Corrective Action Report

NW ¼ of SW ¼ of Section 11, T158N R82W

Glenburn, Renville County, North Dakota

September 29, 2020

Terracon Project No. M1197039

Prepared for:
NDIC Oil and Gas Division
Bismarck, North Dakota

Prepared by:
Terracon Consultants, Inc.
West Fargo, North Dakota

September 29, 2020

Mr. Cody VanderBusch
Reclamation Specialist
NDIC Oil and Gas Division
600 East Boulevard Avenue Dept. 405
Bismarck, ND 58505-0840

Office 701-328-8020
Cell 701-391-1959

Re: Corrective Action Report
NW¼ of SW¼ - S11-T158N-R82W
Glenburn, Renville County, North Dakota
Terracon Project No. M1197039

Dear Mr. VanderBusch:

Terracon Consultants, Inc. (Terracon) is pleased to submit the enclosed Corrective Action Report (CAR) which summarizes the environmental oversight conducted during excavation activities at the historical brine pond associated with a former well site. Prior to proceeding with remediation activities at the site, Terracon prepared a Corrective Action Plan (CAP), dated September 3, 2019, which was submitted to North Dakota Industrial Commission (NDIC) Oil and Gas Division for review and approval. Terracon conducted the CAP in general accordance with our Master Service Agreement (reference number 110.7-15-004) dated September 1, 2019 and authorized Task Order dated September 6, 2019.

Terracon appreciates this opportunity to provide our services to North Dakota Industrial Commission (NDIC) Oil and Gas Division. Should you have questions or require additional information, please do not hesitate to contact our office.

Sincerely,
Terracon Consultants, Inc.

Stephen T. Maliszeski
Sr. Staff Geologist

Jonathan B. Ellingson, PG, CPG
Office Manager/Principal

Daniel F. Schneider, P.E., CHMM
Senior Principal

CORRECTIVE ACTION REPORT
NW ¼ of SW ¼ - S11-T158N-R82W
GLENBURN, RENVILLE COUNTY, NORTH DAKOTA

Terracon Project No. M1197039
September 29, 2020

1.0 INTRODUCTION

The site is located on a parcel of land owned by Randy Palmer (Parcel ID: 23-00000-4710-000) in the NW¼ of SW¼ of Section 11 (S11), Township 158N (T158N), Range 82W (R82W) in Renville County, North Dakota. A Topographic Map showing the site location is included as Exhibit 1 in Appendix A. Terracon completed a Limited Site Investigation (LSI) and a Corrective Action Plan (CAP) dated September 3, 2019 for the historical brine pond.

1.1 Previous Limited Site Investigation

Terracon completed an LSI during August 2019 to address potential brine impacted soils at the location of a legacy brine pond which included the advancement of 18 soil borings ranging from 5 to 15 feet below grade surface (bgs) as well as a grid system approximately 420-feet by 220-feet which was screened in 20-foot intervals for electrical conductivity (EC) and chlorides. The soil samples collected from the borings were screened for EC, chlorides, and organic vapors. Select soil samples from the borings were collected for laboratory analysis. The detailed findings of the LSI are presented in Terracon's Limited Site Investigation and Corrective Action Plan report, dated September 3, 2019.

1.1.1 Field Results

- Terracon generally encountered an approximate one-foot layer of brown topsoil with organics followed by brown silty lean clay until termination depth. Clayey sand was also observed as lenses in various soil borings. Obvious signs of environmental impacts (i.e., odors, staining, etc.) were not observed during soil boring advancements. Groundwater was not encountered in the borings.
- Organic vapor readings greater than one part per million (ppm) were not observed in the soil borings.
- EC readings greater than 2,000 microsiemens per centimeter (µS/cm) were recorded in the upper two feet of soil at various grid locations on the site with the highest readings in the vicinity of the historical brine pond and where stressed vegetation was observed during field activities. The highest reading of 7,690 µS/cm was recorded at grid location 120-100 at the surface. EC readings greater than 2,000 µS/cm were also observed in the upper two feet in borings B1, B4, B5, B7, B13, and B15 through B18 with a highest recorded reading of 11,120 µmhos/cm in boring B4. Readings greater than 4,000 µS/cm from two to four feet bgs were observed in borings B4, B13, and B17 with a highest reading of 8,600 µS/cm in

boring B13. The highest recorded reading of 11,500 µS/cm was detected from boring B4 at approximately 7-8 feet bgs

- Chloride concentrations from aqueous extracts of soil (using QuanTab® titration test strips to determine chloride content) were observed in multiple samples collected from the grid locations greater than 250 milligrams per liter (mg/L). The highest concentration of chloride was observed in B4 at approximately 0-1 foot at 3,575 mg/L.
- The type and condition of vegetation was taken into consideration when developing the Corrective Action Plan.

1.1.2 Lab Results

- EC levels exceeding the North Dakota Regulatory Guidance levels were detected at varying depths from 0-3 feet bgs in samples collected from B4, B5, B7, and B15 with the highest recorded level of 15,100 micromhos per centimeter (µmhos/cm) at 0-1 foot.
- Chloride levels exceeding the North Dakota Regulatory Guidance level of 250 milligrams per kilograms (mg/kg) were detected at varying depths from 0-3 feet bgs in samples collected from B4, B5, B7, B15, and B18 with the highest recorded concentration of 5,580 mg/kg from B4 at approximately 0-1-foot bgs.

1.2 Proposed Corrective Action

Terracon prepared a combination LSI report/CAP, dated September 3, 2019 to manage the brine impacted soil during remediation activities at the site. The CAP proposed the following response actions:

- Approximately 5,000 cubic yards (cy) (7,750 tons based on a conversion factor of 1.55 tons per cy) of soil would be excavated during remediation activities and stockpiled onsite. The estimated lateral extent of the excavation would be determined in the field based upon results of field screening, accessibility of impacted soils, and safety concerns such as the proximity of the excavation to the adjacent coulee and underground pipeline. Terracon would be onsite to guide and monitor site activities during the excavation, material placement, and backfilling. At the time of preparation of the CAP, excavation activity was anticipated to extend up to approximately three feet bgs.
- Soil samples would be screened organic vapors using a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp, electrical conductivity using an EC meter with a stainless steel probe to measure salinity, and chlorides using QuanTab® titration test strips to measure chloride content.
- Field observations, PID readings, EC readings, and chloride concentrations would be used to identify impacted soils. Soils identified as impacted would be excavated and stockpiled on site for amendment and reuse in pre-designated areas over an impermeable geomembrane. The top one foot of excavation material would be

segregated from the lower two feet of excavation material and stockpiled separately. Impacted soils would be segregated from non-impacted soils based on the field observations, PID readings less than 100 ppm, EC field readings less than 4,000 µS/cm , and chloride field concentrations less than 125 mg/L. Non-impacted soil may be reused on-site as fill material for backfilling the excavation at depths greater than four feet bgs.

