Intrepid Produced Water Recycling Facility

C-147 Permit Application

Eddy County, New Mexico

Submitted to:

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

On behalf of:

Intrepid Potash – New Mexico, LLC
1996 Potash Mines Road
Carlsbad, New Mexico 88220

Prepared by:

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Date: June 2022 / Revised February 2023

Intrepid PWRF
Eddy County
Application Document

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Acronyms & Abbreviations

BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
DRO	Diesel Range Organics
FEMA	Federal Emergency Management Agency
GRO	Gasoline Range Organics
HDPE	High-Density Polyethylene
LLDPE	Linear Low-Density Polyethylene
MRO	Motor Oil Range Organics
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMOCD	New Mexico Oil Conservation Division
O&M	Operation and Maintenance
OCD	Oil Conservation Division
PWR	Produced Water Recycling
TPH	Total Petroleum Hydrocarbons

1.0 INTRODUCTION

Intrepid Potash – New Mexico, LLC (Intrepid) is requesting registration under New Mexico Administrative Code (NMAC) 19.15.34 for a Produced Water Recycling (PWR) facility proposed for the location depicted in **Figure 1**. The proposed facility will be used solely for the recycling of produced water from nearby Oil & Gas Operations. The facility will encompass approximately 44 acres on Intrepid owned lands. A copy of the completed Form C-147 is enclosed as **Appendix A**.

The recycling plant and the containment ponds will be located on the same property. Compliance with the requirements of NMAC 19.15.34 are described in this application. Variances are being requested from the requirements and are presented herein.

2.0 DESIGN PLAN

Design layout maps of Intrepid PWR Facility are shown in **Figures 2** & **3**. Detailed plans and specifications for the recycling containment system are included as **Appendix F**. The Intrepid PWR Facility will incorporate the following general specifications into the design and construction process:

- The recycling containment will be constructed with a 40 mil LLDPE lower liner (exceeds NMAC 19.15.34 Part 12 (A)(4) 30 mil requirement), a 60 mil HDPE upper liner and a leak detection system.

- The containment will be designed and constructed in a manner that will ensure containment of the produced water, prevent releases, and prevent overfill due to excess rainfall. The design incorporates a minimum three (3) foot freeboard to prevent overtopping.

- The containment will be designed and constructed with a foundation free of rocks (smooth) and with a firm and unyielding base. An eight (8) ounce non-woven geotextile material will be installed to provide protection for the lower liner and reduce stress on the liner.

- The containment will be designed and constructed with inside and outside slopes of 3H:1V to provide additional stability.

- The liners will be anchored in the bottom of a 24-inch deep compacted trench which will exceed the required depth of 18 inches.

- The liner seams will be minimized and oriented vertically rather than horizontally. Factory welded seams will be utilized as much as possible. Sloped liner panels will extend at least five (5) feet beyond the point of grade to allow seams not to rest on the grade break.

- All field seams and welds will be quality tested using non-destructive methods to ensure proper sealing. The field testing will be performed by qualified personnel. The field seams will have a minimum of six (6) inches of overlap.

- The containment will be installed with a 200 mil geonet leak detection system or

equivalent between the liners. The system will provide effective detection, collection, and removal of liquids.

- No piping will penetrate the liners. The top liner will be protected from excessive force or mechanical damage from discharge or suction.

- The containment is designed and will be constructed in such a manner as to prevent the inflow of rainwater. The containment berm will be constructed a minimum of twelve (12) inches above surface grade with positive drainage provided for the perimeter of the containment.

- Topsoil removed during construction will be stockpiled nearby (onsite) for later use as final cover.

- Signage will be installed in a visible location on the containment fencing. The signage will be no less than 12 inches x 24 inches and should be visible from any direction and will contain the following information, at a minimum:

    - Operators name;
    - Site location by ¼ ¼ or unit letter, section, township and range;
    - Emergency contact number.

- Containment fencing will be constructed using an eight (8) foot game fence with three (3) strands of barbed wire at the top (see Section 7.3). A gate will be installed that will allow authorized access and it will remain locked when not in use. These measures are designed to prevent unauthorized or unwanted wildlife or human access.

- The containment will be equipped with an audible avian species protection system, or equivalent, which will deter birds from approaching the containment pond. This is a variance from the regulations (see Section 7.4). This system will be more effective since the netting option would be impractical due to size of the containment pond. Intrepid proposes to install an electronic/ultrasonic avian deterrence system, or equivalent. These systems have a proven track record for these types of facilities. The facility will inspect for and report the discovery of deceased migratory birds, or other wildlife to the appropriate wildlife agency. The facility will also assess the issue and make changes, if needed, to prevent reoccurrence.

3.0 OPERATION AND MAINTENANCE PLAN

This Operation and Maintenance (O&M) Plan defines responsibilities and provides guidance for the safe operation, maintenance and overall performance of the oil field produced water recycling containment levees, liner, and its appurtenances, owned by Intrepid This document was prepared to meet the requirements of Section 19.15.34 NMAC. Adequate inspection and maintenance are critical for ensuring safe operation of the recycling containment. Intrepid will implement this plan and evaluate the effectiveness of each activity and revise/update operation procedures as necessary to ensure that produced liquids and solids are contained.

The purpose of the recycling containment is to hold produced water for use in connection with drilling, completion, producing or processing oil or gas or both. Such fluids may include fresh water, brackish water, recycled and treated water, fluids added to water to facilitate well drilling or completion, water produced with oil and gas, flowback from operations, water generated by an oil or gas processing facility or other waters that are gathered for well drilling or completion but may not include any hazardous waste. The recycling containment will not be used for disposal of produced water or other oilfield wastes. The recycling facility is designed to comply with requirements of Section 19.15.34.12 NMAC. See Section 2.0 for design details.

Intrepid understands that the recycling containment may be operated for five (5) years from the date on which the registration is filed with the Oil Conservation Division (OCD). Intrepid may extend the allowed time on an annual basis thereafter with OCD approval if, 30 days prior to the registration expiration, Intrepid files a form C-147 with an attached summary showing all monthly inspections at the containment, including the monitoring of the leak detection system, showing the containment's integrity has not been compromised.

Intrepid will maintain and operate the recycling containment in accordance with the following requirements:

1) Any visible layer of oil from the surface of the recycling containment will be removed and disposed of per OCD guidelines.
2) A minimum of three (3) feet of freeboard will be maintained in the containment.
3) Ensure that the injection or withdrawal of fluids is not damaging the liner.
4) If the containment's primary liner is compromised above the fluid's surface, Intrepid will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the OCD district office.

5) If the primary liner is compromised below the fluid's surface, Intrepid will remove all fluid above the damage or leak within 48 hours of discovery, notify the OCD district office and repair the damage or replace the primary liner.
6) The containment berm will be visually inspected for integrity and to ensure that no surface stormwater run-on is entering the containment.
7) An oil absorbent boom or other device capable of containing an unanticipated release will be installed or maintained onsite.

Intrepid will inspect the recycling containment and associated leak detection systems weekly while the ponds contain fluids. An inspection log will be completed for each inspection. An example inspection log that may be used to document the weekly inspections is provided in **Appendix B**. The completed inspection logs will be retained by the facility at an accessible location and be made available to OCD for review upon request.

The facility will also inspect for and report the discovery of deceased migratory birds, or other wildlife to the appropriate wildlife agency within 30 days of discovery. The facility will assess the issue and make changes, if needed, to prevent reoccurrence.

Intrepid will keep accurate records of: the volumes of produced water received; volumes of fresh or brackish water received; and total volume of water leaving the recycling facility. Intrepid will document these volumes and certify containments have not ceased operations on Form C-148 for each calendar month. Completed C-148 Forms will be submitted monthly to OCD within 30 days of the end of the preceding calendar month. A copy of Form C-148 is provided in **Appendix B**.

Produced water deposits into and withdrawals from the recycling containment will be measured and documented to determine when the system has ceased operations. Unless otherwise approved by OCD, a recycling containment shall be deemed to have ceased operations if less than 20% of the total fluid capacity is used every six (6) months following the first withdrawal of produced water for use. The operator must report cessation of operations to OCD. The OCD may grant an extension to this determination of cessation of operations not to exceed six (6) months. Once the facility has ceased operations, Intrepid will follow closure requirements of this plan.

All releases from the recycling and re-use of produced water within the jurisdiction of OCD must be handled in accordance with 19.15.29 NMAC. Therefore, if a release occurs that is detrimental to ground or surface waters, Intrepid must send a copy of Form C-141 to the New Mexico Environment Department, as applicable, in accordance with 19.15.29 NMAC.

4.0 CLOSURE PLAN

Once the Intrepid PWR Facility has ceased operations, the facility operator will remove all fluids within 60 days and close the containment within six (6) months from the date the operator ceases operations from the containment for use.

All remaining liquids and solids will be removed and transferred to a NMOCD-approved disposal facility. Intrepid understands that the OCD district office may grant an extension for the removal of all fluids not to exceed two (2) months. The OCD district office may grant an extension to close the containment not to exceed six (6) months.

Upon closure, Intrepid may maintain the facility levees and liner system for an alternate use. Examples of alternative uses include but are not limited to aquaculture, recycling water for agriculture, and biofuel production. However, for closure considerations, estimated cost, and bonding, Intrepid has developed an estimated closure cost for removal of the recycling ponds and containment. **Appendix G** contains the engineer's estimate of closure costs which is based on a similar sized facility in Lea County that has a recent closure cost estimate provided by a third-party contractor. See **Appendix G** for more details.

Intrepid will test the soils beneath the containment for contamination with a five (5)-point composite sample which includes stained or wet soils, if any, and that sample will be analyzed for the constituents listed in **Table I** below. If the soil sampling results conclude that no release has occurred, and all contaminant concentrations are less than or equal to the parameters listed in **Table I**, Intrepid would propose to move forward with backfill with non-waste containing, uncontaminated, earthen material. If any contaminant concentration is higher than the parameters listed in **Table I**, the NMOCD District Office will be informed to determine if additional delineation is necessary or if the closure can proceed. All releases from the recycling and re-use of produced water within the jurisdiction of OCD will be handled in accordance with 19.15.29 NMAC. If the release is detrimental to ground or surface waters, Intrepid will send a copy of Form C-141 to the New Mexico Environment Department, as applicable, in accordance with 19.15.29 NMAC.

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

Once the PWR Facility operator has closed the recycling containment, the facility will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area. Topsoil and subsoils will be replaced to their original relative position and contoured to achieve erosion control, long-term stability and preservation of surface water flow patterns. The disturbed area will then be reseeded in the first favorable growing season following closure of a recycling containment. The facility shall substantially restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

Reclamation of all disturbed areas no longer in use will 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 50 percent of pre-disturbance levels and a total percent plant cover of at least 70% of pre-disturbance levels, excluding noxious weeds.

The re-vegetation and reclamation obligations imposed by federal, state trust land or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of the facility subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health, and the environment. Intrepid will notify the division when reclamation and re-vegetation are complete. An engineer's estimate for the cost of closure was derived from recent third-party estimates for closure of a similar facility and is provided in **Appendix G.**

Table I

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

* Or other test methods approved by the division.
** Numerical limits or natural background level, whichever is greater.
[19.15.34.14 NMAC - N, 3/31/2015; A, 10/13/2020]

5.0 SITE SPECIFIC GROUNDWATER DATA

Two (2) 75-foot soil borings were advanced at the approximate middle (staked by surveyors) of each proposed containment pond at the subject property to evaluate the shallow subsurface. The borings did not encounter water prior to termination. The soils encountered were described by FC&E Engineering's Registered Professional Geologist Wayne Stover as surficial eolian silty sands (SM), followed by several feet of weathered silty sand caliche (SM), and then a thicker layer of thinly bedded, reddish silty sand (SM) to the termination of each boring. The "Borehole Summary Report" prepared by FC&E is presented in **Appendix C**.

6.0 SITING CRITERIA COMPLIANCE DEMONSTRATIONS

6.1 Surface Owner Certification/Financial Assurance

Intrepid owns the surface where the facility is proposed to be located. Financial Assurance in the form of a $1,585,534 bond will be posted with NMOCD. Surface Owner Certification is presented in **Appendix D**. Closure cost estimate for the bond amount is shown in Appendix G.

6.2 Distance to Groundwater Data

FC&E documented that shallow water is greater than 75 feet below surface by advancing two (2) borings to 75 feet below surface. The borings were advanced in the approximate center of each proposed containment pond. The summary report prepared by FC&E is provided as **Appendix C**. A map of the local aquifer system is presented as **Figure 4**. The location is not mapped in the Regional Aquifer System.

6.3 Municipal Boundary and Fresh Water Field

Figure 5 provides evidence that the proposed location is not within the limits of a municipality or a defined fresh water field.

6.4 Subsurface Mine

The proposed PWR facility does overlay an inactive mine area. The footprint of the proposed facility and the outline of the inactive mines (850’ and 1,000’ below surface) are shown in the attached **Figure 6**. The mine workings located at approximately 1,000 feet below surface have been inactive for more than 60 years, and there are no current plans to resume mining at this depth under the project area. It is unlikely there will be any significant surface subsidence from this mining in the future. These mine workings underlie all the project area and Intrepid is the land owner of the surface and leases the subsurface mineral rights.

The shallower mine workings located about 850’ below surface have been inactive for about five (5) years and there are no current plans to resume mining at this depth under the project area. It is unlikely there will be any significant surface subsidence from this mining in the future. These shallower mine workings underlie portions of the project area. There are no other potash reserves under the project area that are expected to be mined. Additionally, Intrepid controls the potash minerals lease under the entire project area. Intrepid is applying for a variance from this siting condition (see Section 7.1). Further, the design of the lined ponds and detection system will incorporate subsidence into the design.

6.5 Unstable Area (Karst)

The proposed location is not mapped in a high potential Karst area (see **Figure 7**). FC&E also performed a visual inspection of the land which the proposed facility is sited and confirmed that there was no evidence of Karst or unstable ground. A copy of the certification is provided in **Appendix E**.

6.6 Floodplain/FEMA

The Federal Emergency Management Agency (FEMA) National Flood Hazard maps were reviewed to determine the proposed location's potential for flooding (see **Figure 8**). The proposed location is in an area designated "Zone X" which indicates that this is an "Area of Minimal Flood Hazard".

6.7 Surface Water

A site reconnaissance performed by Wayne Stover, R.P.G. for FC&E and a review of **Figure 1** confirm that the proposed location is not within 300-feet of a continuously flowing watercourse, 200 feet of any significant watercourse, lakebed, sink hole, or playa lake. A copy of the certification is provided in **Appendix E**.

6.8 Buffer Zone

A site reconnaissance performed by Wayne Stover, R.P.G. with FC&E, a review of **Figure 1**, and a review of **Figure 6** confirm that the proposed location is not within 1,000 feet of an occupied permanent residence, school, hospital, institution, church, or other permanent structure. A copy of the certification is provided in **Appendix E**.

6.9 Springs or Fresh Water Wells

FC&E Senior Environmental Geologist, Wayne Stover R.P.G. performed a visual inspection of the proposed location and confirmed that the facility will not be located within 500 horizontal feet of a spring, fresh water well used for domestic purposes, or livestock watering. A copy of the certification is provided in **Appendix E**.

6.10 Wetlands

The site reconnaissance by Wayne Stover, R.P.G., a review of **Figure 1**, and a review of the National Wetlands Inventory Map (see **Figure 9**) confirmed that the proposed location is not located within 100 feet of a mapped wetland. A copy of the certification is provided in **Appendix E**.

7.0 VARIANCE REQUESTS

7.1 Subsurface Mine Variance

Intrepid is requesting a variance from General Siting Criteria concerning subsurface mines located under a proposed facility. The proposed PWR facility does overlay an inactive mine area. The footprint of the proposed facility and the outline of the inactive mines (850' and 1,000' below surface) are shown in **Figure 6**. The mine workings at approximately 1,000 feet below surface have been inactive for more than 60 years and there are no current plans to resume mining at this depth under the project area. These mine workings underlie all the project area. Shallower mine workings located about 850' below surface have been inactive for about five (5) years and there are no current plans to resume mining at this depth under the project area. It is unlikely there will be any significant surface subsidence from the former mining areas in the future. This has been documented by a recent 2022 study performed by RESPEC engineers. There are no other potash reserves under the project area that are expected to be mined. Additionally, Intrepid controls the potash minerals lease under the entire project area.

The Site-Specific Groundwater Section (Section 5.0) indicates that the proposed facility is located in an area that does not have a shallow water table (>75 feet). The containment liner for the proposed facility is designed to exceed the NMOCD requirements. The proposed liners, leak detection system, site geology and regular inspections will be protective of the environment and will limit potential leaks.

7.2 Liner Variance

Intrepid is requesting a variance to the Liner requirements (NMAC 19.15.34 Part 12 (A) (4) for the liners to be 30 mil string reinforced LLDPE. A 40 mil LLDPE is proposed instead of the required 30 mil LLDPE. The 40 mil LLDPE will provide equal to or better protection of the environment. The proposed liner system will be seamed in a manner that will be double lined with a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. General technical specifications proposed are listed below:

7.2.1 Specifications. The edges of all liners will be anchored in the bottom of a compacted earth-filled trench. The anchor trench will be at least 24 inches deep. The primary (upper) liner will be a geomembrane 60-mil HDPE liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. The secondary liner will be 40-mil LLDPE with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility will meet or exceed the EPA SW-846 method 9090A or subsequent

relevant publications. Intrepid will instruct its contractor to minimize liner seams and orient them up and down, not across, each slope of the levee. Factory welded seams will be used where possible. Intrepid's contractor will ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the liner contractor will overlap liners four to six inches. The liner contractor will minimize the number of field seams and corners and irregularly shaped areas. There will be no horizontal seams within five (5) feet of the slope's toe. Qualified personnel will perform field welding and testing. At a point of discharge into or suction from the recycling containment, Intrepid will insure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines will not penetrate the liner. Intrepid's contractor will place a leak detection system between the upper and lower geomembrane liners that will 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 will 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 recycling containment is designed to prevent run-on of surface water. The containment will be surrounded by a berm, ditch or other diversion to prevent run-on of surface water. Prior to constructing the containment, Intrepid's contractor will strip and stockpile the topsoil for use as the final cover or fill at the time of closure. Detailed plans and specifications for the proposed recycling containment ponds are contained in **Appendix F**.

7.3 Fencing Variance

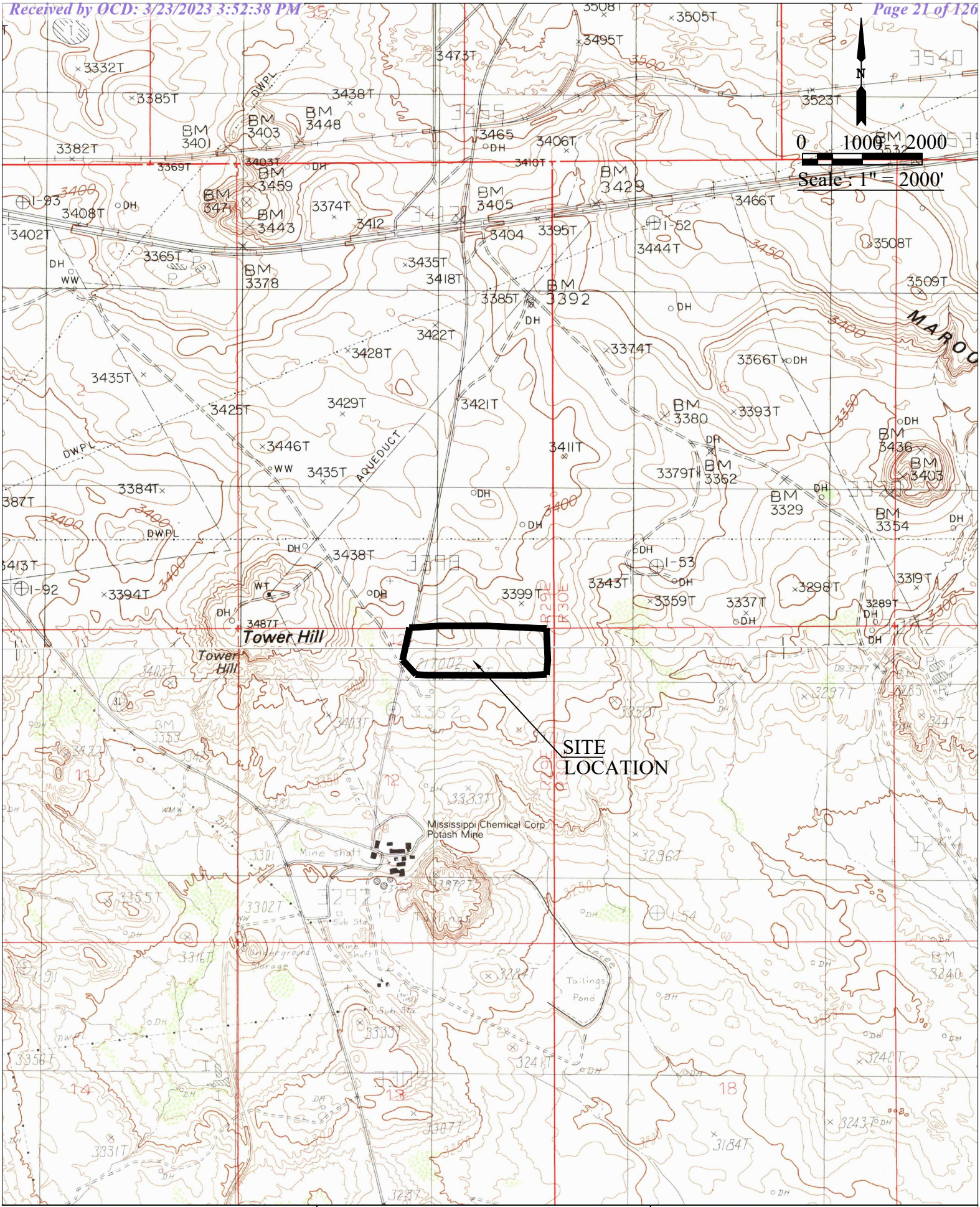
The Intrepid PWR facility fencing for the containment ponds will be constructed with an eight (8) foot game fence topped with three (3) strands of barbed wire. The proposed fencing will better deter people and wildlife from entering the facility and containment area(s). This is a slight variance from the fencing regulations, but this option should be more effective. There will be a locked gate that will allow authorized personnel to enter and limit unauthorized access.

7.4 Netting and Wildlife Protection Variance

Intrepid proposes to utilize an audible avian alarm system instead of netting to deter birds from the containment areas. This is a variance from the netting specified in the regulations. This system along with the proposed fencing should be effective in preventing wildlife from accidently entering the containment.

FIGURES

Figure 1
Topographic Map



FC&E Engineering, LLC
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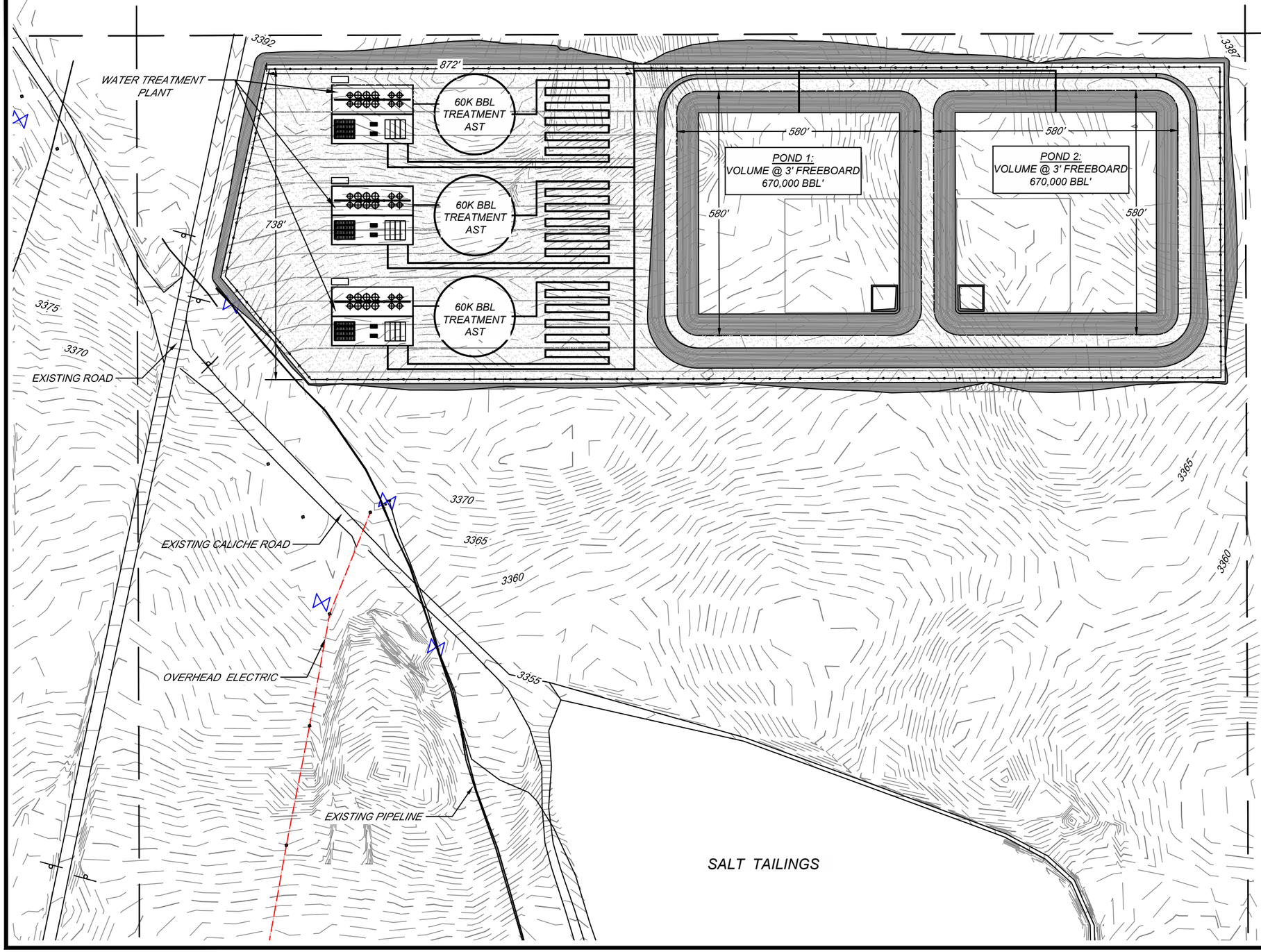
INTREPID POTASH
Topographic Map
Carlsbad, New Mexico

Figure Number: 1
Figure Name: Topographic Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 07-22-2021

Figure 2
Design Layout Map



PRELIMINARY EARTHWORK QUANTITIES	
DISTURBANCE AREA	44 ACRES
CUT (CUT FACTOR 1.00)	365,000 CY
FILL (FILL FACTOR 1.25)	329,000 CY
NET (EXCESS)	36,000 CY

LEGEND

- PROPOSED 8' GAME FENCE
- SECTION LINE (APPROX.)
- PROPOSED DRIVING SURFACE
- EXISTING GRADE CONTOURS
- FINISHED GRADE CONTOURS
- WATER VALVE
- SIGN
- EXISTING OVERHEAD ELECTRIC (OHE)
- EXISTING PIPELINE

N

SCALE 1"=250'

0 125' 250' 500'

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

R-X	DESCRIPTION	DATE	BY
	REVISIONS (OR CHANGE NOTICES)		

SELECT ENERGY SERVICES
Select Energy Services
1233 West Loop South
Suite 1400
Houston, TX 77027
www.Selectenergyservices.com

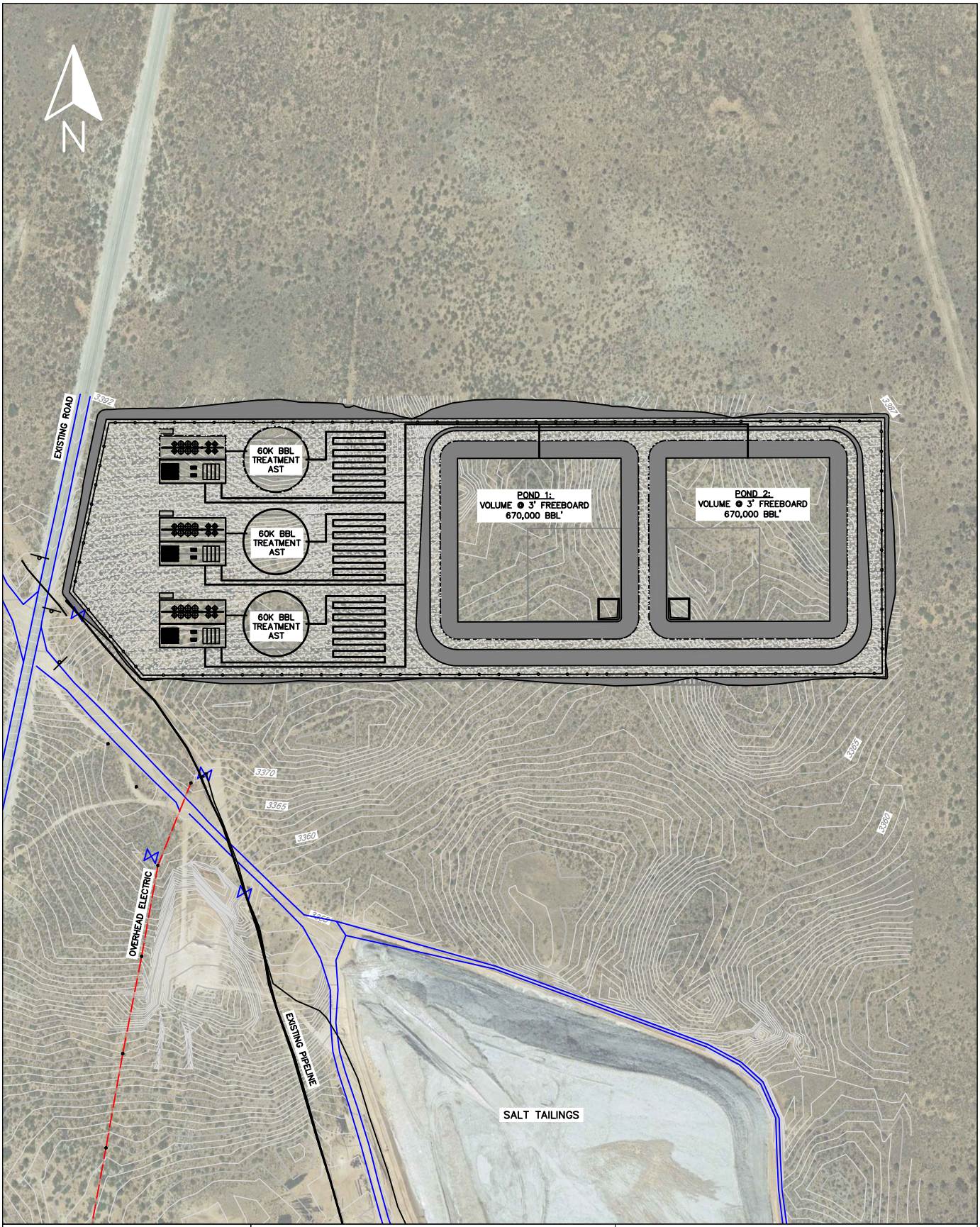
INTREPID PRODUCED WATER TREATMENT AND REUSE FACILITY
S12, T21S, R29E
EDDY COUNTY, NEW MEXICO
SELECT ENERGY SERVICES

