Memorandum

May 29, 2019

To:	Zachary Sasnow, U.S. EPA	Ref. No.:	058502
From:	John-Eric Pardys/kf/37		
cc:	Dave Favero, RACER		

Subject: **RACER Nodular Industrial Land - Response to U.S. EPA Comments from April 4, 2019 Site Meeting**

GHD Services Inc. (GHD) has prepared the following memorandum in response to United States Environmental Protection Agency (U.S. EPA) comments from the April 4, 2019 Site Meeting at RACER's Saginaw Nodular Land (Site) in Saginaw, Michigan.

A summary of the comments and RACER's responses are as follows:

Comment 1:

Confirm the EPA number for formaldehyde in soil.

Response 1:

The EPA industrial soil number for formaldehyde is 73 milligrams per kilogram (mg/kg). MDEQ (December 2013) screening levels are:

- Residential Drinking Water Protection Criteria: 26 mg/kg
- Nonresidential Drinking Water Protection Criteria: 76 mg/kg
- Groundwater Surface Water Interface Protection Criteria: 3.6 mg/kg
- Soil Volatilization to Indoor Air Inhalation Criteria: 65 mg/kg
- Infinite Source Soil Inhalation Criteria: 43 mg/kg
- Finite VSIC for 5 meter source thickness: 69 mg/kg
- Finite VSIC for 2 meter source thickness: 150 mg/kg
- Particulate soil inhalation criteria: 260,000 mg/kg
- Direct Contact criteria: 130,000 mg/kg

In GHD's April 20, 2018 memorandum, "Soil Evaluation", soil was screened against the above MDEQ screening levels with the exception of the drinking water protection criteria and groundwater surface water interface criteria. Formaldehyde was detected above Non-Residential Infinite Source VSIC (43 mg/kg) at five locations in IU I ranging in concentrations from 52 J mg/kg to 78 J mg/kg. Formaldehyde was also detected

above Non-Residential Finite VSIC for 5-meter source thickness (69 mg/kg) at one location (MW-06951) at a concentration of 78 J mg/kg. The memo concluded that no further action is recommended as the results are below the draft 2017 Non-Residential Outdoor Vapor Inhalation criteria, which is more closely aligned with the value used in the Site Specific Risk Assessment documented in the RCRA Facility Investigation - Phase1C Report (CRA, March 2007).

In addition, GHD's response to U.S. EPA comments dated November 28, 2018 identified that, "Formaldehyde exceeded the 2013 Non Residential MDEQ Part 201 VSIC criteria, however, these exceedances are not of concern since there are no buildings within 100-ft of the sample location and there is a proposed deed restriction for the Site that requires conducting a vapor intrusion evaluation or implementation of vapor intrusion controls prior to constructing or occupying buildings or structures on the property."

In conclusion, no further action is recommended with respect to detections of formaldehyde beyond the inclusion of the following prohibition in the declaration of restrictive covenant, "Prohibiting construction and/or occupancy of any building or structures on the Property without completing an evaluation of hazardous substances volatilizing into indoor air or implementing engineering controls to mitigate the potential for subsurface vapor migrating indoor planned."

Comment 2:

Review potential sources of ammonia in Former Desulfurization Slag RCRA Treatment Unit area (including amines).

Response 2:

Based on a review of the Description of Current Conditions (DOCC) (1995 EMCON) and Addendum to the DOCC (1997 DOCC), a potential source of ammonia is historical dumping of an unknown quantity of spent ammonia solution from a blue print machine. An excerpt from the Addendum to the DOCC describing the historical dumping of ammonia solution (Area of Interest G.7) and an associated ammonia investigation that was conducted can be found in Attachment A. Figure 1 shows the extents of the 1994 arsenic and ammonia groundwater investigation as described in the 1997 Addendum.

Other possible sources include the use of amines in bonding sands, however, the types of binding resins used at the Grey Iron and Nodular Iron Plants, identified in the DOCC (1995), were phenol and formaldehyde resins. Therefore, since operations at the Nodular Iron Plant ceased in 1987 and the only types of resins used at the Plants (as of 1995 when the DOCC was prepared), were phenol and formaldehyde, the source of the ammonia plume is unlikely to be from the use of bonding sands containing amines.

