August 2021

C-147 Registration Package for Mobley In-Ground Containment

Section ρ9, T2σS, R3πE, Eddy County

View east from western property line to existing pad for SWDs and producing wells. The eastern levee of the inground containment will abut against the raised production location pad.

Prepared for:
Solaris Midstream LLC
9811 Katy Freeway Suite 900
Houston, TX 77024

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

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

August 31, 2021

Mr. Mike Bratcher
NMOCD - District 2, Supervisor
811 S. First St.
Artesia, NM 88210
Via E-Mail

Ms. Victoria Venegas
NMOCD - District 2
811 S. First St.
Artesia, NM 88210
Via E-Mail

RE: Solaris Water Midstream, Mobley In-Ground Containment Registration
Section 19, T23S, R30E, Eddy County
C-147 and Siting Criteria Demonstration

Dear Mr. Bratcher and Ms. Venegas:

On behalf of Solaris Water Midstream, R.T. Hicks Consultants is pleased submit a registration for the above-referenced project. The current schedule calls for commencing to fill the Containment in late September 2021 at the earliest. Please note that the siting criteria demonstration:

- evaluates the recycling area that includes the proposed AST Containment, the treatment/recycling facility and the in-ground containment,
- demonstrates that the USGS erroneously mapped an intermittent stream that traverses the northwest corner of the recycling area
- demonstrates that the ground/strata underlying the recycling area is stable and does not exhibit any open fractures, caverns or solution conduits between ground surface and groundwater

The in-ground containment is at least 200-feet from the significant watercourse to the south. The closure cost estimate does not consider only the removal of the AST, which is the subject of a previously submitted permit application. We are currently obtaining cost estimates from contractors and will provide the closure cost estimate under separate cover.

In this package are the following:

- Solaris will install a 4-strand barbed wire fence over the proposed game fence to comply with the specific language of the Rule if requested by the District Office
- The 40-mil HDPE secondary liner is “equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec” and meets or exceeds the “EPA SW-846 method 9090A or subsequent relevant publications” and is therefore consistent with the criteria of the Rule. The equivalency demonstration is attached to this letter.
- The Mega Blaster Pro Sonic Bird Repeller “is otherwise protective of wildlife, including migratory birds” and is therefore consistent with the criteria of the Rule. This avian hazing equipment is used at numerous OCD-approved projects and Solaris has ordered a unit specific to the Pecos River Valley and southern Lea County.

Hicks Consultants affirms that

- the location meets all siting criteria in the Rule and the location meets the specified setback criteria
- the Design/Construction Plan, Operation and Maintenance Plan and Closure Plan are consistent with the Rule.
- Unless instructed by OCD, we will employ the analytical tests for closure listed in the Rule

Solaris will transmit the Siting Criteria Demonstration and the registration to OCD via the OCD.Online portal.

In compliance with 19.15.34.10 of the Rule, this submission is copied to the owner of the surface upon which the containments will be constructed.

If you have any questions or concerns regarding this permit or the attached C-147, please contact me. As always, we appreciate your work ethic and attention to detail.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks PG
Principal

Copy: Solaris Water Midstream
Forrest “Augie” Connally via E-mail: fcon673@gmail.com

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Technical Memorandum: 40-mil HDPE as Alternative Secondary Liner System for In Ground Recycling Containment Facilities

NMAC 19.15.34.12 A

I have investigated the suitability of application for 40 mil HDPE geomembrane as an equivalent secondary liner to 30 mil scrim reinforced LLDPE (LLDPEr) in the application for In Ground Recycling Containment facilities. *In summary, it is my professional opinion that the specified 40 mil HDPE geomembrane will provide a secondary liner system that is equal to or better than 30 mil scrim reinforced LLDPEr and will provide the requisite protection of fresh water, public health and the environment for many years when engineering design provides requisite site/soil/slope preparation and when used in concert with requisite primary liners and drainage layers.*

It is understood that the lining system under discussion is composed of a 60 mil HDPE Primary liner, geonet drainage layer and a 40 mil HDPE Secondary liner. *In consideration of the secondary lining system application, size of impoundment and depth, design details as well as the chemical nature of typical processed water, it is my professional opinion that the 40 mil HDPE geomembrane will provide the requisite barrier against processed water loss and will function effectively as a secondary liner.*

The following are discussion points that hopefully will exhibit the equivalency of a 40 mil HDPE secondary liner to that of a 30 mil LLDPEr.

The nature and formulation of the 40 mil HDPE resin is the same as the Primary 60 mil HDPE. The major difference is that the 40 mil HDPE is lower in thickness (more flexible and less puncture resistant). However, in covered conditions, HDPE will resist aging and degradation and remain intact for many decades. In fact, a secondary liner of 40 mil HDPE will outlast an exposed 60 mil HDPE liner. According to the Geosynthetic Research Institute (GRI) study on lifetime prediction (GRI Paper No. 6), the half life of HDPE (GRI GM 13) exposed is > 36 years and the half-life of HDPE covered or buried is greater than 100 years. It is understood that in order to ensure compliance of materials, the primary 60 mil HDPE to be used must meet or exceed GRI GM 13 Standards. Likewise, the secondary liner that is not exposed to the same environmental and chemical conditions must meet or exceed GRI GM 13 for non-reinforced HDPE. Adhering to the minimum requirements of the GRI Specifications, 40 mil HDPE when used as a secondary liner will be equally as protective as the primary 60 mil HDPE liner (reference: www.geosynthetic-institute.org/grispecs) and equally as protective as a 30 mil scrim reinforced LLDPEr liner.

Durability of Geomembranes is directly affected by exposure conditions. Buried or covered geomembranes are not affected by the same degradation mechanisms (UV, Ozone, Chemical, Stress, Temperature, etc) as are fully exposed geomembranes. In this regard, the secondary liner material and thickness can be much less robust than the fully exposed primary liner which in this case is 60 mil HDPE. This is also the case for

landfill lining systems where the secondary geomembrane in a bottom landfill cell may be 40 mil HDPE.

Thermal Fusion Seaming Requirements. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Dual wedge thermal fusion welding is commonly used on HDPE and QC testing by air channel (ASTM D 5820) is fully acceptable and recognized as an industry standard. In this regard, there should be no exception requirement for seaming and QC testing as both the Primary and Secondary geomembranes are HDPE. This is fully covered in comprehensive specifications for both the Primary and Secondary geomembranes (Reference: www.ASTM.org/Standards).

Potential for Leakage through the Primary and Secondary Liners. Leakage through geomembrane liners is directly a function of the height of liquid head above any hole or imperfection. The geonet drainage media provides immediate drainage to a low point or sump and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the secondary liner. In this regard, secondary geomembrane materials can be (and usually are) much less in thickness and also polymer type. Hydraulic Conductivity through the 40 mil HDPE liner material is extremely low due to the polymer type, structure and crystallinity and exceeds requirements of EPA SW-846 Method 9090A.

Chemical Attack. Chemical attack to polymeric geomembranes is directly a function of type of chemical, temperature and exposure time. Again, the HDPE Primary provides the chemically resistant liner and is QC tested to reduce potential defects or holes. If there is a small hole, the geonet drain takes any leakage water immediately to the sump for extraction. Thus, exposure time is very limited on a secondary liner in addition to low temperature, little volume and virtually no head pressure. In this regard, a chemically resistant geomembrane material such as 40 mil HDPE can be specified for the secondary and is a fully acceptable alternate to 30 mil scrim reinforced LLDPEr.

Mechanical Properties Characteristics. Geomembranes of different polymer and/or structure (i.e., reinforced vs non-reinforced) cannot be readily compared using such characteristics as tensile stress/strain, tear, puncture and polymer requirements. For a 40 mil HDPE liner material to function as a Secondary liner it should meet or exceed the manufacturers minimum requirements for Density, Tensile Properties, Tear, Puncture as well as other properties such as UV resistance. The sheet material must also meet or exceed GRI GM 13 minimum requirements. *In this regard, a 40 mil HDPE will be equivalent to a 30 mil LLDPEr as a secondary liner for the conditions listed below:*

- *The subgrade or compacted earth foundation will be smooth, free of debris or loose rocks, dry, unyielding and will support the lining system.*
- *The side slopes for the containment shall be equal to or less than 3H:1V.*
- *The physical properties and condition of the subgrade or liner foundation*

(i.e., density, slope, moisture) will be inspected and certified by a Professional Engineer that it meets or exceeds specification requirements.

- *Immediately prior to installation, the installation contractor shall inspect and sign off on the subgrade conditions that they meet or exceed the HDPE manufacturer and installers requirements.*
- *A protective geotextile will be placed on the finished and accepted subgrade between subgrade and the 40 mil HDPE Secondary liner.*
- *A 200 mil geonet will be placed over the 40 mil HDPE Secondary Liner.*
- *A 60 mil HDPE Primary liner will be placed over the 200 mil geonet drainage layer.*

If you have any questions on the above technical memorandum or require further information, give me a call at 720-289-0300 or email geosynthetics@msn.com

Sincerely Yours,

R K Frobel

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Papers 2017
www.geosynthetic-institute.org

ASTM Geosynthetics' Standards 2017
www.ASTM.org/Standards

SOLMAX

Mustang Extreme

December 9, 2019

Attn: Mr. Steven Roeder
Re: 40 mil HDPE Geomembrane – Hydraulic Conductivity

Dear Mr. Roeder:

Hydraulic Conductivity of HDPE geomembranes can be indirectly obtained through ASTM E96 method (Designing with Geosynthetics, page 437, fifth edition – Robert Koerner).

Based on our test results and the method pointed out in the above reference, it can be concluded that Solmax HDPE geomembranes have a typical Hydraulic Conductivity no higher than 10^{-12} cm/s

Should you need further information, please do not hesitate to contact us.

Sincerely,

Mauricio Ossa
Senior Technical Manager
Houston- Texas

T +1 800 435-2008

GSE ENVIRONMENTAL, LLC | A SOLMAX COMPANY
19103 GUNDLE ROAD, HOUSTON, TX 77073, USA

SOLMAX.COM

SOLMAX

Solmax Reflective HDPE Specification

HDPE 40 mils Smooth Geomembrane Properties

Tested Property	Test Description	Test Method	Unit	Test Value[2]
Thickness	Min. Average	ASTM D5199	mils	40
	Min.	ASTM D5199	mils	36
Resin Density	-	ASTM D1505	g/cm^3	≥ 0.932
Sheet Density	-	ASTM D1505	g/cm^3	≥ 0.940
Carbon Black Content[4]	-	ASTM D4218	%	2.0-3.0
Carbon Black Dispersion[5]	-	ASTM D5596	Category	1 & 2
OIT – Standard	Average	ASTM D3895	min	100
Tensile Properties[1]	Min. Average	ASTM D-6693		
Strength at Yield			ppi	84
Elongation at Yield			%	13
Strength at Break			ppi	162
Elongation at Break			%	700
Tear Resistance	Min. Average	ASTM D1004	lbf	28
Puncture Resistance	Min. Average	ASTM D4833	lbf	80
Dimensional Stability	-	ASTM D1204	%	±2
Stress Crack Resistance	SP-NCTL	ASTM D5397	hours	500
Oven Aging[6]	% retained after 90 days	ASTM D5721		
HP-OIT	Min. Average	ASTM D5885	%	80
UV Resistance[7]	% retained after 1600 hours	ASTM D7238		
HP-OIT	Min. Average	ASTM D5885	%	50
Color	Topside	-	-	White

C-147

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

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

Form C-147
Revised April 3, 2017

Recycling Facility and/or Recycling Containment

Type of Facility: ☒ Recycling Facility ☐ Recycling Containment*****

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

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

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

1.

Operator: Solaris Midstream LLC OGRID #: 371643

Address: 9811 Katy Freeway, Suite 900, Houston, TX, 77024

Facility or well name (include API# if associated with a well): Mobley Containments #1 and #2

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

U/L or Qtr/Qtr: C Section: 19 Township: 23S Range: 30E County: Eddy

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

2.

☒ **Recycling Facility:**

Location of (if applicable): Latitude: 32.2962510 N Longitude: 103.9242565 W approximately (NAD83)

Proposed Use: ☒ Drilling* ☒ Completion* ☒ Production* ☒ Plugging *

The re-use of produced water may NOT be used until fresh water zones are cased and cemented

☐ Other, ***requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.***

☒ Fluid Storage

☒ Above ground tanks ☒ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type _____

☐ Activity permitted under 19.15.36 NMAC explain type: _____ ☐ Other explain _____

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

☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date: _____

3.

☒ **Recycling Containment #1 and #2:**

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

Center of Recycling Containment (if applicable) Latitude: 32.2968844 N Longitude: 103.9242565 W approx. (NAD83)

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

☒ Lined ☐ Liner type: Thickness See Attached Engineer Drawings1 ☐ LLDPE ☒ HDPE ☐ PVC ☐ Other _____

☐ String-Reinforced

Liner Seams: ☐ Welded ☐ Factory ☐ Other Volume: See Attachment Drawings and Plans Dimensions _____.

☐ Recycling Containment Closure Completion Date: _____

4.

Bonding:

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

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

☒ Attach closure cost estimate and documentation on how the closure cost was calculated. (See Transmittal Letter)

5.

Fencing:

☒ Four-foot height, four strands of barbed wire evenly spaced between one and four feet IF REQUESTED BY DISTRICT OFFICE

☐ Alternate. Please specify: Game Fence .

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. See Volume 2 for Variances

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 FIGURES 1-2	☐ 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 FIGURE 3	☐ Yes ☒ No ☐ NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division FIGURE 4	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map FIGURE 5	☐ Yes ☒ No
Within a 100-year floodplain. FEMA map FIGURE 6	☐ 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 FIGURE 7	☐ 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 FIGURE 8	☐ 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. FIGURES 1 and 7 - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 500 feet of a wetland. FIGURE 9 - 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.

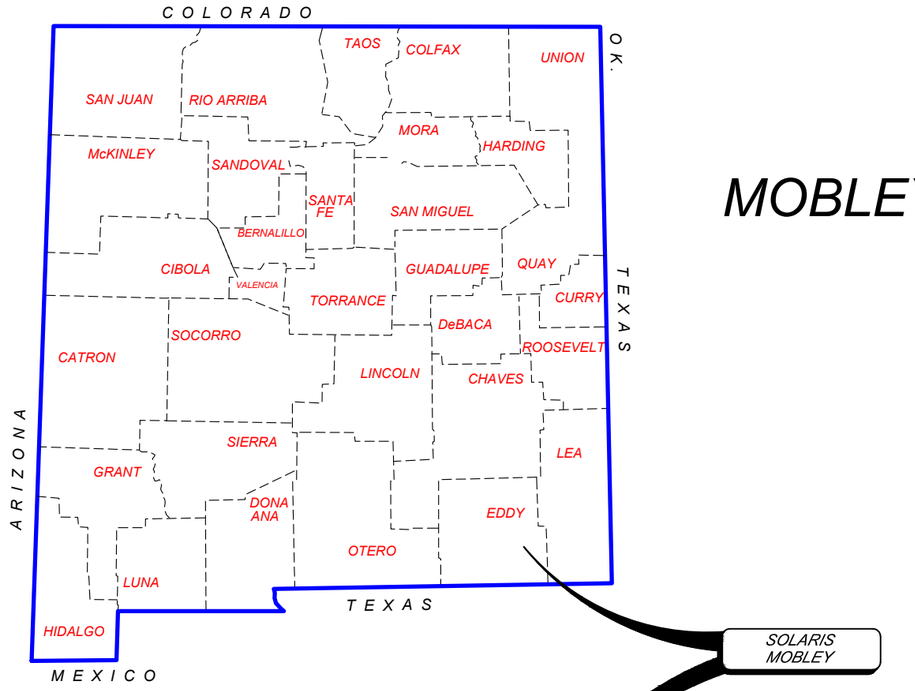
Name (Print): Bradley Todd Carpenter Title: Operations Manager
Signature: Todd Carpenter Date: 08/14/21
e-mail address: todd.carpenter@solarismidstream.com Telephone: (432) 203-9020

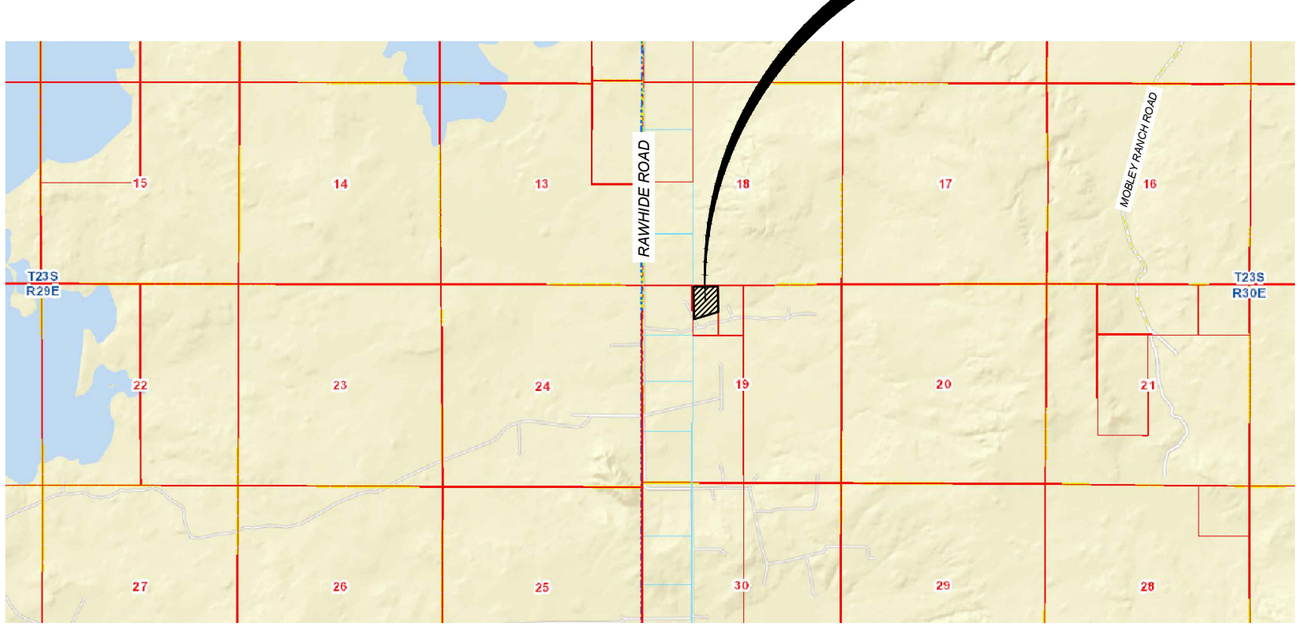
11.
OCD Representative Signature: _____ **Approval Date:** _____

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

☐ OCD Conditions _____
☐ Additional OCD Conditions on Attachment

RECYCLING CONTAINMENT DESIGN DRAWINGS AND AVIAN SPECIES HAZING EQUIPMENT





SOLARIS WATER MIDSTREAM, LLC
MOBLEY WATER TREATMENT AND REUSE FACILITY
S19, T23S, R30E
EDDY COUNTY, NEW MEXICO

INDEX OF SHEETS

MAGRYM
TBPELS F-19848

Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com

IFC	ISSUED FOR CONSTRUCTION	08/19/21	CSC
R-X	DESCRIPTION	DATE	BY
REVISIONS (OR CHANGE NOTICES)			

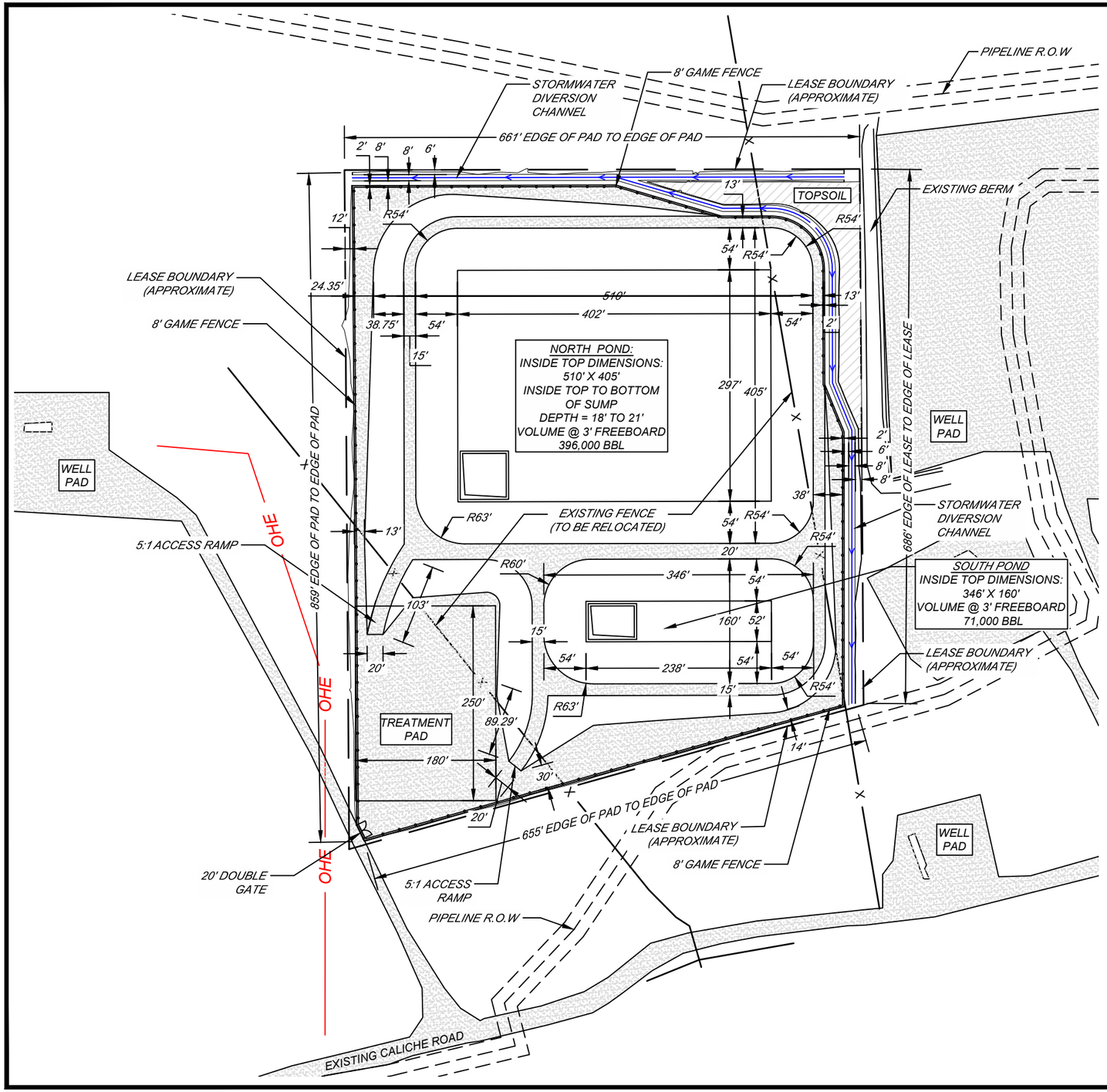
Solaris Water Midstream, LLC
907 Tradewinds Boulevard
Midland, TX 79701
432-203-9020
www.solarismidstream.com

MOBLEY WATER TREATMENT AND REUSE FACILITY
S19, T23S, R30E
EDDY COUNTY, NEW MEXICO
SOLARIS WATER MIDSTREAM, LLC.

COVER SHEET

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-100

Drawing File: Z:\Shared\Projects\2021 Projects\21-190 Solaris Mobley Pond\04_CIVIL\Design\Drawings\21-190 Cover.dwg



PROJECT DESCRIPTION

1. THE PROJECT CONSISTS OF CONSTRUCTING A DUAL CELL PRODUCED WATER RECYCLING CONTAINMENT IN ACCORDANCE WITH NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS.
2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON INFORMATION OBTAINED FROM THE OWNER.

SUGGESTED CONSTRUCTION SEQUENCE

1. CLEAR EXISTING VEGETATION.
2. STRIP AND STOCKPILE TOPSOIL AT THE LOCATION DESIGNATED ON THIS PLAN.
3. PERFORM EARTHWORK OPERATIONS:
   - 3.1. CONSTRUCT STORMWATER DIVERSION CHANNEL.
   - 3.2. PERFORM RIPPING/EXCAVATING OPERATIONS.
   - 3.3. REPLACE EXCAVATED MATERIAL IN COMPACTED LAYERS ON THE LEVEE/PAD IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
   - 3.4. FINISH SLOPES USING A SMOOTH ROLLER.
   - 3.5. DIG ANCHOR TRENCH.
4. INSTALL RIPRAP FOR EROSION PROTECTION.
5. INSTALL CULVERTS.
6. INSTALL NEW GAME FENCE.
7. INSTALL GEOMEMBRANES:
   - 7.1. INSTALL GEOTEXTILE AS NEEDED, SECONDARY LINER, GEONET, LEAK DETECTION SYSTEM AND PRIMARY LINER.
   - 7.2. INSTALL RUB SHEETS AND WATER LEVEL GAGE/LADDER.
   - 7.3. BACKFILL AND COMPACT ANCHOR TRENCH.