- Following the initial excavation of impacted soil, a capillary break would be constructed at the bottom of the excavated area consisting of a six-inch thick gravel layer lined with filter/separation fabric (geotextile) above and below the gravel layer. Approximately 500 tons of gravel would be required in the excavated area. Three-inch plastic drain tile would also be placed into the capillary break and outfall towards the constructed phytoremediation area to the northwest.
- The excavated would be backfilled with the stockpiled excavated material in two layers. The excavated material from the lower two feet would then be placed over the capillary break and the top foot of the excavation was placed over the top of this layer. Straw and gypsum would be tilled into the soil for each of the layers.
- Approximately 2,000 cy of soil is expected to be excavated in the non-impacted area to construct a phytoremediation cell. The excavated soil would be stockpiled on site. The areal extent of the excavation would be approximately 4,100 square feet (SF) with the edges sloping towards the middle of the phytoremediation cell at approximately 50% grade until a depth of 6 feet bgs is reached. A drainage system would be connected to the drainage conveyance piping from the remediation area to the phytoremediation cell.
- The final backfill subgrade would be covered with excavated topsoil to depths consistent with adjoining onsite areas, with the surface contours shaped and sloped to minimize erosion and restored to the original contours as practicable. A soil berm approximately 1-foot in height and 2-feet in width would be constructed surrounding the remediation area from non-impacted soil obtained from homogenized stockpiled soil from the phytoremediation cell excavation area.
- Following the excavation and construction of the remediation plot, the site would be flushed with approximately two acre-feet (450,000 gallons) of water over a course of approximately 40 days. Water would be obtained from the rural water supply provided through Upper Souris Water District. Prior. The water would be field screened and lab tested for EC and the presence of chlorides. Water tanks would be placed on site to store excess water in between flushing events. A sprinkler system would be constructed and connected to the tanks to provide water to the remediation area.
- Water would be drained from the remediation area into the constructed phytoremediation area for storage, treatment, and disposal. Water would be removed from the phytoremediation area periodically and transported to a saltwater disposal treatment plant as-needed. Water from the phytoremediation

area would be periodically field screened and lab tested for EC and the presence of chlorides.

2.0 CORRECTIVE ACTION RESULTS

Terracon initially arrived onsite September 24, 2019 to flag the boundaries of the proposed remediation area before the subcontractor, SM Fencing and Energy Services (SM Fencing), initiated excavations on September 25, 2019. Terracon was present on site between September 24, 2019 through November 9, 2019 to provide environmental oversight of the excavation activities at the site, as well as to monitor if additional brine impacted soils were encountered.

2.1 Excavation

Excavation was initiated downgradient to the east of the historical brine pit where additional impacts were encountered. Excavation continued to the west and south toward the location of the historical brine pit. The remediation area was excavated to approximately three feet bgs to install the capillary break and drainage system. Contaminated soils were stockpiled on impermeable plastic sheeting until used for backfilling after installation of the gravel capillary break and drain tile. Impacted topsoil and subsoil were separated during excavation to be used as backfill in their respective layers after capillary break installation.

Excavation of impacted material continued until the extent of the impacts had been removed. Once the remediation area was fully excavated; the phytoremediation cell area was excavated on the northwest corner of the site. The non-impacted soils excavated from the phytoremediation cell were used to build up the south and east side of the remediation area to aid in the drainage of surface water towards the phytoremediation cell to the northwest.

2.2 Field Screening/Monitoring

During the on-site excavation activities, Terracon field screened soil samples for the presence of organic vapors using a photoionization detector (PID), electrical conductivity using an EC meter to measure salinity, and chlorides with QuanTab® titration test strips to determine chloride content. The PID provides a direct reading in parts per million (ppm) isobutylene equivalents. The EC meter provides a direct reading in microsiemens per centimeter (µS/cm) and is referred to in this report as micromhos per centimeter (µmhos/cm), an estimated corresponding unit of measure for EC evaluations. Chloride concentrations were obtained from aqueous extracts of soil samples or water samples using QuanTab® titration tests which provide salt concentrations in mg/L.

The EC and PID meters were checked periodically to ensure proper calibration. EC readings were obtained by inserting a stainless steel probe, attached to the EC meter, into soils giving a direct reading. Chloride concentrations were obtained by inserting the QuanTab® titration test strips into aqueous extracts with a 1:1 ratio of soil to water. Organic vapor levels were screened by placing and sealing soils within a clean plastic bag allowing it to stand for up to 10 minutes and warming

prior to inserting the probe attached to the PID meter in the bag to obtain the results. The PID was checked periodically throughout the day to ensure proper calibration and operation. The

2.3 Remediation Design Construction

Once the impacted soil was removed from the remediation area, the capillary break was installed. The capillary break was constructed with filter/separation fabric (geotextile) installed directly on the excavated ground surface followed by an approximately six-inch layer of gravel. A drainage system consisting of four-inch PVC drainage piping laid within the gravel layer followed by a filter/separation fabric (geotextile) on top of the final gravel grade.

The PVC drainage system was designed and installed to have a dendric design with a flow to the northwest into the phytoremediation cell. The phytoremediation cell was excavated in the northwest corner of the site and was an approximately 45 by 60-foot excavation to an approximately eight-foot depth and lined with a geomembrane. A single six-inch PVC outfall pipe connected to the PVC drainage system was installed through the geomembrane liner and sealed to prevent water migration in and out of the phytoremediation cell. After the capillary break was completed, the excavation was backfilled as described in the following section.

2.4 Excavation Backfill

Following the installation of the capillary break and drainage system, the excavation was backfilled from November 5, 2019 through November 7, 2019. The backfill material consisted of the original stockpiled impacted soil from the remediation area amended with straw and powdered gypsum. The backfill was graded to allow for surface runoff to flow to the northwest toward the phytoremediation cell and limit the surface flow to the adjoining properties while minimizing potential erosion. The amended backfill was surfaced with a combination of stockpiled topsoil from the area remediation area with an additional 260 tons delivered by Sundre Sand & Gravel, Inc. from an approved off-site location. The delivered topsoil was field screened prior to delivery to check for impacts.

2.5 Flooding, Laboratory Analytical, Monitoring and Revegetation

The Upper Souris Water District installed an access line near the northwest corner of the site for use in the flooding process. A system of surface hoses and portable sprinklers were utilized to saturate the ground (flooding). Prior to commencing the flooding activities, Terracon completed an EC grid to monitor the changes in soil conditions throughout the process and is included in Appendix A and B as Exhibit 3 and Table 1 respectively.

The rate of watering was adjusted based on weather conditions and amount of standing water. The sprinklers were set up with timer devices to allow for various sections to be watered for a specific duration and area of the remediation cell. On average, the site had water spraying for 18 hours per day, one sprinkler at a time in rotation. The sprinklers were also relocated based

on the weather (rainfall, standing water and wind direction). Soil and water outfall conditions were routinely monitored with field measurements using the EC meter and chloride QuanTab® titration test strips.

Irrigation (flooding) was considered complete based upon the field screening results indicating the soil concentrations had decreased to less than 2,000 µS/cm and the EC concentrations of the outfall water into the phytoremediation cell was observed to be decreasing. The final EC field data is presented in Appendix A and B as Exhibit 5 and Table 3 respectively. A total of approximately 128,070 gallons of water was utilized during the flooding process. This volume, in addition to the spring snowmelt, decreased the concentration of electrical conductivity and chlorides in the soil to a level which was at or below the North Dakota guidance levels and suitable for vegetation germination and crop growth.

