STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY
WATER QUALITY BOARD
PO BOX 144870
SALT LAKE CITY, UTAH 84114-4870

Ground Water Discharge Permit
Permit No. UGW450013

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended, the Act,

Magnum Solution Mining, LLC
3165 East Millrock Drive, Suite 330
Holladay, UT 84121

hereafter referred to as the Permittee, is granted a Ground Water Discharge Permit for a brine evaporation pond in Millard County, Utah. The Magnum facility pond is located at Latitude 39° 29' 0.54" North, Longitude -112° 35' 12.19" West on the following tracts of land (Salt Lake Base and Meridian):

Name	Section	Township	Range	Allotment
Brine Pond 4	25	15 South	7 West	in South 1/2

This permit is based on representation made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this permit.

The facility shall be constructed and operated in accordance with conditions set forth in the permit and the Utah Administrative Rules for Ground Water Quality Protection (UAC R317-6).

This permit shall become effective on May 12, 2021.

This permit and authorization to operate shall expire at midnight May 11, 2026.

John Mackey (May 11, 2021 12:18 MDT)

John K. Mackey, P.E.
Acting Director
Utah Division of Water Quality

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PART I CONSTRUCTION PERMIT ISSUANCE

A. AUTHORIZED DESIGN AND CONSTRUCTION

As part of this ground water discharge permit, a construction permit is hereby issued to Magnum Solution Mining, LLC to construct a brine evaporation pond referred to as Brine Pond 4 and ancillary support facilities. Under authority of the Utah Water Quality Act, Section 19-5-108(1) Utah Code Ann. 1953, as amended and Utah Administrative Code R317-1, the authorized facilities will be constructed in accordance with the engineering design plans and specifications attached as Appendix A. Appendix A also includes the construction permit authorized by the Director. Part II.D of this permit describes the Best Available Technology (BAT) standards for these permitted facilities.

The authorized evaporation pond is constructed in accordance with the engineering design plans and specifications approved by the Construction Permit. The evaporation pond is constructed with a composite liner system with two leak detection recovery systems. The pond footprint is approximately 168 acres with maximum allowable storage capacity of approximately 139 acres. Design components include:

- 80-mil HDPE Primary Liner – a 80-mil high density polyethylene liner. Specifications for the HDPE liner are provided in the Ground Water Discharge Permit application.

- 60-mil HDPE Secondary Liner – a 60-mil high density polyethylene line with 130-mil raised drainage studs to support the primary liner will be installed.

- Leak Detection Layer – the liners will be separated by either 130-mil raised drainage studs or a 250-mil geonet geomembrane layer drainage gap between the primary and secondary HDPE liners to route leakage to the Leak Collection Recovery System (LCRS) sumps located at low points within the pond floor.

- Process Component Monitoring System (PCMS) – Collection piping and a leak detection sump will be constructed in the soil under the secondary liner of the evaporation pond. Any liquids reporting to the sump can be sampled or returned to the evaporation pond surface.

PART II SPECIFIC CONDITIONS

A. GROUND WATER CLASSIFICATION

Based on ground water quality data submitted in the permit application and offsite monitoring wells, ground water at the site is defined as Class II Drinking Water Quality Ground Water.

B. BACKGROUND GROUND WATER QUALITY

Table 1 provides background ground water quality data from wells completed in the aquifers and zones located in the vicinity of the brine pond.

Table 1: Background Ground Water Quality

Aquifer	Water Table (Nov 2017)	Water Table (Nov 2017)	Shallow Artesian (May 2013)	Deep Artesian (May 2013)
Well	B-P1-4	B-P1-9	Egg Farm	IPP
Parameter (mg/l)				
Alkalinity (as $CaCO_3$)	229	299		
Chloride	103	157	64	37
Sulfate	39	60	66	27
Total dissolved solids	448	652	328	249
Calcium	20	163	17	15.2
Magnesium	22	58	7	9.2
Potassium	8	13	2	3.5
Sodium	114	149	75	48
pH (units)	8.1	7.7	7.9	7.07
Conductivity (umhos/cm)	808	1090	565	410

units = mg/L

C. GROUND WATER PROTECTION LEVELS

Ground water quality monitoring of the water table aquifer will be conducted using these monitoring wells following installation and development: GA-4, GA-5, GA-6, GA-7, GA-18, GA-19, GA-22 and GA-23. Following an accelerated sampling program and data evaluation, this list might be modified.

Table 2 provides interim ground water protection levels for the water table aquifer, as measured in brine evaporation pond GA compliance monitoring wells. These protection levels are based on Table 1 and shallow water table aquifer water samples collected from nearby brine evaporation pond monitoring wells. These interim protection levels will be adjusted if necessary following the accelerated sampling period for newly installed monitoring wells. See Part II.H.1 for details.

Table 2: Interim Ground Water Protection Levels

Parameter	Protection Level (mg/l)
pH (units)	6.5-8.5[(a)]
Chloride	150
Sodium	200
Total Dissolved Solids	750

(a) Class II Ground Water Quality Standard

D. PERMITTED FACILITIES AND BEST AVAILABLE TECHNOLOGY (BAT) STANDARD

1. Authorized Construction - the project facilities authorized by this permit consist of a brine evaporation pond referred to as Brine Pond 4, and ancillary support facilities.

2. BAT Performance Monitoring - Best available technology monitoring will include a minimum vertical freeboard, maximum allowable leakage rate, and maximum allowable head monitoring. These performance standards are based on *Equations for Calculating the Rate of Liquid Migration through Composite Liners due to Geomembrane Defects* (Giroud, 1997).

   a. Minimum Vertical Freeboard – a minimum of 36 inches of vertical freeboard shall be maintained to ensure total containment of the evaporation/surge pond and peripheral ditches.

   b. Maximum Allowable Leakage Rate – based on the maximum pond capacity of 138 acres (freeboard level three feet below the inside crest of the berm), the maximum allowable leakage rate through the primary HDPE liner of the evaporation/surge pond will be 439 gallons per minute.

   c. Maximum Allowable Head – the maximum head in each of the leak detection sumps will be managed by pumping leakage collected in the sumps back into the respective pond. Head will be kept below the top of the sump at all times, as described in Appendix C, the Brine Evaporation Ponds Operating Manual. Fluids will be pumped from the sumps such that it is not necessary to pump from the pond at a rate greater 439 gallons per minute (26,340 gallons per hour). This maximum pumping rate is equivalent to the Action Leakage Rates in Part II.F.3 below.

3. Spill Containment - The permittee shall design, maintain and construct all pipelines and pumping facilities with a spill containment system that shall:

   a. Prevent any spills or leakage from any contact with the ground surface or ground water.

   b. Convey all spills or leakage to the evaporation pond.

   Any spill that does come into contact with the ground surface or ground water that causes pollution or has the potential to cause pollution to waters of the state shall be reported in accordance with Part III.I.

E. COMPLIANCE MONITORING REQUIREMENTS

1. Compliance Monitoring Points

   a. Leak Detection - The Leak Collection Recovery System (LCRS) and the Process

Component Monitoring System (PCMS) installed under the evaporation pond liners will serve as a ground water compliance mechanism and monitoring point.

b. Compliance Wells – Monitoring wells will serve as ground water compliance monitoring points for the water table aquifer. The monitoring wells will be installed before the pond is put into operation.

c. Ground Water Monitoring Plan - All water quality monitoring shall be conducted in accordance with the ground water monitoring plan (Appendix B).

d. Protection of Monitoring Wells - All compliance monitoring wells must be protected from damage due to surface vehicular traffic or contamination due to surface spills. All compliance monitoring wells shall be maintained in full operational condition for the life of this permit. Any compliance monitoring well that becomes damaged beyond repair or is rendered unusable for any reason will be replaced by the permittee within 90 days or as directed by the Director.

2. Ground Water Compliance Monitoring

a. Water Level Measurements – water level measurements shall be made in each monitoring well prior to any well purging or collection of ground water samples. These measurements will be made from a surveyed permanent reference point clearly demarcated on the top of the well or surface casing. Water level measurements will be made to the nearest 0.01 foot.

b. Ground Water Quality Samples - samples of ground water from compliance monitoring wells will be collected for laboratory analysis on a quarterly basis until the compliance schedule requirements of Part II.H.1 are met.

1) Analysis by Certified Laboratories - analysis of all ground water samples shall be performed by a laboratory certified by the Utah Department of Health.

2) Ground Water Analytical Methods - methods used to analyze ground water samples must comply with the following:

i) Methods cited in UAC R317-6-6.3L, and
ii) Method detection limits are less than Ground Water Protection Levels in Part II.C Table 2

3) Analysis Parameters - the following analyses will be conducted on all ground water samples collected:

i) Field Parameters - pH, temperature, and specific conductance.
ii) Laboratory Parameters – including:
Protection Level Parameters in Part II.C Table 2

3. Leak Detection Sump Monitoring

a. Flow Measurement – When the pond is initially filling during periods of solution mining, the pumping rate of fluids pumped from the LCRS and PCMS sumps and returned to the brine pond will be monitored daily and compared to the Maximum

Allowable Leakage Rates in Table 3 Part II.F.3. below. After the pond has been filled and leakage rates stabilize or decline, the pumping rate of fluids pumped from the LCRS and PCMS sumps and returned to the brine pond will be monitored weekly and compared to the Maximum Allowable Leakage Rates in Table 3 Part II.F.3. below.

b. Sump Fluids —fluids detected in a leak detection sump will be pumped to the evaporation pond surface to minimize maximum allowable head.

F. NON-COMPLIANCE STATUS

1. Probable Out-of-Compliance Status - The permittee shall evaluate results of each ground water sampling event to determine any exceedance of the Ground Water Protection Levels found in Part I.C above. Upon determination that a Ground Water Protection Level has been exceeded at any downgradient compliance monitoring well, the permittee shall:

a. Immediately re-sample the monitoring well(s) found to be in probable out-of-compliance status for laboratory analysis of the exceeded protection level parameter(s). Submit the analytical results thereof, and notify the Director of the probable out-of-compliance status within 30 days of the initial detection.

b. Upon exceedance of any one parameter listed in Table 2 for two consecutive sampling events, immediately implement an accelerated schedule of monthly sampling analysis, consistent with the requirements of this permit. This monthly sampling will continue for at least two months or until the compliance status can be determined by the Director. Reports of the results of this sampling will be submitted to the Director as soon as they are available, but not later than 30 days from each date of sampling.

2. Out-of-Compliance Status Based on Confirmed Exceedance of Permit Ground Water Protection Levels

a. Out of Compliance Status shall be defined as follows:

For parameters that have been defined as detectable in the ground water and for which protection levels have been established, out-of-compliance shall be defined as two consecutive samples exceeding the protection level.

b. Notification and Accelerated Monitoring - upon determination by the permittee or the Director, in accordance with UAC R317-6-6.17, that an out-of-compliance status exists, the permittee shall:

1) Verbally notify the Director of the out-of-compliance status or acknowledge Director Notice that such a status exists within 24 hours of receipt of data, and
2) Provide written notice within 5 days of the determination, and

3) Continue an accelerated schedule of monthly ground water monitoring for at least two months and continue monthly monitoring until the facility is brought into compliance, or as determined by the Director.

c. Source and Contamination Assessment Study Plan - within 30 days after the written notice to the Director required in Part II.F.2.b.2, above, the permittee shall submit an assessment study plan and compliance schedule for:

1) Assessment of the source or cause of the contamination, and determination of steps necessary to correct the source.

2) Assessment of the extent of the ground water contamination and any potential dispersion.

3) Evaluation of potential remedial actions to restore and maintain ground water quality, and ensure that the ground water standards will not be exceeded at the compliance monitoring wells.

3. Out-of-Compliance Status Based Upon Failure To Maintain Best Available Technology - In the event that LCRS and PCMS monitoring indicates a violation of any of the construction or performance standards outlined in Part II.D of this permit, including an exceedance of leakage rates from Table 3 below, the permittee shall submit to the Director a notification and description of the violation in accordance with Part III.I of this permit. If the Maximum Allowable Leakage Rates in Table 3 are exceeded, corrective actions will be initiated following the procedures described in the attached Groundwater Monitoring Plan (Section 3.4 of Appendix B) and Brine Evaporation Ponds Operating Manual (Appendix C).

Table 3 Maximum Allowable Liner Leakage Rates

Monitoring System Component	Brine Pond 4[1]	
LCRS sump	439 gallons per minute	
PCMS sump	13.8 gallons per minute	

[1]The LCRS Action Leakage Rate for the pond is 80 percent of the Maximum Allowable Leakage Rate. Appendix C, the Brine Evaporation Ponds Operating Manual, describes the corrective action response to an exceedance of the Action Leakage Rate(s).

G. REPORTING REQUIREMENTS

1. Quarterly Ground Water Monitoring - monitoring required in Part II.E.2 above shall be reported according to the schedule in Table 4 below, unless modified by the Director:

Table 4: Compliance Monitoring Report Schedule

Quarter		Report Due Date
1st	(January, February, March)	April 30th
2nd	(April, May, June)	July 31st
3rd	(July, August, September)	October 31st
4th	(October, November, December)	January 31st

2. Water Level Measurements - water level measurements from ground water monitoring wells will be reported as measured depth to ground water from the surveyed casing measuring point, and ground water elevations as converted by casing measuring point elevations.

3. Ground Water Quality Sampling - reporting will include:

a. Field Data Sheets - or copies thereof, including the field measurements, required in Part I.E.2.b.3 above, and other pertinent field data, such as: well name/number, date and time, names of sampling crew, type of sampling pump or bail, volume of water purged before sampling.

b. Laboratory Analytical Results - including date sampled, date received; and the results of analysis for each parameter, including: value or concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, and the date of the analysis.

4. Monthly Leak Detection Monitoring - reporting will include:

a. The volume of fluid pumped from the leak detection sumps, tabulated either daily or monthly, depending on the monitoring interval.

b. The disposition of any fluids pumped from the leak detection sump.

5. Electronic Filing Requirements - In addition to submittal of the hard copy data, above, the permittee will electronically submit the required ground water monitoring data in the electronic format specified by the Director. The data may be submitted by e-mail, compact disc, or other approved transmittal mechanism.

6. Monitoring Well As-Built Report - For each well constructed the permittee shall submit diagrams and descriptions of the final completion of the monitoring wells. The report is due within 60 days of the date of well completion. The report shall include:

a. Casing: depth, diameter, and type of material.
b. Screen: length, depth interval, diameter, material type, slot size.
c. Sand Pack: depth interval, material type and grain size.
d. Annular Seals: depth interval, material type.
e. Surface Casing and Cap: depth, diameter, material type, protection measures constructed.
f. Elevation and Well Location: ground surface elevation, elevation of water level measuring point, latitude and longitude in hours, minutes and seconds.
g. Well construction description, well completion description, results of well pump tests or slug tests.

H. COMPLIANCE SCHEDULE

1. **Brine Evaporation Pond Operating Manual.** Prior to receiving DWQ approval to use Brine Pond 4 a *Brine Evaporation Pond Operating Manual/Standard Operating Plan* shall be submitted for Director review and approval. The manual shall describe pond monitoring, operation, maintenance, and repair procedures in detail. Once approved, the document will be enforceable as Appendix C to this permit.
2. **Ground Water Monitoring Plan.** Prior to receiving DWQ approval to use Brine Pond 4 a *Ground Water Monitoring Plan* shall be submitted for Director review and approval. A draft version of the Ground Water Monitoring Plan is attached as Appendix B. The draft document may require edits to reflect as-built conditions of the pond before being submitted in a final version. Once the final document is approved by the Director, it will be enforceable as Appendix B to this permit.

3. **Accelerated Background Monitoring Report.** Independent samples will be collected quarterly from each well according to the requirements of Part II.E.2b above until a total of eight (8) sampling events have been completed. An *Accelerated Background Monitoring Report* shall be submitted with the quarterly report for the 8th sampling event. The report shall include the following statistical calculations presented in spreadsheet format for each parameter in Table 2 for each compliance monitoring well:

    1) Non-detect values converted to the detection limit times 0.25
    2) Mean concentration
    3) Standard deviation
    4) Mean concentration plus 2 standard deviations
    5) Mean concentration of all parameters times 1.25
    6) Ground water quality standard times 0.25

    Following DWQ review and approval, the interim Ground Water Class Protection Levels of Table 2 will be adjusted if necessary to comply with UAC R317-6-4. The Director will then determine if it is appropriate to adjust compliance monitoring frequency from quarterly to semi-annual.

4. **Final Closure Plan.** In the event that the permittee decides to discontinue its operations at the facility the permittee shall notify the Director of such a decision and submit a Final Closure Plan within 180 days prior to the closure of the facility. The permittee shall resubmit Final Closure Plans within 60 days of receipt of written notice of deficiencies therein.

PART III MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. REPRESENTATIVE SAMPLING

Samples taken in compliance with the monitoring requirements established under Part II shall be representative of the monitored activity.

B. ANALYTICAL PROCEDURES

Water sample analysis must be conducted according to test procedures specified under UAC R317-6-6.3.L, unless other test procedures have been specified in this permit.

C. PENALTIES FOR TAMPERING

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. REPORTING OF MONITORING RESULTS

Monitoring results obtained during each reporting period specified in the permit, shall be submitted to the Director, Utah Division of Water Quality at the following address no later than the 30th day of the month following the completed reporting period:

State of Utah
Division of Water Quality
PO Box 144870
Salt Lake City, Utah 84114-4870
Attention: Ground Water Protection Section
Electronic reporting submission portal: https://deq.utah.gov/water-quality/water-quality-electronic-submissions

E. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. ADDITIONAL MONITORING BY THE PERMITTEE

If the permittee monitors any pollutant more frequently than required by this permit, using approved test procedures as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. RECORDS CONTENTS

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements:
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. RETENTION OF RECORDS

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

I. TWENTY-FOUR HOUR NOTICE OF NONCOMPLIANCE REPORTING

1. The permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24 hours from the time the permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 536-4123, or to the Division of Water Quality, Ground Water Protection Section at (801) 536-4300, during normal business hours (Monday through Friday 8:00 am - 5:00 pm Mountain Time).

2. A written submission shall also be provided to the Director within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and,

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. Reports shall be submitted to the addresses in Part III.D, Reporting of Monitoring Results.

J. OTHER NONCOMPLIANCE REPORTING

Instances of noncompliance not required to be reported within 24 hours, shall be reported at the time that monitoring reports for Part II.E are submitted.

K. INSPECTION AND ENTRY

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

PART IV COMPLIANCE RESPONSIBILITIES

A. DUTY TO COMPLY

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding $25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding $50,000 per day. Nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. PROPER OPERATION AND MAINTENANCE

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

PART V GENERAL REQUIREMENTS

A. PLANNED CHANGES

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

B. ANTICIPATED NONCOMPLIANCE

The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. DUTY TO REAPPLY

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this permit.

E. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. OTHER INFORMATION

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. SIGNATORY REQUIREMENTS

All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:

   a. For a corporation: by a responsible corporate officer;

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

   c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to

the Director, and,

b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to Authorization. If an authorization under Part V.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. PENALTIES FOR FALSIFICATION OF REPORTS

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. AVAILABILITY OF REPORTS

Except for data determined to be confidential by the permittee, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.

J. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

K. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

L. TRANSFERS

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

M. STATE LAWS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

N. REOPENER PROVISION

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. If new ground water standards are adopted by the Board, the permit may be reopened and modified to extend the terms of the permit or to include pollutants covered by new standards. The permittee may apply for a variance under the conditions outlined in R317-6-6.4.D.

2. If alternative compliance mechanisms are required.

3. If subsequent ground water monitoring data reveals the background water quality values in Part I Table 1 are not accurate.

APPENDIX A

CONSTRUCTION PERMIT
PLANS AND SPECIFICATIONS

CONSTRUCTION PERMIT ISSUED BY
Utah Department of Environmental Quality
Utah Division of Water Quality

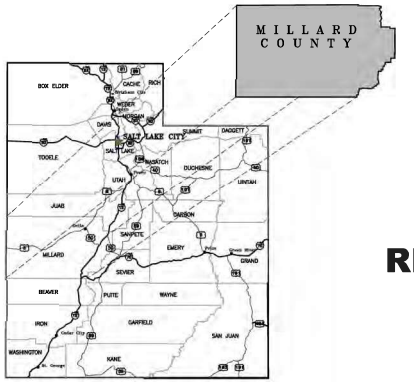
Date: 03/18/2021

Review Engineer: WC

Director: EG

APPENDIX A
SPECIFICATIONS

DRAWINGS

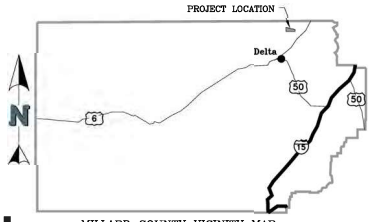


UTAH COUNTY MAP

MAGNUM SOLUTION MINING, LLC

BRINE POND 4

RE-ISSUED FOR CONSTRUCTION 01/29/21



MILLARD COUNTY VICINITY MAP

DRAWING LIST

DWG #	TITLE	REV
A000	COVER SHEET & DRAWING INDEX	1
A010	GENERAL ARRANGEMENT	0
A020	STAGE–STORAGE CURVES AND POND PROPERTIES	1
A050	GEOTECHNICAL INVESTIGATION LOCATIONS	0
A100	OVERALL GRADING PLAN	0
A105	OVERALL GRADING ISOPACH	0
A110	TYPICAL EMBANKMENT SECTIONS AND DETAILS SHEET 1 OF 2	0
A115	TYPICAL EMBANKMENT SECTIONS AND DETAILS SHEET 2 OF 2	1
A120	POND NO. 4 NORTHEAST ACCESS RAMP PLAN AND PROFILE	0
A135	POND NO. 4 SOUTHWEST ACCESS RAMP PLAN AND PROFILE	0
A140	BRINE RECOVERY SYSTEM SECTION AND DETAILS	0
A150	POND INLET PLAN	0
A160	POND INLET SECTIONS AND DETAILS	0
A200	POND BASIN PIPING PLAN	0
A205	POND BASIN PIPING SECTIONS AND DETAILS	0
A220	LEAK COLLECTION AND RECOVERY SYSTEM DETAILS	0
A230	PROCESS COLLECTION AND MONITORING SYSTEM PLAN	0
A300	POND SITE GROUNDWATER DEPTHS PLAN AND PROFILE	1
A400	STORMWATER DIVERSION AND SETTLEMENT MONUMENT PLAN	0
A500	BRINE RECOVERY MANIFOLD SECTIONS AND DETAILS	0
A600	WILDLIFE FENCE DETAILS	0

OWNER'S ACCEPTANCE OF THE DRAWINGS

NAME	SIGNATURE	DATE
Michael J. Ducker	Michael J. Ducker	2/8/21

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
1/29/2021
STATE OF UTAH

MAGNUM
MAGNUM SOLUTION MINING, LLC
3165 E MILLROCK DRIVE
SUITE 330 HOLLADAY, UT 84121
PHONE: 801-993-7001

NewFields
9400 Station Street, Suite 300, Lone Tree, CO 80124
Phone: (720) 508.3300 www.newfields.com

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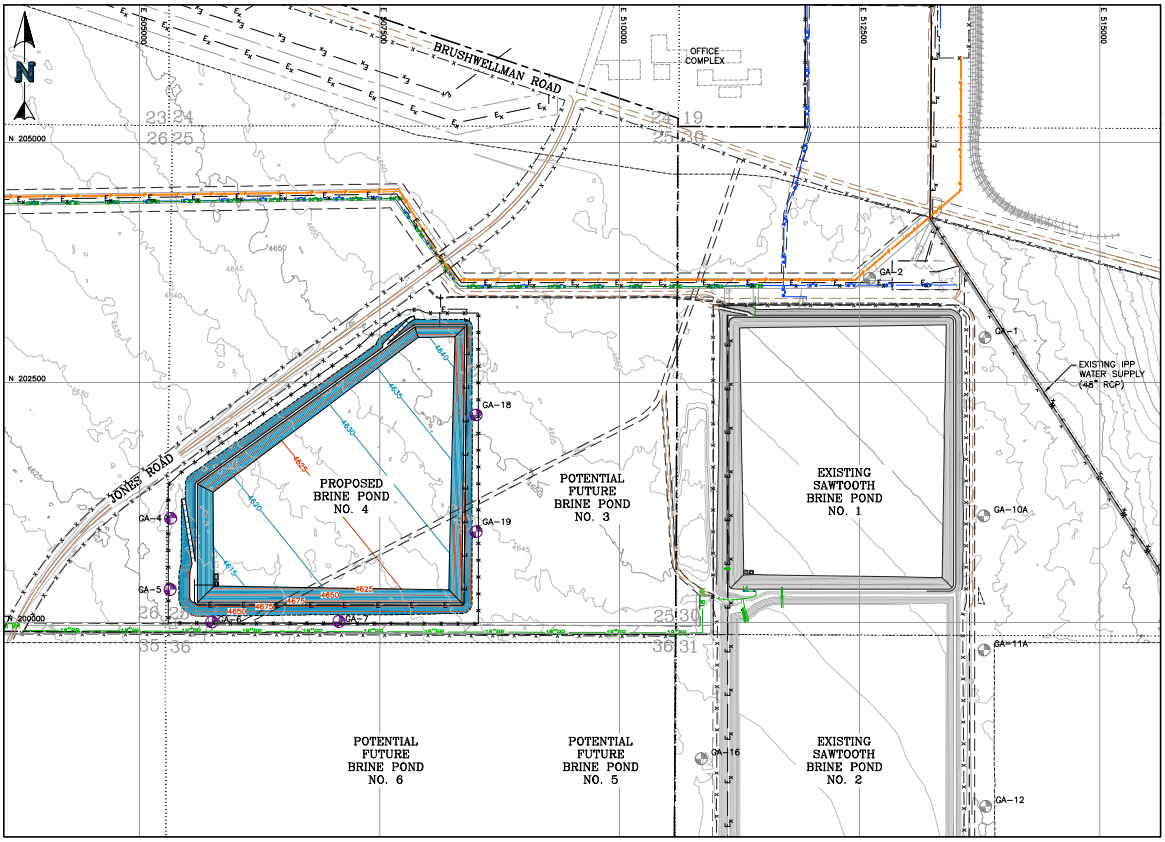

0 500 1000 FEET

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING EASEMENTS
- MAGNUM SITE BOUNDARY
- SITE BOUNDARY
- SECTION LINES
- 20 SECTION NUMBER
- EXISTING FENCE
- PROPOSED WILDLIFE FENCE
- EXISTING BRINE LINE
- EXISTING BRINE LINE
- EXISTING POWER LINE
- EXISTING WATER LINE
- EXISTING PIPE
- EXISTING 18" WATER
- EXISTING 4" WATER
- PROPOSED 20" HDPE DR11 BRINE INFLUENT LINE
- GA-01 EXISTING GROUND WATER MONITORING WELLS TO REMAIN
- GA-12 PROPOSED GROUND WATER MONITORING WELLS

NOTES:

1. STAGE-STORAGE CURVES AND POND PROPERTIES TABLE ARE SHOWN ON DRAWING A020.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: GENERAL ARRANGEMENT

FILENAME: 93.020.002M

DRAWING NO.: A010

REVISION: 0

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TABLE 1 – POND MATERIAL PROPERTIES AND TESTING FREQUENCY SUMMARY (SEE NOTE 4)							
ASTM TEST (DESCRIPTION)	CONTROL & RECORD TEST No.	TESTING FREQUENCIES (ONE PER – SEE NOTE 2)					
		RANDOM FILL	SELECT GRAVEL	PIPE BEDDING/BACKFILL	ROAD WEARING COURSE	EMBANKMENT FOUNDATION	BASIN FOUNDATION
D4318 (ATTERBERG LIMITS)	C1, R1	10,000 yd^3	1,000 yd^3	SOIL TYPE/5,000 yd^3 OR 1 PER STRUCTURE	2,000 yd^3	SOIL TYPE/100,000 ft^2	SOIL TYPE/200,000 ft^2
D2216 (MOISTURE CONTENT)	C2, R2	1 PER LIFT PER DAY OR 2,000 yd^3	–	PER NUCLEAR DENSITY REQUIREMENTS	–	50,000 ft^2	100,000 ft^2
D422 (PARTICLE SIZE DISTRIBUTION)	C3, R3	10,000 yd^3	1,000 yd^3 OR MINIMUM OF 2 TESTS	5,000 yd^3 OR 1 PER STRUCTURE	2,000 yd^3	100,000 ft^2	200,000 ft^2
D698 (STANDARD PROCTOR)	C4, R4	SOIL TYPE/ 1 PER 10 FIELD DENSITY TESTS	–	SOIL TYPE/5,000 yd^3	–	SOIL TYPE/250,000 ft^2	SOIL TYPE/500,000 ft^2
D2922 (NUCLEAR DENSITY)	R5d[NOTE1]	1 PER LIFT PER DAY OR 2,000 yd^3	–	GREATER OF 4 PER STRUCTURE OR 500 yd^3	–	50,000 ft^2	100,000 ft^2
REQUIRED COMPACTION VALUES AND RESULTS (SEE NOTE 1)	MOISTURE CONTENT	WITHIN 2% OF OPTIMUM MOISTURE CONTENT	–	SUFFICIENT TO OBTAIN ADEQUATE DENSITY	–	SUFFICIENT TO OBTAIN ADEQUATE DENSITY	SUFFICIENT TO OBTAIN ADEQUATE DENSITY
	MIN. COMPACTION PER ASTM D698	AT LEAST 95% OF MAX. DRY DENSITY	–	AT LEAST 95% OF MAXIMUM DRY DENSITY	–	95% M.D.D.	95% M.D.D.
	MAXIMUM LOOSE LIFT THICKNESS	8"	–	8"	8"	SUFFICIENT TO ACHIEVE A SMOOTH AND COMPACT SURFACE	
	MAXIMUM PARTICLE SIZE	4"	–		–		
D1556 (SAND CONE) OR D5030 (WATER REPLACEMENT)	R5b, R5c	1 PER 10 NUCLEAR DENSITY TESTS	–	EVERY 10 NUCLEAR DENSITY TESTS	–	1 PER 10 NUCLEAR DENSITY TESTS	1 PER 10 NUCLEAR DENSITY TESTS
D3080 (DIRECT SHEAR STRENGTH – SEE NOTE 3)	C6, R6	1 PER 1,000,000 yd^3	–	–	–	–	–

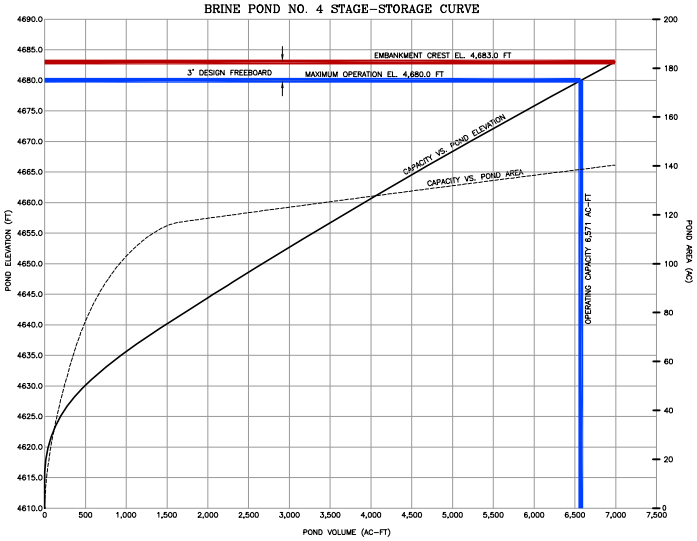
TABLE 2 – PARTICLE SIZE DISTRIBUTION SUMMARY (SEE NOTE 4)											
MATERIAL \ SIEVE SIZE	4"	3"	2"	1.5"	1"	0.75"	0.5"	#4	#16	#200	P.I.
SELECT GRAVEL			100	30–70	0– 15		0–5				
ROAD WEARING COURSE	100					50–70		35–50	15–40	2–10	
PIPE BACKFILL	100	90–100								0–20	<= 10
PIPE BEDDING				100		90–100		30–70		0–20	<= 10

NOTES:

1. IF 3 CONSECUTIVE TESTS FAIL FOR EITHER COMPACTION OR MOISTURE, THE TESTING FREQUENCY SHALL BE INCREASED TO 1 TEST PER 1,000 yd3/ UNTIL 6 CONSECUTIVE PASSING TESTS ARE RECORDED.
2. WHERE TWO CRITERIA ARE GIVEN, WHICHEVER CRITERIA RESULTS IN MORE FREQUENT TESTING SHALL BE OBSERVED.
3. D3080 (DIRECT SHEAR STRENGTH) REQUIREMENT IS A MINIMUM FRICTION ANGLE OF 30° AND A MINIMUM COHESION OF 300 PSF. IF RESULTS DO NOT ACHIEVE THESE MINIMUM CRITERIA, THE ENGINEER SHALL BE NOTIFIED TO RE-EVALUATE THE ANALYSIS.
4. THE INFORMATION PRESENTED ON THIS DRAWING IS AN INCOMPLETE SUMMARY OF THE TECHNICAL SPECIFICATIONS. THE FULL TECHNICAL SPECIFICATIONS ARE INCLUDED IN APPENDIX B OF THE FINAL DESIGN REPORT AND MUST BE REFERRED TO DURING CONSTRUCTION.

1

BRINE POND NO. 4 STAGE–STORAGE CURVE



POND PROPERTIES	
DESCRIPTION	POND NO. 4
CREST ELEVATION (FT)	4,683.0
OPERATING ELEVATION (FT)	4,680.0
TOTAL CAPACITY (AC–FT)	6,989
OPERATING CAPACITY (AC–FT)	6,571
FREEBOARD CAPACITY (AC–FT)	418

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
1/29/2021
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
1	01/29/21	RE-ISSUED FOR CONSTRUCTION	JLW	KNJ
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: STAGE–STORAGE CURVES AND POND PROPERTIES
FILENAME: 93.020.004D
DRAWING NO.: A020
REVISION: 1

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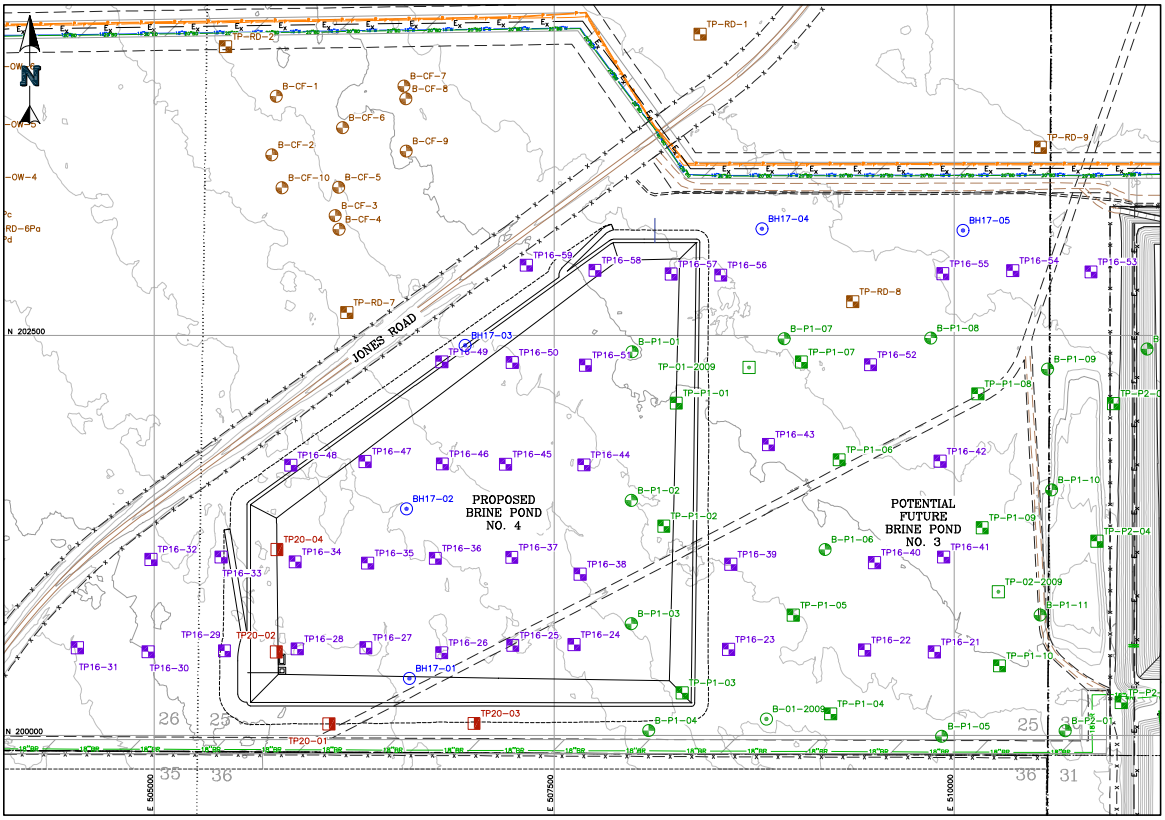

LEGEND:

- EXISTING GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING EASEMENTS
- SITE BOUNDARY
- SECTION LINES
- 20 SECTION NUMBER
- EXISTING FENCE
- EXISTING BRINE LINE
- EXISTING BRINE LINE
- EXISTING POWER LINE
- EXISTING WATER LINE
- EXISTING PIPE
- EXISTING 18" WATER
- B-01-2009 BOREHOLE (IGES, 2009)
- TP-01-2009 TEST PIT (IGES, 2009)
- B-P1-01 BOREHOLE (IGES, 2010)
- TP-P1-02 TEST PIT (IGES, 2010)
- B-P1-01 BOREHOLE (IGES, 2010 PLANT SITE)
- TP-P1-02 TEST PIT (IGES, 2010 PLANT SITE)
- BH15-1 BOREHOLE (NEWFIELDS, 2015)
- TP15-01 TEST PIT (NEWFIELDS, 2015)
- TP16-01 PHASE I TEST PIT (NEWFIELDS, 2016)
- BH17-01 BOREHOLE (NEWFIELDS, 2017)
- TP20-01 TEST PIT (NEWFIELDS, 2020)

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
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APPROVED BY: KNJ
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: GEOTECHNICAL INVESTIGATION LOCATIONS