The Former desulfurization slag RCRA treatment unit area (AOI G.5) is in the vicinity of the high ammonia levels in groundwater, however, based on the treatment reaction that occurred in this area as described in the DOCC, AOI G.5 does not appear to be the source of the elevated ammonia readings.

Comment 3:

Provide wetland delineation for area south of former Nodular Plant.

Response 3:

A copy of the wetland delineation prepared by Niswander Environmental can be found in Attachment B. A copy of the letter can also be found on RACER's website at: https://www.racertrust.org/Properties/Detail?Id=10040

Comment 4:

CMP to be revised after current evaluations are completed.

Response 4:

No response required.

Comment 5:

Review monitoring wells on property south of the clay pile and pending review, propose abandonment.

Response 5:

The following monitoring wells are located on the property south of the clay pile: MW-37, MW-1S, 1I, 1D, MW-2S, 2I, 2D, MW-3, MW-40, MW-4S, 4I, 4D, and MW-42. These wells are shown on Figure 2.

The only available data that is for locations MW-1S, MW-2S, and MW-4S. The locations were analyzed for ammonia (which were all non-detect) and pH (which ranged from 6.23 to 6.96 S.U.) during one event in 2001.

Based on the lack of historical operations in this area, review of available groundwater data, and lack of potential risk/exposure to groundwater in this area, GHD recommends that all the wells be abandoned.

Comment 6:

Complete a Site inspection (including photographs) for areas not accessible on the tour (Crow Landfill, property south of clay pile, area to the east of Outer Drive)

Response 6:

GHD staff Steve Hoevemeyer conducted a Site inspection on April 11, 2019 of the areas not accessible on the April 4, 2019 Site tour as highlighted on Figure 3. Attachment C presents the photographs taken during the inspection. The locations of the photographs are provided on Figure 3. The following is a summary of the inspection

<u>Crow Island Landfill</u>

- Steve noted that the area was heavily treed and there was miscellaneous trash/debris
- No evidence of historical GMC operations
- No further action is recommended for this area

Area along Gauge Drain (immediately north of GM Landfill)

- Steve noted the presence of an electrical panel and what appeared to be pumps associated with the Crow Island Landfill (Photo 1)
- Steve also noted two wells (MW-6 and MW-7) associated with the GM Landfill (Photos 2 and 3). Figure 2 shows the locations of wells that are present to the north of the GM Landfill. GM no longer uses monitoring wells MW-6 and MW-7 as part of the monitoring associated with the GM Landfill. No data is available for MW-6 and MW-7. Given RACER does not have any responsibility for the GM Landfill, there is no data for these wells, there is no current use for the wells, and a lack of potential risk/exposure to groundwater in this area
- U.S. EPA's approval to abandon these wells is requested.

Area at the corner of Hach Road and the end of Outer Drive (most easterly portion of RACER property)

- Steve noted that the area was heavily vegetated and is fenced along the backside of the property
- Miscellaneous trash/debris
- No evidence of historical GMC operations
- No further action is recommended for this area

Two areas south of the clay pile

- In general the two areas are heavily vegetated and there is also miscellaneous trash/debris
- There was evidence of some historical GMC operations (two areas of slag) on the northern of these two parcels (Photos 4 and 5). Figure 3 shows the approximate size of the slag areas. Area 1 is approximately 750 square feet and Area 2 is 12,000 square feet.
- A brief sampling scope of work will be submitted separately for the two areas of slag

Enclosures:

Figure 1	Location of May 1994 Arsenic and Ammonia Groundwater Investigation
Figure 2	Monitoring Well Locations
Figure 3	Photograph Locations from April 11, 2019 Site Inspection
Attachment A	AOI G.7 – Basement Sumps (dumping of ammonia solution)
Attachment B	Wetland Delineation (Niswander)
Attachment C	Photographic Log of Inspection

SECONDARY POND

LAGOON #5

INVESTIGATIVE UNIT H

INVESTIGATIVE UNIT I

FORMER NODULAR IRON PLANT AREA

INVESTIGATIVE UNIT G

N

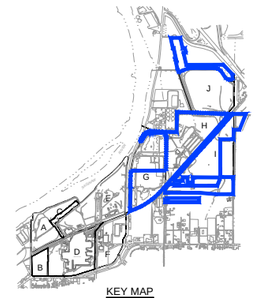
0 100 200 ft

LEGEND

RACER PROPERTY

INVESTIGATIVE UNIT BOUNDARY

ARSENIC AND AMMONIA INVESTIGATION LOCATION



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

REVITALIZING AUTO COMMUNITES ENVIRONMENTAL RESPONSE

SAGINAW, MICHIGAN

LOCATION OF MAY 1994 ARSENIC AND AMMONIA GROUNDWATER INVESTIGATION

GHD

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88 SPICER SURVEY, OCTOBER 2009.