Five soil samples were collected for laboratory analysis of EC and chloride from the areas spread throughout the remediation area based on general location and field EC results. The soil samples were collected and placed into laboratory provided jars and shipped overnight on ice to Pace Analytical Laboratories in Mt. Juliet, Tennessee for analysis of EC and chloride. The analytical data indicated that both the EC and chloride concentrations had decreased below the applicable screening levels. The analytical results are included in Appendix B as Table 4 followed by the laboratory analytical report.

Post-remediation, the site was then tilled and planted with wheat (in the field) and grass (around the phytoremediation cell and north of the field). The wheat and grass were carefully covered with approximately one inch of topsoil via tilling. The sprinkler system was set up to irrigate the planted wheat and grass (at a flow rate conducive to vegetation growth). Irrigation was conducted for three days after planting.

Approximately 115 tons of clay soil was provided by Sundre Sand & Gravel Inc. (Big D Excavating) and placed on the sides of the phytoremediation cell covering the geomembrane to allow for plant growth.

3.0 LAB ANALYTICAL DATA

As previously discussed, soil samples were collected at the conclusion of the flooding process and prior to planting. Theses samples were submitted to Pace Analytical Laboratories in Mt. Juliet, Tennessee for analysis of EC by EPA Method 9050A and chlorides by EPA Method 9056. Analysis indicated that both analytes demonstrated levels/concentrations below the applicable screening levels. The analytical results are included in Appendix B as Table 4 followed by the laboratory analytical report.

4.0 CONCLUSIONS

Based on the historical and preliminary research completed at the site, soil conditions were observed to be unsuitable for crop or vegetation growth due to the elevated concentrations of EC and chlorides in the soil and groundwater. The remediation techniques utilized for remediation of the impacted area were conducted with the intent to minimize the amount of soil disposal and volume of soil handled and/or moved throughout the site and return the site to productive crop growth.

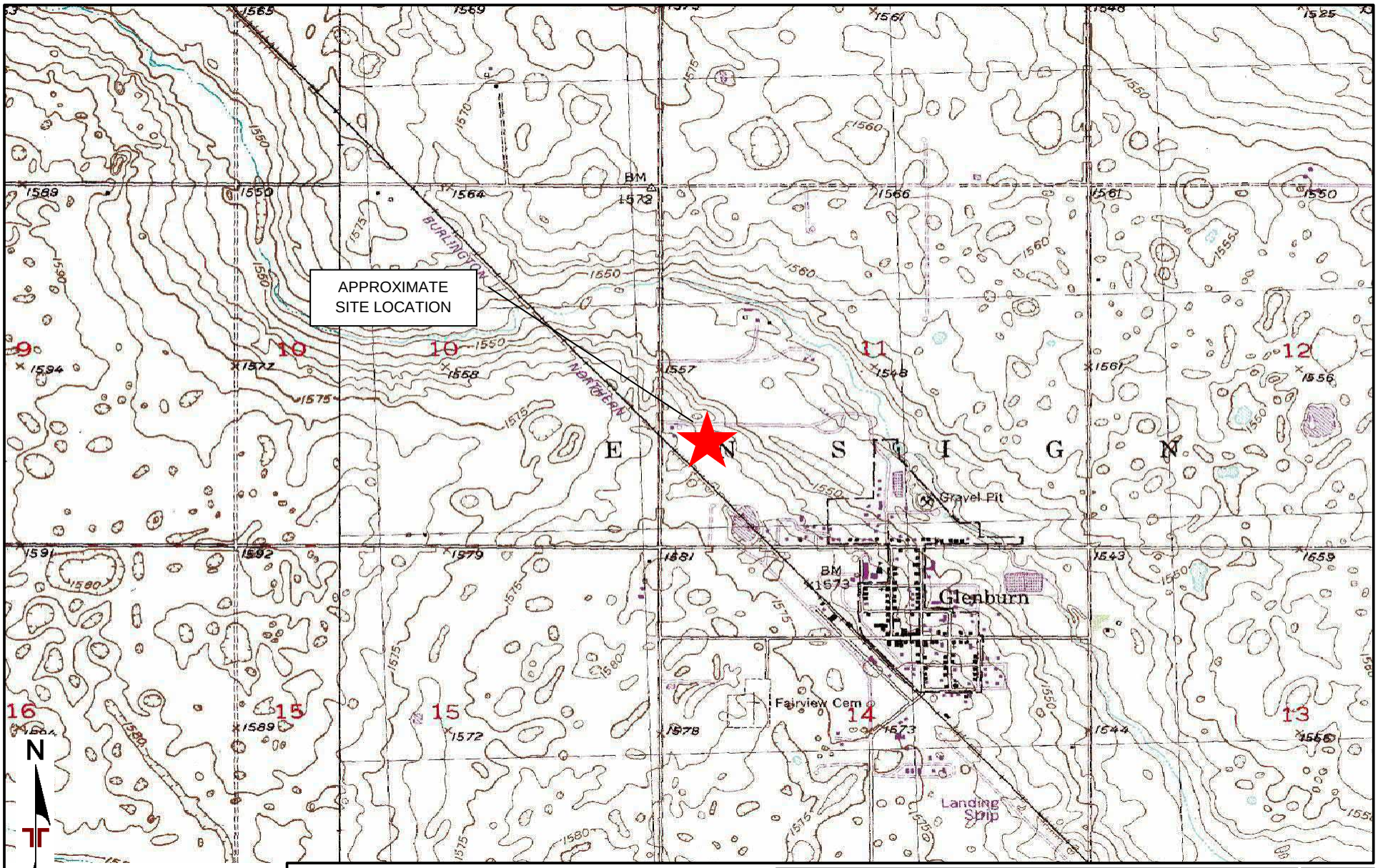
The phytoremediation approach to remediating this site required less time, equipment, soil disposal and soil delivery ultimately leading to significantly reduced costs for remedial actions. As presented in the Limited Site Investigation (LSI) with Corrective Action Plan (CAP) dated September 3, 2019 and this report, based on the progression of field and analytical data collected between August 2019 and July 2020, this technique appears to meet the hypothesis and goal of this brine remediation study.

It was observed that limited areas along the developed berm of the remediation zone have spots that are currently bare ground and not maintaining the desired vegetation growth. This is believed to be due to the steep outer perimeter slope to the east north, east and south being constructed of the same amended soil, yet not receiving the flooding procedure that the central area did. It should be noted that there may be a thinner crop growth this year due to the volume of water stripping the soil of nutrients. Terracon recommends utilizing a bioremediation fluid surface treatment in these areas to assist in the revegetation process. Additionally, Terracon recommends continued monitoring for the 2021 crop season with spray applications as needed based on field observations.

5.0 STANDARD OF CARE

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. Terracon makes no warranties, either express or implied, regarding the findings, conclusions, or recommendations. Please note Terracon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report. These corrective action services were performed in accordance with the scope of work agreed with you, our client, as reflected in our Corrective Action Plan.

APPENDIX A
EXHIBITS



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: LANSFORD, ND (1/1/0001), LANSFORD SE, ND (1/1/1949) and GLENBURN, ND (1/1/1979).

