASSOCIATES
Engineering • Environmental • Surveying
Serving the Southwest & Rocky Mountains
8060 West Fourteenth Avenue
Lakewood, CO 80214
Phone 1.303.239.9011 | Toll-Free 1.877.299.6942 | Fax 1.303.239.9115
www.soudermiller.com

Rev #	Date	Description	By	CHK'D

ENDURING RESOURCES

RIO ARRIBA COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE EROSION AND SEDIMENTATION CONTROL DETAILS

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
HDM	JTN	HDM

Date: October 2018

Scale: Horiz: N/A
Vert: N/A

Project No: 9127383

Sheet: C113

ATTACHMENT C - GEOMAT REPORT

GEOTECHNICAL ENGINEERING REPORT
W ESCAVADA UNIT & LOWRY CAMP RINCON FRACKING WATER PONDS
SANDOVAL & RIO ARRIBA COUNTIES, NEW MEXICO

Submitted To:

James McDaniel
Enduring Resources
332 CR 3100
Aztec, New Mexico 87410

Submitted By:

GEOMAT Inc.
915 Malta Avenue
Farmington, New Mexico 87401

May 16, 2018
GEOMAT Project 182-2992

GEOMAT INC.
915 Malta Avenue ◆ Farmington, NM 87401 ◆ Tel (505) 327-7928 ◆ Fax (505) 326-5721

May 16, 2018

James McDaniel
Enduring Resources
332 CR 3100
Aztec, New Mexico 87410

RE: Geotechnical Engineering Study
Proposed Fracking Water Ponds
Sandoval and Rio Arriba Counties, New Mexico
GEOMAT Project No. 182-2992

GEOMAT Inc. (GEOMAT) has completed the geotechnical engineering exploration for the proposed W Escavada Unit (WEU) and Lowry Camp Rincon (Rincon) fracking water ponds to be located in Sandoval and Rio Arriba Counties, New Mexico, respectively. This study was performed in general accordance with our Proposal No. 182-04-20 dated April 20, 2018.

The results of our engineering study, including the geotechnical recommendations, site plan, boring records, and laboratory test results are attached. Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, the proposed ponds could be constructed as incised, double synthetic-lined ponds as proposed. Other design and construction details, based upon geotechnical conditions, are presented in the report.

We have appreciated being of service to you in the geotechnical engineering phase of this project. If you have any questions concerning this report, please contact us.

Sincerely yours,
GEOMAT Inc.

GEORGE A. MADRID
NEW MEXICO
9110
REGISTERED PROFESSIONAL ENGINEER

George A. Madrid, P.E.
Principal Engineer
5/16/18

Matthew J. Cramer, P.E.
Vice President

Copies to: Addressee (1)

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GEOTECHNICAL ENGINEERING REPORT
W ESCAVADA UNIT & LOWRY CAMP RINCON FRACKING WATER PONDS
SANDOVAL & RIO ARRIBA COUNTIES, NEW MEXICO
GEOMAT PROJECT NO. 182-2992

INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the proposed W Escavada Unit (WEU) and Lowry Camp Rincon (Rincon) fracking water ponds to be located in Sandoval and Rio Arriba Counties, New Mexico, respectively, as shown on the Site Plans in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations about:

- subsurface soil conditions
- groundwater conditions
- lateral soil pressures
- earthwork
- slopes for pond walls
- drainage

The opinions and recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and experience with similar soil conditions, structures, and our understanding of the proposed project as stated below.

PROPOSED CONSTRUCTION

The WEU pond will have dimensions of approximately 350 feet by 350 feet and will be located near 36.132769° north latitude by 107.589962° west longitude. The Rincon pond will have dimensions of approximately 300 feet wide by 400 feet long and will be located near 36.531088° north latitude by 107.495715° west longitude. We also understand the ponds will be excavated (incised) into the existing grades at the sites. We understand the total depth of each pond will be 20 feet. The maximum water depth in each pond will be 17 feet. Both ponds will and located on relatively flat terrain. The ponds will be lined with a double HDPE liner system.

SITE EXPLORATION

Our scope of services performed for this project included a site reconnaissance by a staff geologist, a subsurface exploration program, laboratory testing and engineering analyses.

Field Exploration:

Subsurface conditions at the sites were explored on April 23, 2018, by drilling four exploratory borings at each site at the approximate locations shown on the Site Plans in Appendix A. Borings B-1 through B-4 were drilled at the WEU site and B-5 through B-8 at the Rincon site. All the borings were drilled to depths of approximately 30 feet below existing ground surface.

The borings were advanced using a CME-55 truck-mounted drill rig with continuous-flight, 7.25-inch O.D. hollow-stem auger. The borings were continuously monitored by a geologist from our office who examined and classified the subsurface materials encountered, obtained representative samples, observed groundwater conditions, and maintained a continuous log of each boring.

Soil samples were obtained from the borings using a combination of standard 2-inch O.D. split spoon and 3-inch O.D. modified California ring barrel samplers. The samplers were driven using a 140-pound hammer falling 30 inches. The standard penetration resistance was determined by recording the number of hammer blows required to advance the sampler in six-inch increments. Representative bulk samples of subsurface materials were also obtained.

Groundwater evaluations were made in each boring at the time of site exploration. Soils were classified in accordance with the Unified Soil Classification System described in Appendix A. Boring logs were prepared and are presented in Appendix A.

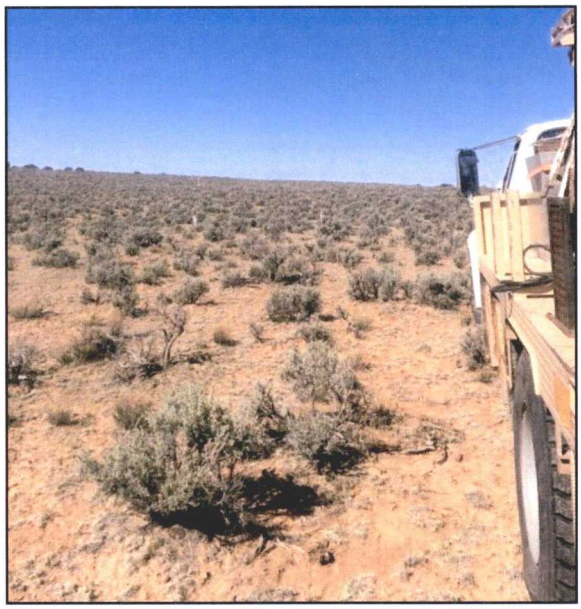
Laboratory Testing:

Samples retrieved during the field exploration were transported to our laboratory for further evaluation. At that time, the field descriptions were confirmed or modified as necessary, and laboratory tests were performed to evaluate the engineering properties of the subsurface materials.

SITE CONDITIONS

WEU Pond

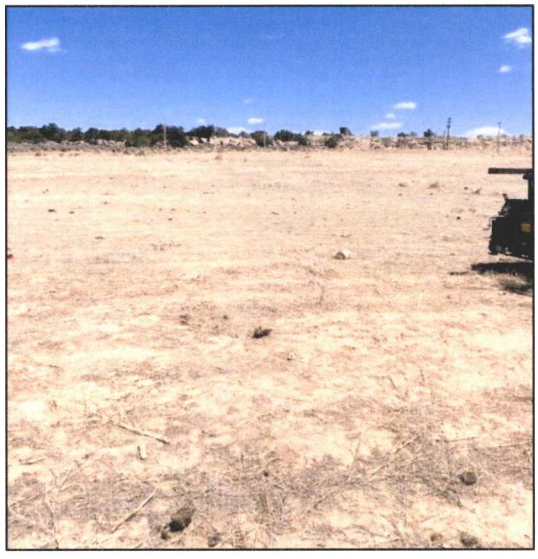
The site of the proposed pond is located roughly 150 feet west of an existing unnamed dirt road in a currently undeveloped area approximately 7 miles south of US Highway 550 between Nageezi, NM and Counselor, NM. The ground surface across the site of the proposed pond slopes gently toward the middle part of the eastern side. The area was vegetated by a significant growth of native weeds, sage brush, shrubs, and small trees at the time of our exploration. No evidence of prior structural development was noted at the site. The photo below depicts the site's condition at the time of our exploration.



Drill Rig at Boring B-2
View toward the west

Rincon Pond

The site of the proposed pond is located several miles into the Largo Wash southeast of Blanco, New Mexico. The site is located approximately 150 west of the old Lowry Camp Buildings on what was once a developed area. The ground surface across the site of the proposed pond was relatively flat and was sparsely vegetated by native weeds at the time of our exploration. There is evidence of prior structural development at the site, as there are several utility lines in place from the previous development. The photo below depicts the site's condition at the time of our exploration.



Work Truck at Boring B-7
View toward the north

SUBSURFACE CONDITIONS

Soil Conditions:

WEU Pond

As presented on the Boring Logs in Appendix A, in all four borings, B-1 through B-4, we encountered sandy soils overlying formational sandstone. In borings B-3 and B-4, the sandstone was underlain by shale rock. The sandstone was encountered at approximately 16 feet in boring B-1, 18 feet in B-2, 14 feet in B-3, and 11 feet in B-4. The shale was encountered at approximately 24 feet in B-3 and 27 feet in B-4. The sandy soils varied in density from medium dense to very dense and were generally slightly damp to damp. The sandstone was generally weakly cemented, slightly to moderately weathered, and slightly damp. The shale rock underlying the sandstone both B-3 and B-4 was generally slightly damp, fissile and friable.

Rincon Pond

As presented on the Boring Logs in Appendix A, in all four borings, B-5 through B-8, we encountered sandy soils overlying clay soils. In boring B-6, the clay was underlain by siltsone. Fill was encountered on the surface of all four borings. The fill was generally loose and slightly damp. The native sandy soils varied in density from loose to medium dense and were generally slightly damp. The clay soils underlying the sandy soils were generally stiff and damp. The siltstone encountered in B-6 was slightly to moderately weathered and damp.

Groundwater Conditions:

Groundwater was not encountered in any of the eight borings with the exception of a wet zone in B-8 from approximately 23 to 25½ feet. The source of this moisture is unknown. Groundwater elevations can fluctuate over time depending upon precipitation, irrigation, runoff and infiltration of surface water. We do not have any information regarding the historical fluctuation of the groundwater level in this vicinity.

Laboratory Test Results:

Laboratory analyses of samples tested indicate the sandy and clayey soils have fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging from approximately 28 to 52 percent. Plasticity indices ranged from non-plastic to 14. In-place dry densities of the samples tested ranged from approximately 104 to 116 pounds per cubic foot (pcf), with natural moisture contents between approximately 3 and 10 percent.

Direct shear testing was performed on representative samples from the Rincon Pond site. The tests were performed on relatively undisturbed ring samples. The three samples tested had angles of internal friction (phi angles) ranging from 23.7 to 32.0 degrees.

Results of all laboratory tests are presented in Appendix B.

OPINIONS AND RECOMMENDATIONS

Geotechnical Considerations:

The sites are considered suitable for the proposed ponds, based on the geotechnical conditions encountered and tested for this report and our understanding of the project. Based on the results of our subsurface exploration, laboratory test results, and engineering analyses, the ponds could be constructed as incised basins as proposed.

Formational sandstone was encountered at depths ranging from approximately 11 to 18 feet below existing ground surface at the WEU Pond site. We anticipate that rock excavation will be required to construct the pond to its planned depth of 20 feet. Excavations in sandstone are anticipated to be difficult, and may necessitate the use of heavy-duty equipment and/or specialized techniques. As an alternate, consideration should be given to making the pond shallower, but with larger footprint to achieve the same volume.

If there are any significant deviations from the assumed finished elevations, structure locations and/or loads noted at the beginning of this report, the opinions and recommendations of this report should be reviewed and confirmed/modified as necessary to reflect the final planned design conditions.

Pond Design and Construction:

The water storage pond could be constructed as an incised basin as proposed. Synthetic liners should be installed in accordance with the manufacturer's recommendations.

Our recommendations are based on the information obtained from the borings performed during our subsurface exploration. It should be realized that subsurface conditions could vary across the extent of the pond areas, and these variations may not become apparent until construction is underway. If, during construction, soil types other than those encountered during our exploration are encountered, we should be contacted to observe the actual conditions and confirm/modify our recommendations, as appropriate.

Slope Stability Analysis:

A slope stability analysis was performed for each site to develop recommendations for the cut slope inclinations for the incised ponds. Galena Slope Stability software (version 6.1) was used as an aid in developing our recommendations. Printouts of the software analyses are available upon request.

Based on the results of our subsurface exploration, laboratory testing, and engineering analyses, the maximum recommended inclinations for the pond walls are 2:1 (horizontal:vertical) for the Rincon Pond. Likewise, the maximum recommended inclinations for the pond walls for the WEU Pond are 2.5:1 in soils and 1:1 in sandstone.

We understand that no above-grade embankments are planned for the project. If the project scope changes to include embankments, GEOMAT should be notified to review the plans and confirm or modify our recommendations as necessary.

Seismic Considerations:

Based on the subsurface conditions encountered in the borings, we estimate that Site Class C is appropriate for the site according to Table 1613.5.2 of the 2009 International Building Code. This parameter was estimated based on extrapolation of data beyond the deepest depth explored, using methods allowed by the code. Actual shear wave velocity testing/analysis and/or exploration to a depth of 100 feet were not performed as part of our scope of services for this project.

Lateral Earth Pressures:

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table:

- **Active:**
  - Granular soil backfill (on-site sand/clay) .....35 psf/ft
  - Undisturbed subsoil .....30 psf/ft

- **Passive:**
  - Shallow foundation walls .....250 psf/ft
  - Shallow column footings.....350 psf/ft
  - Sump walls .....400 psf/ft

- **Coefficient of base friction**: 0.40
  The coefficient of base friction should be reduced to 0.30 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- **At rest:**
  Granular soil backfill (on-site sand).....50 psf/ft
  Undisturbed subsoil.....60 psf/ft

Earthwork:

General Considerations:

The opinions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Although underground facilities such as foundations, septic tanks, cesspools, basements and irrigation systems were not encountered during site reconnaissance, such features could exist and might be encountered during construction.

Site Clearing:

1. Strip and remove all existing fill, debris and other deleterious materials from the proposed construction areas.

2. If unexpected fills or underground facilities are encountered during site clearing, we should be contacted for further recommendations. All excavations should be observed by GEOMAT prior to backfill placement.

3. Stripped materials consisting of vegetation and organic materials should be removed from the site, or used to re-vegetate exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

4. Sloping areas steeper than 5:1 (horizontal:vertical) should be benched to reduce the potential for slippage between existing slopes and fills. Benches should be level and wide enough to accommodate compaction and earth moving equipment.

5. All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of eight inches, conditioned to near optimum moisture content, and compacted to at least 95% of standard proctor (ASTM D698).

Excavation:

We present the following general comments regarding our opinion of the excavation conditions for the designers' information with the understanding that they are opinions based on our boring data. More accurate information regarding the excavation conditions should be evaluated by contractors or other interested parties from test excavations using the equipment that will be used during construction.

Based on our subsurface evaluation it appears that shallow excavations in soils at the sites will be possible using standard excavation equipment. Deeper excavations that encounter formational rock (at the WEU Pond site, for example) are expected to be difficult and may necessitate the use of heavy-duty equipment and/or specialized techniques.

On-site soils may pump or become unstable or unworkable at high water contents. Dewatering may be necessary to achieve a stable excavation. Workability may be improved by scarifying and drying. Over-excavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

Fill Materials:

1. Native soils could be used to replace existing fill areas and any areas cut for facilitation of the pond excavation.

2. Select granular materials should be used as backfill behind walls that retain earth.

3. On site or imported soils to be used in structural fills should conform to the following:

Gradation	Percent finer by weight (ASTM C136)
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	50 Max
Maximum expansive potential (%)*	1.5

* Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 144-psf surcharge and submerged.

4. Aggregate base should conform to Type I Base Course as specified in Section 303 of the 2014 New Mexico Department of Transportation (NMDOT) *"Standard Specifications for Road and Bridge Construction."*

Placement and Compaction:

1. Place and compact fill in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.

2. Un-compacted fill lifts should not exceed 10 inches loose thickness.

3. Materials should be compacted to the following:

Material	Minimum Percent (ASTM D698)
Liner Subgrade	Per Liner Manufacturer's Recommendations
Subgrade soils beneath fill areas	95
On site or imported soil fills:	
Beneath footings and slabs on grade	95
Aggregate base beneath slabs and pavements	95
Miscellaneous backfill	90

4. On-site and imported soils should be compacted at moisture contents near optimum.

Compliance:

To assess compliance, observation and testing should be performed by GEOMAT.

Drainage:

Surface Drainage:

Positive drainage should be provided during construction and maintained throughout the life of the proposed project to prevent surface runoff from entering the ponds.

Protective slopes should be provided with a minimum grade of approximately 5 percent for at least 10 feet from the structures. Backfill against footings, exterior walls, and in utility trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Subsurface Drainage:

Free-draining, granular soils containing less than five percent fines (by weight) passing a No. 200 sieve should be placed adjacent to walls which retain earth. A drainage system consisting of either weep holes or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. Where used, drain lines should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance. An impervious soil should be used in the upper layer of backfill to reduce the potential for water infiltration.