LEGEND

PROPOSED 8' GAME FENCE
EXISTING FENCE
PROPOSED LEASE BOUNDARY
PROPOSED DRIVING SURFACE
STORMWATER CHANNEL
EXISTING OVERHEAD ELECTRIC
EDGE OF EASEMENT

N

SCALE 1"=150'
0 75' 150' 300'

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER
08/19/2021

IFC	ISSUED FOR CONSTRUCTION	08/19/21	CSC
R-X	DESCRIPTION	DATE	BY
	REVISIONS (OR CHANGE NOTICES)		

MAGRYM
TBPELS F-19848

Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com

SOLARIS WATER MIDSTREAM

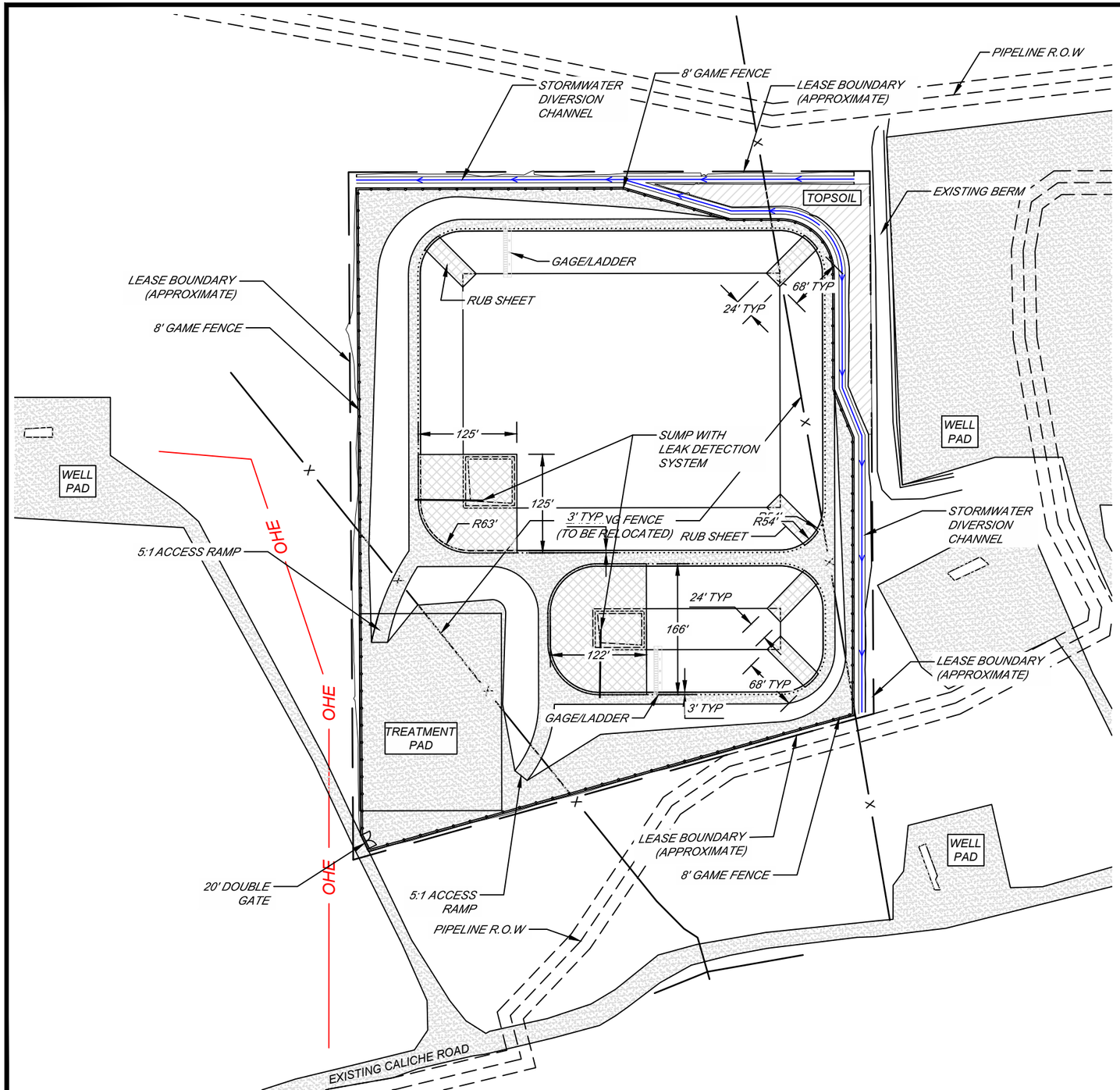
Solaris Water Midstream, LLC
907 Tradewinds Boulevard
Midland, TX 79701
432-203-9020
www.solarismidstream.com

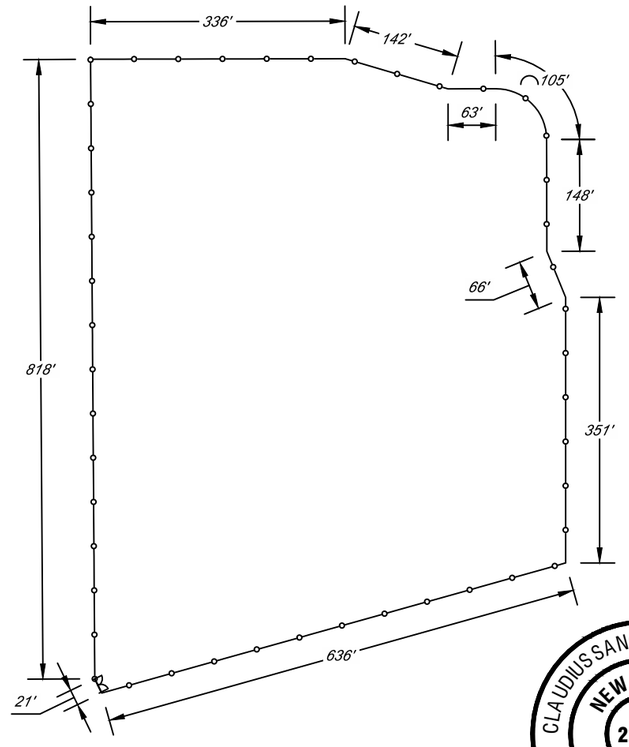
MOBLEY WATER TREATMENT AND REUSE FACILITY
S19, T23S, R30E
EDDY COUNTY, NEW MEXICO
SOLARIS WATER MIDSTREAM, LLC.

PROPOSED SITE PLAN

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-101

Drawing File: Z:\Shared\Projects\2021 Projects\21-190 Solaris Mobley Pond\04_CIVIL\Design\Drawings\21-190 Site Plan.dwg





1 / C-102 DETAILED FENCE DIMENSIONS
NOT TO SCALE

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER
08/19/2021

LEGEND

- PROPOSED 8' GAME FENCE
- EXISTING FENCE
- PROPOSED LEASE BOUNDARY
- PROPOSED DRIVING SURFACE
- STORMWATER CHANNEL
- EXISTING OVERHEAD ELECTRIC — OHE
- EDGE OF EASEMENT
- RUB SHEET
- ANCHOR TRENCH

N

SCALE 1"=150'
0 75' 150' 300'

Magrym Consulting, Inc. 110 W. Louisiana Ave. Ste 314 Midland, TX 79701 (432) 999-2737 www.magrym.com TBPELS F-19848			
IFC	ISSUED FOR CONSTRUCTION	08/19/21	CSC
R-X	DESCRIPTION	DATE	BY
REVISIONS (OR CHANGE NOTICES)			
Solaris Water Midstream, LLC 907 Tradewinds Boulevard Midland, TX 79701 432-203-9020 www.solarismidstream.com			
MOBLEY WATER TREATMENT AND REUSE FACILITY S19, T23S, R30E EDDY COUNTY, NEW MEXICO SOLARIS WATER MIDSTREAM, LLC.			
PROPOSED LINER AND FENCE PLAN			
HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE:		
PRINT DATE: 8/19/2021	DESIGNED BY: NC		
PROJECT NO. 21-190	CHECKED BY: CSC/EMH		
SUBSET: CIVIL	SHEET: C-102		

Drawing File: Z:\Shared\Projects\2021 Projects\21-190 Solaris Mobley Pond\04_CIVIL\Design\Drawings\21-190 Site Plan.dwg

GENERAL NOTES

1. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY SOLARIS WATER MIDSTREAM, LLC.
3. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
4. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION.

LINER NOTES

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

EARTHWORK NOTES

1. FILL FOR LEVEES SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE DIKE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A STANDARD PROCTOR SOILS TEST ON SAMPLES FROM THE SOURCE AREA.
2. FILL SHALL NOT BE PLACED AND COMPACTED WHEN THE MATERIALS ARE TOO WET TO PROPERLY COMPACT. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. IF THE ENGINEER DETERMINED THAT ADDED MOISTURE IS REQUIRED, WATER SHALL BE APPLIED UNIFORMLY OVER THE AREA TO BE TREATED, AND GIVE COMPLETE AND ACCURATE CONTROL OF THE AMOUNT OF WATER TO BE USED. IF TOO MUCH WATER IS ADDED, THAT AREA SHALL BE PERMITTED TO DRY BEFORE COMPACTION IS CONTINUED.
3. PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY OR AS DIRECTED BY ENGINEER.
4. EARTHWORK CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF THE FINISHED COMPACTED POND BOTTOM AND SIDE SLOPES BEFORE HDPE LINER INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.

STAGE STORAGE		
WATER POND ELEVATION (FT)	PRODUCED WATER POND VOLUME NORTH (BBL)	FRESH WATER POND VOLUME SOUTH (BBL)
3031.6	0	0
3032.6	186	133
3033.6	807	807
3034.6	9,410	1,910
3035.6	31,050	4,271
3036.6	53,446	6,951
3037.6	76,609	9,959
3038.6	100,547	13,305
3039.6	125,269	16,998
3040.6	150,787	21,048
3041.6	177,108	25,463
3042.6	204,242	30,252
3043.6	232,199	35,426
3044.6	260,989	40,993
3045.6	290,620	46,962
3046.6	321,103	53,342
3047.6	352,446	60,147
3048.6	384,659	67,380
3049.6	417,753	75,052
3050.6	451,741	83,181
3051.6	486,635	91,778
3052.6	522,440	100,846

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22897
PROFESSIONAL ENGINEER

08/19/2021

SUMMARY OF QUANTITIES			
ITEM NUMBER	ITEM	UNIT	QTY
1	CLEARING AND GRUBBING	ACRES	12
2	STRIP AND STOCKPILE TOPSOIL (6" AVERAGE)	CUBIC YARD	9,017
3	ESTIMATED CUT (BELOW EXISTING GRADE)*	CUBIC YARD	71,382
4	ESTIMATED FILL (ABOVE EXISTING GRADE)**	CUBIC YARD	61,937
5	8' GAME FENCE	LINEAR FEET	2,690
6	20' DOUBLE GATE	LINEAR FEET	1
7	RUB SHEET 60 MIL HDPE GEOMEMBRANE (TEXTURED)***	SQUARE FEET	43,960
8	PRIMARY 60 MIL HDPE GEOMEMBRANE (SMOOTH)***	SQUARE FEET	275,135
9	200 MIL GEONET***	SQUARE FEET	275,135
10	SECONDARY 40 MIL HDPE GEOMEMBRANE (SMOOTH)***	SQUARE FEET	275,135
11	8 OZ. GEOTEXTILE***	SQUARE FEET	275,135
12	6" HDPE DR11 PIPE WITH PERFORATIONS IN SUMP	LINEAR FEET	180
13	GAGE LADDER	EACH	2
14	DRAIN ROCK	CUBIC YARD	2
15	ANCHOR TRENCH	LINEAR FEET	2,711
16	RELOCATE EXISTING FENCE	LINEAR FEET	1,166
17	STORMWATER CHANNEL	LINEAR FEET	1,525

NOTES:

* CUT QUANTITY INCLUDES TOPSOIL QUANTITY AND CONSTRUCTION OF STORMWATER DIVERSION CHANNEL..

** 20% FILL FACTOR APPLIED. FIELD VERIFY. CUT AND FILL QUANTITIES PERTAIN TO THE ENTIRE SITE. PAD, LEVEE AND ROAD MATERIAL ARE INCLUDED IN FILL QUANTITY.

*** COMPLETE-IN-PLACE QUANTITIES. OVERLAP, ANCHOR, WRINKLE, SCRAP AND/OR SPOIL QUANTITIES NOT INCLUDED.

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IFC	ISSUED FOR CONSTRUCTION	08/19/21	CSC
R-X	DESCRIPTION	DATE	BY
REVISIONS (OR CHANGE NOTICES)			

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Solaris Water Midstream, LLC
907 Tradewinds Boulevard
Midland, TX 79701
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MOBLEY WATER TREATMENT AND REUSE FACILITY
S19, T23S, R30E
EDDY COUNTY, NEW MEXICO
SOLARIS WATER MIDSTREAM, LLC.

SUMMARY OF QUANTITIES AND GENERAL NOTES

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-103

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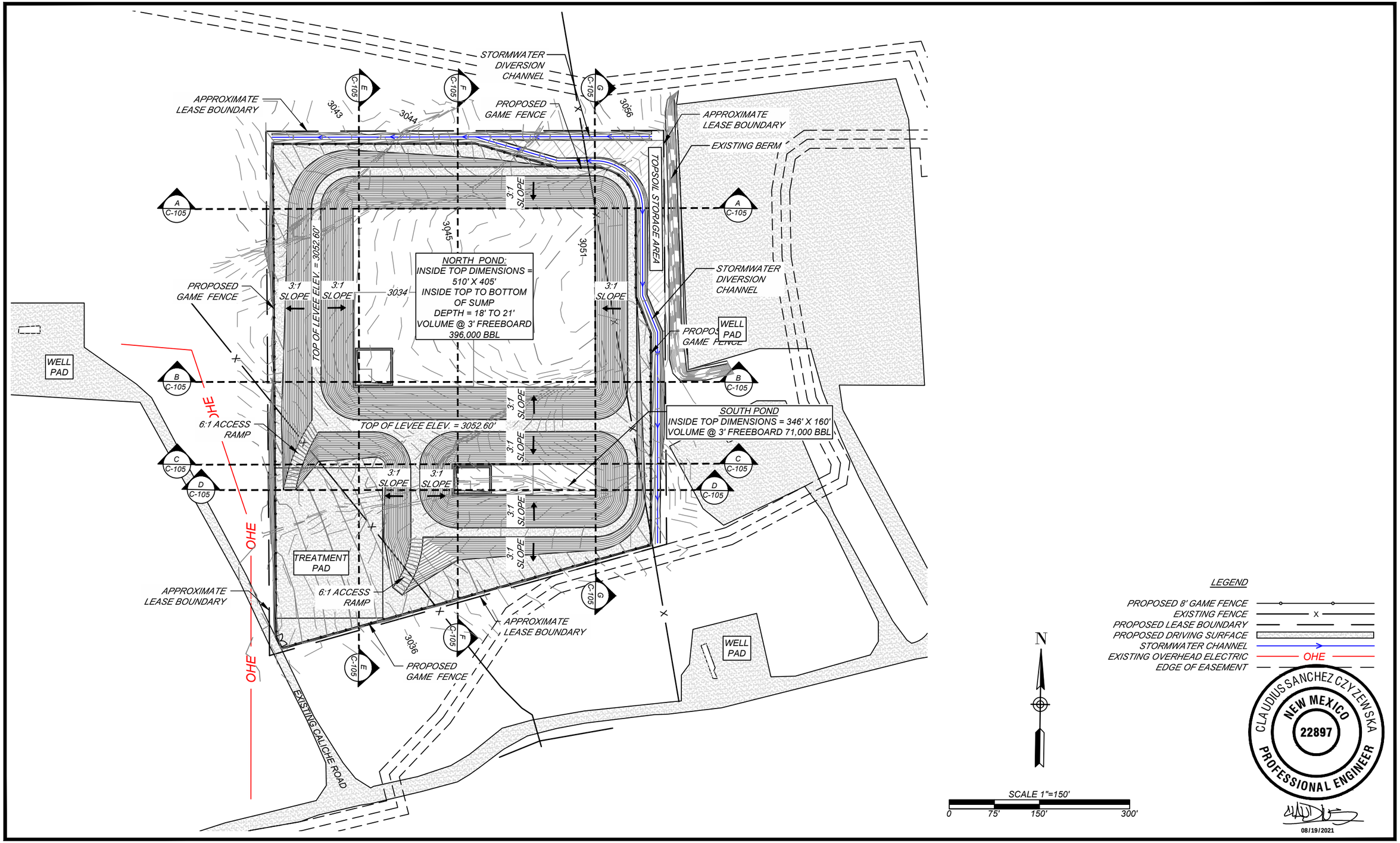

LEGEND

- PROPOSED 8' GAME FENCE
- EXISTING FENCE
- PROPOSED LEASE BOUNDARY
- PROPOSED DRIVING SURFACE
- STORMWATER CHANNEL
- EXISTING OVERHEAD ELECTRIC (OHE)
- EDGE OF EASEMENT

N

SCALE 1"=150'

0 75' 150' 300'

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08/19/2021

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GRADING PLAN

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-104

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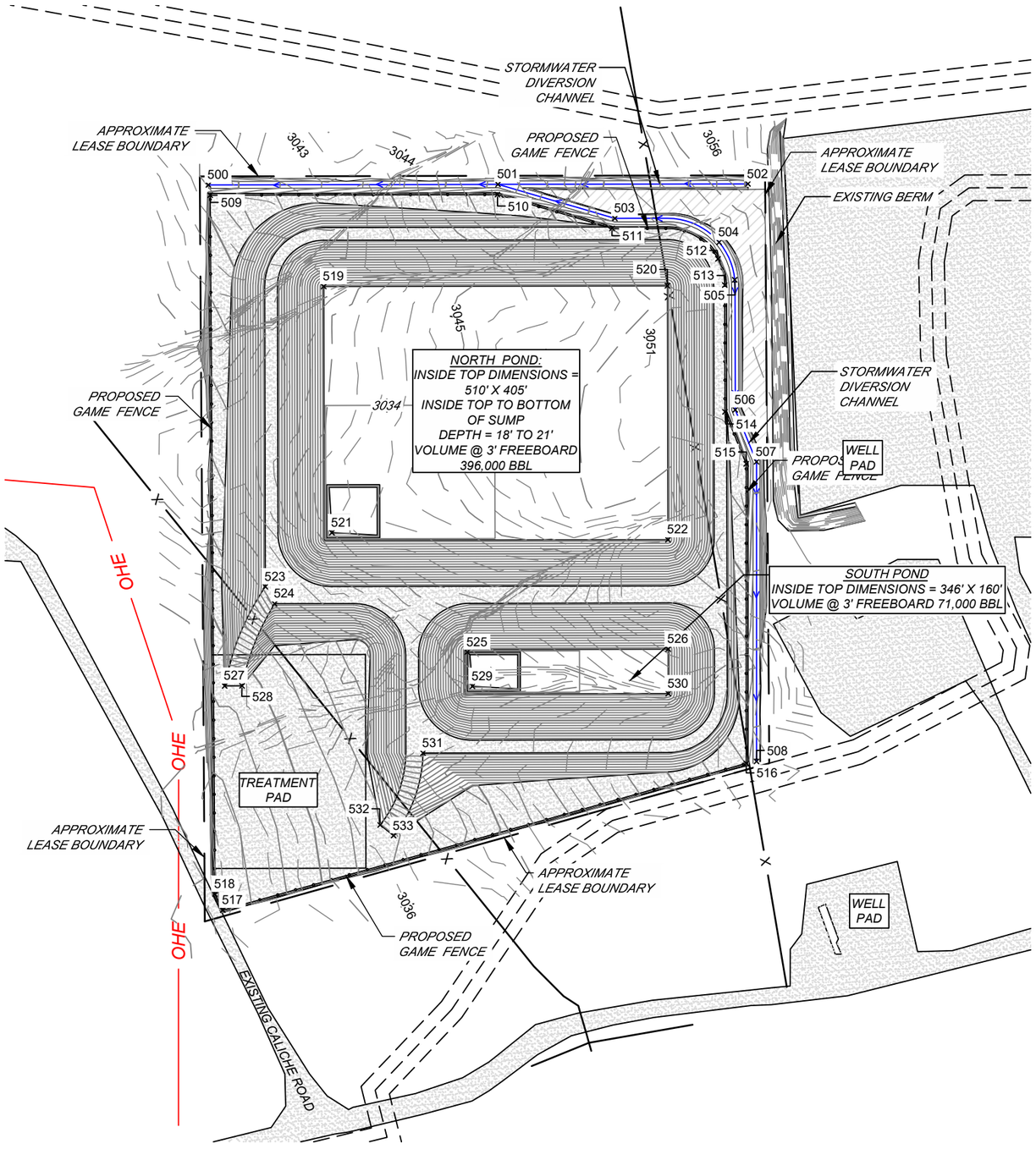

Point Table				
Point #	Northing	Easting	Elevation	Raw Description
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508	471604.56	668074.66	3046.6	FL
501	472279.57	667772.31	3046.3	FL
502	472280.15	668064.65	3055.1	FL
503	472239.78	667909.03	3051.1	FL
504	472211.81	668030.91	3051.6	FL
505	472167.95	668049.18	3051.5	FL
506	472015.83	668049.79	3051.1	FL
507	471955.03	668074.66	3050.4	FL
509	472266.90	667435.66	3040.3	FENCE
510	472267.57	667771.57	3047.8	FENCE
511	472227.96	667905.65	3052.6	FENCE
512	472192.41	668029.59	3052.6	FENCE
513	472161.75	668037.50	3052.6	FENCE
514	472013.46	668037.79	3052.6	FENCE
515	471952.67	668062.66	3051.8	FENCE
516	471602.15	668062.66	3047.0	FENCE

Point Table				
Point #	Northing	Easting	Elevation	Raw Description
517	471430.51	667450.35	3032.2	FENCE
518	471449.35	667441.32	3031.7	FENCE
519	472160.09	667568.50	3034.6	FG
520	472160.91	667970.50	3034.6	FG
521	471872.11	667578.08	3031.6	FG
522	471863.91	667971.10	3034.6	FG
523	471808.95	667500.21	3052.6	FG
524	471788.98	667511.07	3052.6	FG
525	471732.43	667736.36	3033.6	FG
526	471735.91	667971.36	3034.6	FG
527	471692.86	667452.61	3034.4	FG
528	471692.90	667472.98	3034.4	FG
529	471692.44	667742.44	3031.6	FG
530	471683.91	667971.46	3034.6	FG
531	471614.33	667684.60	3052.6	FG
532	471530.22	667634.50	3036.8	FG
533	471517.77	667650.16	3036.8	FG

LEGEND

- PROPOSED 8' GAME FENCE
- EXISTING FENCE
- PROPOSED LEASE BOUNDARY
- PROPOSED DRIVING SURFACE
- STORMWATER CHANNEL
- EXISTING OVERHEAD ELECTRIC — OHE
- EDGE OF EASEMENT

N

SCALE 1"=150'

0 75' 150' 300'

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EDDY COUNTY, NEW MEXICO
SOLARIS WATER MIDSTREAM, LLC.