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	JF
Drawn by:	SMG
Checked by:	JF
Approved by:	JF

Project No.	M1197039
Scale:	1"=2,000'
File Name:	M1197039
Date:	8/20/2019

Terracon
860 9th St. NE, Unit K
West Fargo, ND 58078

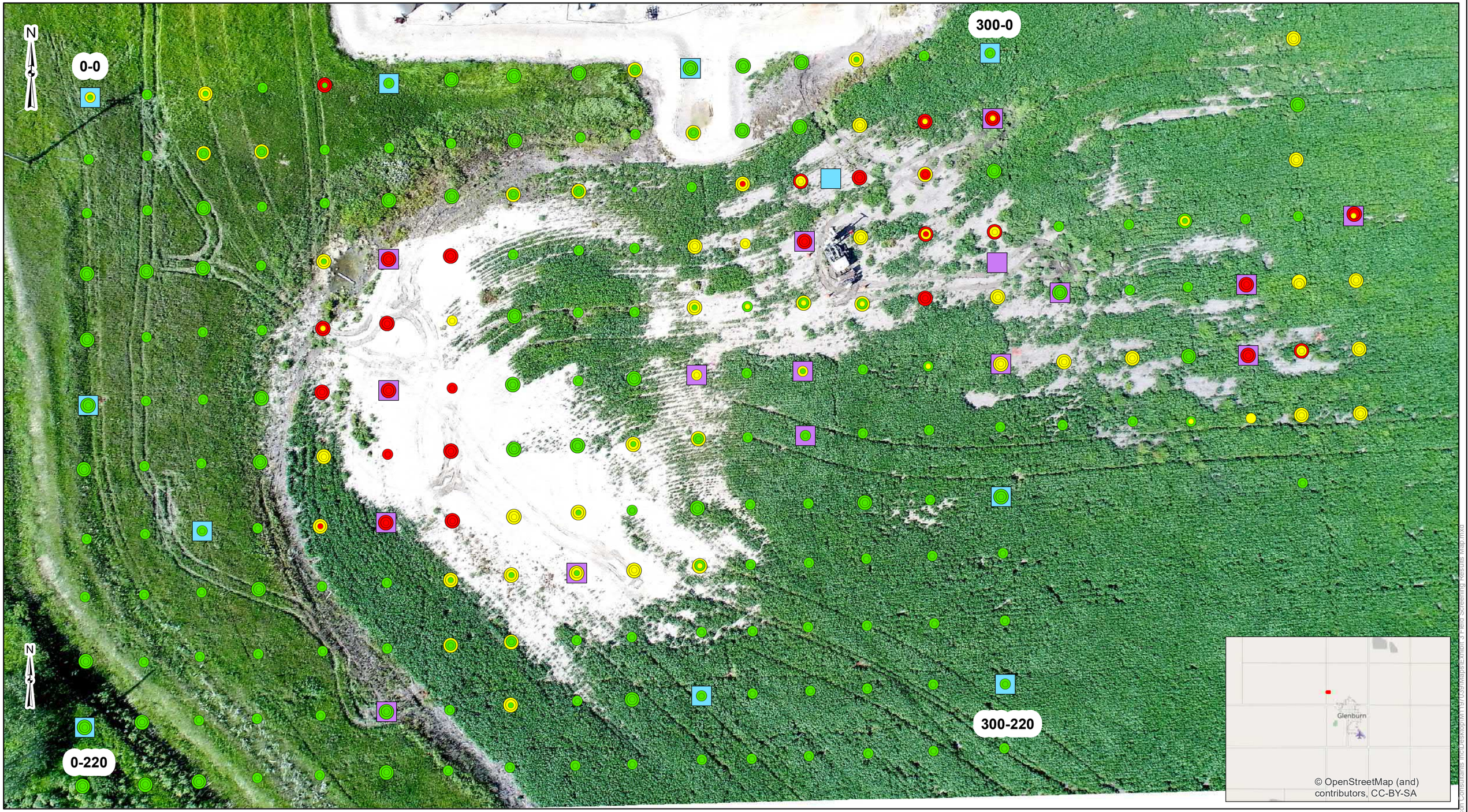
TOPOGRAPHIC MAP

Brine Research Pilot Study

NW ¼ SW ¼ S11 T158N-R82W
Glenburn, Renville County, North Dakota

Exhibit

1



LEGEND

Surface	1 Ft BGS	2 Ft BGS
<1000 us/cm	<1000 us/cm	<1000 us/cm
1000 - 2000 us/cm	1000 - 2000 us/cm	1000 - 2000 us/cm
>2000 us/cm	>2000 us/cm	>2000 us/cm

Blank

Chlorides

Low

High

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

1:339

0 10 20 40 Feet

Project No.:	M1197039
Date:	Sep 2020
Drawn By:	KAK
Reviewed By:	SM

Terracon
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PH. (702) 282-9633 terracon.com

Field Screening Results Map

SW 1/4 of S11
T158N-R82W
Renville County

Exhibit

2

C:\Users\kakarnhorst\OneDrive - Terracon Consultants Inc\Desktop\M1197039\Maps\Exhibit 2 Field Screening Results.mxd

N

N

Glenburn

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1:240

LEGEND

Surface	1 Ft BGS	2 Ft BGS
<1000 us/cm	<1000 us/cm	<1000 us/cm
1000 - 2000 us/cm	1000 - 2000 us/cm	1000 - 2000 us/cm
>2000 us/cm	>2000 us/cm	>2000 us/cm
		Blank

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

0 10 20 40 Feet

Project No.:	M1197039
Date:	Jul 2020
Drawn By:	KAK
Reviewed By:	SM

Terracon
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Field EC Grid - Pre-Flooding

SW 1/4 of S11
T158N-R82W
Renville County

Exhibit

3

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N

0-0 20-0 40-0 60-0 80-0 100-0 120-0 140-0

0-20 20-20 40-20 60-20 80-20 100-20 120-20 140-20

0-40 20-40 40-40 60-40 80-40 100-40 120-40 140-40

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0-140 20-140 40-140 60-140 80-140 100-140 120-140 140-140

1:240

LEGEND

Surface	1 Ft BGS	2 Ft BGS
Blank	Blank	Blank
<1000 us/cm	<1000 us/cm	<1000 us/cm
1000 - 2000 us/cm	1000 - 2000 us/cm	1000 - 2000 us/cm
>2000 us/cm	>2000 us/cm	>2000 us/cm

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

0 10 20 40 Feet

Project No.:	M1197039
Date:	Jul 2020
Drawn By:	KAK
Reviewed By:	SM

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Field EC Grid - 5/4/2020

SW 1/4 of S11
T158N-R82W
Renville County

Exhibit

4

C:\Users\kakenhorst\OneDrive - Terracon Consultants Inc\Desktop\M1197039\mapsheet EC Grid 5-4-2020.mxd

N

1:240

LEGEND

Surface	1 Ft BGS	2 Ft BGS
<1000 us/cm	<1000 us/cm	<1000 us/cm
1000 - 2000 us/cm	1000 - 2000 us/cm	1000 - 2000 us/cm
>2000 us/cm	>2000 us/cm	>2000 us/cm
		Blank