GENERAL COMMENTS

It is recommended that GEOMAT be retained to provide a general review of final design plans and specifications in order to confirm that grading and foundation recommendations in this report have been interpreted and implemented. In the event that any changes of the proposed project are planned, the opinions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

GEOMAT should also be retained to provide services during excavation, grading, foundation, and construction phases of the work. Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present and is considered a necessary part of continuing geotechnical engineering services for the project. Construction testing, including field and laboratory evaluation of fill, backfill, pavement

materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

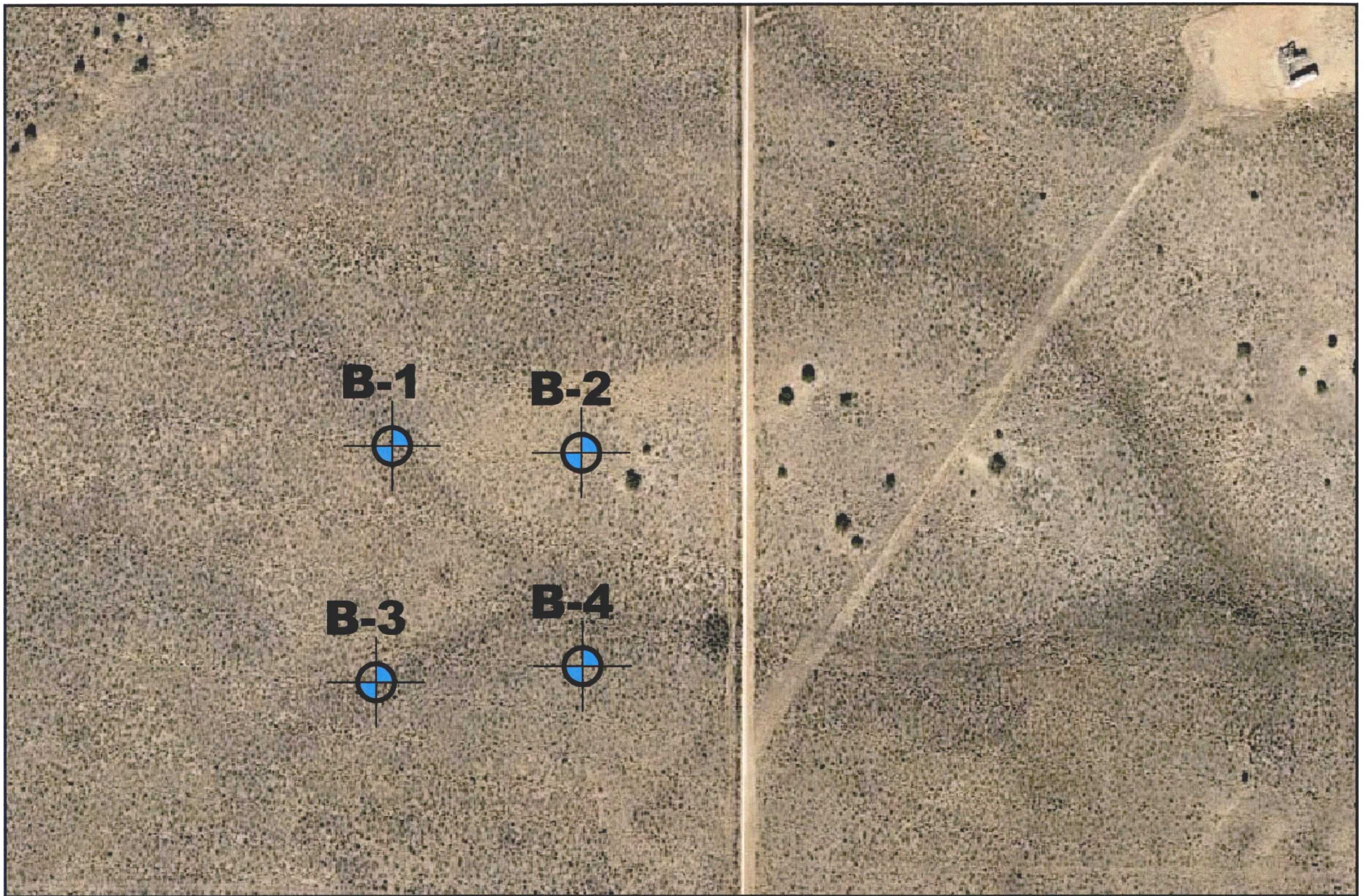
The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the location of test borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities at the same time. No warranty, express or implied, is intended or made. We prepared the report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction equipment and techniques to be used on this project.

This report is for the exclusive purpose of providing geotechnical engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed any geologic hazards that may exist on or near the site.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off site), or other factors may change over time and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify GEOMAT in writing of such intended use. Based on the intended use of the report, GEOMAT may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements, by the Client or anyone else, will release GEOMAT from any liability resulting from the use of this report by an unauthorized party.

Appendix A



Approximate Not to Scale	SITE PLAN Boring Locations (approximate) GEOMAT Project No. 182-2992 Date of Exploration: April 23, 2018	PROJECT WEU Pond Enduring Resources Sandoval County, New Mexico

GEOMAT INC.

Approximate Not to Scale	SITE PLAN Boring Locations (approximate) GEOMAT Project No. 182-2992 Date of Exploration: April 24, 2018	PROJECT Rincon Pond Enduring Resources Rio Arriba County, New Mexico

GEOMAT INC.

GEOMAT INC
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-1

Project Name: WEU and Rincon Fracking Ponds
Project Number: 182-2992
Client: Enduring Resources
Site Location: Sandoval/Rio Arriba Counties, NM
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/23/2018
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: SY
Remarks: WEU Pond

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
									1	Silty, clayey SAND, tan/orange, fine grained, medium dense to dense, slightly damp
113.8			4.7	14-25-27	R 18				2	
									3	
									4	
				12-19-28	SS 6				5	
									6	tan/gray, contains caliche
							SC-SM		7	
									8	
									9	
103.8	41	6	2.9	25-50/6"	R 12				10	
									11	tan/brown, very dense
									12	
									13	
									14	
				15-28-50	SS 18				15	
									16	
									17	SANDSTONE, gray/white, fine- to medium grained, weakly cemented, slightly to moderately weathered, slightly damp
									18	
									19	
				36-50/4"	R 10				20	
									21	Clay in sandstone
									22	
									23	
							RK		24	
									25	
				20-30-19	SS 18				26	
									27	
									28	
									29	
									30	
				21-36-50/5"	SS 17				31	Contains shale lenses
									32	Total Depth 31½ feet
									33	
									34	
									35	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample

GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-2

Project Name: WEU and Rincon Fracking Ponds
Project Number: 182-2992
Client: Enduring Resources
Site Location: Sandoval/Rio Arriba Counties, NM
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/23/2018
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: SY
Remarks: WEU Pond

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
									1	Silty SAND, tan/orange, fine grained, medium dense, slightly damp
	28	NP		11-13-13	SS 18				2	
									3	
									4	
113.3			5.2	14-18-33	R 18		SM		5	
									6	
									7	
									8	
									9	
				26-36-35	SS 18				10	Silty, clayey SAND, white/tan, fine- to medium grained, very dense, slightly damp
									11	
									12	
									13	
							SC-SM		14	
									15	
105.2			4.0	30-50/5"	R 11				16	tan/orange
									17	
									18	
									19	SANDSTONE, gray/white, fine- to medium grained, weakly cemented, slightly to moderately weathered, slightly damp
									20	
				17-19-17	SS 18				21	
									22	
									23	
									24	
							RK		25	
				40-50/1"	R 7				26	
									27	
									28	
									29	
									30	
				50/6"	SS 6				31	Total Depth 30½ feet
									32	
									33	
									34	
									35	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample

GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-3

Project Name: WEU and Rincon Fracking Ponds
Project Number: 182-2992
Client: Enduring Resources
Site Location: Sandoval/Rio Arriba Counties, NM
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/23/2018
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: SY
Remarks: WEU Pond

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
									1	Clayey SAND, tan/brown, fine grained, dense, slightly damp
				14-15-17	SS 6				2	
									3	
									4	
111.2			5.7	13-19-22	R 18		SC		5	
									6	medium dense
									7	
									8	
									9	Grades to silty, clayey sand
				29-39-50	SS 18				10	
							SC-SM		11	Silty, clayey SAND, tan, fine grained, very dense, slightly damp
									12	
									13	
									14	
110.4			4.4	19-50/6"	R 12				15	SANDSTONE, gray/white, fine- to medium grained, weakly cemented, slightly to moderately weathered, slightly damp
									16	
									17	
									18	
							RK		19	
									20	
				12-22-49	SS 18				21	
									22	
									23	
									24	
				30-50/3"	R 9				25	SHALE, dark gray/green, very weakly fissile and friable, slightly damp
									26	
									27	
							RK		28	
									29	
									30	
				10-16-20	SS 18				31	
									32	Total Depth 31½ feet
									33	
									34	
									35	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample

GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-4

Project Name:	WEU and Rincon Fracking Ponds	Date Drilled:	4/23/2018
Project Number:	182-2992	Latitude:	Not Determined
Client:	Enduring Resources	Longitude:	Not Determined
Site Location:	Sandoval/Rio Arriba Counties, NM	Elevation:	Not Determined
Rig Type:	CME-55	Boring Location:	See Site Plan
Drilling Method:	7.25" O.D. Hollow Stem Auger	Groundwater Depth:	None Encountered
Sampling Method:	Ring and Split spoon samples	Logged By:	SY
Hammer Weight:	140 lbs	Remarks:	WEU Pond
Hammer Fall:	30 inches		

Laboratory Results: Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
									1	Clayey SAND, tan/brown, fine grained, medium dense to dense, slightly damp
116.4			5.0	16-23-31	R 18		SC		2 3 4 5	
				17-20-19	SS 18				6	Grades to silty, clayey sand
							SC-SM		7 8 9 10	Silty, clayey SAND, tan, fine grained, dense, damp
114.2			9.6	50/6"	R 6				11	SANDSTONE, gray/white, fine- to medium grained, weakly cemented, slightly to moderately weathered, slightly damp
				50/6"	SS 6				12 13 14 15 16 17 18 19	
				46-50/2"	R 8		RK		20 21 22 23 24 25 26 27	
				50/6"	SS 6				28	SHALE, dark gray/green, very weakly fissile and friable, slightly damp
				7-11-13	SS 18		RK		29 30 31	
									32 33 34 35	Total Depth 31½ feet

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GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-5

Project Name: WEU and Rincon Fracking Ponds
Project Number: 182-2992
Client: Enduring Resources
Site Location: Sandoval/Rio Arriba Counties, NM
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/24/2018
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: SY
Remarks: Rincon Pond

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
				21-9-6	R 18		SC		1–6	Clayey SAND with trace gravel, tan/brown, fine- to coarse grained, loose, slightly damp (FILL) Contains reclaimed asphalt/base coarse gravel
				8-7-9	SS 6					
				9-7-9	R 18		SC		7–22	Clayey SAND, tan/brown, fine grained, loose, slightly damp Fine- to medium grained
				3-2-2	SS 18					
113.3			9.7	7-7-11	R 18					
				5-5-7	SS 18		CL		23–31	Sandy lean CLAY, brown, stiff, damp Contains caliche
				3-5-7	SS 18					
									32–35	Total Depth 31½ feet

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample

GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-6

Project Name: WEU and Rincon Fracking Ponds
Project Number: 182-2992
Client: Enduring Resources
Site Location: Sandoval/Rio Arriba Counties, NM
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/24/2018
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: SY
Remarks: Rincon Pond

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
							SC		1	Clayey SAND with trace gravel, tan/brown, fine- to coarse grained, loose, slightly damp (FILL)
									2	
	39	9		9-6-6	SS 18				3	Clayey SAND, tan/brown, fine grained, medium dense to loose, slightly damp
									4	
108.2			4.8	5-7-13	R 18		SC		5	
									6	
									7	
									8	Grades to silty sand
							SM		9	Silty SAND, tan/brown, fine grained, loose, slightly damp
				3-3-3	SS 18				10	
									11	
									12	Clayey SAND, tan/brown to orange, fine grained, loose, slightly damp to damp
									13	
									14	
				4-7-9	R 18				15	
									16	
									17	
									18	
									19	
									20	
				3-3-3	SS 18				21	Grades to sandy lean clay
									22	Sandy lean CLAY, brown, stiff, damp
									23	
									24	
									25	
				4-7-8	R 18		CL		26	
									27	
									28	
									29	
									30	
				50/6"	SS 6		RK		31	SILTSTONE, gray, weakly cemented, slight to moderately weathered, slightly damp
									32	
									33	Total Depth 30½ feet
									34	
									35	

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GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC.
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-7

Project Name: WEU and Rincon Fracking Ponds
Project Number: 182-2992
Client: Enduring Resources
Site Location: Sandoval/Rio Arriba Counties, NM
Rig Type: CME-55
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 4/24/2018
Latitude: Not Determined
Longitude: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: None Encountered
Logged By: SY
Remarks: Rincon Pond

Laboratory Results										
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
							SC		1	Clayey SAND with trace gravel, tan/brown, fine- to coarse grained, loose, slightly damp (FILL)
									2	
				6-8-8	SS 6				3	Clayey SAND, tan/brown, fine grained, medium dense, slightly damp
									4	
				10-16-24	R 18				5	
									6	
									7	
									8	
									9	
				5-6-6	SS 18		SC		10	
									11	
									12	
									13	
									14	
									15	
				6-9-11	R 18				16	loose
									17	Grades to sandy lean clay
									18	
									19	Sandy lean CLAY, brown, stiff, damp
	52	14		3-4-5	SS 18				20	
									21	
									22	
									23	
									24	
				5-7-10	R 18		CL		25	
									26	
									27	
									28	
									29	
				5-6-7	SS 18				30	Purple/brown to gray, contains trace gravel and calcareous veins
									31	
									32	Total Depth 31½ feet
									33	
									34	
									35	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample

GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

GEOMAT INC
915 Malta Avenue
Farmington, NM 87401
Tel (505) 327-7928
Fax (505) 326-5721

Borehole B-8

Project Name:	WEU and Rincon Fracking Ponds	Date Drilled:	4/24/2018
Project Number:	182-2992	Latitude:	Not Determined
Client:	Enduring Resources	Longitude:	Not Determined
Site Location:	Sandoval/Rio Arriba Counties, NM	Elevation:	Not Determined
Rig Type:	CME-55	Boring Location:	See Site Plan
Drilling Method:	7.25" O.D. Hollow Stem Auger	Groundwater Depth:	None Encountered
Sampling Method:	Ring and Split spoon samples	Logged By:	SY
Hammer Weight:	140 lbs	Remarks:	Rincon Pond
Hammer Fall:	30 inches		

Laboratory Results				Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)							
							SC		1	Clayey SAND with trace gravel, tan/brown, fine- to coarse grained, loose, slightly damp (FILL)
									2	
				5-5-7	R 18				3	Clayey SAND, tan/brown, fine grained, loose, slightly damp
									4	
				3-3-3	SS 18				5	
									6	
									7	
									8	
									9	
				5-7-8	R 18		SC		10	
									11	
									12	
									13	
									14	
									15	
				3-4-5	SS 18				16	Gray/brown, higher clay content
									17	
									18	Grades to sandy lean clay
									19	
				4-5-9	R 18				20	Sandy lean CLAY, brown, stiff, damp
									21	
									22	
									23	
									24	
				4-5-7	SS 18		CL		25	
									26	Wet zone from approximately 23 to 25½ feet
									27	
									28	
									29	
									30	
				5-11-15	R 18				31	Purple/brown to gray, contains trace gravel and calcareous veins
									32	
									33	Total Depth 31½ feet
									34	
									35	

A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample

GEOMAT 182-2992.GPJ GEOMAT.GDT 5/14/18

UNIFIED SOIL CLASSIFICATION SYSTEM					CONSISTENCY OR RELATIVE DENSITY CRITERIA
Major Divisions			Group Symbols	Typical Names	
Coarse-Grained Soils More than 50% retained on No. 4 sieve	**Gravels** 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Standard Penetration Test Density of Granular Soils
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Penetration Resistance, N (blows/ft.) — Relative Density
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures	0-4 Very Loose
			GC	Clayey gravels, gravel-sand-clay mixtures	5-10 Loose
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	11-30 Medium Dense
			SP	Poorly graded sands and gravelly sands, little or no fines	31-50 Dense
		Sands with Fines	SM	Silty sands, sand-silt mixtures	>50 Very Dense
			SC	Clayey sands, sand-clay mixtures	Standard Penetration Test Density of Fine-Grained Soils
Fine-Grained Soils 50% or more passes No. 200 sieve	**Silts and Clays** Liquid Limit 50 or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Penetration Resistance, N (blows/ft.) — Consistency — Unconfined Compressive Strength (Tons/ft2)
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	<2 Very Soft <0.25
			OL	Organic silts and organic silty clays of low plasticity	2-4 Soft 0.25-0.50
	Silts and Clays Liquid Limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts	4-8 Firm 0.50-1.00
			CH	Inorganic clays of high plasticity, fat clays	8-15 Stiff 1.00-2.00
			OH	Organic clays of medium to high plasticity	15-30 Very Stiff 2.00-4.00
Highly Organic Soils			PT	Peat, mucic & other highly organic soils	>30 Hard >4.0

U.S. Standard Sieve Sizes

>12"	12"	3"	3/4"	#4	#10	#40	#200
Boulders	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS	
Dry	Absence of moist, dusty, dry to the touch
Slightly Damp	Below optimum moisture content for compaction
Moist	Near optimum moisture content, will moisten the hand
Very Moist	Above optimum moisture content
Wet	Visible free water, below water table

MATERIAL QUANTITY	
trace	0-5%
few	5-10%
little	10-25%
some	25-45%
mostly	50-100%

OTHER SYMBOLS	
R	Ring Sample
S	SPT Sample
B	Bulk Sample
▼	Ground Water

BASIC LOG FORMAT:

Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.

EXAMPLE:

SILTY SAND w/trace silt (SM-SP), Brown, loose to med. Dense, fine to medium grained, damp

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST DRILLING EQUIPMENT & PROCEDURES

Description of Subsurface Exploration Methods

Drilling Equipment – Truck-mounted drill rigs powered with gasoline or diesel engines are used in advancing test borings. Drilling through soil or softer rock is performed with hollow-stem auger or continuous flight auger. Carbide insert teeth are normally used on bits to penetrate soft rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid.

Sampling Procedures - Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In most cases, 2" outside diameter, 1 3/8" inside diameter, samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3" outside diameter samplers lined with 2.42" inside diameter brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samplers in 6-inch increments. These values are expressed in blows per foot on the boring logs. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. "Undisturbed" sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113).

Boring Records - Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the logs.

Appendix B

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	ASTM D698		MOISTURE CONT. (%)	DENSITY		ATTERBERG LIMITS			SWELL (%)	DIRECT SHEAR	% PASS #200 SIEVE	CLASSIFICATION
			Density	Moisture		WET (pcf)	DRY (pcf)	LL	PL	PI				
WEU														
6294	B1	10	--	--	--	--	--	23	17	6	--	--	41	SC-SM; Silty, Clayey **SAND**
6295	B2	2.5	--	--	--	--	--	NLL	NPL	NP	--	--	28	SM; Silty **SAND**
6327	B1	2.5	--	--	4.7	119.1	113.8	--	--	--	--	--	--	--
6328	B1	10	--	--	2.9	106.9	103.8	--	--	--	--	--	--	--
6330	B2	5	--	--	5.2	119.2	113.3	--	--	--	--	--	--	--
6331	B2	15	--	--	4.0	109.4	105.2	--	--	--	--	--	--	--
6333	B3	5	--	--	5.7	117.5	111.2	--	--	--	--	--	--	--
6334	B3	15	--	--	4.4	115.2	110.4	--	--	--	--	--	--	--
6336	B4	2.5	--	--	5.0	122.1	116.4	--	--	--	--	--	--	--
6337	B4	10	--	--	9.6	125.1	114.2	--	--	--	--	--	--	--
Rincon			--	--	--	--	--	--	--	--	--	--	--	
6296	B6	2.5	--	--	--	--	--	22	13	9	--	--	39	SC; Clayey **SAND**
6297	B7	20	--	--	--	--	--	27	13	14	--	--	52	CL; Sandy Lean **CLAY**
6339	B5	20	--	--	9.7	124.3	113.3	--	--	--	--	--	--	--
6340	B6	5	--	--	4.8	113.4	108.2	--	--	--	--	--	--	--
6341	B5	10	--	--	--	--	--	--	--	--	--	Attached		--
6342	B6	15	--	--	--	--	--	--	--	--	--	Attached		--
6343	B7	5	--	--	--	--	--	--	--	--	--	Attached		--

GEOMAT INC.