FILENAME: 93.020.006M

DRAWING NO.: A050

REVISION: 0

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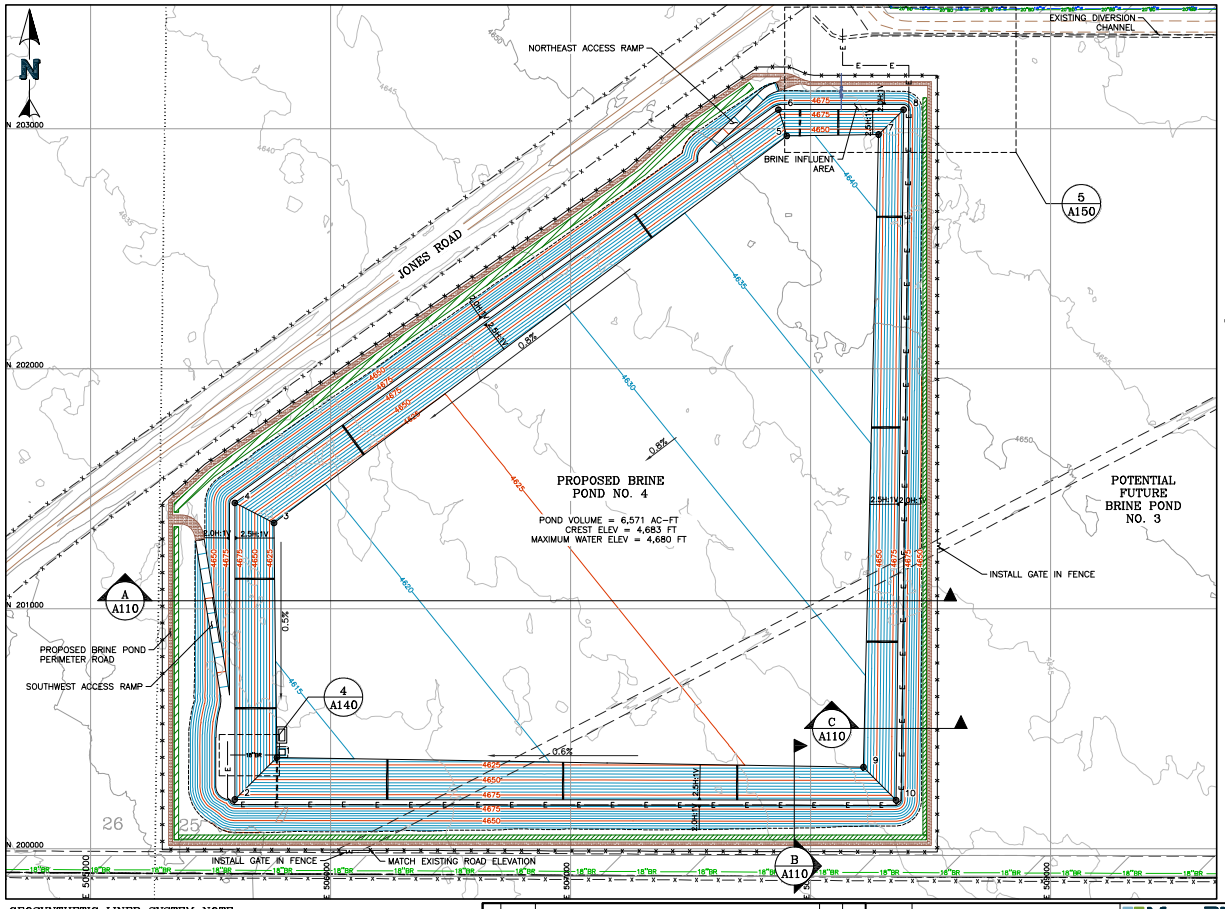

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING EASEMENTS
- SITE BOUNDARY
- EXISTING FENCE
- PROPOSED WILDLIFE FENCE
- EXISTING BRINE LINE
- EXISTING POWER LINE
- PROPOSED POWER LINE
- EXISTING WATER LINE
- EXISTING 18" WATER
- PROPOSED 20" BRINE DELIVERY LINE
- VEGETATION WINDROW
- PROPOSED PERIMETER ROAD
- HDPE ACCESS LADDER WITH WHITE LINER STRIP FOR VISUAL IDENTIFICATION
- WATER LEVEL GAUGE
- SETTING OUT POINTS

SETTING OUT DATA

POINT	NORTHING	EASTING	ELEVATION
1	200,380.84	505,776.18	4,613.02
2	200,206.08	505,601.23	4,683.00
3	201,358.31	505,764.09	4,617.86
4	201,441.50	505,601.23	4,683.00
5	202,970.72	507,901.37	4,639.26
6	203,080.07	507,865.96	4,683.00
7	202,976.75	508,283.54	4,641.67
8	203,080.07	508,388.02	4,683.00
9	200,340.64	508,220.22	4,628.03
10	200,203.07	508,356.12	4,683.00

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

GEOSYNTHETIC LINER SYSTEM NOTE:

1. THE LINER SYSTEM SHALL BE A COMPOSITE SYSTEM WITH THE PRIMARY LINER CONSISTING OF 80-mil (2.0MM) SINGLE SIDED TEXTURED HDPE LINER UNDERLAIN BY A SECONDARY LINER CONSISTING OF A 60-mil (1.5MM) DRAIN LINER WITH 130-mil HEIGHT RAISED STUDS FACING UP. 250-mil GEONET MAY BE USED IN LIEU OF THE 130-mil HEIGHT RAISED STUDS.

0 200 400 FEET

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: OVERALL GRADING PLAN

FILENAME: 93.020.008M

DRAWING NO.: A100

REVISION: 0

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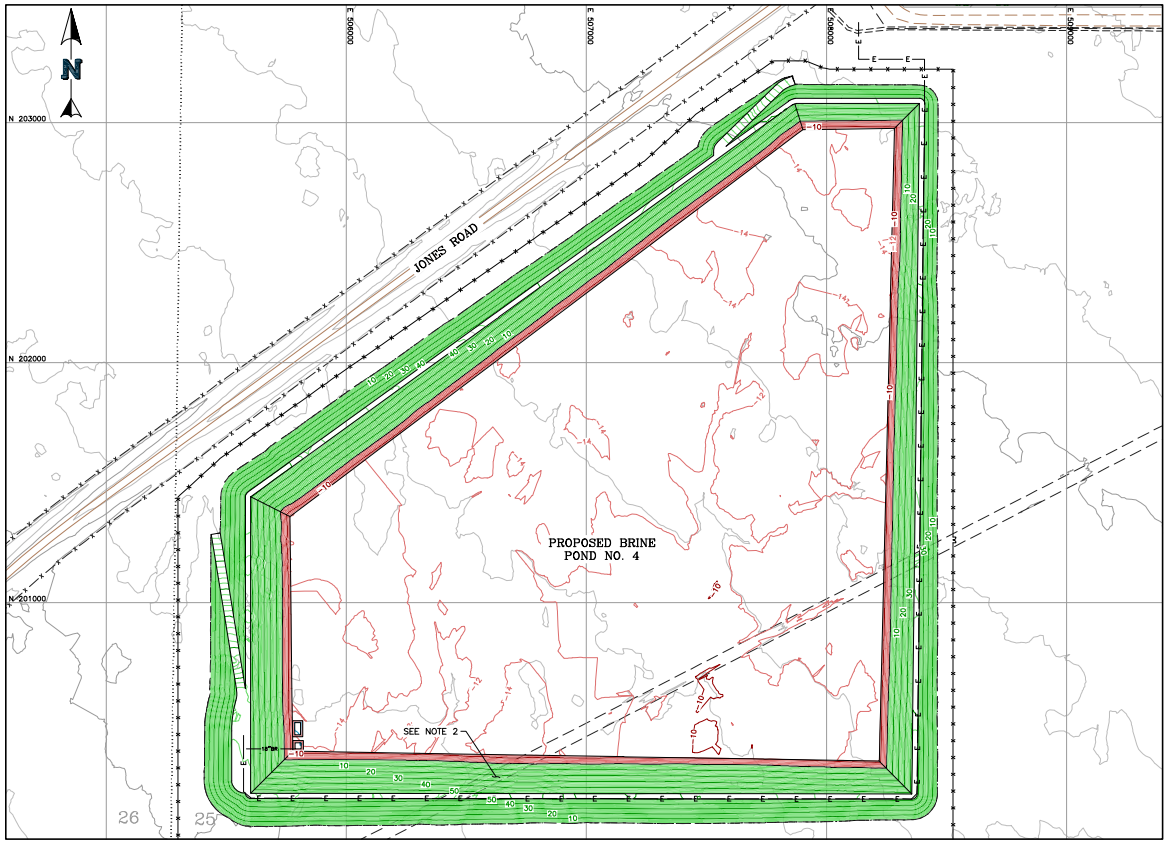

LEGEND:

- EXISTING GROUND CONTOURS
- CUT DEPTH CONTOURS
- FILL DEPTH CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING EASEMENTS
- MAGNUM SITE BOUNDARY
- SITE BOUNDARY
- 20 SECTION NUMBER
- EXISTING FENCE
- PROPOSED WILDLIFE FENCE
- PROPOSED POWER LINE

POND EARTHWORKS	
DESCRIPTION	POND NO. 4
CUT (CY)	2,308,742
FILL (CY)	2,077,186
COMPACTION RATIO (ESTIMATED FROM BRINE PONDS 1 & 2 CONSTRUCTION)	11.1%

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

0 200 400 FEET

NOTES:

1. THE AVERAGE DEPTH OF TOPSOIL IS ASSUMED TO BE 3 INCHES FOR THE EARTHWORK BALANCE.
2. EXISTING ROAD WEARING COURSE MATERIAL TO BE REMOVED AND ROAD SURFACE TO BE SCARIFIED PRIOR TO PLACEMENT OF EMBANKMENT FILL. SEE TECHNICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: OVERALL GRADING ISOPACH

FILENAME: 93.020.010M
DRAWING NO.: A105
REVISION: 0

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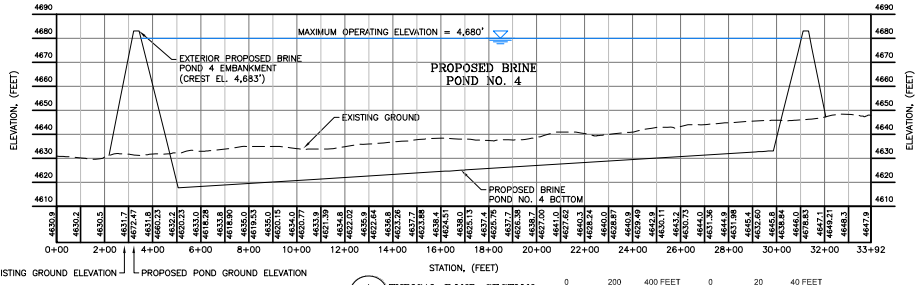
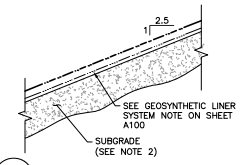


A A100 TYPICAL POND SECTION

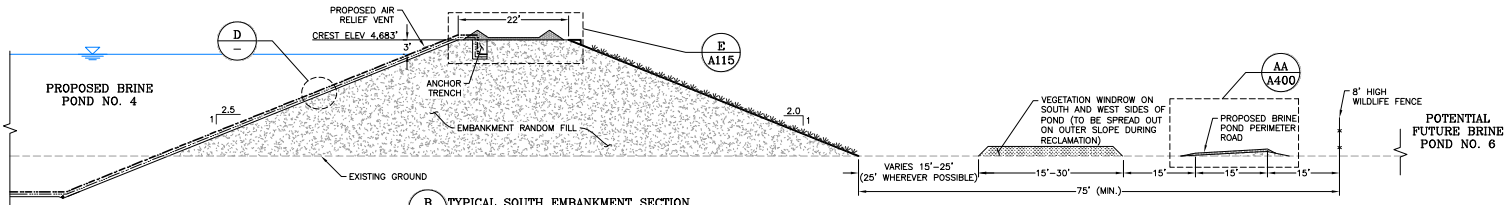
0 200 400 FEET HORIZONTAL

0 20 40 FEET VERTICAL

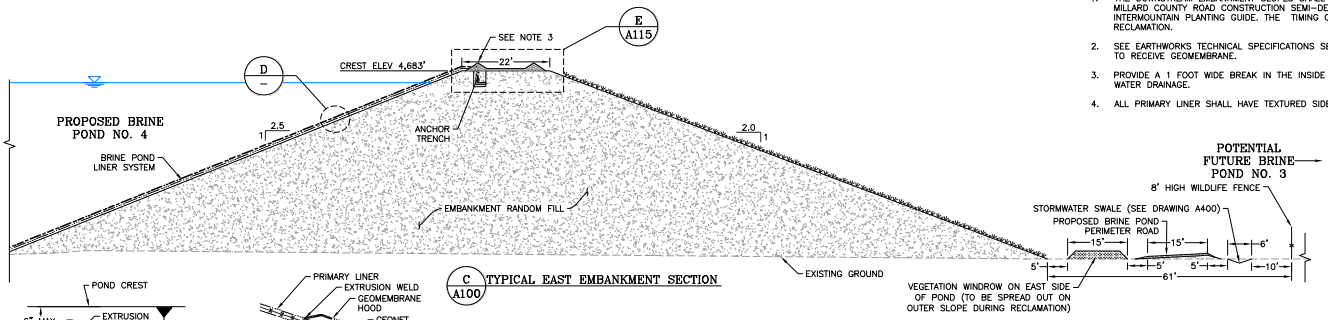
10X EXAGGERATION



D – D A115 TYPICAL GEOMEMBRANE LINED SLOPE



B A100 TYPICAL SOUTH EMBANKMENT SECTION

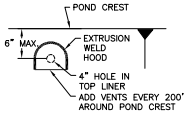


C A100 TYPICAL EAST EMBANKMENT SECTION

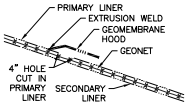
NOTES:

1. THE DOWNSTREAM EMBANKMENT SLOPES SHALL BE SEEDED IN ACCORDANCE WITH THE MILLARD COUNTY ROAD CONSTRUCTION SEMI-DESERT SEED MIX AS BASED ON THE INTERMOUNTAIN PLANTING GUIDE. THE TIMING OF THE SEEDING TO BE DONE WITH RECLAMATION.
2. SEE EARTHWORKS TECHNICAL SPECIFICATIONS SECTION 2.2.5 FOR PREPARING SURFACES TO RECEIVE GEOMEMBRANE.
3. PROVIDE A 1 FOOT WIDE BREAK IN THE INSIDE BERM EVERY 50 FEET FOR SURFACE WATER DRAINAGE.
4. ALL PRIMARY LINER SHALL HAVE TEXTURED SIDE FACING UP.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH



VENT DETAIL PLAN VIEW



VENT DETAIL SECTION

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: TYPICAL EMBANKMENT SECTIONS AND DETAILS SHEET 1 OF 2

FILENAME: 93.020.012D

DRAWING NO.: A110

REVISION: 0

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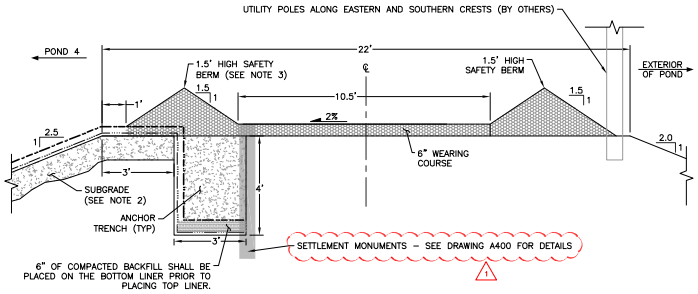

E A110 / E A115 TYPICAL POND CREST

NOTES:

1. THE DOWNSTREAM EMBANKMENT SLOPES SHALL BE SEEDED IN ACCORDANCE WITH THE MILLARD COUNTY ROAD CONSTRUCTION SEMI-DESERT SEED MIX AS BASED ON THE INTERMOUNTAIN PLANTING GUIDE. THE TIMING OF THE SEEDING TO BE DONE WITH RECLAMATION.
2. SEE EARTHWORKS TECHNICAL SPECIFICATIONS SECTION 2.2.5 FOR PREPARING SURFACES TO RECEIVE GEOMEMBRANE.
3. PROVIDE A 1 FOOT WIDE BREAK IN THE INSIDE BERM EVERY 50 FEET FOR SURFACE WATER DRAINAGE.
4. ALL PRIMARY LINER SHALL HAVE TEXTURED SIDE FACING UP.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
1/29/2021
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
1	01/29/21	RE-ISSUED FOR CONSTRUCTION	JLW	KNJ
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: TYPICAL EMBANKMENT SECTIONS AND DETAILS SHEET 2 OF 2
FILENAME: 93.020.014D
DRAWING NO.: A115
REVISION: 1

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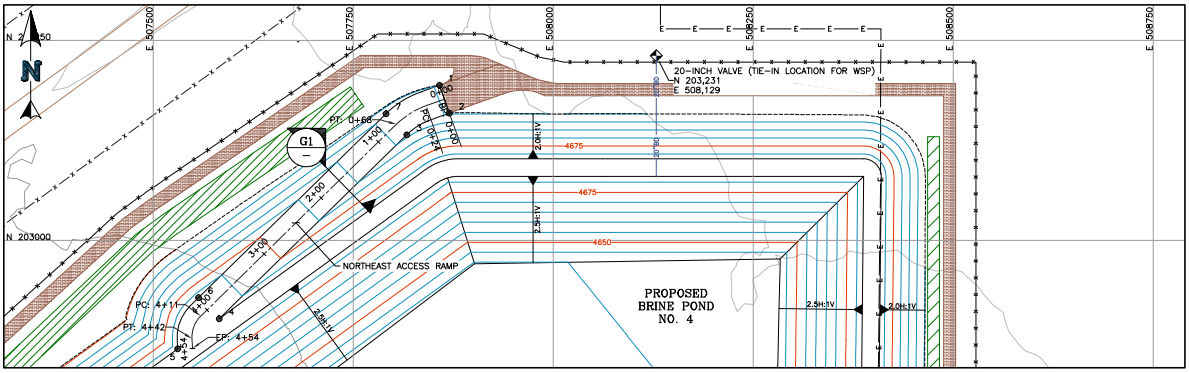
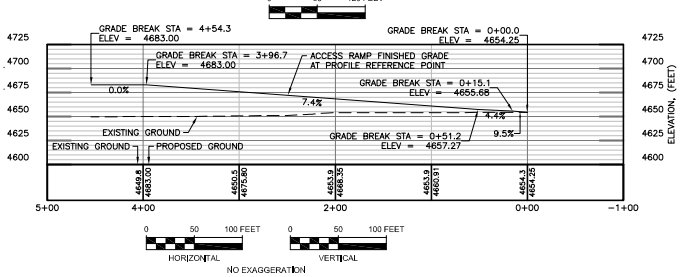


