February 2021

C-147 Registration Package for Longhorn Containment and Recycling Facility

Section 7, T26S, R35E, Lea County

View from the northeast corner of the proposed containment showing the vegetated low sand dunes in the area.

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

February 9, 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 - Longhorn Recycling Facility and Containment Registration Package
Section 7, T26-S, R35-E, Lea County,

Dear Mr. Bratcher and Ms. Venegas:

On behalf of Solaris Water Midstream, R.T. Hicks Consultants is pleased submit a registration to replace the March 2020 permit submission for the above-referenced project. Rule 34 requires no variances for this facility. Specifically:

- 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.
- 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

The closure cost estimate is provided under separate cover.

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

If you have any questions or concerns regarding this registration 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
Bureau of Land Management, Carlsbad

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

32156 Castle Court / Suite 211-240 / Evergreen, CO 80439
Ph 720-289-0300 / geosynthetics@msn.com

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): Longhorn Water Treatment and Reuse Facility

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

U/L or Qtr/Qtr: A Section: 07 Township: 26S Range: 35E County: Eddy

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

2.

☒ **Recycling Facility:**

Location of (if applicable): Latitude: 32.0635060ºN Longitude: 103.3993863ºW 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:**

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

Center of Recycling Containment (if applicable) Pond- Lat 32.0635259°N Long 103.3994541°W (approx.)

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

☒ Lined ☒ Liner type: Thickness 60 mil Primary, 40 mil Secondary ☐ LLDPE ☒ HDPE ☐ PVC ☐ Other

_____

☐ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other Volume: 290,000 BBL Dimensions 320’ x 520’

☐ 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

☒ Alternate. Please specify: 8 ft chain link .

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: Bradley Todd Carpenter Date: December 15, 2020

e-mail address Todd Carpenter <todd.carpenter@solarismidstream.com> Telephone: 432 203 9020

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

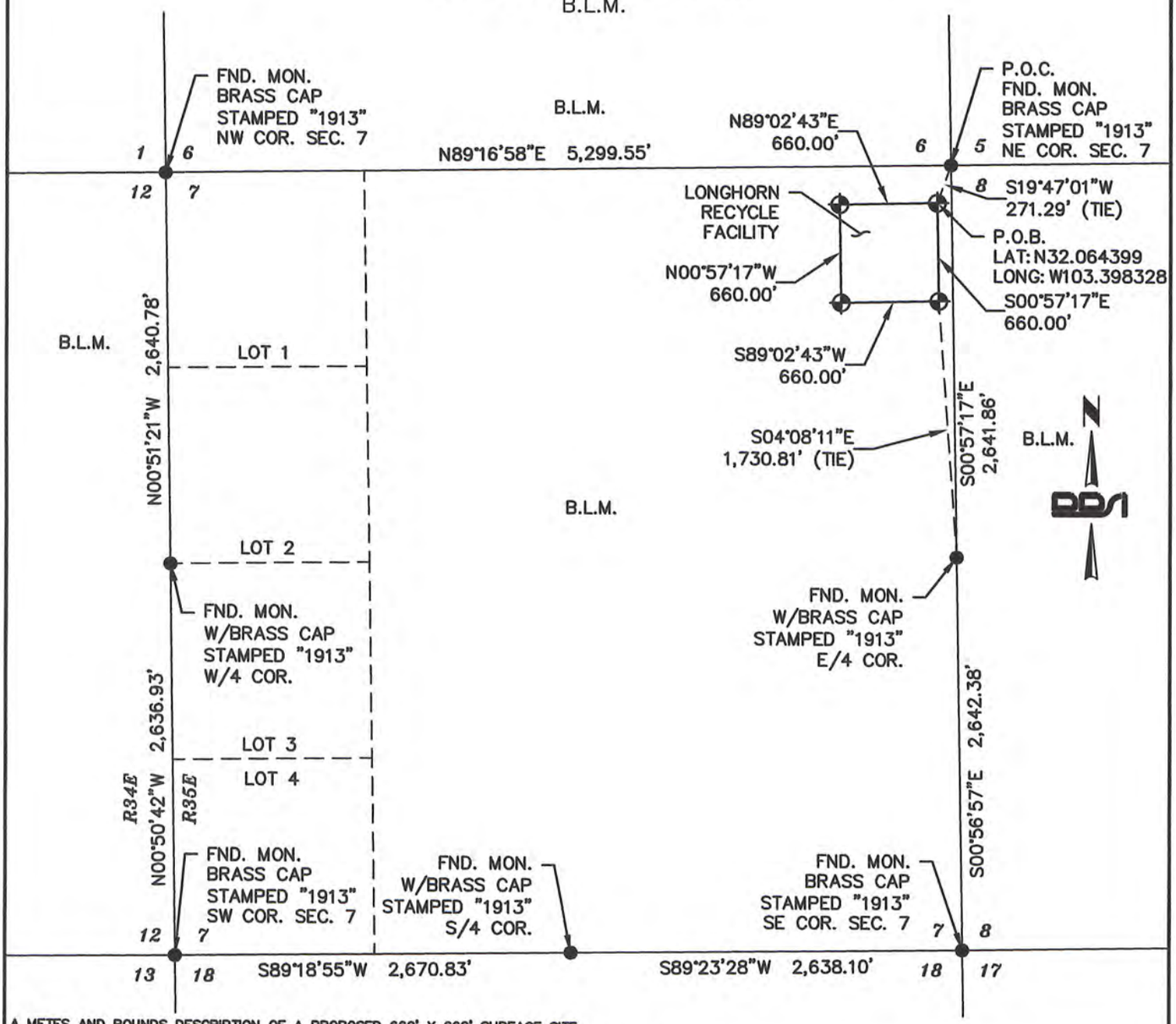
Title: _____ **OCD Permit Number:** _____

☐ OCD Conditions _____
☐ Additional OCD Conditions on Attachment

SURVEY FOR CONTAINMENT AND RECYCLING FACILITY

EXHIBIT A

SECTION 7, TOWNSHIP 26 SOUTH, RANGE 35 EAST, N.M.P.M.
LEA COUNTY, NEW MEXICO
B.L.M.



A METES AND BOUNDS DESCRIPTION OF A PROPOSED 660' X 660' SURFACE SITE

BEING A 10.00 ACRE TRACT OF LAND SITUATED IN SECTION 7, TOWNSHIP 26 SOUTH, RANGE 35 EAST, N.M.P.M., IN LEA COUNTY, NEW MEXICO, SAID SURFACE SITE BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 7, BEING A FOUND MONUMENT WITH BRASS CAP STAMPED "1913"; THENCE SOUTH 19°47'01" WEST, 271.29 FEET TO THE **POINT OF BEGINNING** BEING A CAPPED 1/2" IRON ROD SET STAMPED "NM PS 24876"; THENCE SOUTH 00°57'17" EAST, 96.06 FEET WEST OF AND PARALLEL TO THE EAST LINE OF SAID SECTION 7, 660.00 FEET TO A CAPPED 1/2" IRON ROD SET STAMPED "NM PS 24876", FROM WHICH THE EAST QUARTER CORNER OF SAID SECTION 7, BEING A FOUND MONUMENT WITH BRASS CAP STAMPED "1913", BEARS SOUTH 04°08'11" EAST, 1,730.81 FEET; THENCE SOUTH 89°02'43" WEST, 660.00 FEET TO A CAPPED 1/2" IRON ROD SET STAMPED "NM PS 24876; THENCE NORTH 00°57'17" WEST, 660.00 FEET TO A CAPPED 1/2" IRON ROD SET STAMPED "NM PS 24876"; THENCE NORTH 89°02'43" EAST, 660.00 FEET TO THE **POINT OF BEGINNING**, AND CONTAINING 10.00 ACRES (435,600 SQUARE FEET) OF LAND.

BASIS OF BEARING: BEARINGS SHOWN HEREON ARE BASED UPON UNIVERSAL TRANSVERSE MERCATOR ZONE 13 NORTH, US SURVEY FEET, NORTH AMERICAN DATUM OF 1983. ALL DISTANCES ARE GRID.

LEGEND
● = DENOTES FOUND MONUMENT AS NOTED
⊕ = DENOTES 1/2 INCH IRON ROD SET WITH YELLOW CAP STAMPED "NM PS 24876"

NOTES:
1. RESEARCH HAS BEEN PROVIDED BY OTHERS.
2. THIS PLAT IS FOR EASEMENT PURPOSES ONLY.
3. EASEMENTS, SETBACKS, AND OTHER ENCUMBRANCES ARE NOT SHOWN BY AGREEMENT WITH CLIENT.
4. P.O.C. = POINT OF COMMENCEMENT
5. P.O.B. = POINT OF BEGINNING

EASEMENT TABLE		
SURFACE SITE	435,600 S.F.	10.00 AC.

SURVEYOR'S CERTIFICATE

I, CHRIS E. CARLSON A NEW MEXICO PROFESSIONAL SURVEYOR, CERTIFY I AM RESPONSIBLE FOR THIS EXHIBIT, BEING CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS EXHIBIT MEETS THE MINIMUM SURVEY STANDARDS FOR NEW MEXICO.

Chris Carlson 12/10/2019

DATE OF SIGNATURE: 12/10/2019
CHRIS E. CARLSON N.M.P.S. NO. 24876

CHRIS E. CARLSON NEW MEXICO 24876 PROFESSIONAL SURVEYOR

0 500' 1000'
SCALE 1"= 1000'

DDSI
DOWNTOWN DESIGN SERVICES, INC.
16 E. 16TH ST. SUITE 400
TULSA, OK 74119
Tel: 918-592-3374 Fax: 918-221-3940
www.ddsiglobal.com

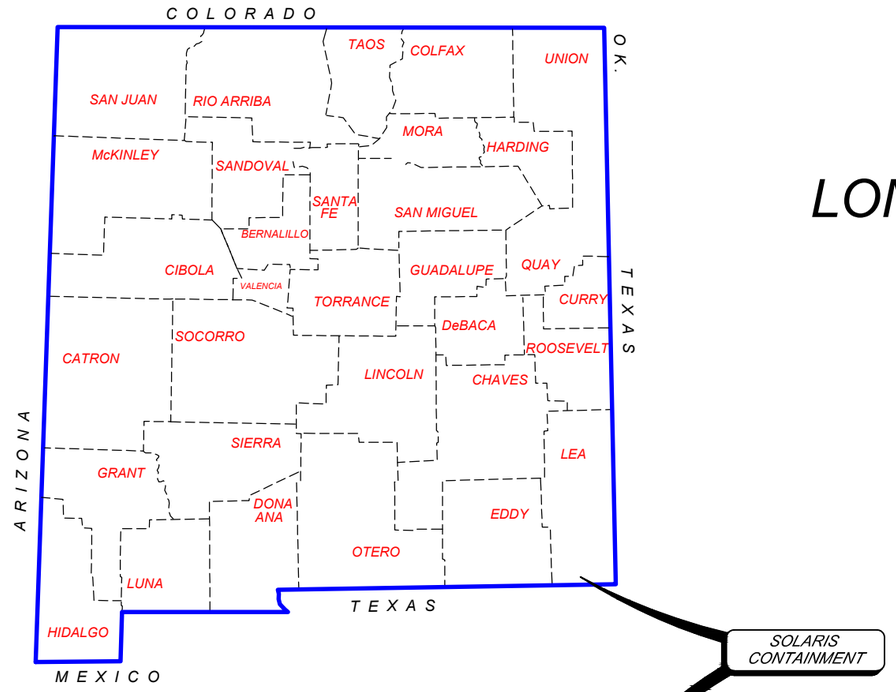
SOLARIS WATER MIDSTREAM, LLC.

LONGHORN RECYCLE FACILITY
LOCATION OF A PROPOSED SURFACE SITE IN
SECTION 7, TOWNSHIP 26 SOUTH, RANGE 35 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO

FIELD DATE:	12/06/2019	
DRAFTING DATE:	12/10/2019	PAGE 1 OF 1
APPROVED BY: CEC	DRAWN BY: TJA	TRACT: SPP-7

G:\Shared drives\Projects\2019-200 Solaris Longhorn Recycle Facility\1. DRAWINGS\EXHIBITS\SPP-7 Longhorn Recycle Facility Surface Site.dwg, 12/10/2019 2:15:45 PM, Adobe PDF.pc3

RECYCLING CONTAINMENT DESIGN DRAWINGS AND AVIAN SPECIES HAZING EQUIPMENT



SOLARIS WATER MIDSTREAM, LLC
LONGHORN PRODUCED WATER TREATMENT AND REUSE FACILTY
S07, T26S, R35E
LEA COUNTY, NM

INDEX OF SHEETS

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER
3/13/2020

MAGRYM
TBPE F-19848
Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com

IFB	ISSUED FOR BIDDING 03/13/2020		
R-X	DESCRIPTION	DATE	BY

REVISIONS (OR CHANGE NOTICES)

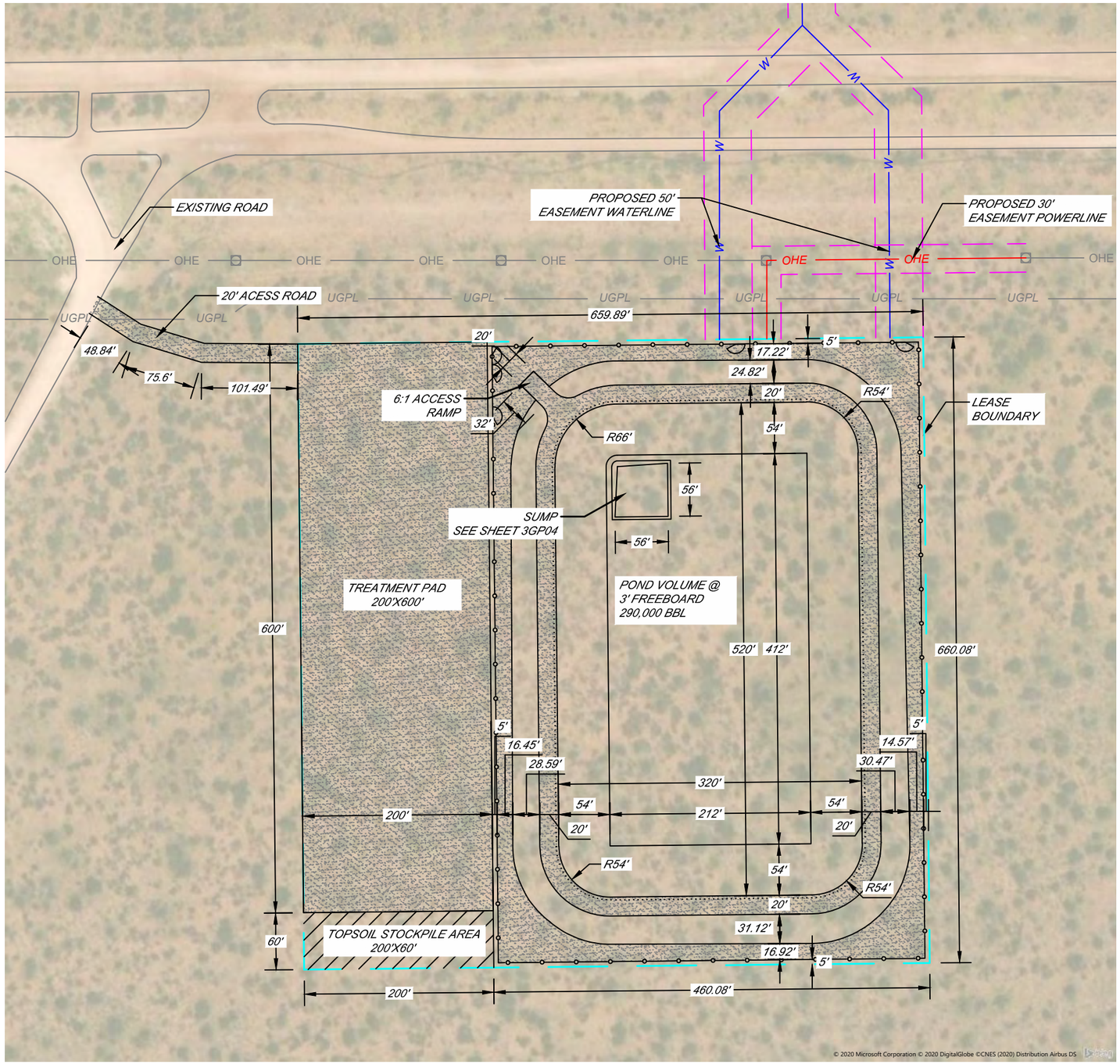
SOLARIS WATER MIDSTREAM
Solaris Water Midstream, LLC
907 Tradewinds Boulevard
Midland, TX 79701
432-203-9020
www.solarismidstream.com

LONGHORN PRODUCED WATER TREATMENT
AND REUSE FACILITY
S07, T26S, R35E, LEA COUNTY, NM
SOLARIS WATER MIDSTREAM, LLC.