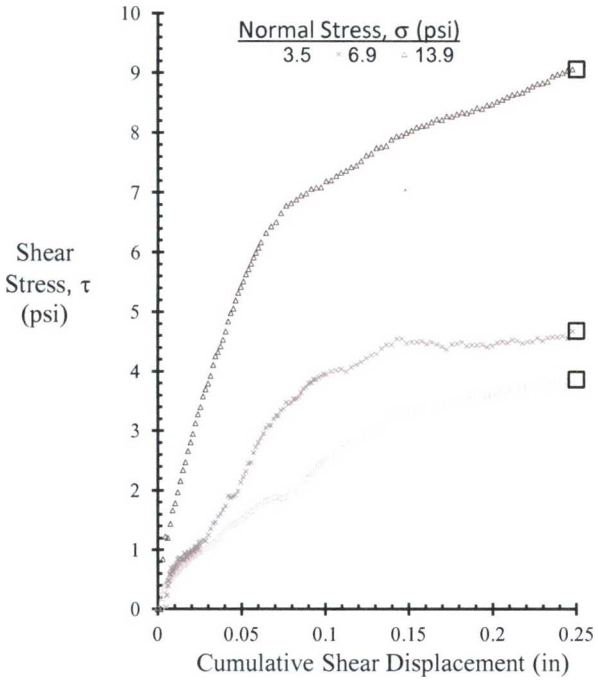
SUMMARY OF SOIL TESTS

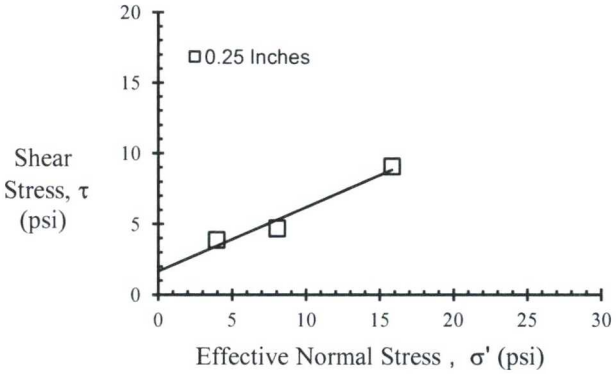
Project	WEU & Rincon Fracking Ponds
Job No.	182-2992
Location	Sandoval & Rio Arriba Counties
Date Drilled	4/23/2018

Direct Shear of Soil Under Consolidated-Drained Conditions

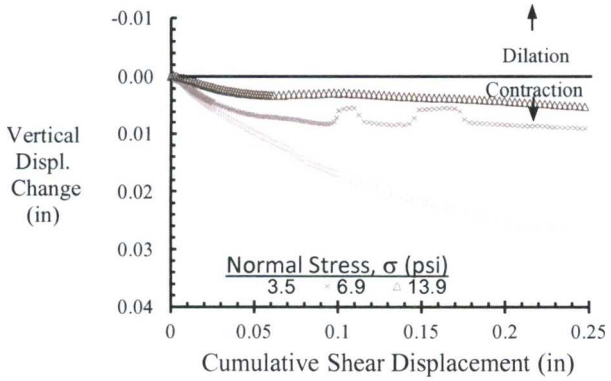
Client: GEOMAT, Inc.
Project: WEU & Rincon Ponds
Sample: B5 @ 10 ft

TRI Log#: 37181.1
Test Method: ASTM D3080





Note: Area Correction Has Been Applied



Sample Number		1	2	3
Initial Condition	Diameter, in	2.50	2.50	2.50
	Height, in (before consol)	1.00	1.00	1.00
	Water Content, %	9.8	9.9	9.5
	Saturation, %	34.4	46.3	44.6
	Dry Density, pcf	94.4	105.7	105.8
	Void Ratio	0.75	0.56	0.56
Post-Consol	Height, in (prior to shear)	0.99	1.00	1.00
	Dry Density, pcf	95.2	105.9	106.3
	Void Ratio	0.74	0.56	0.56
Displacement rate (in/min)		6.0E-04	6.0E-04	6.0E-04
Final Water Content, %		24.1	22.6	18.5
Peak	Normal Stress, σ' (psi)	-	-	-
	Shear Stress, τ (psi)	-	-	-
	Displacement (in)	-	-	-
	ϕ'_d, degrees	-		
	c'_d, psi	-		
0.25 Inches	Normal Stress, σ' (psi)	3.95	8.05	15.84
	Shear Stress, τ (psi)	3.86	4.68	9.05
	Secant Friction Angle, Degrees	44.3	30.2	29.8
	ϕ'_d, degrees	24.4		
	c'_d, psi	1.7		

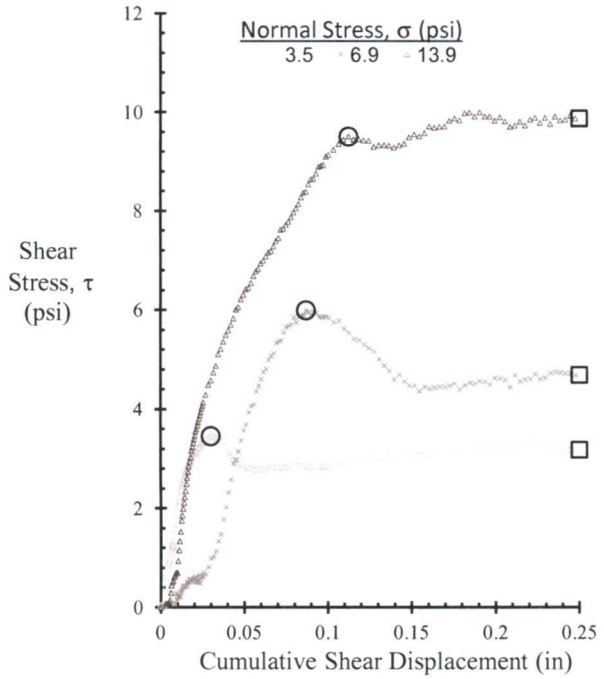
Note: The undisturbed soil samples were extruded and trimmed using a trimming turntable. A specific gravity of 2.65 was assumed for weight-volume calculations.

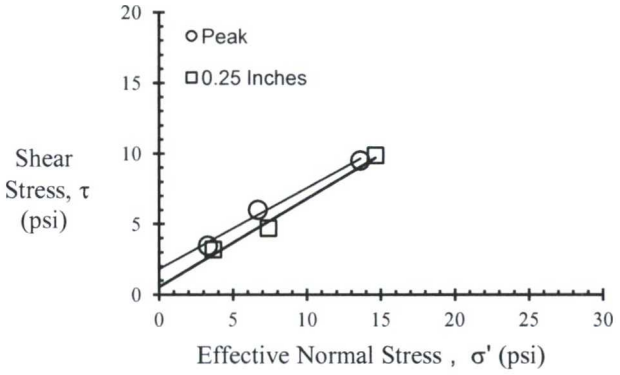
Jeffrey A. Kuhn, Ph.D., P.E., 5/9/18
Analysis & Quality Review/Date

Direct Shear of Soil Under Consolidated-Drained Conditions

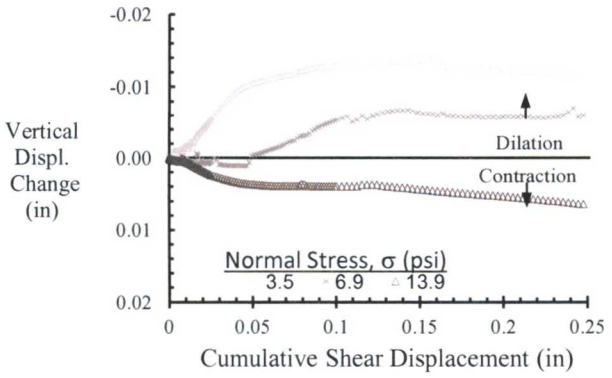
Client: GEOMAT Inc.
Project: WEU & Rincon Ponds
Sample: B6 @ 15 ft

TRI Log#: 37181.2
Test Method: ASTM D3080





Note: Area Correction Has Been Applied



Sample Number		1	2	3
Initial Condition	Diameter, in	2.50	2.50	2.50
	Height, in (before consol)	1.00	1.00	1.00
	Water Content, %	12.4	15.7	14.2
	Saturation, %	60.3	72.1	60.5
	Dry Density, pcf	107.0	104.8	101.8
	Void Ratio	0.54	0.58	0.62
Post-Consol	Height, in (prior to shear)	1.00	1.00	1.00
	Dry Density, pcf	107.2	104.9	102.3
	Void Ratio	0.54	0.58	0.62
Displacement rate (in/min)		6.0E-04	6.0E-04	6.0E-04
Final Water Content, %		18.4	18.1	20.3
Peak	Normal Stress, σ' (psi)	3.31	6.69	13.62
	Shear Stress, τ (psi)	3.45	5.99	9.50
	Displacement (in)	0.03	0.09	0.11
	ϕ'_d, degrees	29.9		
	c'_d, psi	1.8		
0.25 Inches	Normal Stress, σ' (psi)	3.69	7.39	14.64
	Shear Stress, τ (psi)	3.18	4.68	9.87
	Secant Friction Angle, Degrees	40.8	32.4	34.0
	ϕ'_d, degrees	32.0		
	c'_d, psi	0.5		

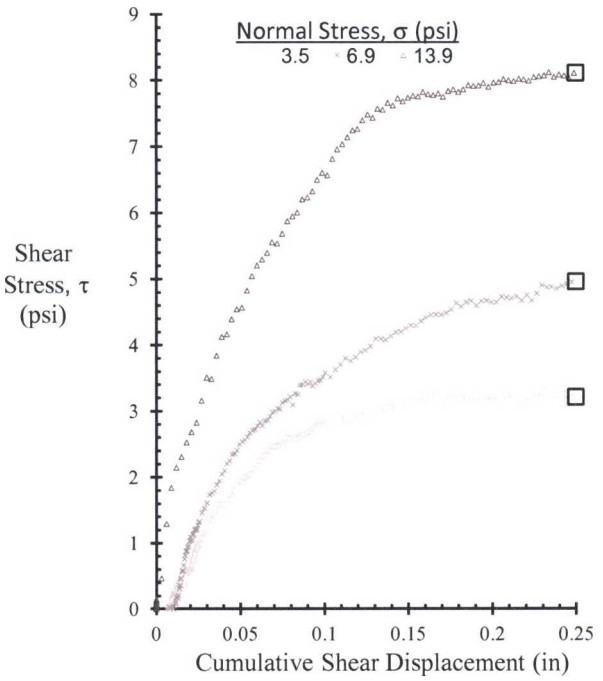
Note: The undisturbed soil samples were extruded and trimmed using a trimming turntable. A specific gravity of 2.65 was assumed for weight-volume calculations.

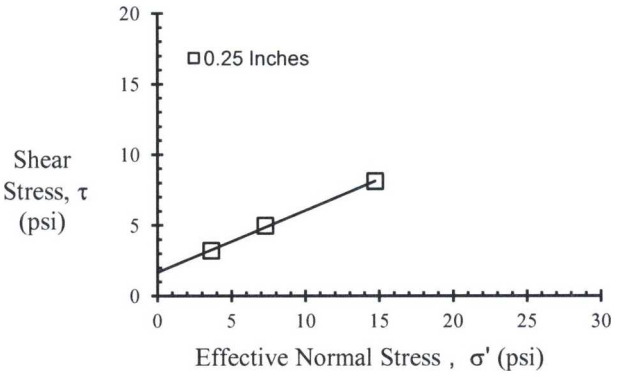
Jeffrey A. Kuhn, Ph.D., P.E., 5/10/18
Analysis & Quality Review/Date

Direct Shear of Soil Under Consolidated-Drained Conditions

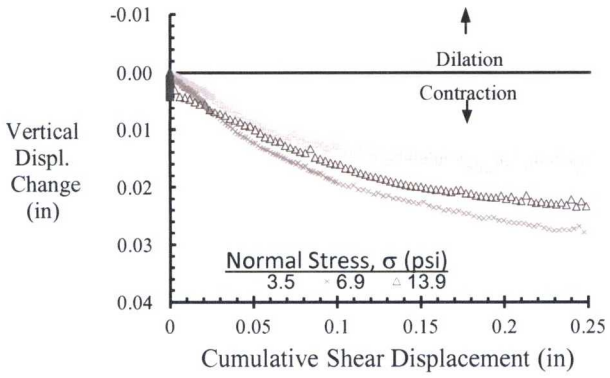
Client: GEOMAT, Inc.
Project: WEU & Rincon Ponds
Sample: B7 @ 5 ft

TRI Log#: 37181.3
Test Method: ASTM D3080





Note: Area Correction Has Been Applied



Sample Number		1	2	3
Initial Condition	Diameter, in	2.50	2.50	2.50
	Height, in (before consol)	1.00	1.00	1.00
	Water Content, %	7.4	11.1	11.6
	Saturation, %	23.8	26.6	42.8
	Dry Density, pcf	91.0	78.6	96.1
	Void Ratio	0.82	1.10	0.72
Post-Consol	Height, in (prior to shear)	0.99	1.00	0.98
	Dry Density, pcf	91.5	78.6	98.2
	Void Ratio	0.81	1.10	0.68
Displacement rate (in/min)		6.0E-04	6.0E-04	6.0E-04
Final Water Content, %		26.0	28.5	28.6
Peak	Normal Stress, σ' (psi)	-	-	-
	Shear Stress, τ (psi)	-	-	-
	Displacement (in)	-	-	-
	ϕ'_d, degrees	-		
	c'_d, psi	-		
0.25 Inches	Normal Stress, σ' (psi)	3.63	7.30	14.73
	Shear Stress, τ (psi)	3.21	4.96	8.11
	Secant Friction Angle, Degrees	41.5	34.2	28.8
	ϕ'_d, degrees	23.7		
	c'_d, psi	1.7		

Note: The undisturbed soil samples were extruded and trimmed using a trimming turntable. A specific gravity of 2.65 was assumed for weight-volume calculations.

Jeffrey A. Kuhn, Ph.D., P.E., 5/10/18
Analysis & Quality Review/Date

LABORATORY TESTING PROCEDURES

Consolidation Tests: One-dimensional consolidation tests are performed using "Floating-ring" type consolidometers. The test samples are approximately 2.5 inches in diameter and 1.0 inch high and are usually obtained from test borings using the dynamically-driven ring samplers. Test procedures are generally as outlined in ASTM D2435. Loads are applied in several increments to the upper surface of the test specimen and the resulting deformations are recorded at selected time intervals for each increment. Samples are normally loaded in the in-situ moisture conditions to loads which approximate the stresses which will be experienced by the soils after the project is completed. Samples are usually then submerged to determine the effect of increased moisture contents on the soils. Each load increment is applied until compression/expansion of the sample is essentially complete (normally movements of less than 0.0003 inches/hour). Porous stones are placed on the top and bottom surfaces of the samples to facilitate introduction of the moisture.

Expansion Tests: Tests are performed on either undisturbed or recompacted samples to evaluate the expansive potential of the soils. The test samples are approximately 2.5 inches in diameter and 1.0 inch high. Recompacted samples are typically remolded to densities and moisture contents that will simulate field compaction conditions. Surcharge loads normally simulate those which will be experienced by the soils in the field. Surcharge loads are maintained until the expansion is essentially complete.

Atterberg Limits/Maximum Density/Optimum Moisture Tests: These tests are performed in accordance with the prescribed ASTM test procedures.

Appendix C

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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GEOMAT INC.
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October 8, 2018

James McDaniel
Enduring Resources
332 CR 3100
Aztec, New Mexico 87410

RE: Geotechnical Engineering Study - Addendum No. 1
Lowry Camp Rincon Unit Fracking Water Pond
Sandoval County, New Mexico
GEOMAT Project No. 182-2992

The purpose of this letter report is to provide updated recommendations based upon revised information related to the design and construction of the Lowry Camp Rincon Unit (Rincon) fracking water pond located in in Rio Arriba County, New Mexico. This letter report should be considered as Addendum No. 1 to our Geotechnical Engineering Report No. 182-2992, dated May 16, 2018, and made a part thereof.

As requested by Enduring Resources in a meeting and confirmed in correspondence dated July 18, 2018, GEOMAT Inc. (GEOMAT) advanced two supplemental borings at the Rincon site to obtain additional samples specifically for evaluation of soil properties. The supplemental borings and analysis were a result of changes to the design of the pond from a fully incised pond to a partially incised pond with constructed embankments on the order of 2 to 15 feet. The proposed changes are shown in the attached 30% review drawings from Souder, Miller and Associates (SMA) as provided by Enduring Resources to GEOMAT on August 29, 2018.

PROJECT DESCRIPTION

Our scope of services performed for this addendum included advancing supplemental borings for sampling, laboratory testing of the samples and engineering analyses.

Field Work:

Supplemental samples were obtained from the Rincon site for laboratory analysis on July 20, 2018. Two additional exploratory borings, designated B-9 and B-10 were advanced at the approximate locations shown on the attached Site Plan. Borings were drilled to depths of approximately 20 feet below existing ground surface (bgs). The borings were advanced using a CME-55 truck-mounted drill rig with continuous-flight, 7.25-inch O.D. hollow-stem auger. Representative bulk samples of subsurface materials were obtained from the auger cuttings.

LABORATORY ANALYSIS

Laboratory Testing:

Bulk samples retrieved during the field exploration were transported to our laboratory for further evaluation. At that time, the samples were prepared and laboratory tests were performed to evaluate the engineering properties of the subsurface materials. Samples were compiled and sent to Knight Piésold and Co. - Soils Laboratory (KP) for direct shear testing remolded to approximately 95 percent of the maximum dry density and optimum moisture content as determined by ASTM D698.

Laboratory Test Results:

Laboratory analyses of the bulk samples tested indicate the soils had fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) of 49 and 51 percent for supplemental borings B-9 and B-10, respectively. This is consistent with data from the May 2018 report. Plasticity indices for B-9 and B-10 were 9 and 6, respectively. Results of the ASTM D698 proctor test indicated maximum dry densities of 115.7 pcf and 116.2 pcf with optimum moisture contents of 12.5% and 12.6% for samples from B-9 and B-10, respectively.

Direct shear results of remolded samples from B-9 and B-10, indicate an effective friction angle, θ', of approximately 28.6° and 31.1°, respectively and an effective cohesion, c', of approximately 86 psf and 41 psf for B-9 and B-10, respectively. Weighted averages of these values, equaling 30^{o} for friction angle and 70 psf for cohesion, were utilized along with a dry density of 110 pcf in slope stability analysis of the revised pond embankments constructed with engineered fill at 95% compaction as recommended.