Project Manager:	Reviewed By:	Date:	
JEP	GR	May 2019	
Scale: 1:200	Project №: 58502A-A02	Report №: MEMO037	Drawing №: figure 1

P:\drawings\58000s\58502\58502-MEMO\58502A-A02(MEMO037)\58502A-A02(MEMO037)GN\58502A-A02(MEMO037)GN-WA002.DWG Plot Date: MAY 27, 2019

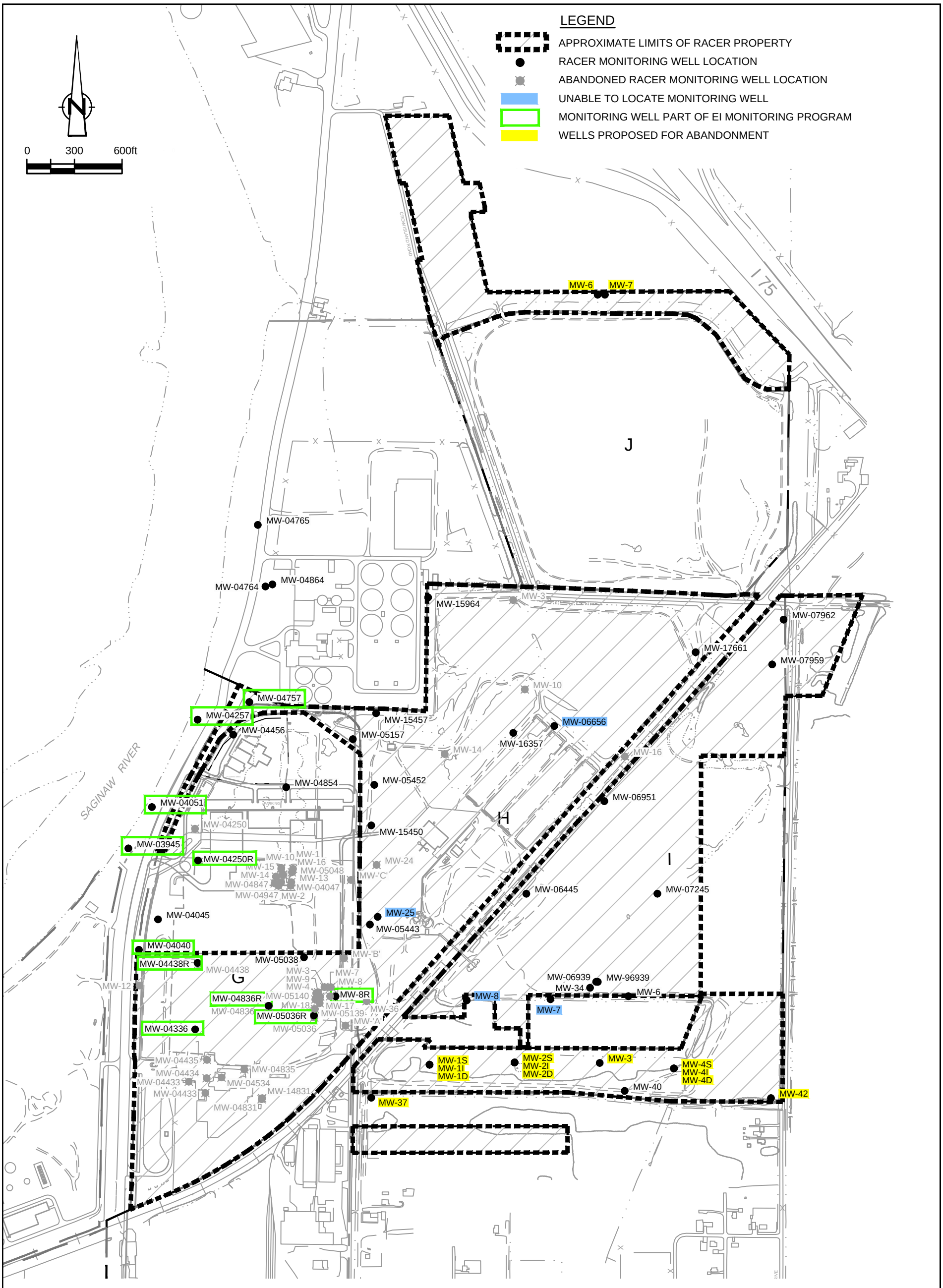


figure 2

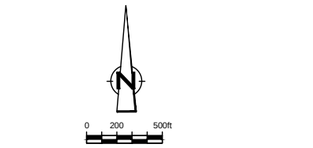
MONITORING WELLS
SAGINAW NODULAR INDUSTRIAL LAND
Saginaw, Michigan

SOURCE:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING
INTERNATIONAL FEET, NGVD 88, TOPO - SANBORN, 1996,

P:\drawings\58000s\58502\58502-MEMO\58502A-A02(MEMO037)\58502A-A02(MEMO037)GN\58502A-A02(MEMO037)GN-WA003.DWG Plot Date: MAY 27, 2019

AREA 1 - SLAG AREA

AREA 2 - SLAG AREA



LEGEND

- A — INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
- APPROXIMATE FORMER PROPERTY BOUNDARY
- APPROXIMATE LIMITS OF RACER PROPERTY
- INSPECTION AREA
- 1 — PHOTO LOCATION AND ORIENTATION

NOTE: TOPO - SANBORN, 1996

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

RACER
SAGINAW NODULAR INDUSTRIAL LAND

SAGINAW, MICHIGAN

PHOTOGRAPH LOCATIONS FROM APRIL 11, 2019 SITE INSPECTION

GHD

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88

Project Manager:	Reviewed By:	Date:	
I.R.	M.T.	May 2019	
Scale: 1" = 500'	Project Nº: 58502A-A02	Report Nº: MEMO037	Drawing Nº: figure 3

P:\drawings\58000s\58502\58502-MEMO\58502A-A02\(MEMO037)\58502A-A02\(MEMO037)GN\58502A-A02(MEMO037)GN-WA001.DWG Plot Date: MAY 27, 2019

Attachment A
AOI G.7 - Basement Sumps (Dumping of Ammonia Solutions)

G.5 Former (Replacement) Desulfurization Slag RCRA Treatment Unit