DESIGN MAP - FIGURE 2

HORIZONTAL SCALE:1"=250'	VERTICAL SCALE: NTS
PRINT DATE: 5/11/2021	DESIGNED BY: CSC/NBC
PROJECT NO. 20-140	CHECKED BY: CSC/EMH
SUBSET: FEASIBILITY	SHEET: FIGURE 2

Drawing File: Z:\Shared\Projects\20-140 Select Energy Intrepid Ponds\04_CIVIL\Design\Drawings\20-140 Exhibit E.dwg

Figure 3
Aerial View Design Layout Map



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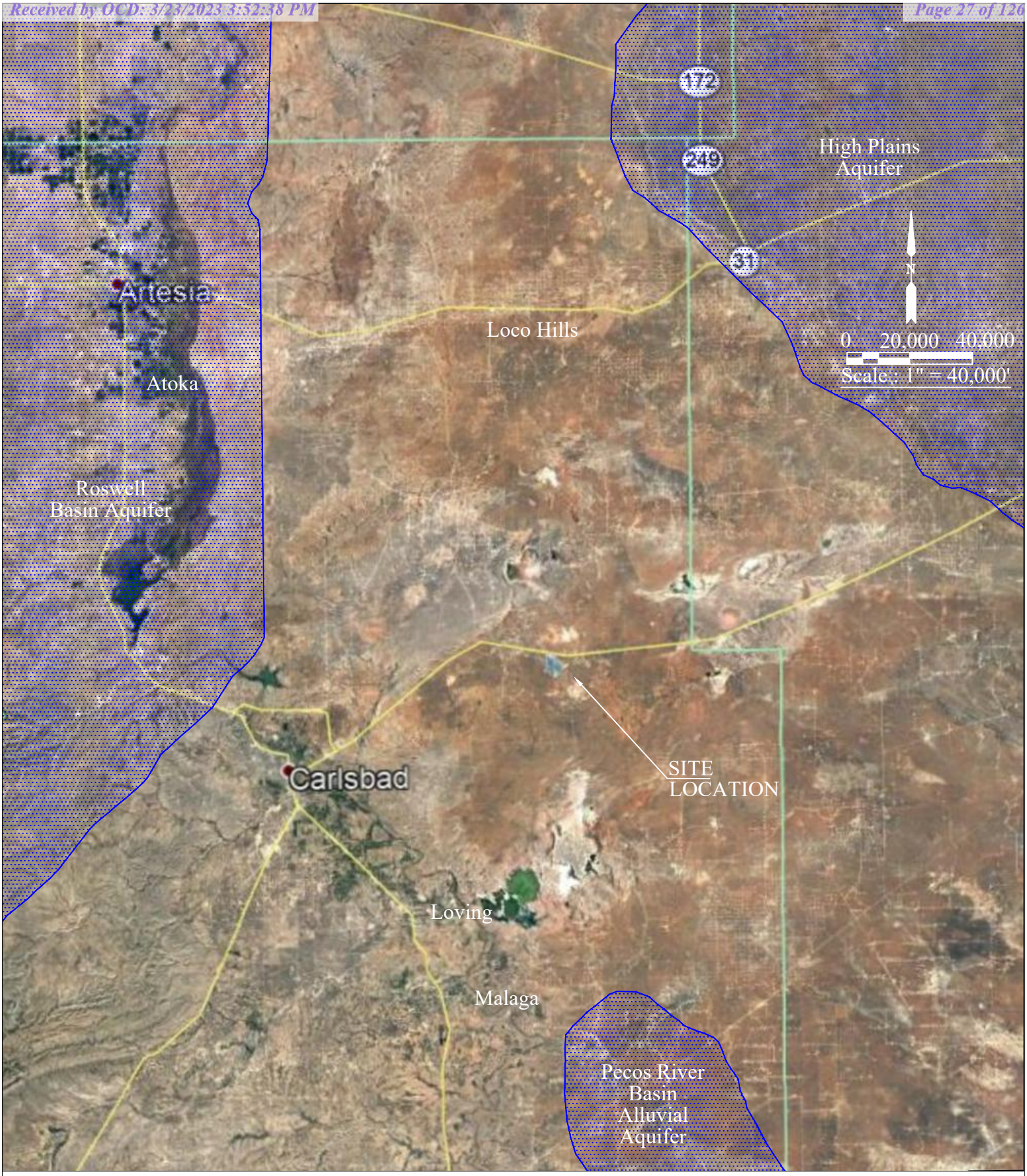
Water ▪ Soils ▪ Air ▪ Compliance

Intrepid, Inc.
Produced Water Treatment and Reuse Facility
Carlsbad, Eddy County, NM

Figure Number: 3
Figure Name: Aerial View Design Drawings
Project: PWRF Package
Drawn By: TF
Date Drawn: 9/2/21

Figure 4
Aquifer Map



*Aquifer Boundaries Scaled From USGS Ground Water Atlas of the United States

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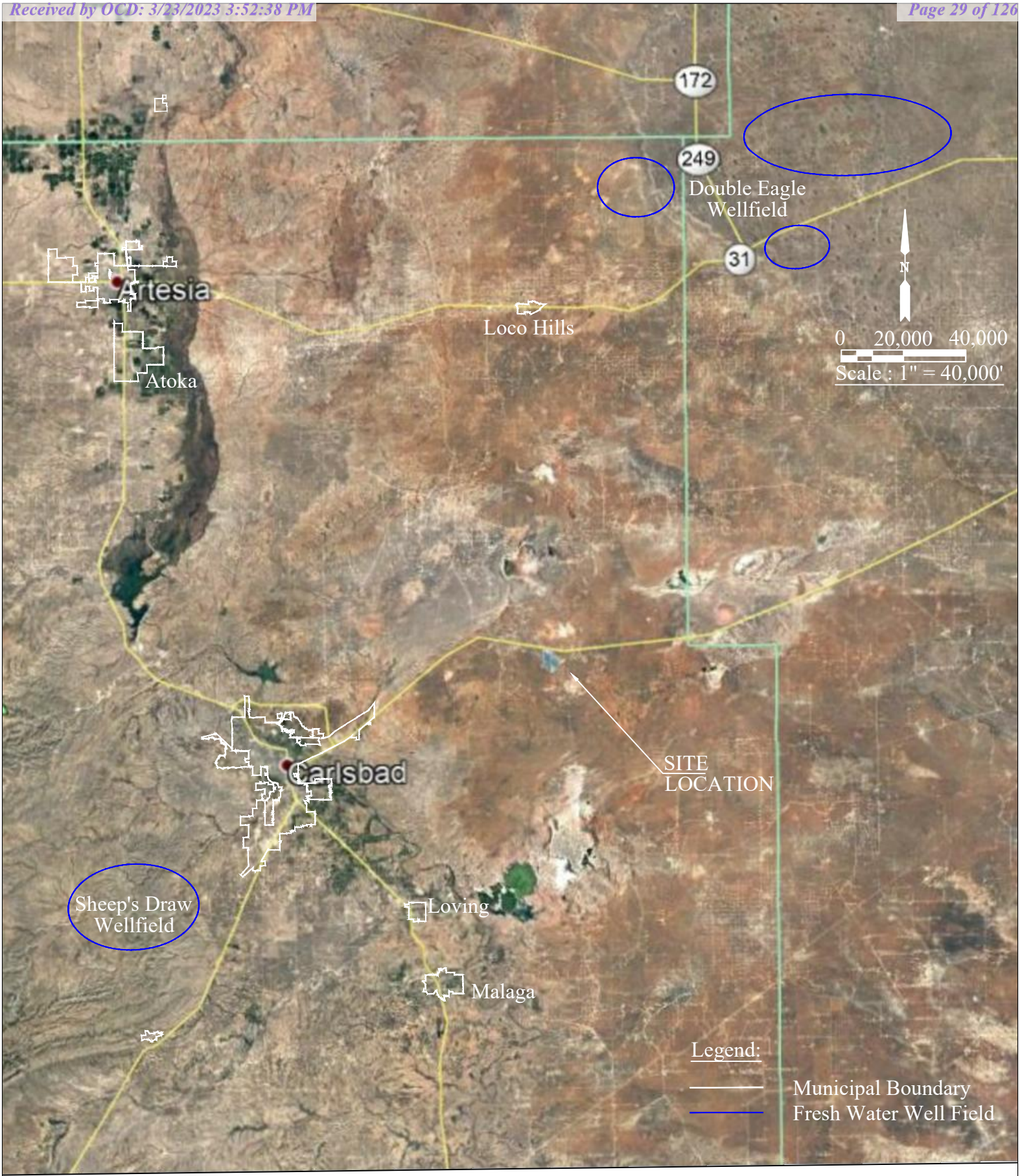
INTREPID POTASH
AQUIFER MAP
Carlsbad, New Mexico

Figure Number: 4
Figure Name: Aquifer Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 08-13-2021

Figure 5
Municipal / Well Field Map



FC&E Engineering, LLC

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INTREPID POTASH
MUNICIPAL / WELL FIELD MAP
Carlsbad, New Mexico

Figure Number: 5
Figure Name: Municipal / Well Field Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 08-12-2021

Figure 6

Siting Map

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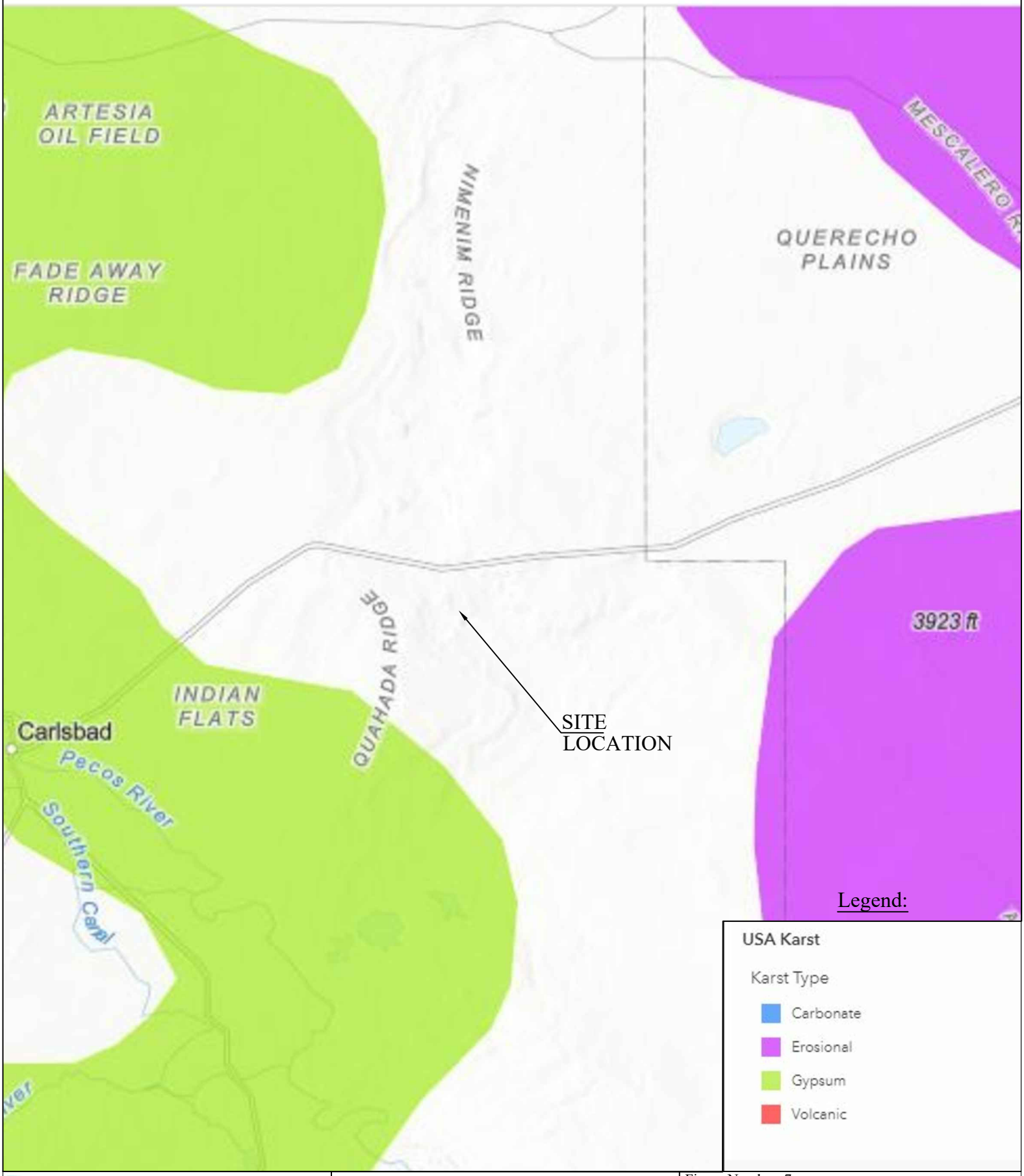
INTREPID POTASH
SITING MAP
Carlsbad, New Mexico

Figure Number: 6
Figure Name: Siting Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 07-15-2021

Figure 7

Karst Map



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INTREPID POTASH
KARST MAP
Carlsbad, New Mexico

Figure Number: 7
Figure Name: KARST MAP
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 08-11-2021

Figure 8

FEMA Map

FC&E Engineering, LLC
917 Marquette Road
Brandon, Mississippi

INTREPID POTASH
FEMA MAP
Carlsbad, New Mexico

Figure Number: 8
Figure Name: FEMA Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 08-11-2021

National Flood Hazard Layer FIRMette

FEMA

103°56'17"W 32°30'14"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

103°55'40"W 32°29'43"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/15/2021 at 2:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Figure 9
Wetland Map

FC&E Engineering, LLC
917 Marquette Road
Brandon, Mississippi

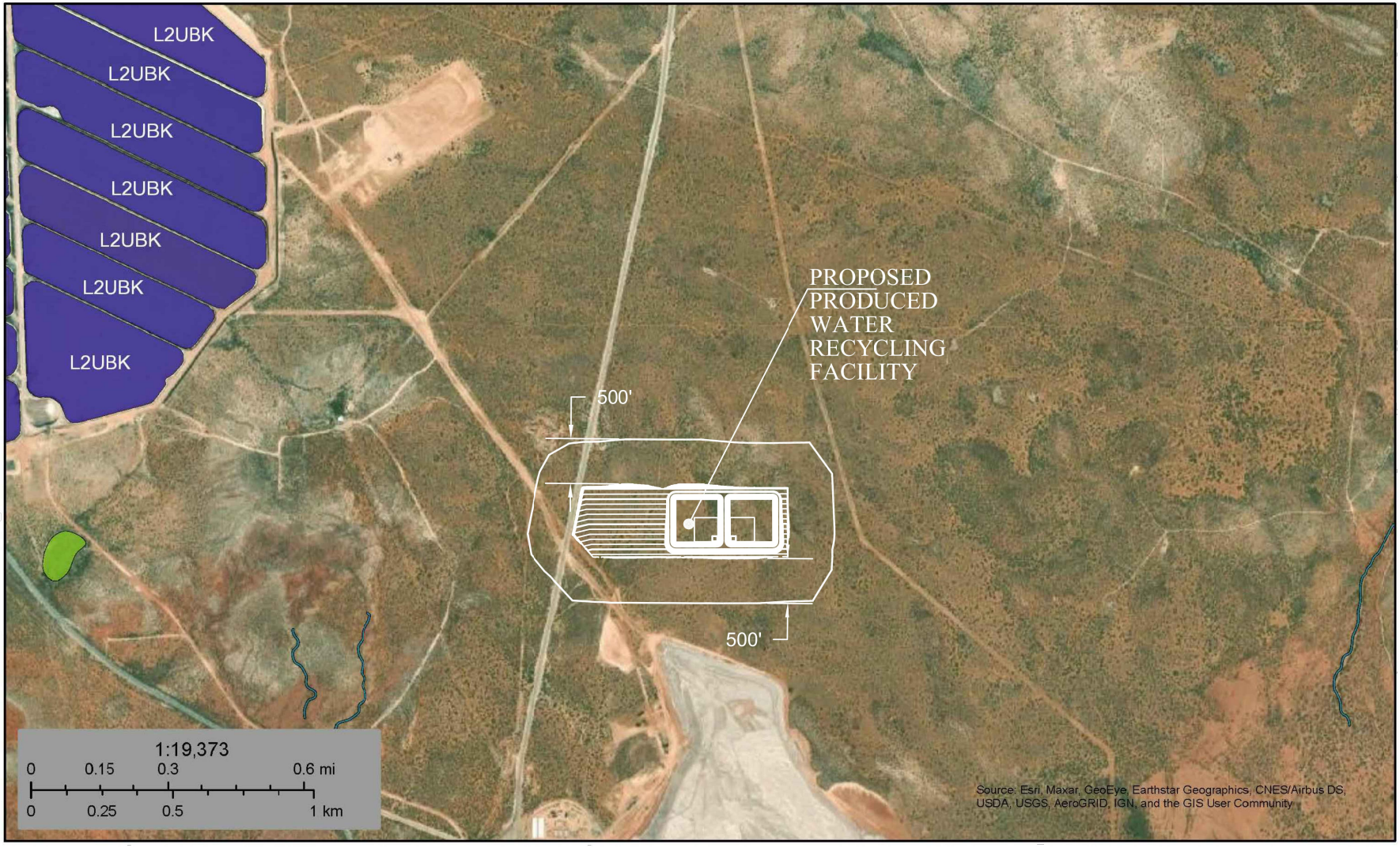
INTREPID POTASH
WETLANDS MAP

Carlsbad, New Mexico

Figure Number: 9
Figure Name: Wetlands Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 08-11-2021

U.S. Fish and Wildlife Service
National Wetlands Inventory

National Wetlands Inventory Map



July 15, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Appendix A

Form C-147 Application

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: Intrepid Potash – New Mexico, LLC (For multiple operators attach page with information) OGRID #: 372681
Address: 1996 Potash Mines Road, Carlsbad NM 88220 (Mailing Address: PO Box 101, Carlsbad NM 88220)
Facility or well name (include API# if associated with a well): Intrepid Central Recycling Facility
OCD Permit Number: **2RF-189** (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr _____ Section 12 Township 21S Range 29E County: Eddy
Surface Owner: ☐ Federal ☐ State **X** Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Recycling Facility:**
Location of recycling facility (if applicable): Latitude **N032° 29' 59.68"** Longitude **W103° 56' 00.14"** 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): Latitude N 32° 29' 59.68" Longitude W103° 56' 00.14" NAD83
☐ For multiple or additional recycling containments, attach design and location information of each containment
☒ Lined ☐ Liner type: Thickness 40 mil ☒ LLDPE ☒ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 2 at 670,000 bbls Dimensions: L 580' x W 580' x D 17' each
☐ 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 $____1,585,534_____ **(work on these facilities cannot commence until bonding amounts are approved)**

☒ Attach closure cost estimate and documentation on how the closure cost was calculated.

5.

Fencing:

☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet

☒ Alternate. Please specify____8' Game Fencing with 3 strands of barbed wire_____

6.

Signs:

☒ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

☐ Signed in compliance with 19.15.16.8 NMAC

7.

Variances:

Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.

Check the below box only if a variance is requested:

☒ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.

If a Variance is requested, it must be approved prior to implementation.

8.

Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

General siting	
Ground water is less than 50 feet below the bottom of the Recycling Containment. NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality	☐ Yes ☒ No ☐ NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	☒ Yes ☐ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	☐ Yes ☒ No
Within a 100-year floodplain. FEMA map	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image	☐ Yes ☒ No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No

9.
Recycling Facility and/or Containment Checklist:
Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

- ☒ Design Plan - based upon the appropriate requirements.
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements.
- ☒ Closure Plan - based upon the appropriate requirements.
- ☒ Site Specific Groundwater Data -
- ☒ Siting Criteria Compliance Demonstrations –
- ☒ **Certify that notice of the C-147 (only) has been sent to the surface owner(s)**

10.
Operator Application Certification:
I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.

Name (Print): Chris Nyikos Title: Director of Technical Services

Signature: Chris Nyikos Date: 20 March 2023

e-mail address: chris.nyikos@intrepidpotash.com Telephone: (575) 499-5027

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 04/03/2023

Title: Environmental Specialist **OCD Permit Number:** 2RF-189

- [X] OCD Conditions
- [x] Additional OCD Conditions on Attachment

Appendix B

Inspection Forms (Weekly and Monthly C-148 Form)

Weekly Containment Inspection Log Sheet

Intrepid Produced Water Recycling Facility

Instructions: This inspection log will be completed weekly while the containment system contains fluids. Add the inspection date, inspector name, and answer Yes (Y) or No (N) to all questions in the columns. If any answer is No (N), the deficient item should noted in the comments and promptly be corrected in accordance with the Section 19.15.34 NMAC. Completed inspection logs will be retained by Intrepid at an accessible location.

Inspection Date	Inspector Name	Containment surface free of visible oil layer?	Is a minimum of 3' of freeboard in containment cell maintained?	Is primary liner free of cracks, tears, or other visual signs of compromised integrity?	Is leak detection system free of produced fluids?	Are earthen berms free of erosion, settling, slides, or other signs of compromised integrity?	Are berms capable of preventing surface stormwater run on into the containment cell?	Does the facility have oil absorbent booms or other devices capable of containing an unanticipated release installed or maintained onsite?	Any signs of wildlife entering the containment ponds?

Comments:

State of New Mexico
Energy Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505
Phone (505) 476-3441 ▪ Fax (505) 476-3462
https://www.emnrd.nm.gov/ocd/

Form C-148
Revised
January 2022

Operator Name _____ OGRID # _____

RF# _____ Facility # _____

☐ I certify all recycling containments associated with this recycling facility are using >= 20% of the containment's total fluid capacity every 6 months until closure in compliance with 19.15.34.13(C)[A] Month/Year _____

Recycling Equipment	Operational Capacity, (bbl)[B]	Produced Water Received, (bbl)	Other Fluid Received, (bbl)	Description of Other Fluid Received (e.g., fresh water, etc.)	Volume Leaving Facility for Recycling/Reuse, (bbl)
Recycling Containments					
Above Ground Storage Tanks					
Recycling Facility Totals[C]					

[A] If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdraw, operation of the facility is considered ceased and a notification of cessation of operations should be sent electronically to OCD Online. A request to extend the cessation of operations, not to exceed six months, may be submitted using a C-147 Long Form to OCD Online.

[B] For recycling containments, operational fluid capacity is the total volume of the containment, minus the volume utilized for the three feet volume of freeboard.

[C] Total the volumes received and the volumes leaving the facility for all equipment.

Appendix C

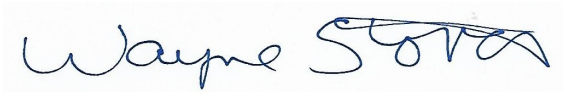
Borehole Summary Report

Intrepid West Plant
Produced Water Recycling Facility
Borehole Summary Report

Prepared for:

Intrepid Potash - New Mexico, LLC
1996 Potash Mines Road
Carlsbad, New Mexico 88220
July 2021

Site Assessment Completed By:



Wayne Stover RPG
Senior Geologist

FC&E ENGINEERING, LLC

917 MARQUETTE ROAD
BRANDON, MISSISSIPPI 39042
(601) 824-1860

Contents

1.0 Introduction

This summary report details the boring activities associated with the proposed Intrepid Produced Water Recycling Facility located at the Intrepid West facility in Carlsbad, New Mexico. The purpose of the drilling activities was to advance two 75 foot borings within the proposed locations of Pond 1 (West) and Pond 2 (East) which will be ancillary to the Produced Water Recycling Facility, describe the subsurface geological conditions and determine the presence of any zones saturated with groundwater. The general location of the project area as well as boring locations are included in Figures 1 and 2.

2.0 Drilling Activities

Prior to initiating boring activities, a cultural resource survey was conducted of the area. On July 12-13, 2021 a road was constructed to the location of the two proposed borings on the Intrepid West Plant property to allow access for the drill rig and associated equipment. FC&E Engineering, LLC (FC&E) personnel provided oversight of road construction and ensured that no cultural sensitive areas were disturbed.

Enviro—Drill, Inc., Albuquerque, NM (Enviro-Drill) and Pettigrew & Associates, Hobbs, NM (Pettigrew) were utilized to conduct the borings and to collect geotechnical samples. Enviro-Drill is a licensed driller with the State of New Mexico (Well Driller License No. WD 118). The crews arrived at the site on July 14, 2021 at 0730 hrs. Enviro-Drill and Pettigrew personnel met with Chris Nyikos and Roy Cooper with Intrepid and myself. The drilling crew was required to take Intrepid Site Safety Training. Following the training the drilling crew proceeded to the boring location.

The borings were advanced within the proposed areas of Pond East and Pond West as part of the site evaluation in preparation of the Produced Water Recycling Facility permit application utilizing a hollow stem auger drilling rig. The locations of the bore holes were previously surveyed and staked by surveyors provided by Intrepid. Borings were drilled to terminal depths of 75 feet Below Ground Surface (BGS). Samples of underlying materials were taken by driving a standard ASTM 2-in. split-spoon sampler 18 in. into the soil using a hammer falling a distance of 30 in. (ASTM 0 1586). Split spoon samples were collected at predetermined depths as represented on the bore logs as provided in **Appendix A**. Representative portions of each split-spoon sample were collected and sealed in zip lock bags to prevent loss of moisture and sent to Pettigrew for geotechnical analysis.

An FC&E Registered Professional Geologist (RPG) observed the boring activities and described the lithologic conditions. Logs of the soil borings are provided in **Appendix A**. The soil borings encountered surficial eolian silty sands (SM), a thin zone consisting of several feet of weathered silty sand caliche (SM), and a thick layer of thinly bedded, reddish silty sand (SM) down to the

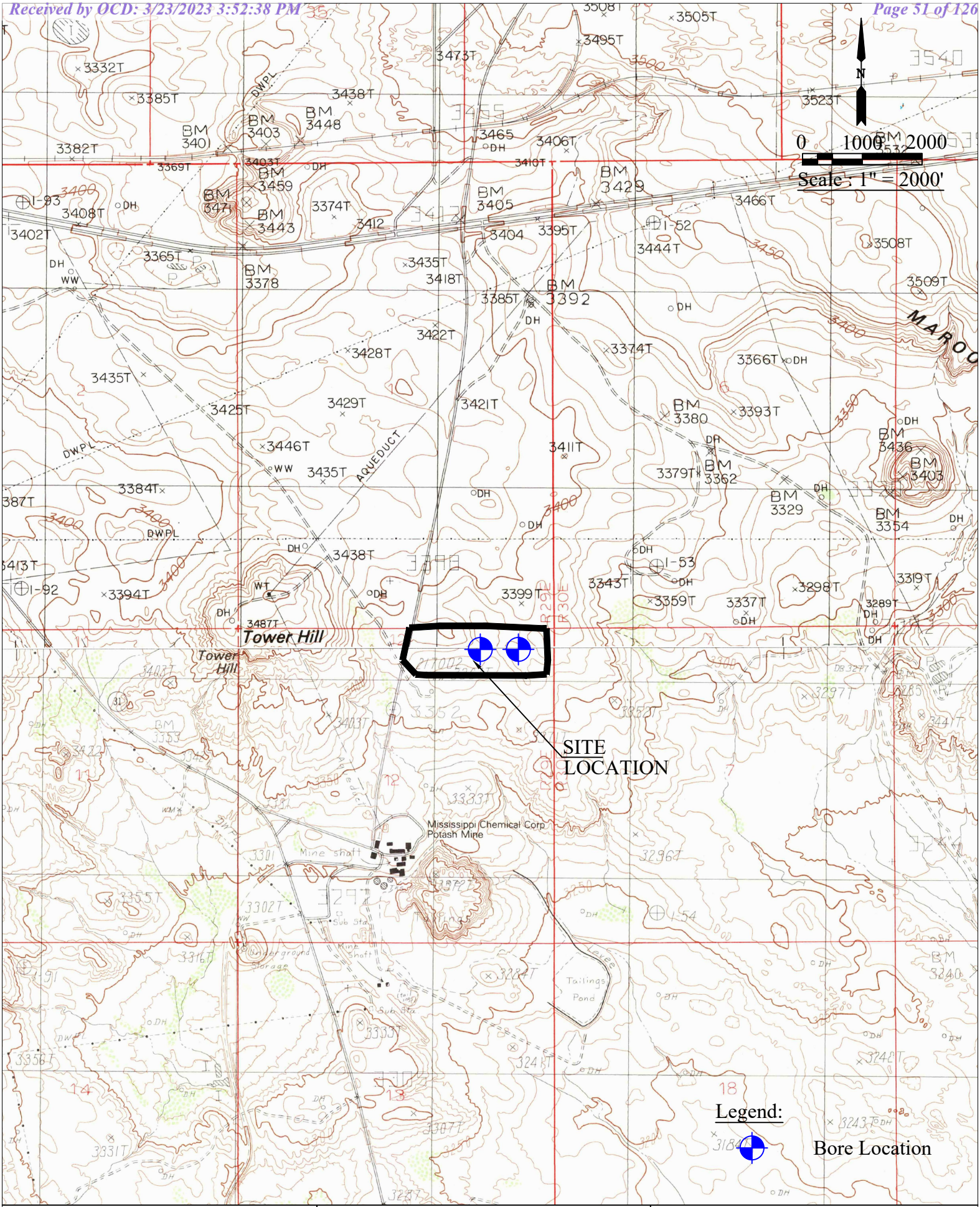
termination of each boring. Photos of drilling and plugging operations are included in **Appendix B**.

During the soil boring advancement, observations for saturated zones of groundwater were made. No noticeable moisture or saturated zones were encountered in either boring.

Following the completion of the borings, each boring was grouted from using a mixture of concrete and bentonite.

Drilling activities were completed at 1700 hrs. and the drilling crew demobilized from the area.