Results of both the GEOMAT testing and the KP direct shear are attached in Appendix B.

ENGINEERING ANALYSIS

Slope Stability Analysis:

A slope stability analysis was performed to evaluate both the cut slope inclinations for the incised portion of the pond and the constructed pond embankment. Data was taken directly from the supplied designs. Analysis was performed for the revised pond designs provided with 2.5:1 internal slopes with 3.0:1 external slopes (horizontal:vertical). A minimum access roadway width of 12 feet on the top of the pond embankments was used in the analyses. Light vehicle loads were added to the model as two 1500-pound point loads to represent the axle loads. Galena Slope Stability software (version 6.1) was used in developing our recommendations.

Seismic Considerations:

Seismic design parameters for the proposed KWU recycling pond were obtained utilizing the U.S. Geological Survey's (USGS) Unified Hazard Tool located at the web address - https://earthquake.usgs.gov/hazards/interactive/. The site replaces previously available information from the USGS and is part of the probabilistic seismic hazard analysis (PSHA) platform developed and maintained by the National Seismic Hazard Mapping Project (NSHMP) within the USGS earthquake hazards program.

The Earthquake Hazard and Probability Map for the Conterminous U.S. for 2014 (version 4.0.x) was selected to display the peak ground acceleration for n event with a probability of 2% in 50 years. From the projects location the site classification was determined to be on the B/C boundary. The resulting peak force produced an earthquake coefficient of 0.1006, which was enter into the Galena models for all sections to represent an overlying earthquake force.

Note that the seismic site classification was estimated based on site location, the results of our subsurface exploration, experience with similar projects in the area, and a review of a geologic map of the project area. Additional exploration to greater depths would be required to verify the subsurface conditions below the depth explored for this report.

Slope Stability Analysis Results:

Graphical printouts are attached in the Appendix and results are included in Table 1 below.

Table 1 - Slope Stability Analysis.

			Factor of Safety	
		Slope	**Base**	**Seismic Applied**
Embankment	Internal Slope	2.5:1	2.02	1.59
Embankment	External Slope	3.0:1	2.25	1.72

Based on the results of our subsurface exploration, laboratory testing, and engineering analyses, the designed grades of the incised pond walls and the constructed embankments are acceptable at the proposed 2.5:1 internal and 3:1 external in the site soils if constructed as recommended herein.

If the project scope changes further or is altered, GEOMAT should be notified to review the plans and confirm or modify our recommendations as necessary.

Pond Design and Construction:

The revised fracking water pond design including pond embankments could be constructed as partially incised with embankments as proposed. The double HDPE liner system should be installed in accordance with the manufacturer's recommendations. Compaction of the subgrade within the incised portions of the pond below the liner should be in accordance with the liner manufacturer's recommendations. Subgrade and fill for the embankments should be constructed in accordance with the **Placement and Compaction** section of the original geotechnical report. Embankment fills should be compacted to a minimum 95 percent of the maximum dry density as determined by ASTM D698 at near optimum moisture content in lifts not exceeding 10-inches in loose thickness.

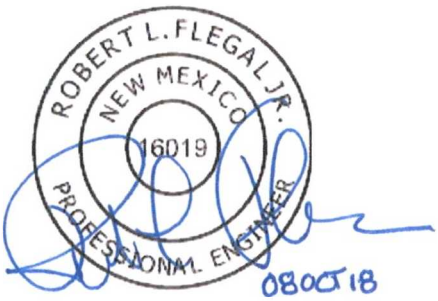
GENERAL COMMENTS

Our recommendations with respect to the construction of the NUE pond are based on the information obtained from the supplemental borings and remain consistent with those given in the original report. It should be realized that subsurface conditions could vary across the extent of the pond area, and these variations may not become apparent until construction is underway. If, during construction, soil types other than those encountered during our exploration are encountered, we should be contacted to observe the actual conditions and confirm/modify our recommendations, as appropriate. It is recommended that GEOMAT be retained to provide a general review of final design plans and specifications in order to confirm that grading recommendations in this report have been interpreted and implemented. In the event that any changes of the proposed project are planned, the opinions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

GEOMAT should also be retained to provide services during excavation, grading, and construction phases of the work. Construction testing, including field and laboratory evaluation of fill, backfill, and compacted slopes should be performed to determine whether applicable project requirements have been met.

We have appreciated being of service to you in the geotechnical engineering phase of this project. If you have any questions or concerns regarding this addendum or the associated report, please feel free to contact us.

Sincerely yours,
GEOMAT Inc.

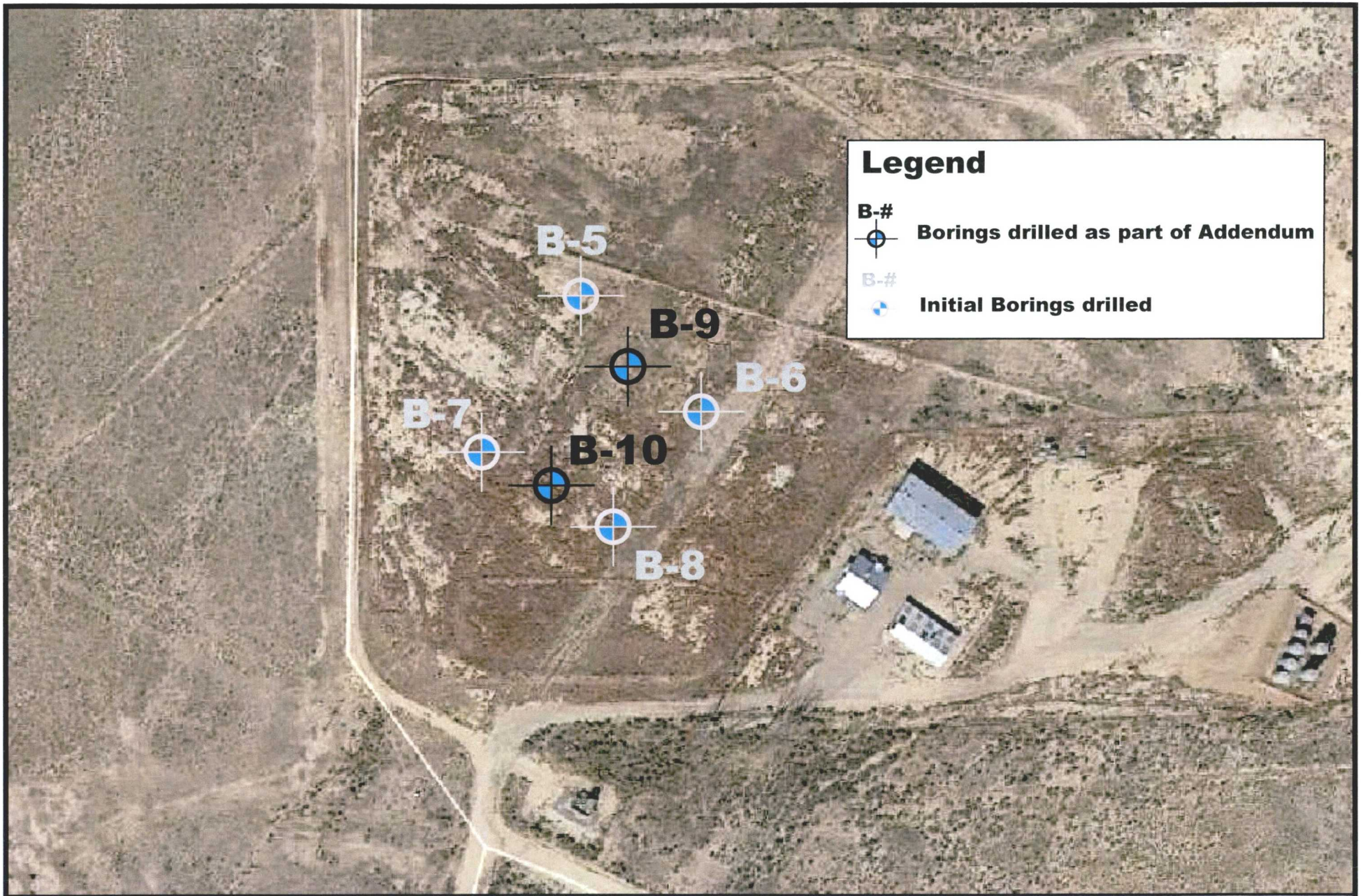


Robert "Bob" Flegal, P.E.
Senior Engineer

Matthew J. Cramer, P.E.
President

Copies to: Addressee (1); Heather McDaniel, P.E., C.F.M., SMA both via E-mail

Attachments: Vicinity Map
Site Plan (Supplemental Borings)
Laboratory Test Results
SMA 30% Review Site Grading & Drainage Plan
Slope Stability Figures



Approximate Not to Scale	SITE PLAN Boring Locations (approximate) GEOMAT Project No. 182-2992 Date of Exploration: April 24 & July 20, 2018	PROJECT Rincon Pond Enduring Resources Rio Arriba County, New Mexico

GEOMAT INC.

UNIFIED SOIL CLASSIFICATION SYSTEM					CONSISTENCY OR RELATIVE DENSITY CRITERIA		
Major Divisions			Group Symbols	Typical Names			
Coarse-Grained Soils More than 50% retained on No. 200 sieve	**Gravels** 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Standard Penetration Test Density of Granular Soils		
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Penetration Resistance, N (blows/ft.)	Relative Density	
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures	0-4	Very Loose	
			GC	Clayey gravels, gravel-sand-clay mixtures	5-10	Loose	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	11-30	Medium Dense	
			SP	Poorly graded sands and gravelly sands, little or no fines	31-50	Dense	
		Sands with Fines	SM	Silty sands, sand-silt mixtures	>50	Very Dense	
			SC	Clayey sands, sand-clay mixtures	Standard Penetration Test Density of Fine-Grained Soils		
Fine-Grained Soils 50% or more passes No. 200 sieve	**Silts and Clays** Liquid Limit 50 or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Penetration Resistance, N (blows/ft.)	Consistency	Unconfined Compressive Strength (Tons/ft2)
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	<2	Very Soft	<0.25
			OL	Organic silts and organic silty clays of low plasticity	2-4	Soft	0.25-0.50
	Silts and Clays Liquid Limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts	4-8	Firm	0.50-1.00
			CH	Inorganic clays of high plasticity, fat clays	8-15	Stiff	1.00-2.00
			OH	Organic clays of medium to high plasticity	15-30	Very Stiff	2.00-4.00
Highly Organic Soils			PT	Peat, mucic & other highly organic soils	>30	Hard	>4.0

U.S. Standard Sieve Sizes

>12"	12"	3"	3/4"	#4	#10		#40	#200	
Boulders	Cobbles	Gravel			Sand				Silt or Clay
		coarse	fine		coarse	medium		fine	

MOISTURE CONDITIONS	
Dry	Absence of moist, dusty, dry to the touch
Slightly Damp	Below optimum moisture content for compaction
Moist	Near optimum moisture content, will moisten the hand
Very Moist	Above optimum moisture content
Wet	Visible free water, below water table

MATERIAL QUANTITY	
trace	0-5%
few	5-10%
little	10-25%
some	25-45%
mostly	50-100%

OTHER SYMBOLS	
R	Ring Sample
S	SPT Sample
B	Bulk Sample
▼	Ground Water

BASIC LOG FORMAT:

Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.

EXAMPLE:

SILTY SAND w/trace silt (SM-SP), Brown, loose to med. Dense, fine to medium grained, damp

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST DRILLING EQUIPMENT & PROCEDURES

Description of Subsurface Exploration Methods

Drilling Equipment – Truck-mounted drill rigs powered with gasoline or diesel engines are used in advancing test borings. Drilling through soil or softer rock is performed with hollow-stem auger or continuous flight auger. Carbide insert teeth are normally used on bits to penetrate soft rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid.

Sampling Procedures - Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In most cases, 2" outside diameter, 1 3/8" inside diameter, samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3" outside diameter samplers lined with 2.42" inside diameter brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samplers in 6-inch increments. These values are expressed in blows per foot on the boring logs. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. "Undisturbed" sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113).

Boring Records - Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the logs.

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	ASTM D698		MOISTURE CONT. (%)	DENSITY		ATTERBERG LIMITS			SWELL (%)	DIRECT SHEAR	% PASS #200 SIEVE	CLASSIFICATION
			Density	Moisture		WET (pcf)	DRY (pcf)	LL	PL	PI				
WEU														
6294	B1	10	--	--	--	--	--	23	17	6	--	--	41	SC-SM; Silty, Clayey **SAND**
6295	B2	2.5	--	--	--	--	--	NLL	NPL	NP	--	--	28	SM; Silty **SAND**
6327	B1	2.5	--	--	4.7	119.1	113.8	--	--	--	--	--	--	--
6328	B1	10	--	--	2.9	106.9	103.8	--	--	--	--	--	--	--
6330	B2	5	--	--	5.2	119.2	113.3	--	--	--	--	--	--	--
6331	B2	15	--	--	4.0	109.4	105.2	--	--	--	--	--	--	--
6333	B3	5	--	--	5.7	117.5	111.2	--	--	--	--	--	--	--
6334	B3	15	--	--	4.4	115.2	110.4	--	--	--	--	--	--	--
6336	B4	2.5	--	--	5.0	122.1	116.4	--	--	--	--	--	--	--
6337	B4	10	--	--	9.6	125.1	114.2	--	--	--	--	--	--	--
Rincon			--	--	--	--	--	--	--	--	--	--	--	
6296	B6	2.5	--	--	--	--	--	22	13	9	--	--	39	SC; Clayey **SAND**
6297	B7	20	--	--	--	--	--	27	13	14	--	--	52	CL; Sandy Lean **CLAY**
6339	B5	20	--	--	9.7	124.3	113.3	--	--	--	--	--	--	--
6340	B6	5	--	--	4.8	113.4	108.2	--	--	--	--	--	--	--
6341	B5	10	--	--	--	--	--	--	--	--	--	Included in 05/16/18 Report	--	--
6342	B6	15	--	--	--	--	--	--	--	--	--		--	--
6343	B7	5	--	--	--	--	--	--	--	--	--		--	--
6836[1]	B9	0 - 10.0	115.7	12.5	--	--	--	25	16	9	--	Attached	49	SC; Clayey **SAND**
6837[1]	B10	10 - 20.0	116.2	12.6	--	--	--	23	17	6	--	Attached	51	CL-ML; Silty **CLAY** with sand

GEOMAT INC.

SUMMARY OF SOIL TESTS

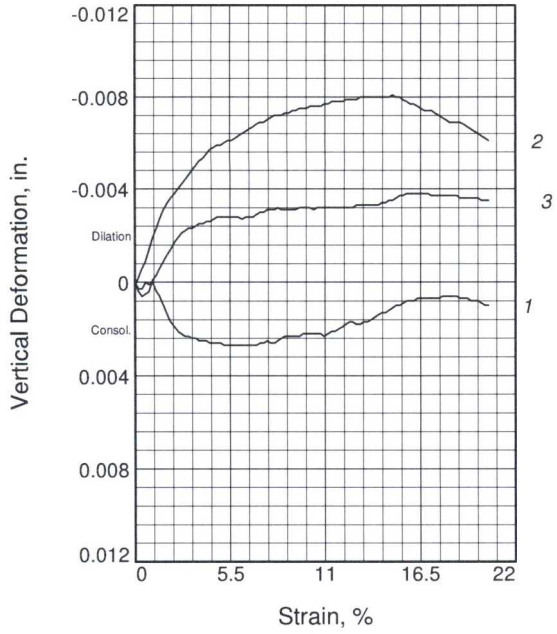
Project	WEU & Rincon Fracking Ponds
Job No.	182-2992
Location	Sandoval & Rio Arriba Counties
Date Drilled	4/23/2018 & [1]6/20/2018

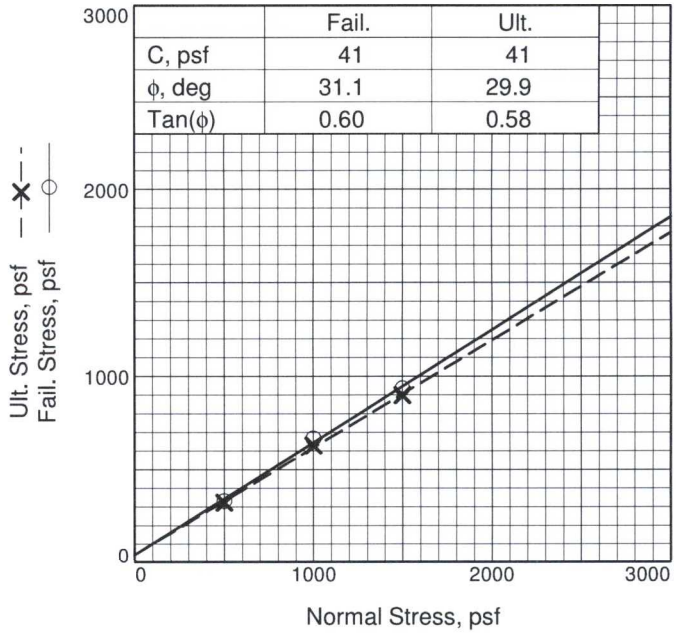
LABORATORY TESTING PROCEDURES

Consolidation Tests: One-dimensional consolidation tests are performed using "Floating-ring" type consolidometers. The test samples are approximately 2.5 inches in diameter and 1.0 inch high and are usually obtained from test borings using the dynamically-driven ring samplers. Test procedures are generally as outlined in ASTM D2435. Loads are applied in several increments to the upper surface of the test specimen and the resulting deformations are recorded at selected time intervals for each increment. Samples are normally loaded in the in-situ moisture conditions to loads which approximate the stresses which will be experienced by the soils after the project is completed. Samples are usually then submerged to determine the effect of increased moisture contents on the soils. Each load increment is applied until compression/expansion of the sample is essentially complete (normally movements of less than 0.0003 inches/hour). Porous stones are placed on the top and bottom surfaces of the samples to facilitate introduction of the moisture.