The DOCC discusses the replacement Desulfurization Slag RCRA Treatment Unit and discusses closure activities completed to date. The DOCC also referenced various MDNR inspection reports and correspondence regarding alleged operating violations. Copies of these documents are attached as **Appendix 12.3** to this Addendum.

The DOCC also presents the results of post-excavation sampling as discussed on page 12-10 of the DOCC and summarized on Tables 12.12 through 12.15. The text mistakenly refers to arsenic data contained on Table 12.14. Table 12.14 does not contain any arsenic data for the eleven samples that are summarized on this Table.

G.7 Basement Sumps

The four basement sumps were originally designed to collect stormwater and groundwater from drain tiles and roof drains at the Nodular Iron Plant. They discharged, via a sewer line, directly to the storm water drainage ditch located directly north of the Nodular Iron Plant. The last study done on the groundwater in the vicinity to the sumps was conducted at the southeast corner of the building in June of 1994. A copy of the results of this investigation is included as **Appendix 12.4**. This investigation also discusses the presence of ammonia in proximity to the southeast corner of the main building. It is believed that the source of this ammonia was from the historic dumping of small quantities spent ammonia solution from a blueprint machine at the Nodular Iron Plant. The exact quantities of ammonia discharged at this location it unknown.

On page 12-13 of this section of the DOCC a reference is made to a 1983 report regarding proposed upgrades to the stormwater collection system. This engineering study was authored by Hubbell, Roth & Clark, Inc. as authorized by GM. A copy of the report in its entirety is included as **Appendix 12.5** in this Addendum.