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

0 10 20 40 Feet

Project No.:	M1197039
Date:	Jul 2020
Drawn By:	KAK
Reviewed By:	SM

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Field EC Grid - 5/19/2020

SW 1/4 of S11
T158N-R82W
Renville County

Exhibit

5

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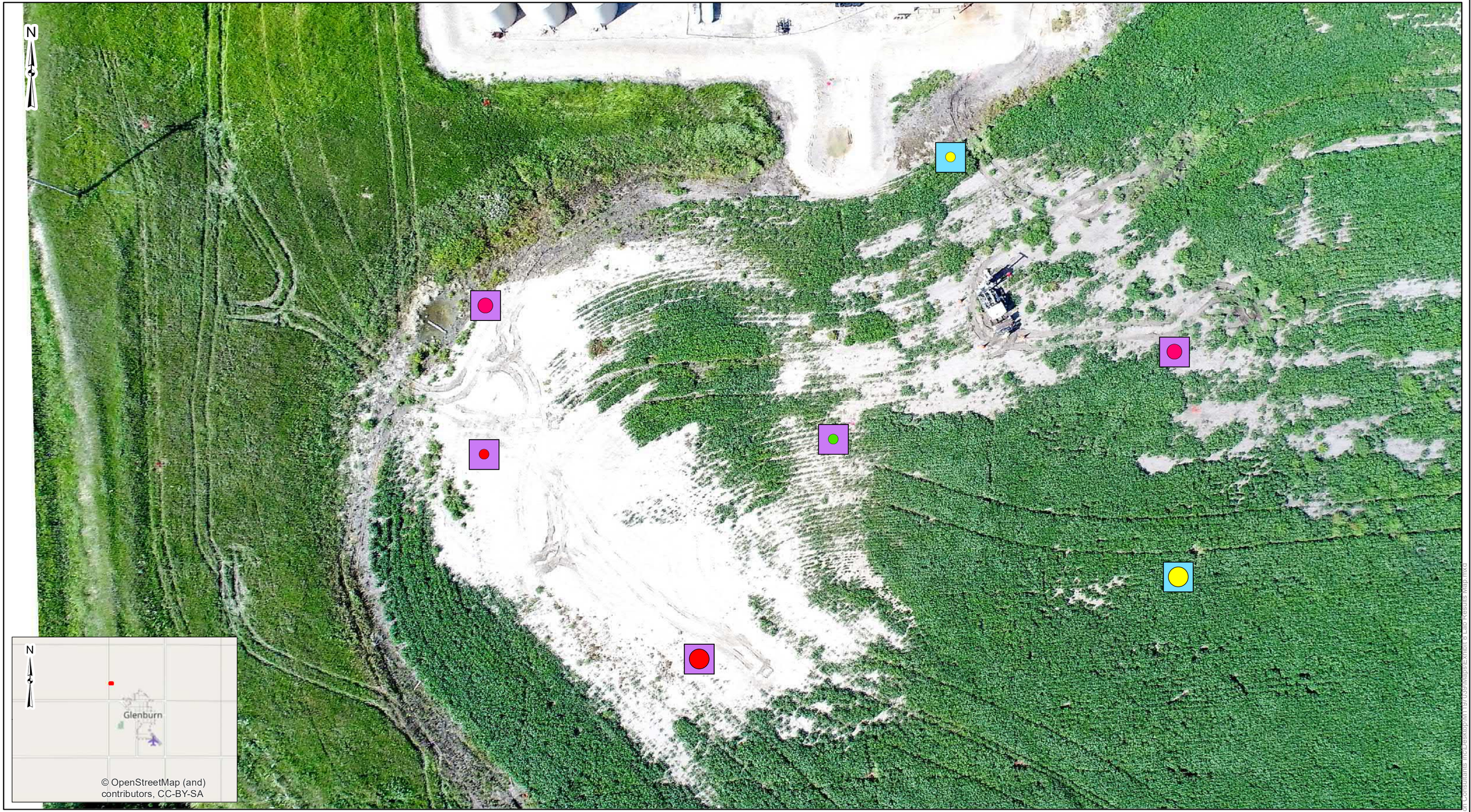

LEGEND

Surface	1 Ft BGS	2 Ft BGS	Blank
<1000 us/cm	<1000 us/cm	<1000 us/cm	
1000 - 2000 us/cm	1000 - 2000 us/cm	1000 - 2000 us/cm	
>2000 us/cm	>2000 us/cm	>2000 us/cm	

Chlorides

Low

High

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

1:300

0 10 20 40 Feet

Project No.:	M1197039
Date:	Sep 2020
Drawn By:	KAK
Reviewed By:	SM

Terracon
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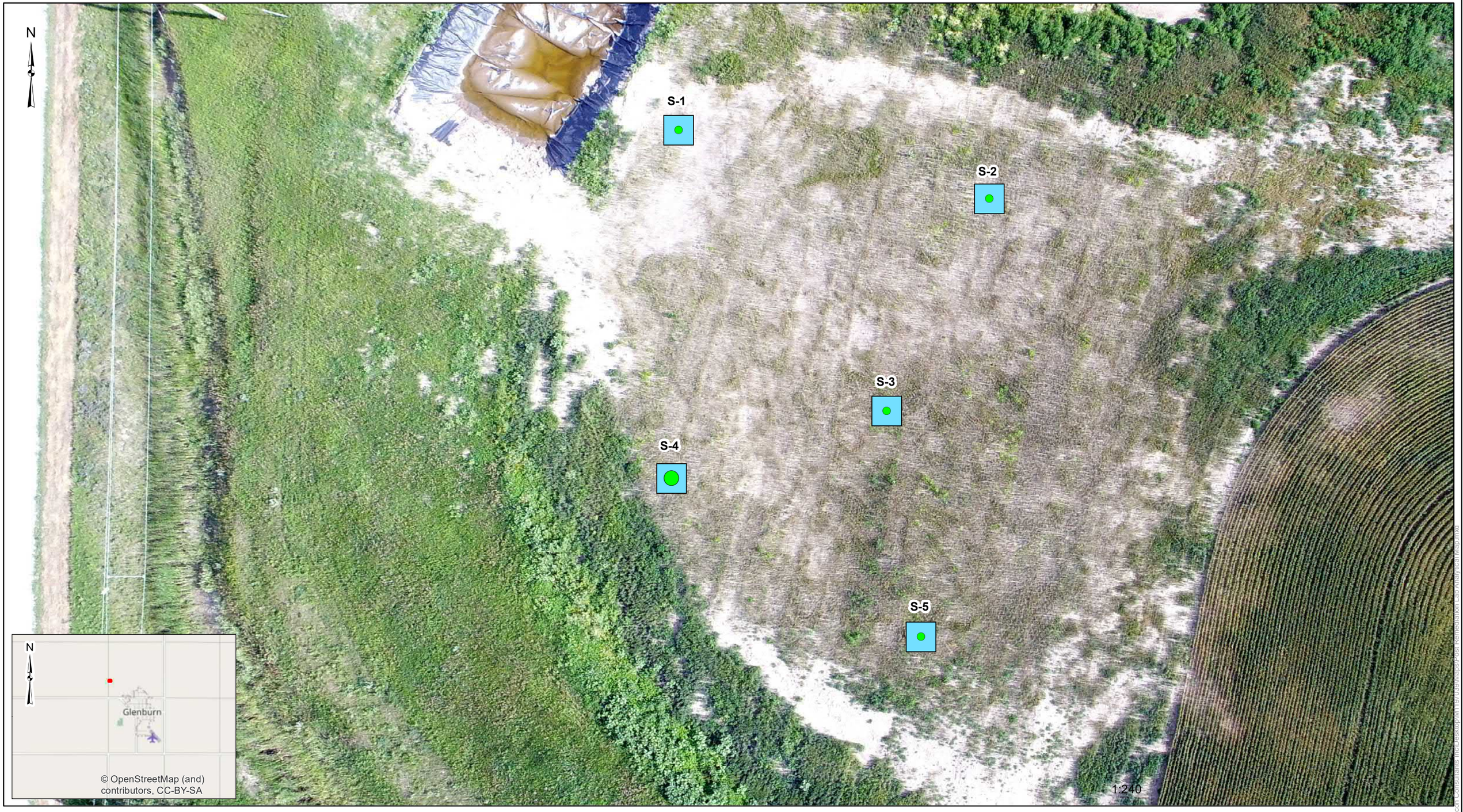
Pre-Remediation Lab Results Map