CONTROL PLAN

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-105

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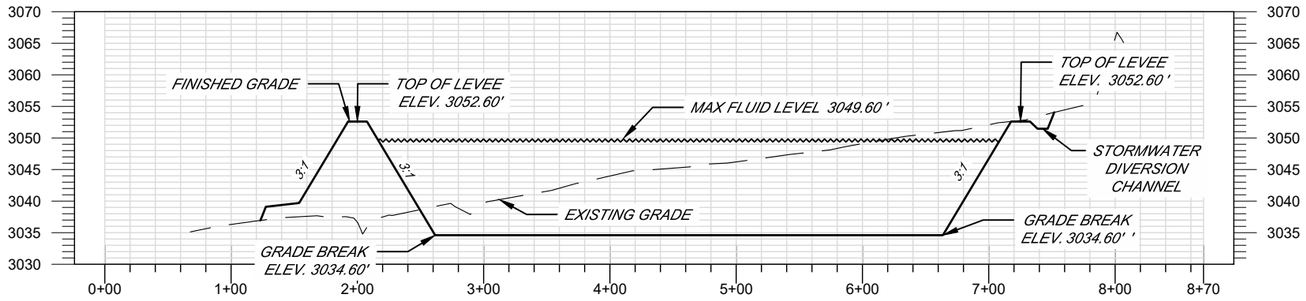

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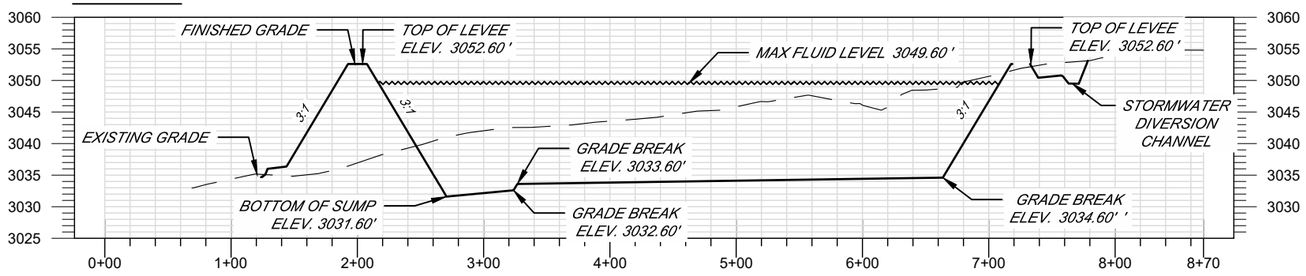

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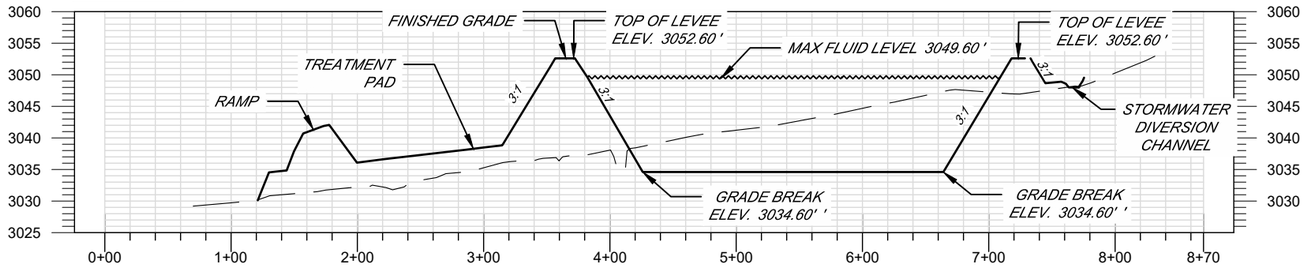

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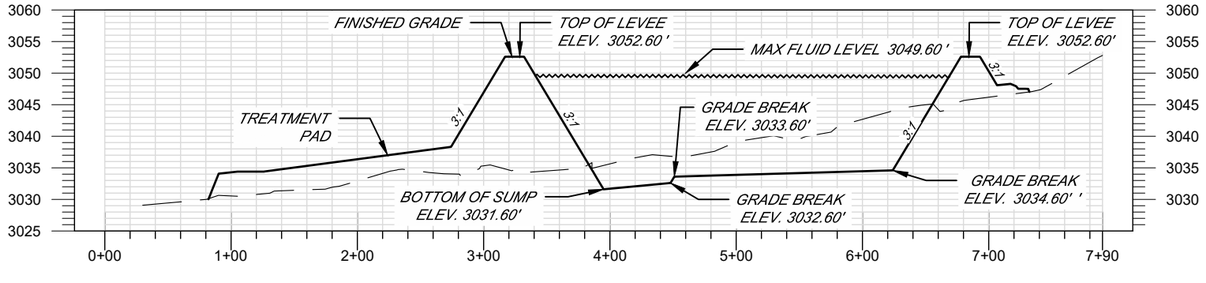

VERTICAL SCALE 1"=24'

0 12' 24' 48'

HORIZONTAL SCALE 1"=150'

0 75' 150' 300'

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CROSS SECTIONS

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: 1"=24'
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-106

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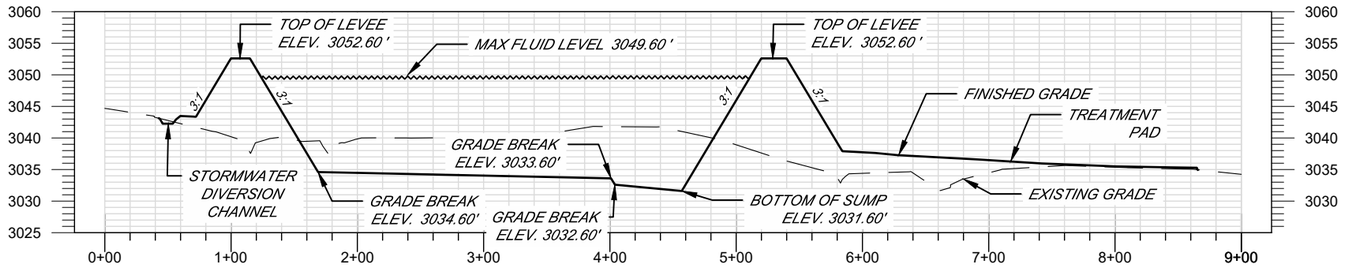

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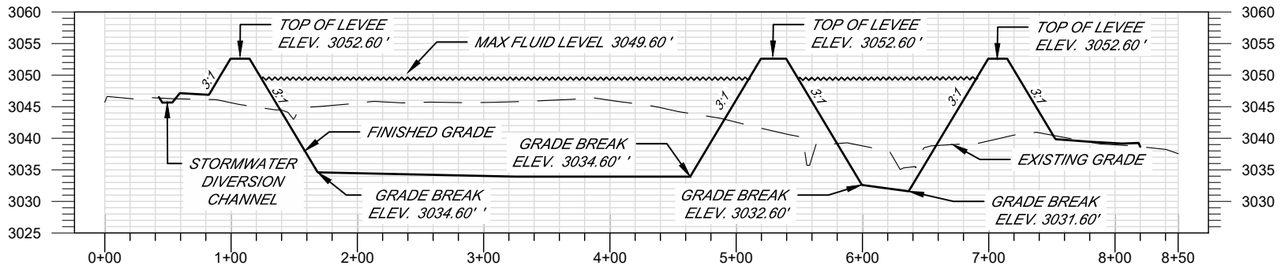

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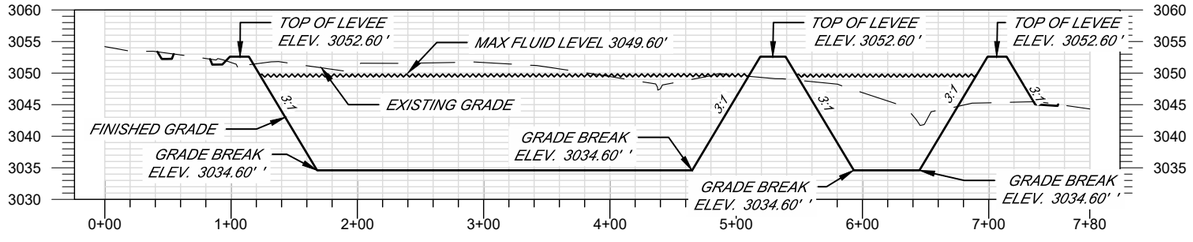

VERTICAL SCALE 1"=24'

0 12' 24' 48'

HORIZONTAL SCALE 1"=150'

0 75' 150' 300'

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CROSS SECTIONS

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SUBSET: CIVIL	SHEET: C-107

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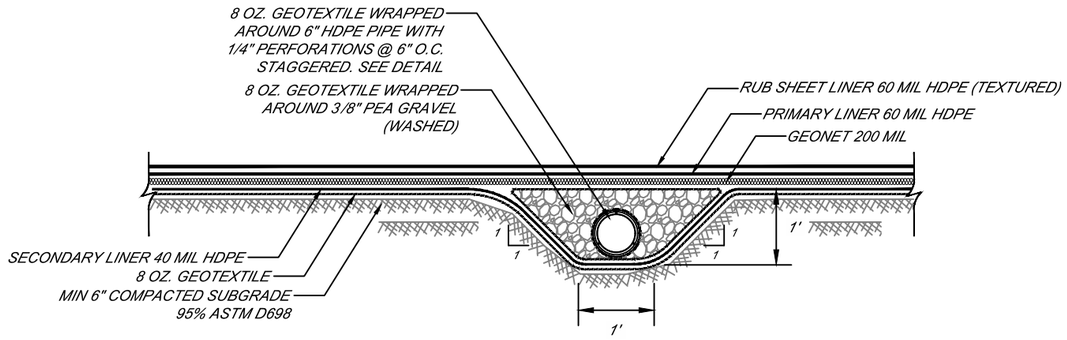
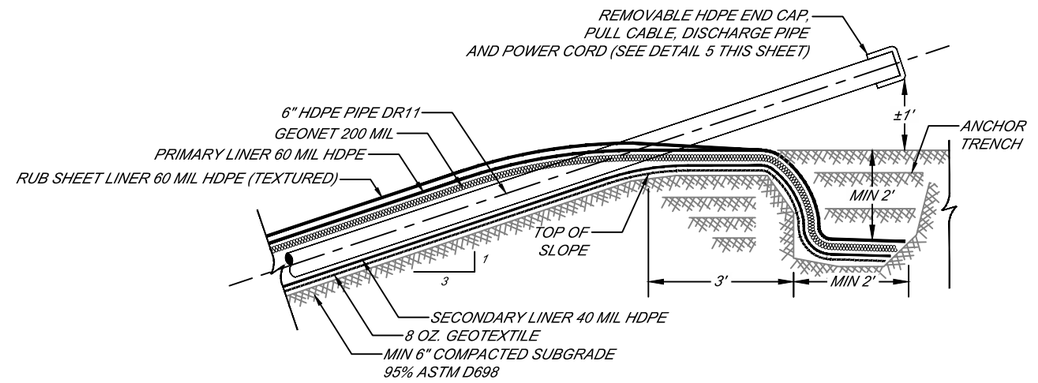
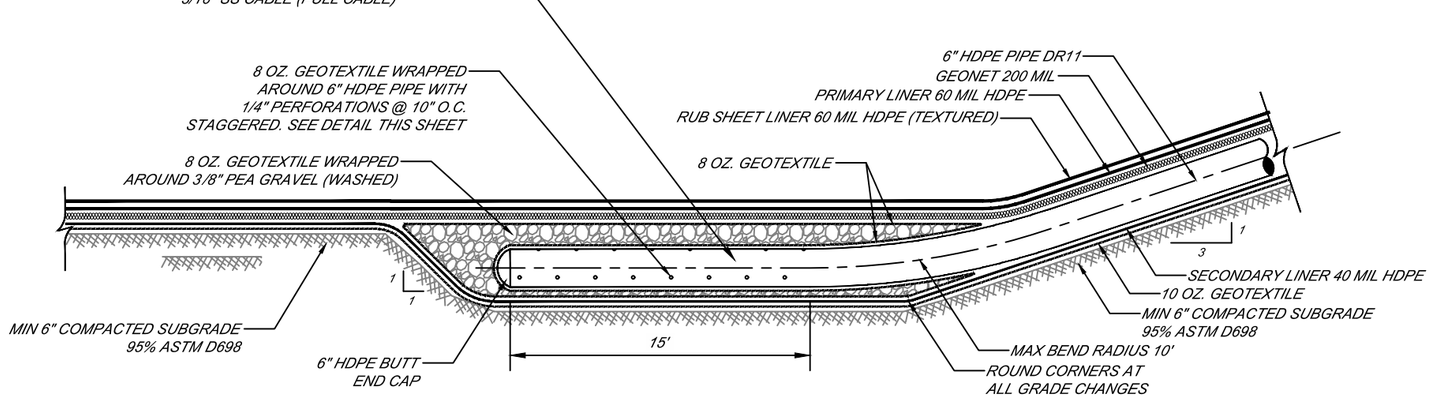


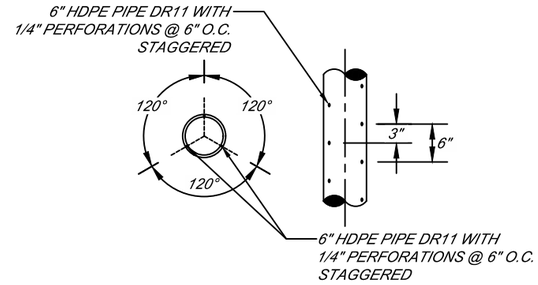
1 / C-108 **LEAK DETECTION SYSTEM SECTION A**
NOT TO SCALE



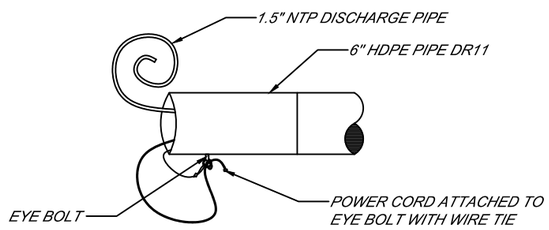
2 / C-108 **LEAK DETECTION SYSTEM PIPE RISER**
NOT TO SCALE



3 / C-108 **LEAK DETECTION SYSTEM SECTION B**
NOT TO SCALE



4 / C-108 **LEAK DETECTION SYSTEM PERFORATED PIPE**
NOT TO SCALE



5 / C-108 **DISCHARGE PIPE, PULL CABLE AND POWER CORD**
NOT TO SCALE

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08/19/2021

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LEAK DETECTION SYSTEM DETAILS

HORIZONTAL SCALE:NTS	VERTICAL SCALE: NTS
PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-106

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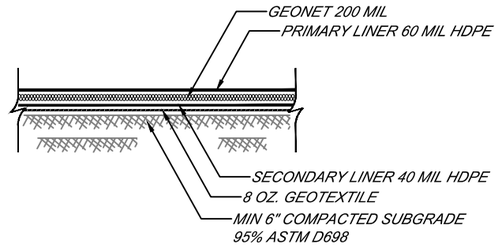
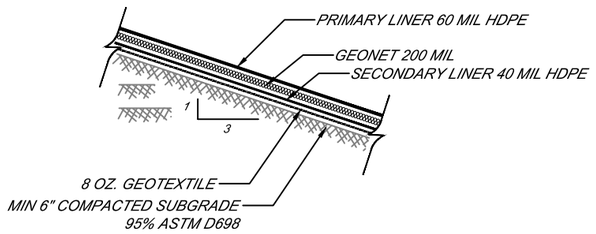


1 / C-109 TYPICAL POND BOTTOM LINER
NOT TO SCALE



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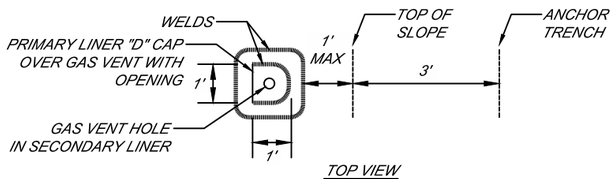
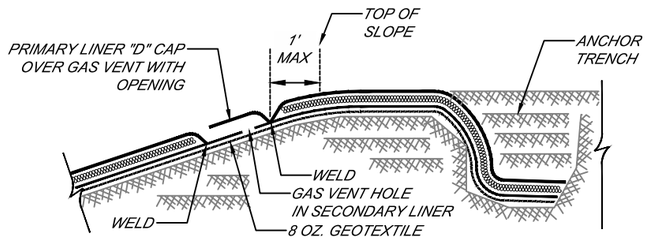


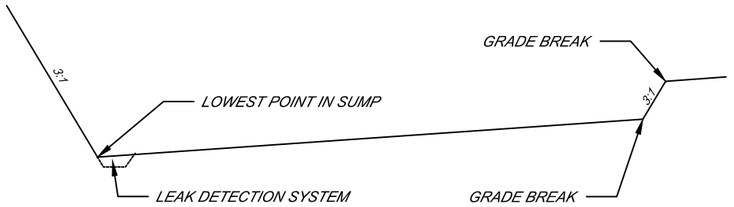
TOP VIEW



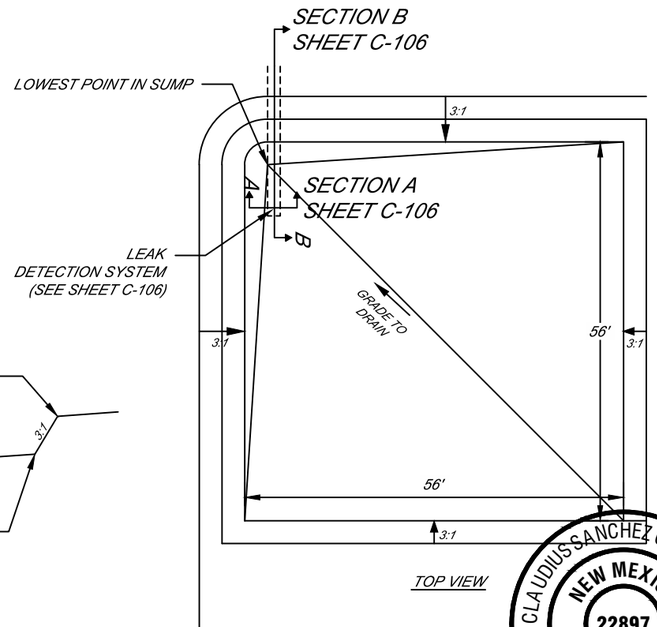
SIDE VIEW

NOTE:
GAS VENT SPACING SHALL BE INSTALLED
PER MANUFACTURER'S RECOMMENDATIONS

3 / C-109 TYPICAL GAS VENT
NOT TO SCALE



SIDE VIEW



TOP VIEW

4 / C-109 SUMP DETAIL
NOT TO SCALE

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PROFESSIONAL ENGINEER
08/19/2021

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MISCELLANEOUS DETAILS

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PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-107

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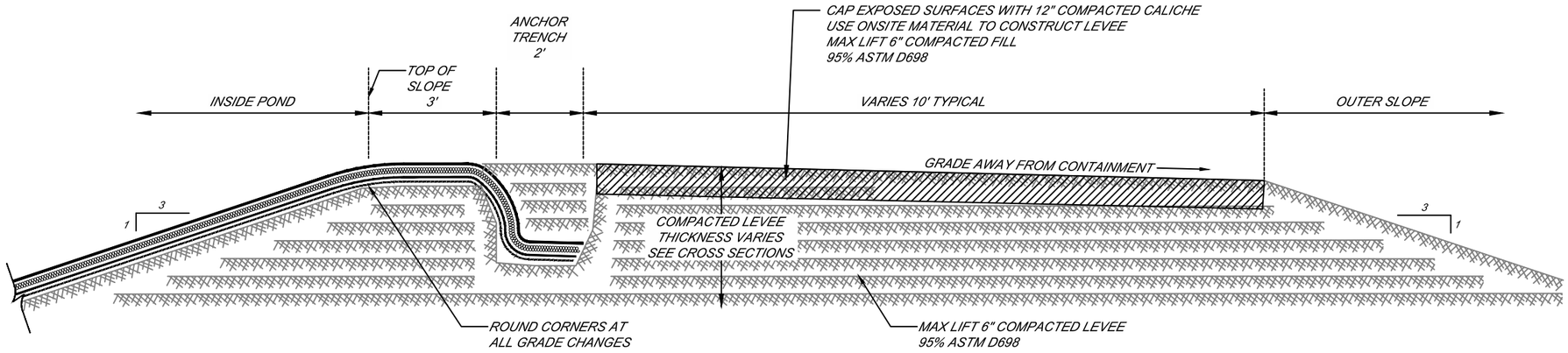

1 / C-110 TYPICAL LEVEE SECTION
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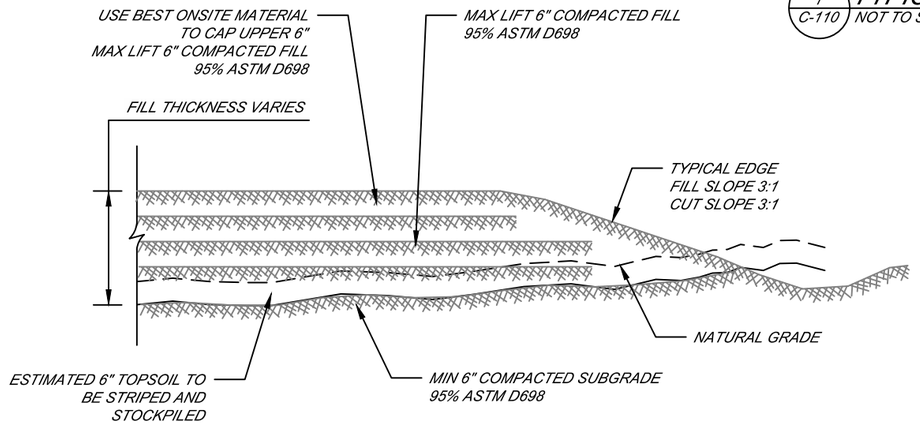

2 / C-110 TYPICAL PAD EDGE SECTION
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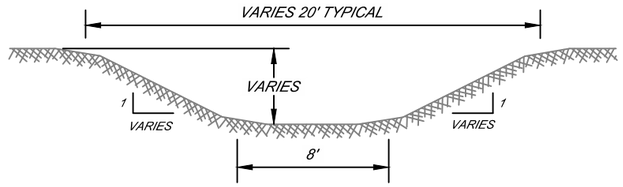

4 / C-110 TYPICAL DRAINAGE DICH
NOT TO SCALE

Magrym Consulting, Inc. 110 W. Louisiana Ave. Ste 314 Midland, TX 79701 (432) 999-2737 www.magrym.com TBPELS F-19848	Solaris Water Midstream, LLC 907 Tradewinds Boulevard Midland, TX 79701 432-203-9020 www.solarismidstream.com	MOBLEY WATER TREATMENT AND REUSE FACILITY S19, T23S, R30E EDDY COUNTY, NEW MEXICO SOLARIS WATER MIDSTREAM, LLC.

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LEVEE AND PAD DETAILS	
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PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
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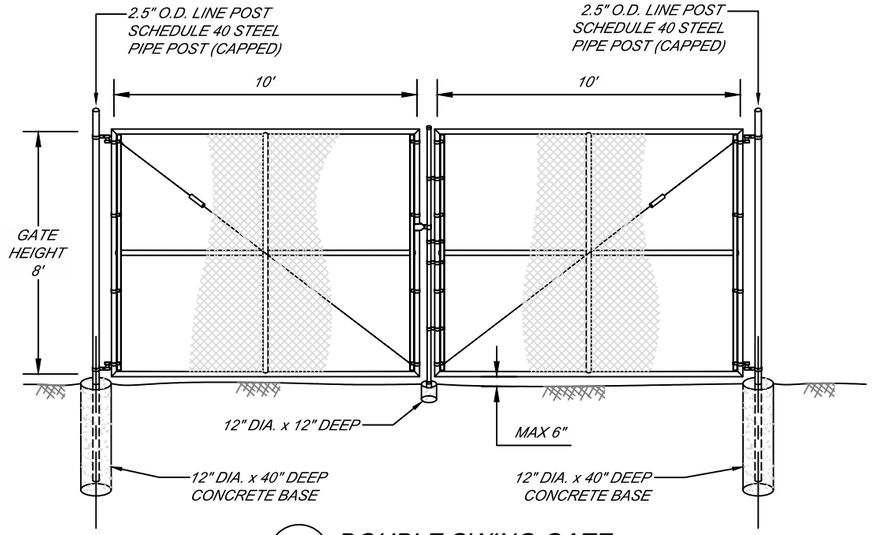
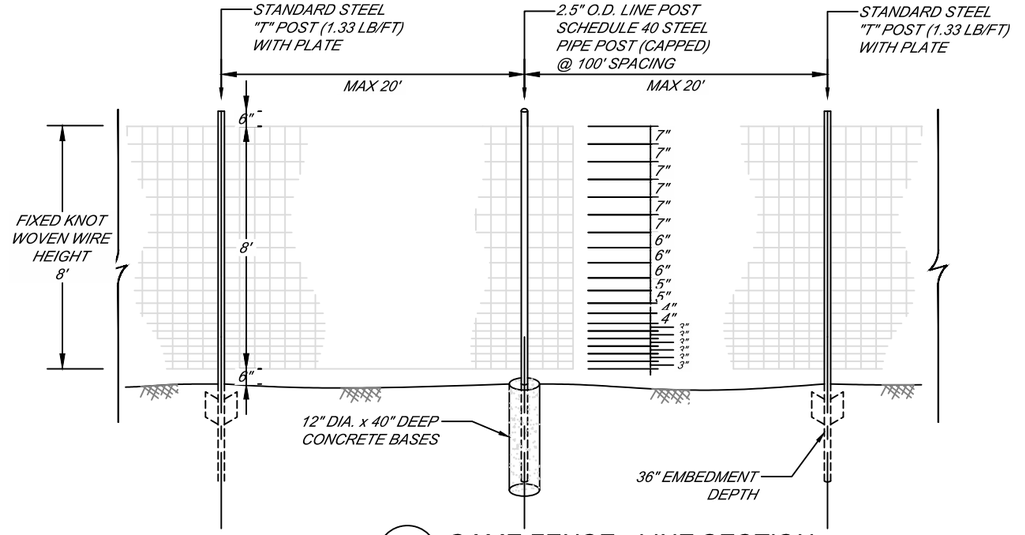
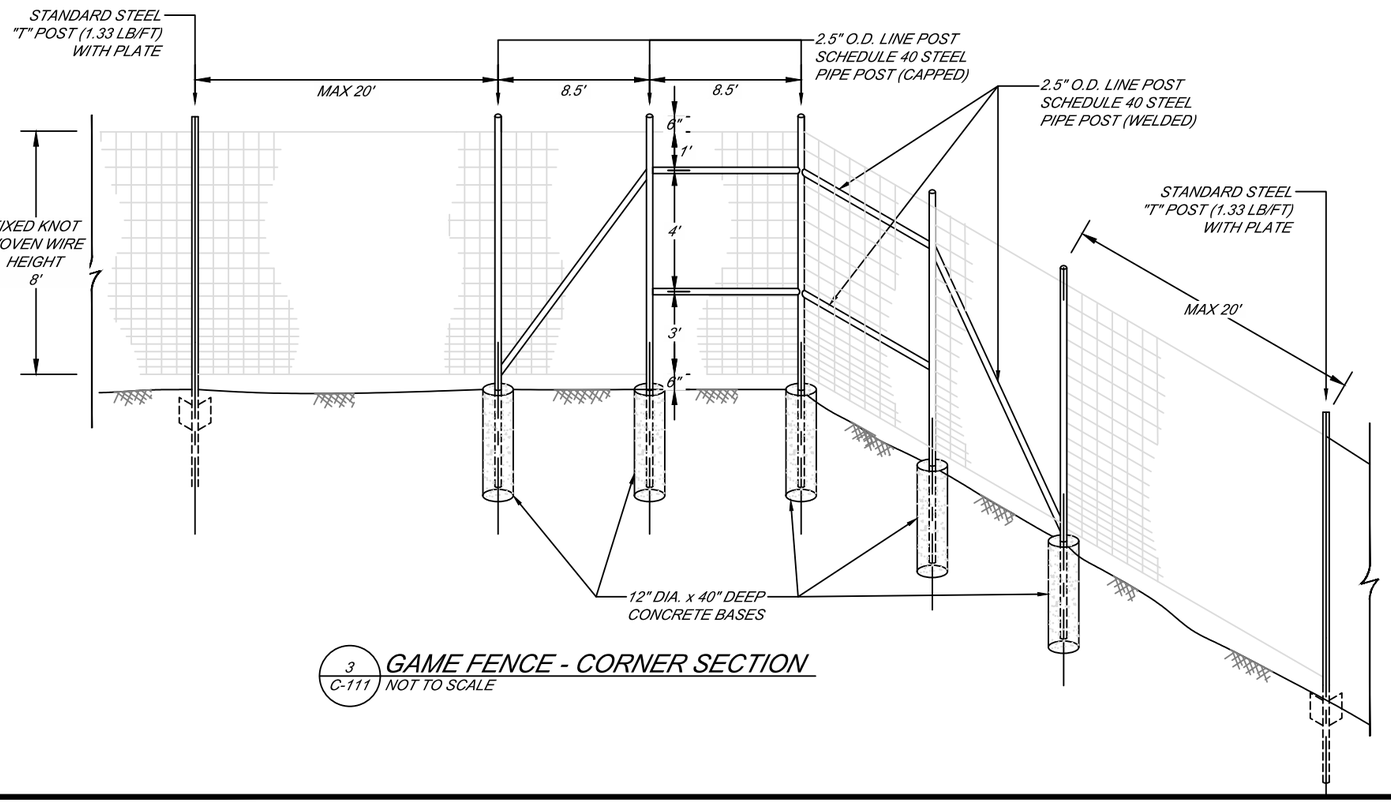