On page 12-15 of the DOCC the text provides information about sampling results for the southwest sump. The units for the last series of reported chemical concentrations was inadvertently omitted from the text. The units on these concentrations are the same as for the remaining constituents listed on the table, parts per billion (ppb).

As referenced at the beginning of this section, the Nodular Iron Plant is currently undergoing dismantlement. The present status of the basement sumps is as follows:

- There is no discharge from the sump system to the stormwater ditch north of the facility. The outlet from the sumps to the ditch has been closed off. The stormwater ditch has been blocked (grouted) at the culverts beneath Veterans

APPENDIX 12.4

G.7 Basement Sumps
Groundwater Investigation

Dragun Corporation

30445 Northwestern Hwy. • Suite 260 • Farmington Hills, MI, USA 48334 • 810-932-0228 • FAX 810-932-0618

June 29, 1994

Mr. William Newsted
General Motors Corporation
Powertrain Casting Technology Center
77 West Center Street
Saginaw, Michigan 48605-5077

SUBJECT: Groundwater Investigation
Manufacturing Basement Area
General Motors Former Nodular Iron Facility (GMNI)
Saginaw, Michigan
Project #1040

Dear Mr. Newsted:

Attached, you will find the Groundwater Investigation Report for the Manufacturing Basement Area at the GMNI plant in Saginaw, Michigan.

If you have any questions regarding The Dragun Corporation's findings or conclusions, please contact us at your convenience.

Sincerely,

THE DRAGUN CORPORATION

Chris Englert

Christopher J. Englert, P.E.
Project Manager

Attachment
cc: Mr. John Takle

CJE/lrs
/1040gmri.rpt

Groundwater Investigation
Manufacturing Basement Area
General Motors Former Nodular Iron Facility
Saginaw, Michigan

Prepared for
Mr. William Newsted
General Motors Corporation
Powertrain Casting Technology Center
77 West Center Street
Saginaw, Michigan 48605-5077

Prepared by
The Dragun Corporation
30445 Northwestern Highway
Suite 260
Farmington Hills, Michigan 48334
Phone: (810) 932-0228
Project #1040

June 29, 1994

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The Dragun Corporation conducted a groundwater investigation at the General Motors Nodular Iron Plant (GMNI) on May 12 and 13, 1994. The purpose of the groundwater investigation was to provide additional information regarding the extent to which groundwater beneath the manufacturing building containing ammonia and arsenic has migrated. In addition, the groundwater investigation was conducted to obtain additional data necessary to identify the source(s) of ammonia and arsenic in groundwater at the subject site. The investigation was authorized by Mr. William Newsted and the General Motors Corporation through Purchase Order No. PXS03022.

The details of the groundwater investigation were presented in The Dragun Corporation's work plan dated January 19, 1994. The work plan included the following two tasks: (a) the investigation of groundwater quality beneath the manufacturing building, and (b) the preparation of a summary report.

This report presents the results of the groundwater investigation in the vicinity of the southeast sump.

SOIL AND GROUNDWATER INVESTIGATION-MANUFACTURING BASEMENT AREA

The Dragun Corporation performed a groundwater investigation in the vicinity of the southeast sump at the GMNI facility on May 12 and 13, 1994. Prior to this investigation, water that covered the basement floor was pumped to the General Motors' waste treatment facility. Sump pumps installed in two previously installed borings B-5 and B-7 were intermittently operated to dewater the basement and remove groundwater which collected in those borings.

Groundwater samples were collected at a total of 11 locations. Groundwater samples were collected from locations beneath the manufacturing basement floor, a monitoring well positioned in an unexcavated area, a monitoring well located outside of the manufacturing building, and a soil boring/temporary monitoring well located outside of the manufacturing building. The investigation centered in the area of the southeast sump. The groundwater sample locations are shown in Figure 1.

Six previously untested locations were sampled during this investigation. Five of the six are permanent locations which can be sampled in the future. The permanent locations include boring B-12, B-13, B-14, B-15, and B-16. In addition, a groundwater sample was collected at a temporary monitoring well at B-11 which was not previously tested. Existing sample locations included monitoring wells MW-5, and MW-6, and borings B-5, B-6, and B-7.