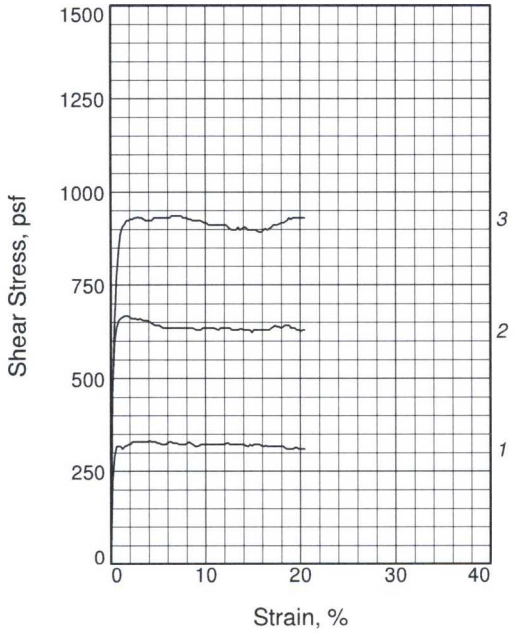
Expansion Tests: Tests are performed on either undisturbed or recompacted samples to evaluate the expansive potential of the soils. The test samples are approximately 2.5 inches in diameter and 1.0 inch high. Recompacted samples are typically remolded to densities and moisture contents that will simulate field compaction conditions. Surcharge loads normally simulate those which will be experienced by the soils in the field. Surcharge loads are maintained until the expansion is essentially complete.

Atterberg Limits/Maximum Density/Optimum Moisture Tests: These tests are performed in accordance with the prescribed ASTM test procedures.





	Fail.	Ult.
C, psf	41	41
ϕ, deg	31.1	29.9
Tan(ϕ)	0.60	0.58



Specimen No.		1	2	3
Initial	Water Content, %	13.1	13.1	13.2
	Dry Density, pcf	109.7	109.9	110.7
	Saturation, %	65.7	66.1	68.0
	Void Ratio	0.5372	0.5342	0.5230
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.4	19.3	18.6
	Dry Density, pcf	110.7	110.8	112.2
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5224	0.5215	0.5017
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.99	0.99
Normal Stress, psf		500	1000	1500
Fail. Stress, psf		332	667	936
Strain, %		4.1	1.4	6.4
Ult. Stress, psf		322	629	898
Strain, %		15.1	15.1	15.1
Strain rate, %/min.		0.04	0.04	0.04

Sample Type: Remolded
Description:

Assumed Specific Gravity= 2.7
Remarks: Failure chosen at peak shear stress and 15% strain. Test was inundated.

Figure _____

Client: Geomat

Project: Kimbeto, S.Escavada & Rincon Ponds

Sample Number: 6836 **Depth:** 0-10'

Proj. No.: DV108-00304/04 **Date Sampled:** 8/9/18

Knight Piésold CONSULTING

Tested By: EAG **Checked By:** JDB

DIRECT SHEAR TEST

8/18/2018

Date: 8/9/18
Client: Geomat
Project: Kimbeto, S.Escavada & Rincon Ponds
Project No.: DV108-00304/04
Depth: 0-10' **Sample Number:** 6836
Description:
Remarks: Failure chosen at peak shear stress and 15% strain. Test was inundated.
Type of Sample: Remolded
Assumed Specific Gravity=2.7 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	149.700		553.620
Moisture content: Dry soil+tare, gms.	132.390		528.000
Moisture content: Tare, gms.	0.000		395.610
Moisture, %	13.1	19.4	19.4
Moist specimen weight, gms.	149.7		
Diameter, in.	2.42	2.42	
Area, in.^{2}	4.60	4.60	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.0	132.1	
Dry density, pcf	109.7	110.7	
Void ratio	0.5372	0.5224	
Saturation, %	65.7	100.0	

Test Readings for Specimen No. 1

Load ring constant = 31.408 lbs. per input unit
Normal stress = 500 psf
Strain rate, %/min. = 0.04
Fail. Stress = 332 psf **at reading no.** 20
Ult. Stress = 322 psf **at reading no.** 73

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
0	0.0000	0.0000	0.0	0.0	0	0.0001
1	0.0050	0.2260	7.1	0.2	222	-0.0002
2	0.0100	0.2961	9.3	0.4	291	-0.0002
3	0.0150	0.3215	10.1	0.6	316	0.0001
4	0.0200	0.3215	10.1	0.8	316	0.0000
5	0.0250	0.3215	10.1	1.0	316	0.0001
6	0.0300	0.3152	9.9	1.2	310	-0.0003
7	0.0350	0.3215	10.1	1.4	316	-0.0005
8	0.0400	0.3247	10.2	1.7	319	-0.0009
9	0.0450	0.3279	10.3	1.9	322	-0.0013
10	0.0500	0.3279	10.3	2.1	322	-0.0016
11	0.0550	0.3343	10.5	2.3	329	-0.0018
12	0.0600	0.3343	10.5	2.5	329	-0.0020
13	0.0650	0.3343	10.5	2.7	329	-0.0021

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
14	0.0700	0.3343	10.5	2.9	329	-0.0022
15	0.0750	0.3343	10.5	3.1	329	-0.0022
16	0.0800	0.3343	10.5	3.3	329	-0.0023
17	0.0850	0.3343	10.5	3.5	329	-0.0023
18	0.0900	0.3343	10.5	3.7	329	-0.0024
19	0.0950	0.3343	10.5	3.9	329	-0.0024
20	0.1000	0.3375	10.6	4.1	332	-0.0024
21	0.1050	0.3343	10.5	4.3	329	-0.0025
22	0.1100	0.3343	10.5	4.5	329	-0.0025
23	0.1150	0.3343	10.5	4.8	329	-0.0025
24	0.1200	0.3311	10.4	5.0	326	-0.0025
25	0.1250	0.3311	10.4	5.2	326	-0.0026
26	0.1300	0.3279	10.3	5.4	322	-0.0026
27	0.1350	0.3279	10.3	5.6	322	-0.0026
28	0.1400	0.3279	10.3	5.8	322	-0.0026
29	0.1450	0.3311	10.4	6.0	326	-0.0026
30	0.1500	0.3343	10.5	6.2	329	-0.0026
31	0.1550	0.3343	10.5	6.4	329	-0.0026
32	0.1600	0.3311	10.4	6.6	326	-0.0026
33	0.1650	0.3311	10.4	6.8	326	-0.0026
34	0.1700	0.3311	10.4	7.0	326	-0.0026
35	0.1750	0.3279	10.3	7.2	322	-0.0025
36	0.1800	0.3279	10.3	7.4	322	-0.0025
37	0.1850	0.3279	10.3	7.6	322	-0.0024
38	0.1900	0.3279	10.3	7.9	322	-0.0025
39	0.1950	0.3311	10.4	8.1	326	-0.0025
40	0.2000	0.3343	10.5	8.3	329	-0.0024
41	0.2050	0.3311	10.4	8.5	326	-0.0023
42	0.2100	0.3279	10.3	8.7	322	-0.0022
43	0.2150	0.3215	10.1	8.9	316	-0.0022
44	0.2200	0.3215	10.1	9.1	316	-0.0022
45	0.2250	0.3247	10.2	9.3	319	-0.0022
46	0.2300	0.3279	10.3	9.5	322	-0.0022
47	0.2350	0.3279	10.3	9.7	322	-0.0021
48	0.2400	0.3279	10.3	9.9	322	-0.0021
49	0.2450	0.3279	10.3	10.1	322	-0.0021
50	0.2500	0.3279	10.3	10.3	322	-0.0021
51	0.2550	0.3279	10.3	10.5	322	-0.0021
52	0.2600	0.3279	10.3	10.7	322	-0.0021
53	0.2650	0.3279	10.3	11.0	322	-0.0022
54	0.2700	0.3279	10.3	11.2	322	-0.0021
55	0.2750	0.3279	10.3	11.4	322	-0.0020
56	0.2800	0.3279	10.3	11.6	322	-0.0020
57	0.2850	0.3279	10.3	11.8	322	-0.0019
58	0.2900	0.3279	10.3	12.0	322	-0.0018
59	0.2950	0.3311	10.4	12.2	326	-0.0017
60	0.3000	0.3311	10.4	12.4	326	-0.0016

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
61	0.3050	0.3279	10.3	12.6	322	-0.0016
62	0.3100	0.3279	10.3	12.8	322	-0.0017
63	0.3150	0.3279	10.3	13.0	322	-0.0017
64	0.3200	0.3279	10.3	13.2	322	-0.0016
65	0.3250	0.3279	10.3	13.4	322	-0.0016
66	0.3300	0.3279	10.3	13.6	322	-0.0015
67	0.3350	0.3279	10.3	13.8	322	-0.0014
68	0.3400	0.3279	10.3	14.0	322	-0.0013
69	0.3450	0.3247	10.2	14.3	319	-0.0012
70	0.3500	0.3215	10.1	14.5	316	-0.0012
71	0.3550	0.3279	10.3	14.7	322	-0.0011
72	0.3600	0.3247	10.2	14.9	319	-0.0010
73	0.3650	0.3279	10.3	15.1	322	-0.0009
74	0.3700	0.3279	10.3	15.3	322	-0.0009
75	0.3750	0.3279	10.3	15.5	322	-0.0008
76	0.3800	0.3279	10.3	15.7	322	-0.0007
77	0.3850	0.3247	10.2	15.9	319	-0.0007
78	0.3900	0.3215	10.1	16.1	316	-0.0007
79	0.3950	0.3247	10.2	16.3	319	-0.0006
80	0.4000	0.3215	10.1	16.5	316	-0.0006
81	0.4050	0.3215	10.1	16.7	316	-0.0006
82	0.4100	0.3215	10.1	16.9	316	-0.0006
83	0.4150	0.3215	10.1	17.1	316	-0.0006
84	0.4200	0.3215	10.1	17.4	316	-0.0006
85	0.4250	0.3215	10.1	17.6	316	-0.0006
86	0.4300	0.3215	10.1	17.8	316	-0.0005
87	0.4350	0.3215	10.1	18.0	316	-0.0005
88	0.4400	0.3215	10.1	18.2	316	-0.0005
89	0.4450	0.3184	10.0	18.4	313	-0.0005
90	0.4500	0.3152	9.9	18.6	310	-0.0005
91	0.4550	0.3152	9.9	18.8	310	-0.0006
92	0.4600	0.3152	9.9	19.0	310	-0.0006
93	0.4650	0.3152	9.9	19.2	310	-0.0006
94	0.4700	0.3184	10.0	19.4	313	-0.0007
95	0.4750	0.3184	10.0	19.6	313	-0.0007
96	0.4800	0.3152	9.9	19.8	310	-0.0007
97	0.4850	0.3152	9.9	20.0	310	-0.0008
98	0.4900	0.3152	9.9	20.2	310	-0.0009
99	0.4950	0.3152	9.9	20.5	310	-0.0009

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	149.990		533.360
Moisture content: Dry soil+tare, gms.	132.650		507.750
Moisture content: Tare, gms.	0.000		375.100
Moisture, %	13.1	19.3	19.3
Moist specimen weight, gms.	150.0		
Diameter, in.	2.42	2.42	
Area, in.^{2}	4.60	4.60	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.2	132.2	
Dry density, pcf	109.9	110.8	
Void ratio	0.5342	0.5215	
Saturation, %	66.1	100.0	

Test Readings for Specimen No. 2

Load ring constant = 31.408 lbs. per input unit

Normal stress = 1000 psf

Strain rate, %/min. = 0.04

Fail. Stress = 667 psf **at reading no.** 9

Ult. Stress = 629 psf **at reading no.** 75

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
0	0.0000	0.0000	0.0	0.0	0	0.0001
1	0.0010	0.0000	0.0	0.0	0	0.0000
2	0.0010	0.0287	0.9	0.0	28	0.0000
3	0.0050	0.4744	14.9	0.2	466	0.0003
4	0.0100	0.6081	19.1	0.4	598	0.0007
5	0.0150	0.6463	20.3	0.6	635	0.0010
6	0.0200	0.6654	20.9	0.8	654	0.0015
7	0.0250	0.6717	21.1	1.0	661	0.0020
8	0.0300	0.6749	21.2	1.2	664	0.0024
9	0.0350	0.6781	21.3	1.4	667	0.0028
10	0.0400	0.6781	21.3	1.7	667	0.0032
11	0.0450	0.6781	21.3	1.9	667	0.0035
12	0.0500	0.6749	21.2	2.1	664	0.0037
13	0.0550	0.6717	21.1	2.3	661	0.0039
14	0.0600	0.6717	21.1	2.5	661	0.0041
15	0.0650	0.6717	21.1	2.7	661	0.0043
16	0.0700	0.6686	21.0	2.9	657	0.0045
17	0.0750	0.6717	21.1	3.1	661	0.0047
18	0.0800	0.6686	21.0	3.3	657	0.0049
19	0.0850	0.6654	20.9	3.5	654	0.0051
20	0.0900	0.6654	20.9	3.7	654	0.0053
21	0.0950	0.6654	20.9	3.9	654	0.0054
22	0.1000	0.6622	20.8	4.1	651	0.0056
23	0.1050	0.6590	20.7	4.3	648	0.0058
24	0.1100	0.6558	20.6	4.5	645	0.0059
25	0.1150	0.6526	20.5	4.8	642	0.0060
26	0.1200	0.6526	20.5	5.0	642	0.0060

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
27	0.1250	0.6526	20.5	5.2	642	0.0061
28	0.1300	0.6495	20.4	5.4	639	0.0062
29	0.1350	0.6463	20.3	5.6	635	0.0062
30	0.1400	0.6463	20.3	5.8	635	0.0063
31	0.1450	0.6463	20.3	6.0	635	0.0064
32	0.1500	0.6463	20.3	6.2	635	0.0065
33	0.1550	0.6463	20.3	6.4	635	0.0066
34	0.1600	0.6463	20.3	6.6	635	0.0067
35	0.1650	0.6463	20.3	6.8	635	0.0068
36	0.1700	0.6463	20.3	7.0	635	0.0069
37	0.1750	0.6463	20.3	7.2	635	0.0070
38	0.1800	0.6463	20.3	7.4	635	0.0070
39	0.1850	0.6463	20.3	7.6	635	0.0071
40	0.1900	0.6463	20.3	7.9	635	0.0072
41	0.1950	0.6463	20.3	8.1	635	0.0073
42	0.2000	0.6463	20.3	8.3	635	0.0073
43	0.2050	0.6463	20.3	8.5	635	0.0073
44	0.2100	0.6463	20.3	8.7	635	0.0074
45	0.2150	0.6431	20.2	8.9	632	0.0074
46	0.2200	0.6399	20.1	9.1	629	0.0075
47	0.2250	0.6399	20.1	9.3	629	0.0075
48	0.2300	0.6399	20.1	9.5	629	0.0076
49	0.2350	0.6463	20.3	9.7	635	0.0076
50	0.2400	0.6463	20.3	9.9	635	0.0076
51	0.2450	0.6463	20.3	10.1	635	0.0077
52	0.2500	0.6463	20.3	10.3	635	0.0077
53	0.2550	0.6463	20.3	10.5	635	0.0077
54	0.2600	0.6463	20.3	10.7	635	0.0077
55	0.2650	0.6463	20.3	11.0	635	0.0078
56	0.2700	0.6431	20.2	11.2	632	0.0078
57	0.2750	0.6399	20.1	11.4	629	0.0079
58	0.2800	0.6463	20.3	11.6	635	0.0079
59	0.2850	0.6463	20.3	11.8	635	0.0079
60	0.2900	0.6463	20.3	12.0	635	0.0079
61	0.2950	0.6463	20.3	12.2	635	0.0080
62	0.3000	0.6463	20.3	12.4	635	0.0080
63	0.3050	0.6463	20.3	12.6	635	0.0080
64	0.3100	0.6399	20.1	12.8	629	0.0080
65	0.3150	0.6399	20.1	13.0	629	0.0081
66	0.3200	0.6399	20.1	13.2	629	0.0081
67	0.3250	0.6399	20.1	13.4	629	0.0081
68	0.3300	0.6431	20.2	13.6	632	0.0081
69	0.3350	0.6431	20.2	13.8	632	0.0081
70	0.3400	0.6399	20.1	14.0	629	0.0081
71	0.3450	0.6399	20.1	14.3	629	0.0081
72	0.3500	0.6399	20.1	14.5	629	0.0081
73	0.3550	0.6399	20.1	14.7	629	0.0081

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
74	0.3600	0.6335	19.9	14.9	623	0.0082
75	0.3650	0.6399	20.1	15.1	629	0.0081
76	0.3700	0.6399	20.1	15.3	629	0.0081
77	0.3750	0.6399	20.1	15.5	629	0.0080
78	0.3800	0.6399	20.1	15.7	629	0.0079
79	0.3850	0.6399	20.1	15.9	629	0.0078
80	0.3900	0.6399	20.1	16.1	629	0.0078
81	0.3950	0.6399	20.1	16.3	629	0.0077
82	0.4000	0.6399	20.1	16.5	629	0.0076
83	0.4050	0.6399	20.1	16.7	629	0.0075
84	0.4100	0.6463	20.3	16.9	635	0.0075
85	0.4150	0.6495	20.4	17.1	639	0.0075
86	0.4200	0.6526	20.5	17.4	642	0.0074
87	0.4250	0.6495	20.4	17.6	639	0.0073
88	0.4300	0.6495	20.4	17.8	639	0.0072
89	0.4350	0.6463	20.3	18.0	635	0.0071
90	0.4400	0.6495	20.4	18.2	639	0.0070
91	0.4450	0.6526	20.5	18.4	642	0.0070
92	0.4500	0.6526	20.5	18.6	642	0.0070
93	0.4550	0.6526	20.5	18.8	642	0.0070
94	0.4600	0.6463	20.3	19.0	635	0.0069
95	0.4650	0.6463	20.3	19.2	635	0.0068
96	0.4700	0.6463	20.3	19.4	635	0.0067
97	0.4750	0.6399	20.1	19.6	629	0.0066
98	0.4800	0.6399	20.1	19.8	629	0.0065
99	0.4850	0.6367	20.0	20.0	626	0.0064
100	0.4900	0.6399	20.1	20.2	629	0.0063
101	0.4950	0.6399	20.1	20.5	629	0.0062

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	151.210		561.350
Moisture content: Dry soil+tare, gms.	133.620		536.510
Moisture content: Tare, gms.	0.000		402.890
Moisture, %	13.2	18.6	18.6
Moist specimen weight, gms.	151.2		
Diameter, in.	2.42	2.42	
Area, in.²	4.60	4.60	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	125.2	133.1	
Dry density, pcf	110.7	112.2	
Void ratio	0.5230	0.5017	
Saturation, %	68.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 31.408 lbs. per input unit
Normal stress = 1500 psf
Strain rate, %/min. = 0.04
Fail. Stress = 936 psf **at reading no.** 31
Ult. Stress = 898 psf **at reading no.** 73