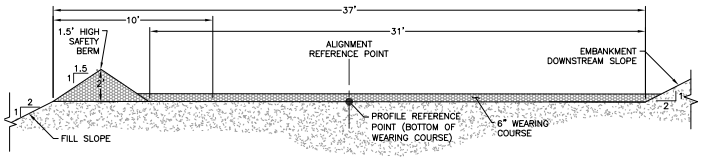
LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED BRINE POND GROUND CONTOURS
- PROPOSED WILDLIFE FENCE
- PROPOSED POWERLINE
- VEGETATION WINDROW
- PROPOSED PERIMETER ROAD
- PROPOSED 20" BRINE DELIVERY LINE
- SETTING OUT POINTS

SETTING OUT DATA			
POINT	NORTHING	EASTING	ELEVATION
1	203,193.86	507,857.64	4,654.25
2	203,159.01	507,870.06	4,654.25
3	203,131.85	507,816.75	4,658.51
4	202,902.03	507,582.35	4,683.00
5	202,864.39	507,530.34	4,683.00
6	202,928.45	507,556.45	4,683.00
7	203,158.27	507,790.85	4,658.51



ALIGNMENT TABLE						
	STATION	NORTHING	EASTING	DELTA (D-M-S)	LENGTH (FT)	RADIUS (FT)
PT	0+00.00	203,176.43	507,863.85			
PC	0+24.40	203,168.25	507,840.87	024-49-34	44.07	101.71
PT	0+68.47	203,145.06	507,803.80			
PC	4+10.97	202,905.28	507,559.24	048-22-02	31.11	36.85
PT	4+42.07	202,877.16	507,548.23			



G1 — G1 A135 TYPICAL ACCESS RAMP SECTION

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

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DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: POND NO. 4 NORTHEAST ACCESS RAMP PLAN AND PROFILE

FILENAME: 93.020.015P
DRAWING NO.: A120
REVISION: 0

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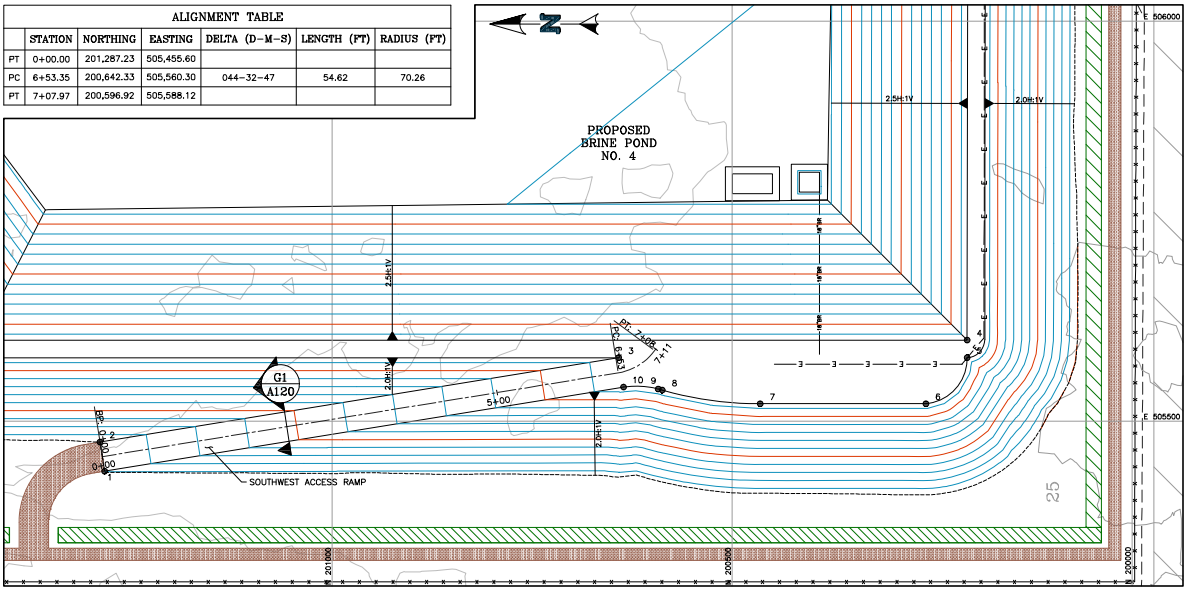
ALIGNMENT TABLE						
	STATION	NORTHING	EASTING	DELTA (D-M-S)	LENGTH (FT)	RADIUS (FT)
PT	0+00.00	201,287.23	505,455.60			
PC	6+53.35	200,642.33	505,560.30	044-32-47	54.62	70.26
PT	7+07.97	200,596.92	505,588.12			

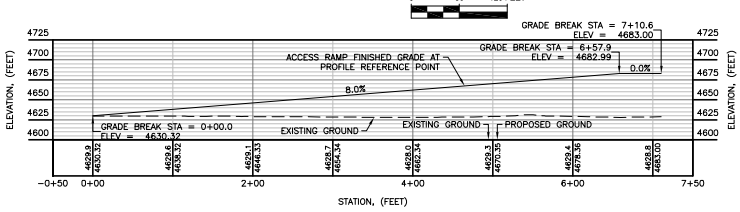


LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED BRINE POND GROUND CONTOURS
- SITE BOUNDARY
- PROPOSED WILDLIFE FENCE
- PROPOSED POWERLINE
- VEGETATION WINDROW
- PROPOSED PERIMETER ROAD
- SETTING OUT POINTS

SETTING OUT DATA			
POINT	NORTHING	EASTING	ELEVATION
1	201,284.27	505,437.34	4,630.32
2	201,290.20	505,473.86	4,630.32
3	200,641.78	505,579.26	4,683.00
4	200,206.08	505,601.23	4,683.00
5	200,206.13	505,579.31	4,683.00
6	200,257.64	505,521.75	4,683.00
7	200,464.80	505,521.74	4,683.00
8	200,587.25	505,538.73	4,683.00
9	200,592.36	505,540.17	4,683.00
10	200,635.59	505,542.65	4,682.91

0 60 120 FEET



0 60 120 FEET HORIZONTAL

0 60 120 FEET VERTICAL

NO EXAGGERATION

REGISTERED PROFESSIONAL ENGINEER
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APPROVED BY: KNJ
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DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: POND NO. 4 SOUTHWEST ACCESS RAMP PLAN AND PROFILE

FILENAME: 93.020.016P

DRAWING NO.: A135

REVISION: 0

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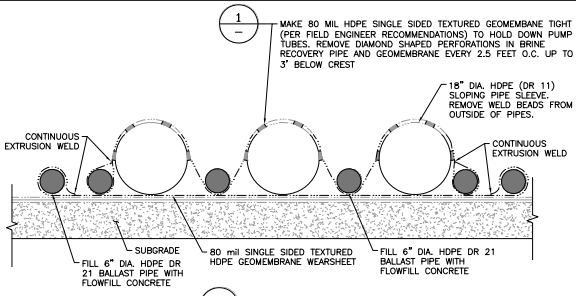
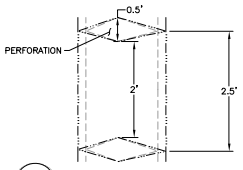
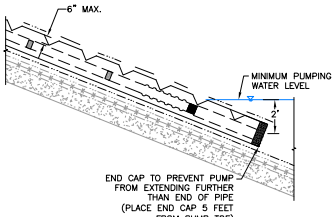


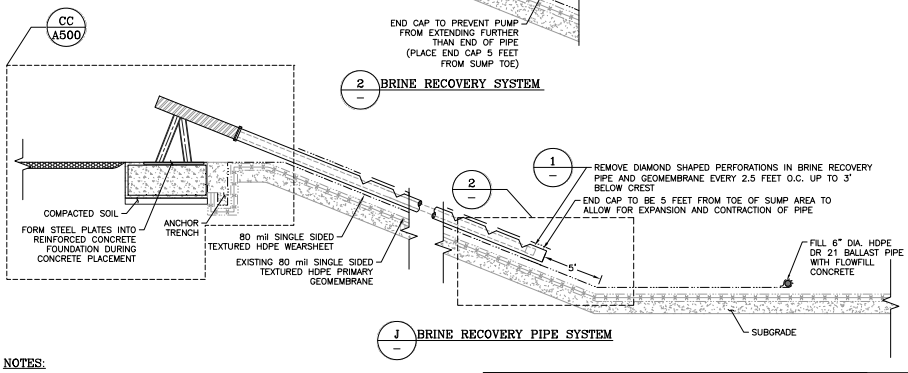
H PIPE SLEEVE SECTION



1 DIAMOND PERFORATION DETAIL



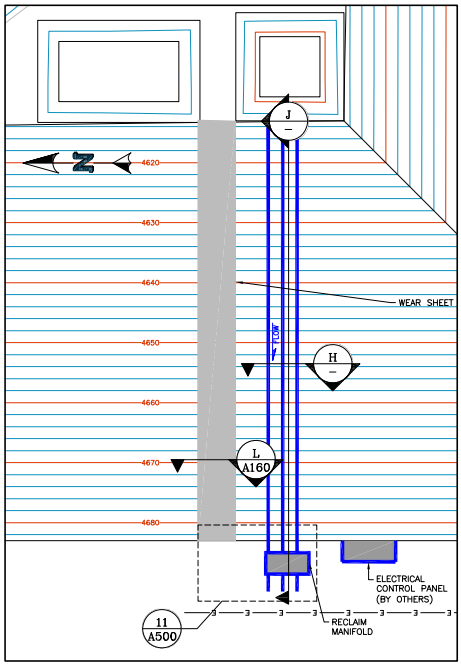
2 BRINE RECOVERY SYSTEM



J BRINE RECOVERY PIPE SYSTEM

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED BRINE POND GROUND CONTOURS
- EXISTING ROADS/TRAILS
- 18 IN DIA. DR11 HDPE PIPE



4 A100 POND 4 RECLAIM PUMPBACK SYSTEM PLAN

0 20 40 FEET

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

NOTES:

1. STUB ENDS TO CONSIST OF SCRAP PIECE OF PIPE TO FUNNEL IN CONCRETE. TO BE REMOVED AFTER CONCRETE PLACEMENT.
2. CUT HOLE IN PIPE WALL TO FULL DIAMETER OF STUB END
3. 12-INCH-DIAMETER STUB END TO BE USED FOR POURING CONCRETE PLUG IN PIPE. PIPE FILLED UNTIL CONCRETE COMES OUT OF 6-INCH-DIAMETER PIPE.

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
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DESIGNED BY: JLW
DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: BRINE RECOVERY SYSTEM SECTION AND DETAILS
FILENAME: 93.020.018D
DRAWING NO.: A140
REVISION: 0

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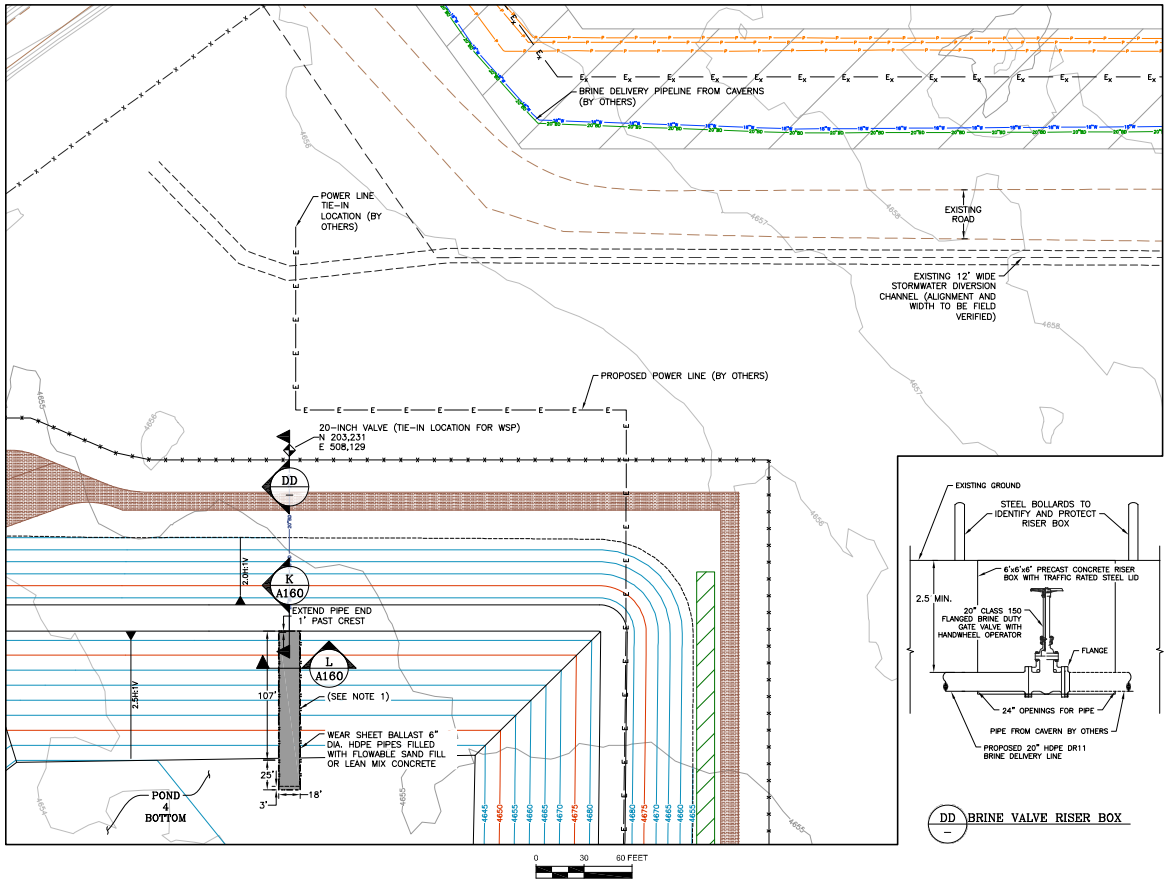

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING EASEMENTS
- SITE BOUNDARY
- EXISTING FENCE
- PROPOSED WILDLIFE FENCE
- EXISTING BRINE LINE
- EXISTING POWER LINE
- PROPOSED POWER LINE
- PROPOSED 20" HDPE DR11 BRINE DELIVERY LINE
- PROPOSED PERIMETER ROAD

DD — BRINE VALVE RISER BOX

NOTES:

1. PLACE GEOTEXTILE IN THE END OF THE PIPE BEFORE WELDING THE END CAP ON.
2. PIPE BALLASTS ANCHORED AT CREST OF SLOPE BEYOND THE EXTENTS OF THE GEOMEMBRANE.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: POND INLET PLAN
FILENAME: 93.020.020D
DRAWING NO.: A150
REVISION: 0

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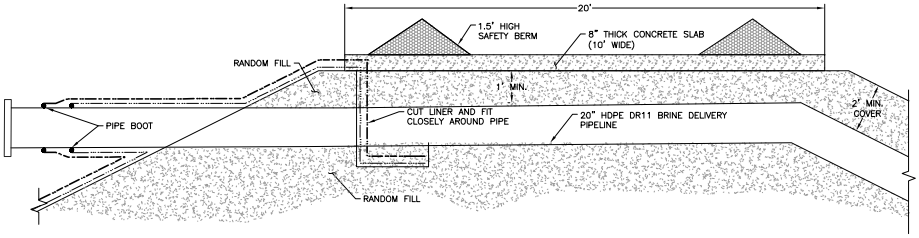
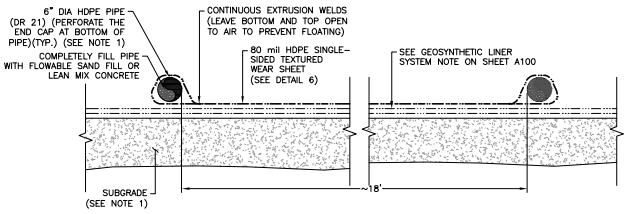
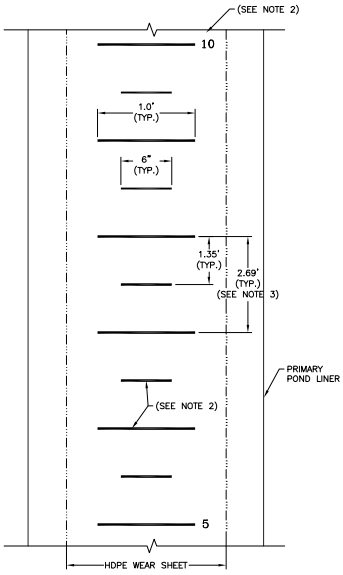


K / A150 PIPE CROSSING CONCRETE CAP



L / A140 L / A150 POND WEAR SHEET BALLASTING



6 / – WATER LEVEL GAUGE DETAIL

NOTE:

1. PIPE BALLASTS ANCHORED AT CREST OF SLOPE BEYOND THE EXTENTS OF THE GEOMEMBRANE.
2. EXTRUDE INCREMENTS ONTO HDPE WEARSHEET AND APPLY FLUORESCENT COLOR PAINT TO ALL INCREMENTS AND LABEL EVERY 5 FEET.
3. SLOPE DISTANCES SHOWN CORRELATE TO VERTICAL INCREMENTS OF 6" ON A 2.5:1 (HORZIONTAL:VERTICAL) SLOPE (TO BE FIELD VERIFIED BY SURVEY).