Details of Investigation Methods

Five borings B-12, B-13, B-14, B-15, and B-16 were drilled through the basement floor of the manufacturing building in the vicinity of the southeast sump. Four-inch- diameter holes were cored through the basement floor to permit the collection of water samples. FMG Concrete Cutting, Inc. located in Brighton, Michigan cored the holes through the basement floor which ranged from 18 inches to 42 inches thick.

A groundwater sample was collected at B-11 with the Geoprobe by hydraulically pushing and/or hammering a stainless-steel screen assembly (19" in length with an expendable drive-point tip) to the desired sampling depth. The screen remained completely sealed within a steel sleeve until, at the desired sampling depth, the sleeve was retracted and the screen exposed. Groundwater was brought to the surface through polyethylene tubing (1/4" inner-diameter) using a vacuum pump. Approximately one liter of water was purged prior to sampling. After purging, two groundwater samples were collected and stored in an ice-filled cooler.

At two locations in the manufacturing building basement, well screens were installed in order to collect representative water samples at B-13 and B-14. Well screens were required due to the presence of standing water which covered the basement floor at those locations. Three-foot-long well screens were installed and grouted in the four-inch-diameter cored holes using silica sand and bentonite grout. Following well screen installation, a dedicated disposable bailer was used to evacuate each well several times. Once the well screens were bailed, a representative sample was collected for field and laboratory testing. Several water samples were collected from B-14 on both May 12 and May 13. The wells were bailed between sampling events. Field test results for ammonia data were consistent, thus indicating that representative samples were collected.

Groundwater Sampling

Duplicate groundwater samples were collected at each location immediately after the concrete core was removed. Groundwater samples were collected with a disposable bailer from the open borehole. Groundwater samples were collected after bailing each boring in order to collect a representative sample. One water sample from each location was tested in the field for ammonia. Field test results were utilized to identify additional test locations in an effort to define the horizontal extent of ammonia in groundwater. Field measurements were collected for ammonia, pH, and specific conductance.

The second groundwater sample collected from each test location was submitted for laboratory testing. Water samples obtained during this investigation were submitted to Environmental Quality Laboratory located in Sterling Heights, Michigan. Water samples were tested for the presence of total and dissolved arsenic (USEPA Method 200.7), and ammonia (USEPA Method 350.1). All samples were transported to the laboratory in an ice-filled cooler.

Groundwater sampling and sample handling were conducted according to United States Environmental Protection Agency (USEPA) protocol.

Additional concrete coring and water sampling were conducted based on the field test results following authorization by General Motors' staff.

All water sampling equipment was decontaminated in three steps: (a) an initial tap water rinse, (b) a brush wash with tap water and phosphate-free detergent, and (c) a final distilled water rinse.

RESULTS OF THE GROUNDWATER INVESTIGATION

The following sections present the results of this groundwater investigation. The first section discusses the results for field testing. The second section presents the laboratory test results for arsenic and ammonia.

Results of Field Testing - Groundwater

This section presents the results of the groundwater investigation in the vicinity of the southeast sump. A discussion of the results is presented in two sections. The first section presents the results of the water quality measurements conducted in the field immediately following sample collection. The second section presents the results of laboratory testing of groundwater samples.

Field Test Results: pH, Specific Conductance, and Ammonia. Water quality measurements were conducted immediately upon sample collection in the field to provide accurate measurements of pH, specific conductance, and ammonia. Several of these parameters, namely pH and specific conductance, are subject to change following sample collection and must be analyzed immediately to provide the most accurate data. Specific conductance and ammonia were measured in the field to provide information necessary to select additional sample locations and adequately define the horizontal extent of groundwater which contains ammonia in the vicinity of the southeast sump.

Table 1 presents the field test results for pH, specific conductance, and ammonia. Review of Table 1 reveals the following information:

(a) The groundwater pH ranged from 7.22 to 11.59. The highest concentrations were measured in groundwater from borings B-13 and B-7.

(b) The conductivity of the groundwater ranged from 583 to 3190 micro mho per square centimeter (umho/cm^2). The highest conductivity value was measured for the sample collected from boring B-6.

(c) The ammonia concentration ranged from 1.01 to 500 milligrams per liter (mg/l). The lowest ammonia concentration was detected in water collected from boring B-11, while the highest concentration was detected in boring B-5.

Laboratory Test Results for Groundwater

Ten water samples collected from locations beneath the basement of the manufacturing building and the unexcavated area in the vicinity of the southeast sump were submitted for laboratory testing. Table 2 provides a summary of the laboratory testing data.