COVER SHEET

HORIZONTAL SCALE:NTS	VERTICAL SCALE:NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET: COVER	SHEET:1COVER

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 Cover.dwg



LEGEND

- 8' GAME FENCE
- EXISTING UNDERGROUND PIPELINE — UGPL
- EXISTING OVERHEAD ELECTRIC — OHE
- WATERLINE — W — W
- OVERHEAD ELECTRIC — OHE
- EASEMENT
- LEASE BOUNDARY
- DRIVING SURFACE
- ANCHOR TRENCH
- EXISTING POWERPOLE

N

SCALE 1"=125'

0 31.25' 62.5' 125'

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER

3/13/2020

Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com
TBPE F-19848

IFB	ISSUED FOR BIDDING 03/13/2020		
R-X	DESCRIPTION	DATE	BY
REVISIONS (OR CHANGE NOTICES)			

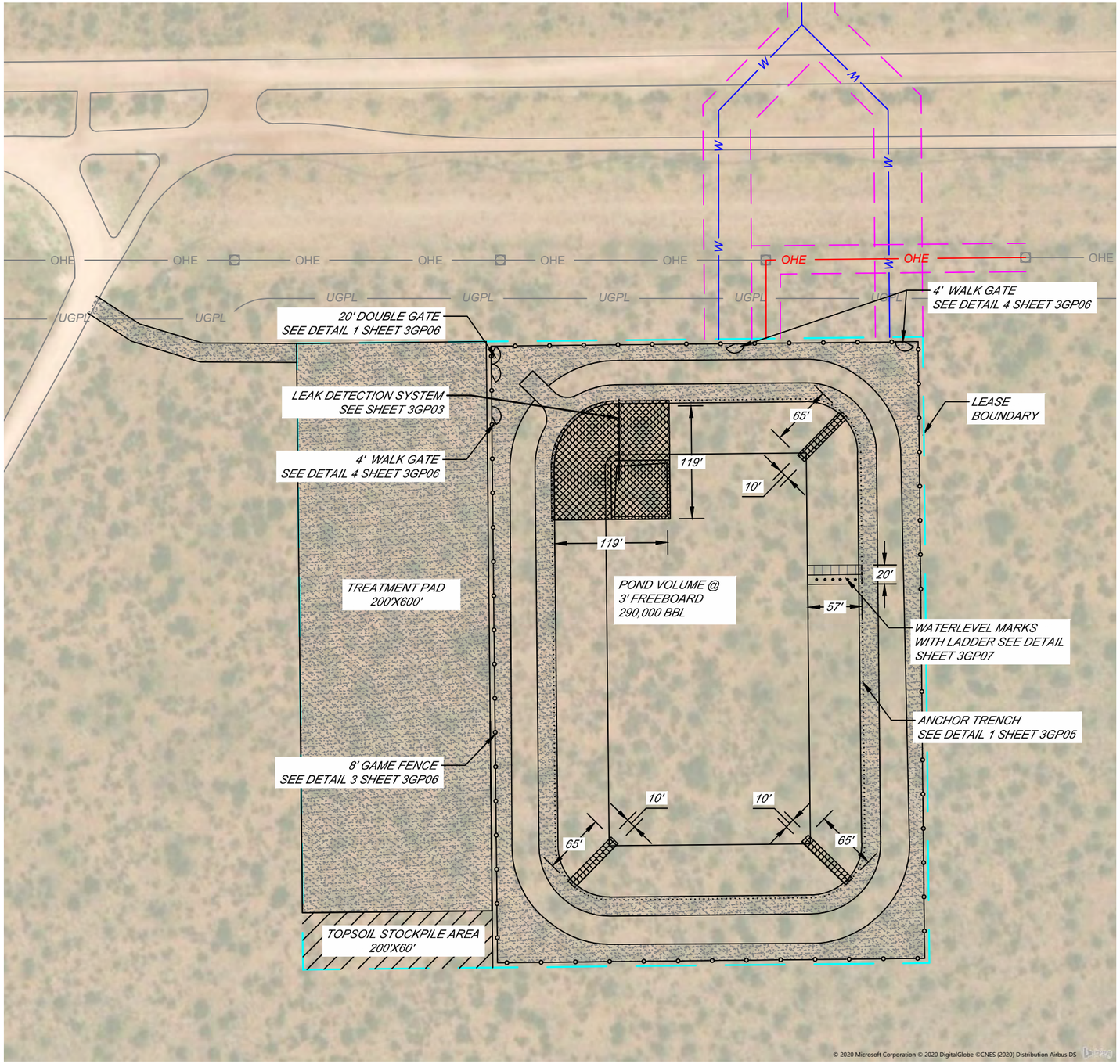
Solaris Water Midstream, LLC
907 Tradewinds Boulevard
Midland, TX 79701
432-203-9020
www.solarismidstream.com

LONGHORN PRODUCED WATER TREATMENT AND REUSE FACILITY
S07, T26S, R35E, LEA COUNTY, NM
SOLARIS WATER MIDSTREAM, LLC.

SITE PLAN

HORIZONTAL SCALE:1"=125'	VERTICAL SCALE:NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET:HORIZONTAL LAYOUT	SHEET:1HL01

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 1HLNN.dwg



LEGEND

- 8' GAME FENCE
- EXISTING UNDERGROUND PIPELINE — UGPL
- EXISTING OVERHEAD ELECTRIC — OHE
- WATERLINE — W
- OVERHEAD ELECTRIC — OHE
- EASEMENT
- LEASE BOUNDARY
- DRIVING SURFACE
- ANCHOR TRENCH
- EXISTING POWERPOLE
- RUB SHEET
- WATERLEVEL MARK AND LADDER

N

SCALE 1"=125'

0 31.25' 62.5' 125'

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER

3/13/2020

Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com
TBPE F-19848

IFB	ISSUED FOR BIDDING 03/13/2020		
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

LONGHORN PRODUCED WATER TREATMENT
AND REUSE FACILITY
S07, T26S, R35E, LEA COUNTY, NM
SOLARIS WATER MIDSTREAM, LLC.

LINER AND FENCE PLAN

HORIZONTAL SCALE: 1"=125'	VERTICAL SCALE: NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET:HORIZONTAL LAYOUT	SHEET:1HL02

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 1HLNN.dwg

GENERAL NOTES

1. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY SOLARIS WATER MIDSTREAM, LLC.
2. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
3. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, TEXAS NORTH CENTRAL, 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 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 GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 60 MIL HDPE TEXTURED MEMBRANE AS THE SECONDARY LINER.
9. LINER TO BE INSTALLED PER MANUFACTURER'S RECOMMENDED 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, THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
    a. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.
    b. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. PRESSURIZE THE AIR CHANNEL TO 35 PSI. NOTE TIME 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 10 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 12 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE DIKE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A MODIFIED 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 UNIFORMILY 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 LINE INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.

SUMMARY OF QUANTITIES

ITEM	UNIT	QTY
CLEARING AND GRUBBING	ACRE	10
ESTIMATED TOPSOIL (6" AVERAGE)	CUBIC YARD	7,640
ESTIMATED CUT (INCLUDING TOPSOIL)	CUBIC YARD	40,654
ESTIMATED FILL (ABOVE EXISTING GRADE)*	CUBIC YARD	33,014
DRAINAGE SWALE	LINEAR FEET	660
8' GAME FENCE	LINEAR FEET	2,222
20' DOUBLE GATE	EACH	1
4' WALK GATE	EACH	3
60 MIL HDPE RUB SHEET GEOMEMBRANE (TEXTURED)**	SQUARE FEET	17,877
60 MIL HDPE PRIMARY GEOMEMBRANE (SMOOTH)**	SQUARE FEET	174,926
200 MIL GEONET**	SQUARE FEET	174,926
60 MIL HDPE SECONDARY GEOMEMBRANE (SMOOTH)**	SQUARE FEET	174,926
10 OZ. GEOTEXTILE**	SQUARE FEET	174,926
6" HDPE DR11 PIPE WITH PERFORATIONS IN SUMP	LINEAR FEET	90
DRAIN ROCK	CUBIC YARD	1
ANCHOR TRENCH	LINEAR FEET	1,620

* +15% FILL FACTOR APPLIED. ACTUAL FIELD CONDITIONS MAY VARY.

** COMPLETE-IN-PLACE QUANTITIES. OVERLAP, SCRAPS AND/OR OTHER QUANTITIES NOT INCLUDED.

STAGE-STORAGE

ELEVATION (FT)	POND VOLUME (BBL)
2859.4	0
2860.4	186
2861.4	805
2862.4	3,646
2863.4	13,921
2864.4	29,828
2865.4	46,457
2866.4	63,820
2867.4	81,929
2868.4	100,794
2869.4	120,427
2870.4	140,838
2871.4	162,040
2872.4	184,044
2873.4	206,860
2874.4	230,501
2875.4	254,976
2876.4	280,298
2877.4	306,478
2878.4	333,502
2879.4	361,352
2880.4	390,031

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PROFESSIONAL ENGINEER
3/13/2020

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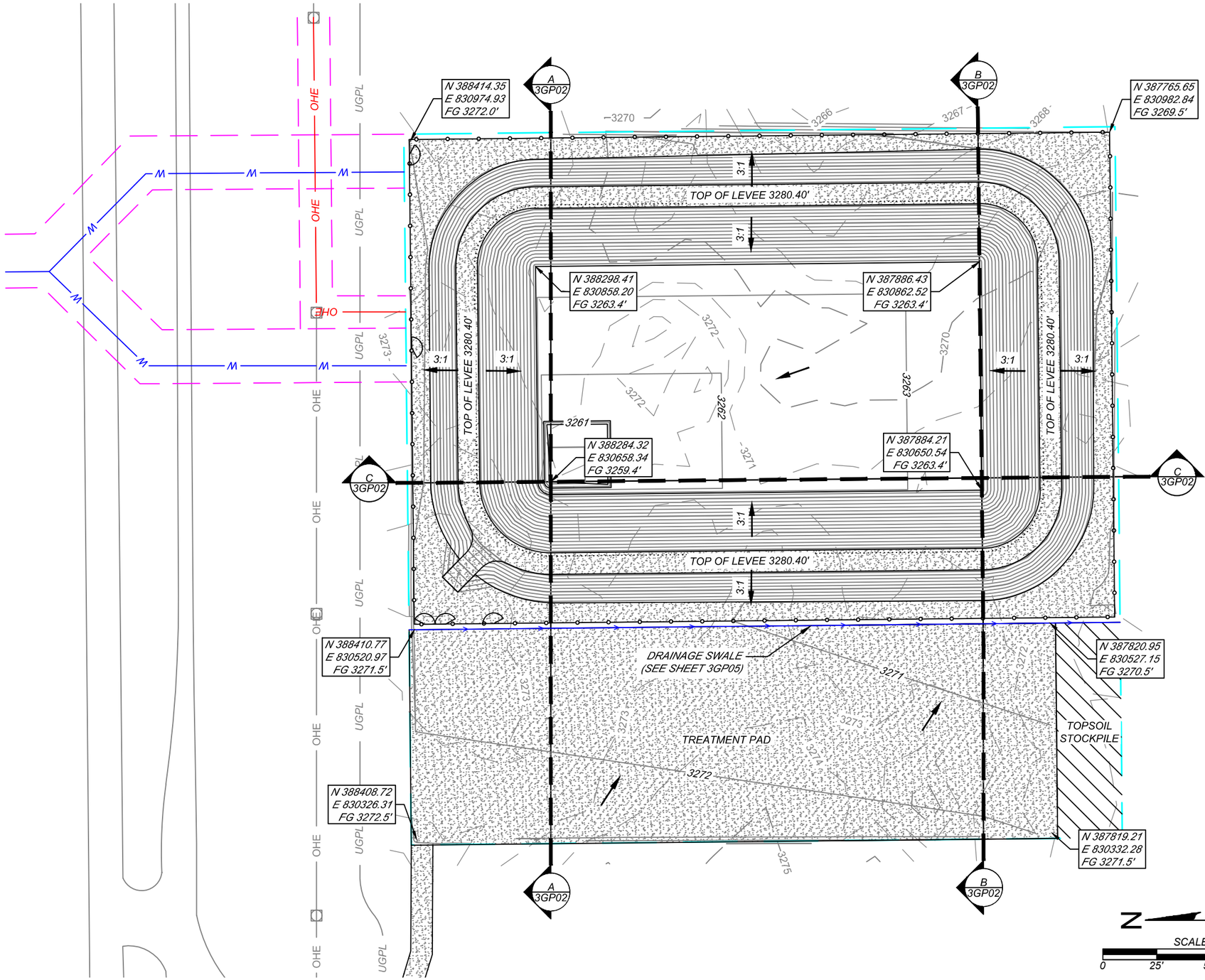
SUMMARY OF QUANTITIES AND GENERAL NOTES

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET: HORIZONTAL LAYOUT	SHEET: 1HL03

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 1HLNN.dwg



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GRADING PLAN

HORIZONTAL SCALE:1"=100'	VERTICAL SCALE:NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET: GRADING PLAN	SHEET: 3GP01

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 3GPNN.dwg

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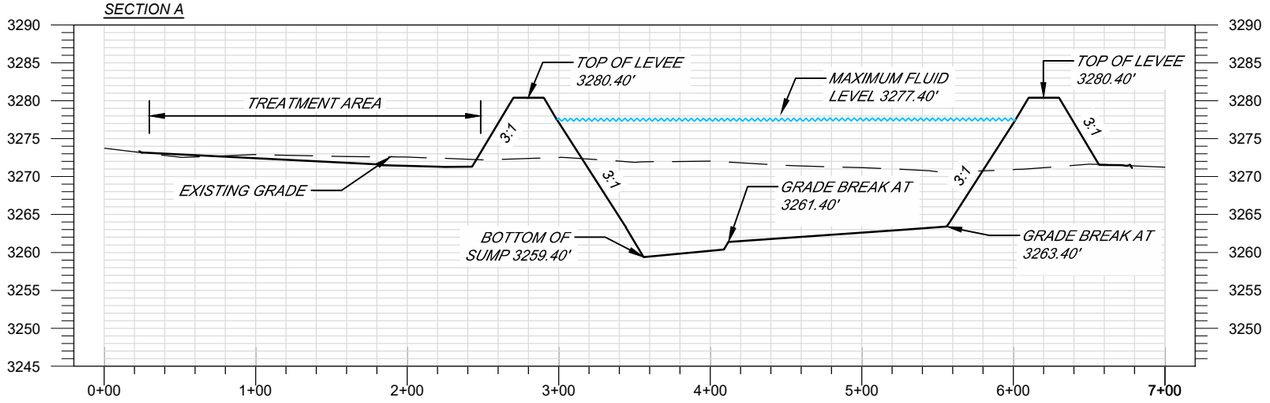