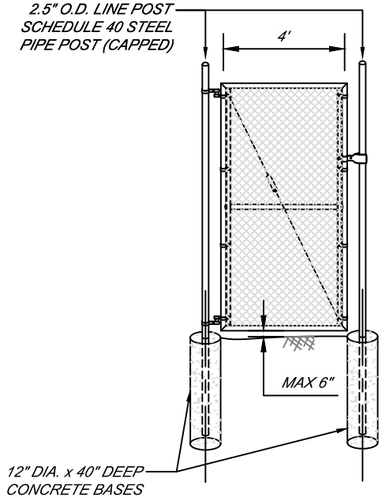
1 C-111 **DOUBLE SWING GATE**
NOT TO SCALE



2 C-111 **GAME FENCE - LINE SECTION**
NOT TO SCALE



3 C-111 **GAME FENCE - CORNER SECTION**
NOT TO SCALE



4 C-111 **WALK GATE**
NOT TO SCALE

NOTES:
1. FOR WOVEN WIRE, TOP AND BOTTOM STRANDS SHALL BE 12½ GAUGE OR HEAVIER; INTERMEDIATE STRANDS SHALL BE 14½ GAUGE OR HEAVIER.
2. ALL WIRE SHALL HAVE CLASS III GALVANIZATION.
3. STANDARD WOVEN WIRE FENCES MAY HAVE LINE POSTS SPACED UP TO 15 FEET APART. HI-TENSILE WOVEN WIRE FENCE MAY HAVE LINE POSTS SPACED UP TO 20 FEET APART. CLOSER SPACING IS REQUIRED WHERE NEEDED FOR INCLINES OR CHANGES IN TOPOGRAPHY.
4. CONCRETE FOOTINGS SHALL HAVE TOPS CROWNED.
5. TO PREVENT WIRE FROM SLIPPING ON STEEL POST, DOUBLE WRAP ALL WIRE AROUND STEEL POST OR WELD CHAIN LINK LOOPS.

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FENCE DETAILS

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SUBSET: CIVIL	SHEET: C-109

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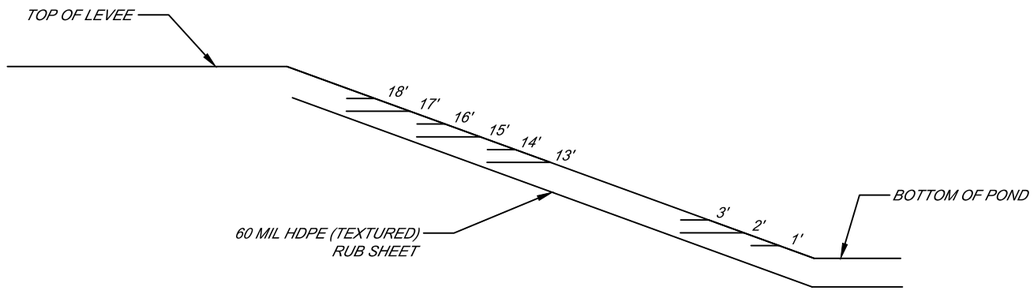
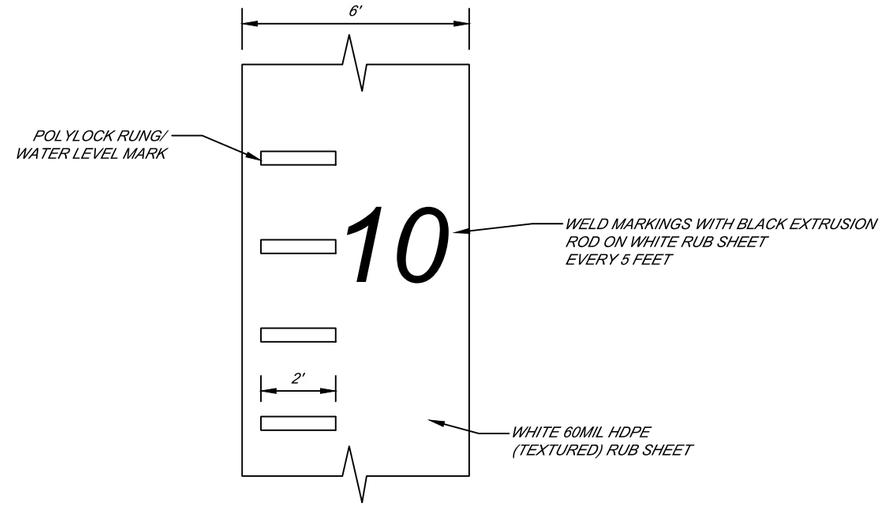
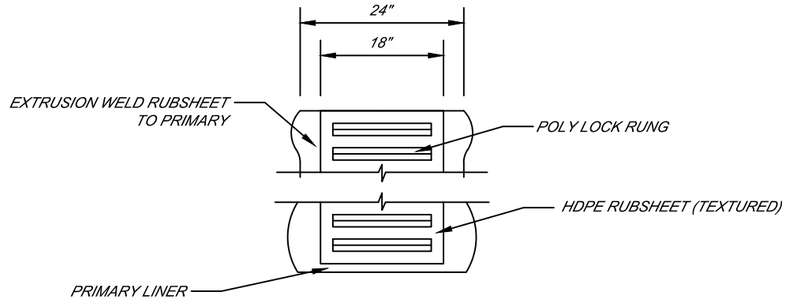
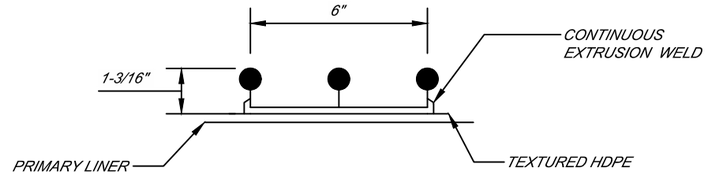




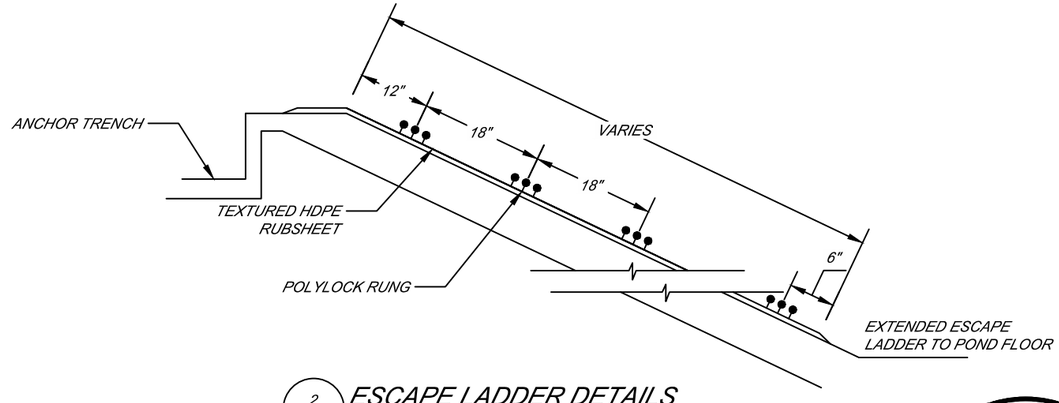
1 / C-112 WATER LEVEL MARKS
NOT TO SCALE



ESCAPE LADDER FRONT VIEW



POLY LOCK RUNG



2 / C-112 ESCAPE LADDER DETAILS
NOT TO SCALE

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ESCAPE LADDER AND GAGE DETAILS

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PRINT DATE: 8/19/2021	DESIGNED BY: NC
PROJECT NO. 21-190	CHECKED BY: CSC/EMH
SUBSET: CIVIL	SHEET: C-110

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EFFECTIVE WIDE-AREA BIRD CONTROL!

Mega Blaster PRO
sonic bird repeller
covers 30 acres!

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

PREDATOR cries help scare all the birds.

- NEMA Rated Case
- Crystal-Clear Digital Sounds

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

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

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

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

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

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

CONFIGURATIONS AVAILABLE:

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

Mega Blaster PRO

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

BIRD-X

The Bird Control 'X'-Perts

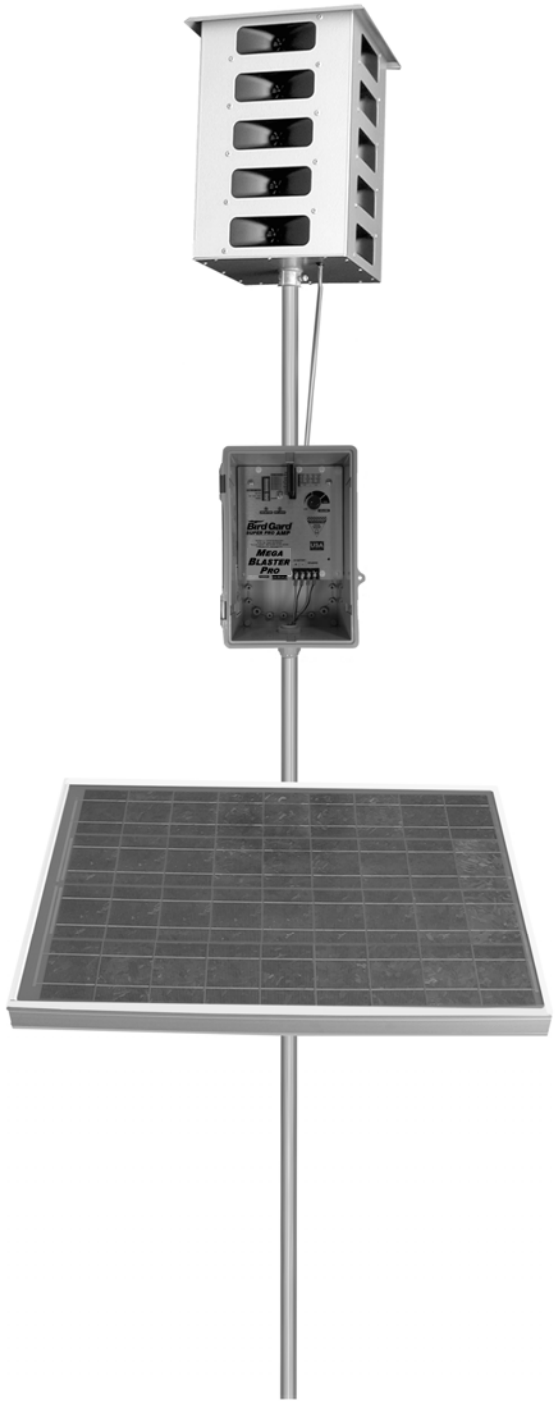
NOTE: This unit is capable of sound output up to 125 decibels. **HEARING PROTECTION IS RECOMMENDED.**

HEARING PROTECTION RECOMMENDED

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

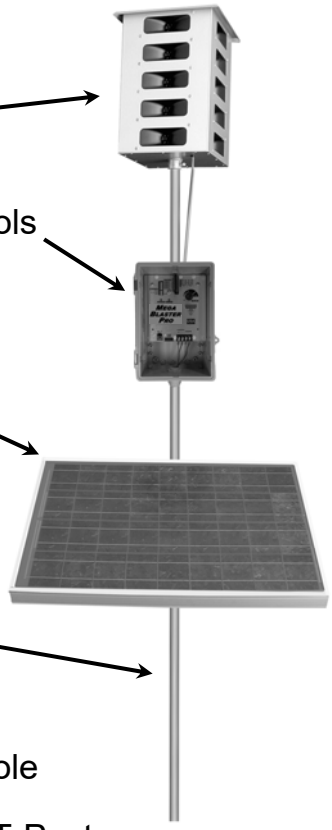
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the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

Your Bird-X Mega Blaster Pro system consists of:

20-Speaker Tower broadcasts the bird sounds

Control Unit produces the bird sounds and contains all operational controls

Solar Panel recharges the 12-volt deep cycle battery



Items needed but not included:

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

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

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

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

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

Bird Control Management Guidelines

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

For best results:

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

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

DESIGN AND CONSTRUCTION PLAN
OPERATION AND MAINTENANCE PLAN
CLOSURE PLAN

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)**

Design and Construction Plan In Ground Containments

This plan addresses construction of the earthen containments.

Magrym Engineers is providing the design of the containment and their plans are presented in this submission.

19.15.34.12 A Design and Construction Specifications
(1). The operator shall design and construct a recycling containment to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall.
(8). The operator of a recycling containment shall design the containment to prevent run-on of surface water. The containment shall be surrounded by a berm, ditch or other diversion to prevent run-on of surface water

Dike Protection and Structural Integrity

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

Stockpile Topsoil

Where topsoil is present, prior to constructing containment, the operator will strip and stockpile the topsoil for use as the final cover or fill at the time of closure.

19.15.34.12 B. Prior to constructing containment, the operator shall strip and stockpile the topsoil for use as the final cover or fill at the time of closure

Signage

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

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

19.15.34.12 C. Signs.
The operator shall post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name, the location of the site by quarter-quarter or unit letter, section, township and range, and emergency telephone numbers

Fencing

The operator will provide for a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. As specified in the transmittal letter and design drawings, the operator will employ a chain-link or game fence rather than a four foot, four-strand wire fence Because feral pigs, javelina and deer are present in the area, a chain link or game fence is required in order to comply with Section 19.15.34.12 D.1 of the Rule. The specification for fencing provided in 19.15.34.12 D.2 contradicts D.1 because pigs will move beneath the lower strand of a 4-strand, 4-foot high barbed wire fence and deer will jump over. Thus, compliance with D.2 results in a violation of D.1. Compliance with D.1 is the critical component of the Rule and operators need not submit a variance request in order to follow Best Management Practices and comply with the Rule.

19.15.34.12 D. Fencing
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
(2) 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.

As stated in the O&M plan, the operator will ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

Netting and Protection of Wildlife

The perimeter game/chain-link fence will be effective in excluding stock and most terrestrial wildlife. If requested by the surface owner, the game fence can include a fine mesh from the base to 1 foot above the ground to exclude the small reptiles (e.g. dune sagebrush lizard).

19.15.34.12 E Netting.
The operator shall ensure that a recycling containment is screened, netted or otherwise protective of wildlife, including migratory birds. The operator shall on a monthly basis inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

The recycling containment will be protective of wildlife, including migratory birds through the implementation of an Avian Protection Plan, routine inspections and the perimeter fence.

The avian protection plan includes the use of a Bird-X Mega Blaster Pro[1] as a primary hazing program for avian species. The device will be equipped with sounds suitable for the Permian Basin environment. In addition to this sonic device, staff will routinely inspect the containment for the presence of avian species and, if detected, will use a blank cartridge or shell in a handgun, starter pistol or shotgun as additional hazing. Decoys of birds of prey may be placed on the game fence and other roosts around the open water to provide additional hazing.

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

Earthwork

The containment will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

19.15.34.12 A
(2) A recycling containment shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity…

This volume provides the stamped drawings for the containment with the following design/construction specifications:

a) levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).

b) levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
c) top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
d) The containment floor design calls for a slope toward the sump in the corner(s).

19.15.34.12 A
(2) …The operator shall construct the containment in a levee with an inside grade no steeper than two horizontal feet to one vertical foot (2H:1V). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

Liner and Drainage Geotextile Installation

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

19.15.34.12 A
(3) Each recycling containment shall incorporate, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

The primary (upper) liner is a geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. It is 60-mil HDPE. The secondary liner is specified in the design drawings and is 40-mil HDPE or thicker and is equivalent to 30-mil LLDPEr (in accordance with a previously approved variance) Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW-846 method 9090A.

19.15.34.12 A
(4) All primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. All primary liners shall be 30-mil flexible PVC, 45-mil LLDPE string reinforced or 60-mil HDPE liners. Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

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

19.15.34.12 A
(7) The operator of a recycling containment shall place a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet or two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater 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.

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

i. minimizing liner seams and orient them up and down, not across, a slope of the levee.
ii. use factory-welded seams where possible.
iii. use field seams in geosynthetic material that are thermally seamed and prior to field seaming, overlap liners four to six inches.
iv. minimize the number of field seams and comers and irregularly shaped areas.
v. provide for no horizontal seams within five feet of the

19.15.34.12 A
(5) The operator of a recycling containment shall minimize liner seams and orient them up and down, not across, a slope of the levee. Factory welded seams shall be used where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches…

slope's toe.

vi. use qualified personnel to perform field welding and testing.

vii. avoid excessive stress-strain on the liner

viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

19.15.34.12 A
(5) …The operator shall minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

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

19.15.34.12 A
(3) The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

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

19.15.34.12 A
(6) At a point of discharge into or suction from the recycling containment, the operator shall insure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment may be equipped with permanent HDPE stinger (supported by a sacrificial liner or geotextile) for withdrawal of fluid if the owner deems necessary during operations.

Leak Detection and Fluid Removal System Installation

The leak detection system, contains the following design elements

a. The 200-mil HyperNet Geonet drainage material between the primary and secondary liner that is sufficiently permeable to allow the transport of fluids to the observation ports (Appendix A).
b. The containment floor is sloped towards the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal.
c. Piping will withstand chemical attack from any seepage, structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction (see Appendix A).

Operation and Maintenance Plan
In Ground Containments

Overview

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

19.15.34.10 D
Recycling containments may not be used for the disposal of produced water or other oilfield wastes.

The operation of the containment is summarized below.

A. Produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
B. Unless specified in the transmittal letter, after treatment, the produced water discharges into the containment.
C. When required, produced water is removed from the containment for E&P operations. At this time, produced water will be used for drilling beneath the freshwater zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.
D. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
E. The operator will keep accurate records and shall report monthly to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148 (see attached example).
F. The operator will maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.

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

19.15.34.9 F
The operator of a recycling facility shall maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.

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

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

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

1. The operator will not discharge into or store any hazardous waste (as defined by 40 CFR 261 and NMAC 19.15.2.7.H.3) in the containments.
2. If the containment's primary liner is compromised above the fluid's surface, the operator will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the division district office.
3. If the primary liner is compromised below the fluid's surface, the operator will remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.
4. If any penetration of the containment liner is confirmed by sampling of fluid in the leak detection system (see Monitoring, Inspection, and Reporting Plan; below), the operator will:
    a. Begin and maintain fluid removal from the leak detection/pump-back system,
    b. Notify the district office within 48 hours (phone or email) of the discovery,
    c. Identify the location of the leak, and
    d. Repair the damage or, if necessary, replace the containment liner.
5. The operator will install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release and the operator will remove any visible layer of oil from the surface of the recycling containment.
6. The operator will report releases of fluid in a manner consistent with NMAC 19.15.29
7. The containment will be operated to prevent the collection of surface water run-on.

19.15.34.13 B
(4) If the containment's primary liner is compromised above the fluid's surface, the operator shall repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the division district office.
(5) If the primary liner is compromised below the fluid's surface, the operator shall remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.

19.15.34.13 B
(7) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.
(1) The operator shall remove any visible layer of oil from the surface of the recycling containment.
19.15.34.8 A

(6) All releases from the recycling and re-use of produced water shall be handled in accordance with 19.15.29 NMAC.

8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-foot of freeboard.
10. As described in the design/construction plan, the injection or withdrawal of fluids from the containment is accomplished through hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
11. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
12. The operator will maintain the fences in good repair.

19.15.34.13
(6) The containment shall be operated to prevent the collection of surface water run-on.

19.15.34.13 B
(2) The operator shall maintain at least three feet of freeboard at each containment.

19.15.34.13 B
(3) 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 or pipes.

19.15.34.12 D
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

19.15.34.13 A
The operator shall inspect the recycling containment and associated leak detection systems weekly while it contains fluids. The operator shall maintain a current log of such inspections and make the log available for review by the division upon request.

Monitoring, Inspection, and Reporting Plan

The operator will inspect the recycling containment and associated leak detection systems weekly while it contains fluids. The operator shall maintain a current log of such inspections and make the log available for review by the division upon request.

Weekly inspections consist of:

- reading and recording the fluid height of staff gauges,
- recording any evidence that the pond surface shows visible oil,
- visually inspecting the containment's exposed liners
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.
- inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs, then the operator will take appropriate action within 48 hours, based on if above or below water surface, as noted above.

Monthly, the operator will:

A. Inspect the containment for dead migratory birds and other wildlife. Within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.
B. Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
C. Record sources and disposition of all recycled water.

19.15.34.12 E
The operator shall on a monthly basis inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

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

19.15.34.9 F
The operator of a recycling facility shall maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.

The operator will maintain a log of all inspections and make the log available for the appropriate Division district office's review upon request. An example of the log is attached to this section of the permit application.

Freeboard and Overtopping Prevention Plan

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

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

I. Cease discharging produced water to the containment.
II. II. Accelerate re-use of the produced water for purposes approved by the Division.
III. Transfer produced water from the containment to injection wells.

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

Protocol for Leak Detection Monitoring, Fluid Removal and Reporting

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

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

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

1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage.
2. Collect a water sample from the monitoring riser pipe to confirm the seepage is produced water from the containment via electrical conductivity and chloride measurements.
3. Notify NMOCD of a confirmed positive detection in the system within 48 hours of sampling (initial notification).
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment until the liner is repaired or replaced.
5. Dispatch a liner professional to inspect the portion of the containment suspected of leakage during a "low water" monitoring event.
6. Provide NMOCD a second report describing the inspection and/or repair within 20 days of the initial notification.

If the point of release is obvious from a low water inspection, the liner professional will repair the loss of integrity. If the point of release cannot be determined by the inspection, the liner professional will develop a more robust plan to identify the point(s) of release. The inspection plan and schedule will be submitted to OCD with the second report. The operator will implement the plan upon OCD approval.

Closure Plan
In Ground Containments

Overview

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

19.15.34.14 A
Once the operator has ceased operations, the operator shall remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use.

The operator shall substantially restore the impacted surface area to

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

19.15.34.14 E
The operator shall substantially restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

19.15.34.14 G
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.

The surface owner will impose a closure design that conforms to their needs for the site. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol.

Excavation and Removal Closure Plan – Protocols and Procedures

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

1. The operator will remove all liquids from the containment and either:
    a. Dispose of the liquids in a division-approved facility, or
    b. Recycle, reuse or reclaim the water for reuse in drilling and stimulation.
2. The operator will close the recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.
3. After the removal of the containment contents and liners, soils beneath the containment will be tested by collection of a five-point (minimum) composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I of 19.15.34.14.
4. After review of the laboratory results:
    a. If any contaminant concentration is higher than the parameters listed in Table I, additional delineation may be required, and the operator must receive approval before proceeding with closure.