Figures



FC&E Engineering, LLC
917 Marquette Road
Brandon, Mississippi
www.fce-engineering.com

INTREPID POTASH
SITE PLAN
Carlsbad, New Mexico

Figure Number: 1
Figure Name: Site Plan
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 07-22-2021

FC&E Engineering, LLC
917 Marquette Road
Brandon, Mississippi
www.fce-engineering.com

INTREPID POTASH
BORING LOCATION MAP
Carlsbad, New Mexico

Figure Number: 2
Figure Name: Boring Location Map
Project:1755
Drawn By: A Fitzhugh
Date Drawn: 07-22-2021

Appendix A
Bore Logs

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Borehole Number 1 (East Pond)
Intrepid West WTP
Soil Characterization

Date Completed:	7/14/2021	Latitude:	32.499981°
Hole Diameter:	6"	Longitude:	-103.930997°
Drilling Method:	Hollow Stem Auger	Drilled by:	Enviro-Drill, Inc., Alburquerque, NM
Sampling Method:	Split Spoon	Logged by:	Wayne Stover, FC&E Engineering

DEPHT (ft)	USCS	SAMPLE TYPES	SOIL DESCRIPTION	REMARKS
	SM	X X X	Reddish brown silty sand	Dry
	SM	X X X	Reddish brown silty sand	Dry
4				
	SM	X X X	Reddish brown silty sand	Dry
	SM	X X X	Reddish brown silty sand	Dry
8				
	SM	X X X	Reddish brown silty sand grading to white caliche silty sand at bottom of boring	Dry
	SM	X X X	Tannish white to sily sand caliche	Dry
12				
	SM		Tannish white to sily sand caliche	Dry
16	SM	X X X	Tannish white to sily sand caliche	Dry
	SM		Reddish silty sand	Dry
20				
	SM	X X X	Light tannish red silty sand	Dry
	SM		Light tannish red silty sand	Dry
24				
	SM	X X X	Light tannish red silty sand	Dry
	SM		Light tannish red silty sand	Dry
28				
	SM	X X X	Tannish red silty sand	Dry
32				

TOC

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Borehole Number 1 (East Pond)
Intrepid West WTP
Soil Characterization

Date Completed:	7/14/2021	Latitude:	32.499981°
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Sampling Method:	Split Spoon	Logged by:	Wayne Stover, FC&E Engineering

DEPHT (ft)	USCS	SAMPLE TYPES	SOIL DESCRIPTION	REMARKS
	SM	X X X	Reddish silty sand	Dry
34	SM		Reddish silty sand	Dry
	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
38	SM		Red silty sand	Dry
	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
42	SM		Red silty sand	Dry
46	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
50	SM		Red silty sand	Dry
	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
54	SM		Red silty sand	Dry
	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
58	SM		Red silty sand	Dry
	SM	X X X	4" layer gray compacted silt and sand, grading into reddish silty sand with gray clastics.	Dry
62				

TOC

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Bore Hole Number 1 (East Pond)
Intrepid West WTP
Soil Characterization

Date Completed:	7/14/2021	Latitude:	32.499981°
Hole Diameter:	6"	Longitude:	-103.930997°
Drilling Method:	Hollow Stem Auger	Drilled by:	Enviro-Drill, Inc., Alburquerque, NM
Sampling Method:	Split Spoon	Logged by:	Wayne Stover, FC&E Engineering

DEPHT (ft)	USCS	SAMPLE TYPES	SOIL DESCRIPTION	REMARKS
	SM		Dark reddish brown silty sand	Dry
66	SM	X X X	Thinnly bedded, dark reddsh silty sand, dense	Dry
	SM		Red silty sand	Dry
70				
	SM	X X X	Thinnly bedded, dark reddsh silty sand, dense	Dry
	SM		Red silty Sand	Dry
74				
	SM	X	Thinnly bedded, dark reddsh silty sand, dense	Dry

TOC

Notes:		
	SM	Silty Sand
	x	Split Spoon
	■	Hollow Stem Auger
		No saturated zones encountered.
		Holes plugged with a mixture of cement and bentonit.
		Hole completed at 1600 hrs

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Borehole Number 2 (West Pond)
Intrepid West WTP
Soil Characterization

Date Completed:	7/14/2021	Latitude:	32.499983°
Hole Diameter:	6"	Longitude:	-103.931953°
Drilling Method:	Hollow Stem Auger	Drilled by:	Enviro-Drill, Inc., Alburquerque, NM
Sampling Method:	Split Spoon	Logged by:	Wayne Stover, FC&E Engineering

DEPHT (ft)	USCS	SAMPLE TYPES	SOIL DESCRIPTION	REMARKS
	SM	X X X	Reddish brown silty sand	Dry
	SM	X X X	Reddish brown silty sand grading to whitish gray caliche at bottom of boring	Dry
4				
	SM	X X X	Whitish gray caliche silty sand	Dry
	SM	X X X	Whitish gray caliche silty sand	Dry
8				
	SM	X X X	Whitish gray caliche silty sand	Dry
	SM	X X X	White to pinkish caliche silty sand	Dry
12				
	SM		White to pinkish caliche silty sand	Dry
16	SM	X X X	Red silty sand	Dry
	SM		Red silty sand	Dry
20				
	SM	X X X	Red silty sand	Dry
	SM		Red silty sand	Dry
24				
	SM	X X X	Red silty sand	Dry
	SM		Red silty sand	Dry
28				
	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
32				

TOC

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Borehole Number 2 (West Pond)
Intrepid West WTP
Soil Characterization

Date Completed:	7/14/2021	Latitude:	32.499983°
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Sampling Method:	Split Spoon	Logged by:	Wayne Stover, FC&E Engineering

DEPHT (ft)	USCS	SAMPLE TYPES	SOIL DESCRIPTION	REMARKS
	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
34	SM		Red silty sand	Dry
	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
38	SM		Red silty sand	Dry
	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
42	SM		Red silty sand	Dry
46	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
50	SM		Red silty sand	Dry
	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
54	SM		Red silty sand	Dry
	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
58	SM		Red silty sand	Dry
	SM	x x x	Thinnly bedded, red silty sand, dense	Dry
62				

TOC

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

Bore Hole Number 2 (West Pond)
Intrepid West WTP
Soil Characterization

Date Completed:	7/14/2021	Latitude:	32.499983°
Hole Diameter:	6"	Longitude:	-103.931953°
Drilling Method:	Hollow Stem Auger	Drilled by:	Enviro-Drill, Inc., Alburquerque, NM
Sampling Method:	Split Spoon	Logged by:	Wayne Stover, FC&E Engineering

DEPHT (ft)	USCS	SAMPLE TYPES	SOIL DESCRIPTION	REMARKS
	SM		Red silty sand	Dry
66	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
	SM		Red silty sand	Dry
70	SM	X X X	Thinnly bedded, red silty sand, dense	Dry
	SM		Red silty sand	Dry
74	SM	X	Thinnly bedded, red silty sand, dense	Dry

TOC

Notes:		
	SM	Silty Sand
	x	Split Spoon
	■	Hollow Stem Auger
		No saturated zones encountered.
		Holes plugged with a mixture of cement and bentonit.
		Hole completed at 1245

Appendix B
Photographs

Photo 1 Stetting up on Borehole #2.

Photo 2 Drilling Borehole #2.

Photo 3 Grouting Borehole #2.

Photo 4 Borehole #2 completed.

Photo 5 Setting up on Borehole #1.

Photo 6 Drilling Borehole #1.

Photo 7 Grouting Borehole #1.

Photo 8 Borehole #1 completed.

Appendix D

Surface Owner Certification

Surface Owner Certification:

I hereby certify that the information and attachments submitted with this application package are true, accurate and complete to the best of my knowledge and belief. As the surface owner, Intrepid is aware that this Produced Water Recycling Facility described herein is proposed to be located on this property.

Company: Intrepid Potash – New Mexico, LLC

Name (Print): Chris Nyikos Title: Director of Technical Services

Signature: Chris Nyikos Date: 20 March 2023

e-mail address: chris.nyikos@intrepidpotash.com

Telephone: (575) 499-5027

Appendix E

Visual Inspection Certification Document

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

August 26, 2021

Mr. Clarke Thomas, RPG

FC&E Engineering, LLC
PO Box 1774
Brandon, MS 39043

RE: Intrepid
Produced Water Recycling Facility Application
Visual Inspection Certification

Mr. Thomas,

Intrepid proposes to permit the construction and operation of a produced water recycling facility within a 44 - acre block located near the Intrepid West Potash Mine near Carlsbad, New Mexico. Proposed Recycling and/or Recycling Containment Facilities are required to submit an application to the New Mexico Energy Minerals and Natural Resources Department, Oil Conservation Division on Form C-147. Section 8, Siting Criteria for Recycling Containment, of Form C-147 requires proposed facilities to demonstrate compliance with listed siting criteria.

On July 9, 2021, Wayne Stover, a Registered Professional Geologist with FC&E Engineering, LLC traversed the area within the proposed project area and performed a visual inspection to certify compliance with the following Section 8 Siting Criteria Conditions:

- No groundwater is less than 50 feet below the bottom of the proposed Recycling Containment. Two (2) bore holes were advanced within the proposed project area to a total depth of 75 feet below surface level. No groundwater was encountered in either bore hole.
- The proposed area is not proposed within an “Unstable Area”, An unstable area as defined by the State of New Mexico means a location that is susceptible to natural or human induced events or forces capable of impairing the integrity of some or all a division-approved facility’s structural components. Examples of unstable areas are areas of poor foundation conditions, areas susceptible to mass earth movements and karst terrain areas where karst topography is developed [as-a result] because of dissolution of limestone, dolomite or other soluble rock. Characteristic physiographic features of karst terrain include sinkholes, sinking streams, caves, large springs and blind valleys. No karst terrain or karst features were noted during the visual inspection.
- The proposed facility is not 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).

- The proposed facility is not within 1,000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.
- The proposed facility is not 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.
- The proposed facility is not within 500 feet of a wetland. A review of the US Fish & Wildlife Service National Wetlands (USFWS) Inventory website indicated that there were no apparent wetlands located within the area of the proposed project area.

Should you have any questions or require any additional information please do not hesitate to contact me at 601-937-2270 or wstover@fce-engineering.com.

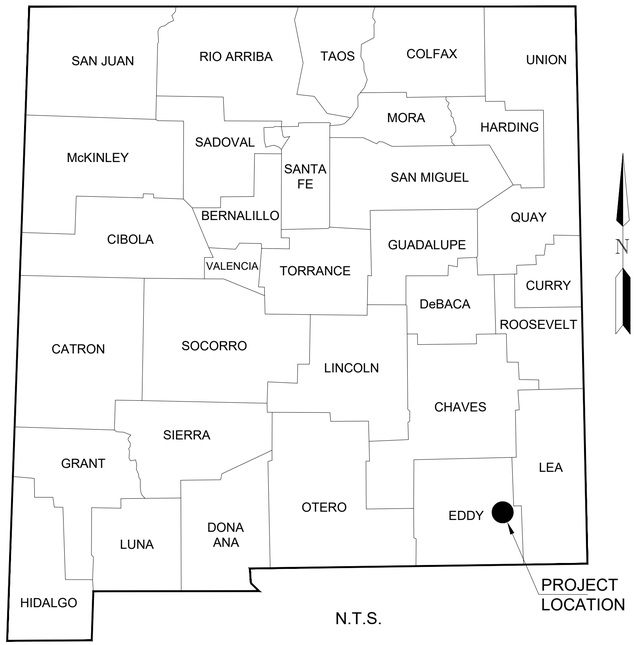
Sincerely,

Wayne Stover, RPG
Senior Geologist
FC&E Engineering

Cc: Ken Faulkner, FC&E
Russ Twitty, FC&E
Jason Jones, Intrepid

Appendix F

Detailed Plans and Specifications
for the Recycling Containment Ponds and Liner System



CONSTRUCTION PLANS

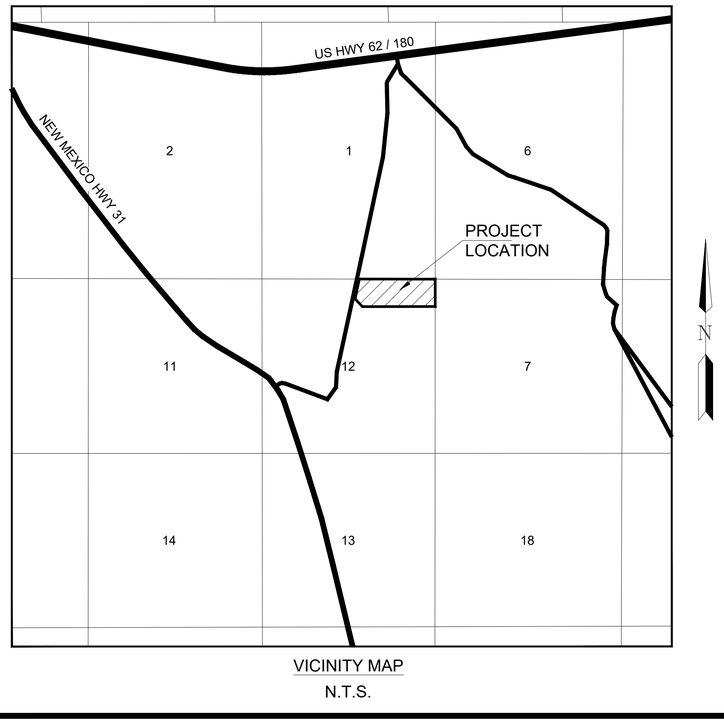
for

INTREPID, INC.

INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY

SECTION 12, TOWNSHIP 21 SOUTH, RANGE 29 EAST, EDDY COUNTY, NEW MEXICO

SEPTEMBER 2022



VICINITY MAP
N.T.S.

SHEET INDEX	
SHEET NO.	TITLE
1	Cover Sheet
2	General Notes & Quantities
3	Existing Conditions
4	Site Plan
5	Site Grading Plan
6	Liner Plan Notes
7	Liner Plan
8	Cross Sectional Views
9	Cross Sectional Views (Con't)
10	Leak Detection Details
11	Miscellaneous Details
12	Miscellaneous Details (Con't)

PREPARED BY:

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance
917 MARQUETTE RD
BRANDON, MS 39042
(601) 824-1860

GENERAL NOTES:

1. EXISTING TOPOGRAPHIC FIELD SURVEY PERFORMED: DECEMBER 7, 8, 9, 10, 2020.
2. HORIZONTAL AND VERTICAL COORDINATES ARE BASED ON CONTROL POINTS PROVIDED BY INTREPID POTASH. "WS-3", LOCATED SOUTH OF THE PROJECT AREA, MONUMENTED BY A 3/4 INCH DIAMETER REBAR, AND HAVING COORDINATES OF N: 540261.853, E: 663151.486 (NAD 83 NEW MEXICO STATE PLANE, EAST ZONE, US SURVEY FEET) EL: 3284.905' (NAVD 88), WAS USED AS A BASE STATION TO CONDUCT THE EXISTING TOPOGRAPHIC SURVEY.
3. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL IDENTIFY AND LOCATE ALL UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES
4. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES AND CONTACT THE ENGINEER IN WRITING.
5. THE CONTRACTOR SHALL INSTALL AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.
6. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.

ESTIMATED QUANTITIES

PAY ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT	QUANTITY
1	MOBILIZATION	LS	1
2	CLEARING AND GRUBBING	ACRE	44
3	REMOVAL AND STOCKPILING OF TOPSOIL (6" AVERAGE DEPTH)	CY	35,493
4	ESTIMATED CUT (IN-PLACE)	CY	302,979
5	ESTIMATED FILL (IN-PLACE)	CY	222,412
6	60 MIL H.D.P.E. TEXTURED GEOMEMBRANE (RUB SHEET)	SF	44,833
7	60 MIL H.D.P.E. SMOOTH GEOMEMBRANE (PRIMARY)	SF	710,578
8	40 MIL H.D.P.E. SMOOTH GEOMEMBRANE (SECONDARY)	SF	710,578
9	200 MIL GEONET	SF	710,578
10	8 OZ. GEOTEXTILE	SF	710,578
11	6" H.D.P.E. DR11 PIPE (LEAK DETECTION)	LF	180
12	DRAIN ROCK	CY	2
13	ANCHOR TRENCH	LF	4,543
14	SECURITY FENCING	LF	5948
15	20' GATES	EA	2
16	GAUGE / ESCAPE LADDER	EA	2
17	MATERIAL TESTING	LS	1
18	CONSTRUCTION WATER	LS	1
19	EROSION CONTROL & BEST MANAGEMENT PRACTICES	LS	1

POND STAGE STORAGE TABLE

ELEVATION (FEET)	POND 1 VOLUME CUMULATIVE (BBL)	POND 1 VOLUME CUMULATIVE (BBL)
3364	0	0
3365	199	199
3366	656	656
3367	6,372	6,372
3368	32,172	32,172
3369	73,412	73,412
3370	115,639	115,639
3371	158,906	158,906
3372	203,222	203,222
3373	248,596	248,596
3374	295,040	295,040
3375	342,562	342,562
3376	391,173	391,173
3377	440,883	440,883
3378	491,701	491,701
3379	543,637	543,637
3380	596,701	596,701
3381	650,903	650,903
3382	706,253	706,253
3383	762,760	762,760
3384	820,435	820,435
3385	879,289	879,289

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CHECKED BY:	KF
SCALE:	N.T.S.

REVISIONS NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR INTREPID, INC. INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY EDDY COUNTY, NEW MEXICO

KENNETH L. FALKNER, NEW MEXICO, 18364, PROFESSIONAL ENGINEER
9/23/22

2 of 12

NOTES & QUANTITIES

EXISTING CONDITIONS NOTES:

1. FIELD SURVEY PERFORMED: DECEMBER 7, 8, 9, 10, 2020.
2. HORIZONTAL AND VERTICAL COORDINATES ARE BASED ON CONTROL POINTS PROVIDED BY INTREPID POTASH. "WS-3", LOCATED SOUTH OF THE SURVEYED AREA, MONUMENTED BY A 3/4 INCH DIAMETER REBAR, AND HAVING COORDINATES OF N: 540261.853, E: 663151.486 (NAD 83 NEW MEXICO STATE PLANE, EAST ZONE, US SURVEY FEET) EL: 3284.905' (NAVD 88), WAS USED AS A BASE STATION TO CONDUCT THIS SURVEY.
3. THIS MAP HAS BEEN PRODUCED ACCORDING TO PROCEDURES THAT HAVE BEEN DEMONSTRATED TO PRODUCE DATA THAT MEETS OR EXCEEDS THE MINIMUM STANDARDS FOR A TOPOGRAPHIC MAP COMPILED AT A SCALE OF 1" = 100'WITH A CONTOUR INTERVAL OF 1 FOOT.
4. THIS IS NOT A BOUNDARY SURVEY.
5. THIS IS A CLASS 3 (RURAL) SURVEY.
6. ADDITIONAL UTILITIES OR IMPROVEMENTS MAY EXIST THAT WERE UNDERGROUND OR INACCESSIBLE ON THE DATE THIS SURVEY WAS CONDUCTED.

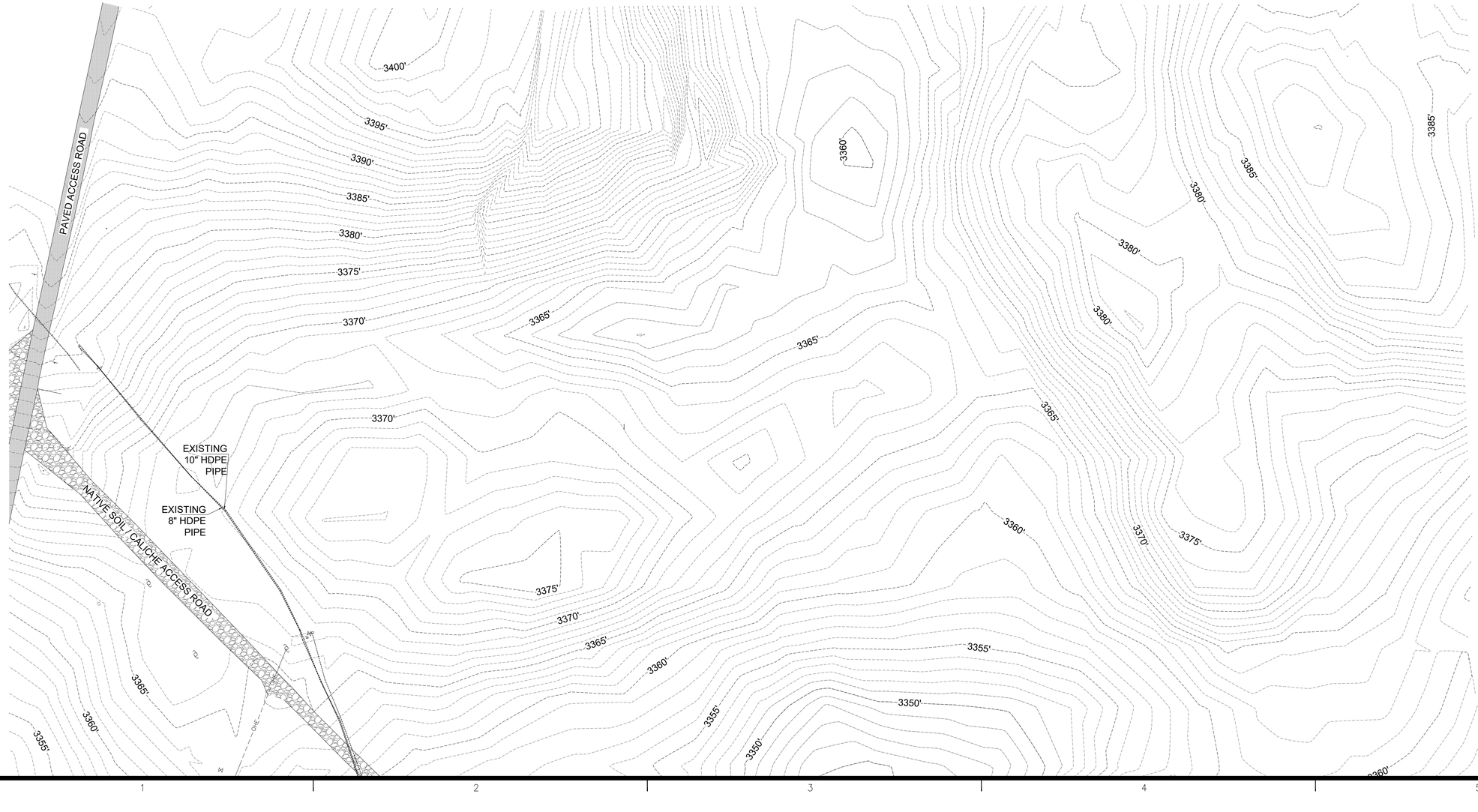
LEGEND

- EXISTING CONTOUR
- 3375' EXISTING INDEX CONTOUR
- EXISTING FENCE (CHAIN LINK)
- EXISTING FENCE (BARBED WIRE)
- OHE OVERHEAD POWER

N

0 50 100 200

SCALE: 1" = 100'



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SCALE:	1" = 50'

REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR INTREPID, INC. INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY EDDY COUNTY, NEW MEXICO

KENNETH L. FANNIN NEW MEXICO 18564 PROFESSIONAL ENGINEER 9/23/23

3 of 12

EXISTING CONDITIONS

SITE PLAN NOTES:

1. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL IDENTIFY AND LOCATE ALL UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES
2. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES AND CONTACT THE ENGINEER IN WRITING.
3. THE CONTRACTOR SHALL INSTALL AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.
4. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.

SITE PLAN NOTES:

1. INSTALL BEST MANAGEMENT PRACTICES (BMP'S).
2. CLEAR AND GRUB VEGETATION.
3. STRIP TOPSOIL AND STOCKPILE IN LOCATION AS DIRECTED BY THE ENGINEER.
4. PERFORM EARTHWORK ACTIVTIES INCLUDING BUT NOT LIMITED TO EXCAVATING, MOVING AND COMPACTING.
5. INSTALL SECURITY FENCING.
6. DIG ANCHOR TRENCHES
7. INSTALL LINERS AND BACKFILL ANCHOR TRENCHES

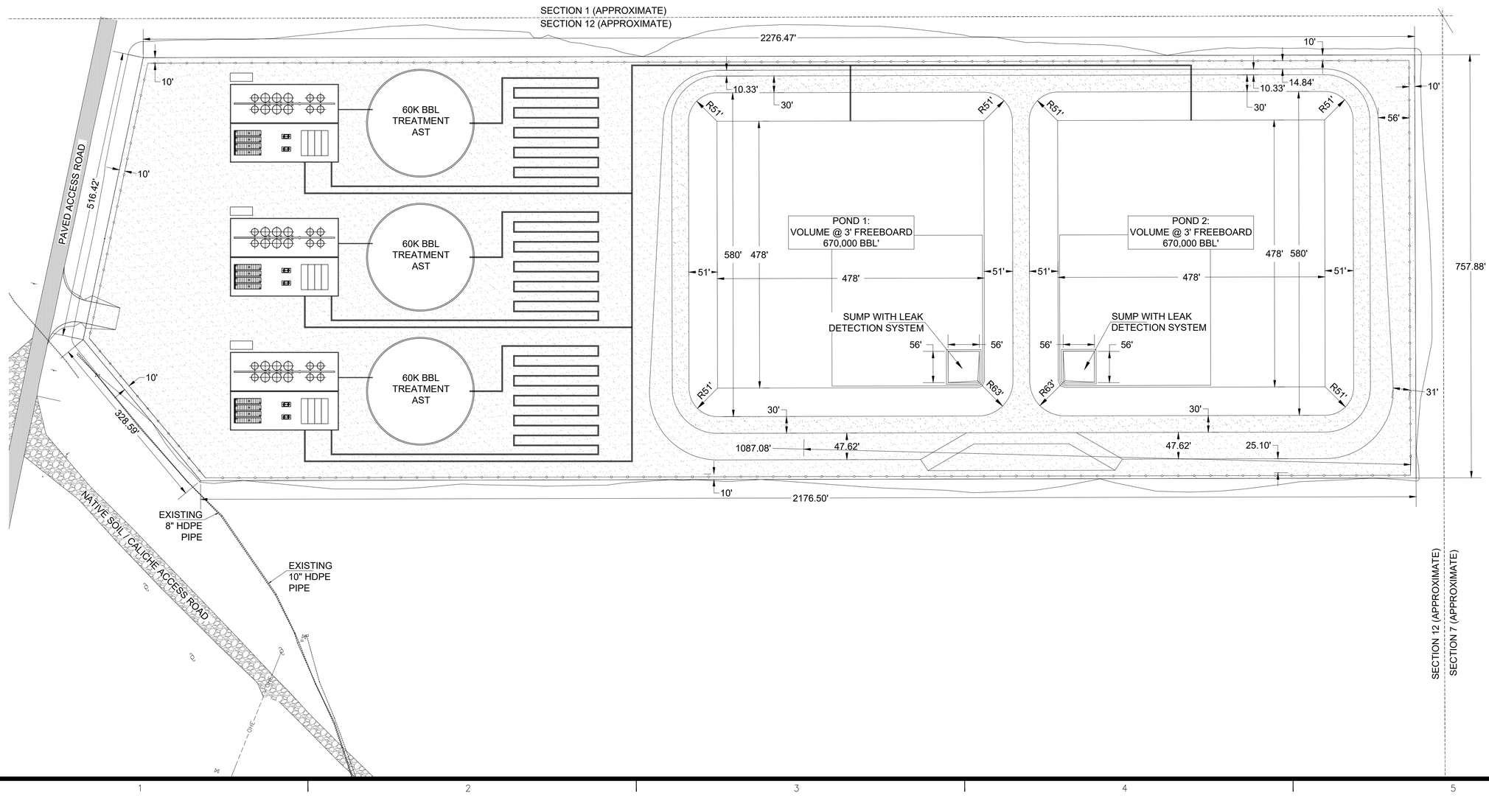
LEGEND

- EXISTING CONTOUR
- 3375' EXISTING INDEX CONTOUR
- PROPOSED FENCE
- OHE OVERHEAD POWER

N

0 50 100 200

SCALE: 1" = 100'



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PROJECT #:	1755
DATE:	09/23/2023
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SCALE:	1" = 100'

REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR INTREPID, INC. INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY EDDY COUNTY, NEW MEXICO

KENNETH L. FAULKNER — NEW MEXICO — 18569 — PROFESSIONAL ENGINEER

9/23/23

4 of 12

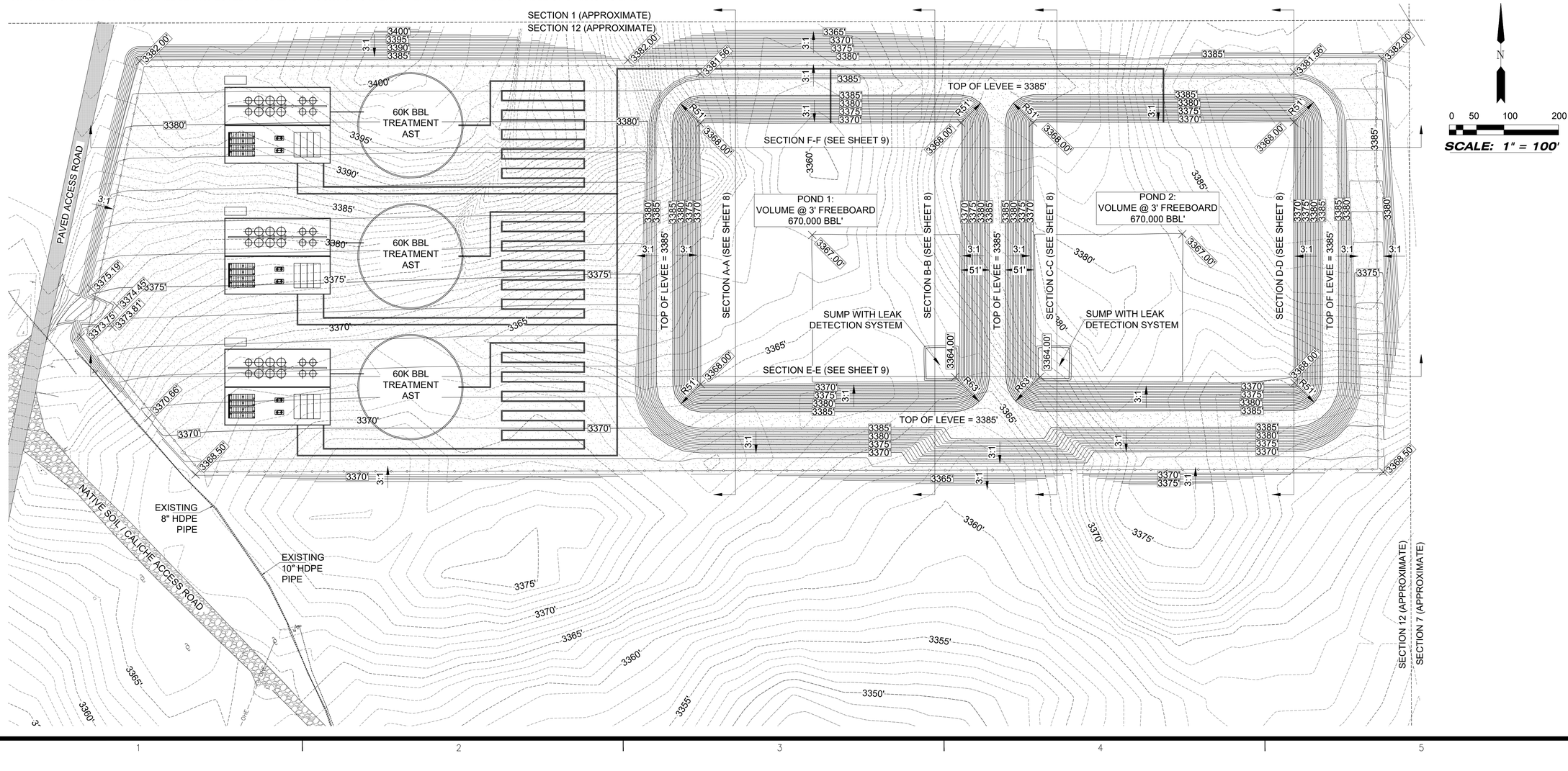
SITE PLAN

GRADING PLAN NOTES:

1. EXISTING TOPOGRAPHIC FIELD SURVEY PERFORMED: DECEMBER 7, 8, 9, 10, 2020.
2. HORIZONTAL AND VERTICAL COORDINATES ARE BASED ON CONTROL POINTS PROVIDED BY INTREPID POTASH. "WS-3", LOCATED SOUTH OF THE PROJECT AREA, MONUMENTED BY A 3/4 INCH DIAMETER REBAR, AND HAVING COORDINATES OF N: 540261.853, E: 663151.486 (NAD 83 NEW MEXICO STATE PLANE, EAST ZONE, US SURVEY FEET) EL: 3284.905' (NAVD 88), WAS USED AS A BASE STATION TO CONDUCT THE EXISTING TOPOGRAPHIC SURVEY.
3. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
4. ALL PROPOSED ELEVATIONS AND CONTOURS REPRESENT FINISHED GRADE.
5. SURFACE SHALL BE ROLLED WITH A SMOOTH ROLLER TO PREVENT RUTS.
6. WATER SHALL BE USED FOR COMPACTION AT ALL TIMES. THE CONTRACTOR SHALL ENSURE THEIR BID INCLUDES CONSTRUCTION WATER. NO EARTHWORK OPERATIONS SHALL TAKE PLACE IF CONSTRUCTION WATER IS NOT AVAILABLE ONSITE.
7. UNCONTROLLED AND INCONSISTENT PUSHING AND PILING OF MATERIAL FOR LEVEE CONSTRUCTION IS NOT ACCEPTABLE. A SUCCESSFUL COMPACTION PROCESS SHALL BE DEVELOPED IN THE BEGINNING STAGES OF CONSTRUCTION. SAID COMPACTION PROCESS SHALL BE VERIFIED THROUGH USAGE OF NUCLEAR DENSITY GAUGE OR SAND CONE TESTING, AND SHALL MAINTAIN CONSISTENCY THROUGHOUT CONSTRUCTION AS LONG AS FILL MATERIALS BEING USED REMAINS CONSISTENT. IF CHANGES IN ONSITE FILL MATERIALS OCCUR, THE CONTRACTOR SHALL DEVELOP A NEW COMPACTION PROCESS. FILL FOR LEVEES SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER. EACH LAYER SHALL BE CONSTRUCTED CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE LEVEE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A STANDARD PROCTOR SOILS TEST ON SAMPLES FROM THE SOURCE AREA.
8. FILL SHALL NOT BE PLACED AND COMPACTED WHEN THE MATERIALS ARE TOO WET TO PROPERLY COMPACT. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. IF THE ENGINEER DETERMINED THAT ADDED MOISTURE IS REQUIRED, WATER SHALL BE APPLIED UNIFORMLY OVER THE AREA TO BE TREATED, AND GIVE COMPLETE AND ACCURATE CONTROL OF THE AMOUNT OF WATER TO BE USED. IF TOO MUCH WATER IS ADDED, THAT AREA SHALL BE PERMITTED TO DRY BEFORE COMPACTION IS CONTINUED.
9. ONE NUCLEAR DENSITY GAUGE TEST SHALL BE PERFORMED PER 2500 CY MINIMUM OR AS DIRECTED BY THE ENGINEER.
10. CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF THE FINISHED COMPACTED POND BOTTOM AND SIDE SLOPES BEFORE HDPE LINER INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.
11. FINAL GRADED SURFACE SHALL BE INSPECTED FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY BE CAPABLE OF DAMAGING LINER.