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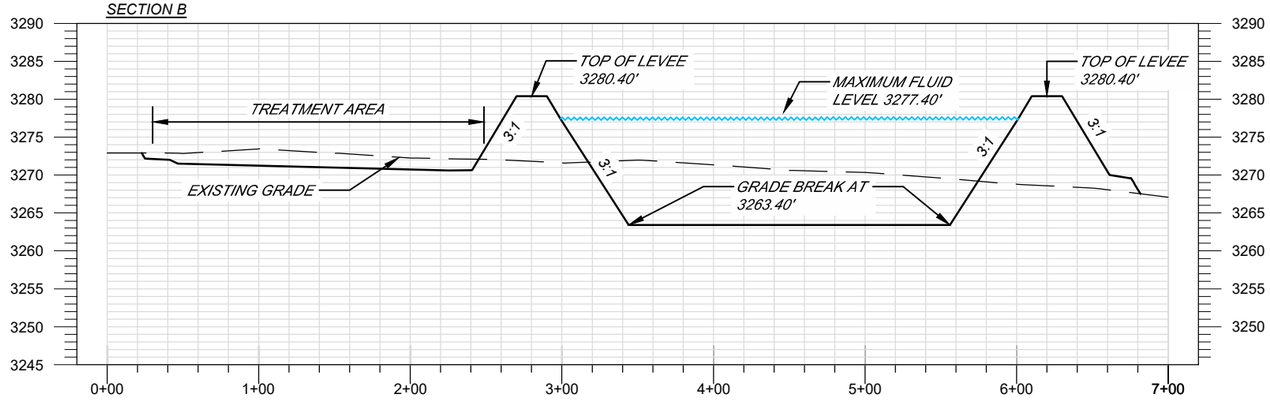

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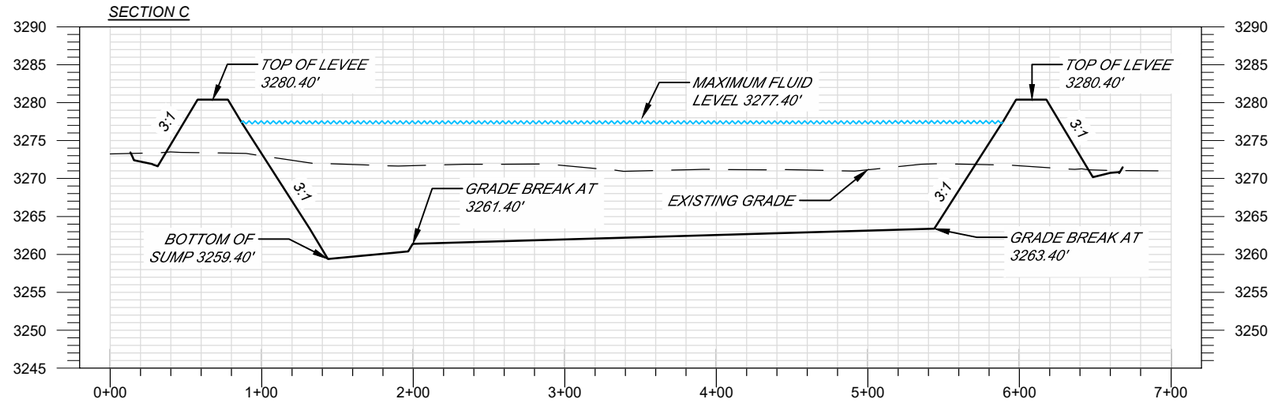

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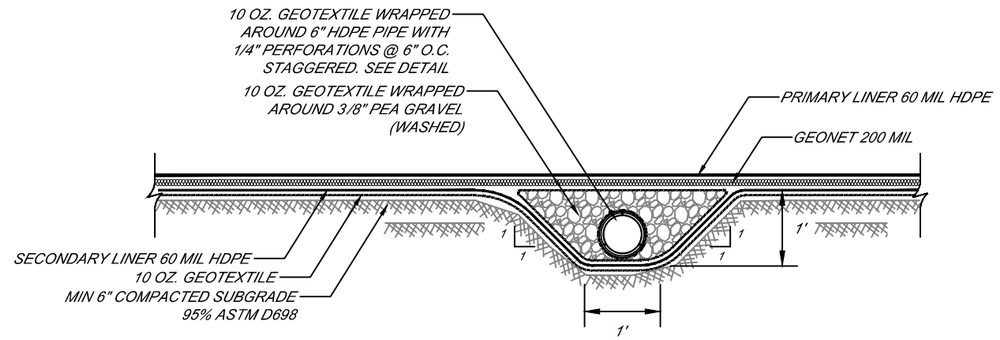
CROSS SECTIONS

HORIZONTAL SCALE:1"=100'	VERTICAL SCALE:1"=20'
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET: GRADING PLAN	SHEET: 3GP02

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 3GPNN.dwg



1 3GP03 LEAK DETECTION SYSTEM SECTION A
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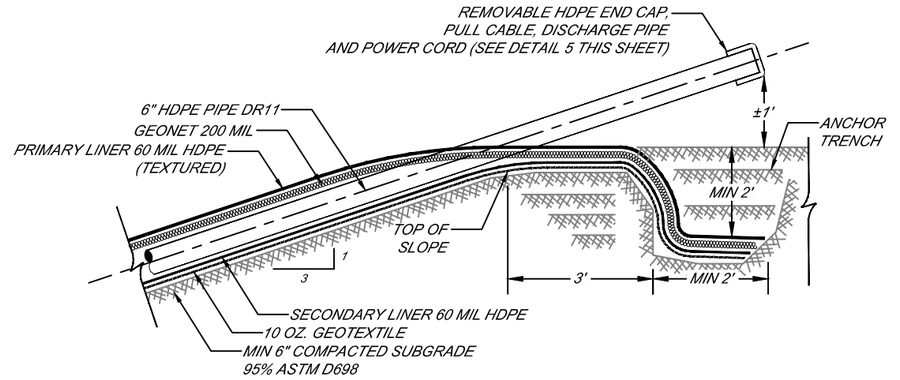

2 3GP03 LEAK DETECTION SYSTEM PIPE RISER
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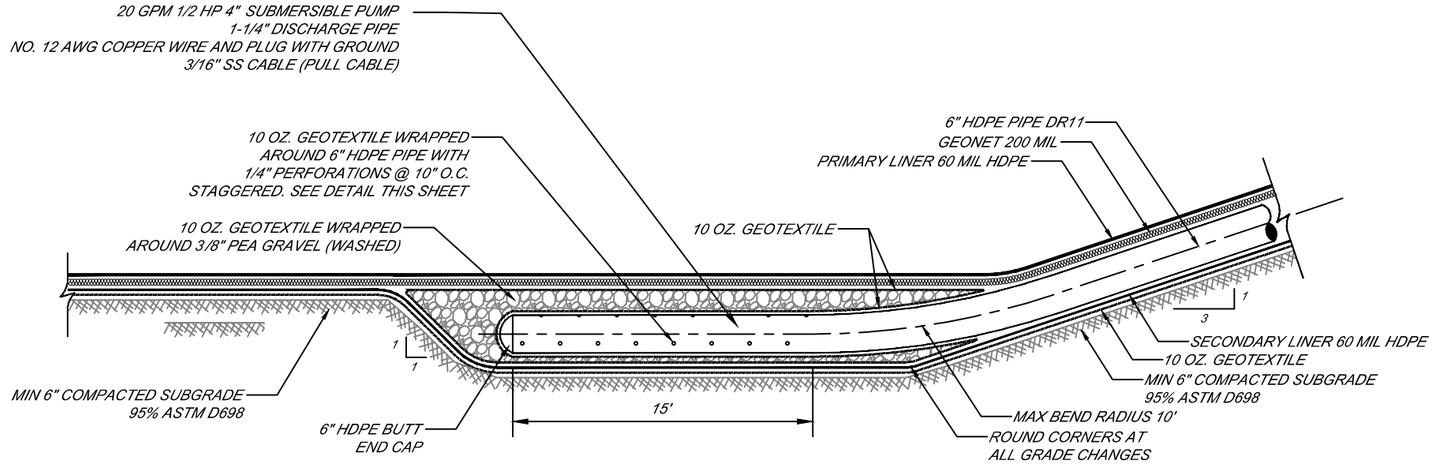

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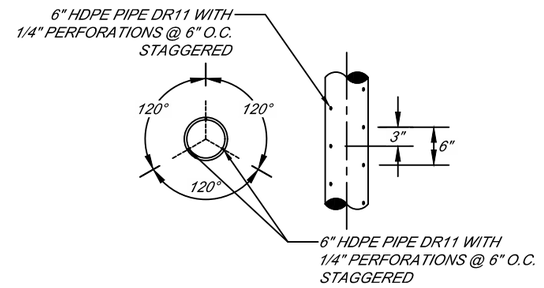

4 3GP03 LEAK DETECTION SYSTEM PERFORATED PIPE
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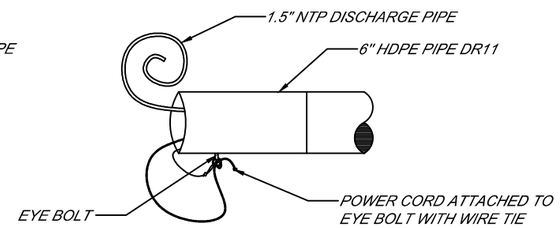

5 3GP03 DISCHARGE PIPE, PULL CABLE AND POWER CORD
NOT TO SCALE

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PROFESSIONAL ENGINEER
3/13/2020

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LEAK DETECTION SYSTEM DETAILS

HORIZONTAL SCALE:NTS	VERTICAL SCALE:NTS
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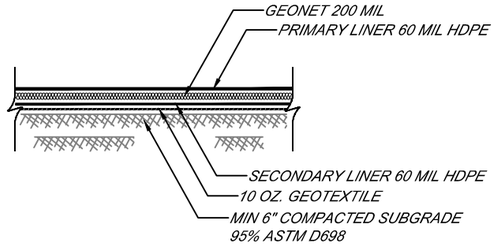
SUBSET:GRADING PLANS	SHEET:3GP03

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 Details.dwg



1 / 3GP04 TYPICAL POND BOTTOM LINER
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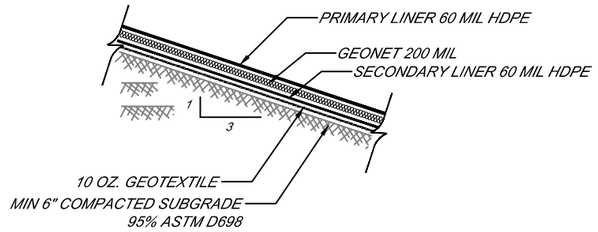

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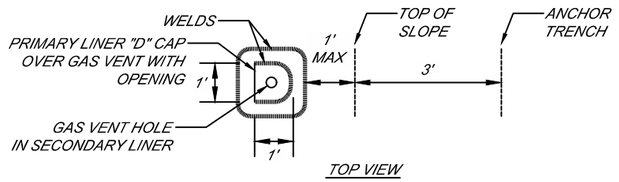

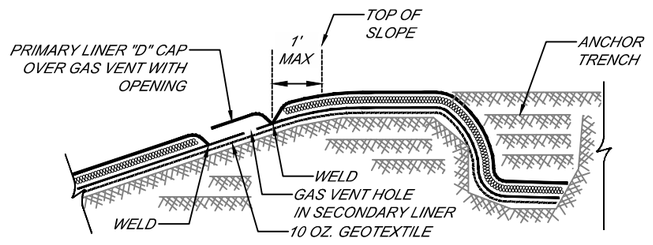

NOTE:
GAS VENT SPACING SHALL BE INSTALLED
PER MANUFACTURER'S RECOMMENDATIONS

3 / 3GP04 TYPICAL GAS VENT
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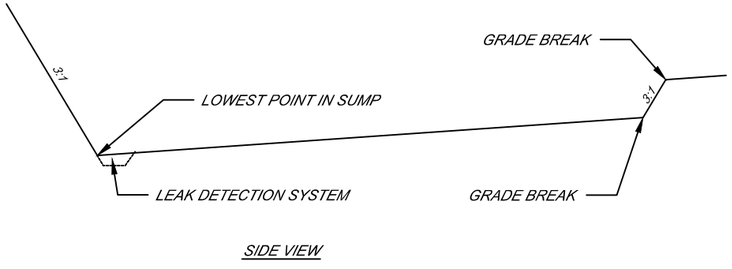

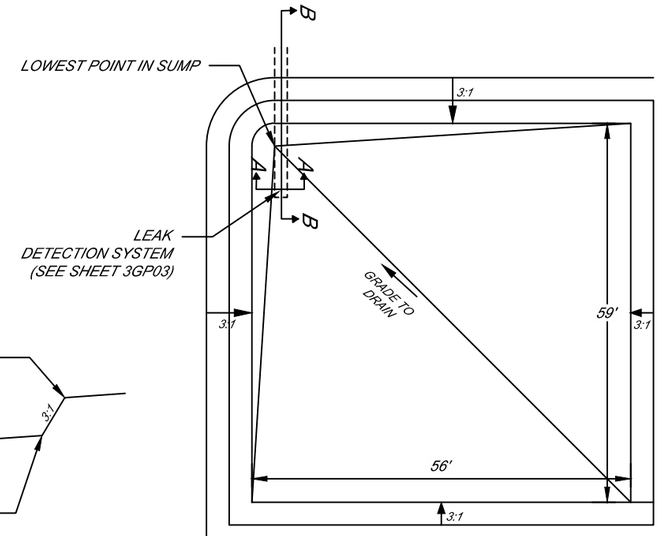

4 / 3GP04 SUMP DETAIL
NOT TO SCALE

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MISCELLANEOUS DETAILS

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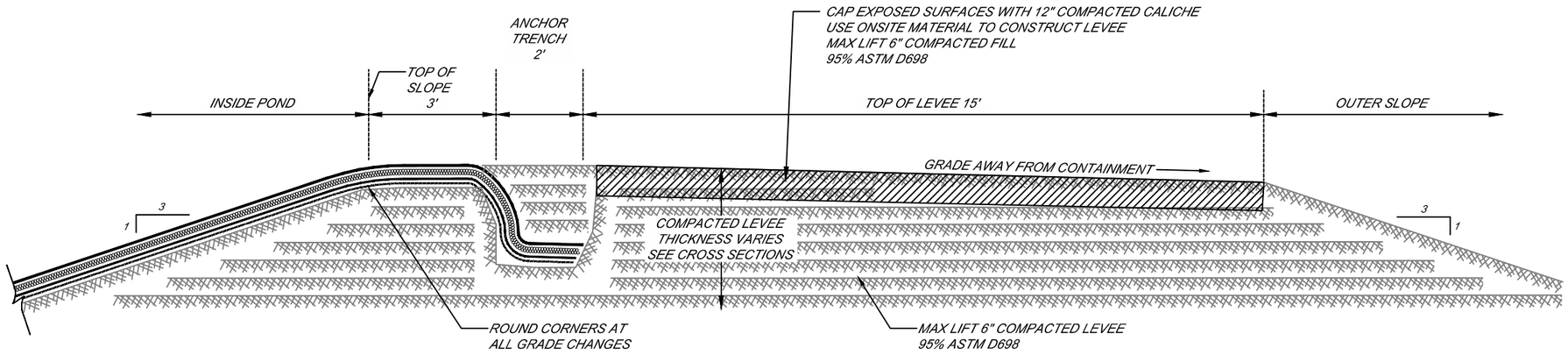
SUBSET:GRADING PLANS	SHEET:3GP04