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: POND INLET SECTIONS AND DETAILS
FILENAME: 93.020.022D
DRAWING NO.: A160
REVISION: 0

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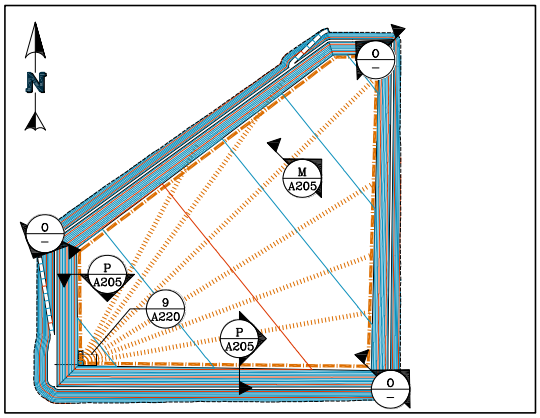
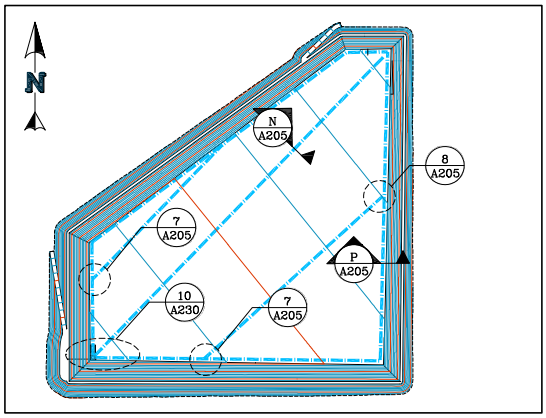


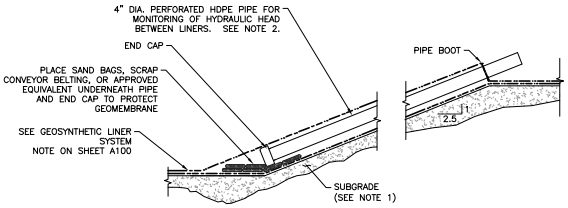
LCRS PIPING AND SUMPS



PCMS PIPING AND SUMPS

LEGEND:

- PROPOSED BRINE POND GROUND CONTOURS
- 4 IN DIA. PERFORATED HDPE DR17 COLLECTION LCRS PIPE
- LCRS 18" WIDE STRIP DRAIN
- 4 IN DIA. PERFORATED CPe COLLECTION PCMS PIPE



0 – TYPICAL 4" HDPE MONITORING SLEEVE

NOTE:

1. SEE EARTHWORKS MATERIALS AND CONSTRUCTION TECHNICAL SPECIFICATIONS SECTION 2.2.5 FOR PREPARING SURFACES TO RECEIVE GEOMEMBRANE.
2. THE MONITORING SLEEVE SHALL BE PERFORATED IN THE SAME MANNER AS THE LCRS PIPES LOCATED ALONG THE INSIDE EMBANKMENT TOE. THE SLEEVES SHALL BE LOCATED AT THE EASTERN, NORTHEASTERN AND NORTHERN CORNERS OF THE POND.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

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0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: POND BASIN PIPING PLAN

FILENAME: 93.020.024M

DRAWING NO.: A200

REVISION: 0

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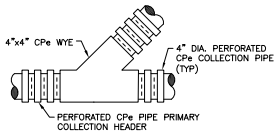
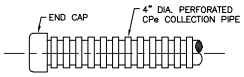
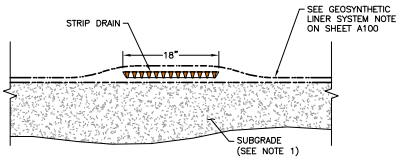


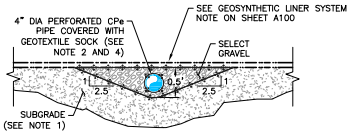
7 A200 COLLECTION PIPE CONNECTION



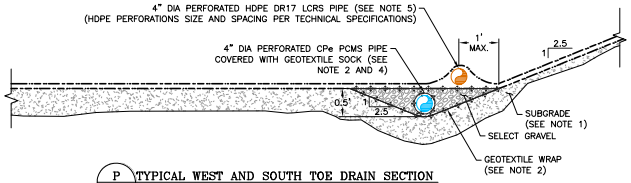
8 A200 TYPICAL COLLECTION PIPE TERMINATION



M A200 TYPICAL LEAK DETECTION STRIP DRAIN



N A200 PCMS CHANNEL



P A200 TYPICAL WEST AND SOUTH TOE DRAIN SECTION

NOTES:

1. SEE EARTHWORKS MATERIALS AND CONSTRUCTION TECHNICAL SPECIFICATIONS SECTION 2.2.5 FOR PREPARING SURFACES TO RECEIVE GEOMEMBRANE.
2. GEOTEXTILE SOCK SHALL BE NON-WOVEN 10 oz/yd^2.
3. ALL PRIMARY LINER SHALL HAVE TEXTURED SIDE FACING UP.
4. PIPE PERFORATIONS SHALL BE IN ACCORDANCE WITH CLASS II AASHTO M252 SPECIFICATION OR APPROVED EQUIVALENT. (SLOT LENGTH = 0.875 IN., WIDTH = 0.125 IN.)
5. ENSURE THE END OF THE PIPE EITHER HAS REDUCERS, OR OTHER MEANS APPROVED BY THE ENGINEER, TO PROTECT THE LINER FROM SHARP EDGES.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: POND BASIN PIPING SECTIONS AND DETAILS
FILENAME: 93.020.026D
DRAWING NO.: A205
REVISION: 0

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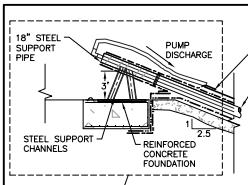
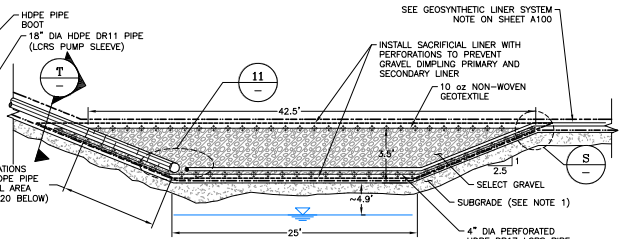
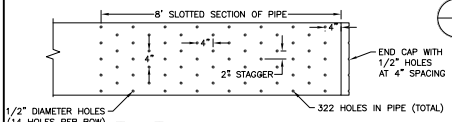
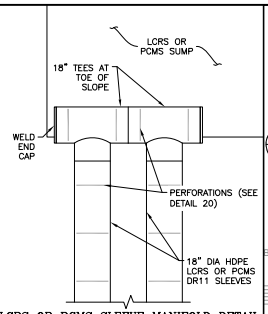




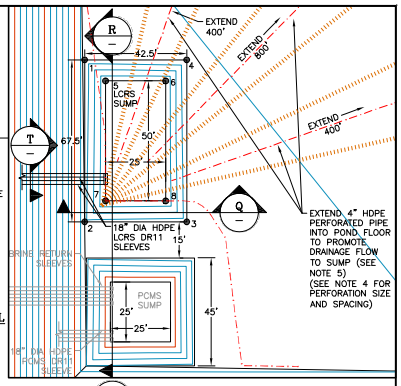
Q – TYPICAL LCRS SUMP SECTION



20 – 20 A230 PERFORATED 18" SLEEVE DETAIL

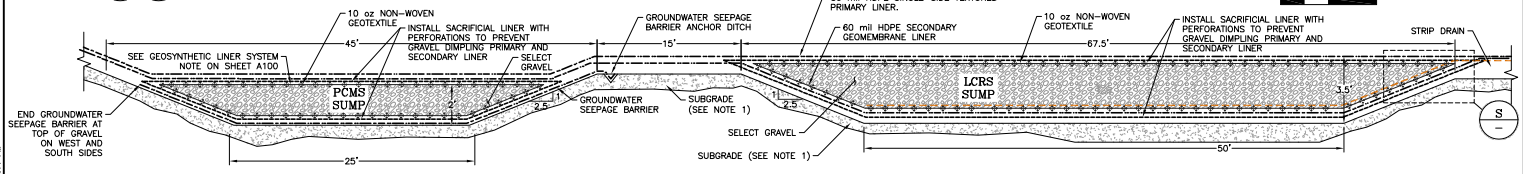


11 – 11 A230 LCRS OR PCMS SLEEVE MANIFOLD DETAIL

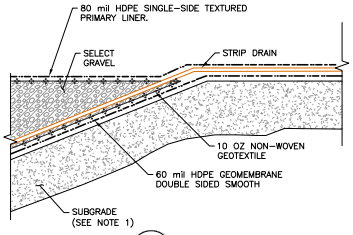


9 A200 LCRS PIPING AND SUMP

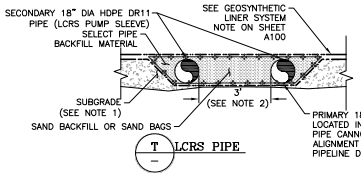
0 20 40 FEET



R – R A230 LCRS AND PCMS SECTION



S – LCRS GEOSYNTHETICS DETAIL



T – LCRS PIPE

PRIMARY 18" DIA HDPE DR11 PIPE (LCRS PUMP SLEEVE) PIPE MUST BE LOCATED IN TRENCH AND HAUNCHES OF PIPE SUPPORTED AS SHOWN. PIPE CANNOT BE INSTALLED ABOVE PLANE OF EMBANKMENT FACE. PIPE ALIGNMENT SHALL BE SURVEYED PRIOR TO PLACING BACKFILL TO ENSURE PIPELINE DOES NOT DEVIATE MORE THAN 6 INCHES FROM CENTERLINE.

POND 4 SETTING OUT DATA

POINT	NORTHING	EASTING	ELEVATION
1	200,508.35	505,775.44	4,613.66
2	200,440.85	505,775.44	4,613.32
3	200,440.85	505,817.94	4,613.58
4	200,508.35	505,817.94	4,613.92
5	200,499.60	505,784.19	4,610.16
6	200,499.60	505,809.19	4,610.20
7	200,449.60	505,784.19	4,610.08
8	200,449.60	505,809.19	4,610.12

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

NOTES:

1. SEE EARTHWORKS MATERIALS AND CONSTRUCTION TECHNICAL SPECIFICATIONS SECTION 2.2.5 FOR PREPARING SURFACES TO RECEIVE GEOMEMBRANE.
2. PIPE SPACING CAN BE ADJUSTED TO ACCOMMODATE PIPE BOOT CONSTRUCTION AT THE CREST. PIPE ALIGNMENT TO BE SURVEYED DURING INSTALLATION AND BACKFILLING TO ENSURE STRAIGHTNESS.
3. ALL PRIMARY LINER SHALL HAVE TEXTURED SIDE FACING UP.
4. SEE TECHNICAL SPECIFICATIONS FOR PERFORATION SIZE AND SPACING.
5. ENDS OF PIPES EXTENDING 400' AND 800' INTO POND FLOOR SHALL EITHER HAVE REDUCERS OR OTHER MEANS (APPROVED BY THE ENGINEER) TO PROTECT THE LINER FROM SHARP EDGES.

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: LEAK COLLECTION AND RECOVERY SYSTEM DETAILS
FILENAME: 93.020.028D
DRAWING NO.: A220
REVISION: 0

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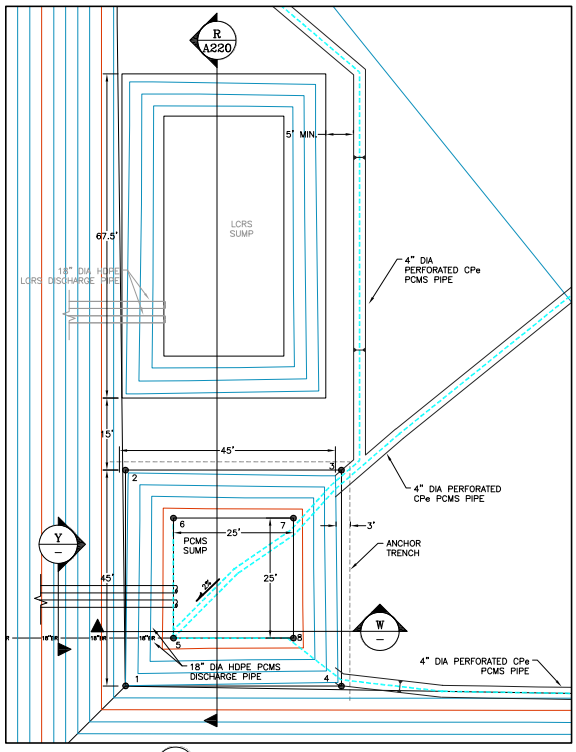
POND 4 SETTING OUT DATA			
POINT	NORTHING	EASTING	ELEVATION
1	200,380.89	505,776.23	4,613.00
2	200,425.84	505,776.18	4,613.25
3	200,425.84	505,821.18	4,613.53
4	200,380.84	505,821.18	4,613.30
5	200,390.84	505,786.18	4,609.10
6	200,415.84	505,786.18	4,609.14
7	200,415.84	505,811.18	4,609.18
8	200,390.84	505,811.18	4,609.14

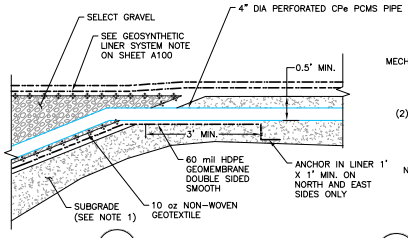
NOTES:

1. SEE EARTHWORKS MATERIALS AND CONSTRUCTION TECHNICAL SPECIFICATIONS SECTION 2.2.5 FOR PREPARING SURFACES TO RECEIVE GEOMEMBRANE.
2. GEOTEXTILE SOCK SHALL BE NON-WOVEN 10 oz/yd².
3. ALL PRIMARY LINER SHALL HAVE TEXTURED SIDE FACING UP.
4. PIPE PERFORATIONS SHALL BE IN ACCORDANCE WITH CLASS II AASHTO M252 SPECIFICATION OR APPROVED EQUIVALENT. (SLOT LENGTH = 0.875 IN., WIDTH = 0.125 IN.)

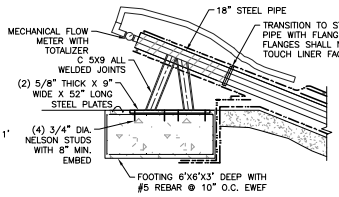


10 A200 PCMS PIPING AND SUMP

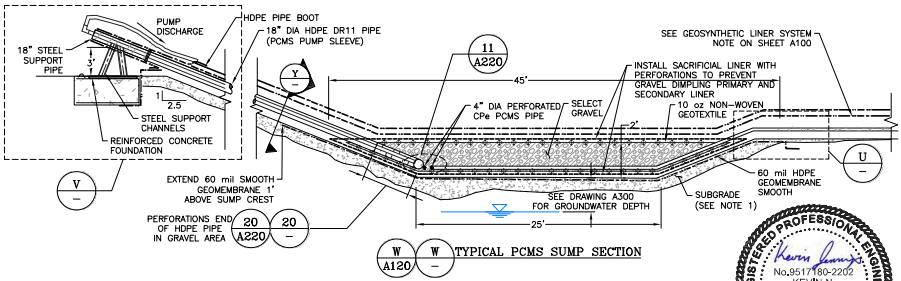
0 10 20 FEET



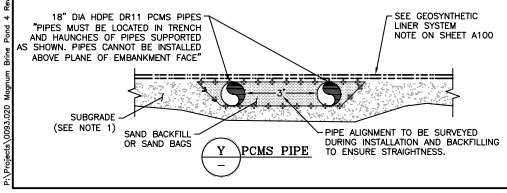
U — PCMS GEOSYNTHETICS DETAIL



V A220 V — PCMS AND LCRS SUPPORT AND ANCHOR DETAIL



W A120 W — TYPICAL PCMS SUMP SECTION



Y — PCMS PIPE

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: PROCESS COLLECTION AND MONITORING SYSTEM PLAN
FILENAME: 93.020.030D
DRAWING NO.: A230
REVISION: 0

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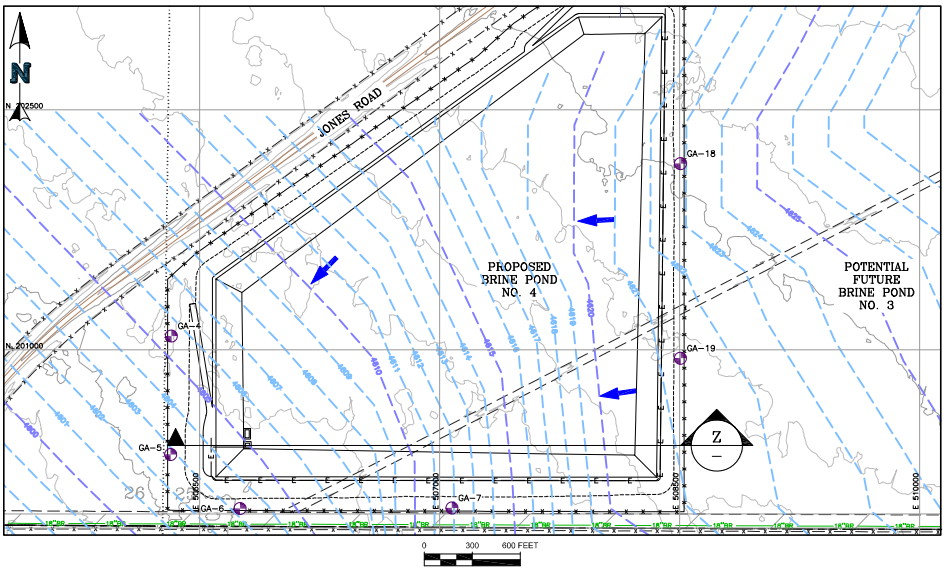
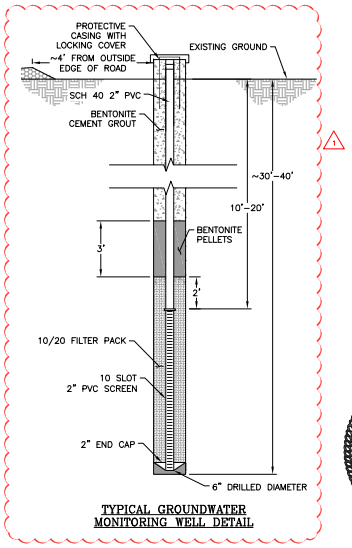


LEGEND:

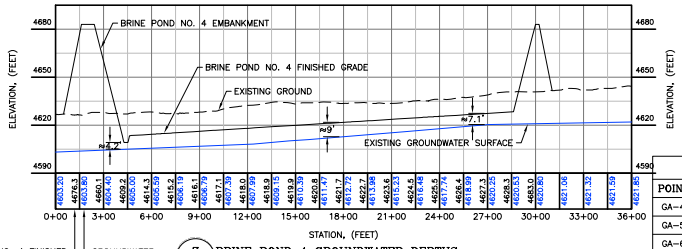
- EXISTING GROUND CONTOURS
- APPROXIMATE GROUNDWATER CONTOURS BASED ON JUNE 2017 SITE INVESTIGATION, MARCH 2015 SITE INVESTIGATION, IGES 2011 SITE INVESTIGATION, AND NEWFIELDS 2020 SITE INVESTIGATION
- EXISTING ROADS/TRAILS
- GA-01 — EXISTING GROUND WATER MONITORING WELLS TO REMAIN
- GA-12 — PROPOSED GROUND WATER MONITORING WELLS
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. MONITORING WELLS WILL BE CONSTRUCTED IN COMPLIANCE WITH UTAH ADMINISTRATIVE RULE R655-4-15.
2. ESTIMATED DEPTH TO WATER IS APPROXIMATELY 15 TO 20 FEET BELOW EXISTING GROUND SURFACE.
3. HOLLOW STEM AUGER DRILLING METHOD IS PREFERRED; ALTHOUGH, OTHERS COULD BE CONSIDERED BASED ON RIG AVAILABILITY.
4. SCREEN LENGTH WILL BE SPECIFIED IN THE FIELD BASED ON SUBSURFACE CONDITIONS, BUT ANTICIPATED LENGTH IS 10 - 20 FEET.
5. FILTER PACK AND WELL SEALANTS WILL BE TREMIED IN PLACE FROM THE BOTTOM UP.
6. WELL DEVELOPMENT WILL BE COMPLETED THROUGH USE OF A BAILER OR PUMP.