SW 1/4 of S11
T158N-R82W
Renville County

Exhibit

6



LEGEND

Surface		1 Ft BGS	
	<1000 us/cm		<1000 us/cm
	1000 - 2000 us/cm		1000 - 2000 us/cm
	>2000 us/cm		>2000 us/cm

Chlorides

Low

High

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

0 10 20 40 Feet

Project No.:	M1197039
Date:	Sep 2020
Drawn By:	KAK
Reviewed By:	SM

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Post-Remediation Lab Results Map

SW 1/4 of S11
T158N-R82W
Renville County

Exhibit

7

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APPENDIX B
DATA TABLES AND LABORATORY REPORTS

Table 1: Electrical Conductivity
Pre-Remediation Field ED Screening Results
Grid Pattern: Exhibit 3
May 19, 2020

Sample ID	Electrical Conductivity (uS/cm)		
	Surface	0-1 foot	1-2 feet
0-0	330	950	280
0-20	4,030	4,440	5,010
0-40	2,830	3,740	4,450
0-60	4,440	4,050	4,820
0-80	5,550	5,010	5,320
0-100	410	270	-
0-120	550	520	-
0-140	410	580	-
20-0	1,290	1,100	710
20-20	1,840	4,220	4,380
20-40	2,450	3,820	4,800
20-60	2,970	4,490	3,550
20-80	3,220	4,620	4,660
20-100	4,740	3,350	4,510
20-120	830	820	320
20-140	530	750	-
40-0	2,790	3,790	4,170
40-20	2,440	3,260	4,580
40-40	2,840	4,080	4,120
40-60	1,290	3,840	4,610
40-80	6,850	4,580	3,570
40-100	2,390	4,530	4,150
40-120	1,840	5,000	4,360
40-140	1,340	470	-
60-0	3,650	4,050	4,310
60-20	1,770	4,070	4,040
60-40	3,280	8,050	7,490
60-60	4,440	4,610	4,770
60-80	1,720	4,100	4,510
60-100	3,040	3,250	4,190
60-120	1,720	3,080	3,620
60-140	1,940	4,140	4,610

Sample ID	Electrical Conductivity (uS/cm)		
	Surface	0-1 foot	1-2 feet
80-0	4,130	4,700	1,540
80-20	4,060	4,060	3,450
80-40	2,490	4,010	2,250
80-60	3,120	3,570	4,080
80-80	2,070	4,290	5,050
80-100	1,630	3,910	4,550
80-120	3,540	4,120	4,360
80-140	3,140	4,410	4,240
100-0	530	1,540	1,600
100-20	3,710	4,070	4,190
100-40	3,010	3,640	3,840
100-60	2,330	3,190	3,320
100-80	1,910	3,280	3,440
100-100	1,750	4,030	4,240
100-120	2,050	4,202	4,390
100-140	1,810	3,310	4,020
120-0	240	560	-
120-20	3,790	4,100	3,950
120-40	1,230	3,390	3,710
120-60	2,220	3,210	3,500
120-80	1,190	2,600	3,720
120-100	1,970	1,500	2,800
120-120	1,750	2,980	1,990
120-140	2,170	1,140	1,570
140-0	1,020	1,230	-
140-20	3,580	3,720	3,540
140-40	1,950	1,170	800
140-60	1,000	1,400	2,430
140-80	850	1,430	2,370
140-100	790	640	-
140-120	970	1,040	-
140-140	740	730	-

= not available

< = less than

Table 2: Electrical Conductivity
During Remediation Field ED Screening Results
Exhibit 4
May 11, 2020

Sample ID	Electrical Conductivity (uS/cm)		
	Surface	0-1 foot	1-2 feet
0-0	1,530	1,080	2,830
0-20	1,570	970	1,080
0-40	910	950	1,640
0-60	1,200	1,570	3,420
0-80	4,070	3,930	4,450
0-100	840	760	1,060
0-120	600	650	
0-140	910	700	540
20-0	2,430	1,120	950
20-20	1,320	2,200	1,880
20-40	990	1,800	1,410
20-60	1,140	1,560	2,210
20-80	1,270	2,100	3,590
20-100	920	2,820	3,820
20-120	1,450	1,250	820
20-140	970	840	1,240
40-0	4,730	4,030	3,640
40-20	900	1,600	2,460
40-40	850	870	1,450
40-60	1,670	2,690	4,140
40-80	1,440	3,070	4,560
40-100	1,160	1,590	2,940
40-120	1,070	2,930	2,200
40-140	1,570	1,210	1,160
60-0	2,650	3,800	4,000
60-20	1,740	1,720	1,690
60-40	1,080	2,220	2,160
60-60	1,300	1,880	3,070
60-80	1,090	2,750	4,230
60-100	2,340	3,460	4,260
60-120	880	1,620	1,650
60-140	1,840	3,070	4,310

Sample ID	Electrical Conductivity (uS/cm)		
	Surface	0-1 foot	1-2 feet
80-0	1,520	3,370	2,820
80-20	1,700	1,870	2,220
80-40	990	1,870	1,540
80-60	760	1,790	2,940
80-80	1,240	1,810	3,960
80-100	1,110	2,160	2,810
80-120	1,840	3,000	3,080
80-140	3,070	4,410	4,430
100-0	1,000	1,660	2,060
100-20	1,850	2,900	3,570
100-40	860	1,190	1,110
100-60	760	1,230	2,640
100-80	1,200	1,550	2,910
100-100	970	1,940	2,340
100-120	1,190	2,720	4,660
100-140	2,700	3,190	3,940
120-0	590	680	1,150
120-20	1,110	2,650	3,720
120-40	1,180	2,010	1,880
120-60	940	1,220	1,850
120-80	1,160	2,530	3,170
120-100	1,220	1,580	1,930
120-120	1,150	2,940	2,310
120-140	990	1,450	770
140-0	1,460	1,750	2,690
140-20	3,460	3,530	3,630
140-40	2,270	1,510	1,850
140-60	1,770	1,000	2,120
140-80	1,300	1,730	3,220
140-100	940	1,150	1,470
140-120	1,350	1,680	1,990
140-140	1,440	670	1,100

- = not available

< = less than

M1197039
Brine Site Remediation

Table 3: Electrical Conductivity
Post-Remediation Field ED Screening Results
Grid Pattern: Exhibit 5
May 19, 2020

Terracon Consultants, Inc.