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 Details.dwg



1 / 3GP05 **TYPICAL LEVEE SECTION**
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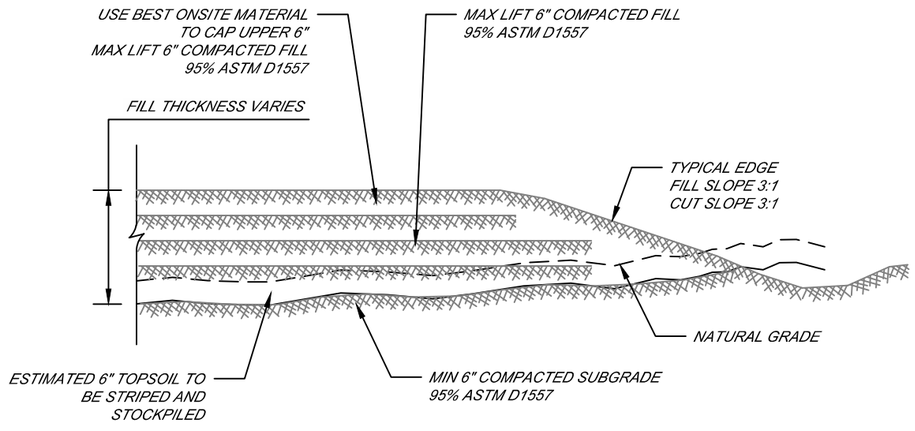

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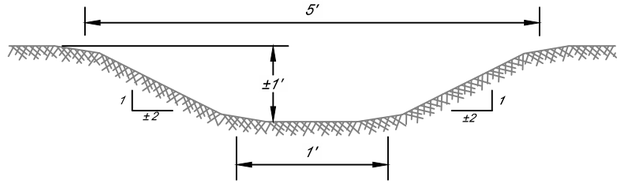

3 / 3GP05 **TYPICAL DRAINAGE SWALE**
NOT TO SCALE

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LEVEE AND PAD DETAILS

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SUBSET:GRADING PLANS	SHEET:3GP05

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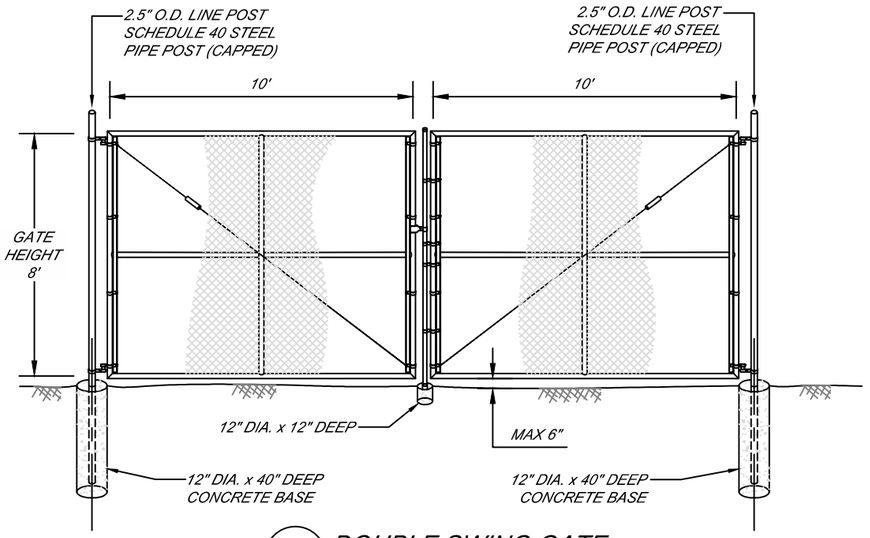

1 3GP06 **DOUBLE SWING GATE**
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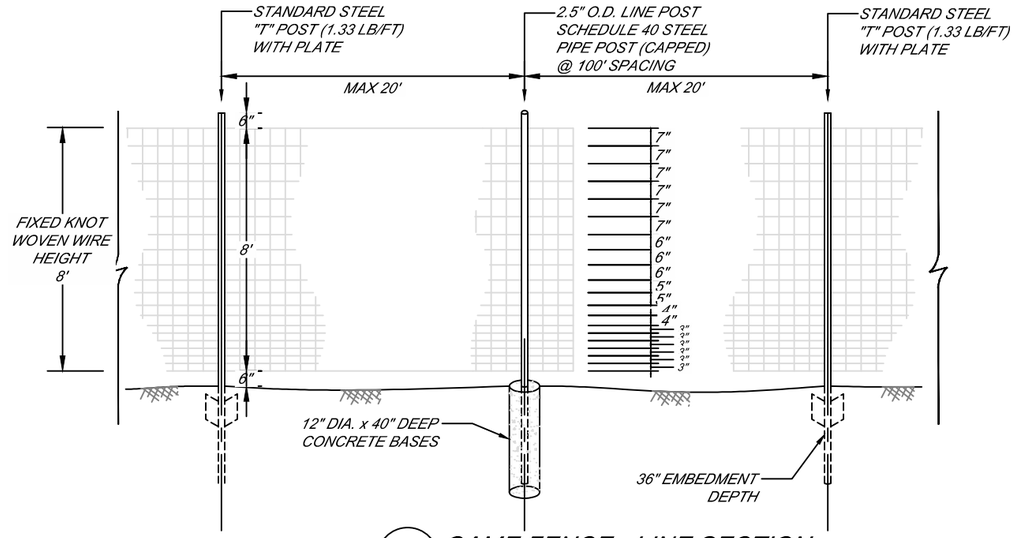
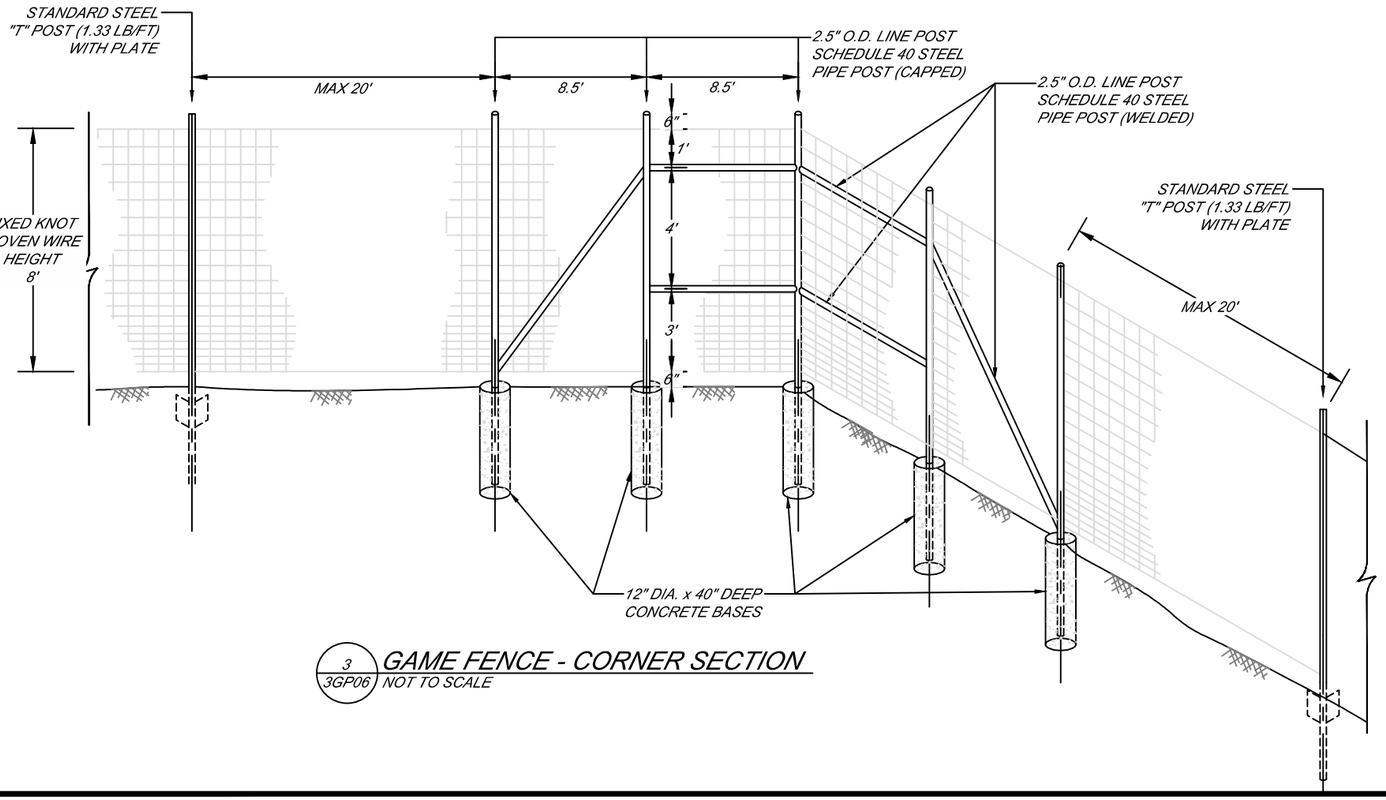
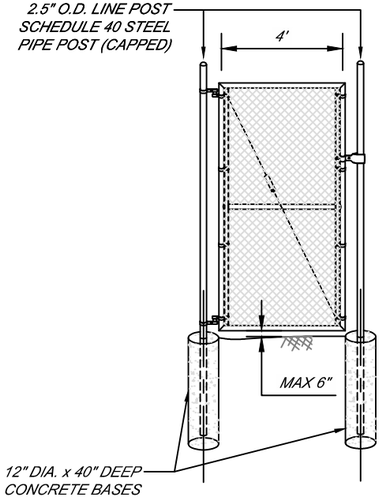


2 3GP06 **GAME FENCE - LINE SECTION**
NOT TO SCALE



3 3GP06 **GAME FENCE - CORNER SECTION**
NOT TO SCALE



4 3GP06 **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.

MAGRYM
TBPE F-19848
Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com

IFB	ISSUED FOR BIDDING 03/13/2020		
R-X	DESCRIPTION	DATE	BY
REVISIONS (OR CHANGE NOTICES)			

SOLARIS WATER MIDSTREAM
Solaris Water Midstream, LLC
907 Tradewinds Boulevard
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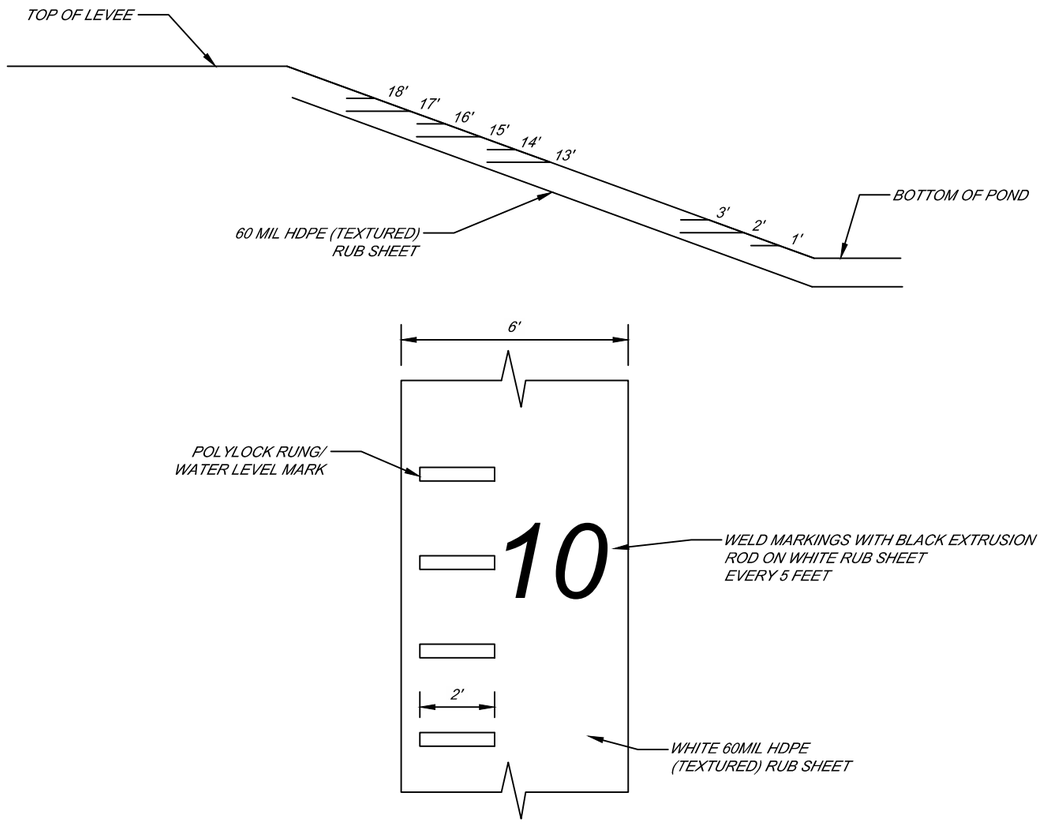
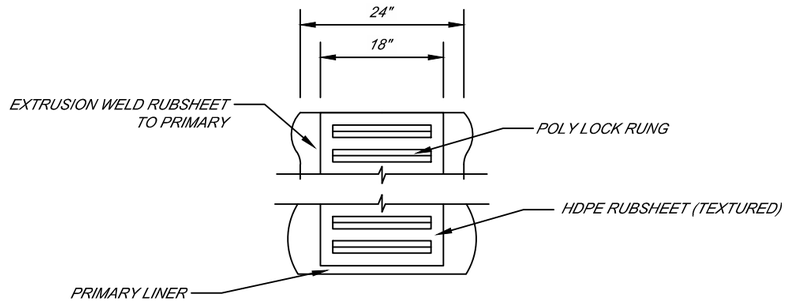
LONGHORN PRODUCED WATER TREATMENT
AND REUSE FACILITY
S07, T26S, R35E, LEA COUNTY, NM
SOLARIS WATER MIDSTREAM, LLC.

FENCE DETAILS	
HORIZONTAL SCALE:NTS	VERTICAL SCALE:NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET:GRADING PLANS	SHEET:3GP06

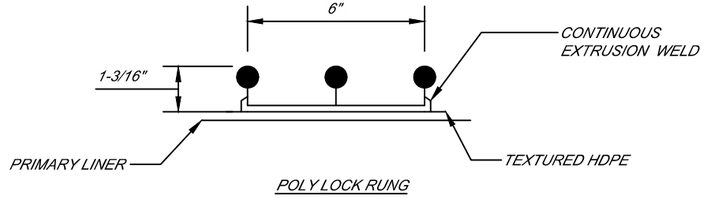
Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 Details.dwg



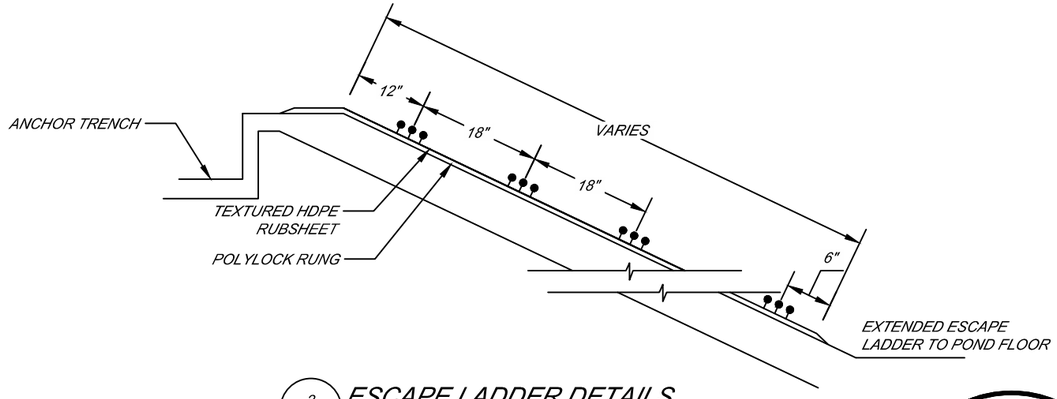
1 3GP07 **WATER LEVEL MARKS**
NOT TO SCALE



ESCAPE LADDER FRONT VIEW



POLY LOCK RUNG



2 3GP07 **ESCAPE LADDER DETAILS**
NOT TO SCALE

CLAUDIUS SANCHEZ CZYZEWSKA
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22897
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3/13/2020

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IFB	ISSUED FOR BIDDING 03/13/2020		
R-X	DESCRIPTION	DATE	BY
REVISIONS (OR CHANGE NOTICES)			

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ESCAPE LADDER AND GAGE DETAILS

HORIZONTAL SCALE:NTS	VERTICAL SCALE:NTS
PRINT DATE: 3/13/2020	DESIGNED BY: RW
PROJECT NO. 19-168	CHECKED BY: CSC/EH
SUBSET:GRADING PLANS	SHEET:3GP07

Drawing File: Z:\Shared\Documents\Projects\19-168 Solaris BLM Site\04_CIVIL\CADD\Design\Drawings\19-168 Details.dwg

EFFECTIVE WIDE-AREA BIRD CONTROL!