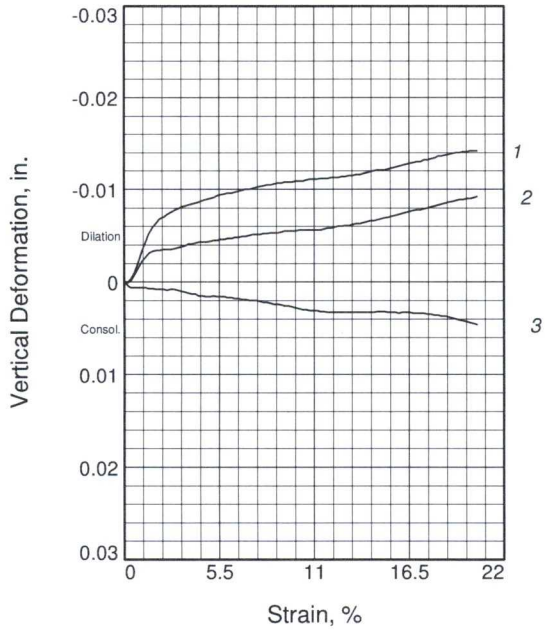
No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
0	0.0000	0.0000	0.0	0.0	0	0.0000
1	0.0050	0.4584	14.4	0.2	451	-0.0004
2	0.0100	0.6654	20.9	0.4	654	-0.0006
3	0.0150	0.7864	24.7	0.6	773	-0.0005
4	0.0200	0.8628	27.1	0.8	848	-0.0004
5	0.0250	0.9010	28.3	1.0	886	0.0001
6	0.0300	0.9201	28.9	1.2	905	0.0003
7	0.0350	0.9296	29.2	1.4	914	0.0006
8	0.0400	0.9392	29.5	1.7	923	0.0009
9	0.0450	0.9392	29.5	1.9	923	0.0012
10	0.0500	0.9424	29.6	2.1	927	0.0014
11	0.0550	0.9424	29.6	2.3	927	0.0017
12	0.0600	0.9455	29.7	2.5	930	0.0019
13	0.0650	0.9455	29.7	2.7	930	0.0021
14	0.0700	0.9487	29.8	2.9	933	0.0022
15	0.0750	0.9455	29.7	3.1	930	0.0023
16	0.0800	0.9455	29.7	3.3	930	0.0023
17	0.0850	0.9424	29.6	3.5	927	0.0024
18	0.0900	0.9392	29.5	3.7	923	0.0025
19	0.0950	0.9392	29.5	3.9	923	0.0025
20	0.1000	0.9392	29.5	4.1	923	0.0026
21	0.1050	0.9392	29.5	4.3	923	0.0026
22	0.1100	0.9455	29.7	4.5	930	0.0027
23	0.1150	0.9455	29.7	4.8	930	0.0028
24	0.1200	0.9455	29.7	5.0	930	0.0028
25	0.1250	0.9455	29.7	5.2	930	0.0028
26	0.1300	0.9455	29.7	5.4	930	0.0028

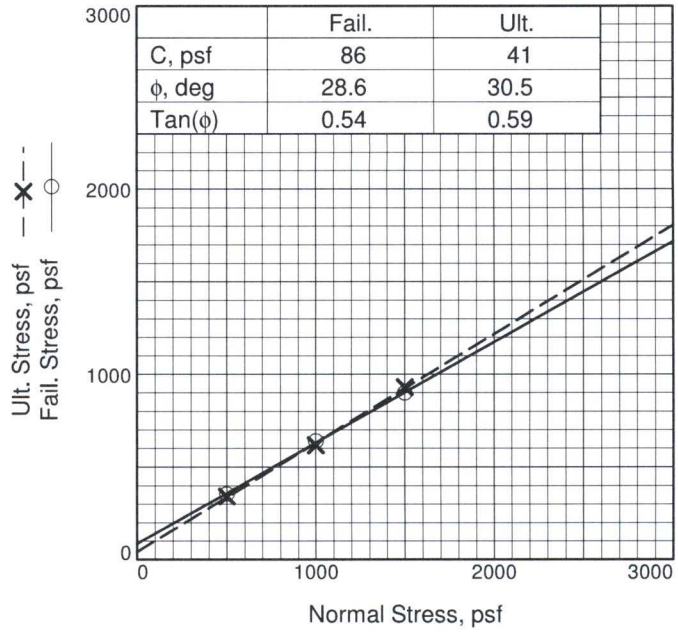
Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
27	0.1350	0.9455	29.7	5.6	930	0.0028
28	0.1400	0.9455	29.7	5.8	930	0.0028
29	0.1450	0.9455	29.7	6.0	930	0.0028
30	0.1500	0.9455	29.7	6.2	930	0.0027
31	0.1550	0.9519	29.9	6.4	936	0.0028
32	0.1600	0.9519	29.9	6.6	936	0.0028
33	0.1650	0.9519	29.9	6.8	936	0.0028
34	0.1700	0.9519	29.9	7.0	936	0.0029
35	0.1750	0.9519	29.9	7.2	936	0.0030
36	0.1800	0.9519	29.9	7.4	936	0.0030
37	0.1850	0.9455	29.7	7.6	930	0.0031
38	0.1900	0.9455	29.7	7.9	930	0.0031
39	0.1950	0.9455	29.7	8.1	930	0.0031
40	0.2000	0.9424	29.6	8.3	927	0.0032
41	0.2050	0.9424	29.6	8.5	927	0.0031
42	0.2100	0.9392	29.5	8.7	923	0.0031
43	0.2150	0.9392	29.5	8.9	923	0.0031
44	0.2200	0.9392	29.5	9.1	923	0.0031
45	0.2250	0.9392	29.5	9.3	923	0.0031
46	0.2300	0.9392	29.5	9.5	923	0.0032
47	0.2350	0.9360	29.4	9.7	920	0.0032
48	0.2400	0.9328	29.3	9.9	917	0.0032
49	0.2450	0.9328	29.3	10.1	917	0.0032
50	0.2500	0.9264	29.1	10.3	911	0.0031
51	0.2550	0.9264	29.1	10.5	911	0.0032
52	0.2600	0.9264	29.1	10.7	911	0.0032
53	0.2650	0.9264	29.1	11.0	911	0.0032
54	0.2700	0.9264	29.1	11.2	911	0.0032
55	0.2750	0.9264	29.1	11.4	911	0.0032
56	0.2800	0.9264	29.1	11.6	911	0.0032
57	0.2850	0.9264	29.1	11.8	911	0.0032
58	0.2900	0.9264	29.1	12.0	911	0.0032
59	0.2950	0.9264	29.1	12.2	911	0.0032
60	0.3000	0.9201	28.9	12.4	905	0.0032
61	0.3050	0.9169	28.8	12.6	902	0.0032
62	0.3100	0.9137	28.7	12.8	898	0.0033
63	0.3150	0.9137	28.7	13.0	898	0.0033
64	0.3200	0.9137	28.7	13.2	898	0.0033
65	0.3250	0.9201	28.9	13.4	905	0.0033
66	0.3300	0.9137	28.7	13.6	898	0.0033
67	0.3350	0.9169	28.8	13.8	902	0.0033
68	0.3400	0.9201	28.9	14.0	905	0.0033
69	0.3450	0.9201	28.9	14.3	905	0.0034
70	0.3500	0.9137	28.7	14.5	898	0.0034
71	0.3550	0.9137	28.7	14.7	898	0.0035
72	0.3600	0.9137	28.7	14.9	898	0.0035
73	0.3650	0.9137	28.7	15.1	898	0.0036

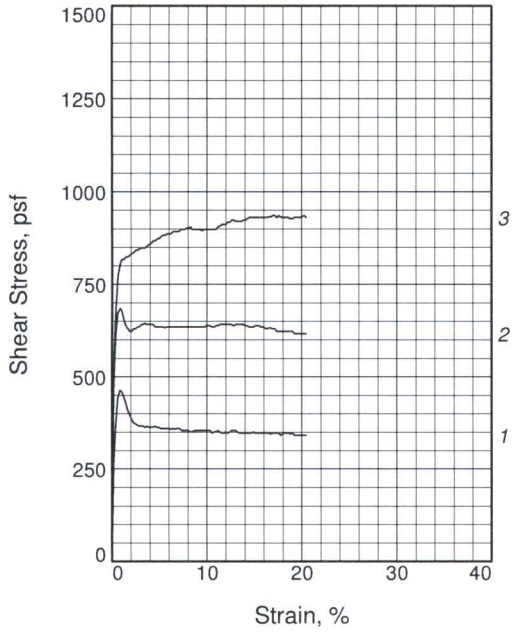
Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
74	0.3700	0.9137	28.7	15.3	898	0.0037
75	0.3750	0.9105	28.6	15.5	895	0.0037
76	0.3800	0.9073	28.5	15.7	892	0.0038
77	0.3850	0.9073	28.5	15.9	892	0.0038
78	0.3900	0.9137	28.7	16.1	898	0.0038
79	0.3950	0.9169	28.8	16.3	902	0.0038
80	0.4000	0.9137	28.7	16.5	898	0.0038
81	0.4050	0.9169	28.8	16.7	902	0.0038
82	0.4100	0.9201	28.9	16.9	905	0.0038
83	0.4150	0.9264	29.1	17.1	911	0.0037
84	0.4200	0.9264	29.1	17.4	911	0.0037
85	0.4250	0.9264	29.1	17.6	911	0.0037
86	0.4300	0.9296	29.2	17.8	914	0.0037
87	0.4350	0.9328	29.3	18.0	917	0.0037
88	0.4400	0.9328	29.3	18.2	917	0.0037
89	0.4450	0.9360	29.4	18.4	920	0.0037
90	0.4500	0.9392	29.5	18.6	923	0.0037
91	0.4550	0.9455	29.7	18.8	930	0.0036
92	0.4600	0.9424	29.6	19.0	927	0.0036
93	0.4650	0.9455	29.7	19.2	930	0.0036
94	0.4700	0.9455	29.7	19.4	930	0.0036
95	0.4750	0.9455	29.7	19.6	930	0.0036
96	0.4800	0.9455	29.7	19.8	930	0.0036
97	0.4850	0.9455	29.7	20.0	930	0.0035
98	0.4900	0.9455	29.7	20.2	930	0.0035
99	0.4950	0.9455	29.7	20.5	930	0.0035





	Fail.	Ult.
C, psf	86	41
ϕ, deg	28.6	30.5
Tan(ϕ)	0.54	0.59



Specimen No.		1	2	3
Initial	Water Content, %	13.0	13.0	12.7
	Dry Density, pcf	110.0	110.2	110.4
	Saturation, %	65.8	66.1	65.1
	Void Ratio	0.5319	0.5301	0.5266
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.5	19.2	18.5
	Dry Density, pcf	110.5	111.0	112.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5257	0.5182	0.5005
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	0.99	0.98
Normal Stress, psf		500	1000	1500
Fail. Stress, psf		354	639	898
Strain, %		10.1	10.1	10.1
Ult. Stress, psf		341	617	930
Strain, %		20.5	20.5	20.5
Strain rate, %/min.		0.04	0.04	0.04

Sample Type: Remolded
Description:

Assumed Specific Gravity= 2.7
Remarks: Failure chosen at 10% and 20% strain. Test was inundated.

Figure _____

Client: Geomat

Project: Kimbeto, S.Escavada & Rincon Ponds

Sample Number: 6837 **Depth:** 10-20'

Proj. No.: DV108-00304/04 **Date Sampled:** 8/10/18

Knight Piésold CONSULTING

Tested By: EAG **Checked By:** JDB

DIRECT SHEAR TEST

8/18/2018

Date: 8/10/18
Client: Geomat
Project: Kimbeto, S.Escavada & Rincon Ponds
Project No.: DV108-00304/04
Depth: 10-20' **Sample Number:** 6837
Description:
Remarks: Failure chosen at 10% and 20% strain. Test was inundated.
Type of Sample: Remolded
Assumed Specific Gravity=2.7 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	150.080		533.770
Moisture content: Dry soil+tare, gms.	132.850		507.910
Moisture content: Tare, gms.	0.000		375.060
Moisture, %	13.0	19.5	19.5
Moist specimen weight, gms.	150.1		
Diameter, in.	2.42	2.42	
Area, in.^{2}	4.60	4.60	
Height, in.	1.00	1.00	
Net decrease in height, in.		0.00	
Wet density, pcf	124.3	132.0	
Dry density, pcf	110.0	110.5	
Void ratio	0.5319	0.5257	
Saturation, %	65.8	100.0	

Test Readings for Specimen No. 1

Load ring constant = 31.408 lbs. per input unit
Normal stress = 500 psf
Strain rate, %/min. = 0.04
Fail. Stress = 354 psf **at reading no.** 49
Ult. Stress = 341 psf **at reading no.** 99

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
0	0.0000	0.0000	0.0	0.0	0	0.0000
1	0.0050	0.2642	8.3	0.2	260	0.0000
2	0.0100	0.3789	11.9	0.4	373	0.0004
3	0.0150	0.4489	14.1	0.6	441	0.0011
4	0.0200	0.4712	14.8	0.8	463	0.0021
5	0.0250	0.4680	14.7	1.0	460	0.0033
6	0.0300	0.4553	14.3	1.2	448	0.0043
7	0.0350	0.4362	13.7	1.4	429	0.0052
8	0.0400	0.4171	13.1	1.7	410	0.0059
9	0.0450	0.4043	12.7	1.9	398	0.0064
10	0.0500	0.3916	12.3	2.1	385	0.0068
11	0.0550	0.3820	12.0	2.3	376	0.0070
12	0.0600	0.3789	11.9	2.5	373	0.0073
13	0.0650	0.3757	11.8	2.7	369	0.0075

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
14	0.0700	0.3725	11.7	2.9	366	0.0077
15	0.0750	0.3725	11.7	3.1	366	0.0079
16	0.0800	0.3725	11.7	3.3	366	0.0081
17	0.0850	0.3693	11.6	3.5	363	0.0082
18	0.0900	0.3725	11.7	3.7	366	0.0083
19	0.0950	0.3693	11.6	3.9	363	0.0084
20	0.1000	0.3693	11.6	4.1	363	0.0085
21	0.1050	0.3693	11.6	4.3	363	0.0086
22	0.1100	0.3725	11.7	4.5	366	0.0088
23	0.1150	0.3693	11.6	4.8	363	0.0089
24	0.1200	0.3693	11.6	5.0	363	0.0090
25	0.1250	0.3661	11.5	5.2	360	0.0091
26	0.1300	0.3661	11.5	5.4	360	0.0093
27	0.1350	0.3661	11.5	5.6	360	0.0094
28	0.1400	0.3661	11.5	5.8	360	0.0095
29	0.1450	0.3661	11.5	6.0	360	0.0096
30	0.1500	0.3629	11.4	6.2	357	0.0096
31	0.1550	0.3661	11.5	6.4	360	0.0097
32	0.1600	0.3629	11.4	6.6	357	0.0098
33	0.1650	0.3661	11.5	6.8	360	0.0099
34	0.1700	0.3661	11.5	7.0	360	0.0100
35	0.1750	0.3629	11.4	7.2	357	0.0100
36	0.1800	0.3597	11.3	7.4	354	0.0101
37	0.1850	0.3597	11.3	7.6	354	0.0102
38	0.1900	0.3597	11.3	7.9	354	0.0103
39	0.1950	0.3597	11.3	8.1	354	0.0104
40	0.2000	0.3566	11.2	8.3	351	0.0105
41	0.2050	0.3566	11.2	8.5	351	0.0105
42	0.2100	0.3597	11.3	8.7	354	0.0106
43	0.2150	0.3597	11.3	8.9	354	0.0107
44	0.2200	0.3597	11.3	9.1	354	0.0107
45	0.2250	0.3597	11.3	9.3	354	0.0108
46	0.2300	0.3597	11.3	9.5	354	0.0108
47	0.2350	0.3597	11.3	9.7	354	0.0108
48	0.2400	0.3597	11.3	9.9	354	0.0109
49	0.2450	0.3597	11.3	10.1	354	0.0109
50	0.2500	0.3597	11.3	10.3	354	0.0109
51	0.2550	0.3534	11.1	10.5	347	0.0110
52	0.2600	0.3566	11.2	10.7	351	0.0111
53	0.2650	0.3566	11.2	11.0	351	0.0111
54	0.2700	0.3597	11.3	11.2	354	0.0111
55	0.2750	0.3566	11.2	11.4	351	0.0112
56	0.2800	0.3534	11.1	11.6	347	0.0112
57	0.2850	0.3534	11.1	11.8	347	0.0112
58	0.2900	0.3566	11.2	12.0	351	0.0113
59	0.2950	0.3534	11.1	12.2	347	0.0113
60	0.3000	0.3566	11.2	12.4	351	0.0113

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
61	0.3050	0.3597	11.3	12.6	354	0.0114
62	0.3100	0.3597	11.3	12.8	354	0.0114
63	0.3150	0.3597	11.3	13.0	354	0.0115
64	0.3200	0.3566	11.2	13.2	351	0.0115
65	0.3250	0.3534	11.1	13.4	347	0.0116
66	0.3300	0.3534	11.1	13.6	347	0.0116
67	0.3350	0.3534	11.1	13.8	347	0.0117
68	0.3400	0.3534	11.1	14.0	347	0.0118
69	0.3450	0.3534	11.1	14.3	347	0.0119
70	0.3500	0.3534	11.1	14.5	347	0.0120
71	0.3550	0.3534	11.1	14.7	347	0.0121
72	0.3600	0.3566	11.2	14.9	351	0.0121
73	0.3650	0.3534	11.1	15.1	347	0.0121
74	0.3700	0.3534	11.1	15.3	347	0.0122
75	0.3750	0.3534	11.1	15.5	347	0.0123
76	0.3800	0.3534	11.1	15.7	347	0.0124
77	0.3850	0.3534	11.1	15.9	347	0.0125
78	0.3900	0.3534	11.1	16.1	347	0.0126
79	0.3950	0.3534	11.1	16.3	347	0.0127
80	0.4000	0.3534	11.1	16.5	347	0.0128
81	0.4050	0.3502	11.0	16.7	344	0.0129
82	0.4100	0.3534	11.1	16.9	347	0.0130
83	0.4150	0.3534	11.1	17.1	347	0.0130
84	0.4200	0.3534	11.1	17.4	347	0.0132
85	0.4250	0.3534	11.1	17.6	347	0.0132
86	0.4300	0.3470	10.9	17.8	341	0.0133
87	0.4350	0.3534	11.1	18.0	347	0.0134
88	0.4400	0.3534	11.1	18.2	347	0.0136
89	0.4450	0.3534	11.1	18.4	347	0.0136
90	0.4500	0.3534	11.1	18.6	347	0.0137
91	0.4550	0.3502	11.0	18.8	344	0.0138
92	0.4600	0.3534	11.1	19.0	347	0.0139
93	0.4650	0.3470	10.9	19.2	341	0.0140
94	0.4700	0.3470	10.9	19.4	341	0.0140
95	0.4750	0.3470	10.9	19.6	341	0.0141
96	0.4800	0.3470	10.9	19.8	341	0.0141
97	0.4850	0.3470	10.9	20.0	341	0.0142
98	0.4900	0.3470	10.9	20.2	341	0.0142
99	0.4950	0.3470	10.9	20.5	341	0.0142