Sample ID	Electrical Conductivity (uS/cm)		
	Surface	0-1 foot	1-2 feet
0-0	390	1,020	1,970
0-20	640	720	860
0-40	1,260	1,600	2,300
0-60	690	1,560	1,800
0-80	3,040	3,970	2,750
0-100	800	780	800
0-120	770	970	-
0-140	710	340	720
20-0	1,770	1,450	1,370
20-20	1,260	1,670	1,950
20-40	830	1,160	1,190
20-60	1,260	1,560	1,530
20-80	1,010	1,300	1,540
20-100	540	910	2,450
20-120	690	800	1,910
20-140	860	1,530	2,080
40-0	3,170	3,440	840
40-20	1,140	1,860	2,660
40-40	1,490	1,870	2,100
40-60	1,490	1,650	1,700
40-80	850	1,380	2,910
40-100	1,000	1,650	2,350
40-120	840	1,780	2,510
40-140	860	910	930
60-0	1,300	2,470	2,480
60-20	950	1,040	1,080
60-40	480	740	850
60-60	760	1,270	1,340
60-80	620	1,180	1,490
60-100	920	1,370	1,390
60-120	810	1,160	1,190
60-140	2,160	3,750	3,450

Sample ID	Electrical Conductivity (uS/cm)		
	Surface	0-1 foot	1-2 feet
80-0	630	2,010	2,010
80-20	230	710	720
80-40	770	860	1,130
80-60	700	1,400	1,970
80-80	680	1,630	1,980
80-100	400	750	830
80-120	1,550	0	2,470
80-140	2,550	0	3,500
100-0	810	790	870
100-20	490	780	810
100-40	380	510	720
100-60	830	940	1,330
100-80	640	890	1,670
100-100	400	760	1,210
100-120	1,010	1,940	2,140
100-140	1,470	2,140	2,690
120-0	770	850	-
120-20	500	1,390	2,230
120-40	420	760	820
120-60	390	880	930
120-80	480	1,070	1,350
120-100	730	1,550	1,560
120-120	1,390	2,310	2,460
120-140	1,510	1,800	1,710
140-0	1,230	1,490	1,620
140-20	2,290	2,740	2,850
140-40	1,560	1,720	1,760
140-60	1,000	910	-
140-80	790	830	1,030
140-100	990	1,110	-
140-120	1,660	1,590	2,220
140-140	1,610	1,200	-

- = not available

< = less than

			Electrical Conductivity (EC) by EPA Method 9050A (µmhos/cm)	Chlorides by EPA Method 9056 (mg/kg)
North Dakota Regulatory Guidance[1]			**2,000**	**250**
High Electrical Conductivity[2]			**4,000**	**NE**
North Dakota Industrial Commission[3]			**35,000**	**NE**
EPA Residential RSLs[4]			**NE**	**NE**
EPA Industrial RSLs[4]			**NE**	**NE**
Sample ID	**Depth**	**Date**		
1	0 ft	5/19/2020	711	<20
2	0 ft	5/19/2020	819	<20
3	0 ft	5/19/2020	859	22
4	1 ft	5/19/2020	799	64
5	0 ft	5/19/2020	584	220

NOTES:

Units in milligrams per kilogram, or mg/kg, is equivalent to parts per million (ppm)

Units in micromhos per centimeter (µmhos/cm) is equivalent to microsiemans per centimeter (µS/cm); however, these units do not have a direct equivalency to ppm

[1]Information from North Dakota Department of Health: *UST Information-Cleanup Action Levels for Gasoline and Other Petroleum Hydrocarbons; and Guidelines for the Assessment and Cleanup of Saltwater Releases (Draft; December, 2014)*

[2]EPA Regional Screening Levels (RSLs) May, 2020 - Residential and Industrial Soil Screening Levels in mg/kg

[3]Information from North Dakota Industrial Commission: A Guide for Remediation of Salt/Hydrocarbon Impacted Soil

[4]EPA Regional Screening Levels (RSLs) May, 2020 - Residential and Industrial Soil Screening Levels in mg/kg

Bold = Result exceeds NDIC, NDDoH, and/or EPA guidance level, action level, and/or screening level

-- = Not applicable

< = less than minimum detection limit (MDL)

NE = Not established

Some soil samples are not true representative of the EC values and are biased low due to the conductivity meter not being adjusted for the high chloride content.

ANALYTICAL REPORT

May 28, 2020

Terracon - Fargo, ND

Sample Delivery Group:	L1221008
Samples Received:	05/21/2020
Project Number:	M1197039
Description:	Brine Research Bioloat Study

Report To: Jacqueline Finck
860 9TH ST E
West Fargo, ND 58078

Entire Report Reviewed By:

John Hawkins
Project Manager

TABLE OF CONTENTS

S-1 (0') L1221008-01 Solid

Collected by: Steve Maliszeski | Collected date/time: 05/19/20 09:10 | Received date/time: 05/21/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9050AMod	WG1481745	1	05/25/20 02:00	05/25/20 04:00	CAT	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1480446	1	05/25/20 12:43	05/26/20 21:51	ELN	Mt. Juliet, TN

S-2 (0') L1221008-02 Solid

Collected by: Steve Maliszeski | Collected date/time: 05/19/20 09:16 | Received date/time: 05/21/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9050AMod	WG1481745	1	05/25/20 02:00	05/25/20 04:00	CAT	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1480446	1	05/25/20 12:43	05/26/20 22:00	ELN	Mt. Juliet, TN

S-3 (0') L1221008-03 Solid

Collected by: Steve Maliszeski | Collected date/time: 05/19/20 09:20 | Received date/time: 05/21/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9050AMod	WG1481745	1	05/25/20 02:00	05/25/20 04:00	CAT	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1480446	1	05/25/20 12:43	05/26/20 22:19	ELN	Mt. Juliet, TN

S-4 (1') L1221008-04 Solid

Collected by: Steve Maliszeski | Collected date/time: 05/19/20 09:24 | Received date/time: 05/21/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9050AMod	WG1481745	1	05/25/20 02:00	05/25/20 04:00	CAT	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1480446	1	05/25/20 12:43	05/26/20 22:29	ELN	Mt. Juliet, TN

S-5 (0') L1221008-05 Solid

Collected by: Steve Maliszeski | Collected date/time: 05/19/20 09:31 | Received date/time: 05/21/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9050AMod	WG1481745	1	05/25/20 02:00	05/25/20 04:00	CAT	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1480446	1	05/25/20 12:43	05/26/20 22:38	ELN	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Project Manager