Mega Blaster PRO sonic bird repeller covers 30 acres!

- NEMA Rated Case
- Crystal-Clear Digital Sounds

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

PREDATOR cries help scare all the birds.

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

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

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

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

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

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

CONFIGURATIONS AVAILABLE:

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

Mega Blaster PRO

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

BIRD-X

The Bird Control 'X'-Perts

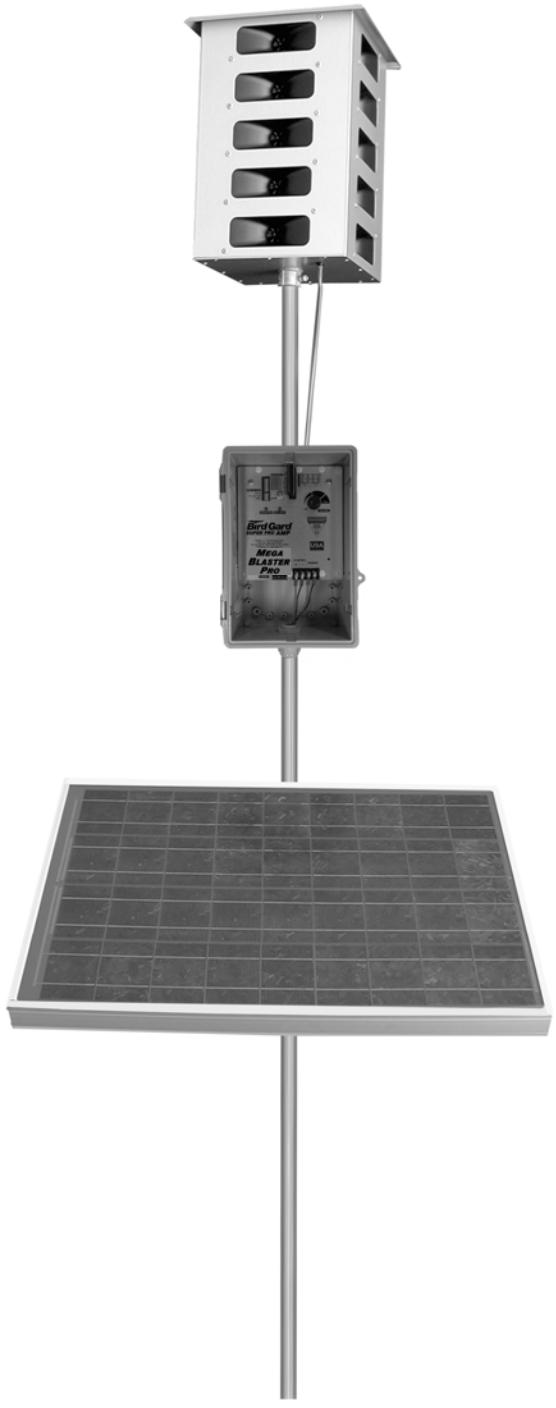
NOTE: This unit is capable of sound output up to 125 decibels. **HEARING PROTECTION IS RECOMMENDED.**

HEARING PROTECTION RECOMMENDED

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

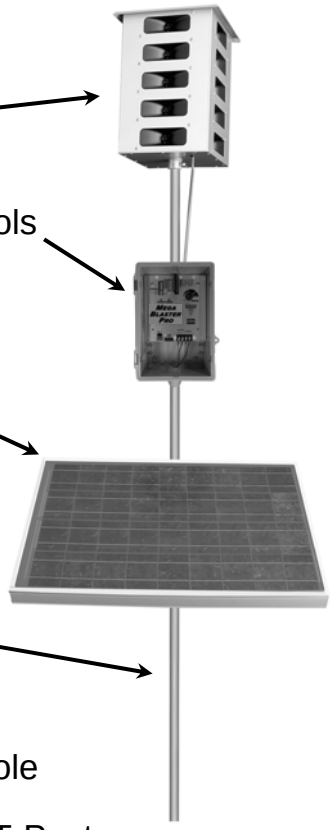
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the 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 <u>not</u> included:

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

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

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

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

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

Bird Control Management Guidelines

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

For best results:

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

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

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.

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.

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.

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.

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.

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.

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
Longhorn 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.

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	☐ 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

Distance to Groundwater

Figure 1, Figure 1a, Figure 2, Figure 2a, and the discussion presented below demonstrate that groundwater (fresh water, as defined by NMOCD Rules) at the location is greater than the required 50 feet below the proposed Longhorn Recycling Facility and Containment. Groundwater resides in the Triassic Dockum Group sandstones at a depth of about 280 feet. This groundwater is confined and exhibits a depth to the potentiometric surface of about 210 feet below surface.

Hydrogeology of Longhorn Containment Area

The proposed site for the Longhorn Recycling Facility and Containment is located approximately 35 miles west of the Pecos River and about 4.5 miles north of the Texas state line. The area is in the South Plain, which is a subdivision of the High Plains Physiographic province. At the surface lies Quaternary age eolian piedmont deposits (Qe/Qp), according to the Geologic Map of New Mexico (Figure 1). The site visit confirmed this, the landscape is largely flat, with the highest features being dunes about 3 or 4 feet high which are anchored by Shinnery Oak. These dunes are called the "Mescalero sands" as reported by Ground-Water Report 6 (GWR6) by Nicholson and Clebsch. Regionally, the dunes are a few inches to 30 feet thick, and the sand forms a 5 to 10-foot veneer, but local to the Longhorn facility, the dune and sand layer is 5- to 20-feet thick. Image 1 shows a caliche pit that is roughly 0.5 miles south west of the facility and lies at an elevation of 3250 feet, which is 20 feet lower than at the facility. The caliche layer is at the surface at the caliche mine, so we can assume that the sand and dune layer could be as much as 20-feet thick under the recycling facility.

Image 1 – Caliche mine approximately .5 miles south west of the facility. The caliche exists at the surface and the elevation of this mine is 3250 feet.

At a pipeline excavation about 2000 feet due east of the proposed recycling facility and storage containment, the sand was only about 5-feet thick (Image 2). The bottom of the caliche layer was not visible but based upon the 8- to 10-foot depth of the caliche pit shown in Image 1 and about 2.7 miles south of the proposed Longhorn facility, the caliche layer is also at least 10 feet thick (see Image 3). We conclude that the caliche horizon beneath the proposed containment it is roughly 10 feet thick and may be overlain by as little as 5-feet of sand.

Image 2 – Pipeline excavation occurring .4 miles east of the Longhorn Recycling Facility showing the contact between the caliche and overlying sand.

Image 3 – Caliche mine 2.7 miles south of the Longhorn Facility which exposes the 8 to 10-foot-thick layer of caliche.

From Plate 1 of GWR6, which is a geologic map that includes elevation contours of the erosional surface of the red-beds, we estimate that the elevation of the top of the "red bed " (Triassic Dockum Group) directly under the Longhorn Recycling Facility is about 3175 feet above mean sea level. A portion of this map is reproduced below as Figure 2b. These data imply that the red beds lie between 70 and 120 feet below the surface. The sand/caliche layer is approximately 30 feet thick, thus the remaining 40-90 feet is Ogallala Formation or Bolson Fill (perhaps the Gatuna Formation). However, according to Plate 2 of GWR6 (see Appendix A), the primary water bearing unit in the immediate area of and surrounding the Longhorn facility is Triassic in age. This is reflected in USGS wells near the site, which mostly produce water from the Santa Rosa Sandstone of the Dockum Group. As discussed below, the elevation of the top of the red beds is higher than the potentiometric surface of the area. We evaluated several driller's logs from the OSE database and believe that CP-1305 provides the most accurate data (see Appendix B). This well is about 3 miles to the northeast. From these data we conclude:

- Figure 2b suggests the top of the red beds at this location is at a depth of (3270 -3100 =) 170 feet
- The base of the Ogallala or Bolson Fill sediments based upon the log may be 95 feet below surface (dry red sandstone) or 165 feet where a "red clay" is noted
- The first water is noted in the log at 280-320 feet
- The best groundwater zone is the 70-foot sandstone between 330 and 400 feet below the surface.

Static water in the well is reported by the driller as 220 feet, more than 100 feet beneath the top of the red bed surface. Figure 1 is a topographic map overlain by transparent geologic map of the state of New Mexico and associated legend (Figure 1a) that displays the following:

- The Longhorn Recycling Facility identified by a blue square labeled by a yellow callout box.
- Water wells from the USGS database as yellow, green, cyan, purple, and red triangles. The colors indicate the principal water bearing-unit for each well: Alluvium, Alluvium/Bolsom, Ogallala, Chinle, and Santa Rosa, respectively. The well number as defined in the USGS database, recorded depth to water value, and date the water level measurement was recorded is displayed next to the corresponding well point.
- Miscellaneous water wells from public and non-public databases that were identified by field inspection or other published documents are represented by yellow, blue, and green squares with black dots at the center. The colors correspond to the depth to water recorded in the RT Hicks database. The depth to water and date the depth to water value was recorded are also displayed.
- Water wells from the Office of the State Engineer WATERS database as light blue, light green, dark green, and dark blue circles with colored triangles that represent the depth to water. Well ID as documented in the OSE WATERS database, depth to water value, and the date the value was recorded.

The data presented in Figure 1 shows depth to water measurements obtained after 2013 in the five closest wells are 176.81 feet or more:

- 197.2 feet in MISC-231 to the southeast
- >250 feet in MISC-232 to the south
- 225.68 feet in USGS-14775 to the north
- 176.81 feet in USGS-14973 to the west
- 230 feet in CP-01305 (POD1) to the north east

Figure 2 and Figure 2a is a topographic map overlain by a transparent geologic map of the state of New Mexico and a potentiometric surface map and the associated legend that displays the following:

- The Longhorn Recycling Facility identified by a blue square labeled by a yellow callout box.
- Water wells from the USGS database as green, cyan, purple, red and blue triangles, and purple and brown squares. The symbols correspond to the principle water bearing unit: Alluvium/Bolsom, Ogallala, Chinle, Santa Rosa, and Not Defined. The well number as defined in the USGS database, recorded groundwater elevation value, and date the value was recorded is displayed next to the corresponding well point.
- Miscellaneous water wells from public and non-public databases that were identified by field inspection or other published documents are represented by yellow, blue, and green squares with black dots at the center. The colors correspond to the depth to water recorded in the RT Hicks database. The groundwater elevation and date the ground water elevation value was recorded are also displayed near the representative point on the map.
- Isocontours of a potentiometric surface are generated by RT Hicks Consultants, Ltd. USGS and Miscellaneous wells and their groundwater elevation values were used to create the potentiometric surface.

Depth to Groundwater Assessment

The well nearest to the Longhorn Recycling Facility site is MISC-232 (Andrew's Place), which is a windmill whose water level was measured by an RT Hicks Employee in 2015. It exists just over 2 miles directly south of the site (Figures 1 and 2). According to our data, the windmill is abandoned but is near another active windmill. The depth to water in MISC-232 is greater than 250 feet, and the groundwater elevation is less than 2626 feet. For the purpose of our evaluation we did not employ this value in development of the potentiometric surface as the data are not consistent with all wells in the area. We relied on the data from several wells to define the 3100-foot elevation contour of the potentiometric surface. These wells are:

- Andrews West (groundwater surface elevation of 3018.1 in 2015), which is approximately 4 miles southwest of the Longhorn site.
- USGS 14775, which is 4.4 miles to the north east of the proposed site and has a 2013 groundwater surface elevation of 3014 feet.
- USGS 15013, which has a ground water surface elevation of 3098 feet and is about 6.3 miles to the north east. (not shown on Figure 2)

- USGS 14973, which has a ground water surface elevation of 3142 feet and is 6.25 miles to the north west of the proposed location.

We defined the 2800-foot isocontour from the 2018-19 USGS data in the southeast corner of Figure 2 and the data presented in Figure 2b that shows a significant depression of the red bed top elevation in this area. This depression is represented at the surface as the Javelina Basin and is filled by Ogallala Formation or Bolson-fill sediments. Thus, the wells in this area draw water from this basin fill, not from the Santa Rosa or Dockum sandstone. However, groundwater in the Triassic rocks is hydraulically connected to these younger water-bearing units.

Note that groundwater elevations are flat within the boundaries of this depression. The slope of potentiometric surface west of the Longhorn location is also relatively flat. Between these two areas the elevation of potentiometric surface falls from 3050 (at Longhorn) to 2800 feet at what we are mapping as the edge of the Javelina Basin depression. In this same transect, the elevation of the top of the red beds also falls by (3175-2950 =) 225 feet. Which is no surprise because we used the elevation of the red bed as a basis for our interpretation of the groundwater surface.

According to the potentiometric surface (as seen in Figure 2), the potentiometric surface beneath the Longhorn site is approximately 3040 feet. Thus, depth to water is (3270-3040-20=) 210 feet. We conclude the primary water-bearing unit in this area is the Santa Rosa Sandstone. The analysis that lead to this conclusion is in the above Hydrogeology of the Longhorn Containment Area section.