19.15.34.14 B
The operator shall close a recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.

19.15.34.14 C
The operator shall 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.

19.15.34.14 C
(1) If any contaminant concentration is higher than the parameters listed in Table I, the division may require additional delineation upon review of the results and the operator must receive approval before proceeding with closure.

b. If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator will proceed to
    i. backfill with non-waste containing, uncontaminated, earthen material - Or
    ii. undertake an alternative closure process pursuant to a variance request after approval by OCD.

19.15.34.14 C
(2) If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator can proceed to backfill with non-waste containing, uncontaminated, earthen material.

Reclamation and Re-vegetation

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

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

Closure Documentation

Within 60 days of closure completion, the operator shall submit a closure report on form C-147, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The closure report shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in division rules or directives.

19.15.34.14 D
Within 60 days of closure completion, the operator shall submit a closure report on form C-147, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The closure report shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in division rules or directives.

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

19.15.34.14 H
The operator shall notify the division when reclamation and re-vegetation are complete.

19.15.34.14 F
Reclamation of all disturbed areas no longer in use shall be considered complete 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 plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.

Quarterly Inspection Log Sheet - In Ground Containment

Solaris Water Midstream
- ÏÂÌÅÙ Containment

Inspect weekly while fluids present (>1 foot); Monthly when fluids <1 foot								
Inspection Date	Inspector (Initials)	Describe any 1. Tear of Liner 2. Break in Berms and Run-on of Stormwater 3. Dead Wildlife 4. Oil on Fluid				Report Fluid Freeboard	Leak Detection System Functioning (yes/no)	Comments
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			

Weekly inspections consist of:

- reading and recording the fluid height of staff gauges,
- recording any evidence that the pond surface shows visible oil,
- visually inspecting the containment's exposed liners
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.
- inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.

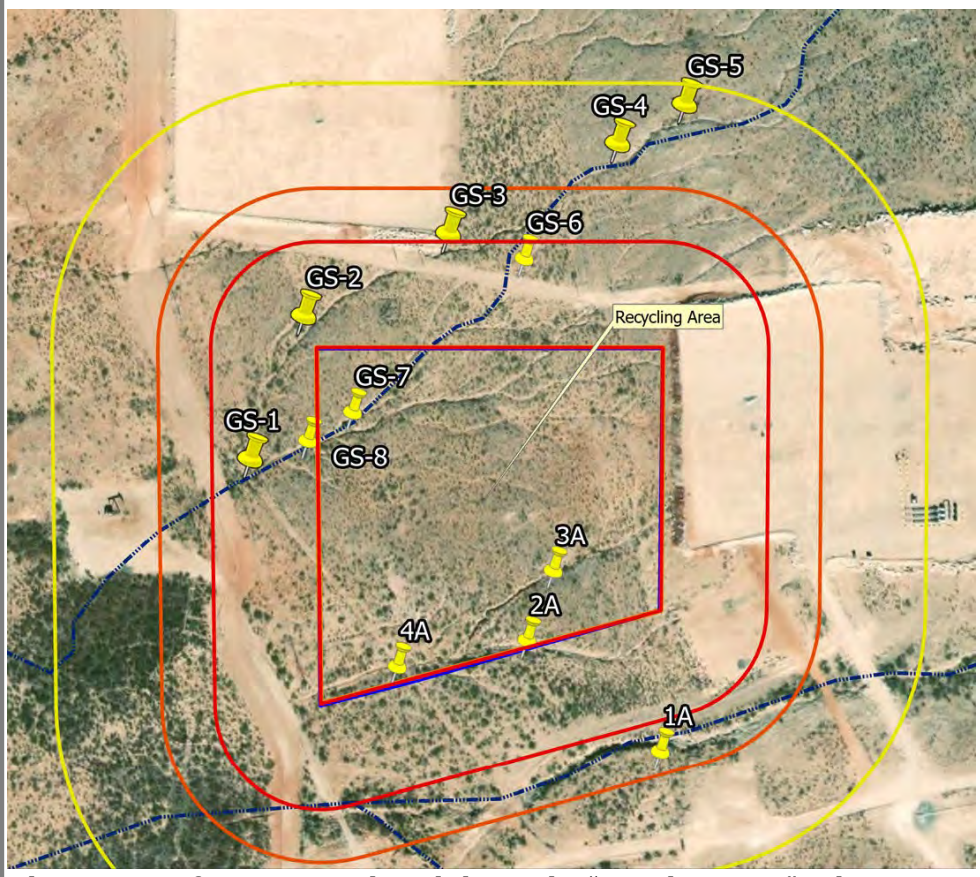
Monthly, the operator will:

A. Inspect the containment for dead migratory birds and other wildlife. Within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.
B. Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
C. Record sources and disposition of all recycled water.

August 2021

Siting Criteria Demonstration for Mobley Recycling Area

Section 9, T26S, R32E, Eddy County



This image is from Figure 7b and shows the "recycling area". The in-ground containment occupies the northern portion of the area. The working pad is on the southern portion of the area on which are the recycling facility and AST Containment. The labeled pins in the image correspond to photographs in the Appendix that demonstrate the USGS mapping of an intermittent stream is incorrect.

Prepared for:
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General Siting Criteria Demonstration and Site-Specific Groundwater Data

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 FIGURES 1-2

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 FIGURE 3

Within the area overlying a subsurface mine.
- Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division FIGURE 4

Within an unstable area.
- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map FIGURE 5

Within a 100-year floodplain. FEMA map FIGURE 6

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 FIGURE 7

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 FIGURE 8

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. FIGURES 1 and 7
- NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site

Within 500 feet of a wetland. FIGURE 9
- US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site

Geology

According to the State of New Mexico Geologic Map[1], Permian Age Rustler Formation (Pr) is exposed at the location of the proposed Mobley Containment recycling area with Quaternary Piedmont (Qp) and Playa Deposits (Qpl) overlying the Rustler and, to the west, overlying the Permian Salado Formation (Figure 1a). The Mobley Containment recycling area is comprised of the lined containment and levees that occupy the northern ¾ of the area and the operations pad that will hold the recycling facility and AST Containment in the southern ¼ of the site.

The Nash Draw Geologic Map (USGS Bulletin 1141[2]) presents a more detailed description of the geology (Figure 1b). The recycling area, which will contain the in-ground and AST containments, lies upon Qal with the Tamarisk Member of the Rustler (Prt) exposed to the east, northwest and south. As the Appendix Site Photos show, the massive gypsum of the Tamarisk is exposed in the west-draining gullies within the recycling area and the main drainage to the south of the area. The recycling area is on the west side of a hill that Bulletin 1141 describes as a domal karst feature formed by solution of the underlying Salado Formation. Numerous sinkholes (Sk) exist on the north and east side of this hill within the Forty-niner Member gypsum and Magenta Member dolomite, both of which are stratigraphically above the Tamarisk.

The Forty-niner Member gypsum is exposed about 2000 feet northeast and uphill of the recycling area on the karst dome, where it is displaced by faulting against the Tamarisk. The USGS map of Quaternary Faults shows no recent faulting. USGS Bulletin 1141 indicates that the Mescalero Caliche layer (age is about 100,000 ybp) is deformed by karst features of the area. Thus, we assume the karst and rock movement (faulting) occurred after the formation of the caliche and before the Holocene.

The Tamarisk Member is described as 115 feet thick in Bulletin 1141 and this unit is underlain by the Culebra Dolomite. The recycling site appears to be beyond the western flank of the karst dome. The Tamarisk is exposed 1-mile to west and in a broad area to the north and northwest.

The 72-foot-deep boring in the southeast corner of the recycling area demonstrates that gypsum is present from 4-feet below surface to 31-feet. From 31 feet to total depth feet are reddish and tan silty clays and clays interbedded with a 10-foot-thick massive gypsum bed (see Appendix Logs). The auger rig encountered saturated conditions at 71 feet.

Distance to Groundwater

Figures 1a, 1b and, with the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 50 feet beneath the containment.

Figure 1a is topographic map with the New Mexico state geologic map that shows:

1. The Mobley recycling area identified by the blue striped polygon.
2. Water wells from the OSE database as a blue triangle inside colored circles that indicate well depth. OSE wells are often miss-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range.

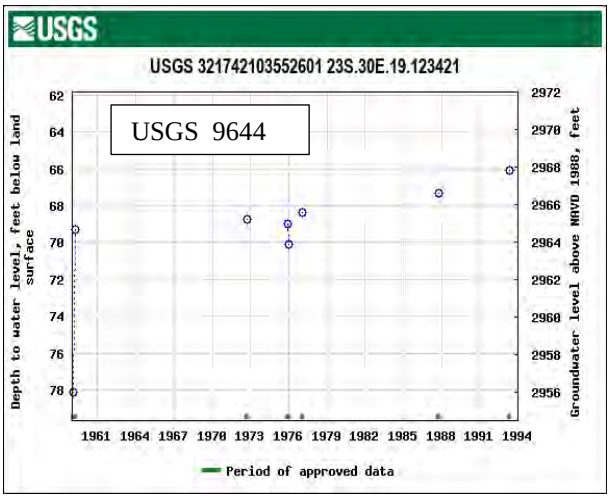
[1] https://geoinfo.nmt.edu/publications/maps/geologic/state/home.cfml
[2] https://pubs.er.usgs.gov/publication/b1141B

3. Water wells from the USGS database as large triangles color-coded to the formation from which the well draws water.
4. Water wells and borings, which are not documented in the public databases but were identified by field inspection or other published reports as colored squares (MISC).
5. The depth-to-water from the most recent available measurement for each well is provided adjacent to the well symbol.

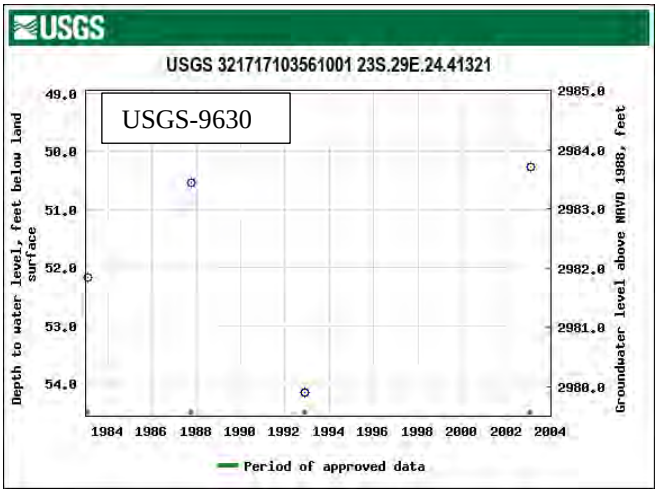
Figure 2 presents groundwater elevation data on a recent air photograph and shows:
1. The Mobley containment identified by the blue striped square with an estimated surface elevation of 3048.
2. Water wells measured by the USGS, the year of the measurement and the calculated elevation of the groundwater surface.
3. Water wells measured by professionals from the MISC database.
4. Isocontour lines (50-foot interval) displaying the elevation of the groundwater surface of the Rustler Formation.

Please note the following when examining Figure 2:
1. The cluster of OSE wells located about 2 miles southwest of the containment (Figure 1a) are monitoring wells and borings. Most of the borings did not drill to groundwater. One of these closely spaced wells with a static groundwater elevation (Misc- 419) provides representative data. We believe the depth to water measurements in monitoring wells were obtained by professionals.
2. C-2486 was drilled as an exploratory water well and did not intercept a sufficient groundwater flow into the mud-rotary boring for their use. The well log indicates “windmill water, 5 gpm” from 48-80 feet.
3. After looking at the well log and other data from well C-4472, we believe the depth to water measurement is valid and added this well to the MISC database (Misc-420).
4. Data for USGS 9630 and 9644, which are the only USGS wells with historic groundwater depth measurements in the database, are presented below.
5. The surface elevation data in the USGS Database for well 9644 is 3034, and this is incorrect. The actual elevation is 3043. Thus, the reported groundwater elevation for this well is 9 feet higher than reported in the USGS database.
6. We examined all wells shown on Figures 1a and 2 and believe all are located approximately correct.

As indicated above, because the surface elevation in the USGS database is incorrect for USGS-9644, the elevation of groundwater is 9 feet higher than shown in the graph to the right, which is insignificant due to the 50-foot contour used in Figure 2. What is important about this historic data is the depth to water is stable over the 30+ years of record, showing only 4-feet of variation.



The historic groundwater elevation/depth data for USGS-9630 is presented below. These data also show only 4-feet of variation over the 20-year period of record.



These data (see Appendix Well Logs) allow us to confidently conclude:

1. Groundwater elevation beneath the proposed containment is about 2980 feet above sea level.
2. The elevation of the bottom of the proposed containment will be about 3040.
3. The depth from the proposed bottom of the containment is (3040-2980=) 60 feet.

Distance to Municipal Boundaries and Fresh Water Fields

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

- The nearest municipality is the city of Malaga, New Mexico. It is located 8.56 miles to the southwest of the site.

Distance to Subsurface Mines

Figure 4 and our general reconnaissance demonstrate the proximity of surface mines to the containment. This location does not overlie a subsurface mine.

- The site is within the potash district but does not overlie a subsurface mine
- A prospect mine exists 1.56 miles to the northwest.

Distance to High or Critical Karst Areas

The presence of karst features near proposed storage of treated recycle water for E&P (e.g., hydraulic stimulation) can be problematic for two reasons. First, as suggested in Part 34.11 of OCD Rules, a produced water recycling containment must be located within a stable area. For the benefit of our clients, a portion of Part 34 is presented below with **emphasis** added:

> *19.15.34.11 SITING REQUIREMENTS FOR RECYCLING CONTAINMENTS:*
> *A. An operator shall **not locate a recycling containment**:*
> *(8) **within an unstable area** unless the operator demonstrates that it has incorporated engineering measures into the design to ensure that the containment's integrity is not compromised.*
>
> *Unstable area is defined in 19.15.2.7 as*
> *U.(6) "Unstable area" means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of a division-approved facility's structural components. **Examples of unstable areas are** areas of poor foundation conditions, areas susceptible to mass earth movements and **karst terrain** areas where karst topography is developed as a result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features of karst terrain include sinkholes, sinking streams, caves, large springs, and blind valleys.*

In addition to potential instability of the containment foundation, karst features, such as sinkholes, open fractures or other conduits can provide a direct link between the surface and groundwater. Thus, a release from the containment within an area of high karst could introduce a large volume of saline water to an underlying water table aquifer over a relatively short time.

Small caverns, sinkholes, and strata deformation due to dissolution of the underlying Salado Formation are described in USGS Bulletin 1141 and in *Evaporite Karst Features and Processes At Nash Draw, Eddy County, New Mexico*[3]. As discussed in these publications, the age of these features appears to be prior to the Holocene (>11,000 years before present). All of these karst features are mapped on the summit of and east facing slope of the semi-circular hill (karst dome) that is about 3,000 feet northeast. Given the proximity of these features and the probable presence of enlarged fractures in the dolomite aquifers underlying the area, there is no doubt that BLM mapping of the area as High Karst Potential in Figures 5a and 5b is appropriate.

The proposed recycling area does not contain sinkholes, enlarged fractures due to solution, or deformation of the exposed Tamarisk Member. Two sinkholes (Sk on Figure 1a) are mapped in the Tamarisk Member about 1 mile and 1.25 miles north-northeast. Two sinkholes are mapped in piedmont deposits overlying the Forty-niner member (gypsum) about 0.75 miles north-northeast of the recycling area. Northeast of the containment three sinkholes are mapped in piedmont deposits overlying the Magenta member of the Rustler (dolomite and anhydrite).

[3] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiYzP--y7vxAhWlFjQIHd8oDDQQFjAAegQIBBAD&url=https%3A%2F%2Fnmgs.nmt.edu%2Fpublications%2Fguidebooks%2Fdownloads%2F57%2F57_p0253_p0265.pdf&usg=AOvVaw23rX2dJ7ZThj9jvOgCaWxS

We do not believe that the placement of drilling and production pads more than 700 feet from mapped sinkholes is accidental on the part of the BLM. Rather, the presence of drilling pads on all sides of the proposed containment supports two conclusions. First, the recycling area is stable ground. Second, the BLM karst experts understand that the ground is suitable and will support the weight of and vibration associated with drilling.

Our surface investigation found no evidence of open fractures or solution features that could rapidly transmit a release of produced water to the groundwater table. Based upon the results of an on-site boring, the lithology of the underlying gypsum and clay do not suggest ground instability or the potential for open conduits between ground surface and ground water.

We conclude the ground is stable and the proposed location of the Mobley Containment does not represent an unacceptable risk to groundwater or the environment.

Distance to 100-Year Floodplain

Figure 6 demonstrates that the location is not located in a 100-year floodplain.

- The nearest 100-year floodplain is located 1.31 miles to the northwest of the site.

Distance to Surface Water

OCD Rule 34 establishes a 200-foot setback distance from "significant watercourse", which is defined in Rule 17 as:

> P. "Significant watercourse" means a watercourse with a defined bed and bank either named or identified by a dashed blue line on a USGS 7.5-minute quadrangle map or the next lower order tributary with a defined bed and bank of such watercourse.

And 19.15.2.7 of OCD Rules define watercourse as:

> (4) "Watercourse" means a river, creek, arroyo, canyon, draw or wash or other channel having definite banks and bed with visible evidence of the occasional flow of water.

We understand that the USGS employs topographic maps, aerial photographs, and general knowledge of the various areas of the United States to map ephemeral streams. EPA noted that the mapping protocol can underestimate the number of ephemeral streams. In New Mexico, Hicks Consultants ground surveys identified several instances where the USGS mapping was not accurate. As discussed below, we conclude a mapped watercourse in the northern area of the containment area is one such error in mapping.

Figure 7a shows watercourses mapped by the USGS and one of which traverses the northwest corner of the proposed containment. The mapped watercourse south of the containment area is more about 200 feet from the southern boundary. The AST Containment and the in-ground Containment will be on the north side of the containment area and more than 200 feet from this mapped watercourse.

Figure 7a shows a dashed blue line traversing through the northwest quadrant of the Recycling Area. Close examination of the topographic map shows this mapped channel lies within a valley shown by the 3050-foot elevation contour line (heavy brown) and continues to an incised area suggested by the 3040-contour line at the northern boundary of the Recycling Area, flowing

through a shallow incision evidenced by the 3030-contour line west of the western boundary of the area.

Figure 7b clarifies the location of the incised channel on a larger scale recent air photograph. Location of photographs in the Site Photos Appendix are also presented in this Figure. Examination of the Appendix will aid in understanding the data that demonstrates the USGS mapped ephemeral stream is not a watercourse as defined by Rule 34 and poses no risk to the in-ground containment that will be located in the northern portion of the Recycling Area.

Based upon the evidence collected during the site inspections and presented in the Site Photographs Appendix, we conclude:

- USGS mapping of an ephemeral stream (dashed blue line) about 200 feet south of the containment area is valid
- USGS mapping of an empheral stream (dashed blue line) within the northwest quadrant of the recycling area is an error. The site photographs and Figure 7b demonstrate
    - There is no hydraulic connection between mapped ephemeral stream shown in the Site Photos Appendix figure GS4 and GS4 and the channel in the northwest quadrant in the recycling area shown in photos GS6-GS8.
    - All of the channels observed within and 200 feet from the recycling area do not meet the definition of a Significant watercourse or a watercourse in OCD Rules. All are erosional channels without a bed and bank that are common to ephemeral streams.

Of equal importantance is the fact that the engineering design calls for stormwater diversion on the uphill sides (north and east) of the containments.

Distance to Permanent Residence or Structures

Figure 8 and the site visit demonstrates that the location is not within 1000 feet from an occupied permanent residence, school, hospital, institution, church, or other structure in existence at the time of initial application.

- No occupied permanent residences, schools, hospitals, institutions, churches, or other structures are located within 1000 feet of the site.

Distance to Non-Public Water Supply

Figures 1a, 1b, 1c and 7 demonstrates that the location is not within 500 horizontal feet of a spring or fresh water well used for domestic or stock watering purposes, in existence at the time of initial application.

- Figure 1a shows the locations of all area water wells, active or plugged.
- The nearest well is USGS-9644, which is located .85 miles northwest of the site.
    - We believe this well is the same as MISC-10 in our database and the “Connelly Water Well” pin. It is the only well in the area as seen on the aerial imagery or Google Earth.
    - Figure 1c shows a more detailed look at the proximity of this well.
- There are no known domestic water wells located within 1,000 feet of the proposed pits.
- No springs were identified within the mapping area (see Figure 7).

Distance to Wetlands

Figure 9 demonstrates the location is within 300 feet of wetlands.

- The nearest designated wetland is a "riverine" wetland. It is approximately 1,500 feet south of the northwestern corner of the containment. It is approximately 200 feet from the southern edge of the recycling area.

Figures

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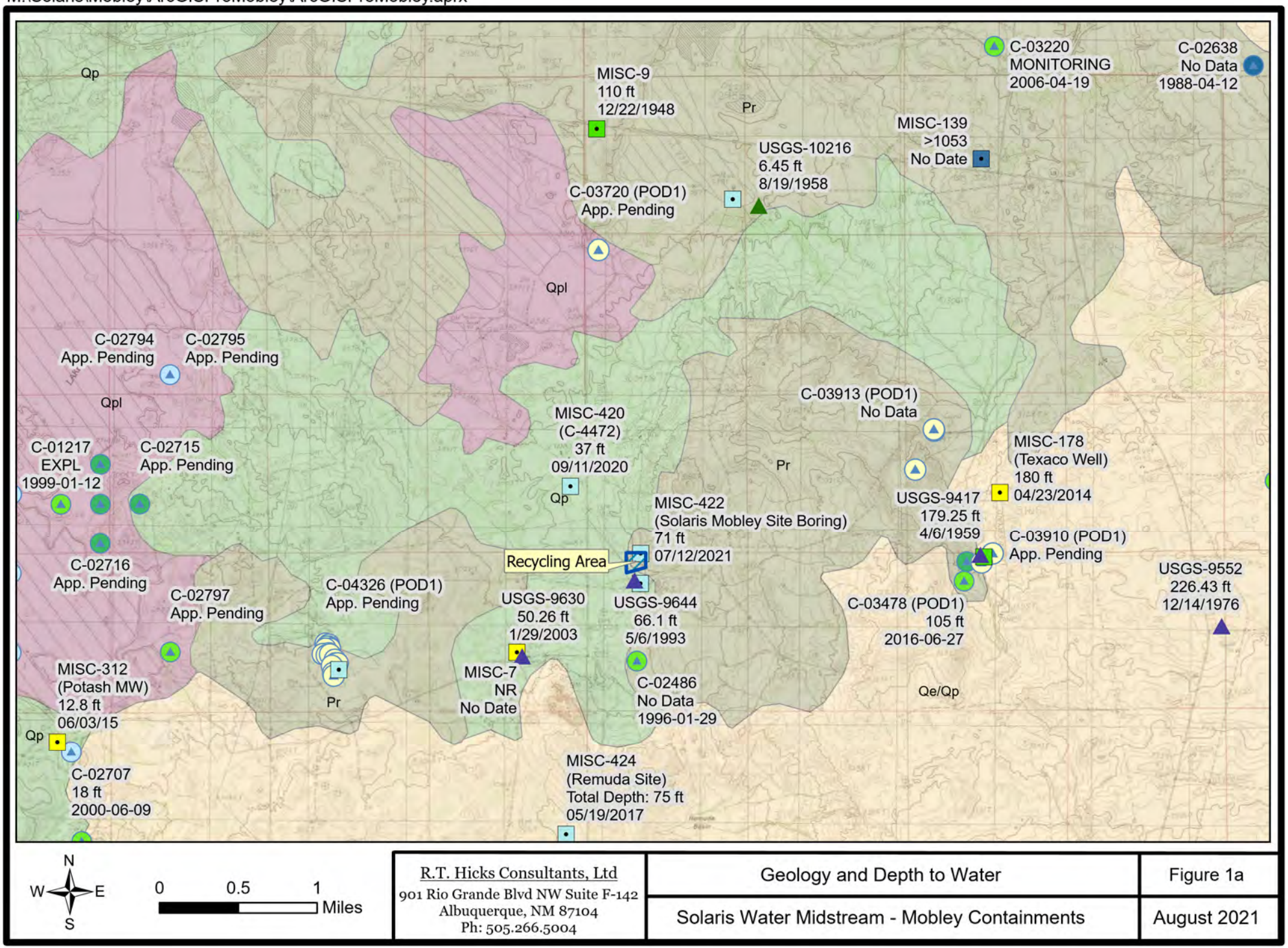

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Geology and Depth to Water	Figure 1a
	Solaris Water Midstream - Mobley Containments	August 2021