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	711		10.0	1	05/25/2020 04:00	WG1481745

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Chloride	ND		20.0	1	05/26/2020 21:51	WG1480446

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	819		10.0	1	05/25/2020 04:00	WG1481745

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Chloride	ND		20.0	1	05/26/2020 22:00	WG1480446

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	859		10.0	1	05/25/2020 04:00	WG1481745

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Chloride	22.2		20.0	1	05/26/2020 22:19	WG1480446

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	799		10.0	1	05/25/2020 04:00	WG1481745

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Chloride	63.6		20.0	1	05/26/2020 22:29	WG1480446

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	umhos/cm		umhos/cm		date / time	
Specific Conductance	584		10.0	1	05/25/2020 04:00	WG1481745

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Chloride	33.2		20.0	1	05/26/2020 22:38	WG1480446

Method Blank (MB)

(MB) R3531424-1 05/25/20 04:00

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

Laboratory Control Sample (LCS)

(LCS) R3531424-2 05/25/20 04:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	445	446	100	85.0-115	

Method Blank (MB)

(MB) R3531999-1 05/26/20 17:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Chloride	U		9.20	20.0

Laboratory Control Sample (LCS)

(LCS) R3531999-2 05/26/20 17:42

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	200	189	94.5	80.0-120	

L1221008-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1221008-02 05/26/20 22:00 • (MS) R3531999-7 05/26/20 22:10

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	500	ND	487	94.4	1	80.0-120	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

Billing Information:
860 9th Street NE
Unit K
West Fargo, ND 58078

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: Jacqueline Finck

Email To: Jackueline.Finck@terracon.com

Project Description: Brine Research Bioloat Study

City/State Collected: Glenburn, ND

Please Circle: PT MT CT ET

Phone: 701-356-7621

Client Project # M1197039

Lab Project #

SDG # L122008

A033

Collected by (print): Steve Maliszeski

Site/Facility ID #

P.O. #

Acctnum:

Template:

Prelogin:

PM:

PB:

Collected by (signature):

Immediately Packed on Ice N ___ Y ___

Rush? (Lab MUST Be Notified)
___ Same Day X Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Shipped Via:

WO#: 10518549

10518549

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Specific Conductance/Chlorides	Remarks	Sample # (lab only)
S-1 (0')	Grab	SS	0'	5/19/2020	910	2	X	-01	001
S-2 (0')		SS	0'		916	2	X	-02	002
S-3 (0')		SS	0'		920	2	X	-03	003
S-4 (1')		SS	1'		924	2	X	-04	004
S-5 (0')		SS	0'		931	2	X	-05	005

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 320 752 203 24

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Scott Taylor/Terracon	5/19/20	1650	PACE	5.20.20 850
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
	5/20/20	1735		2.6 2.4 A 10
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
			Sandy Yoset	5/21/20 8:45

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

L122108

Pace Analytical®	Document Name: **Sample Condition Upon Receipt (SCUR) - MN**	Document Revised: 27Mar2020 **Page 1 of 1**
	Document No.: **ENV-FRM-MIN4-0150 Rev.00**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt

Client Name: Brine Research Broiler Study

Project #: WO#: 10518549

PM: AA1 Due Date: 05/28/20

CLIENT: Terracon-ND

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial See Exceptions ☐

Tracking Number: 1608 7302 4590

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☒ Yes ☐ No

Thermometer: ☐ T1(0461) ☐ T2(1336) ☒ T3(0459) ☐ T4(0254) ☐ T5(0489) **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☒ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 0.6 °C **Average Corrected Temp (no temp blank only):** ☐ See Exceptions ☐ 1 Container

Correction Factor: true **Cooler Temp Corrected w/temp blank:** 0.6 °C ____ °C

USDA Regulated Soil: (☐ N/A, water sample/Other:_____) **Date/Initials of Person Examining Contents:** 05.20.20

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present and Filled Out?	☒ Yes ☐ No	1.
Chain of Custody Relinquished?	☒ Yes ☐ No	2.
Sampler Name and/or Signature on COC?	☒ Yes ☐ No ☐ N/A	3.
Samples Arrived within Hold Time?	☒ Yes ☐ No	4.
Short Hold Time Analysis (<72 hr)?	☐ Yes ☒ No	5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other_____
Rush Turn Around Time Requested?	☒ Yes ☐ No	6.
Sufficient Volume?	☒ Yes ☐ No	7.
Correct Containers Used? -Pace Containers Used?	☒ Yes ☐ No ☒ Yes ☐ No	8.
Containers Intact?	☒ Yes ☐ No	9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes ☐ No ☒ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☐ Water ☒ Soil ☐ Oil ☐ Other_____	☒ Yes ☐ No	11. If no, write ID/ Date/Time on Container Below: See Exception ☐
All containers needing acid/base preservation have been checked?	☐ Yes ☐ No ☒ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes ☐ No ☒ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐ Yes ☐ No ☒ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No pH Paper Lot# See Exception ☐
		Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes ☐ No ☒ N/A	13. See Exception ☐
Headspace in VOA Vials (greater than 6mm)?	☐ Yes ☐ No ☒ N/A	
Trip Blank Present?	☐ Yes ☐ No ☒ N/A	14. Pace Trip Blank Lot # (if purchased):_____
Trip Blank Custody Seals Present?	☐ Yes ☐ No ☒ N/A	

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted:_____ Date/Time:_____

Comments/Resolution:_____

Project Manager Review:_____ **Date:**_____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: RNC (2)

L124008

Pace Analytical®	Document Name: Shipping Exception Form		Document Revised: 16Jul2018 Page 1 of 1
	Document No.: F-MN-C-310-Rev.00		Issuing Authority: Pace Minnesota Quality Office

Date 5/20/20	Must Arrive By:	Check one: AM X / PM	Shipping Method (check one) FedEx: X	SpeeDee	UPS
Senders Initials: ***CL1***	**Shipping account if NOT Mpls #:**		***Dept. # 1003***		

Ship Package To:

Company Name:	**PACE NATIONAL**
Street Address:	
Phone Number:	

Fill out below only if samples weren't logged in as a sub.

Sample number	Container Type/Count	Location
10518549001-005	1 JGFU AND 1 WG20 EACH	RECEIVING
	Direct Ship	

Special Instructions:

2.6 - .4 = 2.2 A2

RAD SCREEN: <0.5 mR/hr

L095c, (12/01)

APPENDIX C
PHOTOLOG

Photo #1 View of remediation area prior to commencing work.

Photo #2 Initial earthwork and removal of topsoil.

Photo #3 Stockpiling topsoil and excavated contaminated soil.

Photo #4 Soil Excavation.

Photo #5 Excavation of phytoremediation cell.

Photo #6 Installation of capillary break.

Photo #7 Installation of PVC drain tile in the capillary break with filter fabric.

Photo #8 Placing gypsum and straw amended soil over capillary break.

Photo #9 Remediation area with hoses and sprinklers laid out.

Photo #10 Wheat growth in the remediation cell.

Photo #11 Wheat growth in the remediation cell compared to the surrounding wheat fields.

Photo #12 Placing soil cover over the Phytoremediation pond.