LEGEND

- EXISTING CONTOUR
- 3375' EXISTING INDEX CONTOUR
- PROPOSED CONTOUR
- 3375' PROPOSED INDEX CONTOUR
- PROPOSED FENCE
- OHE OVERHEAD POWER



FC&E Engineering, LLC
Water • Soils • Air • Compliance
917 MARQUETTE RD
BRANDON, MS 39042
(601) 824-1860

PROJECT #:	1755
DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	1" = 100'

NO.	DATE	DESCRIPTION
REVISIONS		

CONSTRUCTION PLANS FOR INTREPID, INC. INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY EDDY COUNTY, NEW MEXICO

KENNETH L. FAULKNER — NEW MEXICO — 18567 — PROFESSIONAL ENGINEER
9/23/22

5 of 12

SITE GRADING PLAN

LINER PLAN NOTES:

1. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES AND CONTACT THE ENGINEER IN WRITING. THE CONTRACTOR SHALL INSTALL AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.
2. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
3. PRIOR TO INSTALLATION, LINER INSTALLER SHALL SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE).
4. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL PROVIDE SUBMITTAL DEPICTING PROPOSED LAYOUT OF LINER PANELS.
5. CONTRACTOR SHALL INSTALL A FULL DOUBLE WIDTH SECTION OF 60 MIL TEXTURED HDPE GEOMEMBRANE RUB SHEET. EXTRUSION 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.
6. FOR SEAM REINFORCEMENT, A 3 FOOT DIAMETER MINIMUM PIECE OF 40 MIL LINER SHALL BE EXTRUSION WELDED WHERE CORNER PORTIONS MEET.
7. GRADED SURFACE SHALL BE INSPECTED FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER.
8. SURFACE SHALL BE ROLLED WITH A SMOOTH ROLLER TO PREVENT RUTS.
9. UNTIL POND IS FILLED TO A MINIMUM DEPTH OF 3 FEET, SANDBAGS SHALL BE PLACED ON LINER DURING INSTALLATION AS NEEDED TO PREVENT WIND UPLIFT.
10. BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE SHALL BE USED AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE SHALL BE USED AS THE SECONDARY LINER.
11. CONTRACTOR SHALL INSTALL LINER AS PER MANUFACTURER'S RECOMMENDATIONS.
12. CONTRACTOR SHALL WELD ALL SEAMS WITH A MINIMUM OF 6" OVERLAP.
13. FULL LENGTH OF ALL SEAMS SHALL BE NONDESTRUCTIVELY TESTED USING AN AIR PRESSURE OR VACUUM TEST, TO CHECK THE CONTINUITY OF THE SEAM PER THE INSTALLATION QUALITY ASSURANCE MANUAL.
14. FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.

    A. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.

    B. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. THEN PRESSURIZE THE AIR CHANNEL TO A MINIMUM OF 35 PSI. NOTE TIME STARTS AND WAIT A MINIMUM OF 5 MINUTES TO CHECK. IF PRESSURE AFTER 5 MINUTES HAD DROPPED LESS THAN 2 PSI THE TEST IS SUCCESSFUL (THICKNESS OF MATERIAL MAY CAUSE VARIANCE).

    C. CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.

    D. IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
    - WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
    - WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING
    - RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS LOCATED.

    E. ONCE LEAK IS FOUND USING ONE OF THE PROCEDURES ABOVE, CUT OUT THE AREA AND RETEST 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.

15. ALL NON-DESTRUCTIVE TESTS SHALL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
16. LINER SHALL BE PROTECTED WITH A 8 OZ. NON-WOVEN GEOTEXTILE IF ROCK OR OTHER ANGULAR MATERIALS WITH A DIMENSION GREATER THAN 3/4 INCH ARE PRESENT
17. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
18. GAS LINER VENTS SHALL BE INSTALLED ALONG THE INSIDE SLOPES AT INTERVALS OF 100 FEET OR A MINIMUM OF 2 VENTS PER SIDE.
19. 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.
20. BOTH PRIMARY AND SECONDARY LINERS SHALL BE PLACED IN ANCHOR TRENCHES.
21. ANCHOR TRENCHES SHALL BE BACKFILLED WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER.

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BRANDON, MS 39042
(601) 824-1860

PROJECT #:	1755
DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	N.T.S.

REVISIONS

NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR
INTREPID, INC.
INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY
EDDY COUNTY, NEW MEXICO

KENNETH L. FAULKNER
NEW MEXICO
18534
PROFESSIONAL ENGINEER
9/23/23

LINER PLAN NOTES

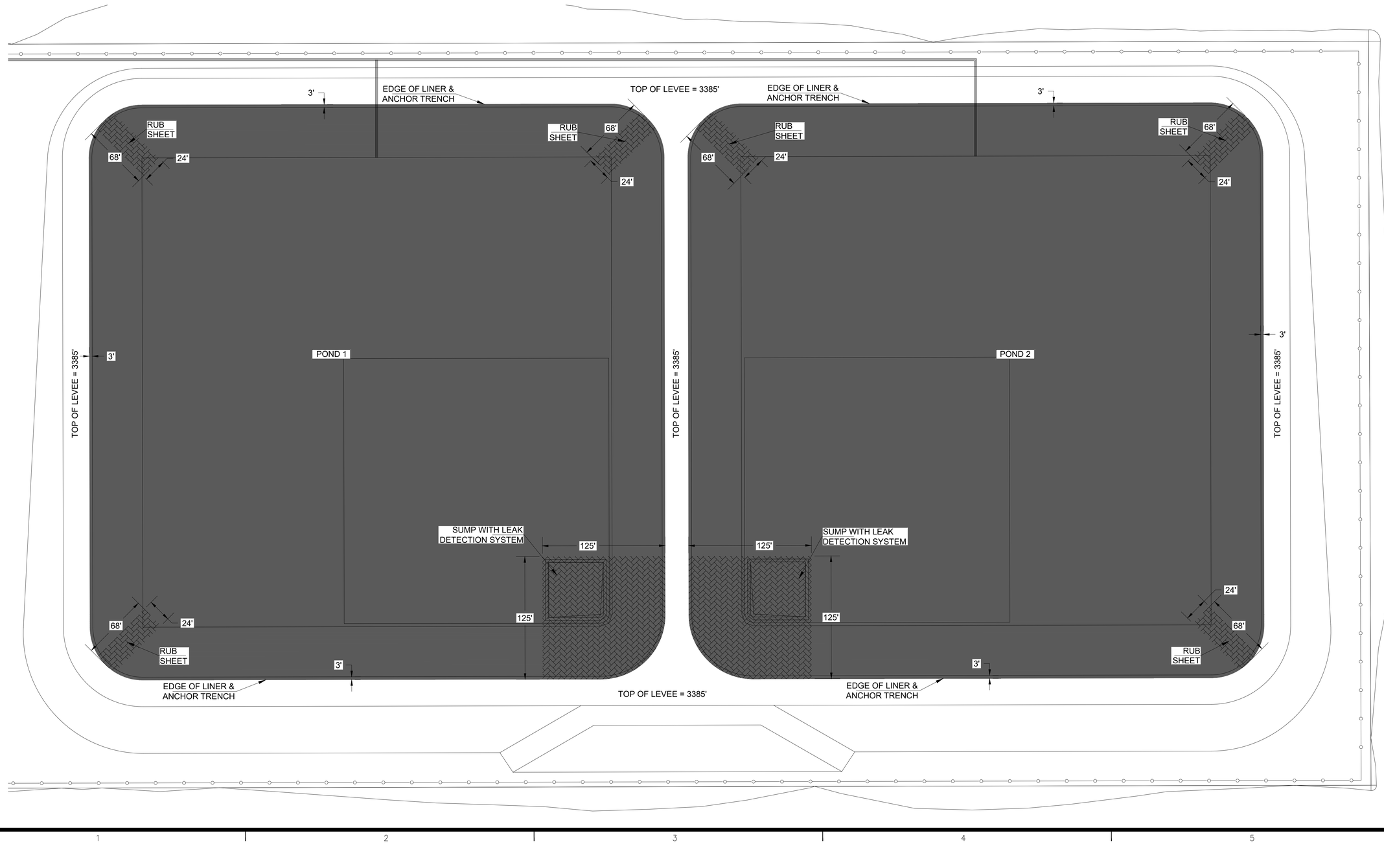
LEGEND

- EXISTING CONTOUR
- 3375' EXISTING INDEX CONTOUR
- PROPOSED FENCE
- PROPOSED LINER
- PROPOSED RUB SHEET

N

0 25 50 100

SCALE: 1" = 50'



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PROJECT #:	2065
DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	1" = 50'

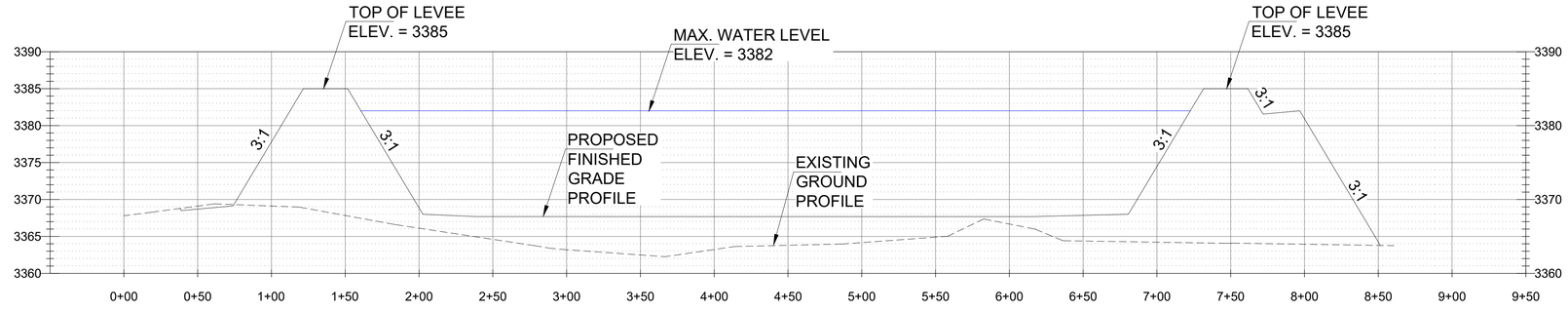
REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR INTREPID, INC. INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY EDDY COUNTY, NEW MEXICO

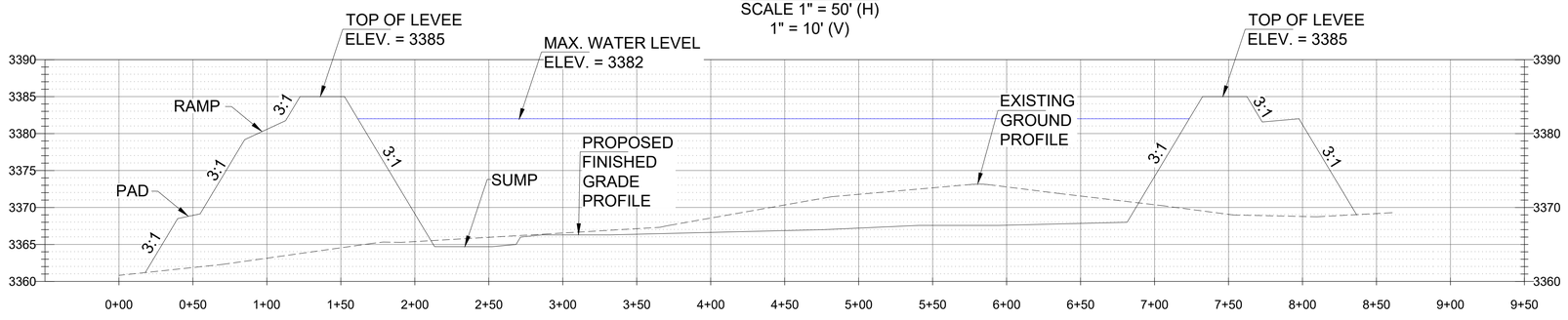
KENNETH L. FAULKNER NEW MEXICO 18509 PROFESSIONAL ENGINEER
9/23/22

7 of 12

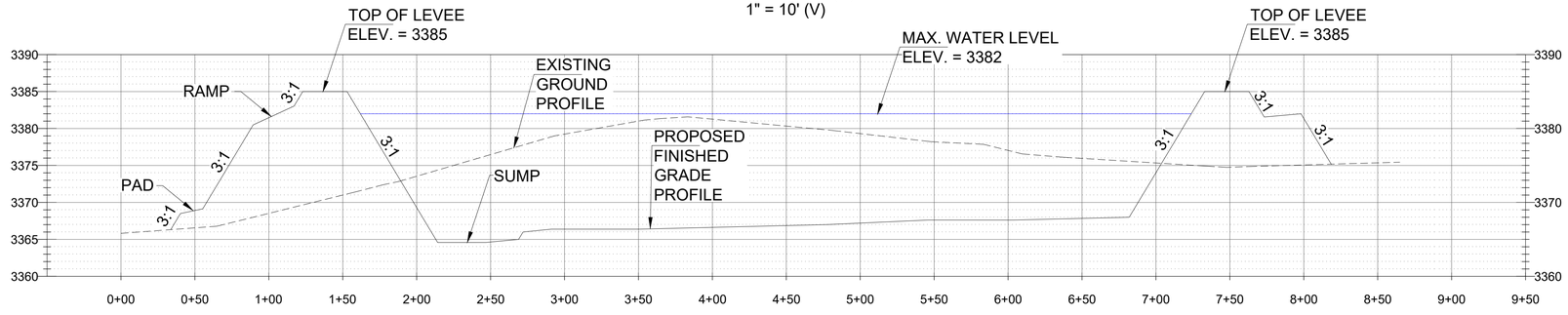
LINER PLAN



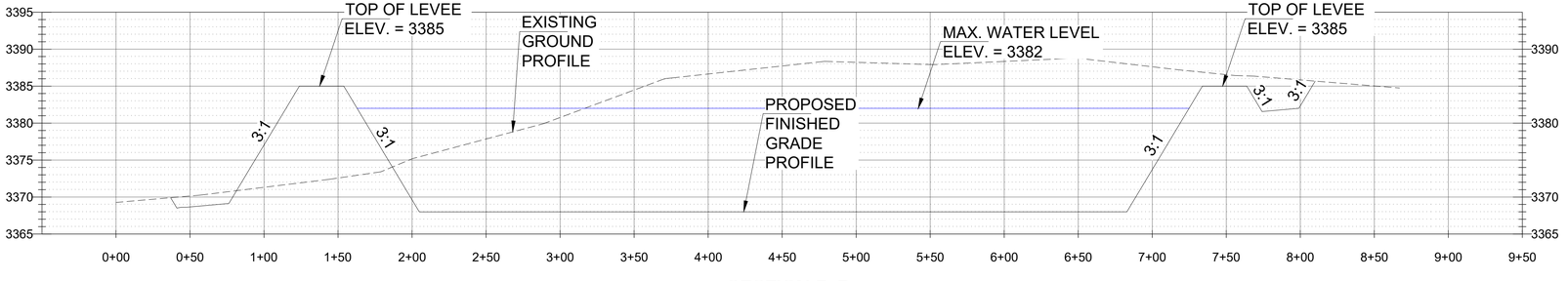
SECTION A-A
SCALE 1" = 50' (H)
1" = 10' (V)



SECTION B-B
SCALE 1" = 50' (H)
1" = 10' (V)



SECTION C-C
SCALE 1" = 50' (H)
1" = 10' (V)



SECTION D-D
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1" = 10' (V)

FC&E Engineering, LLC
Water • Soils • Air • Compliance
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BRANDON, MS 39042
(601) 824-1860

PROJECT #:	1755
DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	1" = 100'

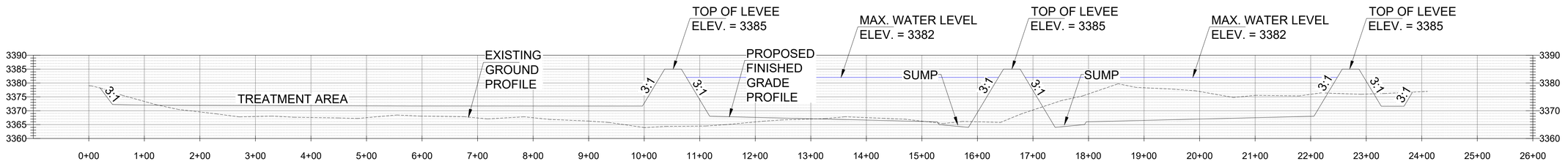
REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR
INTREPID, INC.
INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY
EDDY COUNTY, NEW MEXICO

KENNETH L. FAULKNER
NEW MEXICO
18556
PROFESSIONAL ENGINEER
9/23/22

8 of 12

CROSS SECTIONAL VIEWS



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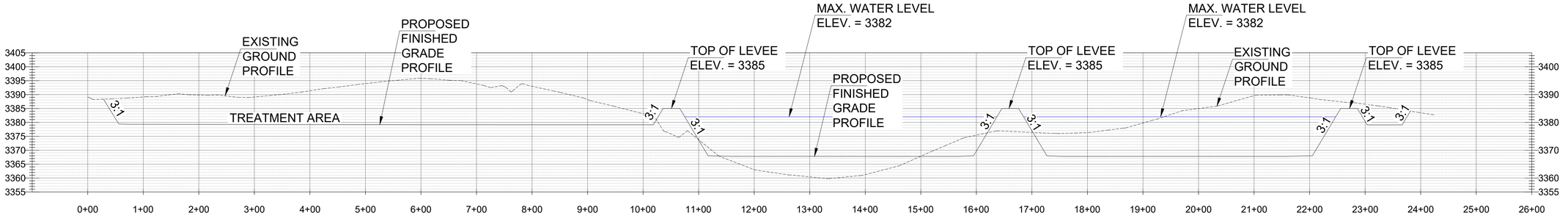

SECTION E-E
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1" = 20' (V)

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PROJECT #:	1755
DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	AS SHOWN

REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR
INTREPID, INC.
INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY
EDDY COUNTY, NEW MEXICO

KENNETH L. FAIN JR.
NEW MEXICO
18554
PROFESSIONAL ENGINEER
9/23/22

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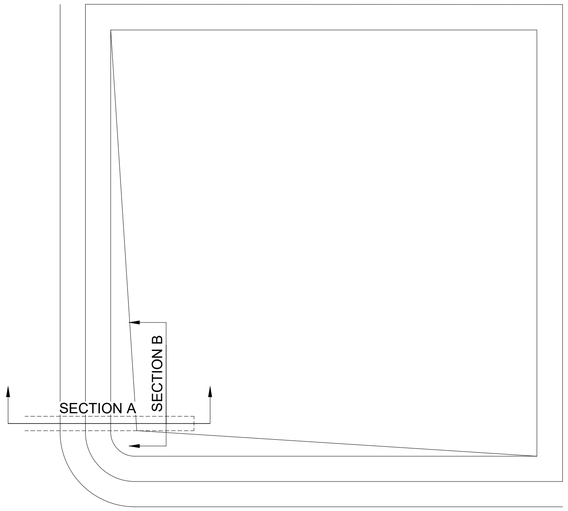
CROSS SECTIONAL VIEWS (Con't)



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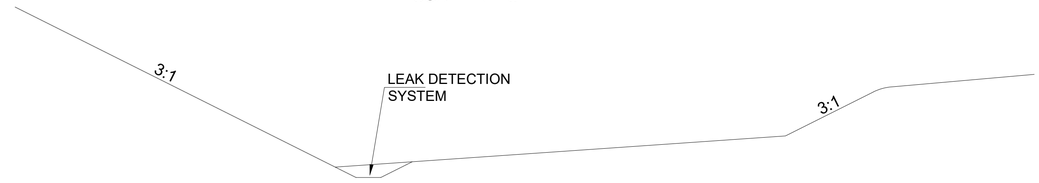

SUMP DETAIL (PROFILE VIEW)
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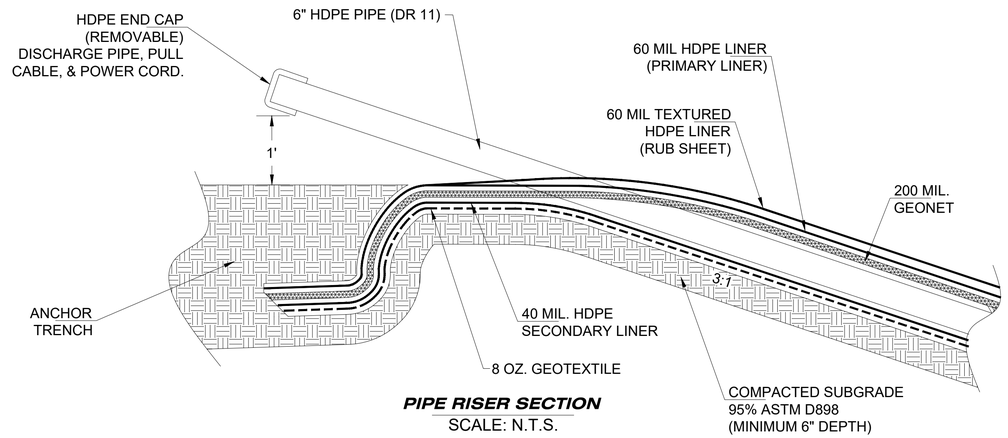

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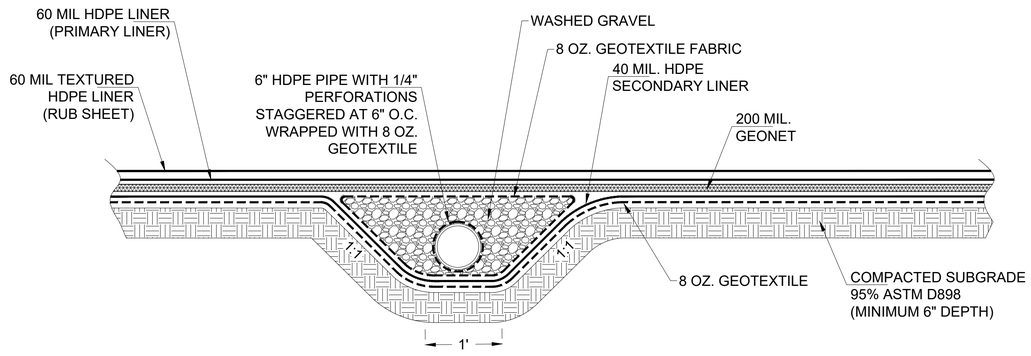

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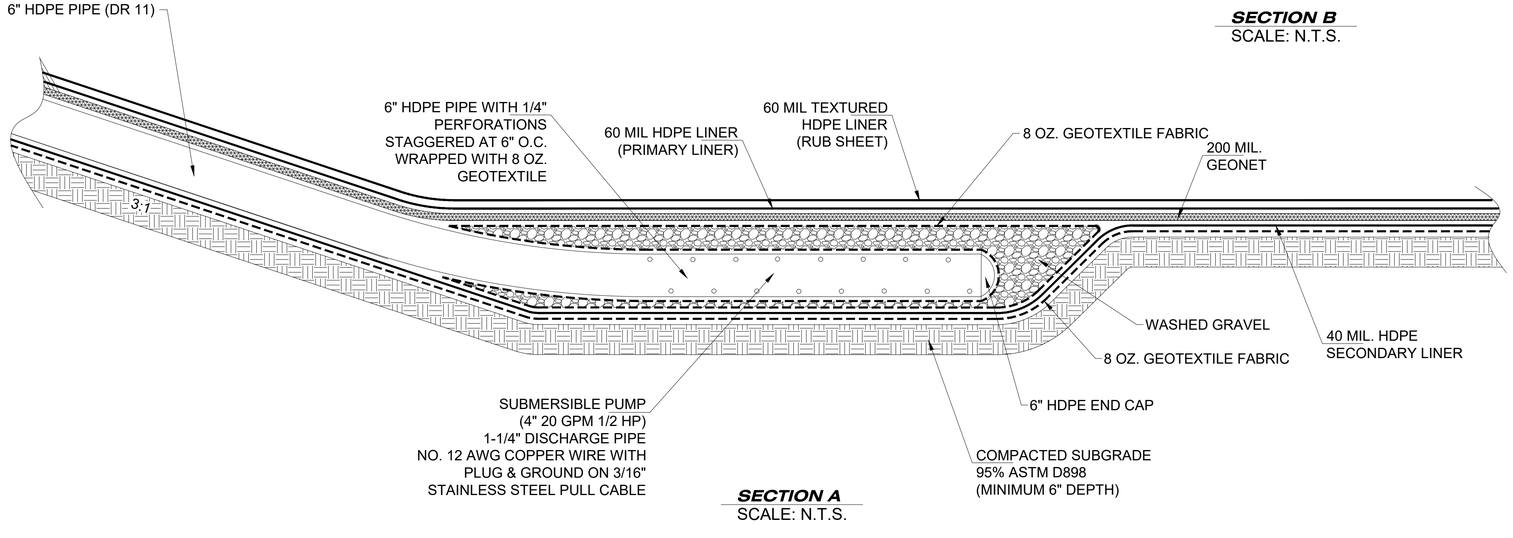

SECTION A
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PROJECT #:	1755
DATE:	09/23/2023
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CHECKED BY:	KF
SCALE:	N.T.S.