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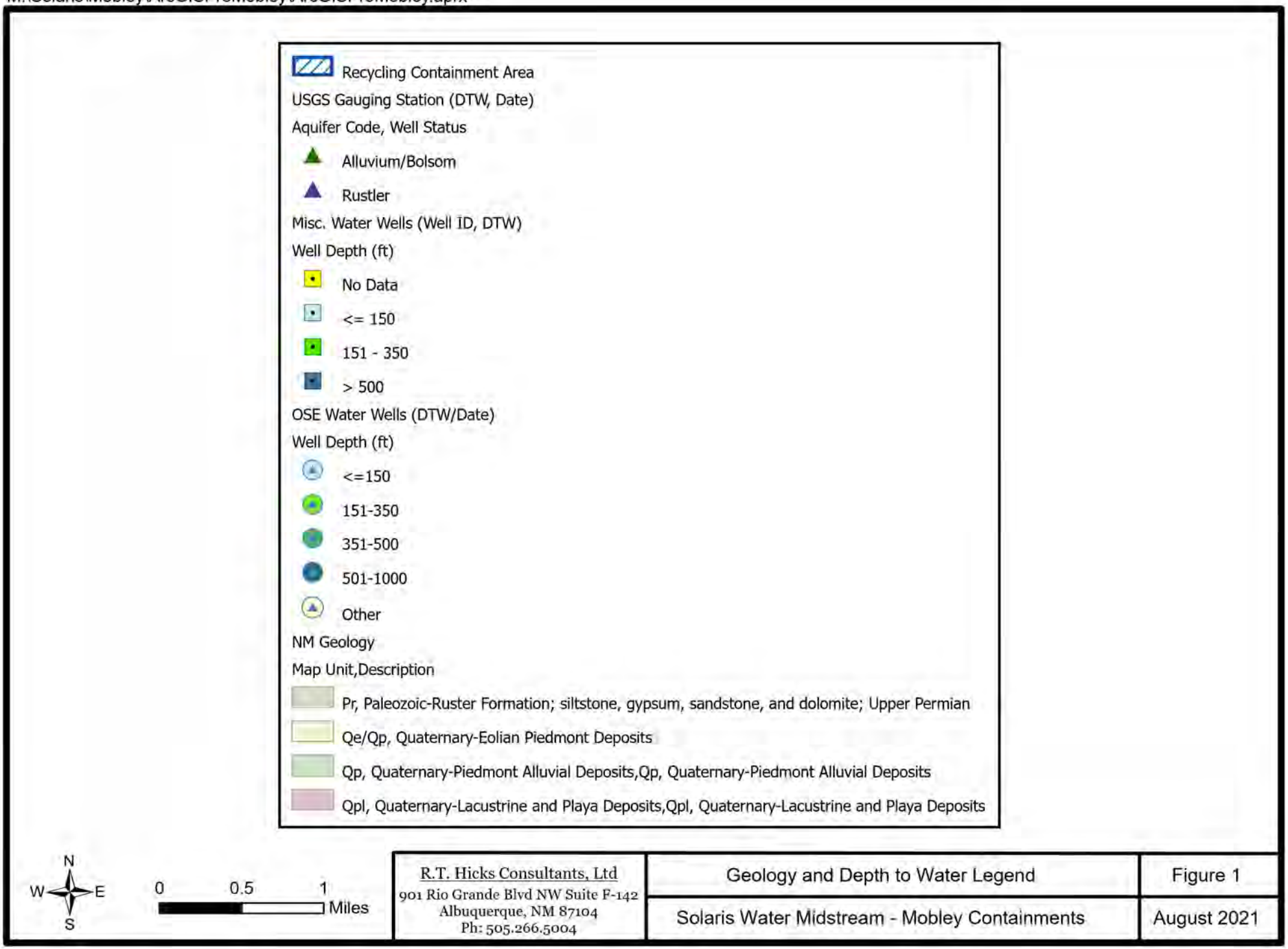

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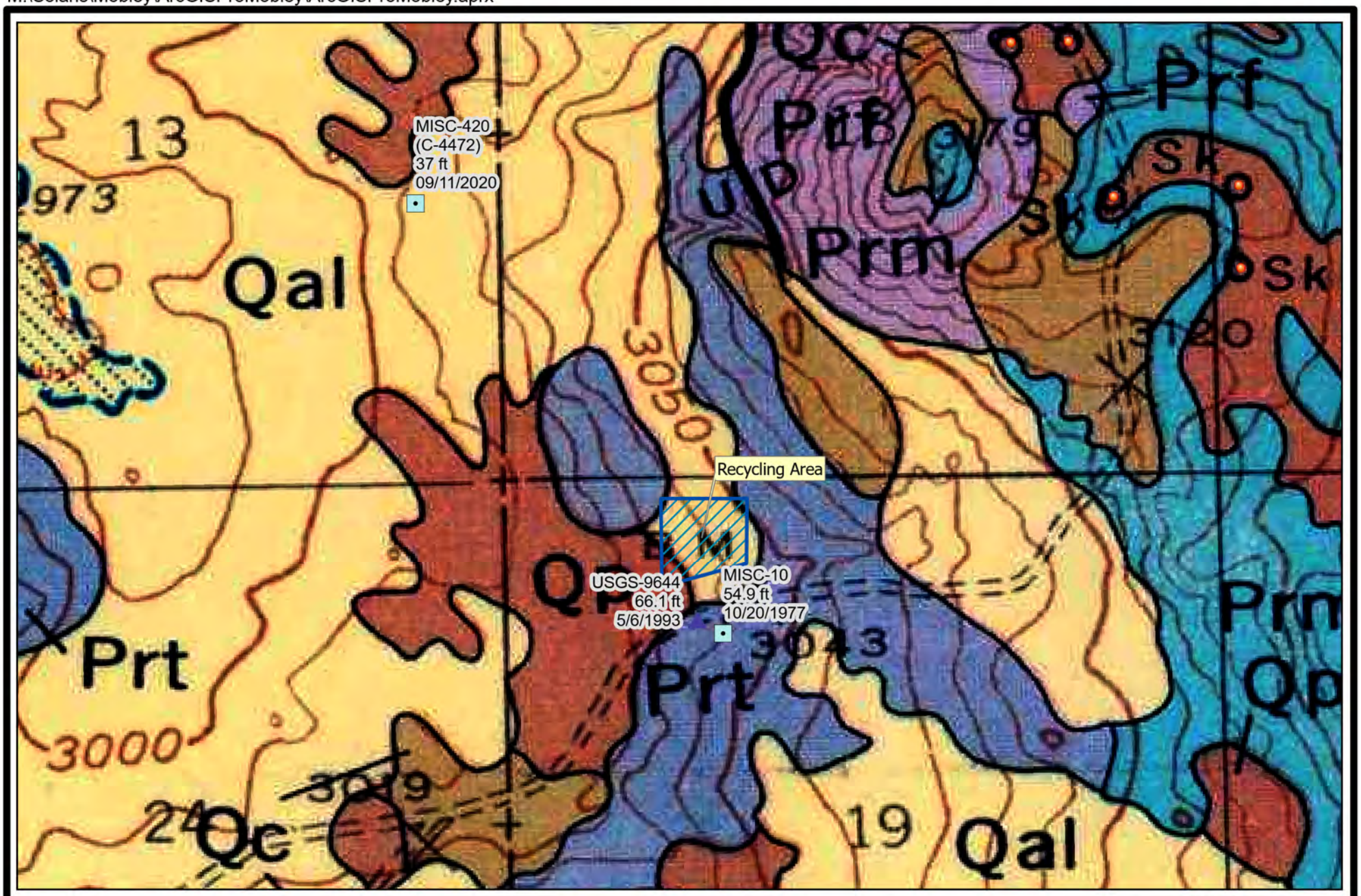

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nash Draw Geology and Depth to Water	Figure 1b
	Solaris Water Midstream - Mobley Containments	August 2021

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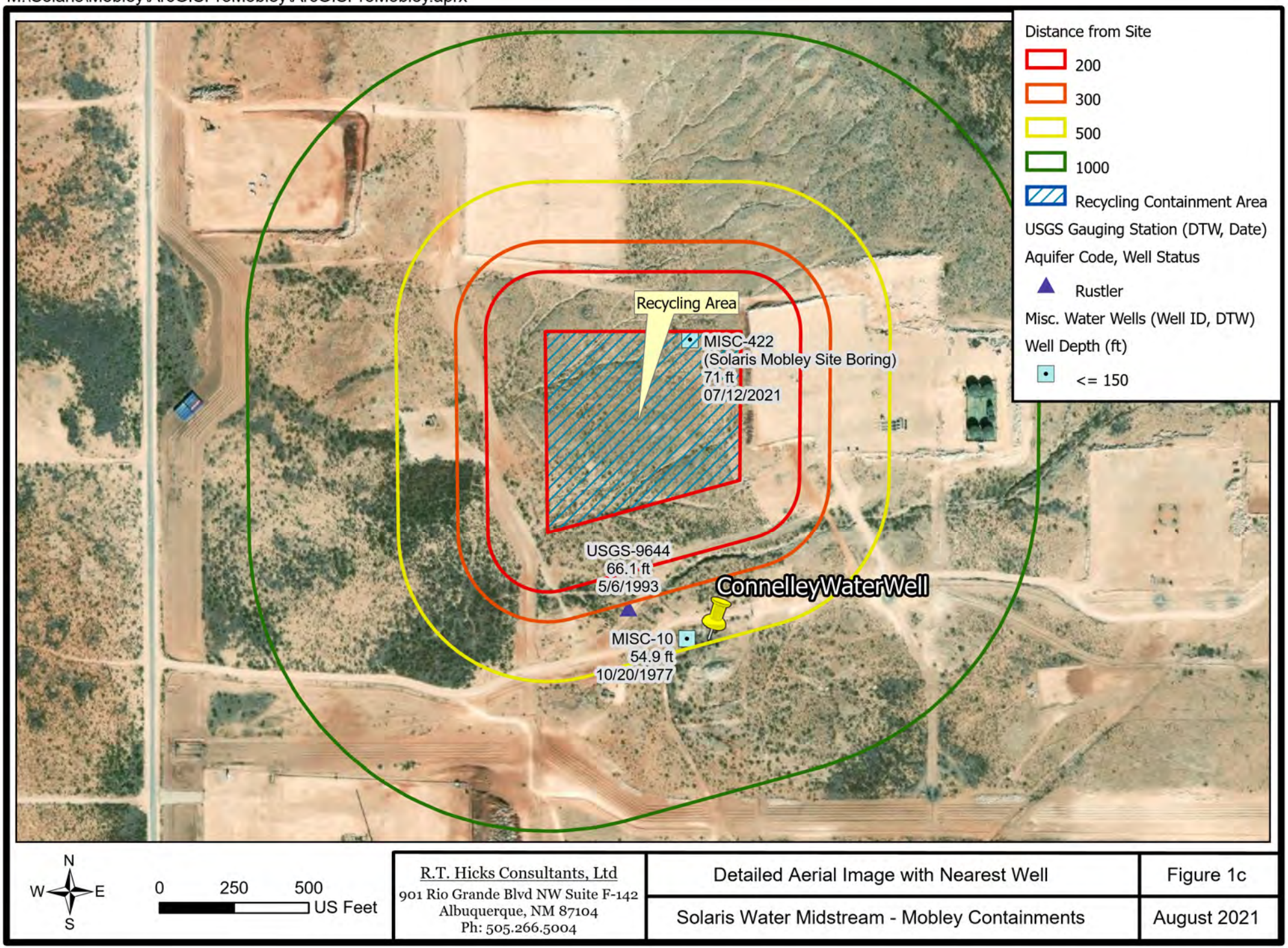

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Detailed Aerial Image with Nearest Well	Figure 1c
	Solaris Water Midstream - Mobley Containments	August 2021

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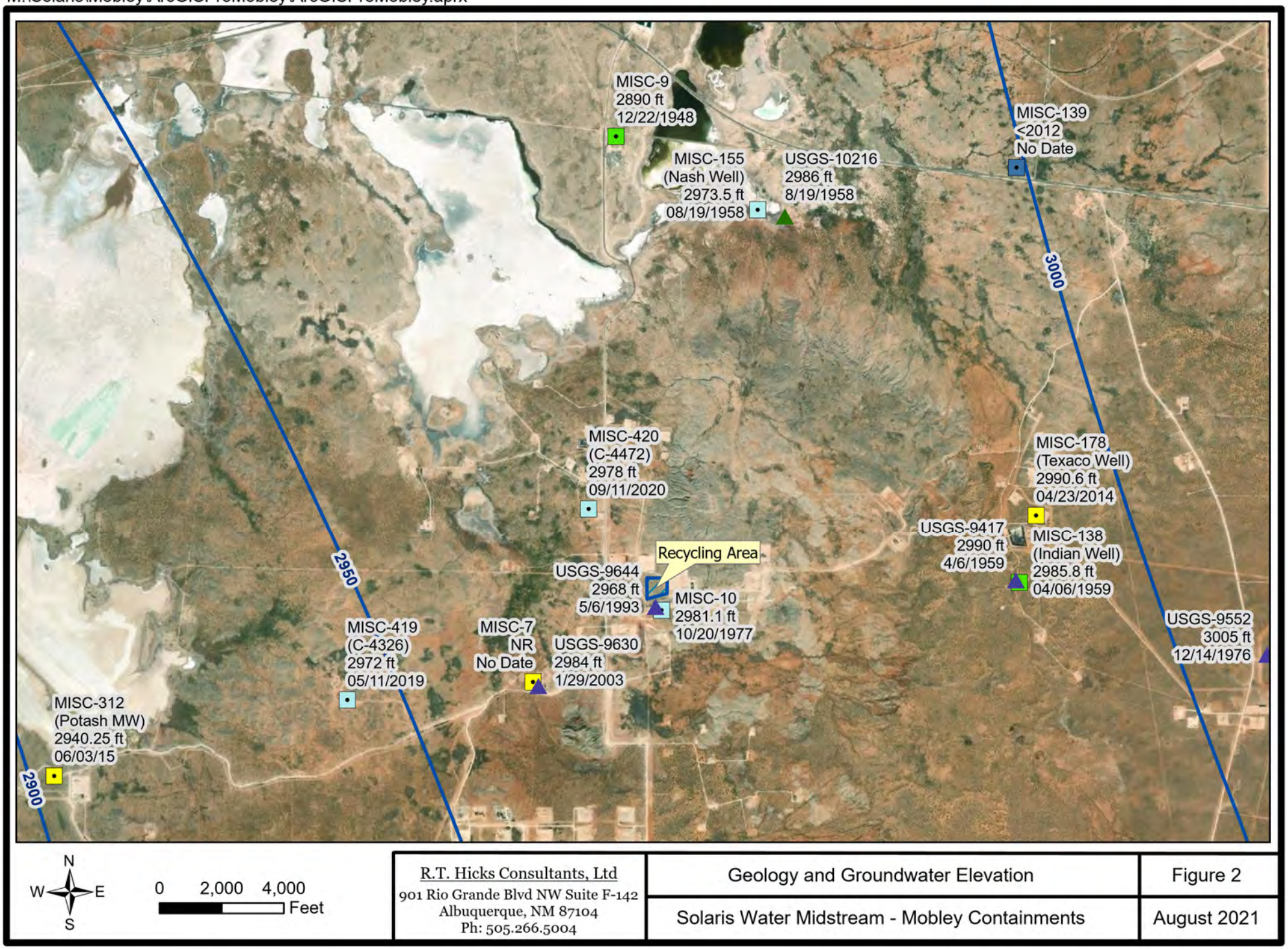

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Geology and Groundwater Elevation	Figure 2
	Solaris Water Midstream - Mobley Containments	August 2021

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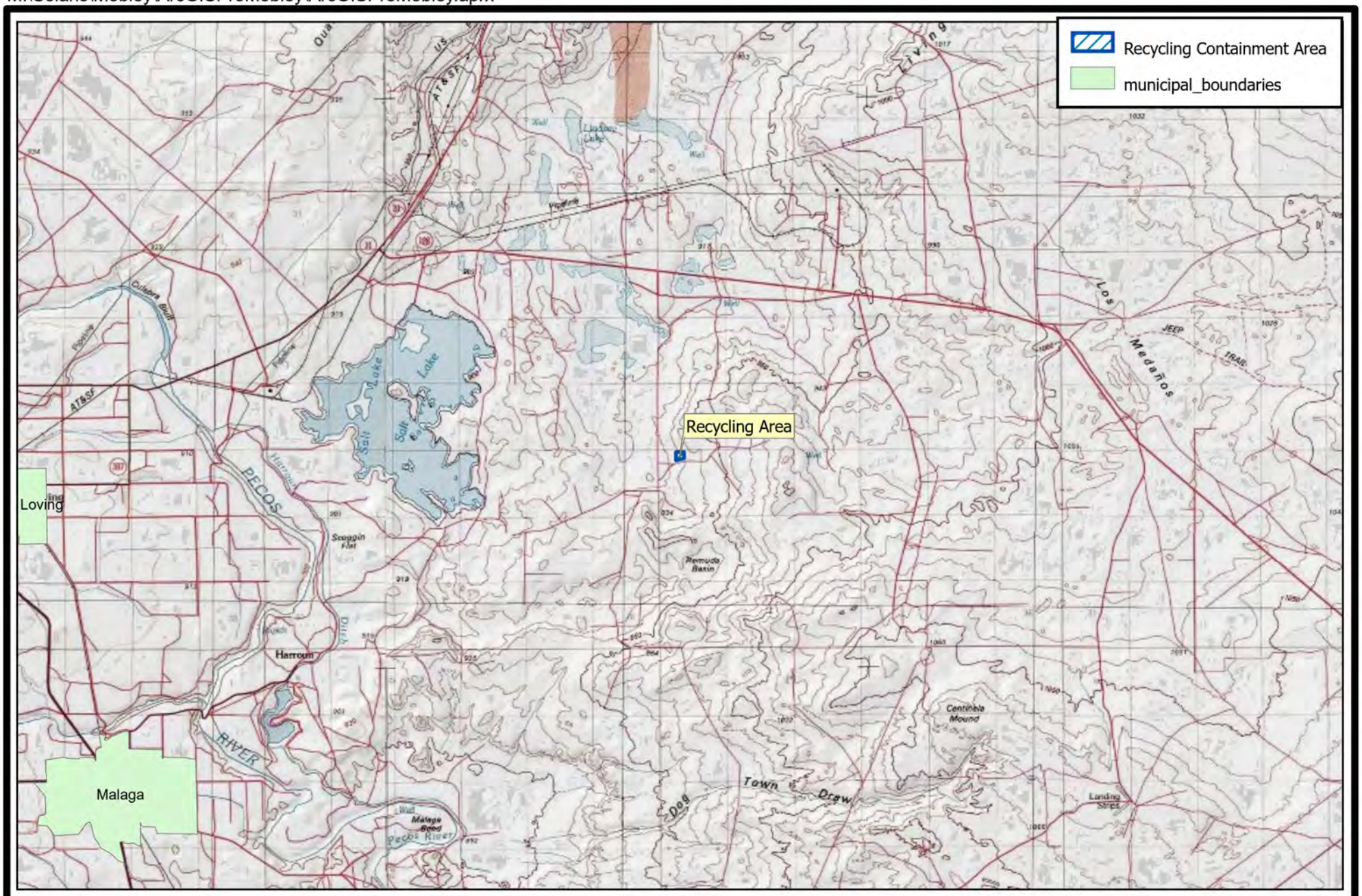

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Municipalities and Municipal Well Fields	Figure 3
	Solaris Water Midstream - Mobley Containments	August 2021

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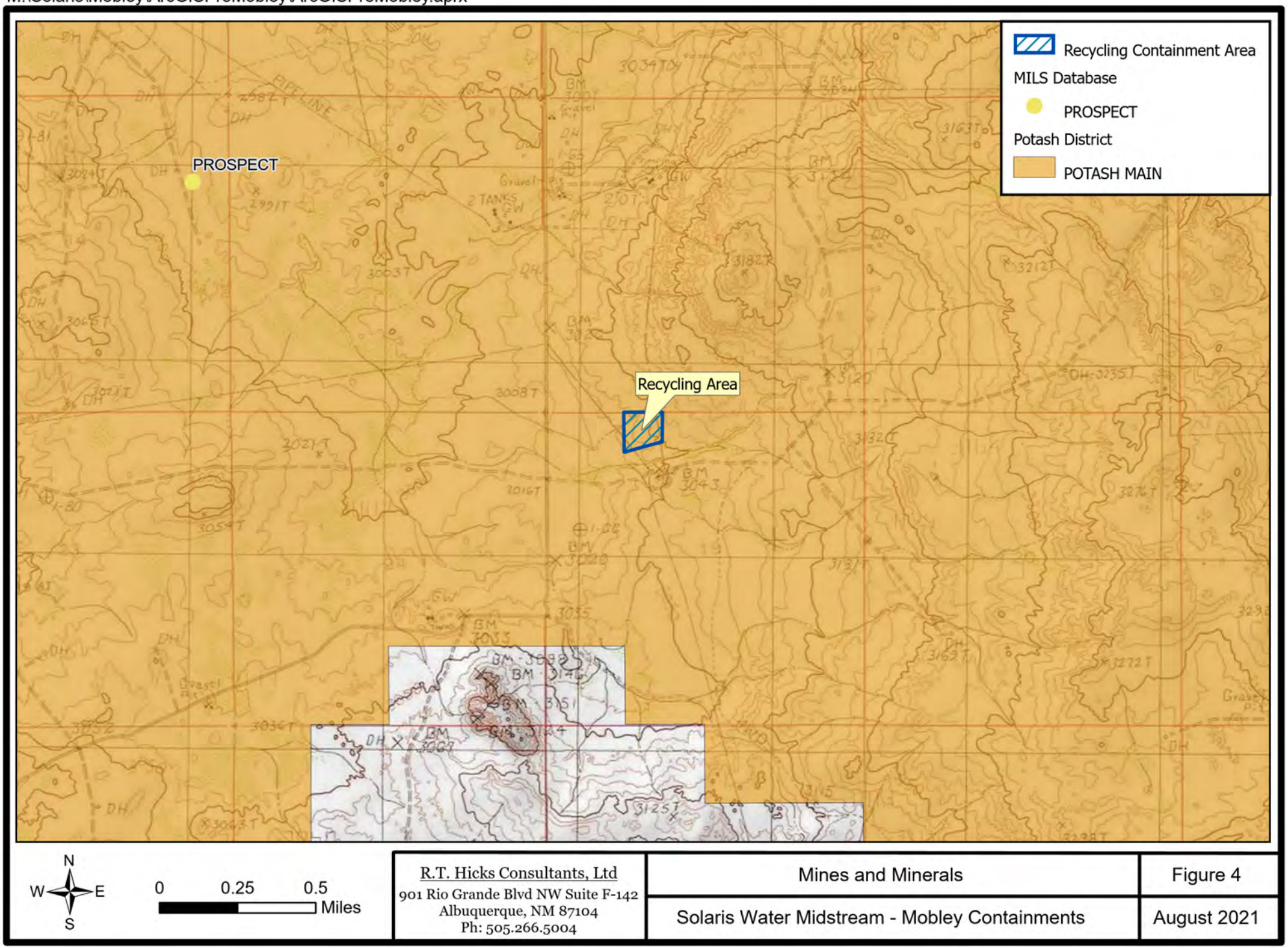

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mines and Minerals	Figure 4
	Solaris Water Midstream - Mobley Containments	August 2021

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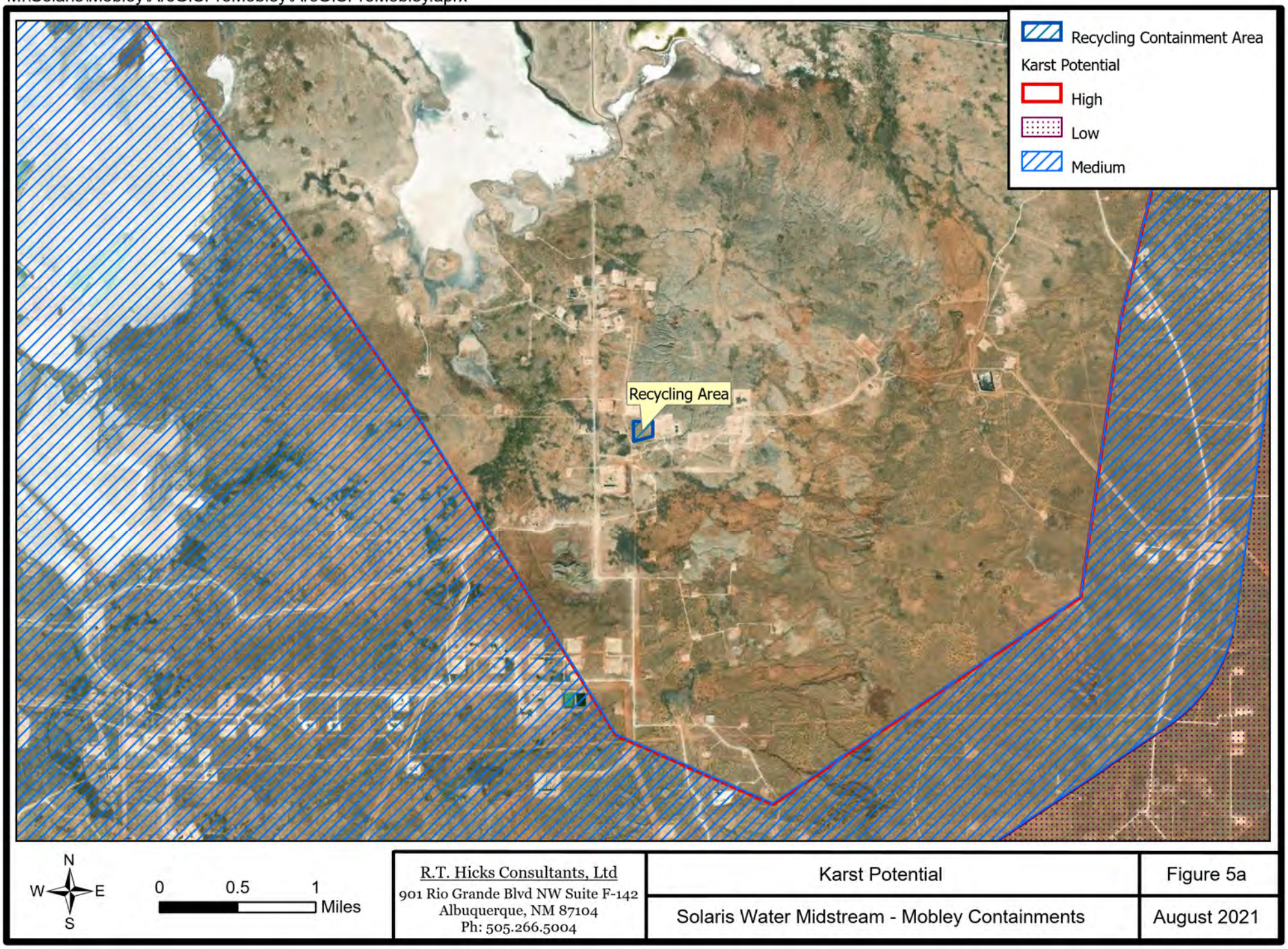