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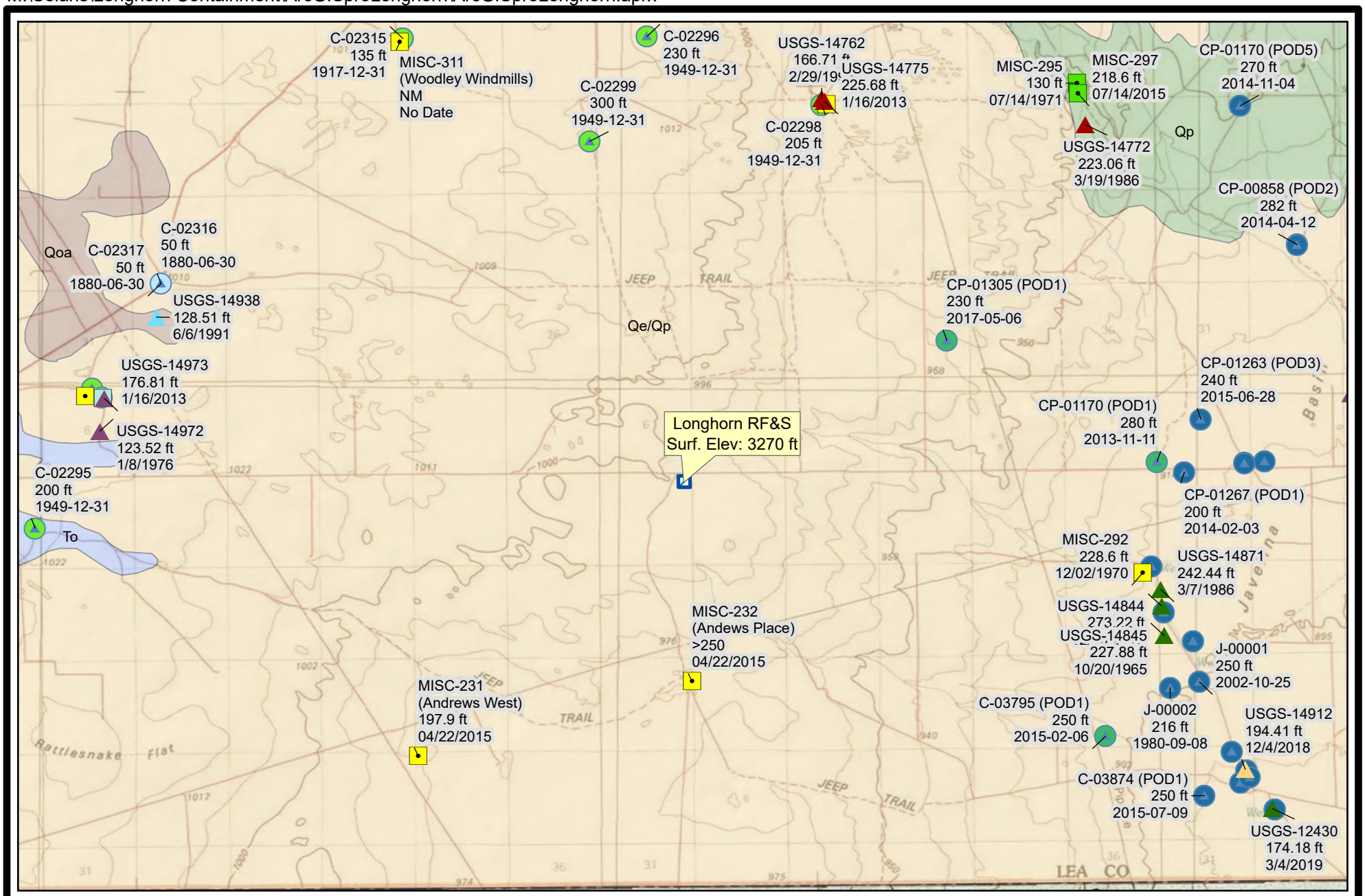

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth to Groundwater and Geology	Figure 1
	Solaris Longhorn Recycling Containment	Mar 2020

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth to Groundwater and Geology Legend	Figure 1a
	Solaris Midstream Longhorn Containment	March 2020

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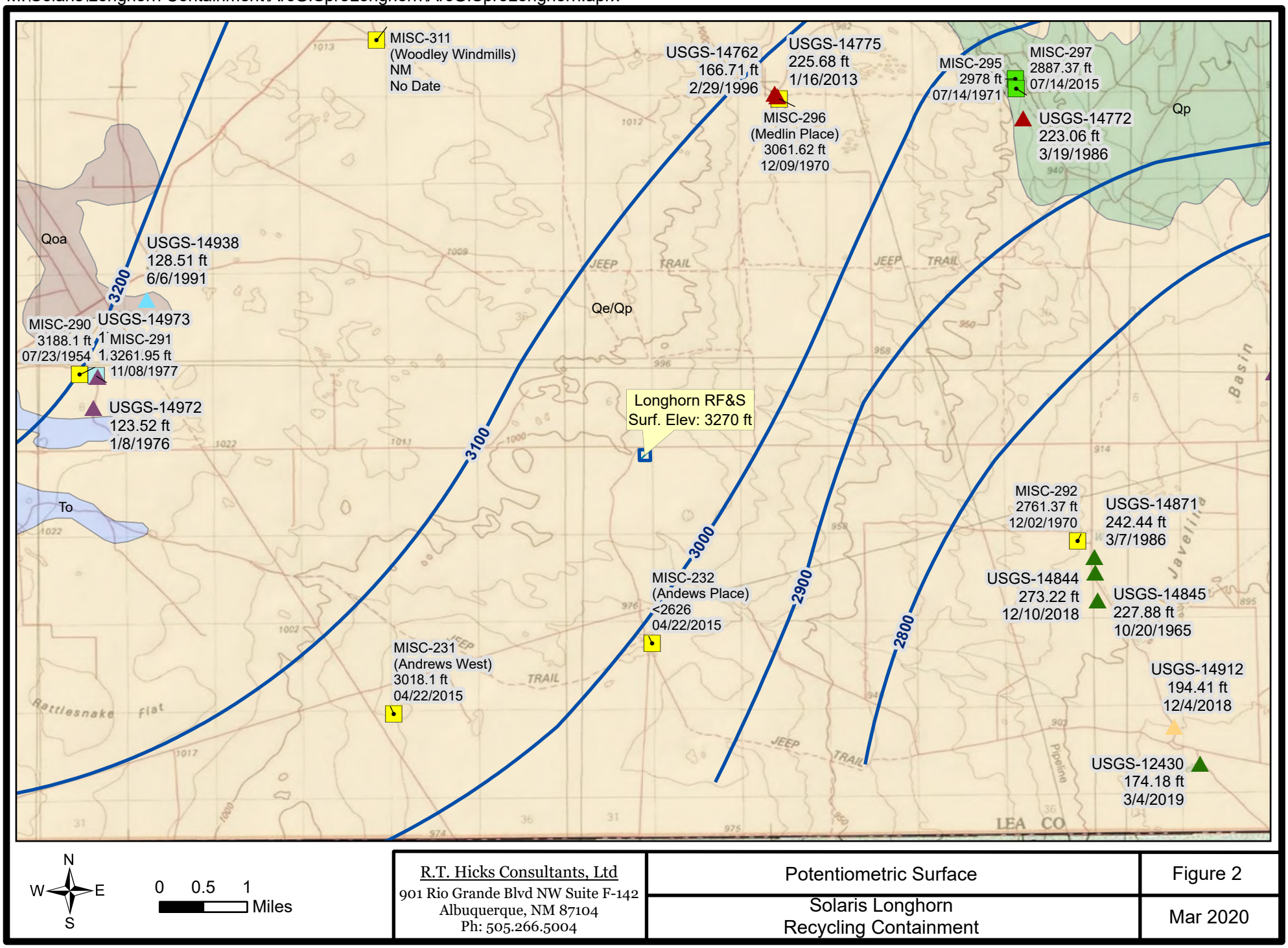

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface Solaris Longhorn Recycling Containment	Figure 2 Mar 2020

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Groundwater Elevation and Potentiometric Surface Legend	Figure 2a
	Solaris Midstream Longhorn Containment	March 2020

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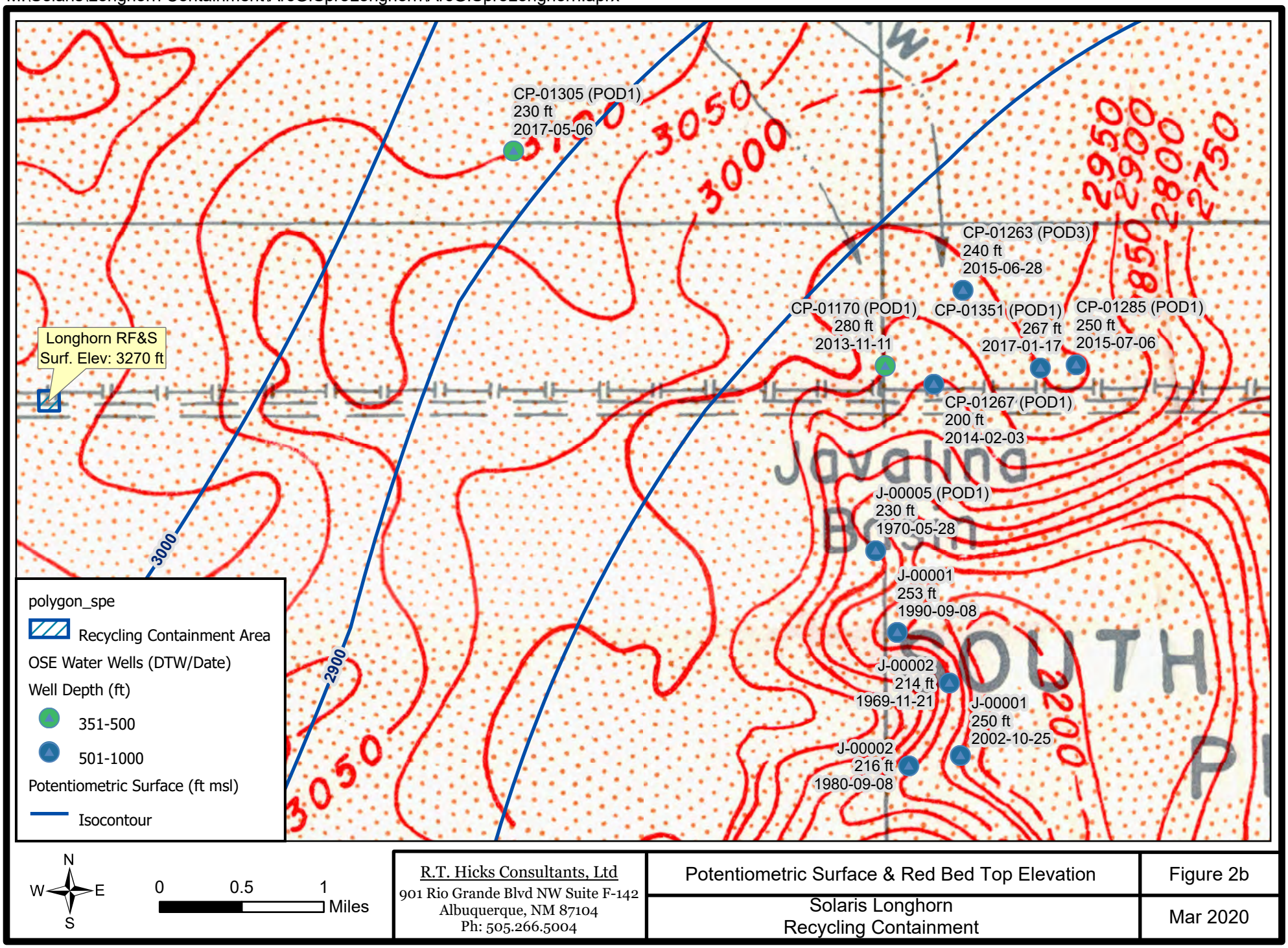

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface & Red Bed Top Elevation	Figure 2b
	Solaris Longhorn Recycling Containment	Mar 2020

Distance to Municipal Boundaries and Freshwater Fields

Figure 3 demonstrates that the area of interest is not within incorporated municipal boundaries or within defined municipal freshwater well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended

- The closest municipality is Jal, NM, which is about 12.5 miles to the north east.
- The closest mapped well field is near Jal, NM about 6 miles to the southeast.

Distance to Subsurface Mines

Figure 4 and our general reconnaissance of the area demonstrate the absence of subsurface mines in the area.

- The nearest mapped surface mine is a closed and reclaimed gravel pit and lies approximately 2,200 feet to the south west.
- The nearest active caliche pit is about 2 miles to the south-southeast
- There are no subsurface mines in the area.

Distance to High or Critical Karst Areas

Figure 5 illustrates the Longhorn Recycling Facility's absence of mapped areas of high or critical karst potential.

- The proposed location for the recycling facility is wholly contained within an area considered low karst potential by the Bureau of Land Management.
- The closed area mapped as High Karst Potential is …….
- Our field investigation found no evidence of unstable ground or karst features

Distance to 100-Year Floodplain

Figure 6 demonstrates the absence of 100-year flood plains with respect to the proposed location for the Longhorn Recycling Facility.

- The nearest 100-year flood plain is near the Jal municipality, approximately 12.5 miles to the north east of the proposed recycling facility.

Distance to Surface Water

Figure 7 and the site visit demonstrate the that the Longhorn facility is outside of the setback distances for a continuously flowing watercourse or the next lower order tributary, lakebed, sinkhole, playa lake (measured from the ordinary high-water mark) or y.

- The Longhorn Recycling Facility is not within 300 feet of a continuously flowing watercourse, or within 200 feet of any other significant watercourse, lakebed, sinkhole, playa lake (as measured from the ordinary high-water mark), or spring.
- A lake/pond (stock tank) lies approximately 1.5 miles to the north west
- Two mapped reservoirs (stock tanks) are approximately 1.6 miles to the north west and south west.

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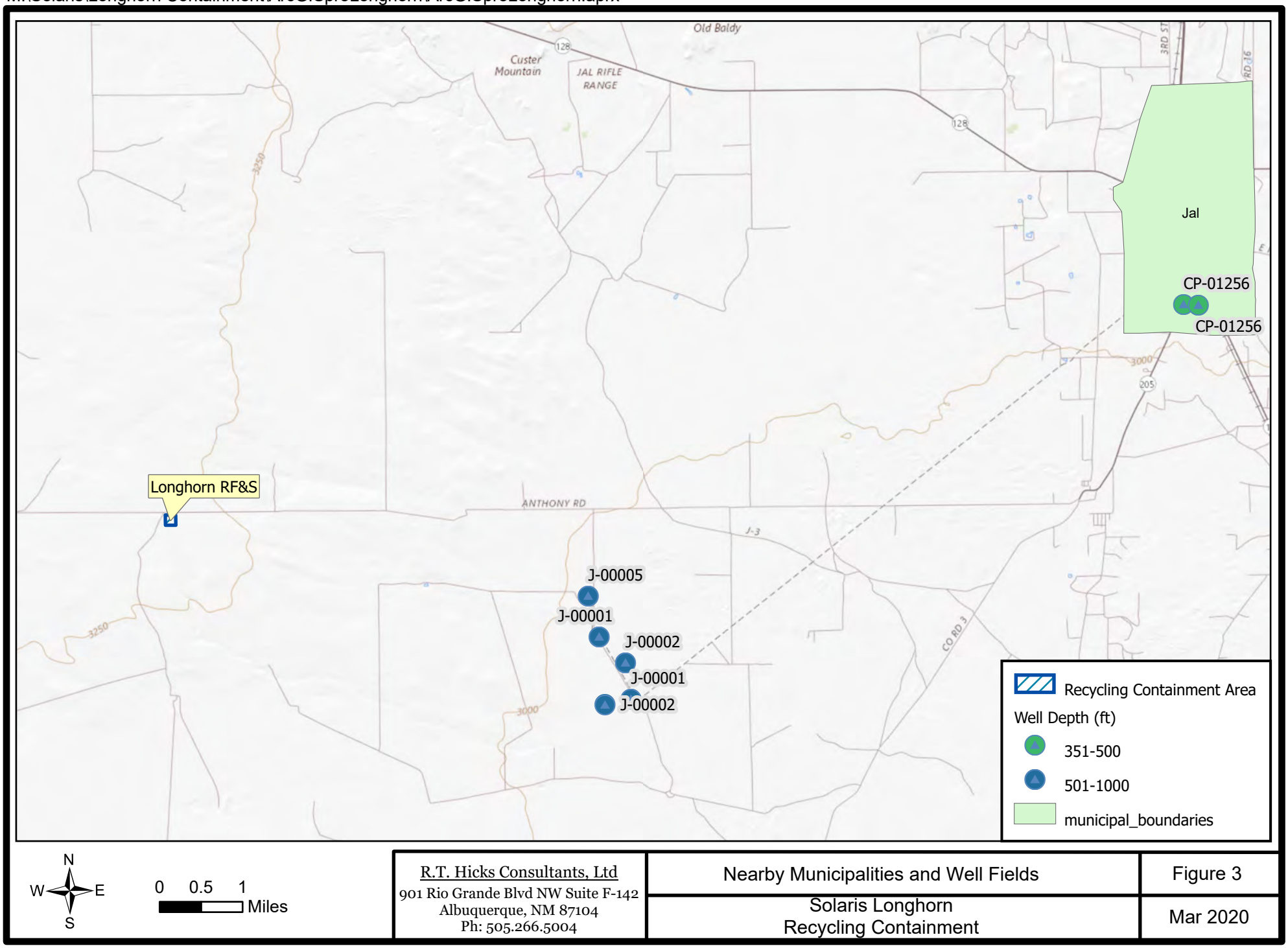