TYPICAL GROUNDWATER MONITORING WELL DETAIL



Z — BRINE POND 4 GROUNDWATER DEPTHS

0 300 600 FEET HORIZONTAL — 0 30 60 FEET VERTICAL — 10X EXAGGERATION

SETTING OUT DATA			
POINT	NORTHING	EASTING	ELEVATION
GA-4	201,086.18	505,322.74	4,630.00
GA-5	200,345.23	505,318.08	4,626.59
GA-6	200,007.73	505,751.69	4,625.59
GA-7	200,011.24	507,075.74	4,632.98
GA-18	202,163.53	508,504.91	4,650.93
GA-19	200,946.77	508,504.91	4,644.00

REGISTERED PROFESSIONAL ENGINEER — No.9517180-2202 KEVIN N. JENNINGS 1/29/2021 — STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
1	01/29/21	RE-ISSUED FOR CONSTRUCTION	JLW	KNJ
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ — CHECKED BY: JLW — DESIGNED BY: JLW — DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: POND SITE GROUNDWATER DEPTHS PLAN AND PROFILE

FILENAME: 93.020.032D — DRAWING NO.: A300 — REVISION: 1

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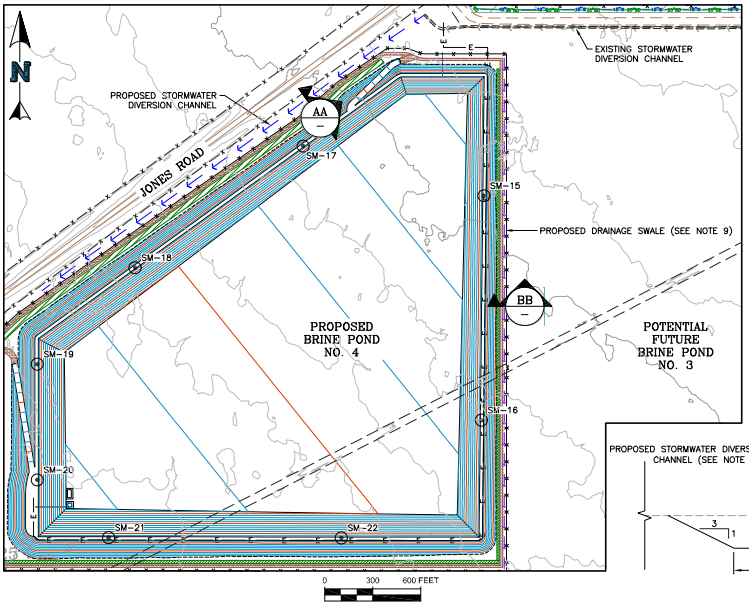


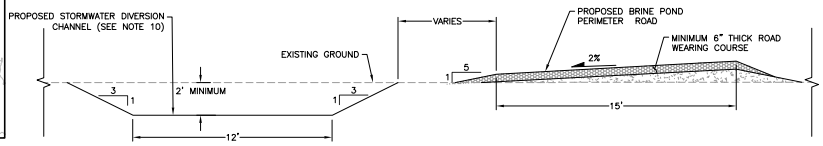
LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED BRINE POND GROUND CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING STORMWATER DIVERSION CHANNEL
- PROPOSED STORMWATER DIVERSION CHANNEL
- PROPOSED DRAINAGE SWALE
- SM-9 PROPOSED EMBANKMENT SETTLEMENT MONUMENTS (SEE NOTE 6)

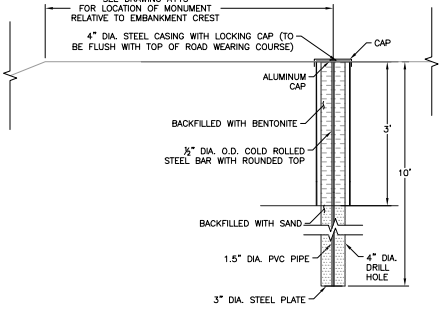
SETTLEMENT MONUMENT SETTING OUT DATA			
POINT	NORTHING	EASTING	ELEVATION
SM-15	202,336.65	508,385.78	4,683.00
SM-16	200,933.82	508,370.22	4,683.00
SM-17	202,646.69	507,256.73	4,683.00
SM-18	201,886.70	506,206.33	4,683.00
SM-19	201,283.62	505,595.23	4,683.00
SM-20	200,560.93	505,595.23	4,683.00
SM-21	200,199.60	506,041.64	4,683.00
SM-22	200,198.01	507,496.17	4,683.00

NOTES:

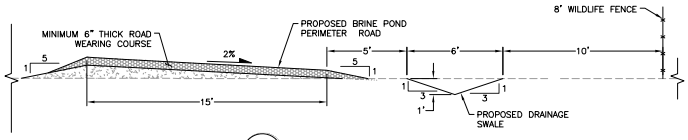
1. FINAL LOCATION OF ROAD AND DIVERSION CHANNEL TO BE DETERMINED DURING CONSTRUCTION BY THE FIELD ENGINEER.
2. DIVERSION CHANNELS SHALL BE CONSTRUCTED AT A MINIMUM 0.3% SLOPE TO MINIMIZE EARTHWORKS.
3. DIVERSION CHANNELS SHALL BE CONSTRUCTED WITH A MINIMUM 2 FOOT DEPTH.
4. BRINE POND PERIMETER ROAD SHALL BE CONSTRUCTED WITH A MINIMUM 6" THICK WEARING COURSE.
5. CULVERTS AND LOCAL DITCHES SHALL BE CONSTRUCTED AS REQUIRED TO MINIMIZE PONDING OF SURFACE WATER, LOCATIONS TO BE DETERMINED IN THE FIELD.
6. FINAL LOCATION OF SETTLEMENT MONUMENTS TO BE DETERMINED DURING CONSTRUCTION BY THE OWNER OR OWNER'S REPRESENTATIVE.
7. FIELD VERIFY AND EXTEND CHANNEL IF NECESSARY TO ALLOW PROPER DRAINAGE SLOPE.
8. THE DIVERSION CHANNEL SHALL BE GRADED AS SUCH TO OUTFALL INTO NATURAL DRAINAGE WAYS WHEN POSSIBLE.
9. A DRAINAGE SWALE SHOULD BE CONSTRUCTED ADJACENT TO THE EAST PERIMETER ROAD TO DIRECT STORM RUNOFF PAST THE SOUTHEAST CORNER OF THE POND.
10. THIS CHANNEL SECTION SHOULD CONTINUE SOUTHWEST UNTIL IT CAN DISCHARGE INTO THE EXISTING CHANNEL ALONG THE SOUTHEAST SIDE OF JONES ROAD.



AA — TYPICAL STORMWATER DIVERSION AND NORTHWEST PERIMETER ROAD SECTION



TYPICAL SETTLEMENT MONUMENT



BB — TYPICAL DRAINAGE SWALE AND EAST PERIMETER ROAD SECTION

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: STORMWATER DIVERSION AND SETTLEMENT MONUMENT PLAN

FILENAME: 93.020.034D
DRAWING NO.: A400
REVISION: 0

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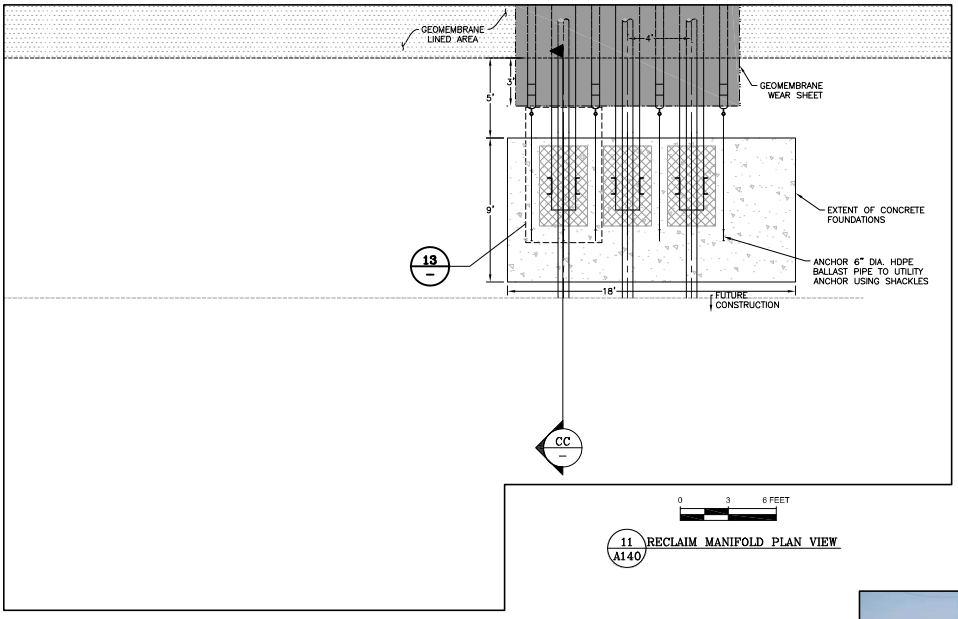
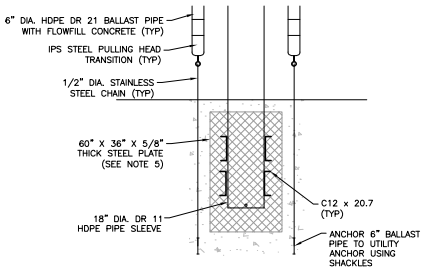


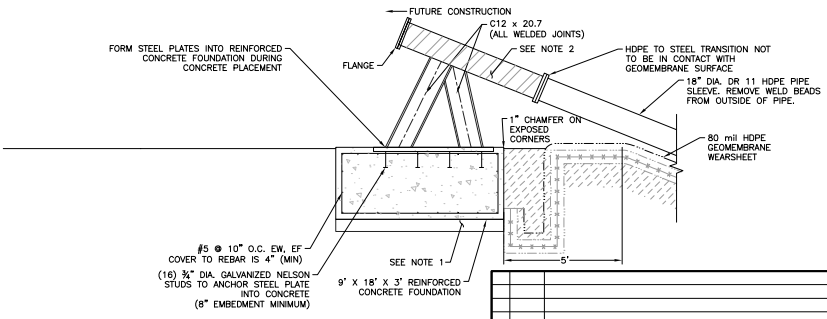
11 A140 RECLAIM MANIFOLD PLAN VIEW

NOTES:

1. COMPACT SOIL TO 95% STANDARD PROCTOR DENSITY UNDER THE CONCRETE FOUNDATION FOOTPRINT.
2. COAT STEEL AND CONCRETE WITH TNEMEC EPOXOLINE SERIES 141 OR SIMILAR FOR CORROSION PROTECTION.
3. POSITION STEEL PLATE OR PLATES SO THAT CHANNEL LEGS CAN BE WELDED AT PLATE AND SLOPING PIPE SLEEVE.
4. FUTURE PIPING TO BE DETAIL DESIGNED IN FUTURE.



13 STEEL PLATE PLAN VIEW



CC A140 CC BRINE RECOVERY MANIFOLD SECTION

EXISTING BRINE RECOVERY ANCHOR SYSTEM
FROM SAWTOOTH BRINE POND 1 FOR FABRICATION REFERENCE

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

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NewFields

CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT: BRINE POND 4
TITLE: BRINE RECOVERY MANIFOLD SECTIONS AND DETAILS
FILENAME: 93.020.036D
DRAWING NO.: A500
REVISION: 0

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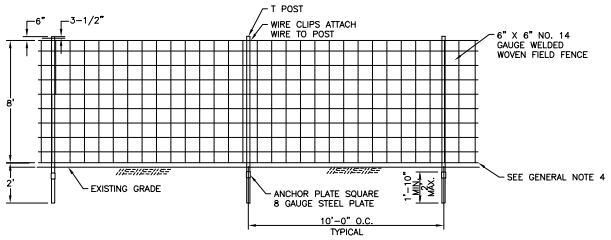
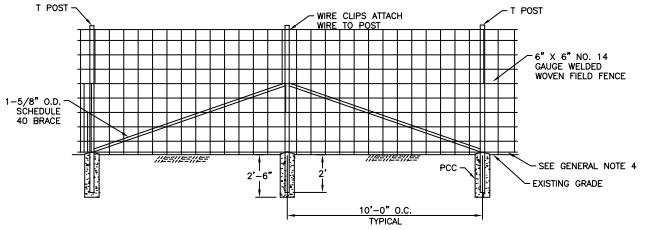
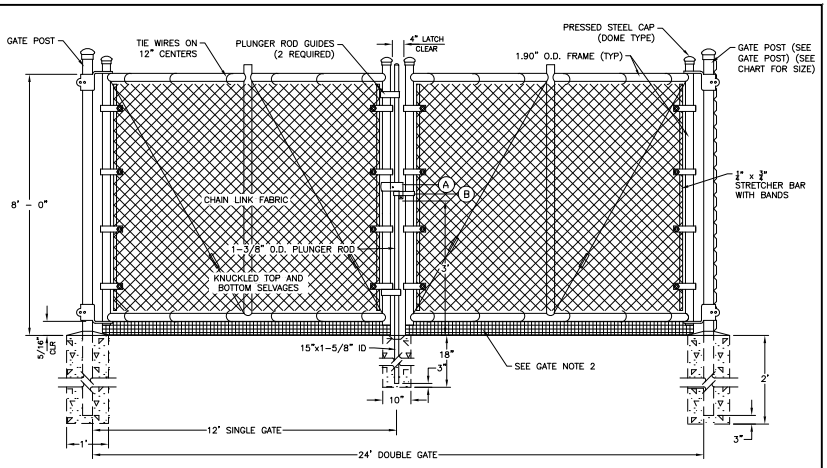


LINE PANELS

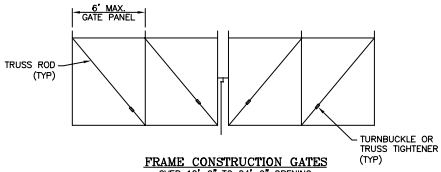


END PANEL



SWING GATE

NTS



FRAME CONSTRUCTION GATES

OVER 12'-0" TO 24'-0" OPENING

HINGE FOR TUBULAR POSTS

(A) LOCK KEEPER

(B) LOCK KEEPER GUIDE

PANEL NOTES:

1. END PANELS SHALL BE PLACED EVERY 1000' ON TANGENTS.
2. END PANELS SHALL BE USED WHEREVER A BREAK IN THE FENCE OCCURS, (I.E. GATES, CATTLE GUARDS) AND AT THE BEGINNING AND END OF ALL CURVES
3. WIRES ARE TO BE TIED OFF AT STRETCH POINTS. WRAP AND SPLICE TO SELF WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANELS.
4. FENCE SHALL BE INSTALLED TIGHT TO THE GROUND.

GATE NOTES:

1. 3/8" ADJUSTABLE TRUSS RODS SHALL BE INSTALLED ON ALL GATES OVER 6 FEET IN WIDTH (SEE DETAIL B, SHEET C3.09, FOR TRUSS TIGHTENER DETAIL).
2. 1/2" X 1/2" NO. 12-1/2 GAUGE WIRE MESH OR 11-1/2 GAUGE CHAIN LINK FABRIC TO BE INSTALLED AT THE BOTTOM OF GATES AS REQUIRED TO CLOSE GAP BETWEEN GATE FRAME AND GROUND.

WILDLIFE FENCE

NTS

GATE POST				
GATE OPENING IN FEET		ROUND GATE POLES O.D. (INCHES)	MIN. WEIGHT POUNDS/LIN. FEET	
SINGLE GATE	DOUBLE GATE		CLASS 1	CLASS 2
7 THRU 13	13 THRU 26	4.000	9.11	6.56

GENERAL NOTES:

1. DIAMETERS AND WEIGHTS LISTED ABOVE ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF ENGINEER
2. 3-1/2" x 3-1/2" TYPE II POST (4.65 LBS/FT) CAN BE USED IN PLACE OF 2.875" O.D. ROUND GATE POST.
3. CONCRETE SHALL BE CLASS A OR AA.
4. FENCE FABRIC IS TO BE PLACED FLUSH WITH THE EXISTING GROUND.

REGISTERED PROFESSIONAL ENGINEER
No.9517180-2202
KEVIN N. JENNINGS
09/15/2020
STATE OF UTAH

REV	DATE	DESCRIPTION	TECH	ENG
0	09/15/20	ISSUED FOR CONSTRUCTION	JLW	KNJ

APPROVED BY: KNJ
CHECKED BY: JLW
DESIGNED BY: JLW
DRAWN BY: LE

DISCLAIMER

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CLIENT: MAGNUM SOLUTION MINING, LLC

PROJECT: BRINE POND 4

TITLE: WILDLIFE FENCE DETAILS

FILENAME: 93.020.042D

DRAWING NO.: A600

REVISION: 0

DWQ-2021-004917

P:\Projects\093.020 Magnum Brine Pond 4 Revised Design\A-CAD\DWGS\93.020.042D.dwg-9/15/2020 8:54 AM

Signature:

Email: egaddis@utah.gov

Signature: Woodrow Campbell
Woodrow Campbell (Mar 18, 2021 18:27 MDT)

Email: wwcampbell@utah.gov

APPENDIX B

GROUNDWATER MONITORING PLAN
MAGNUM GAS STORAGE, LLC

APPENDIX B
MONITORING PLAN

Groundwater Monitoring Plan

Draft

February 4, 2021

DRAFT

Prepared by
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Section 1

Introduction

1.1 Plan Purpose

This Groundwater Monitoring Plan has been developed to describe the processes and procedures for groundwater monitoring and agency reporting for the Magnum Solution Mining, LLC (Company) hydrogen production and storage facility. The facility is located approximately ten miles north of Delta in Millard County, Utah on lands leased from the School and Institutional Trust Lands Administration (SITLA). The storage facility consists of a Storage Cavern Field; a series of electrolyzer banks, an approximately 168-acre brine pond; a substation with an associated electric distribution and high voltage system; office and warehouse buildings; water production wells; and associated buried piping and utilities. The monitoring procedures in this Plan pertain only to the monitoring of potential effects to groundwater relative to the construction and operation of storage caverns within the Storage Cavern Field and the operation of the brine pond.

The Company has committed to groundwater monitoring within the confines of the facility using a network of existing and proposed groundwater production, observation and monitoring wells. Groundwater monitoring activities for the facility are under the jurisdiction of the Department of Environmental Quality, Division of Water Quality (DWQ). The Plan is written to comply with the requirements of all project permits.

1.2 Local Hydrogeology

Groundwater beneath the hydrogen storage facility occurs in unconsolidated sediments within the Sevier Desert Basin aquifer system. Four aquifers units are of interest (from shallowest to deepest):

- The water table aquifer;
- The shallow artesian aquifer;
- The deep artesian aquifer; and
- The basement aquifer.

Table 1 provides a summary of the four aquifers. Figure 1 is a graphical depiction of the aquifers' hydrostratigraphy. The aquifers depths have been refined utilizing a geologic model constructed based on drilling data from wells constructed by the Company.

There is currently a network of groundwater production, observation and monitoring wells for monitoring groundwater levels and groundwater quality within the aquifers depicted in Figure 1. The Company also has permission from the adjacent landowners to monitor groundwater levels in their respective water production wells. Figure 2 depicts the location of the network of groundwater wells that will be used for groundwater monitoring.