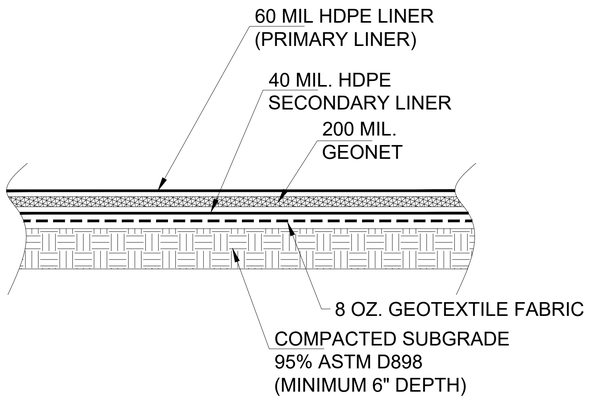
REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR
INTREPID, INC.
INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY
EDDY COUNTY, NEW MEXICO

KENNETH L. FALKNER
NEW MEXICO
16504
PROFESSIONAL ENGINEER
9/23/23

10 of 12

DETAILS - LEAK DETECTION



TYPICAL LINER SECTION (BOTTOM)
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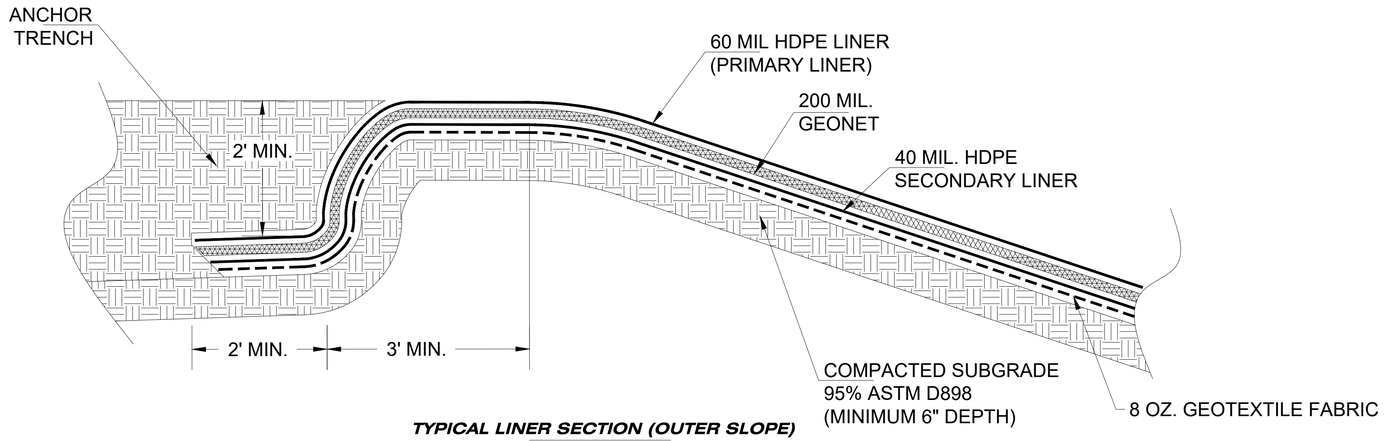

TYPICAL LINER SECTION (OUTER SLOPE)
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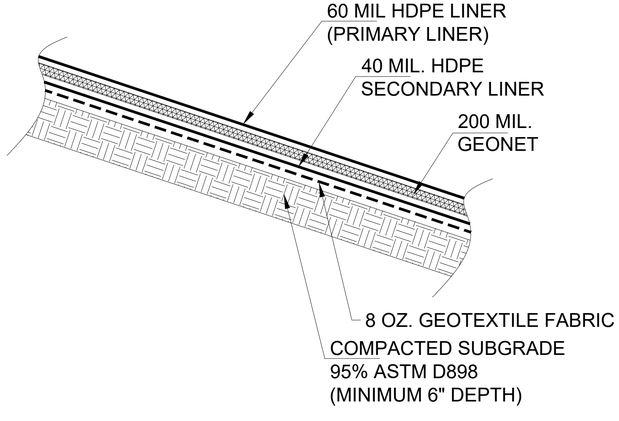

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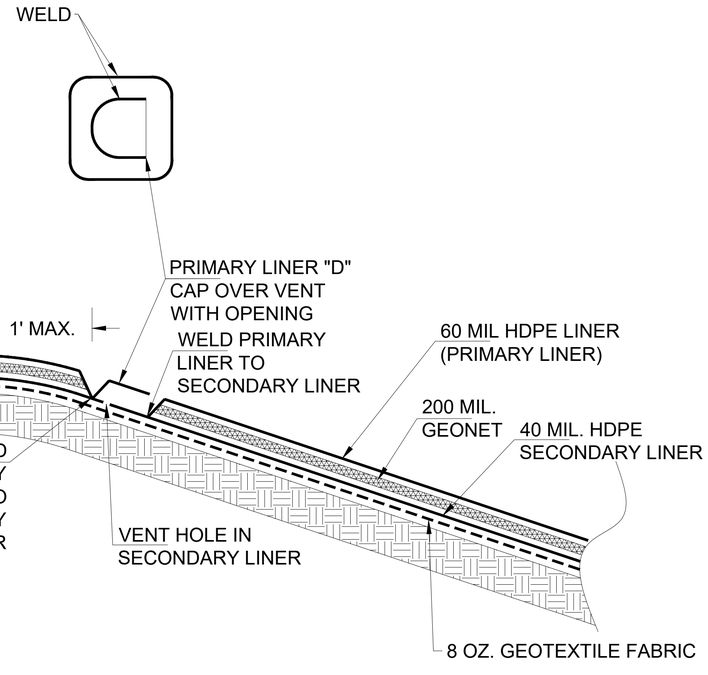

TYPICAL LINER SECTION (OUTER SLOPE WITH GAS VENT)
SCALE: N.T.S.

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PROJECT #:	1755
DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	N.T.S.

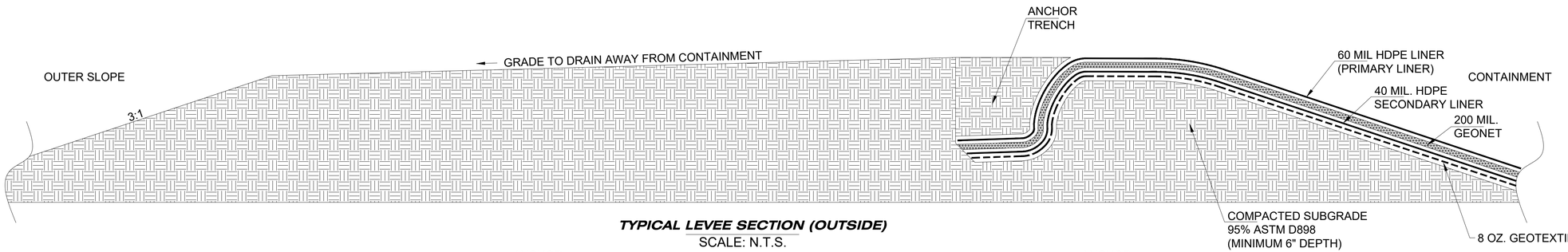
REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR
INTREPID, INC.
INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY
EDDY COUNTY, NEW MEXICO

KENNETH L. FALVEY
NEW MEXICO
18584
PROFESSIONAL ENGINEER
9/23/22

11 of 12

DETAILS - MISCELLANEOUS



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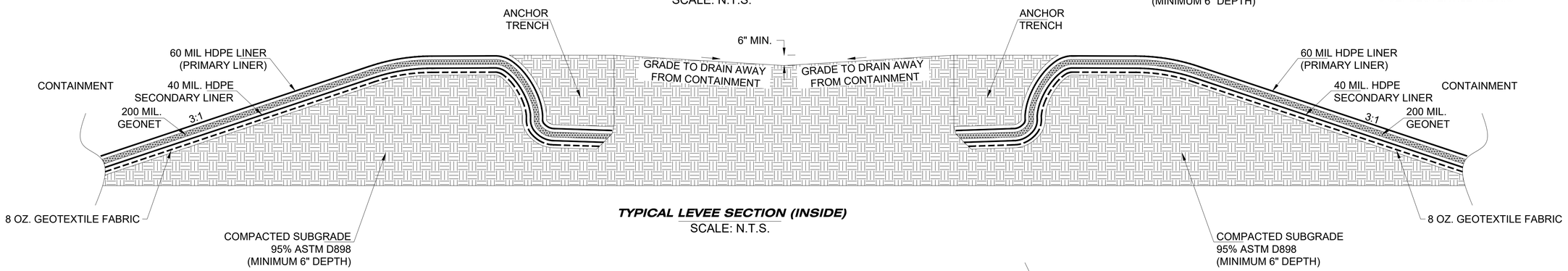

TYPICAL LEVEE SECTION (INSIDE)
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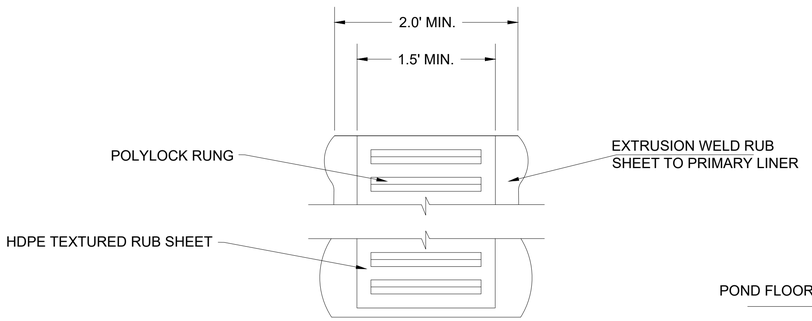

ESCAPE LADDER (FRONT)
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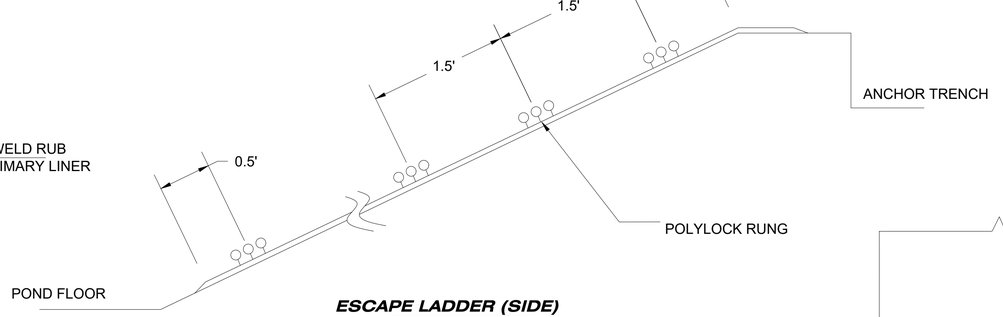

ESCAPE LADDER (SIDE)
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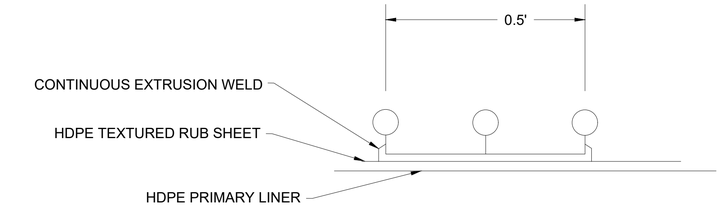

POLYLOCK RUNG
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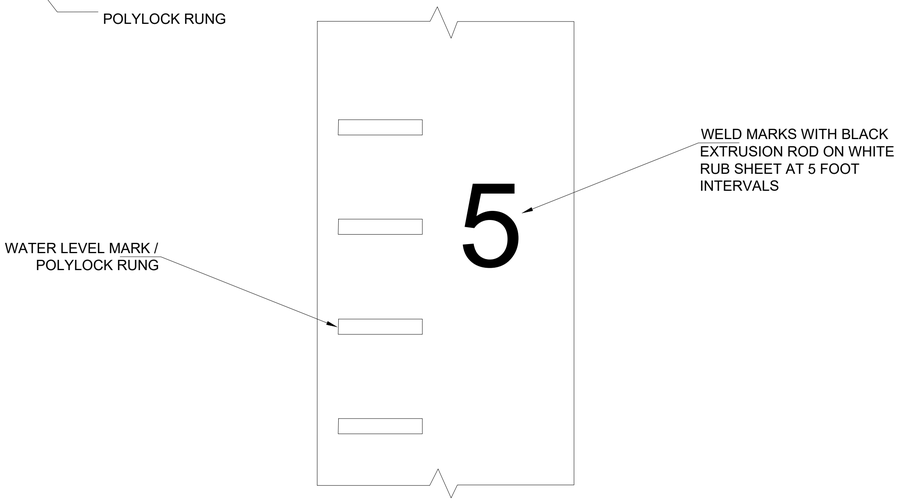

WATER LEVEL MARKS
SCALE: N.T.S.

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DATE:	09/23/2023
DRAWN BY:	TAF
CHECKED BY:	KF
SCALE:	N.T.S.

REVISIONS		
NO.	DATE	DESCRIPTION

CONSTRUCTION PLANS FOR INTREPID, INC. INTREPID CENTRAL PRODUCED WATER RECYCLING FACILITY EDDY COUNTY, NEW MEXICO

KENNETH L. FALVEY — NEW MEXICO — 18564 — PROFESSIONAL ENGINEER — 9/23/22

12 of 12

DETAILS - MISCELLANEOUS

Appendix G

Engineer's Estimate for Closure

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

ENGINEER'S ESTIMATE Intrepid Central Produced Water Recycling Facility Closure						
Bid Item No.	Task	Units	Engineer's Estimated Quantity		Engineer's Estimated Unit Price	Extended Price
3.1	Mobilization & Demobilization	LS	1		$76,000.00	$76,000.00
3.2	Demolition - Fence Removal	LF	5,948.0		$4.70	$27,955.60
3.3	Demolition - Liner Removal & Disposal	SF	710,578		$1.00	$710,578.00
3.4	Removal of Berms and Spreading Topsoil	CY	302,979		$2.07	$627,166.53
3.5	Seeding / Fertilizing / Mulching	AC	43.2		$681.00	$29,419.20
						$0.00
						$0.00
						$0.00
						$0.00
						$0.00
						$0.00
				TOTAL ESTIMATE BEFORE TAX		$1,471,119.33
				GROSS RECEIPTS TAX RATE (7.4375%)		$109,414.50
				TOTAL ESTIMATE WITH TAX		$1,580,533.83

Soil Sampling/Analysis: $ 5,000

Total:$1,585,534

FC&E Engineering calculated the above values by using a similar facility located in Lea County that had a recent third party contractor (Shackelford Construction) develop a closure cost proposal. The quantities used by FC&E Engineering are based on Intrepid's proposed Central Recycling Facility and therefore the estimated closure cost is greater than the attached Shackelford estimate.

Shackelford

Construction & Hauling, LLC
Yazoo City, MS
Houston, TX

Finish every job ahead of schedule with zero incidents allowing our customers the earliest possible financial return on their investment.

Main Office
350 S. Industrial Pkwy
Yazoo City, MS 39194

PO Box 1529
Yazoo City, MS 39194

Office: (662) 746-5112
Fax: (662) 746-8383

Houston Office
1810 West Polk St.
La Porte, TX 77571

Office: (832) 856-0011

Date: 1/12/2021

Attn: Travis McBain

Ref: Warrior Water Treat and Reuse Facility (Reclamation) – Lea County, New Mexico

Mr. McBain,

Shackelford Construction and Hauling, LLC is pleased to offer the following proposal for the above referenced project. This proposal is based and conditioned upon the documents and drawings dated 11/8/2021 provided with the request for proposal on 1/4/2021 as well as pre-bid notes, and clarifications. The attached list of clarifications shall become an integral part of the Contract and take precedence over any conflict.

We thank you for the opportunity to provide a proposal for this project and look forward to working together.

Scope:

Included:

- One (1) mobilization
- Demo – 8’ Game Fence Removal
- Demo – Liner Removal & Disposal – (Includes removal of 60 mil rubsheet, 200 mil geonet, 40 mil secondary rubsheet, geotextile, gage ladder, HDPE pipe)
- Removal of Berms and Spreading of Topsoil
- Permanent Seeding – (Includes regional seed mix with fertilizer)

Duration of Work:

65 days to complete demo, removal of berms and seeding.

Clarifications for Mutual Understanding:

1. Shackelford Construction's current proposal does NOT include:
    - Field Offices
    - Material and compaction testing
    - Onsite Safety Coordinator
    - Removal or relocation or existing utilities
    - Maintenance
    - Removal of (2) onsite tanks (60k BBL AST)

The above list of exclusions has been made based on our understanding of the current request for proposal and have been listed above for clarity. Our current proposal and pricing can be revised to include an excluded item or items upon request.

2. Shackelford Construction plans to work 7 days a week 10-12 hours a day.
3. Schedule and pricing dependent upon crew(s) working continuously without delay once mobilized.
4. The warranties provided will be an industry standard prorated manufacturers warranties on the liner material and installs 1-year workmanship warranty
5. All pricing below includes 7.4375% NM gross receipts tax
6. Adjustment to mobilization cost dependent upon award of multiple projects that succeed each other
7. Pricing is only for the reclamation and closeout of the project site. New buildout costs based on the IFC drawings dated 11/8/2021 have not been submitted.

Pricing:

Description	Quantity	UOM	Unit Price	Extended
Mob. / Demob.	1	LS	$75,978.32	$75,978.32
Demo - Fence Removal	4,563	LF	$4.70	$21,454.38
Demo - Liner Removal & Disposal	1	LS	$541,811.87	$541,811.47
Removal of Berms and Spreading Topsoil	156,745	CY	$2.07	$324,928.58
Permanent Seeding	40	AC	$680.56	$27,222.29

Total before tax: $991,395.04
Gross Receipts Tax Rate: 7.4375%
Gross Receipts Tax: $73,735.01
Total with tax: $1,065,130.05

Shackelford Construction thanks you for the opportunity to provide a proposal for this project. We look forward to discussing the project further. If you have any questions or requests, please feel free to call myself or Jay Shackelford, President of Shackelford Construction, at (662) 746-5112.

Sincerely,

Bradley Boyd

Bradley Boyd
Project Manager / Estimator
Shackelford Construction & Hauling, LLC
601-503-5517
bradley@shackelfordconst.com

Appendix H

Letter Regarding Mining Variance

FC&E Engineering, LLC
Water ▪ Soils ▪ Air ▪ Compliance

October 24, 2022

Victoria Venegas
Environmental Specialist
Environmental Bureau
EMNRD – Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Re: Intrepid, Inc.
Proposed Produced Water Recycling Facility
Eddy County New Mexico
Requested Variance to NMAC 19.15.34.11.A.8

Dear Ms. Venegas:

I am writing regarding a variance to New Mexico Administrative Code 19.15.34.11.A.8 requested by Intrepid, Inc. for a proposed Produced Water Recycling Facility to be located in Eddy County, New Mexico.

Intrepid, Inc. is requesting a variance from General Siting Criteria concerning subsurface mines located under a proposed facility. The proposed PWR facility does overlay an inactive mine area. The mine workings at approximately 1,000 feet below surface have been inactive for more than 60 years and there are no current plans to resume mining at this depth under the project area. It is unlikely there will be any significant surface subsidence from this mining in the future. These mine workings underlie all the project area. Shallower mine workings located about 850' below surface have been inactive for about five (5) years and there are no current plans to resume mining at this depth under the project area. It is unlikely there will be any significant surface subsidence from this mining in the future. These shallower mine workings underlie portions of the project area. There are no other potash reserves under the project area that are expected to be mined.

Additionally, Intrepid controls the potash minerals lease under the entire project area. Intrepid retained RESPEC engineers to perform a study to determine the likelihood of future subsidence due to the location of these underground mines. The results of that study concluded that "Most of the subsidence that is anticipated to manifest on the surface from the convergence of the underground workings near the West Tailings Dam has already occurred and the continued convergence of the underground workings will likely have a negligible impact on the surface infrastructure." Therefore, we conclude from this study that a variance is warranted for

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underground mine workings below the proposed recycling containment structures. The full report from RESPEC is attached to this letter.

The Site-Specific Groundwater Section (Section **5.0**) indicates that the proposed facility is located in an area that does not have a shallow water table (>75 feet). The containment liner for the proposed facility is designed to exceed the NMOCD requirements. Detailed recycling facility plans and specifications are included in Appendix F of Intrepid's submittal of the *Intrepid Produced Water Recycling Facility C-147 Permit Application Report dated October 2022* for our proposed facility in Eddy County, New Mexico. Further, the proposed liners, leak detection system, site geology and regular inspections will be protective of the environment and will limit potential leaks.

In conclusion, the operator demonstrates that it has incorporated engineering measures into the design to ensure that the containment's integrity is not compromised. If you have additional questions or require more information, please contact me at (601) 824-1860 or KFaulkner@fce-engineering.com.

Sincerely,

Ken L. Faulkner, P.E.
Principal Engineer

KENNETH L. FAULKNER
NEW MEXICO
18564
PROFESSIONAL ENGINEER
10/24/22

CONFIDENTIAL MEMORANDUM

To: Greg Bruce
Chief Mining Engineer
Intrepid Potash Inc.
210 Red Cloud Road
Carlsbad, NM 88220

cc: Project Central File M0007.22005

From: Cody Vining
Manager, Rock Mechanics
RESPEC
P.O. Box 725
Rapid City, SD 57709

Date: October 10, 2022

Subject: Subsidence West Tailings Dam Subsidence Investigation

INTRODUCTION

The West Mine is located approximately 20 miles east of Carlsbad, New Mexica. Intrepid Potash extracted potash from the underground West Mine since acquiring the operation from Mississippi Potash Inc. and Eddy Potash, Inc. in 2004 until 2016, when mining ceased at the West Mine. Sylvinite was extracted from the 1st, 5th, and 7th Ore Zones within the center of the Salado Formation in the Permian Basin, which were generally flat at depths ranging between approximately 823 and 954 ft. During operations, ground-surface subsidence manifested because the convergence of the underground mine generally resulted in an acceptable response. However, in late 2015, a pipe at the West Tailings Dam failed and was attributed to ground-surface displacements.

Intrepid Potash Inc. (Intrepid) requested that a consultant familiar with salt mining conduct a subsidence study to predict the ground-surface response that can be attributed to the continued convergence of the historical mine workings. The study will help to better understand the impact that the convergence of the underground workings had on the tailings dam and how continued convergence may impact future ground-surface behavior.

This memorandum provides estimates of the anticipated subsidence distributions near the West Mine Tailings Dam. The memorandum briefly discusses RESPEC's qualifications and presents the study objectives, approach, significant results, and summary and conclusions.

CORPORATE QUALIFICATIONS

Salt mechanics gained importance as an engineering discipline when the hydrocarbon storage industry began constructing caverns in salt, and the United States started to study

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605.394.6400

radioactive waste disposal in salt formations. Since 1972, RESPEC has specialized in salt mechanics. Our first corporate contract was to perform salt-mechanics research for the national radioactive waste-disposal program, and our 50-plus-year continual involvement in this particular industry continues with our work for the Waste Isolation Pilot Plant in New Mexico, United States. Throughout this period, we extended our application of salt-mechanics principles to industrial projects involving salt and potash mining and hydrocarbon and hazardous waste storage in salt. Our long-term involvement, both corporately and individually, provides RESPEC engineers with the background and insight required to solve mining and rock-mechanics problems and demonstrates that RESPEC has consistently provided the rock-mechanics services required to satisfy project and client needs.

Rock mechanics, in its most basic form, involves developing and applying an understanding of how rock responds to changes in its equilibrium. This translates into how the rock that remains within and around a mine reacts to ore excavation for underground mining. Understanding how the rock reacts is important to understanding and addressing short-term, local issues with ground control and long-term, mine-wide issues that address overall mine stability and potential surface disturbances, as well as suitable resource management. RESPEC is one of the few organizations involved in rock-mechanics studies that also provides services in numerical analysis, laboratory testing, and field monitoring and testing. Our technical staff includes engineers and scientists with backgrounds in rock, solid, and fracture mechanics; mechanical, mining, and civil engineering; and geology, geophysics, and geological engineering. Our extensive background and approach to engineering problems have given us a deeper understanding of client needs and an appreciation for the critical interaction between the three areas. During the last 5 years, RESPEC has completed more than 400 mining and geomechanical projects. These projects include salt and potash mines in North America, South America, Europe, and Southeast Asia.

STUDY OBJECTIVES AND APPROACH

The subsidence distribution and subsidence rates that occur on the surface near the West Mine Tailings Dam are a cumulative result of the characteristics of the underground mine workings and creep characteristics of the rock salt, respectively. The resulting subsidence magnitude, therefore, is not uniform and will be greater above portions of the mine where the extraction intensity is the greatest. The objective of this subsidence study was to predict ground displacement by using the Solution Mining Research Institute's computer program SALT_SUBSID [Nieland and Van Sambeek, 2010][1] to better understand the ground-surface response attributed to the continued mine convergence of the historical workings in the 1st, 5th, and 7th Ore Zones. This study is specifically aimed to delineate regions on the surface near the tailings dam where subsidence-induced damage may be expected within prescribed time periods.

Predicting surface subsidence requires understanding the relationships among the volumes of the openings, movement rate of material into the openings, and spatial limits and proportional volume of movement toward the surface. Consequently, the parameter values required for calculating ground displacement included the mined geometries, depths, and dates; volumetric closure parameters; and parameters that define the isotropic material properties used to model subsidence over the Intrepid West Mine.

For this study, Intrepid provided RESPEC with a mine plan that identified the locations and details of the historical workings proximate to the West Mine Tail Dam, as shown in Figure 1. The historical workings

[1] **Nieland, J. D. and L. L. Van Sambeek, 2010.** *SALT_SUBSID, Version 2.0 User's Manual*, Research Report RR2009-02, prepared by RESPEC, Rapid City, SD, and POD, Inc., Albuquerque, NM, for the Solution Mining Research Institute, Clarks Summit, PA.

were subdivided into 1,050 discrete mine blocks based on the West Mine development schedule. Each block was assigned a local extraction ratio, mined height, and mined depth based on the mine location and data provided by Intrepid. The SALT_SUBSID parameter values used to describe the volumetric closure of the underground mine workings were derived from a fitting process that reduced the error between the predicted displacements and those displacements calculated from the available benchmark-elevation surveys between 2015 and 2022. Detailed descriptions of the SALT_SUBSID software, the methodology used to calculate the ground displacements, and the developed parameter values that were used to describe the West Mine closure are provided in Attachment A. Time-series plots comparing the predicted benchmark displacements to the displacements calculated from the benchmark-elevation surveys are provided in Figures B-1 through B-4 in Attachment B.

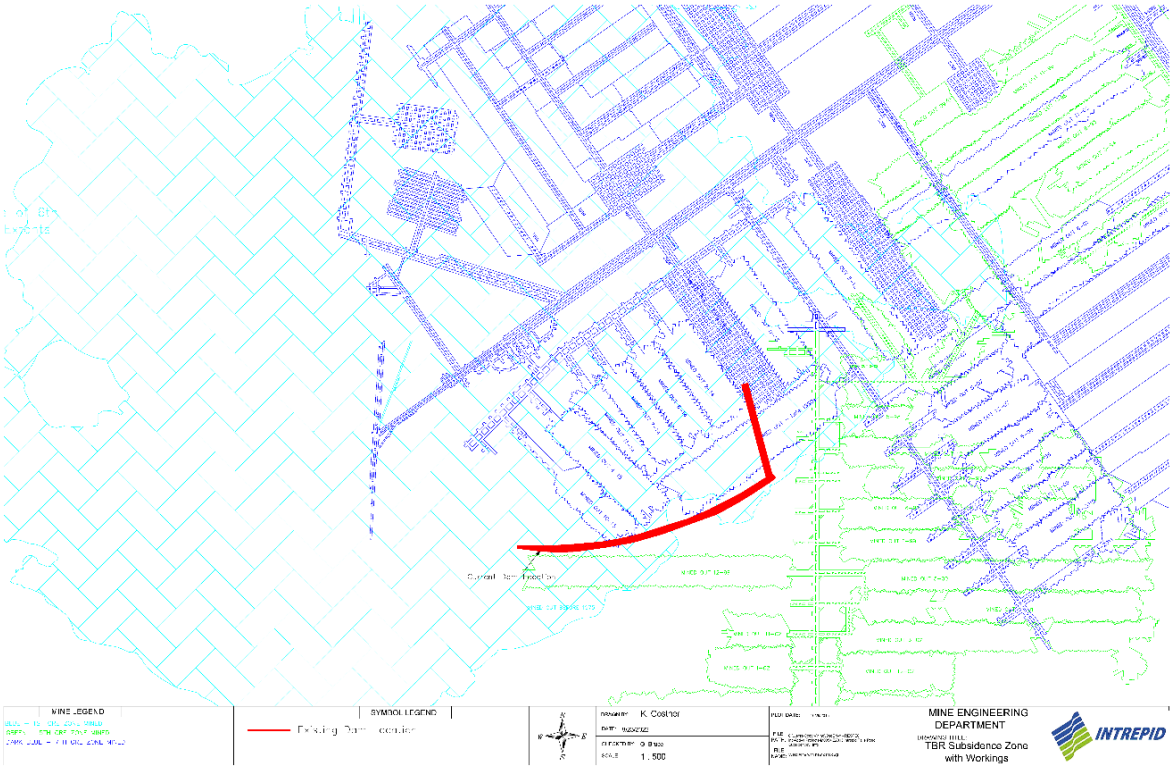

Figure 1. Drawing Illustrating the Location of Historical Workings on the 1st (Cyan), 5th (Green), and 7th (Blue) Ore Zones Relative to the West Tailings Dam Incorporated Into the Subsidence Model.

DAMAGE THRESHOLD CRITERION

The method used to assess the potential impact of mining-induced subsidence has on the ground-surface response and the tailings dam consisted of delineating regions on the surface that would be subject to damage from ground-surface subsidence. The term surface subsidence implies the total phenomenon of surface and subsurface movements and includes vertical and horizontal displacements and the associated forms of ground movement that result from differential (i.e., nonuniform) ground movement. These additional components include ground-surface tilt and differential vertical movement, curvature (i.e., bending), and horizontal extension (i.e., lengthening) and compression (i.e., shortening) of the ground surface.

In addition to altering the original ground surface, subsidence components transferred to the surface and subsurface infrastructure within these zones can adversely affect the useful life of the infrastructure. Selecting an appropriate damage-avoidance criterion for each subsidence-related

damage type is not straightforward. The damage type and severity level depend on the specific subsidence effect and type of structure. Vertical displacements are likely to affect surface-water drainage more than other subsidence components. However, surface structures (e.g., buildings, roads, pipelines, and dams) are usually affected more adversely by the components associated with differential displacement of the ground surface (e.g., horizontal strains and ground-surface tilts).

Threshold values that indicate the onset of negligible to slight damage were used for this study to assess the potential for dike cracking are provided in Table 1; horizontal strain and tilt values that exceed these limits may result in negligible to very slight damage. Attachment A provides information on the development of the damage-avoidance criteria values.

Table 1. Avoidance Criteria Values for Negligible to Very Slight Damage

Zone Description	Unit	Damage-Avoidance Value
Absolute Horizontal Strain	(microstrain)	1,000 to 2,000
Ground-Surface Tilt	in/in	0.002

(–) = strain
in/in = inch per inch.

SURFACE RESPONSE BETWEEN 1975 AND 2016

Ground-displacement calculations were made to predict the ground-surface response to the convergence of the historical workings to better understand the impact that convergence will have on the subsidence distribution near the tailings dam. The subsidence calculations represented the progressive development of the West Mine near the tailings dam on a 6-month interval from the first production on the 1st Ore Zone in the late 1930s through the development of the workings in the 5th and 7th Ore Zones. The simulations then calculated the ground-surface response that could be attributed to the convergence of the underground working until the Year 2050.

These results were used to estimate the subsidence that accumulated after the construction of the tailings dam and to provide estimates of the impact that subsidence had on the tailings dam. Construction detail on the tailings dam was limited, but is believed to have been constructed in the mid- to late-1970s. For this study, it is assumed that the tailings dam was constructed in 1975.

The subsidence values obtained from these calculations were compared to those of established damage-avoidance criteria to delineate surface regions that may suffer negligible to slight damage from continual mine convergence and assess the potential risk to the island dikes, surface structures, and surface and subsurface infrastructure. The results presented in this section are discussed in terms of the accumulated vertical displacements and extensional and compressional strains that manifested on the surface between Years 1975 and 2016.

VERTICAL DISPLACEMENT

Figures 2 and 3 show the contours of the predicted vertical displacement between 1975 and 2016 and the vertical displacement rate in 2016, respectively. These contours are used to illustrate the displacements attributed to the convergence of underground workings that underlie and surround the West Mine Tailings Dam since construction, which was assumed to occur in 1975. The smallest contour of vertical displacement is –0.05 feet, which is an arbitrary cutoff of the actual vertical displacement distribution. The maximum accumulated surface displacement between 1975 and 2016 is predicted

north of the tailings dam and approaches 4 feet, and the predicted subsidence rate in 2016 approaches 5 inches per year (inch/year).

HORIZONTAL SURFACE STRAINS

Ground lengthening (i.e., extension) occurs along the perimeter of the underground mine where the surface becomes convex and ground shortening (i.e., compression) occurs near the midspan of the underground mine where the surface becomes concave. As strains are transferred to the surface, cracks may form in high-extensional-strain zones and bulging may occur in high-compression areas; additionally, horizontal strains have the potential to damage linear structures that are unfavorably orientated. The established threshold for the onset of negligible to slight damage attributed to horizontal strain that was used for this study is 1,000 microstrain.