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Municipalities and Well Fields	Figure 3
	Solaris Longhorn Recycling Containment	Mar 2020

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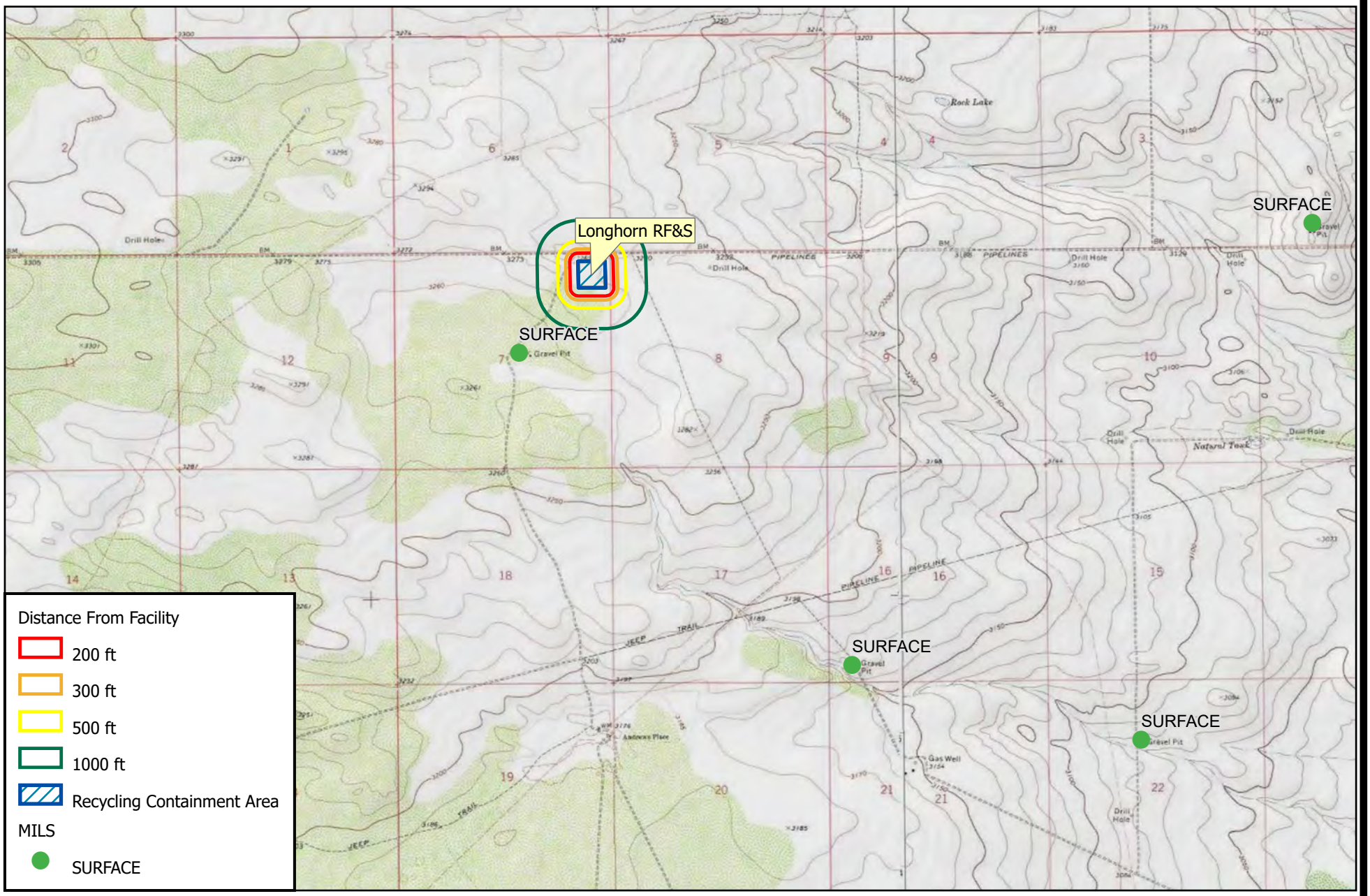

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Mines Solaris Longhorn Recycling Containment	Figure 4 Mar 2020

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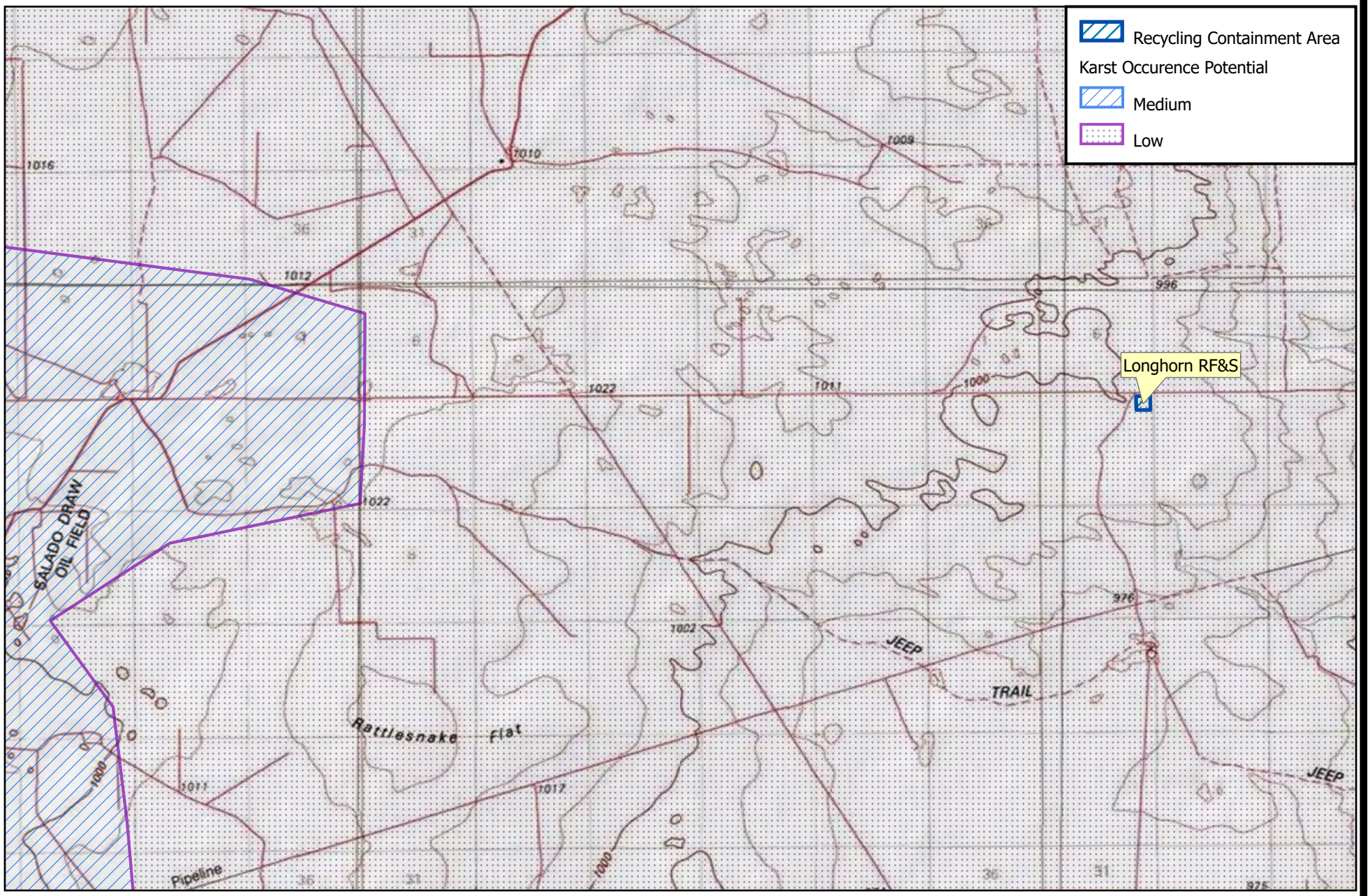

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Figure 5
	Solaris Longhorn Recycling Containment	Mar 2020

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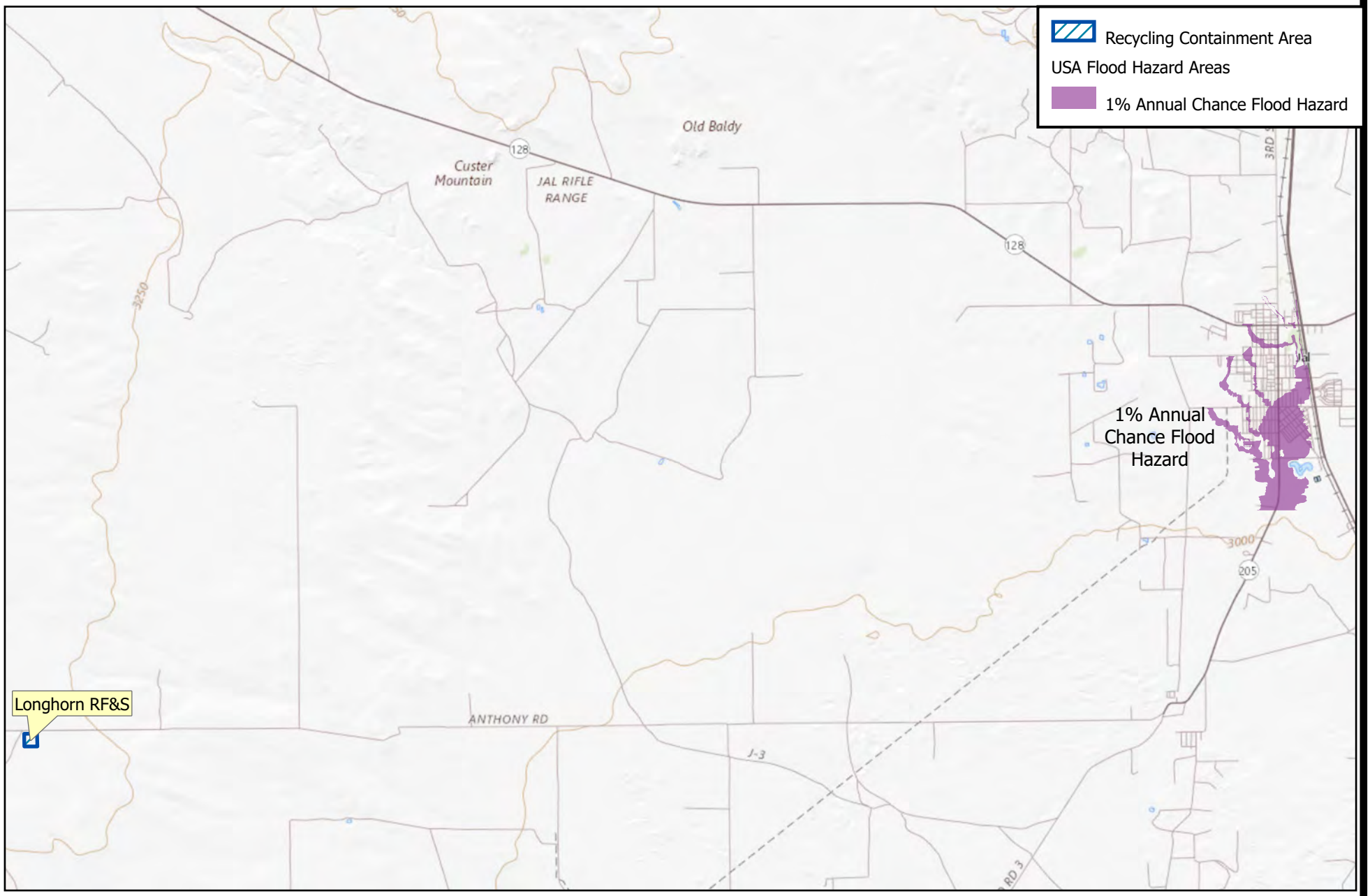

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	FEMA Flood Hazard Map	Figure 6
	Solaris Longhorn Recycling Containment	Mar 2020

- Intermittent streams are approximately 1 mile to the south, 1.75 miles to the south east, and .8 miles to the north east.
- The site visit documents the lack of watercourses within the setback distances

Distance to Permanent Residences or Structures

Figure 8 demonstrates that the proposed site for the Longhorn Recycling Facility is not within the setback distances of an occupied permanent residence, school, hospital, institution, church or other structure at the time of the initial application.

- The only structures near the proposed site are well pads and tank batteries.

Distance to Non-Public Water Supply

Figures 1 and 7 demonstrate the Longhorn location is not within the setback distances of a spring or freshwater well used for domestic or stock watering purposes, in existence at the time of initial application.

- Figure 1 shows the location of all area water wells. The nearest well is located approximately 2 miles to the south of the proposed site (Andrew's Place).
- No domestic water wells are located within 1,000 feet of the recycling area.
- No springs were identified in the area.
- The facility is not within 500 feet of a spring or freshwater well used for domestic or stock watering purposes, in existence at the time of initial application

Distance to Wetlands

Figure 9 demonstrates that the proposed site of the Longhorn Recycling Facility is not within the 300-foot setback distance of a wetland.

- The nearest mapped wetland is a freshwater pond (stock tank) that is approximately 1.5 miles to the north east.
- The site visit found no evidence of wetlands within the stabilized dunes of the area around the Longhorn Recycling Facility.