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Table 1: Summary of Local Hydrology

Depth (feet bgs)	Aquifer Name	Aquifer Description and Use
0 to 250	Water table aquifer	The water table aquifer is unconfined and generally not used within the area due to high total dissolved solids and poor quality conditions. (The Sawtooth GA and the Company's B-P wells are currently used to monitor water quality)
300 to 600	Shallow artesian aquifer	Confining zones vary in thickness and location and can include several hundred feet of the identified depths. This aquifer is generally used for agricultural and drinking water purposes. (The Sawtooth DA wells and Egg Farm off-site well are currently used to monitor water levels)
700 to 1,400	Deep artesian aquifer	Confining zones vary in thickness and location and can include several hundred feet of the identified depths. This aquifer is generally used for industrial and drinking water purposes. This is the aquifer from which water will be produced for the facility. (The Sawtooth DA wells and the IPP off-site well are currently used to monitor water levels)
> 1,650 to 3,000	Basement aquifer	This aquifer extends to bedrock or the salt structure and includes several small inter-bedded sand and gravel units within significant silt and clay zones. (Sawtooth currently owns and operates the MH wells to monitor water levels and quality and DA wells to monitor water levels)

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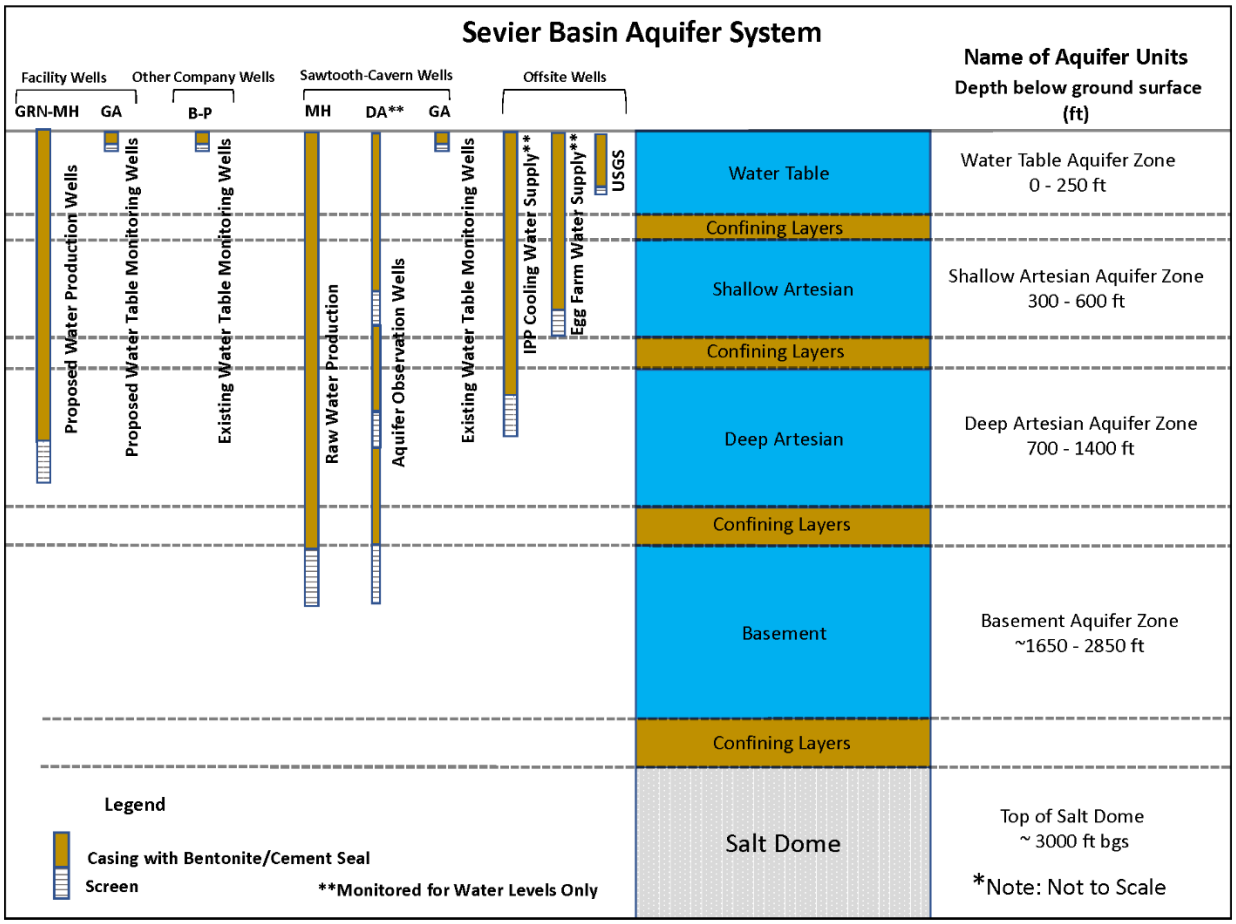

Figure 1 Hydrostratigraphy of the Project Area

1.3 Storage Cavern Field Groundwater Monitoring

Groundwater monitoring activities associated with the storage caverns will entail both groundwater level and groundwater quality monitoring. The storage caverns will be constructed in a salt formation that is located approximately 3,000 feet below the ground surface (bgs) using standard solution mining technology. Water for the solution mining process will be obtained through off-site water supply agreements and/or from three proposed water production wells (GRN-MH-1, GRN-MH-2, and GRN-MH-3; see Figure 2). Water chemistry testing indicates that water from the basement aquifer is not suitable for all facility components (e.g.: cooling towers), therefore the Company is proposing to produce groundwater for this facility from the deep artesian aquifer. While multiple hydrological analyses indicate that Company's production from the deep artesian and basement aquifers will not drawdown the overlaying shallow artesian aquifers, the Company has committed to monitoring the shallow artesian, deep artesian, and basement aquifers to ensure groundwater levels are not negatively affected by solution mining activities (see Table 1 and Figure 1).

In addition to water level monitoring, the Company has also committed to monitoring groundwater quality in the deep artesian aquifer during solution mining and storage cavern operations.

1.4 Brine Evaporation Pond Groundwater Monitoring

Groundwater monitoring activities associated with the brine evaporation ponds will entail groundwater quality monitoring and leak detection system monitoring to protect the water table aquifer. The 168-acre pond will be constructed with a double geomembrane liner system with a leak detection system composed of a Leak Collection and Recovery System (LCRS) between the liners and a Process Component Monitoring System (PCMS) below the liners. The purpose of monitoring the leak detection system is to ensure that the system is working in accordance with the pond design, thereby reducing the potential for significant leaks through the bottom pond liner. In addition, groundwater monitoring wells around the perimeter and on the berms of the pond will be installed in the water table aquifer, as shown in Figure 2. The purpose of the monitoring wells is to monitor water level and for elevated conductivity, sodium, TDS, or chloride levels that could indicate a leak in the double liner system. In sum, the design provides for three levels of protection to ensure groundwater quality in the water table aquifer is not negatively affected by the brine pond: 1) the double geomembrane liner system; 2) the dual leak detection and collection system; and 3) the network of groundwater monitoring wells.

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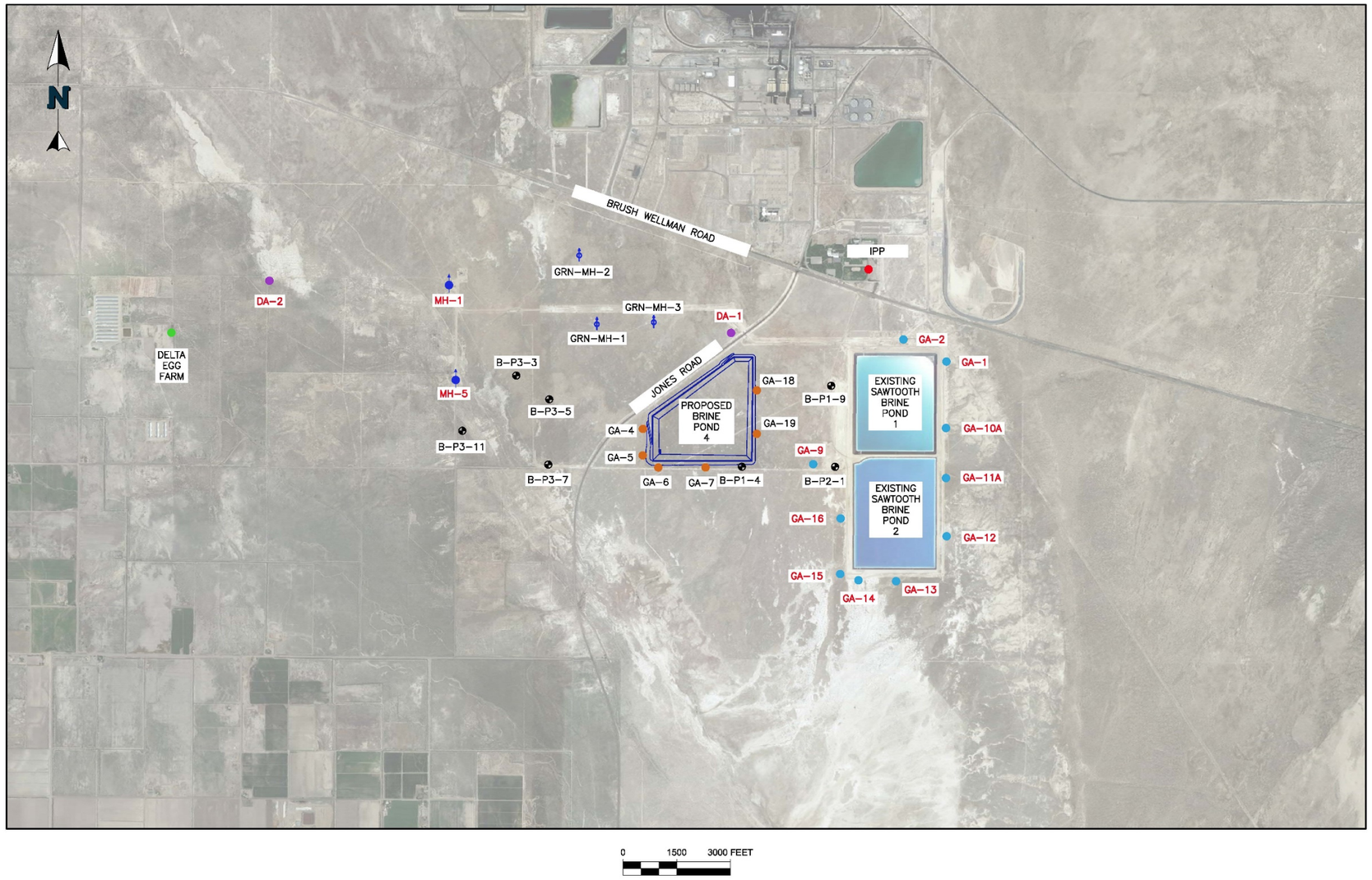

LEGEND:

———	PROPOSED BRINE POND
GA-4	PROPOSED WATER TABLE AQUIFER MONITORING WELL
GRN-MH4	PROPOSED DEEP ARTESIAN AQUIFER WATER PRODUCTION WELL

EXISTING SAWTOOTH WELLS:

GA-1	WATER TABLE AQUIFER MONITORING WELL
MH-1	BASEMENT AQUIFER WATER PRODUCTION WELL
DA-2	MULTI-AQUIFER MONITORING WELL

OTHER WELLS:

DELTA EGG FARM	SHALLOW ARTESIAN AQUIFER WATER PRODUCTION WELL
IPP	DEEP ARTESIAN AQUIFER WATER PRODUCTION WELL
B-P1-4	MAGNUM WATER TABLE AQUIFER MONITORING WELL

NOTES:

1. AERIAL IMAGE WAS OBTAINED FROM GOOGLE EARTH AND IS DATED AUGUST 19, 2019

MAGNUM

NewFields	CLIENT: MAGNUM SOLUTION MINING, LLC
PROJECT	BRINE POND 4
TITLE: AQUIFER MONITORING WELL NETWORK	FILENAME: 475.0093.020.GWDP.1-1
	FIGURE NO.: APP.D.2 — REVISION: B

Figure 2 - Aquifer Monitoring Well Network

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Section 2

Groundwater Monitoring Methods

Baseline data for the groundwater system that the facility will be producing from has been collected since 2009. Baseline data collection for groundwater level in the shallow artesian, deep artesian, and basement aquifers was first initiated in 2009 when MH-1 was first drilled and developed, and has continued as MH-5, DA-1 and DA-2 have been drilled and developed. (Water production wells MH-1 and MH-5, and the multi-aquifer monitoring wells DA-1 and DA-2, were previously owned by the Company). Data collection for groundwater level baseline conditions also includes data collected since 2009 from an Intermountain Power Agency (IPA) industrial water well, a private commercial water well owned by the Delta Egg Farm, and a well installed and monitored by the U.S. Geological Survey (USGS). Baseline data for groundwater levels and quality of the water table aquifer directly beneath the brine evaporation ponds have been collected since 2010. These baseline conditions are kept on file at the facility and are incorporated into the required agency reporting as necessary.

2.1 Storage Cavern Field Groundwater Level Monitoring Methods

The facility will conduct groundwater level monitoring in association with the storage caverns using a network of proposed and existing groundwater production and observation wells that are located both within the facility and off-site. The wells within the facility that will be used to monitor groundwater levels are the planned production wells GRN-MH-1 through GRN-MH-3 as they are drilled and put into service. The off-site wells that will be used to monitor groundwater levels include Sawtooth's MH-1 and MH-5 water production wells and observation wells DA-1 and DA-2, an industrial water well owned by the Intermountain Power Agency (IPA), and a private commercial water well owned by the Delta Egg Farm. Figure 2 depicts the location of all the wells that will be used for groundwater level monitoring. This network of wells will allow the Company to monitor groundwater levels in the shallow artesian, deep artesian, and basement aquifers. Figure 1 illustrates the individual well depths and monitoring points in relation to the groundwater system. Note that the Company will only be able to monitor the groundwater aquifer conditions from the off-site locations with landowner cooperation.

Existing monitoring wells are equipped with transducers to measure groundwater levels; future wells will be similarly equipped. The transducers are installed within monitoring tubes located within the production casings of the individual wells. Each of the Sawtooth, Delta Egg Farm and the IPA water wells each have a single monitoring tube installed to monitor the respective aquifer in which each well is completed. DA-1 and DA-2 are equipped with monitoring tubes that enable monitoring of shallow artesian, deep artesian, and basement aquifers.

The data loggers connected to each transducer have been set to record groundwater level measurements daily. Data from the transducers at each monitoring well will be downloaded and analyzed monthly during periods of solution mining. Groundwater level measurements will be documented to the nearest 0.1 foot. The functionality of transducers will be checked monthly the first year of operations and quarterly thereafter; adjustments to transducer settings will be made accordingly. Table 2 summarizes the groundwater level monitoring schedule as described above.

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Table 2: Storage Cavern Field Groundwater Level Monitoring Schedule

Well	Aquifer Monitoring Point	Data Collection Interval	Data Download and Analysis Frequency[1]
GRN-MH-1 – GRN-MH-3 Water Production Wells[2]	Deep artesian	Daily	Monthly
Sawtooth DA-1 and DA-2 Observation Wells[3]	Shallow artesian, deep artesian, and basement	Daily	Monthly
Sawtooth MH-1 and MH-5	Basement	Daily	Monthly
IPA Water Production Well[4]	Deep artesian	Daily	Monthly
Delta Egg Farm Water Production Well[5]	Shallow artesian	Daily	Monthly
USGS Well	Shallow artesian	Daily	As available[6]

[1]Data will be downloaded and analyzed monthly during periods of solution mining, quarterly otherwise.
[23]Planned Company-owned wells.
[3] Wells owned by Sawtooth NGLs, LLC. Owner permission required to monitor.
[4]Well owned by Intermountain Power Agency. Owner permission required to monitor.
[5]Well owned by Delta Egg Farm. Owner permission required to monitor.
[6]Data recorded daily by USGS but made publicly available at irregular intervals, approximately every six months.

2.2 Storage Cavern Field Groundwater Quality Monitoring Methods

The Company will conduct groundwater quality monitoring in association with the hydrogen storage caverns using the planned production wells GRN-MH-1 through GRN-MH-3. These wells are proximal to the storage cavern field and will produce water from the deep artesian aquifer at elevations between 700 to 1,400 feet bgs (see Figures 1 and 2).

Groundwater samples will be collected monthly from GRN-MH-1, GRN-MH-2, and GRN-MH-3. Groundwater sampling methods will be per the Groundwater Sampling Quality Assurance Procedures included as Appendix A. The sampling methods include:

- Water samples will be collected from the sample port that is closest to each wellhead.
- A hand-held multi-gas meter will be used to monitor the headspace of each well for the presence of combustible gas, including but not limited to hydrogen and hydrocarbons, prior to sampling. If combustible gas is detected, subsequent analysis can be done.
- The water level will be measured prior to sampling.
- Samples will be collected directly into laboratory-provided containers and delivered per the laboratory-required protocols.
- Information pertinent to the sampling effort will be documented on preprinted field sheets.
- The handling of all samples collected will be traceable from the time of collection, through analysis, until final disposition. Documentation of the sample history is referred to as chain-of-custody.

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- Samples will be sent to and analyzed by a State of Utah certified laboratory for the analysis of sodium, chloride, and total dissolved solids.

Table 3 summarizes the groundwater quality monitoring schedule associated with the storage caverns as described above.

Table 3: Storage Cavern Field Groundwater Quality Monitoring Schedule

Well	Aquifer Monitoring Point	Water Sample Frequency
GRN-MH-1 – GRN-MH-3 water production wells[1]	Deep artesian	Monthly

[1] Planned facility-owned wells.

2.3 Brine Evaporation Ponds Groundwater Quality Monitoring Methods

The Company will conduct groundwater quality monitoring of the water table aquifer in association with the brine evaporation ponds using the proposed monitoring wells GA-4, GA-5, GA-6, GA-7, GA-18, and GA-19. Following an accelerated sampling program and data evaluation, this list might be modified. These wells are placed in an array around and on the berms of the brine evaporation ponds (see Figure 2). All wells will be installed to a depth within the water table aquifer zone (see Figure 1 and Figure 2). GA-18 and GA-19 are intended to monitor upgradient groundwater quality of the brine evaporation ponds; the remaining wells are intended to monitor groundwater quality downgradient of the ponds. Water level measurements also will be taken during monitoring events.

Groundwater monitoring of the water table aquifer will be conducted in accordance with the requirements of the DWQ GWDP. The water table aquifer groundwater monitoring plan includes

- Monthly field parameter data collection for pH, temperature, TDS, and conductivity; and,
- Quarterly laboratory analysis for the parameters identified in Table 4.

In accordance with DWQ GWDP #(Insert New Permit Number), the Company will conduct field monitoring monthly for the parameters above. Monthly field monitoring will be conducted for a period of 24 months after the initiation of commercial operations. After the first 24 months of commercial operations, the frequency of field monitoring will be reduced to quarterly.

In addition, the DWQ GWDP requires Accelerated Background Monitoring on a quarterly basis for a period of 24 months to establish ground water protection levels for the storage facility. Accelerated Background Monitoring will initially include both the collection of field parameters and collection of groundwater samples for laboratory analysis on a quarterly basis for the parameters above. Analysis of all groundwater samples will be performed by laboratories certified by the Utah Department of Health, will follow methods cited in Utah Administrative Code (UAC) R317-6-6.3L, and will ensure that method detection limits are less than the Interim Ground Water Protection Levels for the water table aquifer zone described in Table 4.

After completion of the Accelerated Background Monitoring, the Company will submit an Accelerated Background Monitoring Report to the DWQ. After review and approval of the Accelerated Background Monitoring Report, the Director of DWQ (the Director) will establish

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well-specific groundwater protection levels for each parameter in accordance with R317-6-4 of the Ground Water Quality Protection Rules. After specific well protection measures have been identified, sampling will be reduced to a semi-annual frequency.

Table 4: DWQ Interim Groundwater Protection Levels

Parameter	Protection Level (mg/L)
pH (units)	6.5 – 8.5[1]
Chloride	150
Sodium	200
Total Dissolved Solids	750

[1]Class II Groundwater Quality Standard

Table 5 summarizes the groundwater quality monitoring schedule for the evaluation of the DWQ Groundwater Quality Standards in the vicinity of the brine evaporation pond.