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Figure 5a
	Solaris Water Midstream - Mobley Containments	August 2021

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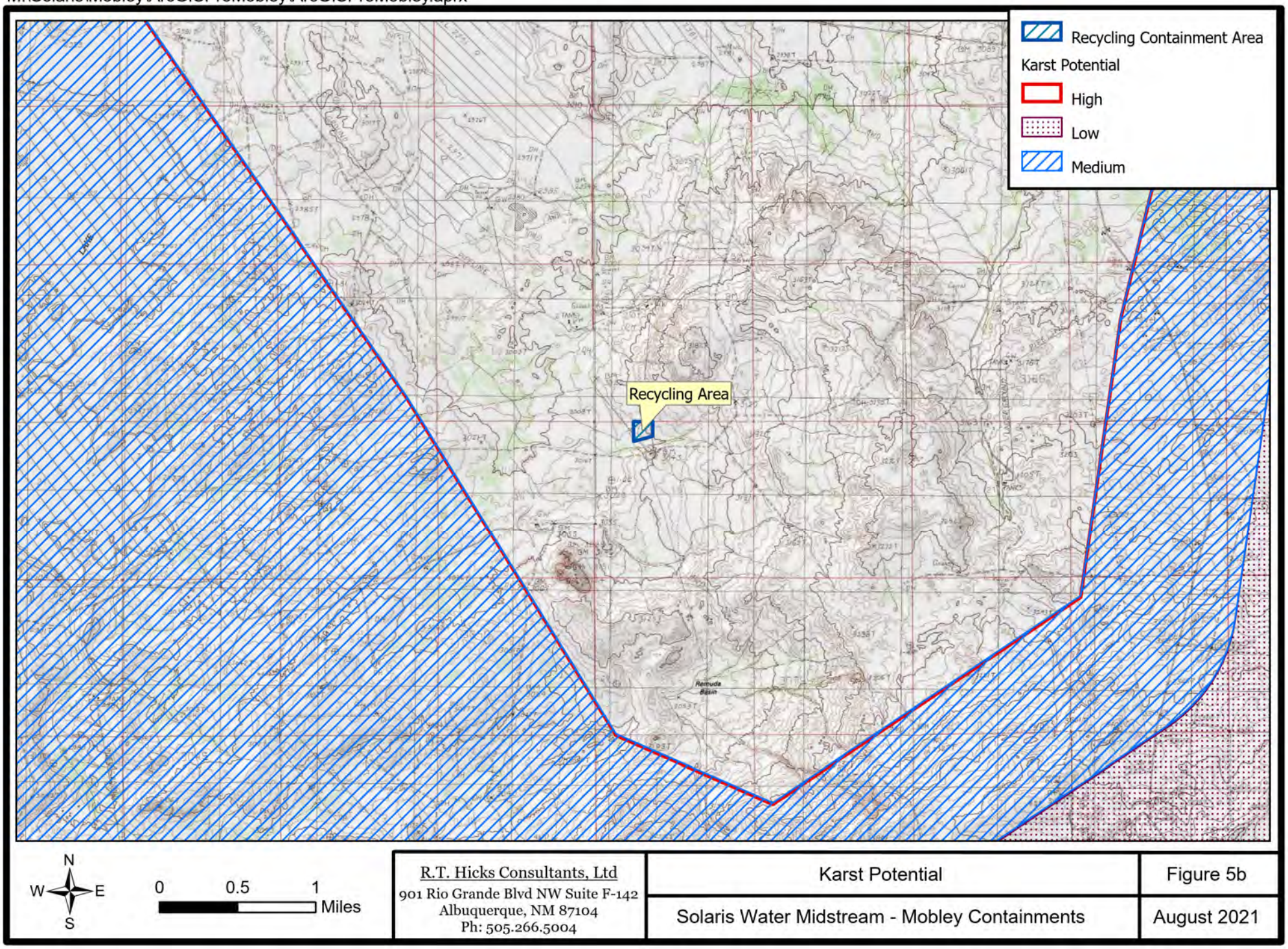

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Figure 5b
	Solaris Water Midstream - Mobley Containments	August 2021

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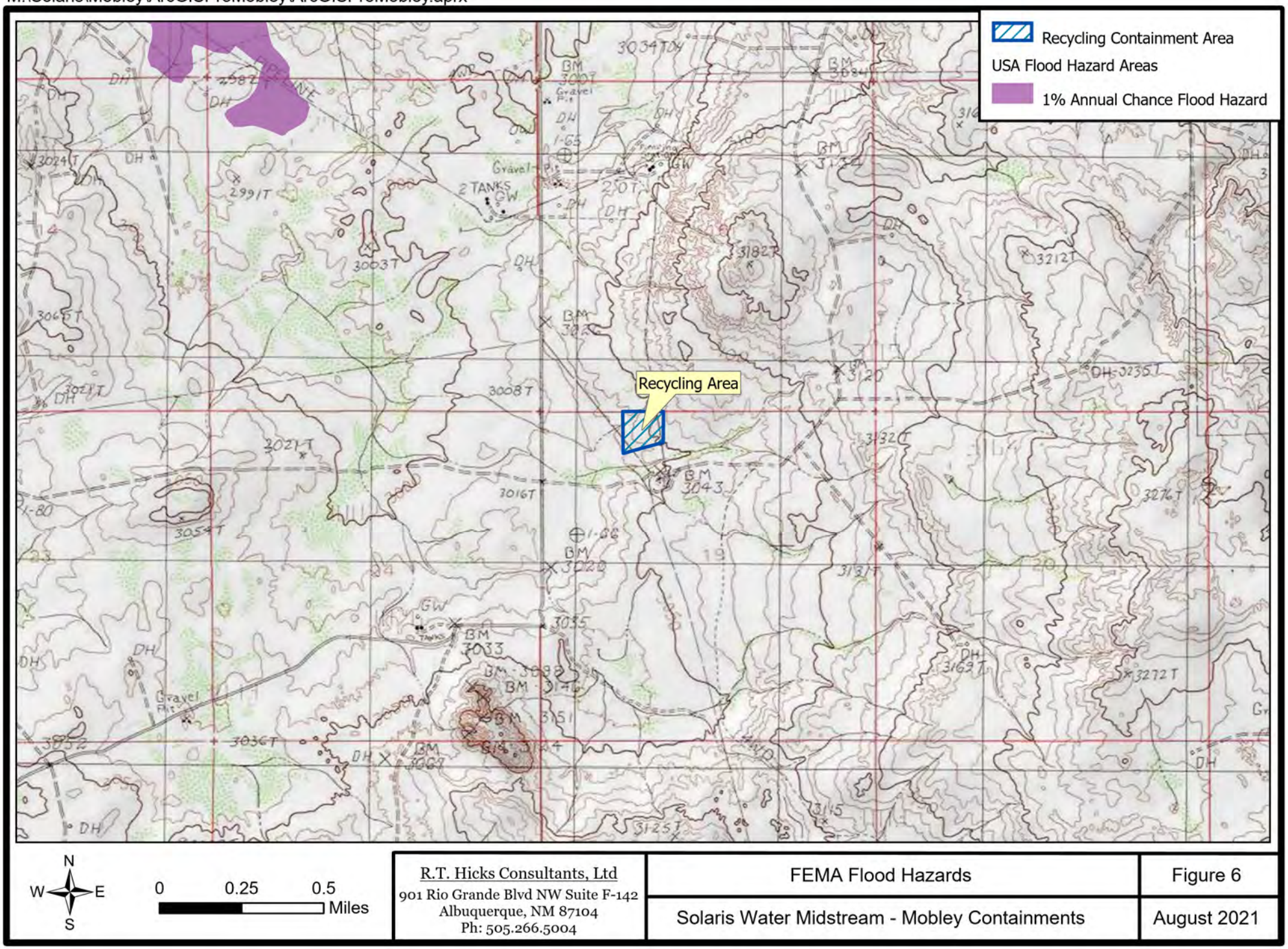

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	FEMA Flood Hazards	Figure 6
	Solaris Water Midstream - Mobley Containments	August 2021

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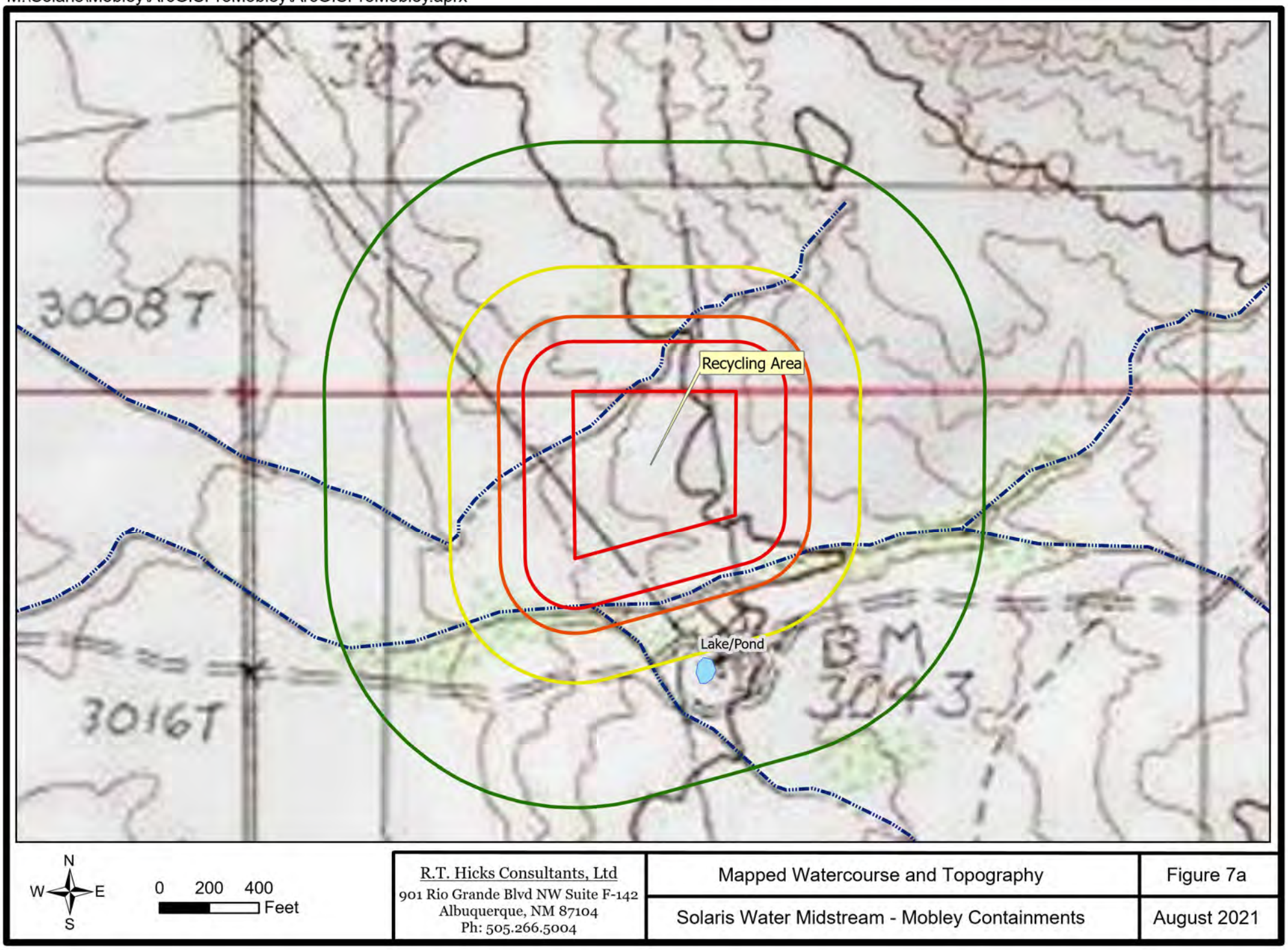

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mapped Watercourse and Topography	Figure 7a
	Solaris Water Midstream - Mobley Containments	August 2021

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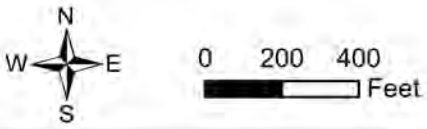

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mapped Watercourse and Topography Legend	Figure 7
	Solaris Water Midstream - Mobley Containments	August 2021

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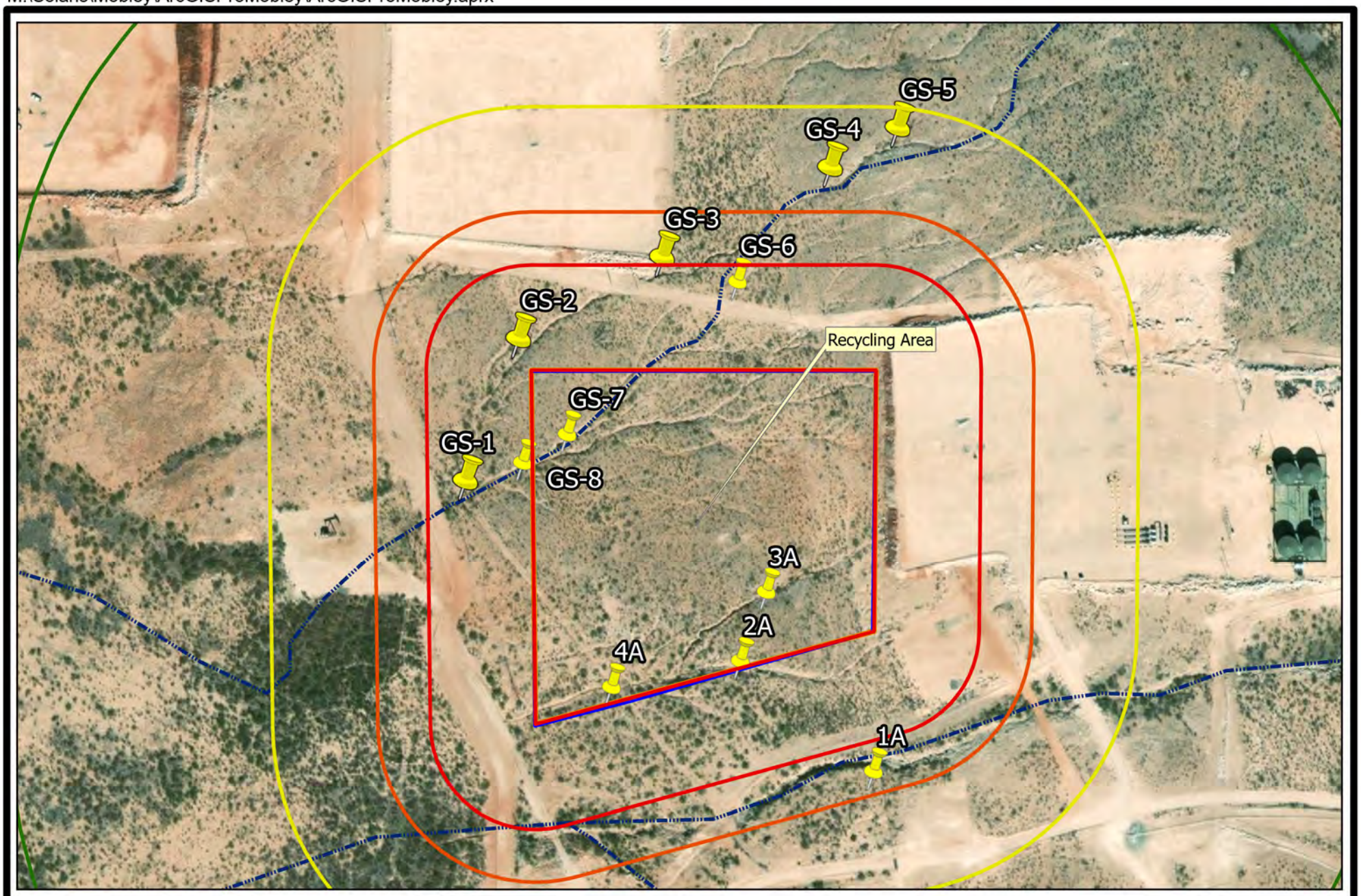

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mapped Watercourse on Recent Air Photo	Figure 7b
	Solaris Water Midstream - Mobley Containments	July 2021

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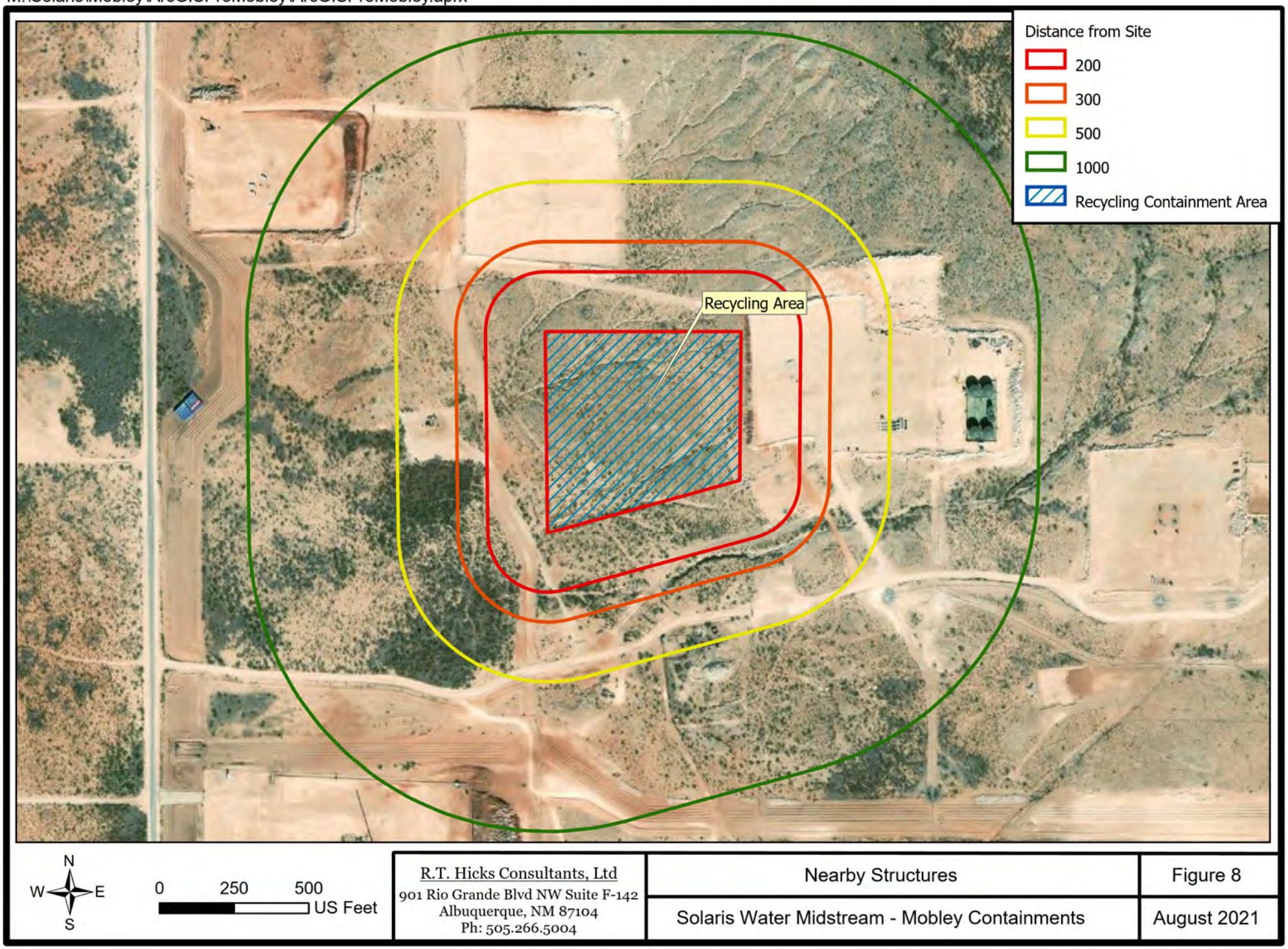

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Structures	Figure 8
	Solaris Water Midstream - Mobley Containments	August 2021

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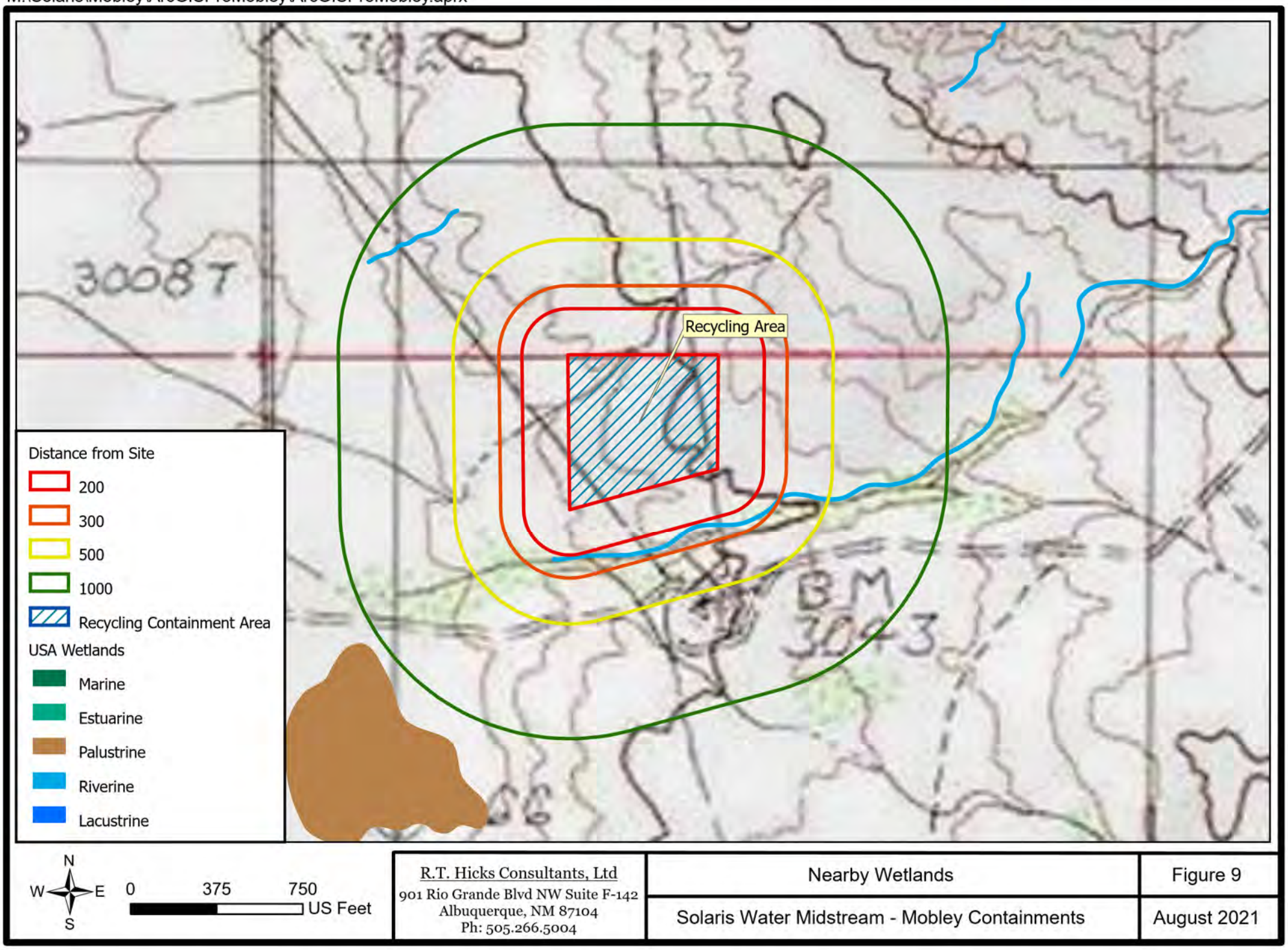