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	150.270		561.500
Moisture content: Dry soil+tare, gms.	133.000		535.970
Moisture content: Tare, gms.	0.000		402.970
Moisture, %	13.0	19.2	19.2
Moist specimen weight, gms.	150.3		
Diameter, in.	2.42	2.42	
Area, in.²	4.60	4.60	
Height, in.	1.00	0.99	
Net decrease in height, in.		0.01	
Wet density, pcf	124.5	132.3	
Dry density, pcf	110.2	111.0	
Void ratio	0.5301	0.5182	
Saturation, %	66.1	100.0	

Test Readings for Specimen No. 2

Load ring constant = 31.408 lbs. per input unit
Normal stress = 1000 psf
Strain rate, %/min. = 0.04
Fail. Stress = 639 psf **at reading no.** 49
Ult. Stress = 617 psf **at reading no.** 99

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
0	0.0000	0.0000	0.0	0.0	0	0.0000
1	0.0050	0.4680	14.7	0.2	460	-0.0001
2	0.0100	0.6272	19.7	0.4	617	0.0002
3	0.0150	0.6845	21.5	0.6	673	0.0008
4	0.0200	0.6972	21.9	0.8	686	0.0015
5	0.0250	0.6908	21.7	1.0	679	0.0022
6	0.0300	0.6686	21.0	1.2	657	0.0027
7	0.0350	0.6495	20.4	1.4	639	0.0031
8	0.0400	0.6399	20.1	1.7	629	0.0033
9	0.0450	0.6335	19.9	1.9	623	0.0034
10	0.0500	0.6335	19.9	2.1	623	0.0034
11	0.0550	0.6399	20.1	2.3	629	0.0035
12	0.0600	0.6399	20.1	2.5	629	0.0035
13	0.0650	0.6463	20.3	2.7	635	0.0035
14	0.0700	0.6463	20.3	2.9	635	0.0036
15	0.0750	0.6526	20.5	3.1	642	0.0037
16	0.0800	0.6526	20.5	3.3	642	0.0038
17	0.0850	0.6558	20.6	3.5	645	0.0039
18	0.0900	0.6526	20.5	3.7	642	0.0041
19	0.0950	0.6526	20.5	3.9	642	0.0041
20	0.1000	0.6526	20.5	4.1	642	0.0042
21	0.1050	0.6526	20.5	4.3	642	0.0043
22	0.1100	0.6463	20.3	4.5	635	0.0043
23	0.1150	0.6463	20.3	4.8	635	0.0043
24	0.1200	0.6463	20.3	5.0	635	0.0044
25	0.1250	0.6463	20.3	5.2	635	0.0045
26	0.1300	0.6463	20.3	5.4	635	0.0045

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
27	0.1350	0.6431	20.2	5.6	632	0.0046
28	0.1400	0.6463	20.3	5.8	635	0.0046
29	0.1450	0.6463	20.3	6.0	635	0.0047
30	0.1500	0.6463	20.3	6.2	635	0.0047
31	0.1550	0.6463	20.3	6.4	635	0.0048
32	0.1600	0.6463	20.3	6.6	635	0.0048
33	0.1650	0.6463	20.3	6.8	635	0.0049
34	0.1700	0.6463	20.3	7.0	635	0.0049
35	0.1750	0.6463	20.3	7.2	635	0.0050
36	0.1800	0.6463	20.3	7.4	635	0.0051
37	0.1850	0.6463	20.3	7.6	635	0.0051
38	0.1900	0.6463	20.3	7.9	635	0.0051
39	0.1950	0.6463	20.3	8.1	635	0.0052
40	0.2000	0.6463	20.3	8.3	635	0.0052
41	0.2050	0.6463	20.3	8.5	635	0.0053
42	0.2100	0.6463	20.3	8.7	635	0.0053
43	0.2150	0.6463	20.3	8.9	635	0.0053
44	0.2200	0.6463	20.3	9.1	635	0.0054
45	0.2250	0.6463	20.3	9.3	635	0.0055
46	0.2300	0.6463	20.3	9.5	635	0.0055
47	0.2350	0.6463	20.3	9.7	635	0.0055
48	0.2400	0.6495	20.4	9.9	639	0.0055
49	0.2450	0.6495	20.4	10.1	639	0.0056
50	0.2500	0.6495	20.4	10.3	639	0.0056
51	0.2550	0.6463	20.3	10.5	635	0.0056
52	0.2600	0.6463	20.3	10.7	635	0.0056
53	0.2650	0.6495	20.4	11.0	639	0.0056
54	0.2700	0.6495	20.4	11.2	639	0.0056
55	0.2750	0.6526	20.5	11.4	642	0.0056
56	0.2800	0.6526	20.5	11.6	642	0.0057
57	0.2850	0.6526	20.5	11.8	642	0.0058
58	0.2900	0.6526	20.5	12.0	642	0.0058
59	0.2950	0.6526	20.5	12.2	642	0.0059
60	0.3000	0.6526	20.5	12.4	642	0.0060
61	0.3050	0.6526	20.5	12.6	642	0.0060
62	0.3100	0.6495	20.4	12.8	639	0.0061
63	0.3150	0.6526	20.5	13.0	642	0.0061
64	0.3200	0.6526	20.5	13.2	642	0.0062
65	0.3250	0.6526	20.5	13.4	642	0.0063
66	0.3300	0.6526	20.5	13.6	642	0.0063
67	0.3350	0.6526	20.5	13.8	642	0.0064
68	0.3400	0.6495	20.4	14.0	639	0.0065
69	0.3450	0.6495	20.4	14.3	639	0.0066
70	0.3500	0.6463	20.3	14.5	635	0.0066
71	0.3550	0.6463	20.3	14.7	635	0.0067
72	0.3600	0.6463	20.3	14.9	635	0.0068
73	0.3650	0.6495	20.4	15.1	639	0.0069

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
74	0.3700	0.6495	20.4	15.3	639	0.0070
75	0.3750	0.6495	20.4	15.5	639	0.0071
76	0.3800	0.6463	20.3	15.7	635	0.0072
77	0.3850	0.6463	20.3	15.9	635	0.0073
78	0.3900	0.6431	20.2	16.1	632	0.0074
79	0.3950	0.6399	20.1	16.3	629	0.0075
80	0.4000	0.6431	20.2	16.5	632	0.0076
81	0.4050	0.6431	20.2	16.7	632	0.0077
82	0.4100	0.6399	20.1	16.9	629	0.0078
83	0.4150	0.6399	20.1	17.1	629	0.0078
84	0.4200	0.6335	19.9	17.4	623	0.0079
85	0.4250	0.6335	19.9	17.6	623	0.0080
86	0.4300	0.6335	19.9	17.8	623	0.0081
87	0.4350	0.6335	19.9	18.0	623	0.0082
88	0.4400	0.6335	19.9	18.2	623	0.0083
89	0.4450	0.6335	19.9	18.4	623	0.0084
90	0.4500	0.6335	19.9	18.6	623	0.0085
91	0.4550	0.6335	19.9	18.8	623	0.0086
92	0.4600	0.6335	19.9	19.0	623	0.0087
93	0.4650	0.6272	19.7	19.2	617	0.0088
94	0.4700	0.6272	19.7	19.4	617	0.0089
95	0.4750	0.6272	19.7	19.6	617	0.0089
96	0.4800	0.6272	19.7	19.8	617	0.0090
97	0.4850	0.6272	19.7	20.0	617	0.0090
98	0.4900	0.6272	19.7	20.2	617	0.0091
99	0.4950	0.6272	19.7	20.5	617	0.0092

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	150.230		550.960
Moisture content: Dry soil+tare, gms.	133.310		526.260
Moisture content: Tare, gms.	0.000		392.950
Moisture, %	12.7	18.5	18.5
Moist specimen weight, gms.	150.2		
Diameter, in.	2.42	2.42	
Area, in.²	4.60	4.60	
Height, in.	1.00	0.98	
Net decrease in height, in.		0.02	
Wet density, pcf	124.4	133.1	
Dry density, pcf	110.4	112.3	
Void ratio	0.5266	0.5005	
Saturation, %	65.1	100.0	

Test Readings for Specimen No. 3

Load ring constant = 31.408 lbs. per input unit
Normal stress = 1500 psf
Strain rate, %/min. = 0.04
Fail. Stress = 898 psf **at reading no.** 49
Ult. Stress = 930 psf **at reading no.** 99

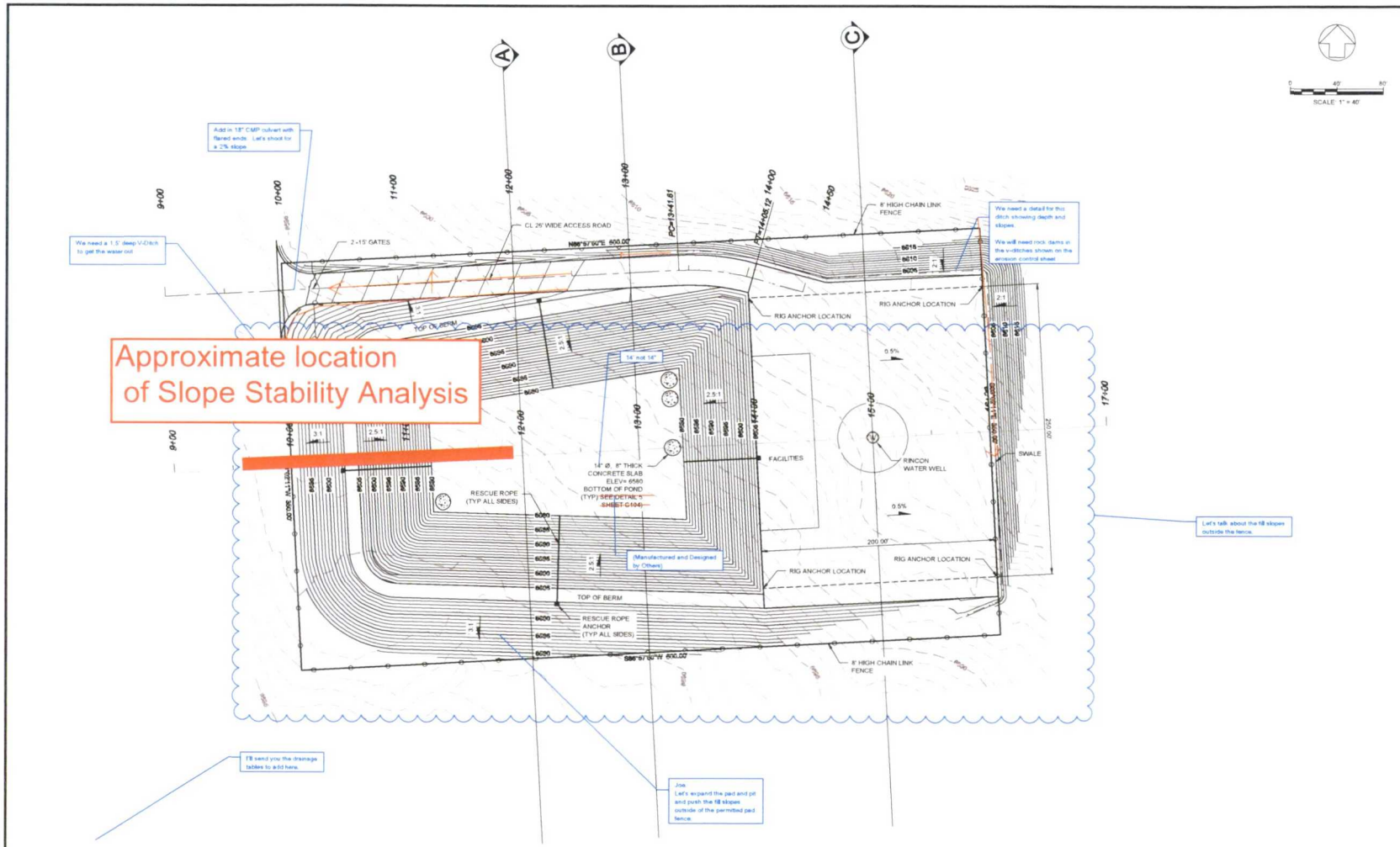
No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
0	0.0000	0.0000	0.0	0.0	0	0.0000
1	0.0050	0.5126	16.1	0.2	504	-0.0004
2	0.0100	0.6972	21.9	0.4	686	-0.0006
3	0.0150	0.7832	24.6	0.6	770	-0.0006
4	0.0200	0.8182	25.7	0.8	805	-0.0006
5	0.0250	0.8309	26.1	1.0	817	-0.0006
6	0.0300	0.8309	26.1	1.2	817	-0.0006
7	0.0350	0.8373	26.3	1.4	823	-0.0007
8	0.0400	0.8373	26.3	1.7	823	-0.0007
9	0.0450	0.8437	26.5	1.9	830	-0.0008
10	0.0500	0.8468	26.6	2.1	833	-0.0008
11	0.0550	0.8500	26.7	2.3	836	-0.0008
12	0.0600	0.8564	26.9	2.5	842	-0.0009
13	0.0650	0.8564	26.9	2.7	842	-0.0008
14	0.0700	0.8596	27.0	2.9	845	-0.0008
15	0.0750	0.8628	27.1	3.1	848	-0.0009
16	0.0800	0.8628	27.1	3.3	848	-0.0010
17	0.0850	0.8628	27.1	3.5	848	-0.0011
18	0.0900	0.8691	27.3	3.7	855	-0.0012
19	0.0950	0.8723	27.4	3.9	858	-0.0013
20	0.1000	0.8755	27.5	4.1	861	-0.0013
21	0.1050	0.8819	27.7	4.3	867	-0.0015
22	0.1100	0.8819	27.7	4.5	867	-0.0015
23	0.1150	0.8882	27.9	4.8	873	-0.0016
24	0.1200	0.8882	27.9	5.0	873	-0.0016
25	0.1250	0.8946	28.1	5.2	880	-0.0015
26	0.1300	0.8978	28.2	5.4	883	-0.0016

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
27	0.1350	0.8978	28.2	5.6	883	-0.0016
28	0.1400	0.9010	28.3	5.8	886	-0.0016
29	0.1450	0.9010	28.3	6.0	886	-0.0017
30	0.1500	0.9010	28.3	6.2	886	-0.0017
31	0.1550	0.9073	28.5	6.4	892	-0.0018
32	0.1600	0.9073	28.5	6.6	892	-0.0018
33	0.1650	0.9073	28.5	6.8	892	-0.0019
34	0.1700	0.9073	28.5	7.0	892	-0.0019
35	0.1750	0.9137	28.7	7.2	898	-0.0020
36	0.1800	0.9137	28.7	7.4	898	-0.0020
37	0.1850	0.9137	28.7	7.6	898	-0.0020
38	0.1900	0.9169	28.8	7.9	902	-0.0021
39	0.1950	0.9169	28.8	8.1	902	-0.0022
40	0.2000	0.9201	28.9	8.3	905	-0.0022
41	0.2050	0.9137	28.7	8.5	898	-0.0023
42	0.2100	0.9137	28.7	8.7	898	-0.0024
43	0.2150	0.9137	28.7	8.9	898	-0.0024
44	0.2200	0.9137	28.7	9.1	898	-0.0025
45	0.2250	0.9137	28.7	9.3	898	-0.0026
46	0.2300	0.9105	28.6	9.5	895	-0.0026
47	0.2350	0.9137	28.7	9.7	898	-0.0027
48	0.2400	0.9137	28.7	9.9	898	-0.0028
49	0.2450	0.9137	28.7	10.1	898	-0.0029
50	0.2500	0.9137	28.7	10.3	898	-0.0030
51	0.2550	0.9137	28.7	10.5	898	-0.0030
52	0.2600	0.9137	28.7	10.7	898	-0.0031
53	0.2650	0.9137	28.7	11.0	898	-0.0031
54	0.2700	0.9201	28.9	11.2	905	-0.0031
55	0.2750	0.9232	29.0	11.4	908	-0.0032
56	0.2800	0.9264	29.1	11.6	911	-0.0032
57	0.2850	0.9264	29.1	11.8	911	-0.0033
58	0.2900	0.9264	29.1	12.0	911	-0.0033
59	0.2950	0.9328	29.3	12.2	917	-0.0033
60	0.3000	0.9328	29.3	12.4	917	-0.0033
61	0.3050	0.9392	29.5	12.6	923	-0.0033
62	0.3100	0.9392	29.5	12.8	923	-0.0033
63	0.3150	0.9360	29.4	13.0	920	-0.0033
64	0.3200	0.9360	29.4	13.2	920	-0.0033
65	0.3250	0.9360	29.4	13.4	920	-0.0033
66	0.3300	0.9360	29.4	13.6	920	-0.0033
67	0.3350	0.9392	29.5	13.8	923	-0.0033
68	0.3400	0.9392	29.5	14.0	923	-0.0033
69	0.3450	0.9424	29.6	14.3	927	-0.0033
70	0.3500	0.9455	29.7	14.5	930	-0.0033
71	0.3550	0.9455	29.7	14.7	930	-0.0032
72	0.3600	0.9455	29.7	14.9	930	-0.0032
73	0.3650	0.9455	29.7	15.1	930	-0.0032

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress psf	Vertical Def. Dial in.
74	0.3700	0.9455	29.7	15.3	930	-0.0033
75	0.3750	0.9455	29.7	15.5	930	-0.0033
76	0.3800	0.9455	29.7	15.7	930	-0.0033
77	0.3850	0.9455	29.7	15.9	930	-0.0034
78	0.3900	0.9455	29.7	16.1	930	-0.0033
79	0.3950	0.9455	29.7	16.3	930	-0.0033
80	0.4000	0.9487	29.8	16.5	933	-0.0033
81	0.4050	0.9487	29.8	16.7	933	-0.0034
82	0.4100	0.9519	29.9	16.9	936	-0.0034
83	0.4150	0.9519	29.9	17.1	936	-0.0034
84	0.4200	0.9455	29.7	17.4	930	-0.0034
85	0.4250	0.9519	29.9	17.6	936	-0.0035
86	0.4300	0.9487	29.8	17.8	933	-0.0035
87	0.4350	0.9455	29.7	18.0	930	-0.0036
88	0.4400	0.9455	29.7	18.2	930	-0.0036
89	0.4450	0.9455	29.7	18.4	930	-0.0037
90	0.4500	0.9455	29.7	18.6	930	-0.0037
91	0.4550	0.9424	29.6	18.8	927	-0.0038
92	0.4600	0.9424	29.6	19.0	927	-0.0039
93	0.4650	0.9455	29.7	19.2	930	-0.0040
94	0.4700	0.9455	29.7	19.4	930	-0.0041
95	0.4750	0.9455	29.7	19.6	930	-0.0042
96	0.4800	0.9455	29.7	19.8	930	-0.0043
97	0.4850	0.9487	29.8	20.0	933	-0.0044
98	0.4900	0.9519	29.9	20.2	936	-0.0045
99	0.4950	0.9455	29.7	20.5	930	-0.0046



Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
PAD AND PIT EARTHWORK	1.000	1.200	193533.29 Sq. Ft.	33562.25 Cu. Yd.	21855.01 Cu. Yd.	11707.24 Cu. Yd.<Cut>
ACCESS ROAD EARTHWORK	1.000	1.200	14197.62 Sq. Ft.	372.57 Cu. Yd.	205.09 Cu. Yd.	167.48 Cu. Yd.<Cut>
Totals			207730.90 Sq. Ft.	33934.82 Cu. Yd.	22060.10 Cu. Yd.	11874.72 Cu. Yd.<Cut>

PROPOSED POND INFORMATION:

TOP OF BERM ELEVATION :	6605.00
WATER SURFACE ELEVATION:	6602.00
WATER SURFACE AREA (ELEVATION 6602.00)	71,818 SQ. FT. (1.65 ACRES)
POND STORAGE VOLUME:	38,964 CU. YD. (187,359 BBLS)

P:\5-Enduring Resources - 16B Pond Design (5127383)\CADD\cv\BRINCON\5127383 RNC G&D PLAN.dwg, 8/29/2018 8:21:31 AM, JTN

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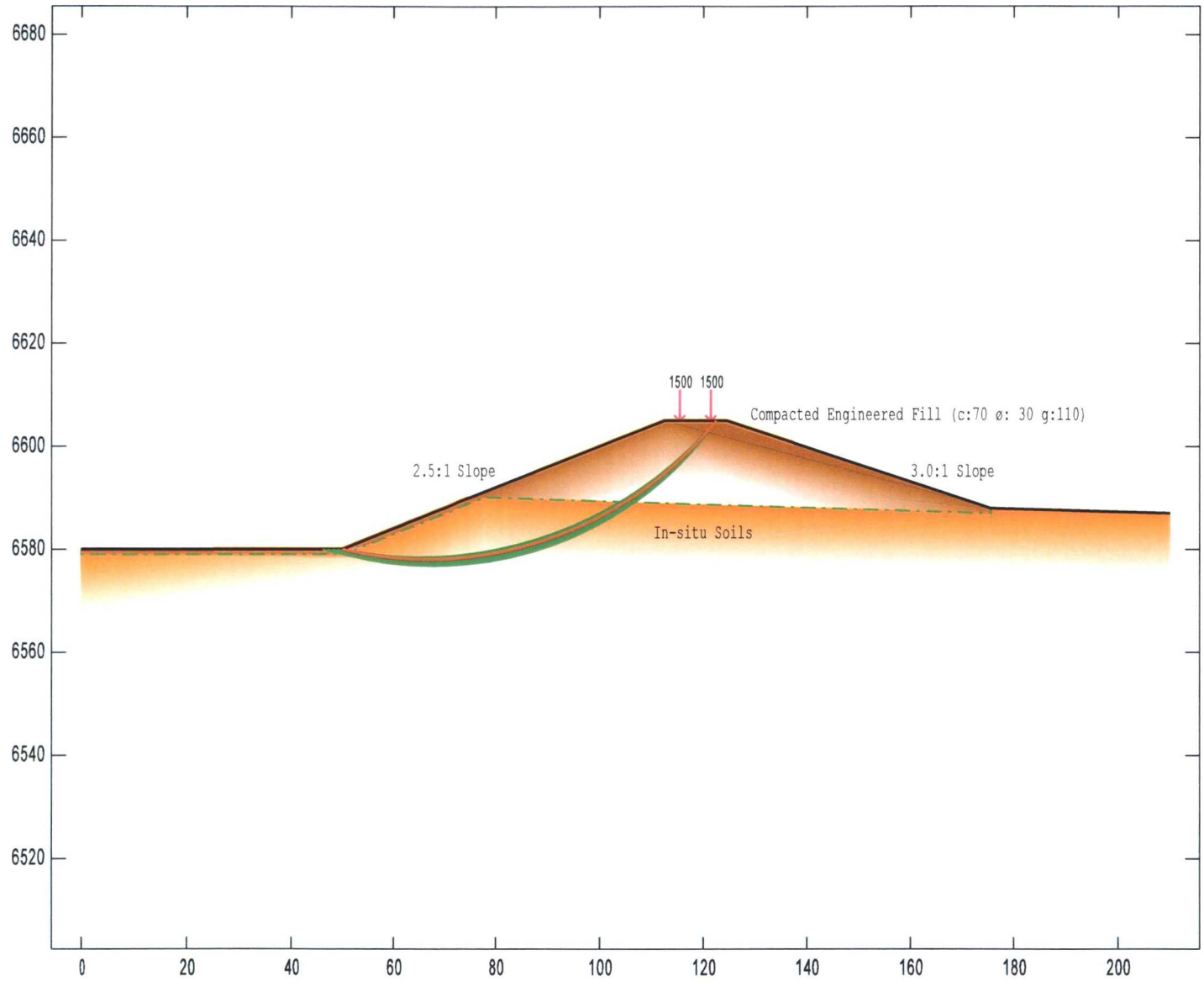
ENDURING RESOURCES
SAN JUAN COUNTY, NM

32F RECYCLING CONTAINMENT PIT PROJECT
RINCON LOCATION
SITE GRADING & DRAINAGE PLAN

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS STAMPED, SIGNED AND DATED

Designed	Drawn	Checked
HDM	JTN	HDM

Date: August 2018
Scale: Horiz: 1" = 60' Vert: N/A
Project No: 9127383
Sheet: C102



GALENA Version 6.10

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Material Keys

Compacted Berm

Silty Sand (insitu)

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 2.02

Project 182-2992 Rincon Pond - RF 20SEP18
Enduring Rincon Pond - 2.5:1 Internal, 3.0:1 External

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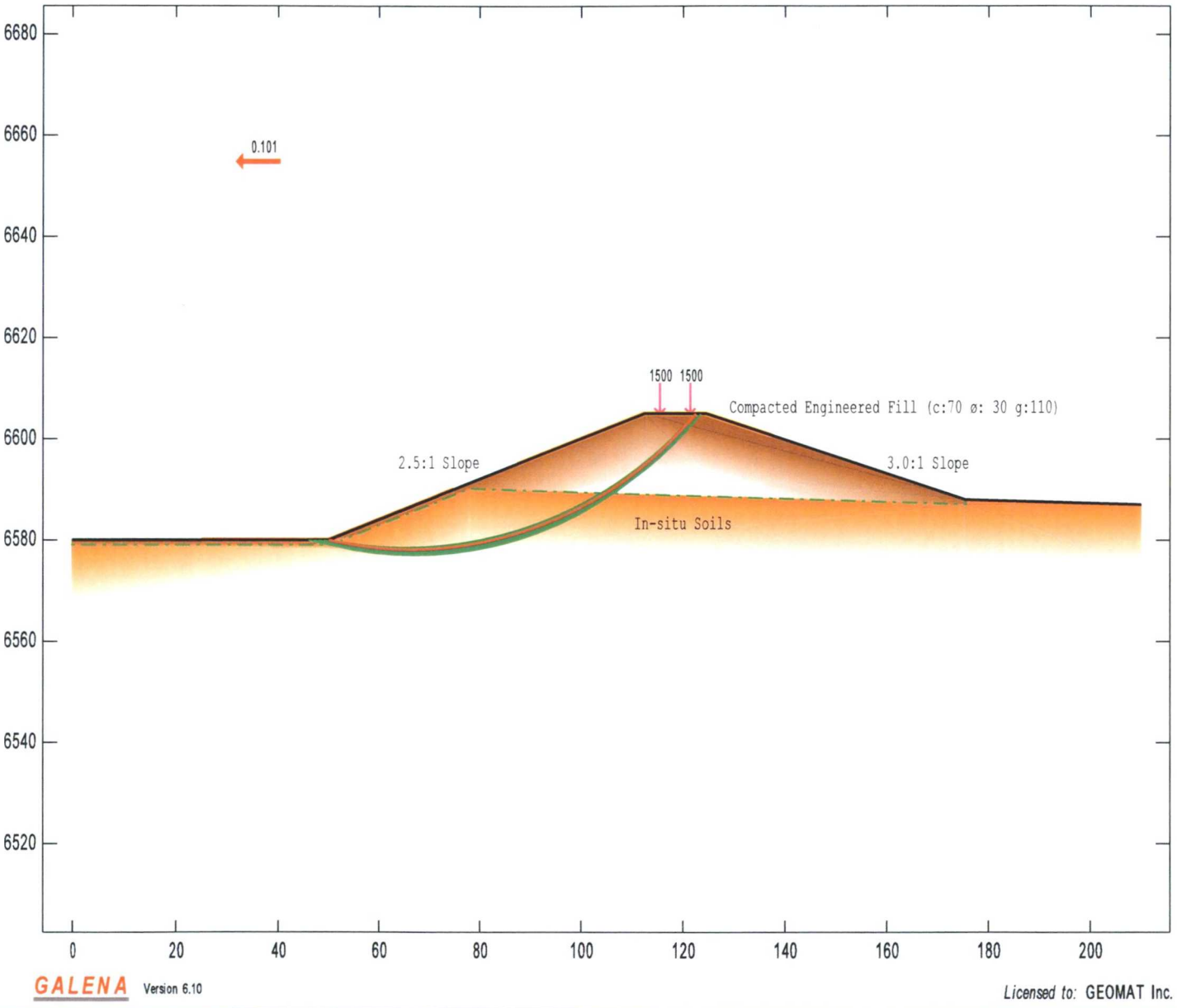
Edited: 5 Oct 2018
Processed: 5 Oct 2018

GEOMAT INC



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Material Keys

Compacted Berm

Silty Sand (insitu)

Analysis 2

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

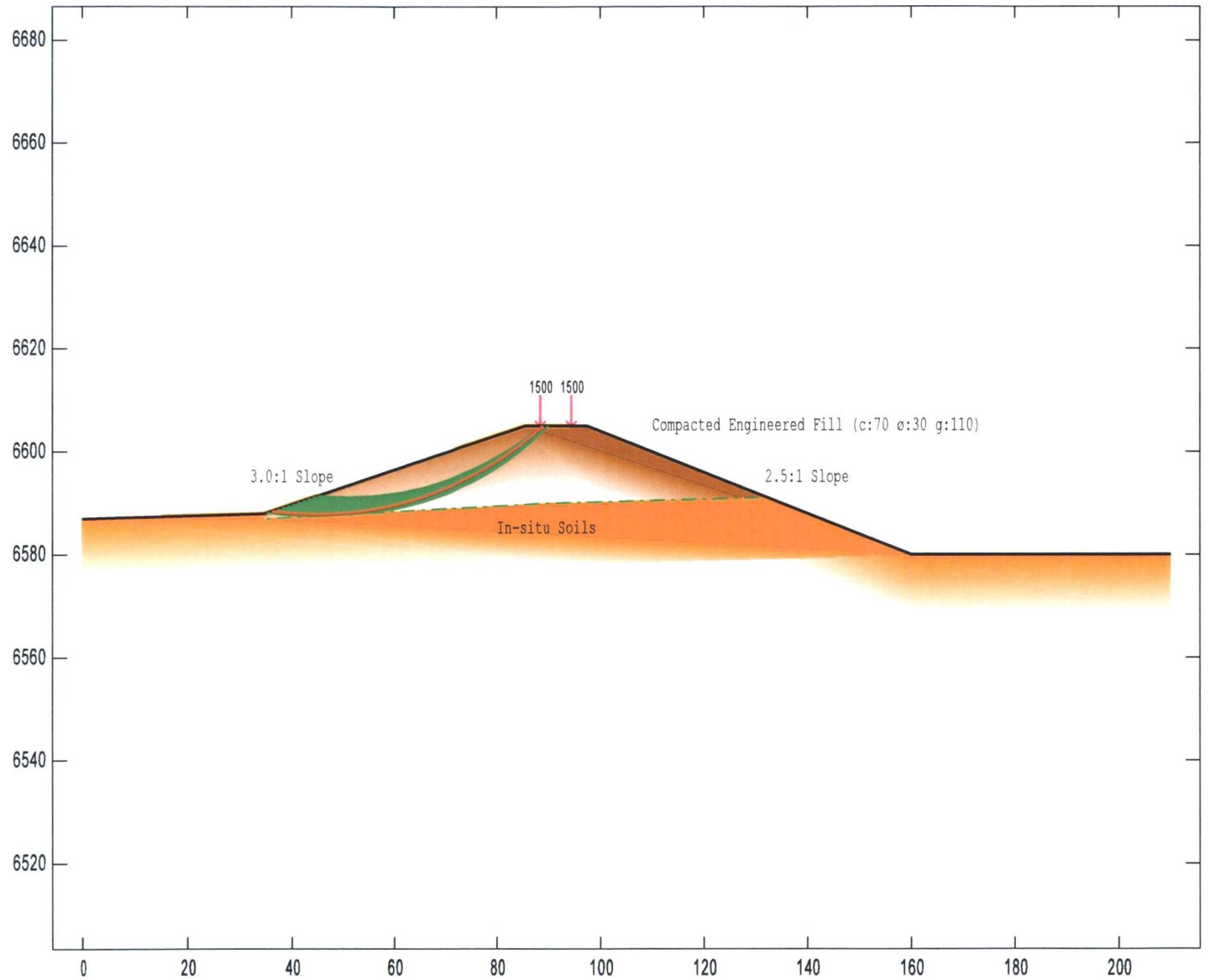
Critical Factor of Safety: 1.59

Project 182-2992 Rincon Pond - RF 20SEP18
Enduring Rincon Pond - 2.5:1 Internal, w/Seismic

File: P:\Eng\Project 2018\182-2992 WEU and Rincon Lake Ponds\Addenda\Engineering\Slope Stability\Rincon Pond RF 2.5to1 INSIDE.gmf

Edited: 5 Oct 2018
Processed: 5 Oct 2018

GEOMAT Inc.



GALENA Version 6.10

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Material Keys

Compacted Berm

Silty Sand (insitu)

Analysis 1

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 2.25

Project 182-2992 Rincon Pond OUTSIDE Berm
Enduring Rincon Pond - 3.0:1 Outside

File: P:\Eng\Project 2018\182-2992 WEU and Rincon Lake Ponds\Addenda\Engineering\Slope Stability\Rincon Pond RF 3.0to1 OUTSIDE.gmf

Edited: 5 Oct 2018
Processed: 5 Oct 2018

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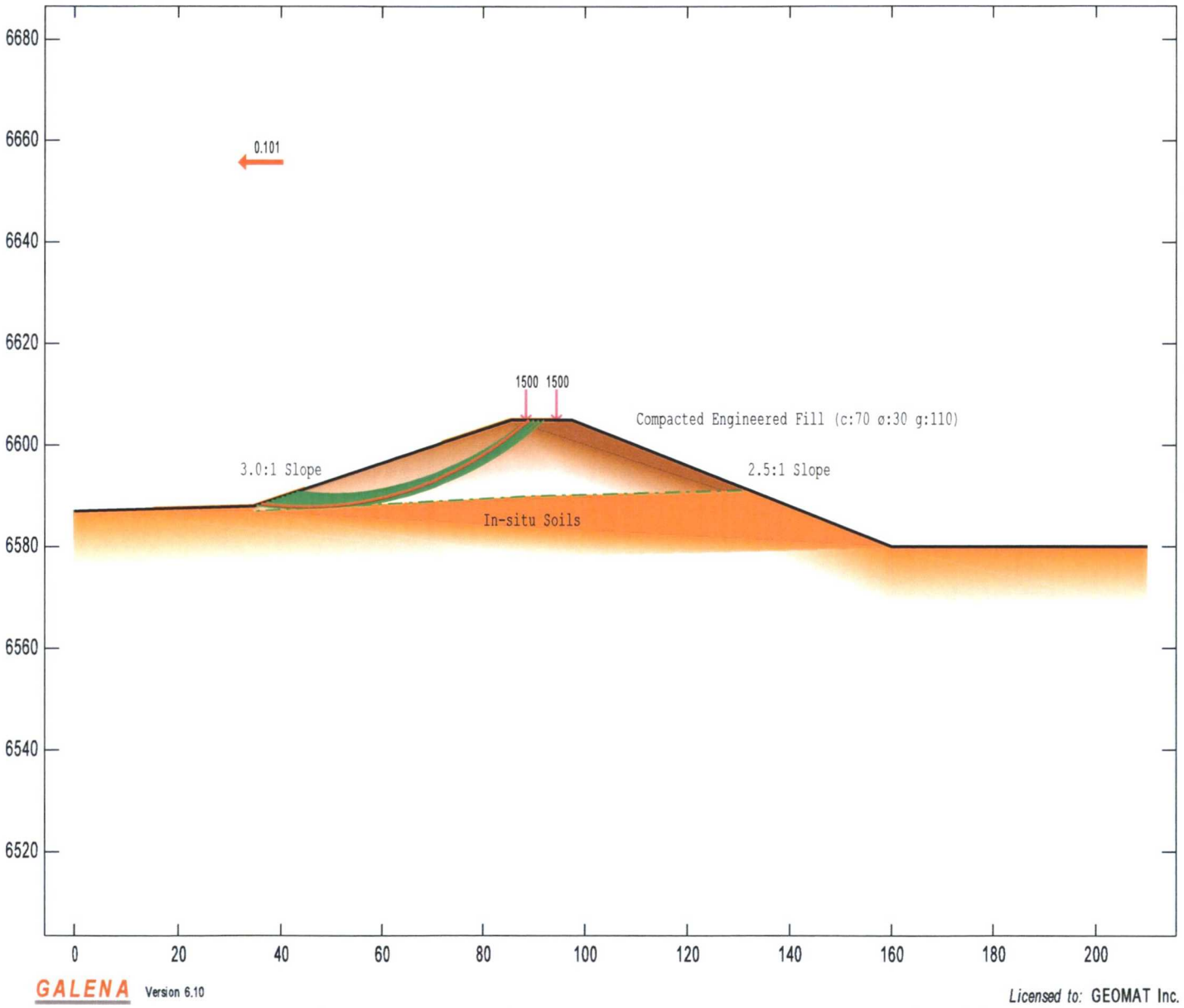

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Material Keys

Compacted Berm

Silty Sand (insitu)

Analysis 2

Multiple Stability Analysis

Method: Bishop Simplified

Surface: Circular

Results

Critical Factor of Safety: 1.72

Project 182-2992 Rincon Pond OUTSIDE Berm
Enduring Rincon Pond - 3.0:1 Outside, w/Seismic

File: P:\Eng\Project 2018\182-2992 WEU and Rincon Lake Ponds\Addenda\Engineering\Slope Stability\Rincon Pond RF 3.0to1 OUTSIDE.gmf

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be,* and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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