Table 5: Brine Evaporation Pond Groundwater Quality Monitoring Schedule

Well	Aquifer	Field Monitoring (0-24 mos.)	Field Monitoring (after 24 mos.)	Accelerated Background Monitoring (0-24 mos.)	Compliance Monitoring (after 24 mos.)
GA Monitoring Wells	Water table aquifer	Monthly	Quarterly	Quarterly	Semi-annual

2.3.1 Exceedances

Upon exceedance in a downgradient monitoring well of any one parameter listed in Table 4, the monitoring well(s) in which the exceedance was(were) detected will immediately be resampled for laboratory analysis of the exceeded protection level parameter(s). The analytical results will be submitted to the DWQ, and the Director will be notified of a probable out-of-compliance status within 30 days of the initial detection.

Upon exceedance of any one parameter listed in Table 4 for two consecutive sampling events, the Company will immediately notify the DWQ and Millard County and implement an accelerated schedule of monthly sampling and analysis. This monthly schedule will continue for at least two months or until the compliance status can be determined by the Director. Reports of the results of this sampling will be submitted to the Director as soon as they are available, but not later than 30 days from each date of sampling.

If the protection level for a parameter listed in Table 4 is exceeded in two consecutive samples from a compliance monitoring well, the well is out of compliance. The Director will be notified verbally of the exceedance within 24 hours of the receipt of data demonstrating out-of-compliance status; written notice will be provided within 5 days. Accelerated monthly groundwater monitoring will continue for at least two months, and until the facility is brought into compliance, or as determined by the Director.

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Within 30 days after the written notice to the Director of out-of-compliance status, the Company will submit an assessment study plan and compliance schedule for:

1) Assessment of the source or cause of the contamination, and determination of steps necessary to correct the source.
2) Assessment of the extent of the ground water contamination and any potential dispersion.
3) Evaluation of potential remedial actions to restore and maintain ground water quality and ensure that the ground water standards will not be exceeded at the compliance monitoring wells.

Millard County will be immediately notified of any monitoring well that is out of compliance.

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Section 3

Agency Reporting and Notification

3.1 Storage Cavern Field Groundwater Level Reporting and Notification

During the first year of solution mining, the Company will submit monthly water level measurement reports to Millard County during periods of solution mining. The reports will include water level as measured in depth to ground water from the surveyed casing measuring point, and ground water elevations as converted by casing measuring point elevations. The report will also include a graphical depiction of the water level data from all monitored wells. The Company will also submit an annual Water Rights and Water Usage Summary and Analysis to the State Engineer and Millard County by April 30 for the previous year in which solution mining activities have been conducted.

The facility managers will initiate a detailed internal review with a professional engineer/hydrogeologist if a sustained change in water levels greater than 12 feet below the historic recorded low is documented within the shallow and deep artesian aquifers in off-site monitoring wells. Once the internal review is complete, facility managers will meet with the owner of the off-site well, the Company or facility's professional engineer/hydrogeologist, and the State Engineer to review and coordinate any necessary action. The Company will notify Millard County of any official determination made by the State Engineer.

3.2 Storage Cavern Field Groundwater Quality Reporting and Notification

The Company will prepare and file quarterly groundwater quality monitoring reports with the required agencies. The reports will include the groundwater analysis results and groundwater level measurements for each monitoring well. Reports will be submitted per the following schedule:

- First Quarter Report (January, February, March) – Due April 30.
- Second Quarter Report (April, May, June) – Due July 31.
- Third Quarter Report (July, August, September) – Due October 31.
- Fourth Quarter Report (October, November, December) – Due Jan 31.

The Company will immediately consult with agencies on an appropriate course of action if:

- Sodium or chloride concentrations measured in a groundwater sample are higher than the baseline concentrations by a factor of two.
- Combustible gases traceable to storage products are detected in the headspace of a well.

3.3 Brine Evaporation Pond Groundwater Quality Reporting and Notification

Quarterly groundwater quality monitoring reports will be submitted to the required agencies per the following schedule:

- First Quarter Report (January, February, March) – Due April 30.

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- Second Quarter Report (April, May, June) – Due July 31.
- Third Quarter Report (July, August, September) – Due October 31.
- Fourth Quarter Report (October, November, December) – Due Jan 31.

The Company will also submit an Accelerated Background Monitoring Report to the required agencies per the requirements of the DWQ GWDP after eight quarterly sample events have been completed. The report will include all field data sheets (see Appendix B), laboratory analytical reports, and the following statistical calculations by well, presented in spreadsheet format for the interim groundwater protection parameters listed in Table 4.

- Non-detect values converted to the detection limit times 0.25
- Mean concentration
- Standard deviation
- Mean concentration plus 2 standard deviations
- Mean total dissolved solids concentration times 1.25
- Mean concentration of all other parameters times 1.25
- Ground water quality standard times 1.25

After Accelerated Background Monitoring is completed and the Director establishes well-specific groundwater protections parameters, ongoing groundwater quality monitoring reports will include the following information:

- Field Data Sheets (see Appendix B), or copies thereof, including the field measurements required as identified in Section 3.3 above, and other pertinent field data, such as well name/number, date and time, names of sampling crew, depth to water, type of sampling pump or bail, volume of water purged before sampling.
- Laboratory Analytical Results, including date sampled, date received; and the results of analysis for each parameter, including the value or concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, and the date of the analysis.
- A summary table of the analytical results from the current and previous monitoring events, a discussion of whether the monitoring wells comply with groundwater protection parameters, an evaluation of temporal and spatial trends in the data, a discussion laboratory data quality assurance/quality control, and any other information pertinent to the monitoring even.

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3.4 Brine Evaporation Pond Leak Detection System Reporting, Notification, and Corrective Action

Leak detection system (LCRS and PCMS) monitoring will be reported monthly. The reports will be submitted to the required agencies and will include:

- A verification that the inspection schedule is being maintained;
- A verification that the measured LCRS and PCMS Maximum Allowable Leakage rates in Table 6 below have not been exceeded;
- The volume of fluid pumped from the LCRS and PCMS sumps, tabulated either daily or monthly depending on the monitoring interval;
- The disposition of any fluids pumped from the LCRS and PCMS sumps; and,
- If the Maximum Allowable Leakage Rates have been exceeded, the Director will be notified verbally as soon as possible, but no later than 24 hours after the Company becomes aware of the exceedance. The report shall be made to the Utah Department of Environmental Quality 24-hour number, (801) 536-4123, or to the Division of Water Quality, Ground Water Protection Section at (801) 536-4300, during normal business hours (Monday through Friday 8:00 am - 5:00 pm Mountain Time).
- Electronic and written submission will also be provided to the Director within five days of the time that the Company becomes aware of the exceedance. The electronic data in the format specified by the Director (e-mail, compact disc, or another approved transmittal mechanism). The written submission will contain:
    - A description of the exceedance and its cause;
    - The period of exceedance, including exact dates and times;
    - The estimated time the exceedance is expected to continue if it has not been corrected; and,
    - Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the exceedance.
- Out-of-compliance conditions will be evaluated by daily monitoring of pumping rates from the LCRS and PCMS sumps during the filling of the pond.
    - A sudden spike in flows indicates one or more leaks. Filling will be halted, and the pond will be inspected to determine the source of the leaks.
    - After the leak(s) is(are) identified and repaired, filling will continue, while continuing to monitor flows.
- After the pond has been filled and leakage rates stabilize or decline, the pumping rate of fluids pumped from the LCRS and PCMS sumps and returned to the pond will be monitored weekly and compared to the Maximum Allowable Leakage Rates.
- The maximum head in the LCRS sump will be managed by pumping leakage collected in sump back into the pond. Fluid will be pumped from the sump such that it is not necessary to pump at a rate greater than the Action Leakage Rates in Table 6 below.

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- If a leak develops after filling the pond, the first step will be to monitor head in the space between the liners to narrow the location of the leak(s) to allow focused inspections and to confirm that head has been controlled between the liners.
    - If elevated head between the liners is identified as the source of leakage, head control will be reestablished as described in the Brine Evaporation Ponds Operating Manual.
    - If excessive leakage occurs because of a liner failure, the liner will be repaired prior to introducing additional fluids into the pond.

Table 6: Brine Evaporation Pond Maximum Allowable Leakage Rates

Monitoring System Component	Maximum Allowable Leakage Rate	Action Leakage Rate[1]
LCRS Sump	460 gallons per minute	370 gallons per minute
PCMS Sump	14.0 gallons per minute	11.2 gallons per minute

[1]The Action Leakage Rate for each component is 80 percent of the respective Maximum Allowable Leakage Rate.

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Section 4

Record Retention

4.1 Records

The Company will retain copies at the storage facility of all monitoring data sheets, laboratory analyses and agency reports associated with groundwater level, water quality, and leak detection system monitoring. These records will be kept for the operational life of the facility.

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Appendix A

Groundwater Sampling Quality Assurance Procedures

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GROUNDWATER SAMPLING QUALITY ASSURANCE PROCEDURES

1.0 SAMPLING PROCEDURES

Groundwater samples will be collected monthly from production wells GRN-MH-1, GRN-MH-2, and GRN-MH-3, and analyzed for sodium, chloride, total dissolved solids, and dissolved gases. Groundwater samples from the water table aquifer monitoring wells GA-4, GA-5, GA-6, GA-7, GA-18, and GA-19 will be collected monthly initially, moving to semi-annually. Sampling events will be documented on field forms and reported in quarterly reports. Basic sampling procedures are as follows:

- Prior to sampling GRN-MH-1, GRN-MH-2, and GRN-MH-3, a hand-held multi-gas meter will be used to monitor the headspace of each well for the presence of combustible gases, including but not limited to hydrogen and hydrocarbons.
- Prior to sampling all monitoring wells, water levels also will be measured.
- Groundwater sampling will be performed by collecting a sample directly from the sample port that is closest to each wellhead in the case of GRN-MH-1, GRN-MH-2, and GRN-MH-3. In the case of the GA wells, sampling will be performed directly from the well.
- Each well will be purged prior to sampling. A minimum of three volumes of water in the well casing will be removed, unless the well runs dry. A well that runs dry will be revisited and sampled once the water level has recovered and sufficient water is available for sampling.
- Because exact flow rates are unknown, the well pumping and sampling point purge rates will be recorded.

2.0 SAMPLING QUALITY CONTROL

The quality control (QC) objective is to ensure that data are not biased by contamination or sampling error.

To meet this objective, the following QC samples will be collected in the field:

- Field duplicates will be collected with a minimum of 1 for every 10 samples. Field duplicates will be collected from the same source at the same time as the primary sample. The field duplicate will be labeled differently than the parent sample in order to appear as a separate sample to the analytical laboratory.

Matrix spike/matrix spike duplicate (MS/MSD) samples will not be collected. MS/MSDs will be analyzed by the analytical laboratory for each batch of samples run, but not necessarily from the samples collected at the site.

3.0 FIELD DOCUMENTATION

Information pertinent to the sampling effort will be documented on preprinted field sheets or bound logbooks. All entries will be made in indelible ink and all corrections will be made by drawing one line through the error and initialing and dating the correction.

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At a minimum, entries on field documentation will include the following:

- Date,
- Project,
- Identification of sampling team members, and,
- Location and description of sampling points.
- Static water levels,
- Date and time of sample collection,
- Sample identification,
- Sampling methodology,
- Field observations, and
- Field instrument calibration results.

Documentation will contain sufficient information to reconstruct the sampling activity without relying on the sampler's memory. The field documentation will be kept on file at the sampling contractor's office.

4.0 DECONTAMINATION PROCEDURES

Because no field equipment will come into contact with groundwater samples, decontamination procedures are not required.

5.0 SAMPLE ANALYSIS AND CONTAINERS

Samples will be analyzed by a Utah certified laboratory for the following:

- Sodium by USEPA Method 200.7;
- Chloride by USEPA Method 300.0;
- Total Dissolved Solids by USEPA Method SM2540C; and
- Dissolved Gases by USEPA Method
- or equivalent.

6.0 SAMPLE HANDLING

At the time of sample collection, labels will be affixed to the sample containers. These labels will contain the following information:

- Sample identification number,
- Date and time of sampling,
- Preservative,

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- Analyses requested, and
- Name of sampler.

Samples will be collected directly into laboratory-provided containers and placed on ice in an insulated cooler. All samples will be identified, labeled, and logged onto a chain-of-custody (COC) form, and handled under standard COC protocol. Samples will be considered to be under a person's custody if they remain:

- In a person's physical possession,
- In view of the person after he/she has taken possession,
- Secured by that person so that no one can tamper with the sample, or
- In a secure area accessible only to authorized personnel.

To establish the documentation necessary to trace sample possession from the time of collection, the COC record must be completed and accompany every sample shipment. At a minimum, COC records should contain the following information:

- Project name,
- Sample identification,
- Date and time of sample collection,
- Type of matrix,
- Number of containers,
- Preservative,
- Analyses requested,
- Method of shipment,
- Signature of sampler, and
- Date and time of each change in custody.

Each person who has custody of the samples will sign the record. The completed COC record will be sealed in a waterproof plastic bag and placed inside the sample cooler. The sampler will keep a copy of each COC record. Custody seals will be affixed to the front and back of the cooler and covered with clean tape during storage and shipping operations.

The laboratory will assess the integrity of the custody seals upon sample arrival. The laboratory will also verify and document the following information upon sample receipt:

- Condition of the shipping container,
- Condition of the sample container(s),
- Condition of the custody seals,
- Presence/absence of custody seals,
- Presence/absence of custody records,

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- Presence/absence of sample labels,
- Agreement/non-agreement of documents,
- Cross-reference of laboratory numbers, and
- Temperature inside the shipping container.

The laboratory will document any problems or discrepancies with the samples or custody documents, contact the sampling organization, and document the resolution to the problems or discrepancies.

The laboratory completing chemical analyses will be required to maintain samples in a secure location with limited access from the time of sample receipt through sample disposal. Samples collected during this investigation will be either shipped to the laboratory via an overnight carrier or will be hand delivered to the analytical laboratory. If the samples are shipped via an overnight carrier, the following procedure will be used for packaging:

- Inert cushioning material will be placed in the bottom of the cooler.
- The cooler will be lined with a large plastic bag.
- Each sample container will be sealed in a resealable plastic bag and placed upright in the cooler.
- For all coolers containing samples that require 4°C preservation, blue ice or wet ice and additional packaging materials will be placed around the containers. Wet ice will be double bagged.
- A temperature blank will be included in each cooler containing samples that require 4°C preservation.
- Pertinent paperwork such as the COC form will be placed in a re-sealable plastic bag and taped to the inside lid of the cooler.
- Signed custody seal will be attached to the cooler in two places and covered with clear tape in such a way that the custody seal must be broken to open the cooler.
- The cooler will be sealed with packaging tape.

A shipping label will be affixed to the outside of the cooler.

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Appendix B
Monitoring Forms

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BRINE POND 4 MONITORING FORM
MAGNUM SOLUTION MINING, LLC
DELTA, UTAH

Well I.D. and Depth of Well (DOW)	DATE mm/dd/yy	DTW (feet)	Water Column Thickness	Total Gallons Removed	TEMP. (°C)	Specific Conductance ($\mu S/cm^3$)	Conductivity (ohms)	Salinity (ppt)	TDS (mg/L)	pH	NOTES
GA-4 (TBD)											
GA-5 (TBD)											
GA-6 (TBD)											
GA-7 (TBD)											
GA-18 (TBD)											
GA-19 (TBD)											

Brine Pond Sump Monitoring

LCRS Sump										
Water Present Y / N	Conductivity (ohms)		Salinity (ppt)		Flow Rate (GPM)		Meter Reading (gal)			
PCMS Sump										
Water Present Y / N	Conductivity (ohms)		Salinity (ppt)		Flow Rate (GPM)		Meter Reading (gal)			
Sump Equipment Inspection and Performance Verified				Y / N	Allowable Leakage Rate for the Pond Liner System Verified				Y / N	

Field Data Collection and Sample Collection Instructions

Field Data Parameter Collection Instructions

Step 1) Calibrate YSI meter prior to each use (follow instructions in manual)

Step 2) Measure depth to groundwater with water interface probe

Step 3) Calculate well volume to be removed from each well using Purge Volume Table and remove the calculated volume

Step 4) Collect field parameter readings upon completion of Step 3 and record any unusual circumstances in the "NOTES" column above

Step 5) Collect field parameter readings from sumps

Groundwater Sampling Instructions

Step 6) Upon completion of Step 4 collect groundwater samples from each well

Step 7) Fill appropriate laboratory provided containers

Step 8) Complete Laboratory Chain of Custody (see attached example)

Laboratory Analysis Requirements

Sodium by Method 200.7, Plastic Pint Container Preserved with HNO_3

Chloride by Method 300, Total Dissolved Solids (TDS) by Method SM-2540C, and pH, all collected in a 1/2 gallon plastic container with no preservative.

COMMENTS

BRINE POND 4 FIELD MONITORING FORM
MAGNUM SOLUTION MINING, LLC
DELTA, UTAH

Well I.D.	DATE mm/dd/yy	DTW (feet)	Flow Rate (gpm)	Draw Down (ft)	Headspace Gas (LEL)	TEMP. (°C)	Specific Conductance (µS/cm³)	Conductivity (ohms)	Salinity (ppt)	TDS (mg/L)	pH	NOTES
GRN-MH-1												
GRN-MH-2												
GRN-MH-3												
DA-1 Shallow												
Deep												
Basement												
DA-2, Shallow												
Deep												
Basement												
Delta Egg Farm Well												
IPA												

Field Data Collection and Sample Collection Instructions

Field Data Parameter Collection Instructions

Step 1) Calibrate YSI meter prior to each use (follow instructions in the equipment manual)

Step 2) Calibrate combustible gas meter prior to each use (follow instructions in the equipment manual)

Step 3) Measure combustible gas levels inGS-MH-1, GS_MH-2, GS-MH-3, GS-MH-4, and GS-MH-5 with portable combustible gas meter

Step 4) Measure depth to groundwater manually using the water interface probe in GS-MH-1, GS_MH-2, GS-MH-3, GS-MH-4, and GS-MH-5

Step 5) Collect field parameter readings and record any unusual circumstances in the "NOTES" column above

Step 6) Confirm functionality of the water level transducers and download water table elevation data from each well to the laptop computer

Step 7) Manually record WTE data from DA wells, and the Egg Farm and IPA Wells

Groundwater Sampling Instructions

Step 7) Follow Steps 1-6 above. Collect groundwater samples from GS-MH-1, GS_MH-2, GS-MH-3, GS-MH-4, and GS-MH-5 in the laboratory-provided containers

Step 8) Complete Laboratory Chain of Custody (see attached example)

Laboratory Analysis Requirements

Sodium by Method 200.7, Plastic Pint Container Preserved with HNO_3

Chloride by Method 300, Total Dissolved Solids (TDS) by Method SM-2540C, and pH, all collected in a 1/2 gallon plastic container with no preservative.

Data Submittal

At the completion of each monthly data collection effort send electronic depth-to-water data to ATC Associates (jim.coletta@atcassociates.com).

COMMENTS

DWQ-2021-008157

APPENDIX C

BRINE EVAPORATION POND OPERATING MANUAL (PENDING PUBLICATION)