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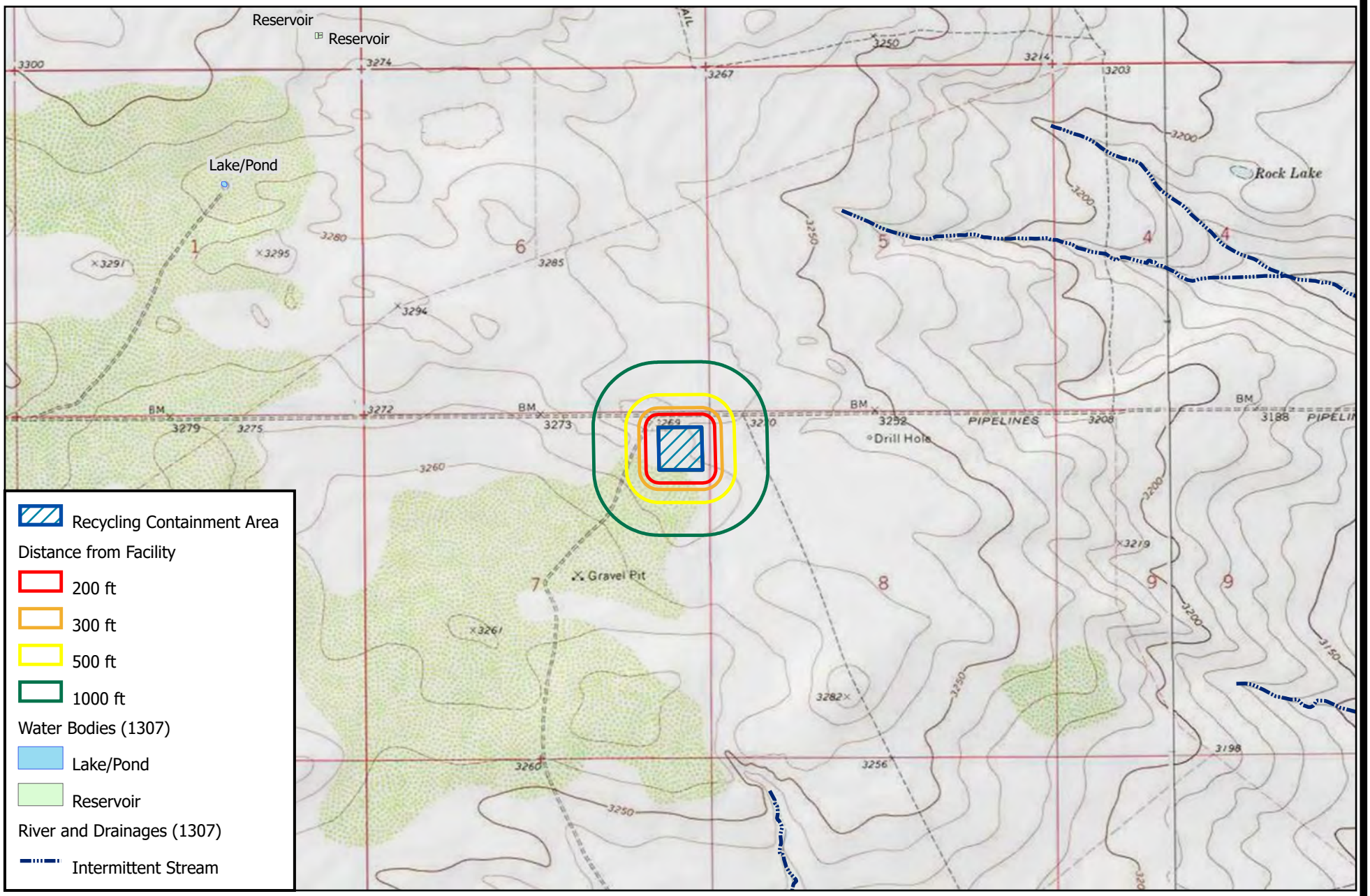

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Surface Water and Topography Solaris Longhorn Recycling Containment	Figure 7 Mar 2020

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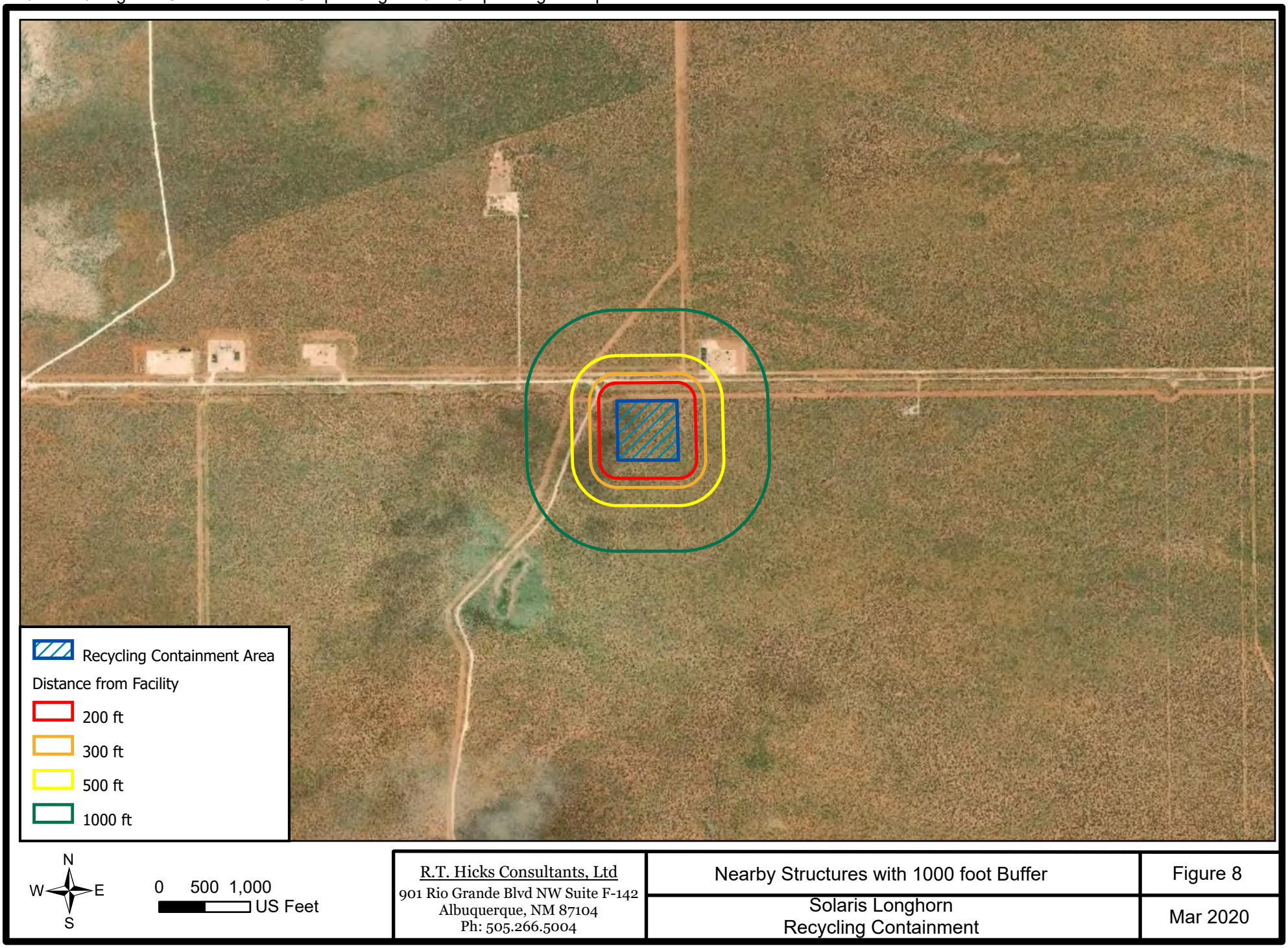

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Structures with 1000 foot Buffer	Figure 8
	Solaris Longhorn Recycling Containment	Mar 2020

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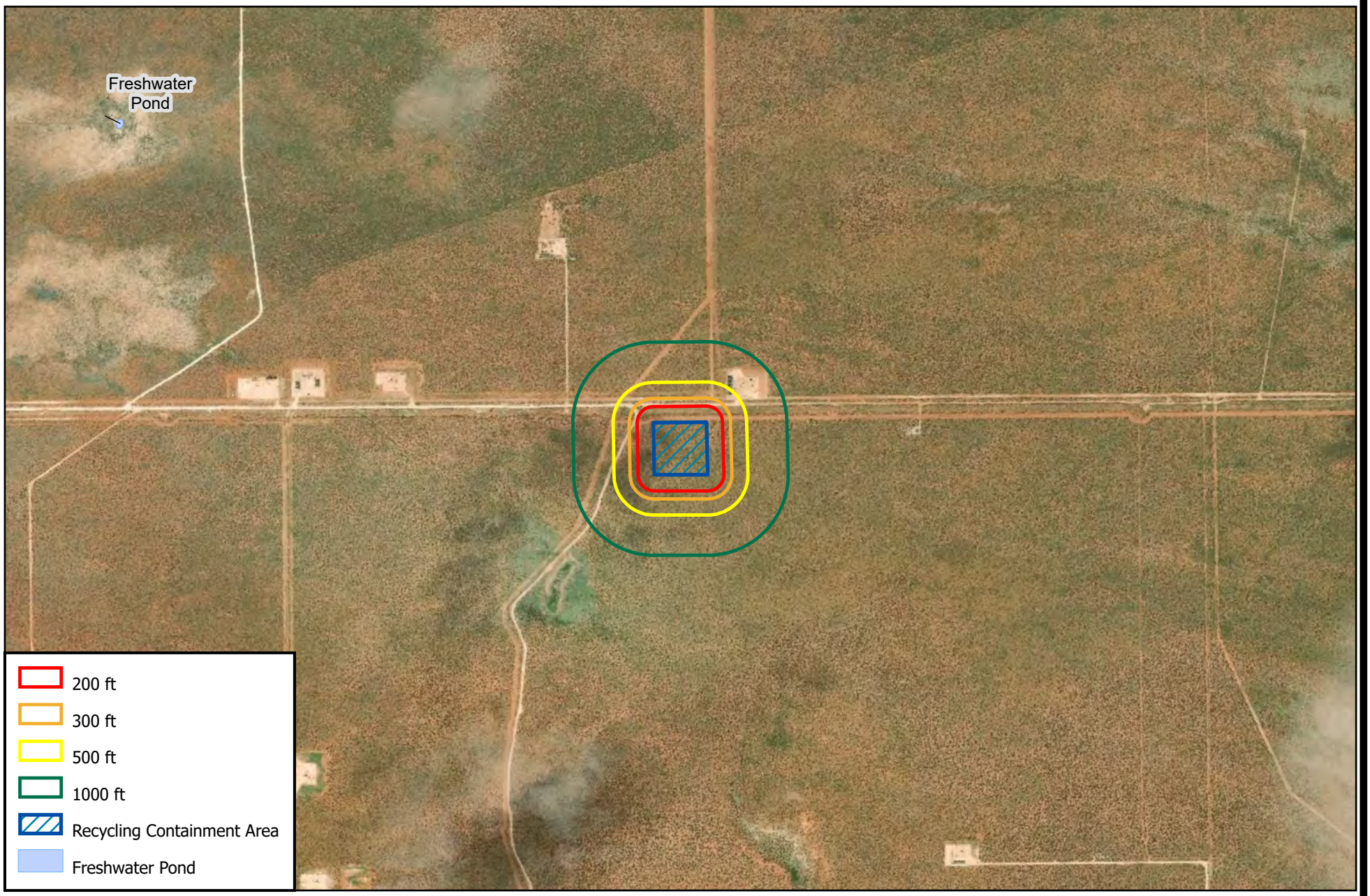

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Mapped Wetlands	Figure 9
	Solaris Longhorn Recycling Containment	Mar 2020

APPENDIX A PLATE 2 FROM GROUND WATER REPORT 6

EXPLANATION

$\frac{150}{252}$°

Water well

Upper figure is depth to water; lower figure is depth of well. Open circles are wells finished in Tertiary or Quaternary rocks; solid circles are wells finished in Triassic rocks

F = Flowing
R = Reported
P = Water level measured while pumping
D = Dry
? = Uncertainty as to aquifer
> = More than
< = Less than

(See tables 6 and 7 for detailed well data.)

3925

Water-table contour in Tertiary or Quaternary rocks

Dashed where inferred or uncertain. Contour interval 25 feet. Datum mean sea level

3500

Water-table or piezometric contour on water body in Triassic aquifers

Dashed where inferred or uncertain. Contour interval 100 feet. Datum mean sea level

Approximate position of boundary between Triassic rocks and saturated Tertiary and Quaternary rocks

PLATE 2. GROUND-WATER MAP OF SOUTHERN LEA COUNTY, NEW MEXICO

APPENDIX B OSE WELL LOGS

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

2017 JUL -7 AM 10:36

STATE ENGINEER OFFICE ROSWELL, NEW MEXICO

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)	OSE FILE NUMBER(S)
CP-1305-POD1	
WELL OWNER NAME(S)	PHONE (OPTIONAL)
Gregg Fulfer	575-631-0522
WELL OWNER MAILING ADDRESS	CITY / STATE / ZIP
P.O. Box 1227	Jal NM 88252

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	32	05	06.5976	N
	LONGITUDE	103	21	03.3840	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

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD1706	Bryce J Wallace	Elite Drillers Corporation

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
5/4/17	5/6/17	see driller's report ~~340~~ 420 ft BRL	12.25	230

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

STATIC WATER LEVEL IN COMPLETED WELL (FT): ~~215~~ 220 ft see driller's report BRL

DRILLING FLUID: ☑ AIR ☐ MUD ADDITIVES – SPECIFY:

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

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	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	20	17.5	A53 Grade B Steel		12.57	.188	
0	320	12.25	A53 Grade B Steel	Weld	6.065	.280	
320	420	12.25	SDR 21 PVC	Spline connection	6.0	SDR 21	.032

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	20	17.5	Neat Portland Cement Type 1/11	18	Pour
0	313	12.25	Neat Portland Cement Type 1/11	175	Trimmie
313	420	12.25	Silica sand 8-16	60	Pour

FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 10/29/15)

FILE NUMBER	CP-1305	POD NUMBER	1	TRN NUMBER	604490
LOCATION	COM	25S.37E.31.41			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	35	35	Sand and caliche.	Y ✓ N	
35	70	35	Red Sandstone.	Y ✓ N	
70	95	25	White sandstone.	Y ✓ N	
95	125	35	Red sandstone.	Y ✓ N	
125	165	40	Tan/Grey sandstone.	Y ✓ N	
165	175	10	Red clay.	Y ✓ N	
175	195	20	Sandstone with gravel.	Y ✓ N	
195	280	85	Red/Tan/White sandstone.	Y ✓ N	
280	320	40	Sandstone with clay stringers.	(Y) N	Brw
320	330	10	Red/Grey clay.	Y ✓ N	
330	400	70	Sandstone.	(Y) ✓ N	
400	420	20	Red clay.	~~Y~~ ✓N	60.00
				Brw/Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

STATE ENGINEER OFFICE ROSWELL, NEW MEXICO 2017 JUN -7 AM 10:26

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

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

TOTAL ESTIMATED WELL YIELD (gpm): 60.00

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:

Bryce J Wallace

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 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Bryce J Wallace — 6/1/17

SIGNATURE OF DRILLER / PRINT SIGNEE NAME — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 10/29/2015)

FILE NUMBER	CP-1305	POD NUMBER	1	TRN NUMBER	604490
LOCATION	Com	25S.37E.31.41			PAGE 2 OF 2

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

March 19, 2021

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

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

RE – Financial Assurance Cost Estimate
Longhorn Containment. Lea County, Submitted to OCD 4/24/20

Dear Ms. Venegas:

On behalf of Solaris Water Midstream LLC, we are pleased to present the cost estimate for closure and reclamation for the above-referenced containment, which was prepared by Solaris. The current cost for reclamation is 60% lower than 12-18 months ago and reflects the impact of a lower oil price and significantly less construction activity in the Permian Basin of New Mexico. Hicks Consultants contends that this facility will be closed in five or ten years when oil and gas activity is similar to current conditions. We believe the estimate using current pricing as shown is fully appropriate for the time of closure.

ITEM NO.	ITEM DESCRIPTION	UNITS	QTY	UNIT PRICE	TOTAL PRICE
	Longhorn Recycle facility				
1	Dirt work/Pond reclaimation	1	1	$60,000.00	$60,000.00
2	Liner Removal and Disposal	1	1	$40,000.00	$40,000.00
3	Removal of Game Fence	1	1	$9,200.00	$9,200.00
4	Re-seed	1	1	$4,500.00	$4,500.00
5	Water	1	1	$4,000.00	$4,000.00
9	Remove Pumps, piping, and equipment	1	1	$1,500.00	$1,500.00
11	Assess soil for impacts	1	1	$2,500.00	$2,500.00
	Facility Decommision and Reclaim Site Subtotal:				**$121,700.00**

We are proposing a $125,00 bond for closure. Please contact me if you have any questions.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks
Principal

Copy: Solaris Water Midstream LLC

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 21512

CONDITIONS OF APPROVAL

Operator:			OGRID:	Action Number:	Action Type:
SOLARIS WATER MIDSTREAM, LLC	907 Tradewinds Blvd, Suite B	Midland, TX79706	371643	21512	C-147L

OCD Reviewer	Condition
vvenegas	NMOCD has reviewed the recycling containment permit application and related documents, submitted by SOLARIS WATER MIDSTREAM, LLC [371643] on March 22, 2021, for the proposed 1RF-466 - Longhorn Water Treatment and Reuse Facility in Unit Letter A, Section 07, T-26S, R-35E, in Lea County, New Mexico. The Application has been approved with conditions of approval.