Figures 4 and 5 show contours of the total predicted extensional and compressional horizontal strains in 2016 and illustrate the strains that can be attributed to the convergence of the underground mine between 1975 and 2016. The smallest contour in each figure is 50 microstrain, which is an arbitrary cutoff of the actual strain distribution. The contours reveal that the extensional strains (Figure 4) of approximately 1,040 microstrain are predicted along the east section of the West Mine Tailings Dam at Year 2016, whereas compressional strains (Figure 5) of approximately 1,120 microstrain are predicted along the north section of the tailings dam. *These results indicate that the horizontal extensional and compressional strains that are predicted to have accumulated between 1975 and 2016 are greater than the threshold of negligible to slight damage (1,000 microstrain).*

INCREMENTAL SUBSIDENCE

The previous section presented the subsidence that was anticipated to accumulate on the surface from the convergence of the historical mine workings from the time the tailings dam was constructed in 1975 until 2016. Figures 6, 7, and 8 show contours of the predicted incremental vertical displacement that is anticipated to accumulate between 2022 and 2025, 2022 and 2035, and 2022 and 2050, respectively. In each figure, the smallest contour of vertical displacement is –0.05 inch, which is an arbitrary cutoff of the actual vertical displacement distribution. The maximum surface displacement that is predicted to accumulate between 2022 and 2025, 2022 and 2035, and 2022 and 2050 near the West Tailings Dam approaches 0.4, 1.3, and 2.0 inches, respectively.

Figures 9, 10, and 11 show contours of the predicted vertical displacement rates anticipated to manifest on the surface in 2025, 2035, and 2050. In each figure, the smallest contour of vertical displacement is –0.05 inch/year, which is an arbitrary cutoff of the actual vertical displacement distribution. The maximum surface displacement that is predicted to accumulate between 1975 and 2016, 1975 and 2022, and 1975 and 2050 approaches 0.12, 0.07, and less than 0.05 inch/year, respectively. *These results suggest that most of the subsidence that is anticipated to manifest from the convergence of the underground workings near the West Tailings Dam has already occurred, and the continued convergence of the underground workings will likely have a negligible impact on the surface infrastructure*.

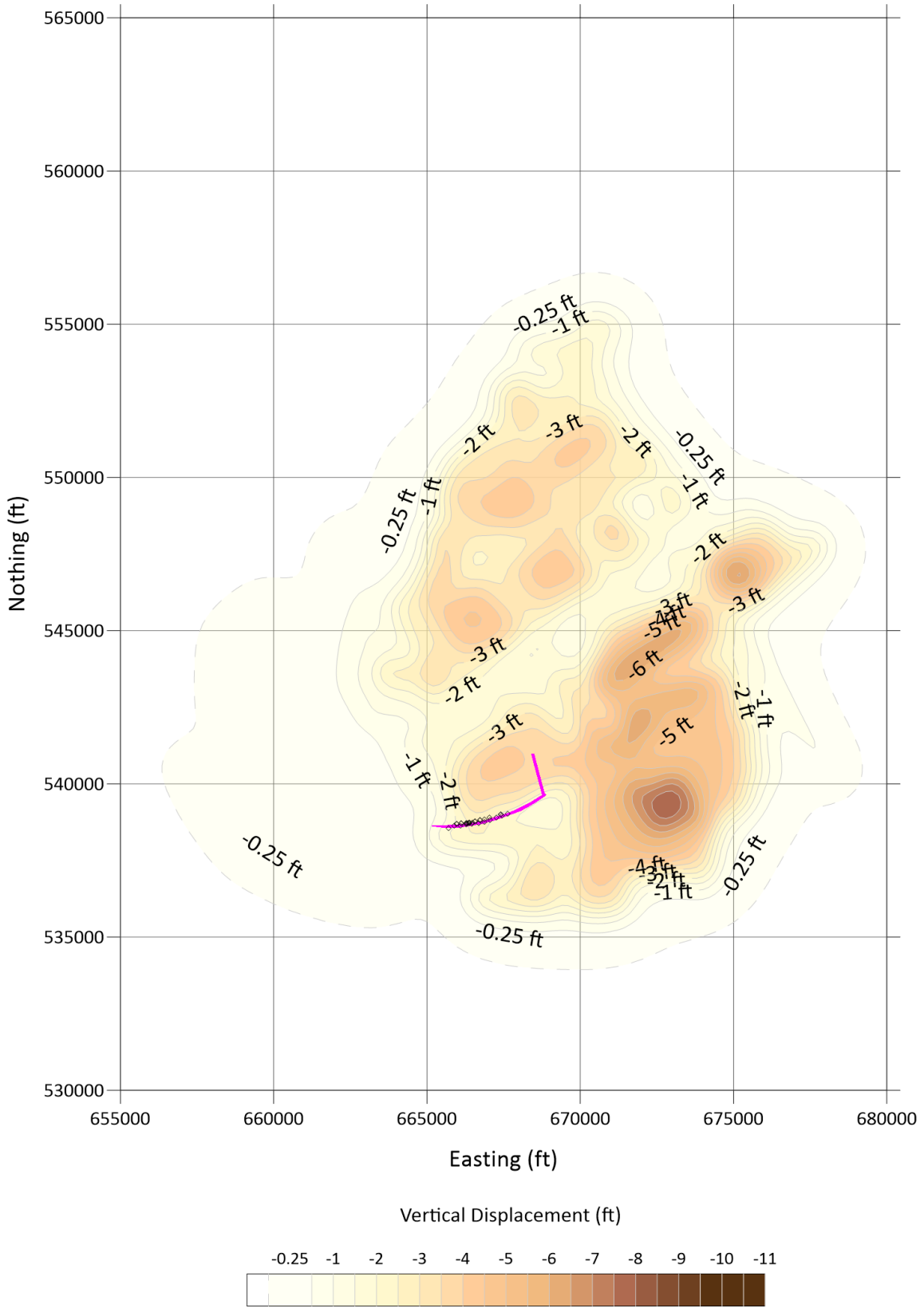

Figure 2. Vertical Displacements (Feet) Predicted Near the West Tailings Dam Between the Years 1975 and 2016.

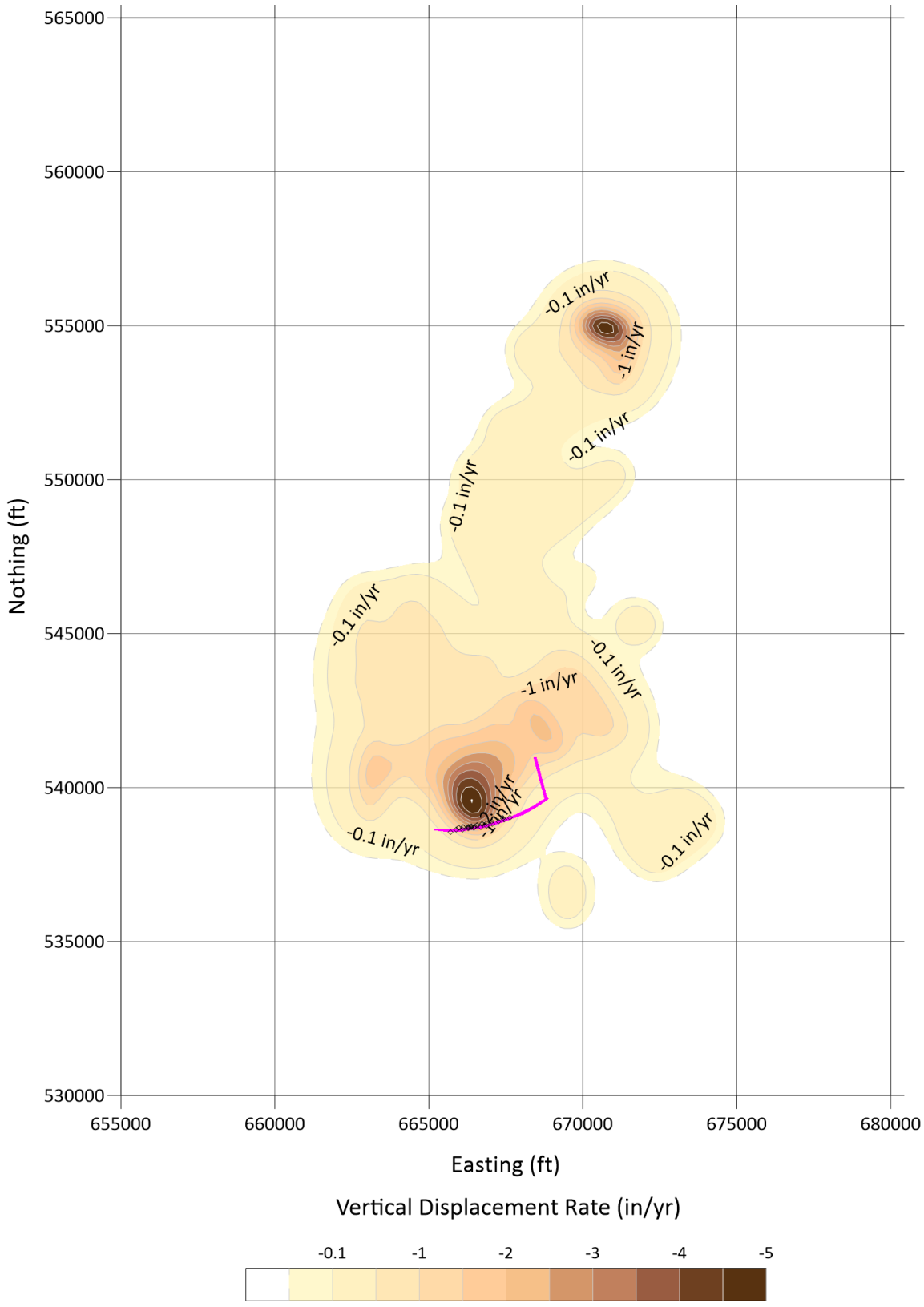

Figure 3. Vertical Displacements Rates (Inches/Year) Predicted Near the West Tailings Dam in Year 2016.

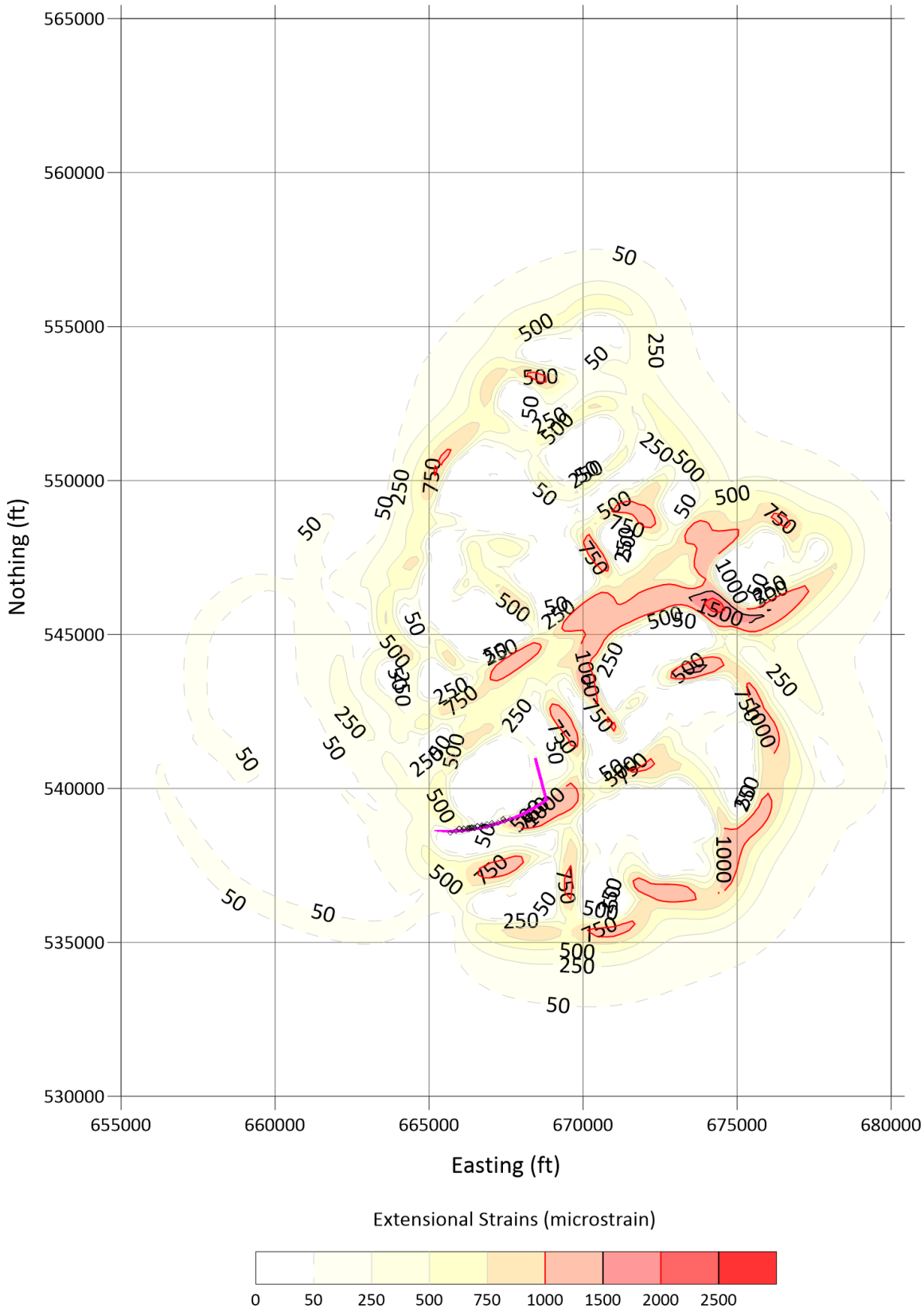

Figure 4. Horizontal Extensional Strain (Microstrain) Predicted to Accumulate Near the West Tailings Dam Between the Years 1975 and 2016.

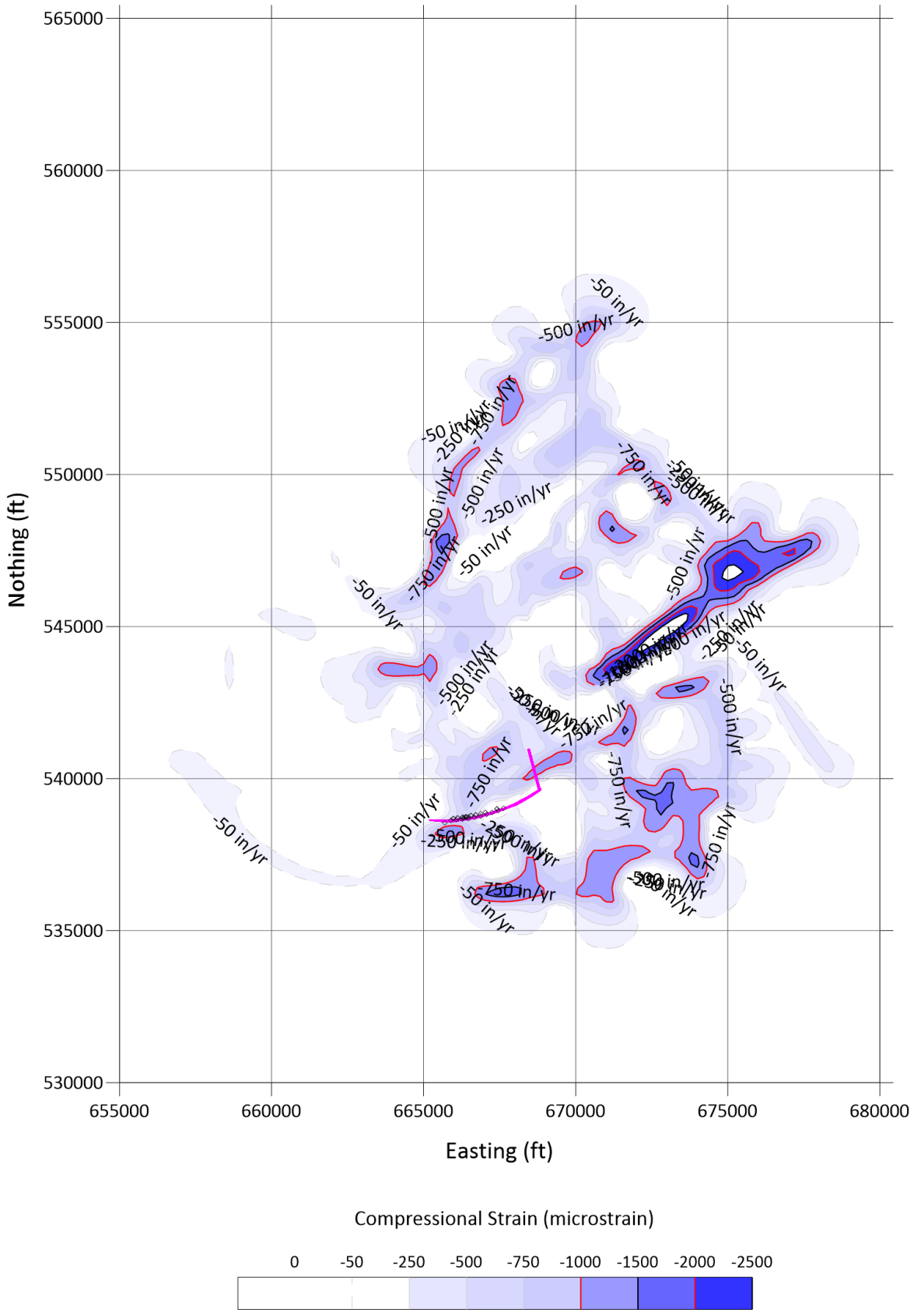

Figure 5. Horizontal Compressional Strain (Microstrain) Predicted to Accumulate Near the West Tailings Dam Between Years 1975 and 2016.

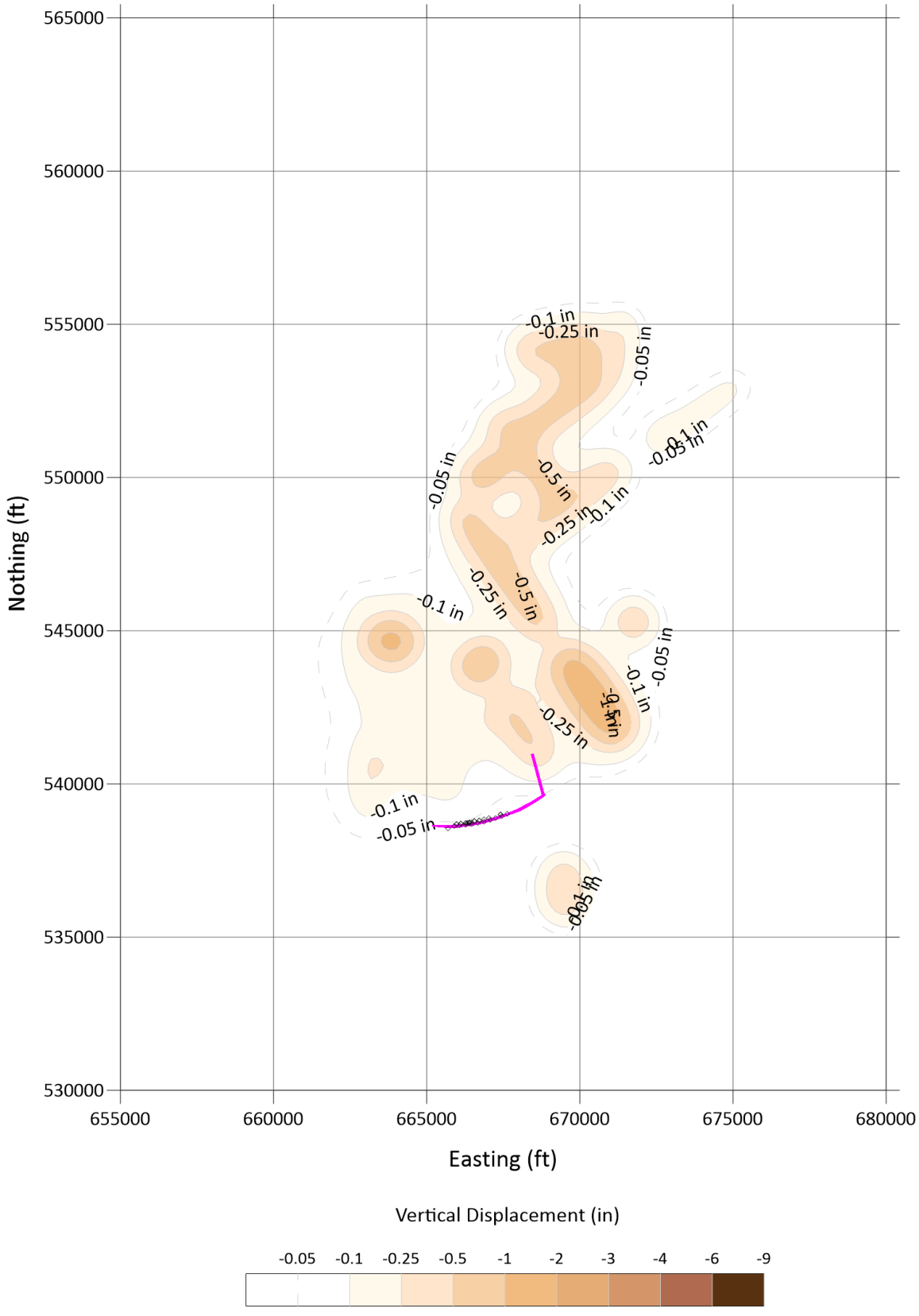

Figure 6. Incremental Vertical Displacements (Inches) Predicted to Accumulate Near the West Tailings Dam Between Years 2022 and 2025.

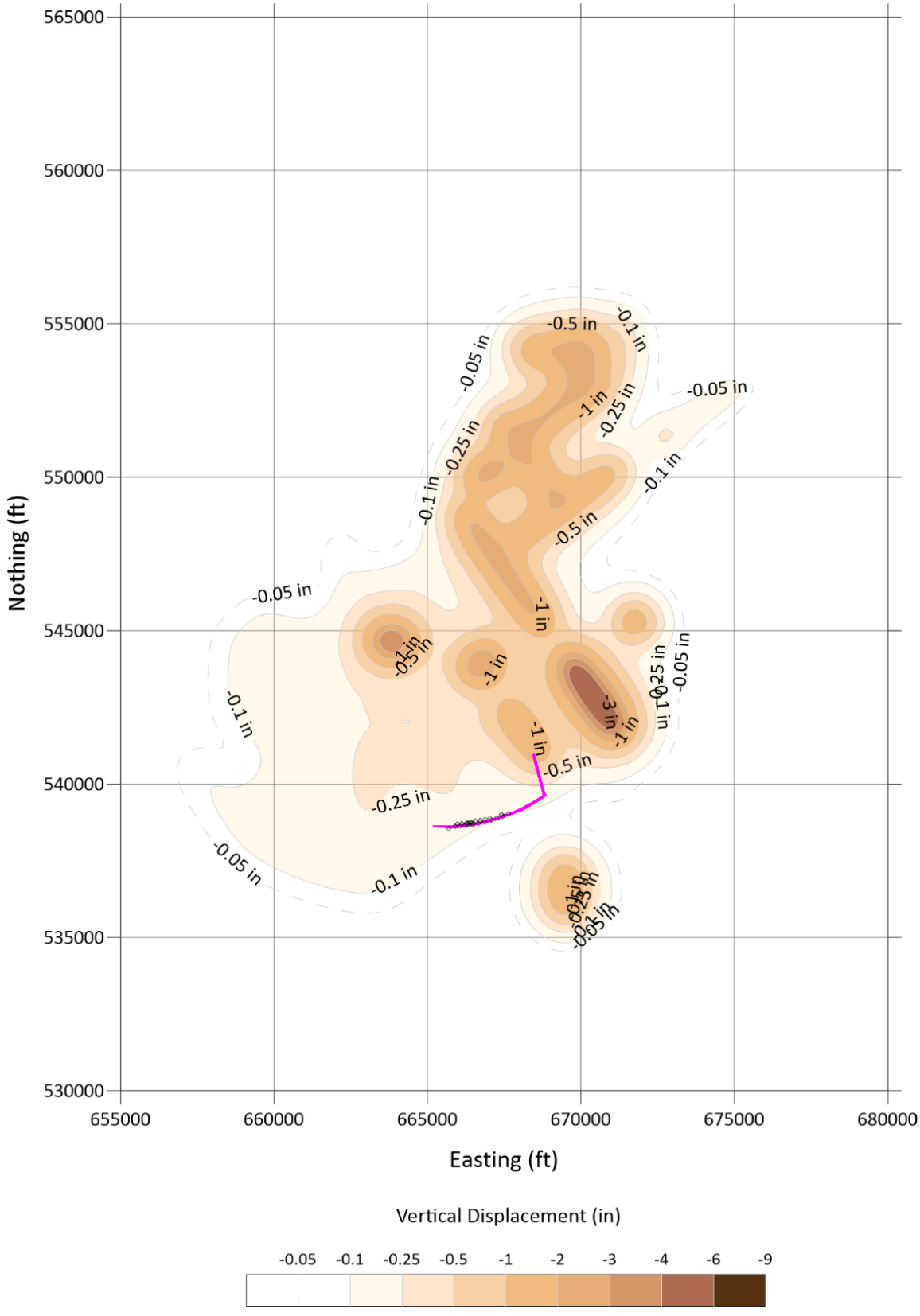

Figure 8. Incremental Vertical Displacements (Inches) Predicted to Accumulate Near the West Tailings Dam Between Years 2022 and 2035.

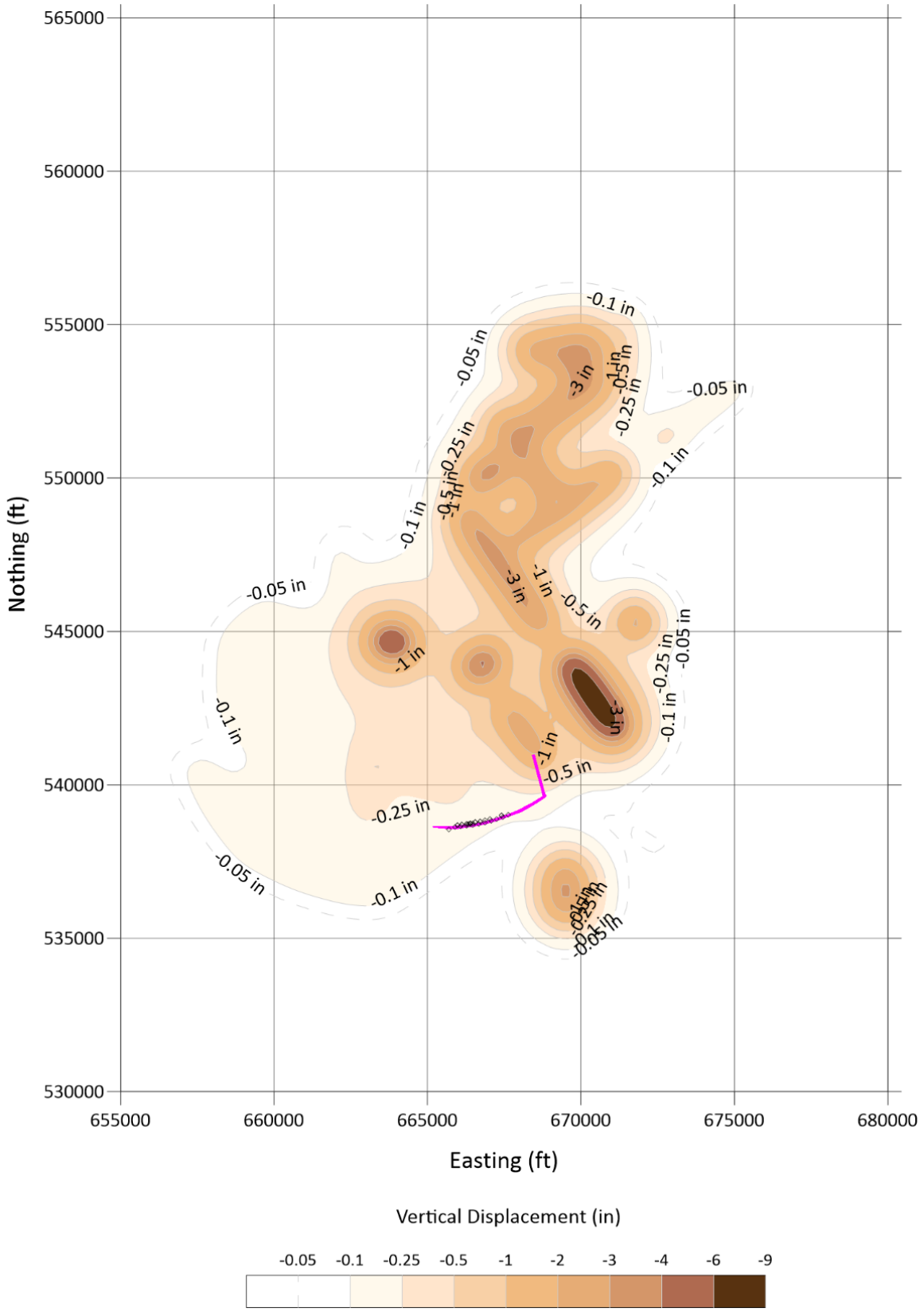

Figure 9. Incremental Vertical Displacements (Inches) Predicted to Accumulate Near the West Tailings Dam Between Years 2022 and 2050.