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Nearby Wetlands

Figure 9

Solaris Water Midstream - Mobley Containments

August 2021

APPENDIX Well Logs

Client:	Project Number:	Project:	
Solaris Water Midstream	21-190	Mobley Site	MAGRYM
Boring No.:	Date Drilled:	Drilling Contractor:	Drill Rig Type
BH-1 (NE Corner)	7/12/2021	Byrd Oilfield Services	Rotary Auger
Lat: 32.2976°	Groundwater Depth:	Elevation:	Total Depth of boring:
Long: -103.9237°	71' bgs	~3053' (USGS topo map)	72'

Depth (feet)	Graphic Log	Sample Type	blows/foot (n-value)	Tests	Material Description and Comments
1–4					**Tan Silty Sand**
5					**White Chalky Gypsum**
15					**White Chalky Gypsum**
26					**Very Dense Caliche - Scraping 22-28'**
28					**White Chalky Gypsum**
30					**White Chalky Gypsum**

Total Depth: 72'

Client:	Project Number:	Project:	
Solaris Water Midstream	21-190	Mobley Site	MAGRYM
Boring No.:	Date Drilled:	Drilling Contractor:	Drill Rig Type
BH-1 (NE Corner)	7/12/2021	Byrd Oilfield Services	Rotary Auger
Lat: 32.2976°	Groundwater Depth:	Elevation:	Total Depth of boring:
Long: -103.9237°	71' bgs	~3053' (USGS topo map)	72'

Depth (feet)	Graphic Log	Sample Type	blows/foot (n-value)	Tests	Material Description and Comments
32–37					**Tan Silty Sand (Caliche)**
37–43					**Reddish Brown Silty Sand**
43–50					**Red Clay**
50–60					**White Chalky Gypsum**
60–62					**Tan Clay**

Total Depth: 72'

Client:		Project Number:	Project:	
Solaris Water Midstream		21-190	Mobley Site	MAGRYM
Boring No.:		Date Drilled:	Drilling Contractor:	Drill Rig Type
BH-1 (NE Corner)		7/12/2021	Byrd Oilfield Services	Rotary Auger
Lat:	32.2976°	Groundwater Depth:	Elevation:	Total Depth of boring:
Long:	-103.9237°	71' bgs	~3053' (USGS topo map)	72'

Depth (feet)	Graphic Log	Sample Type	blows/foot (n-value)	Tests	Material Description and Comments
63					
64					
65					
66					
67					
68					**Damp Greenish Tan Clay**
69					
70					Ground water encountered.
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					

Total Depth: 72'

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

19808 46572

Section 1. GENERAL INFORMATION

(A) Owner of well Texaco Exploration & Production Owner's Well No. C2486

Street or Post Office Address P.O. Box 764

City and State Hobbs, NM 88240

Well was drilled under Permit No. _____ and is located in the:

a. SW ¼ ____ ¼ ____ ¼ ____ ¼ of Section 19 Township 23S Range 30E N.M.P.M.
Eddy Co.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor West Texas Water Well Service License No. WD1184

Address 3432 W. University, Odessa, TX 79764

Drilling Began 01-26-96 Completed 01-29-96 Type tools air/rotary Size of hole 8-3/4 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 350 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well _____ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
			No water encountered formation log on back	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

STATE ENGINEER OFFICE SANTA FE NEW MEXICO '96 SEP 25 AM 10 09

Section 5. PLUGGING RECORD

Plugging Contractor West Texas Water Well Service

Address 3432 W. University, Odessa, TX 79764

Plugging Method pumped cement slurry

Date Well Plugged 01-29-96

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1	0	350	133
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received 03-13-96

Quad _____ FWL _____ FSL _____

File No. C-2486 Use OWD "Dry Hole" Location No. 23S.30E.19.311

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	1	1	Sand
1	18	17	Caliche
18	27	9	Sand
27	48	21	Caliche
48	80	32	Sand/small gravel (windmill water 5 gpm)
80	235	155	Brown sandy shale
235	350	115	Dark brown sandstone, hard, no water

Section 7. REMARKS AND ADDITIONAL INFORMATION

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
'96 MAR 13 AM 10 23

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Robert E. Collins
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

19809 46572

Section 1. GENERAL INFORMATION

(A) Owner of well Texaco Exploration & Production Owner's Well No. C2486

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City and State Hobbs, NM 88240

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Eddy Co.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

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Elevation of land surface or _____ at well is _____ ft. Total depth of well 350 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well _____ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
			No water encountered formation log on back	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

STATE ENGINEER OFFICE SANTA FE NEW MEXICO '96 SEP 25 AM 10 09

Section 5. PLUGGING RECORD

Plugging Contractor West Texas Water Well Service

Address 3432 W. University, Odessa, TX 79764

Plugging Method pumped cement slurry

Date Well Plugged 01-29-96

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1	0	350	133
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received 03-13-96

Quad _____ FWL _____ FSL _____

File No. C-2486 Use OWD "Dry Hole" Location No. 23S.30E.19.311

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	1	1	Sand
1	18	17	Caliche
18	27	9	Sand
27	48	21	Caliche
48	80	32	Sand/small gravel (windmill water 5 gpm)
80	235	155	Brown sandy shale
235	350	115	Dark brown sandstone, hard, no water

Section 7. REMARKS AND ADDITIONAL INFORMATION

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
'96 MAR 13 AM 10 23

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Edward E. Collins

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

OSE DII OCT 8 2020 PM3:24

1. GENERAL AND WELL LOCATION

OSE POD NO. (WELL NO.)	WELL TAG ID NO.	OSE FILE NO(S).
POD1 (BH-01)	n/a	C-4472

WELL OWNER NAME(S)	PHONE (OPTIONAL)
XTO Energy (Kyle Littrell)	

WELL OWNER MAILING ADDRESS	CITY	STATE	ZIP
6401 Holiday Hill Dr.	Midland	TX	79707

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS		
	LATITUDE	32°	18'	13.90"	N	* ACCURACY REQUIRED: ONE TENTH OF A SECOND
	LONGITUDE	-103°	55'	51.66"	W	* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHJIP, RANGE) WHERE AVAILABLE

NE NE SE (Unit 1) Sec. 13 T23S R29E

2. DRILLING & CASING INFORMATION

LICENSE NO.	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
1249	Jackie D. Atkins	Atkins Engineering Associates, Inc.

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
09/11/20	09/11/20	temporary well material	55	±37

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 37

DRILLING FLUID: ☑ AIR ☐ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ☐ ROTARY ☐ HAMMER ☐ CABLE TOOL ☑ OTHER – SPECIFY: Hollow Stem Auger

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	55	±8.5	Boring- HSA	–	--	--	–

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/30/17)

FILE NO. C-4472	POD NO. 1	TRN NO. 677404
LOCATION 23S.29E.13.422	WELL TAG ID NO. —	PAGE 1 OF 2

RECEIVED OCT 5 2020 [illegible]

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	2	2	Sand, Medium , poorly-graded with silt and gravel , no plasticity, Brown	Y ✓N	
2	19	17	Caliche, increased cementation with depth, Light Gray	Y ✓N	
19	40	21	Dolomite/Dolostone with micro crystalline matrix, Yellow-Gray	✓Y N	
40	55	15	Clay, Fat inorganic, High Plasticity. Tan, Red	✓Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

☐ PUMP ☐ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): 0.00

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION: Temporary well materials removed and the soil boring plugged using Type I/II Neat Cement Slurry (<6.0 gallons per 94 lbs. sack) from total depth to surface.
Logs adapted from LTE on-site geologist.

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

Shane Eldridge

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 30 DAYS AFTER COMPLETION OF WELL DRILLING:

Jack Atkins — Jackie D. Atkins — 10/06/2020

SIGNATURE OF DRILLER / PRINT SIGNEE NAME — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/30/2017)

FILE NO. C-4472	POD NO. 1	TRN NO. 677404
LOCATION	WELL TAG ID NO. —	PAGE 2 OF 2

2020-10-05_C-4472POD1_OSE_Well Record and Log-forsign

Final Audit Report 2020-10-06

Created:	2020-10-06
By:	Lucas Middleton (lucas@atkinseng.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAVNExAMfaqXv8kEK9Z4CDvLMLBTSbjMjK

"2020-10-05_C-4472POD1_OSE_Well Record and Log-forsign" History

Document created by Lucas Middleton (lucas@atkinseng.com)
2020-10-06 - 3:00:23 PM GMT- IP address: 69.21.248.123

Document emailed to Jack Atkins (jack@atkinseng.com) for signature
2020-10-06 - 3:00:55 PM GMT

Email viewed by Jack Atkins (jack@atkinseng.com)
2020-10-06 - 4:18:52 PM GMT- IP address: 74.50.153.115

Document e-signed by Jack Atkins (jack@atkinseng.com)
Signature Date: 2020-10-06 - 4:20:55 PM GMT - Time Source: server- IP address: 74.50.153.115

Agreement completed.
2020-10-06 - 4:20:55 PM GMT

OSE DII OCT 6 2020 PM2:24

Adobe Sign

Atkins ENGINEERING ASSOCIATES INC.
2904 W 2nd St.
Roswell, NM 88201
voice: 575.624.2420
fax: 575.624.2421
www.atkinseng.com

10/06/2020

DII-NMOSE
1900 W 2nd Street
Roswell, NM 88201

Hand Delivered to the DII Office of the State Engineer

Re: Well Record C-4472 Pod1

To whom it may concern:

Attached please find a well record and a plugging record, in duplicate, for a one (1) soil borings, C-4472 Pod1.

If you have any questions, please contact me at 575.499.9244 or lucas@atkinseng.com.

Sincerely,

Lucas Middleton

Enclosures: as noted above

BORING LOG NO. B-5

PROJECT: Potato Basin 2 Recycling Facility

CLIENT: EnviroTech Engineering & Consulting Inc
Enid, OK

SITE: South of Highway 128
Eddy County, NM

LOCATION See Exhibit A-2

Latitude: 32.247° Longitude: -103.9529°

Approximate Surface Elev.: 3104 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0					
		9-14-14 N=28			
5		31-50/2"			
		10-16-20 N=36	6	NP	19
10		11-11-11 N=22			
15		9-12-13 N=25			
		6-7-5 N=12			
20		10-18-15 N=33			
25		20-42-36 N=78			
30					
35					
40					
45					
50					
55					
60					
65					
70					
75					

SILTY SAND (SM), brown, medium dense

very dense

trace gravel, brown and white, dense, carbonate indurated

tannish white, medium dense

brown and white

medium dense

dense

reddish brown, very dense

brown

75.0 3029+/-

Boring Terminated at 75 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
4450 Bataan Memorial E
Las Cruces, NM

Boring Started: 01-21-2020 Boring Completed: 01-21-2020

Drill Rig: CME-75 Driller: Enviro-Drill

Project No.: 68195146 Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 68195146 POTATO BASIN 2 RE.GPJ TERRACON_DATATEMPLATE.GDT 2/5/20

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NO. (WELL NO.)	WELL TAG ID NO.	OSE FILE NO(S).
POD 14	BH 14	C-4326

WELL OWNER NAME(S)	PHONE (OPTIONAL)
XTO Energy, Inc.	432-221-7331

WELL OWNER MAILING ADDRESS	CITY	STATE	ZIP
522 W Mermond, Suite 704	Carlsbad	NM	88220

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	32	17	14.49	N
	LONGITUDE	103	57	25.95	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

North East Quarter of South West Quarter of Section 23, Township 23 South, Range 29 East, Eddy County, New Mexico

2. DRILLING & CASING INFORMATION

LICENSE NO.	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
1664	Shawn Cain	Cascade Drilling

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
5/11/2019	5/11/2019	58	58	54

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 48

DRILLING FLUID: ☑ AIR ☐ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ☐ ROTARY ☐ HAMMER ☐ CABLE TOOL ☑ OTHER – SPECIFY: Sonic

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	58	6					
0	48		2" PVC Blank	Flush Thread SCH 40	2.067	.154"	
48	58		2" PVC Screen	Flush Thread SCH 40	2.067	.154"	.020

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	2	6	Concrete	.5	Poured
2	45	6	Bentonite Chips	7.5	Poured
45	58	6	12-20 Sand	2.5	Poured

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 04/30/19)

FILE NO. C-4326	POD NO. 14	TRN NO. 648985	
LOCATION 23S.29E.23.324		WELL TAG ID NO.	PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES **(attach supplemental sheets to fully describe all units)**	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	4	4	Open Excavation	Y ✓ N	
4	10	6	brown-tan clayey SAND	Y ✓ N	
10	20	10	pinkish-tan silty SAND	Y ✓ N	
20	45	25	off white-tan CALICHE	Y ✓ N	
45	54	9	gray-light green DOLOMITE	✓ Y N	
54	58	4	dark gray-light gray CLAY	Y ✓ N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

☐ PUMP ☐ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): 0.00

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

BY SIGNING BELOW, I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED WELL. I ALSO CERTIFY THAT THE WELL TAG, IF REQUIRED, HAS BEEN INSTALLED AND THAT THIS WELL RECORD WILL ALSO BE FILED WITH THE PERMIT HOLDER WITHIN 30 DAYS AFTER THE COMPLETION OF WELL DRILLING.

Shawn C. Shawn Cain — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

8-23-19 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 04/30/2019)

FILE NO.	POD NO.	TRN NO.	
LOCATION		WELL TAG ID NO.	PAGE 2 OF 2

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NO. (WELL NO.)	WELL TAG ID NO	OSE FILE NO(S).
POD 16 (BH16)		C-4326

WELL OWNER NAME(S)	PHONE (OPTIONAL)
XTO Energy, Inc.	432-221-7331

WELL OWNER MAILING ADDRESS	CITY	STATE	ZIP
522 W Mermond, Suite 704	Carlsbad	NM	88220

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	32	17	13.25	N
	LONGITUDE	103	57	25.74	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

North East Quarter of South West Quarter of Section 23, Township 23 South, Range 29 East, Eddy County, New Mexico

2. DRILLING & CASING INFORMATION

LICENSE NO	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
1664	Shawn Cain	Cascade Drilling

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
5/14/2019	5/14/2019	64	64	54

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 51

DRILLING FLUID: ☑ AIR ☐ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ☐ ROTARY ☐ HAMMER ☐ CABLE TOOL ☑ OTHER – SPECIFY: Sonic

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	64	6					
0	54		2" PVC Blank	Flush Thread SCH 40	2.067	.154"	
54	64		2" PVC Screen	Flush Thread SCH 40	2.067	.154"	.020

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	2	6	Concrete	.5	Poured
2	52	6	Bentonite Chips	9	Poured
52	64	6	12-20 Sand	2.5	Poured

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 04/30/19)

FILE NO. C-4326	POD NO. 16	TRN NO. 648985
LOCATION 23S.29E.23342	WELL TAG ID NO.	PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES **(attach supplemental sheets to fully describe all units)**	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	4	4	Open Excavation	Y ✓N	
4	13	9	light brown-tan silty SAND	Y ✓N	
13	21	8	red-dark brown CLAY	Y ✓N	
21	52	31	off white-tan CALICHE	Y ✓N	
52	60	8	gray-light green DOLOMITE	✓Y N	
60	64	4	dark brown-red CLAY	Y ✓N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

☐ PUMP ☐ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): 0.00

5. TEST; RIG SUPERVISION

WELL TEST: TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

BY SIGNING BELOW, I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED WELL. I ALSO CERTIFY THAT THE WELL TAG, IF REQUIRED, HAS BEEN INSTALLED AND THAT THIS WELL RECORD WILL ALSO BE FILED WITH THE PERMIT HOLDER WITHIN 30 DAYS AFTER THE COMPLETION OF WELL DRILLING.

Shawn C. Shawn Cain — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

8-23-19 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 04/30/2019)

FILE NO.	POD NO.	TRN NO.
LOCATION	WELL TAG ID NO.	PAGE 2 OF 2

BORING LOG NO. B-1

Page 1 of 1

PROJECT: Proposed Water Impoundments - Remuda Site

CLIENT: CDM Smith Houston, Texas

SITE: South of Rawhide Road and NM-128 Loving, Eddy County, NM

Vickery, Jason A.

LOCATION: See Exhibit A-4

Latitude: 32.2718° Longitude: -103.9319°

Approximate Surface Elev: 3057 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
0	3057+/-					
4.0	3053+/-	**SILTY SAND WITH GRAVEL (SM)**, tan to pinkish tan, medium dense	2-5-12 N=17	2	NP	24
		CLAYEY SAND WITH GRAVEL, locally called "CALICHE" (SC), pinkish tan to tan, very dense	8-4-6 N=10			
			2-14-50 N=64			
			46-50/5"		26-18-8	
			50/5"			
			50/4"	2	27-18-9	39
22.0	3035+/-		50/4"			
		FAT CLAY WITH SAND (CH), brown to dark brown and gray, hard	13-21-22 N=43			
31.0	3026+/-		9-12-20 N=32	14	63-18-45	85
		SILTY SAND, locally called "CALICHE" (SM), grayish tan, very dense	50/1"			
			50/1"			
			50/1"			
			50/1"			
			50/1"			
60.0	2997+/-		50/1"			
		FAT CLAY (CH), gray to yellowish-brown, hard	9-19-27 N=46	16	52-20-32	85
			14-26-26 N=52			
75.0	2982+/-		50/1"			
		Boring Terminated at 75 Feet				

INSTALLATION DETAILS

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Continuous Flight Auger

Abandonment Method:
Boring backfilled with soil cuttings

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.
Elevations Obtained from Google Earth

Notes:
NP = Non-Plastic

WATER LEVEL OBSERVATIONS

No Groundwater Encountered During Drilling

Dry At Completion

10400 State Highway 191
Midland, TX

Boring Started: 5/18/2017 | Boring Completed: 5/19/2017

Drill Rig: CME 55 | Driller: Leo

Project No.: A4175030 | Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL A4175030 PROPOSED WATER IM.GPJ

BORING LOG NO. B-2

Page 1 of 1

PROJECT: Proposed Water Impoundments - Remuda Site

CLIENT: CDM Smith Houston, Texas

SITE: South of Rawhide Road and NM-128 Loving, Eddy County, NM

Vickery, Jason A.

LOCATION: See Exhibit A-4

Latitude: 32.2718° Longitude: -103.9309°

Approximate Surface Elev: 3058 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), brown to tan, loose			1-2-3 N=5	2	NP	21
4.0	3054+/-							
		LEAN CLAY WITH SAND (CL), reddish-brown to tan, stiff	5		3-4-5 N=9			
		-medium stiff at 6'			4-5-6 N=11			
		-hard material, locally called "caliche" below 8'	10		3-2-3 N=5	5	30-20-10 27-18-9	75
17.0	3041+/-		15		17-23-32 N=55			
		CLAYEY SAND WITH GRAVEL, locally called "CALICHE" (SC), reddish-brown to pinkish tan, very dense			28-50/2"			
			20		50/4"			
			25		50/4"			
31.0	3027+/-		30		50/3"			
		FAT CLAY WITH SAND (CH), grayish tan to dark brown, hard	35		17-25-23 N=48			
		-very stiff at 38'	40		9-10-17 N=27	15	78-18-60	81
42.0	3016+/-							
		SILTY SAND, locally called "CALICHE" (SM), gray to yellowish-brown, very dense	45		12-50/4"			
			50		50/1"			
			55		50/1"			
			60		50/1"			
			65		50/1"			
			70		50/1"	1	NP	47
75.0	2983+/-		75		50/1"			
		Boring Terminated at 75 Feet						

INSTALLATION DETAILS

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:

Abandonment Method:
Boring backfilled with soil cuttings

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.
Elevations Obtained from Google Earth

Notes:
NP = Non-Plastic

WATER LEVEL OBSERVATIONS

No Groundwater Encountered During Drilling

Dry At Completion

10400 State Highway 191
Midland, TX

Boring Started: 5/18/2017 Boring Completed: 5/18/2017

Drill Rig: CME 55 Driller: Leo

Project No.: A4175030 Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL A4175030 PROPOSED WATER IM.GPJ

Appendix Site Photographs

Figure 1-A: Image looking east at watercourse mapped on the USGS 7.5 minute topographic map. Watercourse is located more than 200 feet south of southern boundary of proposed containment area. Rustler gypsum bedrock is exposed in channel. E&P pad that serves several operators, two injection wells and several producing wells is in background. Location 32 17 44.12, -103 55 23.39 and is shown on Figure 7b

Figure 2-A: Image looking uphill (due east) of small channel with exposed Rustler gypsum. Two-three feet of sandy soil is covered by sparse vegetation. This is not a watercourse mapped on a USGS 7.5-minute topographic map. Rather, it is an erosion feature that currently terminates at the production pad to the east. Location is 32 17 46.21, -103 55 26.33

Figure 3-A: View east of a channel north of Figure 2-A. Most channels show exposed gypsum bedrock and thin soil with sparse vegetation. Channel terminates at production pad, which was constructed over all of the channels that traverse the area of the proposed containments.. Surface flow from pad flows into mapped channel in Figure 1-A. Note large blocks of gypusm on slope of pad. Locaiton 32 17 47.51, -103 55 25.75

Figure 4-A: View west downhill from confluence of drainages shown in A-2 and A-3 near western edge of area proposed for containments. These channels terminate in the flat vegetated area about 500 feet downhill. Location of image is 32 17 45.73, -103 55 29.19

Figure 55A -The production pad due east of the containment area (see Figure 3A) lies on and in the Tamarisk Member of the Rustler Formation. During or just before 2019 the existing production pad (for a 1996 vertical well) expanded to allow for drilling one Devonian SWD and two horizontal wells. The pad expansion caused excavation of part of the massive, hard gypsum strata. Some blocks of gypsum on the side of the pad shown above are about the size of large pick-up trucks.

Images of USGS mapped drainage and nearby channels

Figure GS1a - Looking north at an unmapped USGS channel west of containment area. Location of images shown on Figure 7b.

Figure GS1b – Looking southwest at same location as GS1a. The channel intercepts break in slope and the sediment load disperses on the flat area causing channel to become undefined.

Figure GS2 – View north (up hill) of the channel shown in GS1. This is the channel that is closest to the containment area. This channel has no bed or bank and is an erosional gully.

Figure GS3 – View west-southwest (downhill) of channel shown in GS2. This erosional gully crosses the road and powerline south of the elevated drilling/production location on the right of image.

GS4- Looking downhill from within USGS mapped watercourse, uphill from image GS3. Like all drainage channels in the area, this is an erosional gully with no defined bed and bank. Drilling/production pad location shown on Figure 7b is in background.

GS-5 – View northeast within USGS mapped watercourse uphill from previous image.

Figure GS-6 View of USGS mapped watercourse where it crosses lease road (32 17 53.36, -103 55 26.52 and Figure 7b). This is a minor drainage that the USGS watercourse mapping unit drew as a watercourse that connects the channels shown in GS4 and GS5 with the channels shown in GS7, below. There is no such connection on the ground or any evidence of a connection of channels in Google Earth images.

GS- 7 View northeast downhill from GS-6 in USGS mapped watercourse. This is an erosional channel with no bed or defined bank.

Figure GS-8 View northeast within the USGS mapped drainage within the area of the proposed containment. north of previous images are smaller and exhibit slightly thicker sandy soil outside of the channels. Location is 32 17 49.97, -103 55 31.14

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R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

MOBLEY IN-GROUND CONTAINMENT

Financial Assurance Cost Estimate

Attached is the cost estimate for reclamation of the Mobley recycling in-ground containment. The attached cost estimate does not include removal of the AST Containment ($32,500).

The quotation was based upon the standards in Rule 34. Patriot summarized the work below:

> ***Estimate for pulling and disposing of liner, pushing in berms, spreading topsoil and seeding.***

Solaris confirmed with Patriot that the description of "pushing in berms" includes grading the site to conform with surrounding topography and drainage. The reclamation must meet terms set forth in the surface lease agreement with the landowner, who received a copy of the August 31, 2021, registration and permit.

Please contact me or Todd Carpenter if you have any questions.

Patriot Environmental I
220 W. Carl Hubbell Blvd. #671
Meeker, OK 74855
USA

Voice: 405-279-6052
Fax:

QUOTATION

Quote Number: 1826
Quote Date: Dec 6, 2021
Page: 1

Quoted To:
Solaris Water Midstream 9811 katy freeway suite 700 Houston, TX 77024 USA

Customer ID	Good Thru	Payment Terms	Sales Rep
Solaris	1/5/22	Net 30 Days	

Quantity	Item	Description	Unit Price	Amount
1.00	Labor - Liner	Estimate for pulling and disposing of liner, pushing in berms, spreading topsoil and seeding.	194,400.000	194,400.00

Subtotal	194,400.00
Sales Tax	11,582.94
TOTAL	**205,982.94**

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

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

CONDITIONS

Action 71276

CONDITIONS

Operator: SOLARIS WATER MIDSTREAM, LLC 907 Tradewinds Blvd, Suite B Midland, TX 79706	OGRID: 371643
	Action Number: 71276
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	NMOCD has reviewed the recycling containment permit application and related documents, submitted by [371643] SOLARIS WATER MIDSTREAM, LLC on September 11, 2021 for 2RF-166 - MOBLEY CONTAINMENTS #1 AND #2 FACILITY ID fVV2131951088 in Unit Letter C, Section 19, Township 23S, Range 30E, Eddy County, New Mexico. The form C-147 and related documents for 2RF-166 - MOBLEY CONTAINMENTS #1 AND #2 FACILITY ID fVV2131951088 is approved with conditions of approval:	1/20/2022