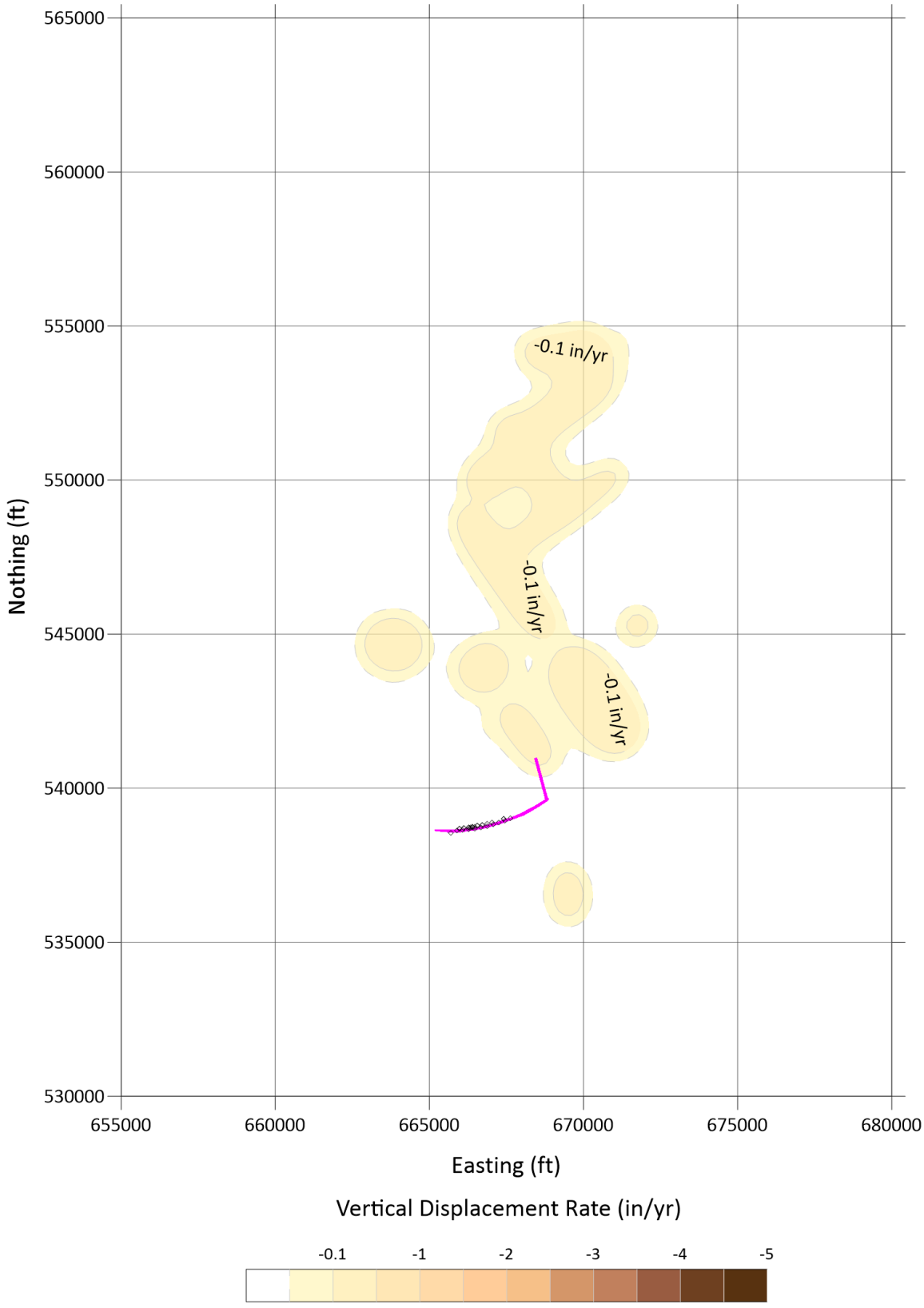

Figure 10. Vertical Displacement Rates (Inches/Year) Predicted Near the West Tailings Dam in Year 2025.

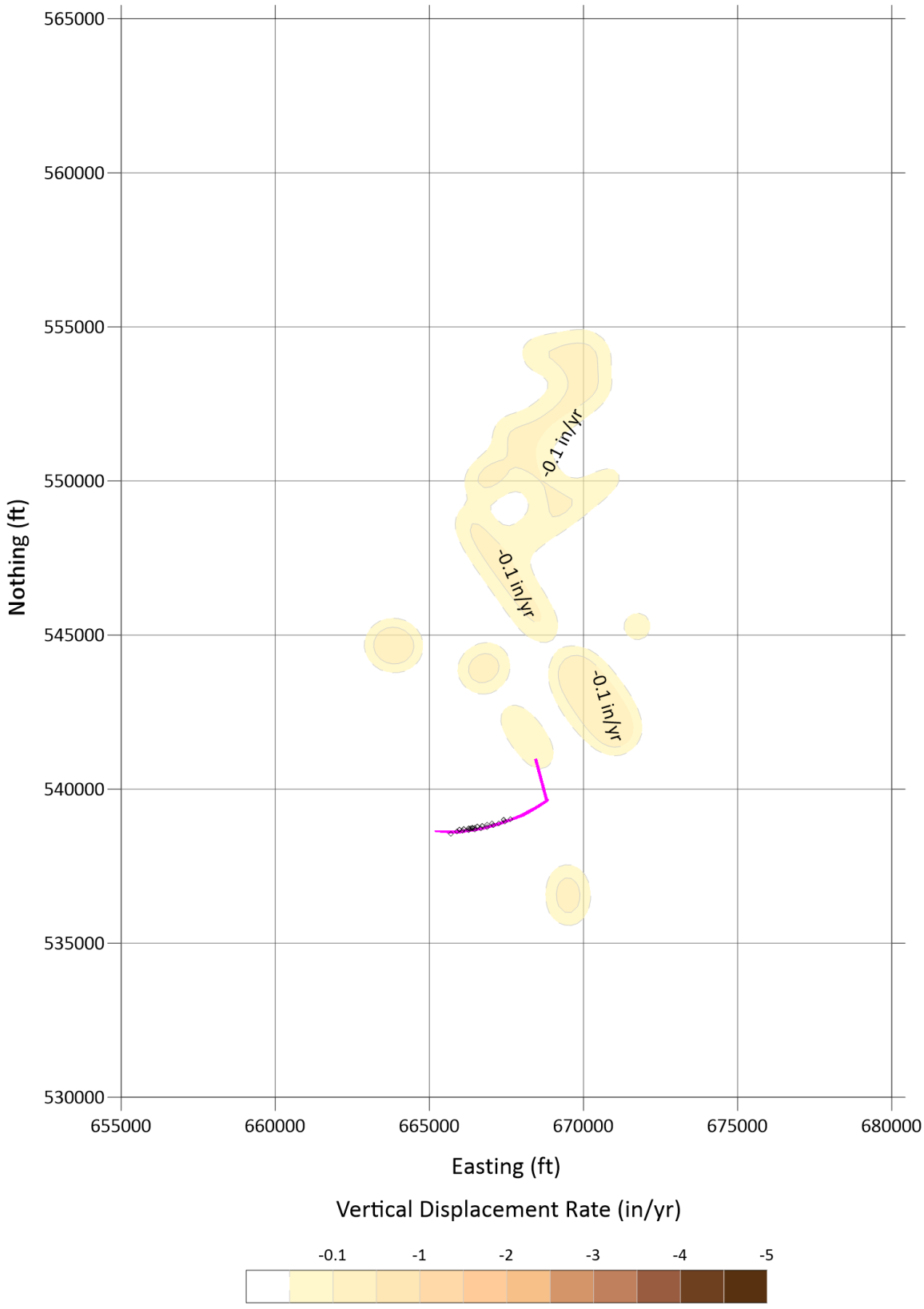

Figure 11. Vertical Displacement Rates (Inches/Year) Predicted Near the West Tailings Dam in Year 2035.

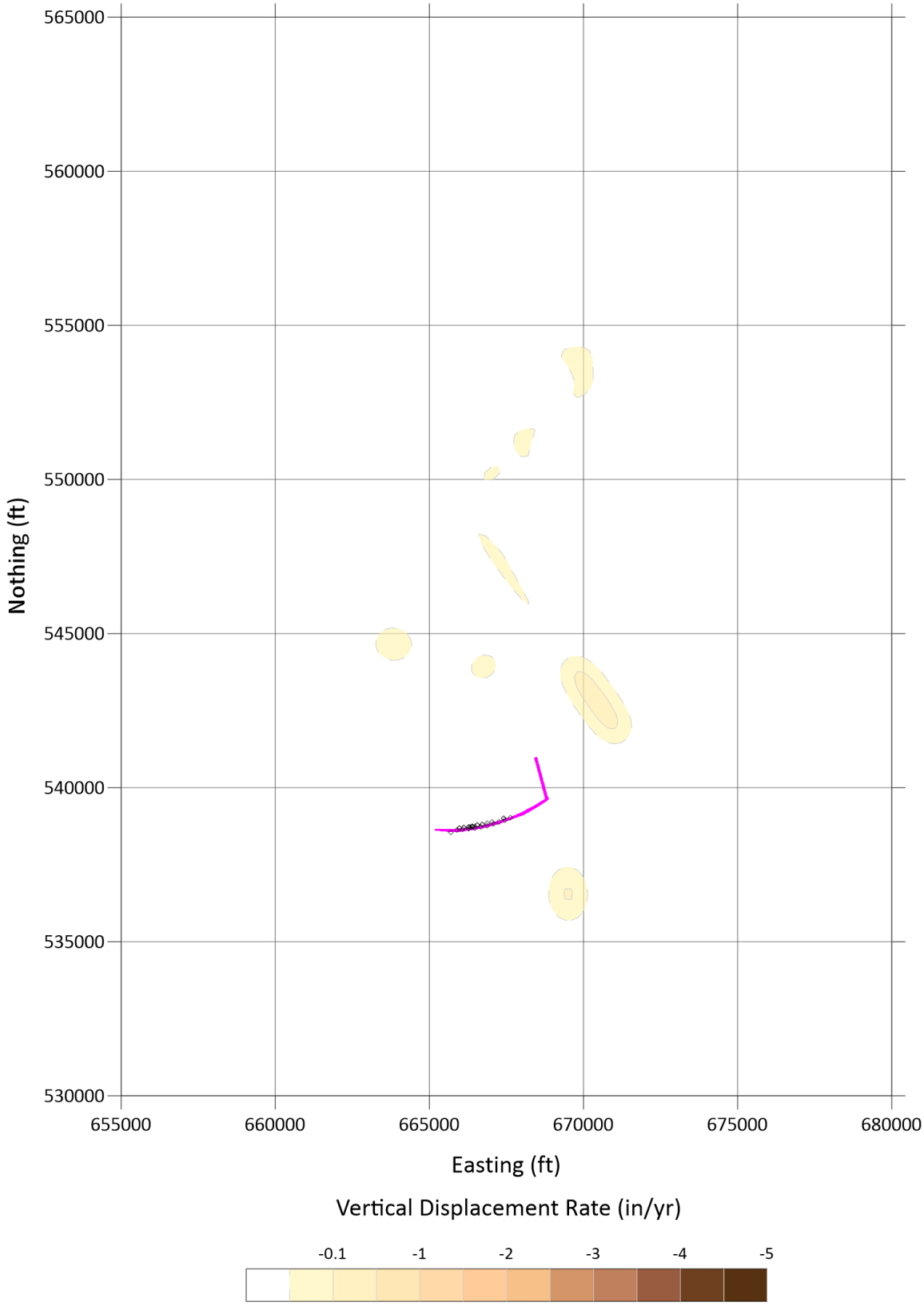

Figure 12. Vertical Displacement Rates (Inches/Year) Predicted Near the West Tailings Dam in Year 2050.

SUMMARY AND CONCLUSIONS

The primary objective of this subsidence study was to delineate regions on the surface where subsidence-induced damage may be expected in surface structures within a prescribed time period. Subsidence calculations were performed that represented the progression of the West mine from first production on the 1st Ore Zone in the late 1930s through development on the 5th and 7th Ore Zones. The simulations then calculated the ground-surface response that could be attributed to the continued mine convergence until Year 2050. The predicted values of vertical displacement, ground-surface tilt, and horizontal strain were compared to established damage-avoidance threshold values to assess the potential impact that mining-induced subsidence will have on the ground-surface response near the West Mine Tailings Dam and delineate regions on the surface that may suffer adversely from continual convergence of the mine. The following significant findings and conclusions were derived from this study:

- **The horizontal extensional and compressional strains that are predicted to have accumulated between 1975 and 2016 are greater than the threshold of negligible to slight damage.** The maximum extensional and compressional strains predicted to accumulate on the surface near the West Tailings Dam between 1975 and 2016 are approximately 1,040 and –1,120 microstrain, respectively. The strains are greater than the threshold limit of negligible to slight damage of 1,000 microstrain, which suggests that the convergence of the mine may have been sufficient to have an impact on West Tailings Dam.
- **Most of the subsidence that is anticipated to manifest on the surface from the convergence of the underground workings near the West Tailings Dam has already occurred and the continued convergence of the underground workings will likely have a negligible impact on the surface infrastructure.** The maximum surface displacement that is predicted to accumulate between 2022 and 2025, 2022 and 2035, and 2022 and 2050 near the West Tailings Dam approaches 0.4, 1.3, and 2.0 inches, respectively. The maximum surface displacement that is predicted to accumulate between 1975 and 2016, 1975 and 2022, and 1975 and 2050 approaches 0.12, 0.07, and less than 0.05 inch/year, respectively.

CAV:llf

ATTACHMENT A

TECHNICAL INFORMATION SUPPORTING THE SUBSIDENCE EVALUATION OF THE WEST MINE

RESPEC

A. TECHNICAL INFORMATION SUPPORTING THE SUBSIDENCE EVALUATION OF THE WEST MINE

A.1 SUBSIDENCE-MODEL APPROACH

Surface-subsidence displacement predictions were made using the Solution Mining Research Institute computer program SALT_SUBSID [Nieland and Van Sambeek, 2010]. SALT_SUBSID is a three-dimensional (3D) computer program that was developed to simulate ground subsidence above solution-mined caverns or dry mines in salt, potash, and trona deposits. The methodology used in SALT_SUBSID is based on the analytical solution for a "closing" parallelepiped opening in a homogeneous material. Subsidence is estimated in SALT_SUBSID by using influence functions to relate the closure of underground openings to surface displacements. The ultimate subsidence from complete closure of an underground opening is estimated by integrating the influence function over the volume of the opening. The subsidence at a specific time is determined by multiplying the ultimate subsidence by the fractional closure of the opening at a chosen time. The solutions for each individual opening are superimposed to obtain an approximation for the total displacements at the ground surface.

The surface subsidence, S_j, at a given horizontal location $P(x,y)$ with respect to the global coordinate system at time t can be expressed as follows:

$$S_j(x,y,t)=\sum_{i=1}^{n}\left(C_i(t)\times\int_V f_j(x'_i,y'_i,z'_i)\,dv\right) \quad \text{(A-1)}$$

where:

n = number of underground openings

$C_i(t)$ = fractional closure of underground opening i at time t

$f_j(x'_i,y'_i,z'_i)$ = ultimate subsidence from complete closure of the opening i relative to the opening center

j = subsidence component $(x, y, \text{or } z)$

x'_i, y'_i, z'_i = relative coordinates from $P(x,y)$ to the center of the underground opening i.

The influence function used to simulate the mine is based on the closure of openings in an isotropic elastic half-space described by Maruyama [1964]; thus, this model assumes that the rock mass that hosts the underground openings is an isotropic elastic material and the solution assumes a Poisson's ratio of 0.25, which is suitable for most rocks. The influence function for vertical surface displacements calculated with this model is given by:

$$f_z(x',y',z')=\frac{-3}{2\pi\left(\rho^2+1\right)^{2.5}} \quad \text{(A-2)}$$

where:

$x', y', z' =$ coordinates to the center of the opening with respect to the point at which subsidence is calculated

$$\rho^2 = \frac{x'^2 + y'^2}{z'^2}.$$

The influence functions for the horizontal displacements of this model are given by:

$$f_x\left(x', y', z'\right) = f_z\left(x', y', z'\right)$$
$$f_y\left(x', y', z'\right) = f_z\left(x', y', z'\right) \quad \text{(A-3)}$$

The horizontal surface strains and surface tilt are calculated from the surface displacements $\left(S_x, S_y, \text{and } S_z\right)$ as follows:

$$\text{Horizontal strain in Easting } (x) \text{ direction} = \varepsilon_x = \frac{d}{dx} S_x$$

$$\text{Horizontal strain in Northing } (y) \text{ direction} = \varepsilon_y = \frac{d}{dy} S_y$$

$$\text{Surface shear strain} = \gamma_{xy} = \frac{d}{dx} S_y + \frac{d}{dy} S_x$$

$$\text{Tilt in the Easting } (x) \text{ direction} = T_x = \frac{d}{dx} S_z$$

$$\text{Tilt in the Northing } (y) \text{ direction} = T_y = \frac{d}{dy} S_z$$

For conventional mines, the fractional closure as a function of time, $C\left(t\right)$, is:

$$C\left(t\right) = y_{ss} t + y_0 \left(1 - e^{\frac{-\beta_c t}{(1-E)^n}}\right) \quad \text{(A-4)}$$

where:

$y_{ss}, y_0, \beta_c, \text{and } n =$ model parameters

$E =$ extraction ratio of the mine

$t =$ time since the opening was created.

The closure model in SALT_SUBSID (Equation A-4) includes four parameters that control the steady-state volumetric closure rate $\left(y_{ss}\right)$, the transient volumetric closure rate $\left(y_0\right)$, the transient closure rate exponential decay factor $\left(\beta\right)$, and the stress concentration influence of the extraction ratio on the subsidence rate $\left(n\right)$. The closure of an opening, $C\left(t\right)$, is not allowed to exceed a value of 1. When $C\left(t\right)$ is equal to 1, the opening has completely closed. Predictions at $C\left(t\right) = 1$ (when all of the mined openings are fully closed) in SALT_SUBSID are referred to as the ultimate subsidence values.

A.1.1 WEST MINE SUBSIDENCE MODEL

The West Mine subsidence model used to represent the mined geometry was developed by subdividing the mine plan that Intrepid provided (shown in Figure 1) into 1,150 smaller mining areas (i.e., mine blocks) based on the date that mining occurred within the delineated mine block. Each room within the mine block was not explicitly represented; rather, the mine block defined the location, mined depth, mined height, and an average extraction ratio within the mine block. Table A-1 provides detail on the mine block characteristics for the historical workings. The blocks representing the workings vary in size but the extraction ratio ranges between 60 and 90. The depths of the mine blocks range between approximately 823 and 954 feet (ft) below the ground surface. The height of the mine blocks ranges between 7 and 10 ft.

Table A-1. General Mine Block Characteristics for the West Mine

Mine Block Characteristic	1st Ore Zone Workings	5th Ore Zone Workings	7th Ore Zone Workings
Mined Depth (ft)	954	841	823
Mining Dates (Year)	1930	1993–2003	1985–2016
Mined Height (ft)	10	7	7
Extraction Ratio (%)	60	68–90	68–90

A.1.2 WEST MINE SUBSIDENCE PARAMETER VALUES

For this study, Intrepid provided benchmark elevations measured to assess the ongoing subsidence and provide data to calibrate and verify the predictive capability of the West Mine subsidence model. The benchmark network consists of 32 survey benchmarks located directly above the West Mine near the West Tailings Dam. The data consisted of an initial elevation survey performed in 2015 and 61 subsequent elevation surveys with the final elevation survey performed in June 2022.

RESPEC reviewed the available elevation surveys and calculated displacements for each benchmark. The parameter values used to describe the West Mine closure were derived from interpretations of subsidence rates based on benchmark measurements recorded above the West Mine. RESPEC believes that the validation process shows a good agreement between the measured displacements and those displacements predicted directly overlying the mine footprint. The input parameters defining the closure model are provided in Table A-2, and Figure A-1 provides a time-series plot that illustrates the closure model (Equation A-4) for the parameter values used to represent closure of the underground mine.

Table A-2. Subsidence-Model Closure Parameters for the West Mine

Mine Block	y_{ss} (1/year)	y_0 (—)	β (1/year)	n (—)
1st Ore Zone	0.0	0.8	0.015	1.5
5th and 7th Development Entries	0.0	0.8	0.008	3.5
5th and 7th Production Panels	0.0	0.8	0.0003	3.5
7th Room and Pillar Workings	0.0	0.8	0.01	1.5

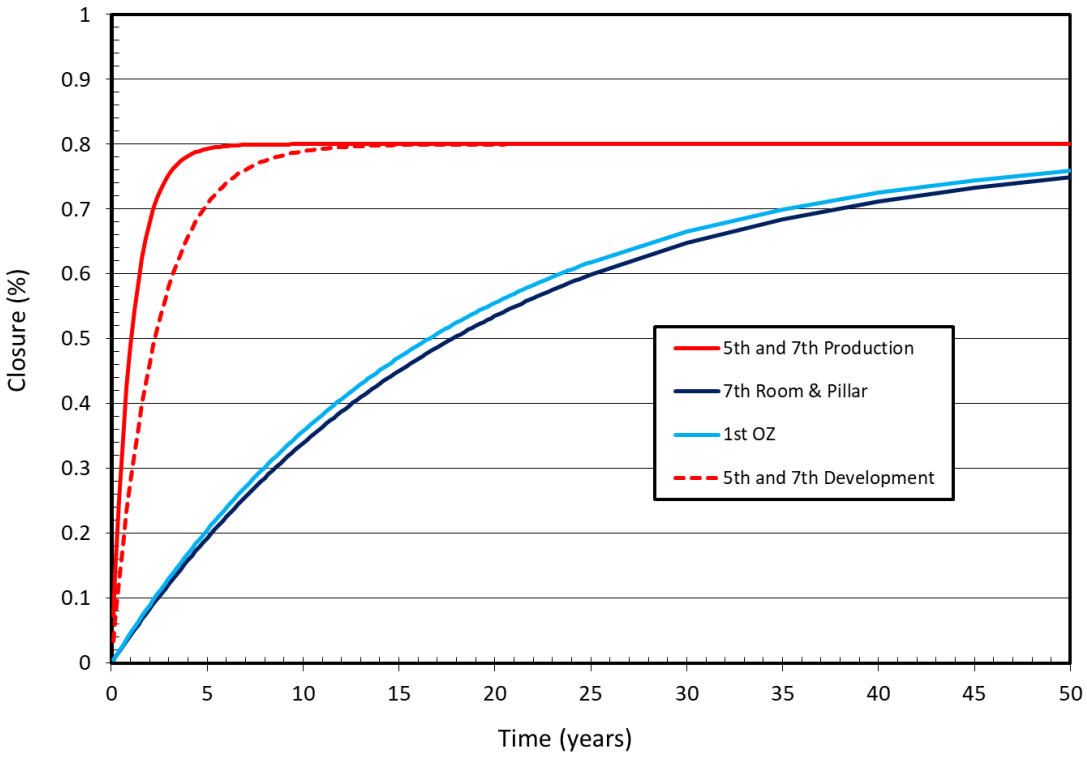

Figure A-1. Plot of the SALT_SUBSID Closure Model Used to Represent the West Mine.

A.2 GROUND-SURFACE SUBSIDENCE AND THE ASSOCIATED MOVEMENTS

Ground-surface subsidence is a natural, normal, and unavoidable movement of the earth's surface in response to fluids or solids being removed from underground. The term surface subsidence implies the total phenomenon of surface and subsurface movements and includes vertical and horizontal displacements and the associated forms of ground movement that result from differential (i.e., nonuniform) ground movement. The relationships between the different subsidence-component movements are illustrated in Figure A-2.

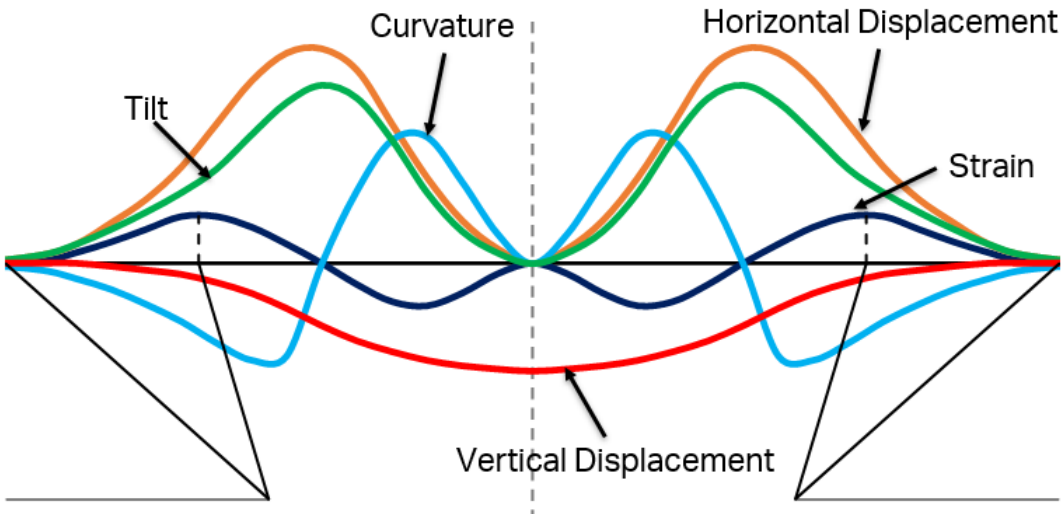

Figure A-2. Components of Ground Movement.

Selecting an appropriate damage-avoidance criterion for each subsidence-related damage type is not straightforward, and the damage type and severity level depend on the specific subsidence effect and structure type. The degree of damage is generally classified as follows:

- **Negligible to very slight**. This degree of damage includes hairline cracks that are easily repaired during routine redecoration. Slight redecoration is warranted because of the damage; cracks are easily filled, exterior cracks are visible in brickwork and slabs, and/or some binding occurs in windows and doors.
- **Moderate.** A moderate degree of damage consists of reoccurring cracks after fixing and may even require removing or replacing damaged portions of walls and floors. Doors and windows stick tightly but can still be moved. Utility services to the structure (e.g., water, electrical, and sewer) may be interrupted.
- **Severe.** A severe degree of damage requires extensive repair that involves removing and replacing sections of walls and floors. Windows and door frames may be distorted and only partially functional, and floors may noticeably slope. Walls may lean or bulge, and beams may become partially dislocated. Utility services are disrupted (e.g., broken water lines or stretched electrical lines).
- **Very severe (intolerable).** Very severe damage requires major repairs that involve partial to complete reconstruction. Beams may no longer rest on bearing surfaces, and walls may require shoring to arrest leaning. Windows may be frozen and glass may be broken by distortion. Strong instability perception is noted even if the structure still stands.

For this study, threshold values that were developed to indicate the onset of negligible to slight damage were also used to delineate regions on the surface where mining-induced subsidence may adversely affect surface structures and surface and subsurface infrastructure. The threshold values that define the onset of negligible to slight damage are provided in Table A-3. Horizontal strains have the potential to cause negligible to slight damage at absolute values greater than 0.001. These strain magnitudes can cause negligible to slight damage to linear structures that are unfavorably orientated by stretching (i.e., extensional strains) or compressing (i.e., compressional strains) the structure [Kratzsch, 1983]. For linear structures that are designed to accommodate subsidence, the strain-damage threshold increases to 0.002 [Kratzsch, 1983]. Surface-tilt values of less than 0.002 inch per inch (in/in) are not expected to cause damage to buildings, roads, and pipelines [Kratzsch, 1983]. Vertical displacement, horizontal strain, and tilt values that exceed these limits may result in negligible to very slight damage.

Table A-3. Avoidance Criteria Values for Negligible to Very Slight Damage

Zone Description	Unit	Damage-Avoidance Value
Absolute Horizontal Strain	(–)	0.001 to 0.002
Ground-Surface Tilt	in/in	0.002

(–) = strain
in/in = inch.

A.3 REFERENCES

Kratzsch, H., 1983. *Mining Subsidence Engineering,* R. F. S. Fleming (translator), Springer-Verlag, Berlin, Germany.

Maruyama, T., 1964. "Statistical Elastic Dislocations in an Infinite and Semi-Infinite Medium," *Bulletin of the Earthquake Research Institute*, Tokyo University, Vol. 42, pp. 289–368.

Nieland, J. D. and L. L. Van Sambeek, 2010. *SALT_SUBSID, Version 2.0 User's Manual*, Research Report RR2009-02, prepared by RESPEC, Rapid City, SD, and POD, Inc., Albuquerque, NM, for the Solution Mining Research Institute, Clarks Summit, PA.

ATTACHMENT B

CHARTS OF THE PREDICTED AND MEASURED SURFACE DISPLACEMENTS OVERLYING THE WEST MINE

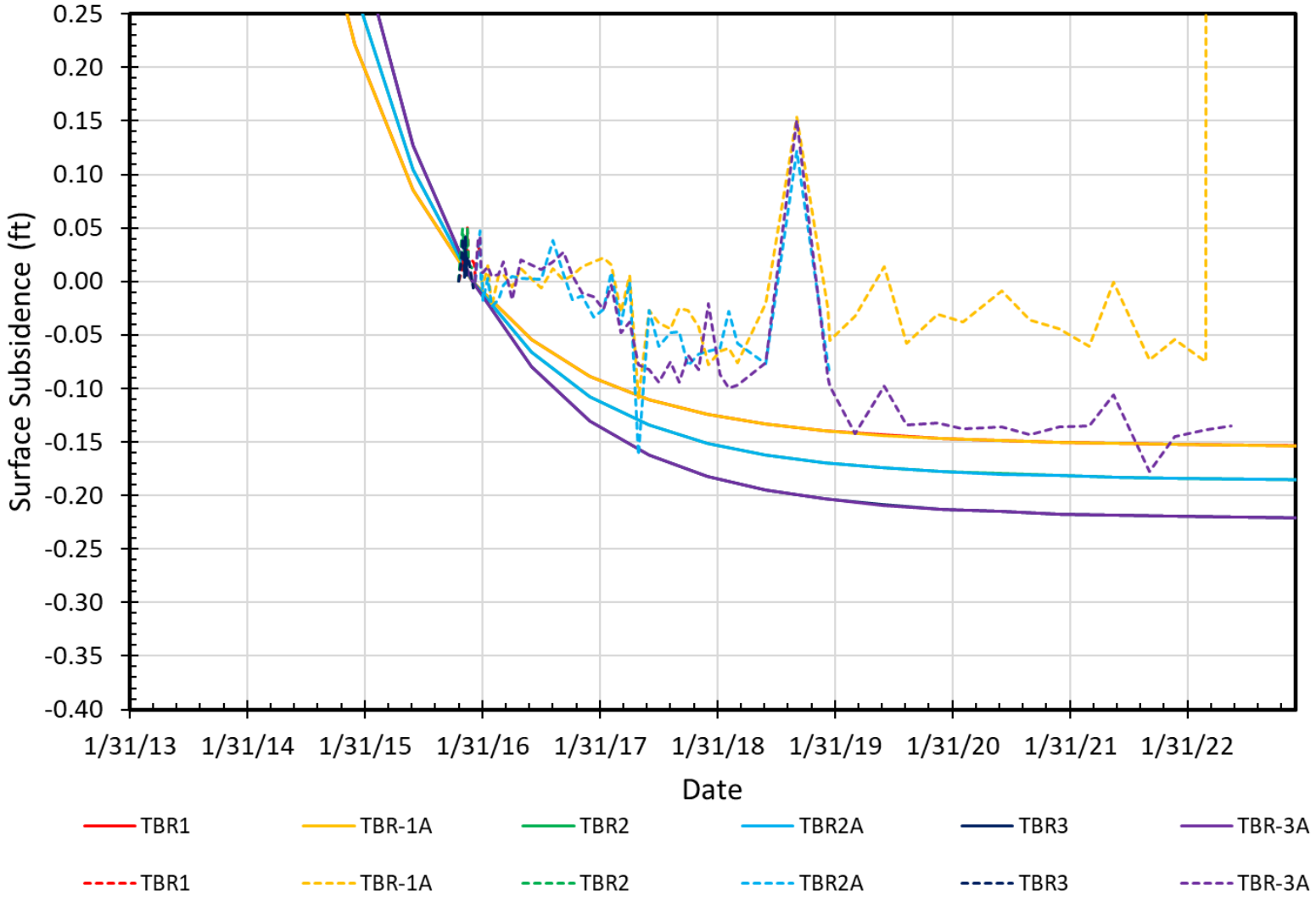

Figure B-1. Comparison of the Measured (Dashed Curves) and Predicted (Solid Curves) Displacements at Benchmarks TBR1, TBR-1A, TBR2, TBR2A, TBR3, and TBR-3A.

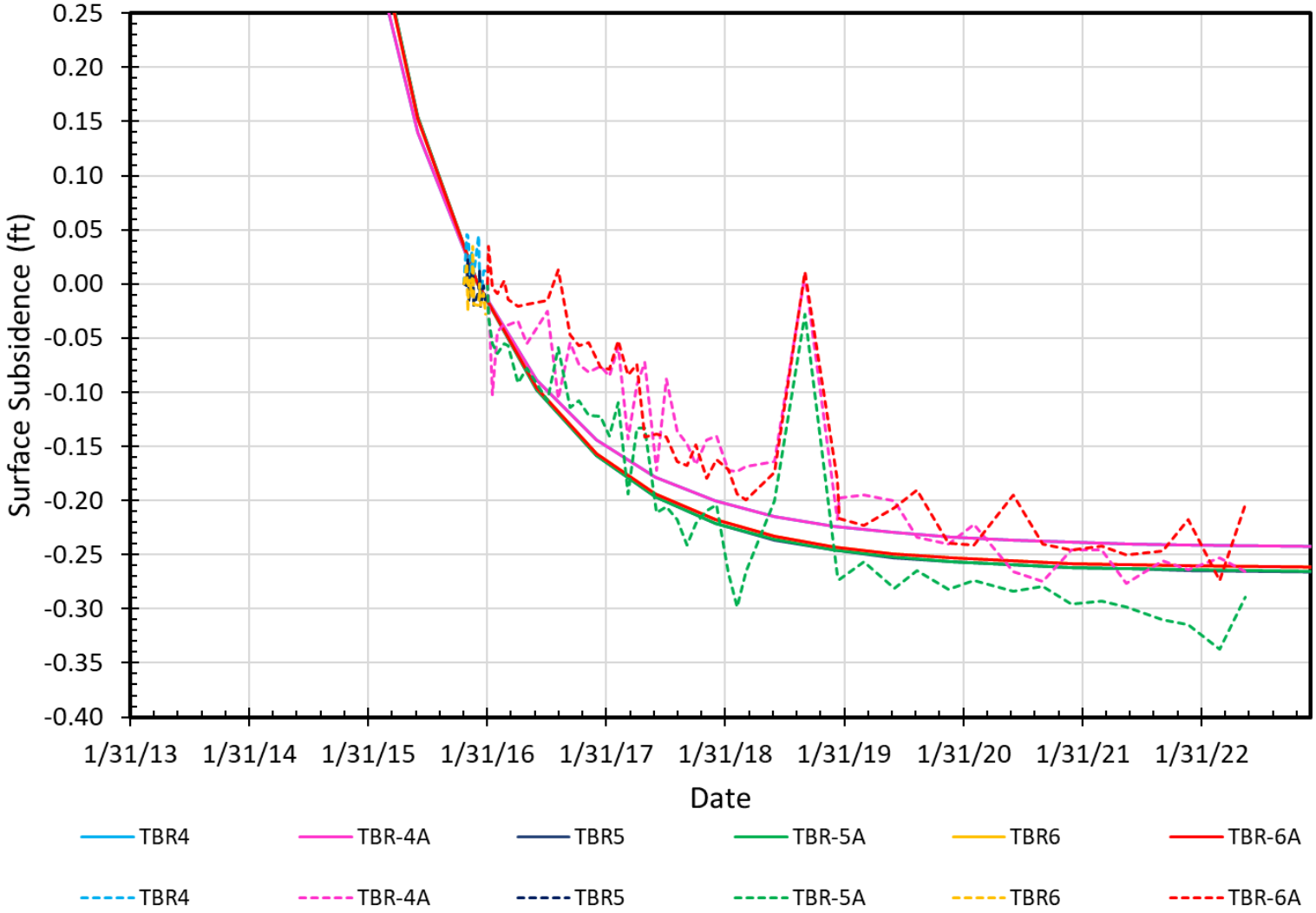

Figure B-2. Comparison of the Measured (Dashed Curves) and Predicted (Solid Curves) Displacements at Benchmarks TBR4, TBR-4A, TBR5, TBR-5A, TBR6, and TBR-6A.

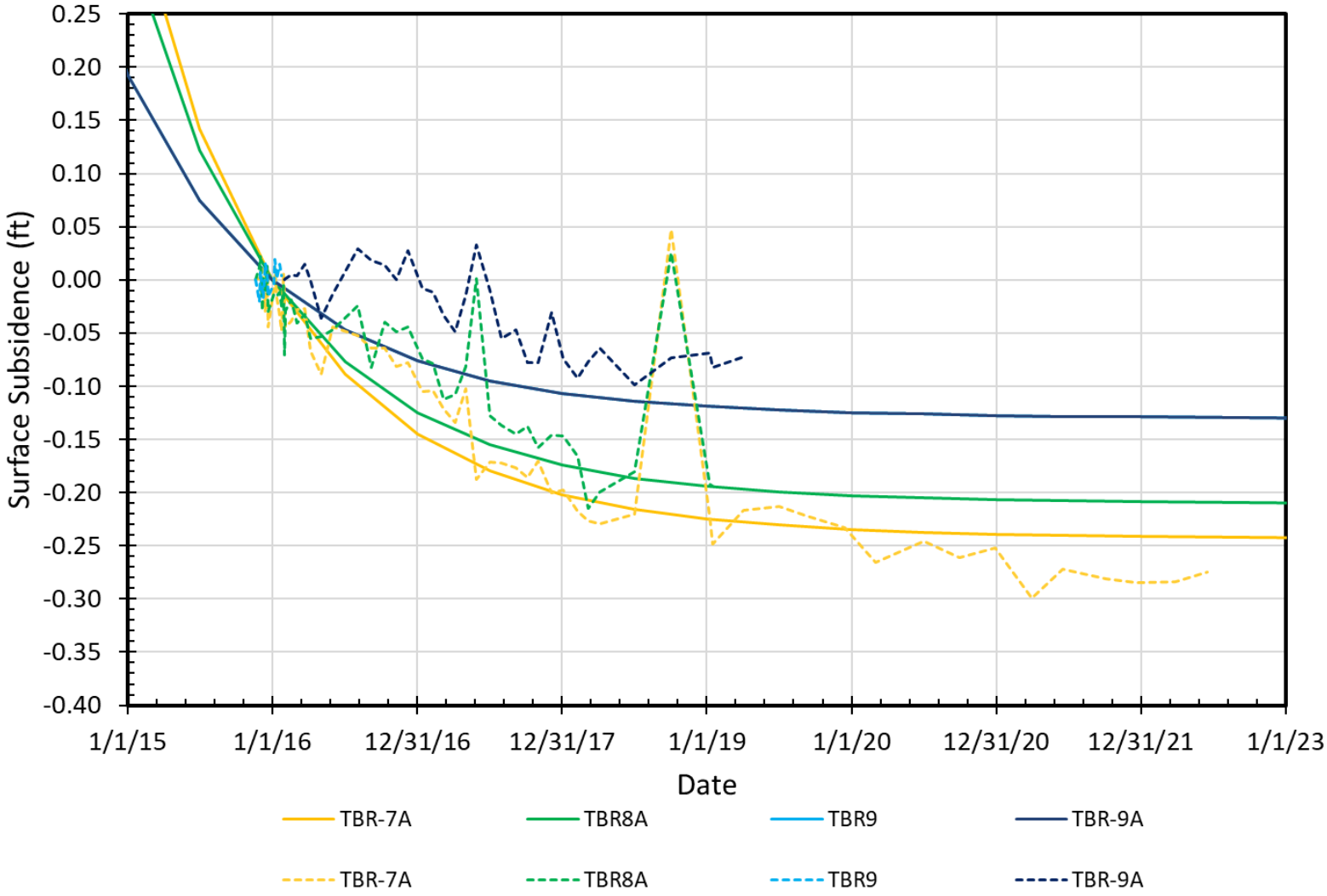

Figure B-3. Comparison of the Measured (Dashed Curves) and Predicted (Solid Curves) Displacements at Benchmarks TBR7A, TBR8A, TBR9, and TBR-9A.

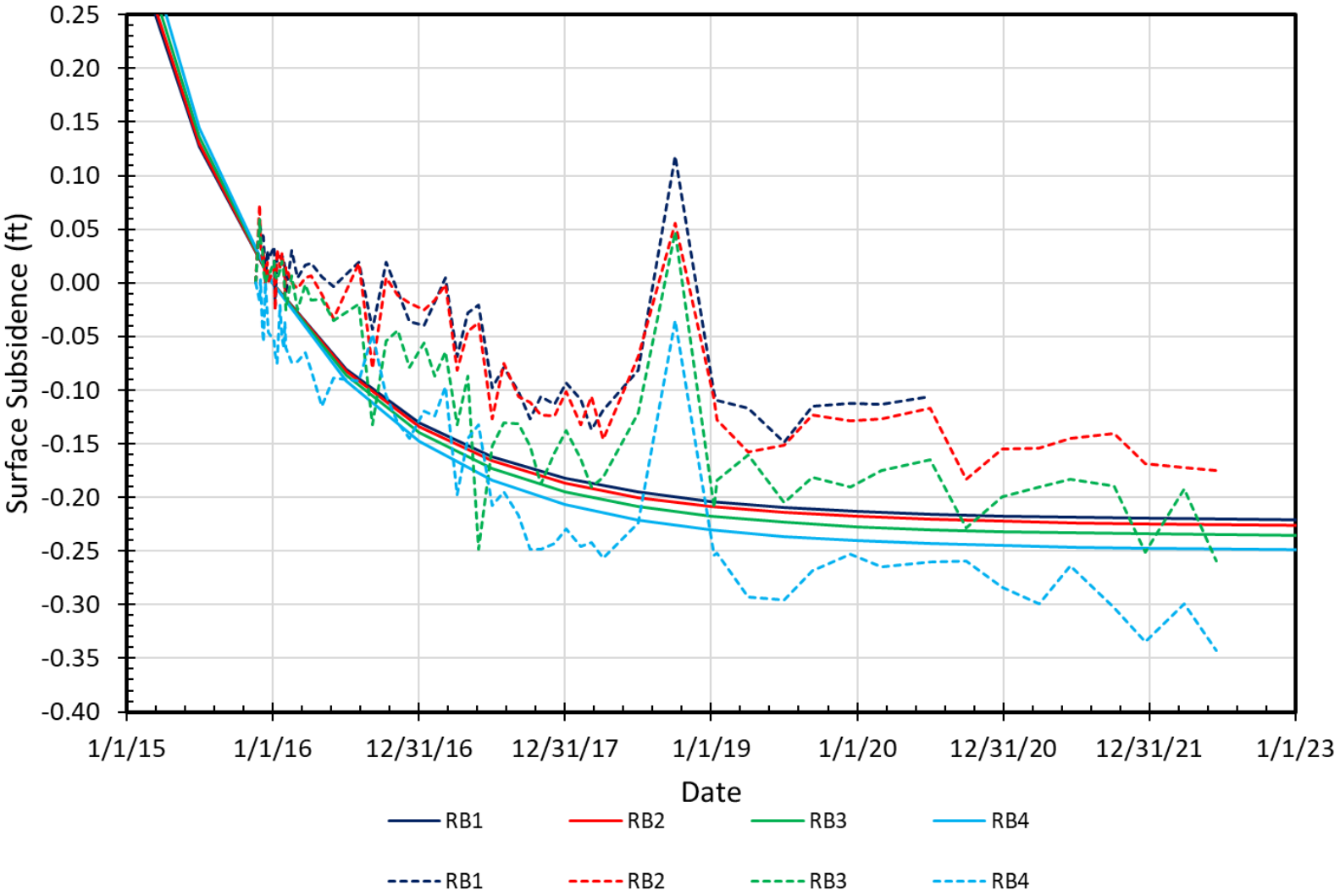

Figure B-4. Comparison of the Measured (Dashed Curves) and Predicted (Solid Curves) Displacements at Benchmarks RB1, RB2, RB3, and RB4.

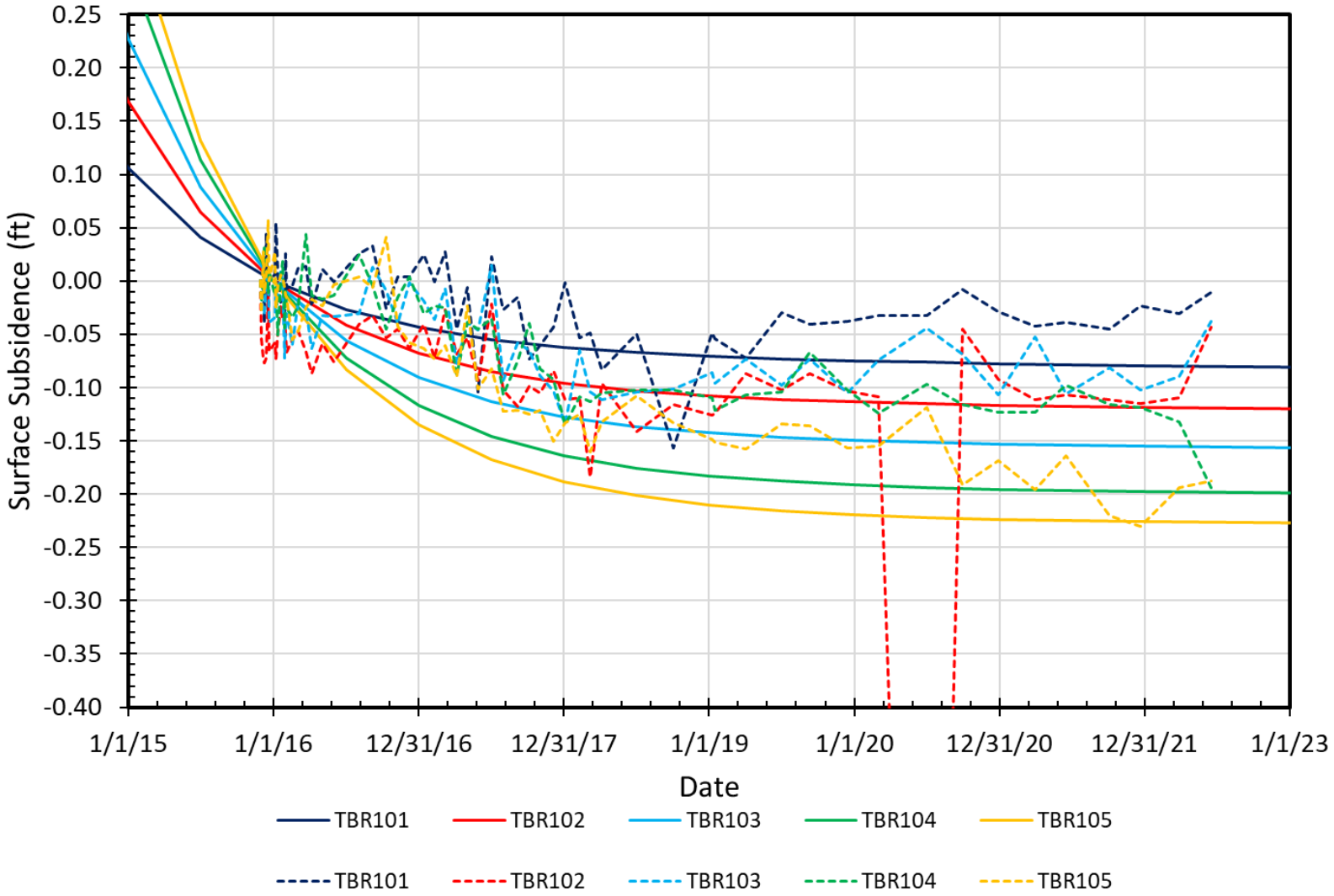

Figure B-5. Comparison of the Measured (Dashed Curves) and Predicted (Solid Curves) Displacements at Benchmarks TBR101, TBR102, TBR103, TBR104, and TBR105.

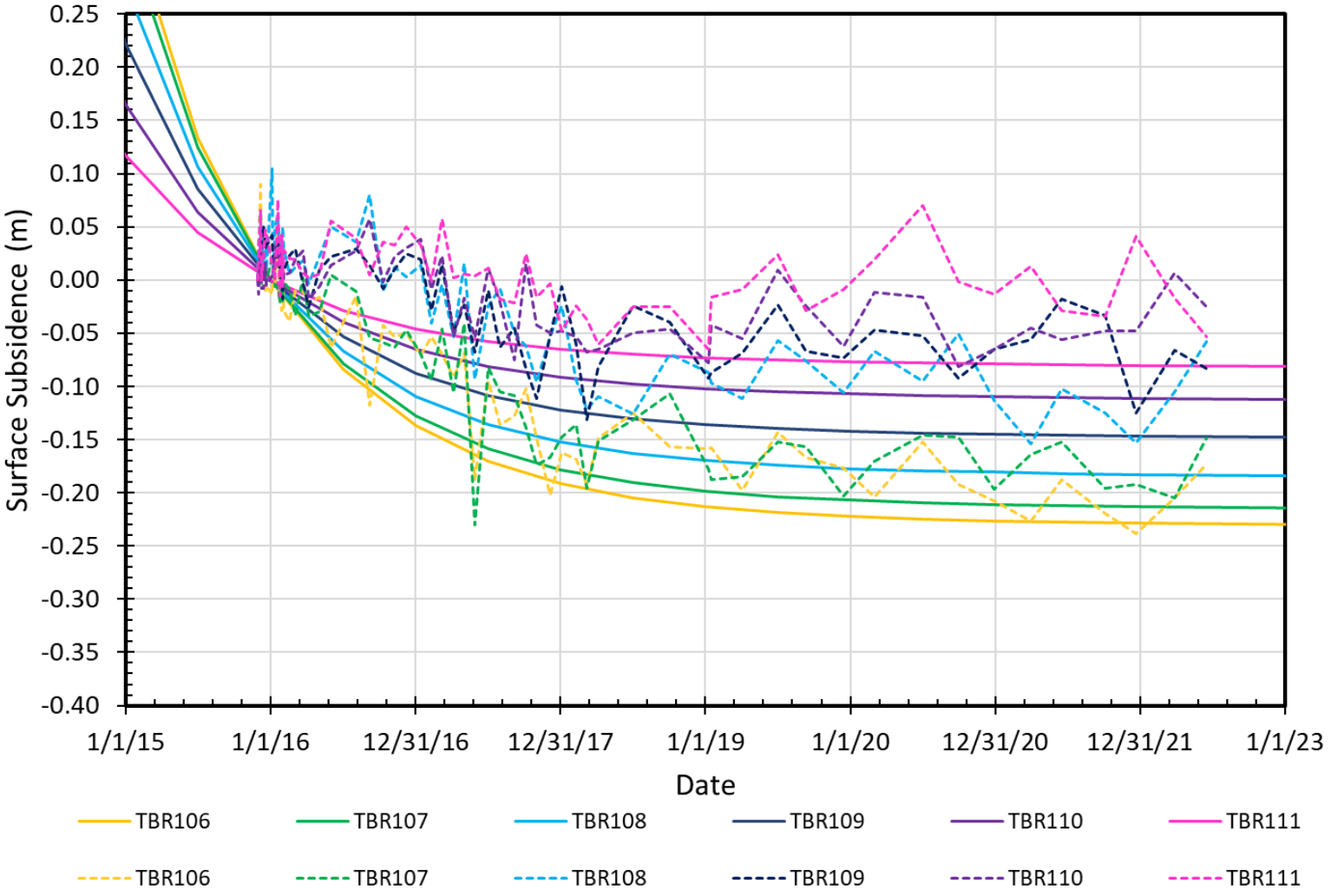

Figure B-6. Comparison of the Measured (Dashed Curves) and Predicted (Solid Curves) Displacements at Benchmarks TBR106, TBR107, TBR108, TBR109, TBR110, and TBR111.

Appendix I

Letter of Acknowledgement of NMOCD Requiring Prior Notice Before Resuming Mining Activities

INTREPID
Essential Minerals for Success

November 28, 2022

Via Electronic and U.S. Mail
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Santa Fe, NM 87505
Victoria.Venegas@state.nm.us

Re: Acknowledgement and Prior Notice
Intrepid Potash New Mexico, LLC's Proposed Produced Water Recycling Facility
Eddy County, New Mexico

Dear Ms. Venegas:

On behalf of Intrepid Potash New Mexico, LLC ("Intrepid"), I am writing to acknowledge that if mining activities are planned to resume in the area where Intrepid proposes to construct a Produced Water Recycling Facility (Section 12, Township 21 South, Range 29 East, Eddy County New Mexico), Intrepid will provide the New Mexico Oil Conservation Division with prior notice in order to allow the NMOCD to evaluate monitoring strategies and to determine if closure of the Produced Water Recycling Facility is necessary.

Please contact me at (575) 499-5027 if you have questions or wish to discuss this matter.

Sincerely,

Chris Nyikos
Director of Technical Services

March 20, 2023

Via Electronic
Victoria Venegas
Environmental Specialist
Environmental Bureau
EMNRD – Oil Conservation
Division 1220 South St. Francis
Drive Santa Fe, NM 87505
Victoria.Venegas@state.nm.us

Re: Acknowledgement and Prior Notice to
Intrepid Potash New Mexico LLC Proposed Produced Water Recycling Facility
Unit Letter A, Section 12, Township 21S, Range 29E
Eddy County, New Mexico

Dear Ms. Venegas:

I am in receipt of your correspondence dated July 27, 2022 The following are responses to the comments and questions set forth in that correspondence. Additionally, Intrepid Potash New Mexico LLC ("Intrepid") submits herewith a revised and updated C-147 Application ("Application").

- The closure cost estimate in the amount of $25,000.00 doesn't meet the requirements of the rule.
  Intrepid's Response*: Intrepid has developed a closure cost estimate that meets the requirements of 19.15.34.14 NMAC. Intrepid's consultant, FC&E Engineering prepared a closure cost estimate using a similar facility unit cost basis and applied the actual quantities proposed for the Intrepid Central Produced Water Recycling Facility containment ponds. The closure cost estimate and the basis of this estimate is contained in new Appendix G of the enclosed Application*.

- Please provide a complete itemized closure cost estimate that includes all closure requirements per 19.15.34.14 CLOSURE AND SITE RECLAMATION REQUIREMENTS FOR RECYCLING CONTAINMENTS from 19.15.34.14 A – H. The closure cost must include closure costs associated with liner and fence removal, sampling, backfilling, capping or covering, where applicable, re-vegetation and reclamation activities. Operators can use a third-party quote for the closure cost estimate and the NMOCD will evaluate it as part of the application.
  Intrepid's Response*: Intrepid incorporates by reference its response to the previous comment and Appendix G of the enclosed Application.*

- The engineering Drawings are incomplete. Please include the details of the liner system, leak detection system and sump, levees, slope and trenches, etc. as per 19.15.37.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT.
  ***Intrepid's Response**: Please see Appendix F of the enclosed Application. Detailed plans and specifications have been prepared by FC&E Engineering in accordance with 19.15.37.12 NMAC.*
- [372681] INTREPID POTASH - NEW MEXICO must request a variance to 19.15.34.11.A.8 for the proposed inground containment located withing an area overlying a subsurface mine. Please include the following information in the application, specific to this variance request:
  - a detailed statement explaining the need for a variance,
  - a detailed written demonstration that the variance will provide equal or better protection of fresh water, public health and the environment and,
  - a letter signed and stamped by a professional engineer stating that: "the operator demonstrates that it has incorporated engineering measures into the design to ensure that the containment's integrity is not compromised;" per 19.15.34.11.A.8.

  ***Intrepid's Response**: Please see Appendix H of the enclosed Application. FC&E Engineering has developed and stamped a letter addressing the above items. Additionally, Intrepid has attached as part of Appendix H a separate engineering study performed by RESPEC engineers that specifically addresses the likelihood of future subsidence and impact to above ground structures as a result of past underground mining activity.*

- From C-148 included in the application is out of date. The new Form C-148 can be found at: https://www.emnrd.nm.gov/ocd/wp-content/uploads/sites/6/Revised-C-148-Form-January-2022.pdf
  ***Intrepid's Response**: The new Form C-148 dated January 2022 has been inserted into Appendix B of the enclosed Application.*

- [372681] INTREPID POTASH - NEW MEXICO would need to acknowledge, in writing, that that if mining activities on site were to ever resume, NMOCD would need prior notice so we can evaluate monitoring strategies and if closure is necessary.
  ***Intrepid's Response**: A letter signed by Intrepid acknowledging the prior notice will be provided to the NMOCD prior to resuming mining activity. Intrepid has prepared this letter and is included in Appendix I of the enclosed Application.*

Should you have any questions or wish to discuss any of the responses above, Please do not hesitate to contact me at (575) 499-5027. I appreciate your and the NMOCS's time and review of this submission.

Respectfully,

Chris Nyikos

Chris Nyikos
Director of Technical Services

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD
Sent: Monday, April 3, 2023 3:21 PM
To: Chris Nyikos; Kim Kennedy; Ken Faulkner
Subject: 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602]
Attachments: C-147 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602].pdf

2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602]

Good afternoon Mr. Nyikos,
NMOCD has reviewed the recycling containment permit application and related documents, submitted by [372681] INTREPID POTASH - NEW MEXICO, LLC on March 23, 2023, for 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] in Unit Letter A, Section 12, Township 21S, Range 29E, Eddy County, New Mexico. [372681] INTREPID POTASH - NEW MEXICO, LLC requested variances from 19.15.34 NMAC for 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602].

The following variances have been approved:

- The variance to 19.15.34.12.A.(4) NMAC for the installation on the containment of a 60 mil HDPE as primary liner and a 40 mil HDPE as a secondary liner is approved.
- The primary (upper) liner will be a geomembrane 60-mil HDPE liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts, and acidic and alkaline solutions. The secondary liner will be 40-mil LLDPE with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility will meet or exceed the EPA SW-846 method 9090A or subsequent (the liner system is described on page 79 of the application).
- The variance from 19.15.34.13.D NMAC, for the installation of an eight-foot-tall chain link fence equipped with three strands of barbed wire on top, is approved.
- The variance from 19.15.34.13.E NMAC for the installation of an audible bird deterrence system, is approved.
- A variance to 19.15.34.11.A.(7) to locate the recycling containment within an area overlying a subsurface mine is approved. [372681] INTREPID POTASH - NEW MEXICO, LLC has included an engineering study that specifically addresses the likelihood of future subsidence and impact to above ground structures as a result of past underground mining activity (Appendix H, page 86). [372681] INTREPID POTASH - NEW MEXICO, LLC has demonstrated that it has incorporated engineering measures into the design to ensure that the containment's integrity will not be compromised.
- [372681] INTREPID POTASH - NEW MEXICO, LLC has acknowledged, in writing, that if mining activities at the site were ever to resume, NMOCD must be notified -a minimum of 60 days before the resumption of mining activities- to assess the monitoring strategies and, if necessary, the closure of 2RF-189 - CENTRAL RECYCLING FACILITY INTREPID ID [fVV2309057602] (Appendix I, page 120).

The form C-147 and related documents for 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] is approved with the following conditions of approval:

- The purpose of this permit is for oil and gas activities regulated under the NMAC 19.15.34.3 STATUTORY AUTHORITY: 19.15.34 NMAC is adopted pursuant to the Oil and Gas Act, Paragraph (15) of Section 70-2-12(B) NMSA 1978, which authorizes the division to regulate the disposition of water produced or used in connection with the drilling for or producing of oil and gas or both and Paragraph (21) of Section 70-2-12(B) NMSA 1978 which authorizes the regulation of the disposition of nondomestic wastes from the exploration, development, production or storage of crude oil or natural gas.
- [372681] INTREPID POTASH - NEW MEXICO, LLC shall construct, operate, maintain, close, and reclaim for 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] in compliance with NMAC 19.15.34 NMAC.

- 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] is approved for five years of operation from the date of permit application.
- 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] permit expires on March 23, 2028. If [372681] INTREPID POTASH - NEW MEXICO, LLC wishes to extend operations past five years, an annual permit extension request must be submitted using an OCD form C-147 through OCD Permitting by February 23, 2028.
- Per Rule 19.15.34.15.A.(1) operators without existing financial assurance pursuant to 19.15.8 NMAC shall furnish financial assurance acceptable to the division in the amount of the recycling containment's estimated closure cost. The total closure cost estimate for 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] consisting of two (2) earthen impoundments of 1,340,000.00 BBL of capacity in the amount of $ 1,585,534.00, meets the requirements of NMAC 19.15.34.15.A.(1).
- [372681] INTREPID POTASH - NEW MEXICO, LLC cannot receive produced water in 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] until after the original copy of the financial assurance has been accepted by NMOCD.
- The financial assurance bond should be mailed to the Oil Conservation Division; Bonding and Compliance; 1220 South St Frances Drive; Santa Fe, NM 87505.
- [372681] INTREPID POTASH - NEW MEXICO, LLC shall notify OCD, through OCD Permitting, when construction of 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] commences.
- [372681] INTREPID POTASH - NEW MEXICO, LLC shall notify NMOCD through OCD Permitting when recycling operations commence and cease at 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602].
- A minimum of 3-feet freeboard must be maintained at 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] at all times during operations.
- [372681] INTREPID POTASH - NEW MEXICO, LLC shall submit monthly reports of recycling and reuse of produced water, drilling fluids, and liquid oil field waste on OCD form C-148 via OCD Permitting even if there is zero activity.
- If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdrawal, operations of the 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] is considered ceased and a notification of cessation of operations should be sent electronically to OCD Permitting. A request to extend the cessation of operation, not to exceed six months, may be submitted using a C-147 form through OCD Permitting.
- If after that 6-month extension period, the 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] is not utilized at a minimum of 20% fluid capacity, no additional extensions would be granted, and the operator would be directed to remove all fluids and proceed with the closure requirements.
- [372681] INTREPID POTASH - NEW MEXICO, LLC 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 as per 19.15.34.13.A.
- [372681] INTREPID POTASH - NEW MEXICO, LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field waste at 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602].

Please reference number 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] in all future communications.
Regards,

Victoria Venegas ● Environmental Specialist
Environmental Bureau
EMNRD - Oil Conservation Division
(575) 909-0269 | Victoria.Venegas@emnrd.nm.gov
https://www.emnrd.nm.gov/ocd/

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 200058

CONDITIONS

Operator: INTREPID POTASH - NEW MEXICO, LLC 210 Red Cloud Road Carlsbad, NM 88220	OGRID: 372681
	Action Number: 200058
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	NMOCD has reviewed and approved the recycling containment permit application and related documents, submitted by [372681] INTREPID POTASH - NEW MEXICO, LLC on March 23, 2023, for 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] in Unit Letter A, Section 12, Township 21S, Range 29E, Eddy County, New Mexico. • 2RF-189 - INTREPID CENTRAL RECYCLING FACILITY ID [fVV2309057602] permit expires on March 23, 2028. If [372681] INTREPID POTASH - NEW MEXICO, LLC wishes to extend operations past five years, an annual permit extension request must be submitted using an OCD form C-147 through OCD Permitting. • [372681] INTREPID POTASH - NEW MEXICO, LLC has acknowledged, in writing, that if mining activities at the site were ever to resume, NMOCD must be notified -a minimum of 60 days before the resumption of mining activities- to assess the monitoring strategies and, if necessary, the closure of 2RF-189 - CENTRAL RECYCLING FACILITY INTREPID ID [fVV2309057602] (Appendix I, page 120).	4/4/2023