Total and Dissolved Arsenic. Review of Table 2 reveals that the total arsenic concentration in the groundwater samples collected during this investigation ranged from 0.008 to 0.247 mg/l. The dissolved arsenic concentrations range from 0.006 to 0.172 mg/l. The dissolved arsenic concentrations are less than the total arsenic values, which may indicate the presence of arsenic associated with suspended solids or colloidal solids in groundwater in the investigation area.

Figure 2 provides a summary of the laboratory test results for total and dissolved arsenic. Review of Figure 2 reveals that the highest concentration of total arsenic in the groundwater was 0.247 mg/l for the groundwater sample obtained from boring B-5. The highest concentration of dissolved arsenic was 0.172 mg/l at boring B-7.

Figures 3 and 4 present iso-concentration maps for total and dissolved arsenic, respectively. Review of Figures 3 and 4 reveal that groundwater having the highest arsenic concentrations are found in the vicinity of B-5 and B-7. The general shape of the arsenic contours in Figures 3 and 4 suggest that groundwater in the vicinity of the southeast sump is migrating to the west.

Ammonia Nitrogen. Review of Tables 1 and 2 reveals that ammonia was detected in water samples collected from all borings, monitoring wells, and temporary wells tested during this investigation. The ammonia concentrations measured in the field ranged from 1.01 to 500 mg/l, with the highest ammonia concentration measured in water from boring B-5. Borings B-12 and B-5 contained the highest ammonia concentrations as reported by the testing laboratory; measuring 116 and 115 mg/l, respectively.

Laboratory results for ammonia were generally lower when compared with field test results. The difference between the field and laboratory test results may be attributed to the volatilization of ammonia during the two weeks between sample collection and laboratory

testing. At high pH levels, ammonia is present in the form of the ammonium ion and is relatively unstable and volatile. Due to the inordinately high pH of groundwater at the site, the quantity of acid in the sampling containers provided by the laboratory may have been insufficient to properly preserve samples. The same test method (ISE) was used both in the field and by the testing laboratory for the determination of ammonia.

Figures 5 and 6 present the ammonia concentrations in groundwater as reported by field testing and laboratory testing, respectively. A review of Figures 5 and 6 reveals that the highest ammonia concentrations were measured in water from borings B-5, B-7, B-12, and MW-6.

Figures 7 and 8 present ammonia iso-concentration maps for field test results and laboratory test results, respectively. Figures 7 and 8 reveal that the highest ammonia concentrations appear to be centered in the vicinity of B-5 and B-7. Note, that while the reported ammonia concentration for field and laboratory testing differ, the shape of the ammonia contours as shown on Figures 7 and 8 are nearly identical. The general shape of the ammonia contours suggest that groundwater in the vicinity of the southeast sump appears to be migrating to the west.

SUMMARY AND CONCLUSIONS

The area containing elevated arsenic and ammonia in groundwater beneath the basement of the manufacturing building was defined during this investigation. Based on the field test data, borings B-5, B-6, B-7, B-12, and MW-6 contained the highest ammonia concentrations in groundwater measured during this investigation. The sample locations having water which contained the highest arsenic concentrations include B-5, B-6, B-12, and MW-6.

In general, the ammonia and arsenic concentrations found during this investigation are higher than concentrations exhibited during previous sampling events. This may be due to movement of the heart of the plume toward sample locations, pumping of water from borings B-5 and B-7, or the collection of more representative water samples from beneath the manufacturing building. Several observations and conclusions were reached based on The Dragun Corporations review of this data.

First, the highest ammonia concentrations were found in groundwater collected from B-5, B-7, B-12, and MW-6.

Second, the highest total arsenic concentrations were found in groundwater collected from B-5 and B-7.

Third, the presence of arsenic seems to be associated with the presence of ammonia in groundwater.

Fourth, the boundary of groundwater that contains elevated levels of ammonia and arsenic have been defined.

Fifth, the groundwater flow direction in the vicinity of the southeast sump appears to be toward the west.

Sixth, the groundwater pH exceeds 10 in the vicinity of the southeast sump.

Seventh, groundwater containing ammonia and arsenic appears to have migrated beneath the basement floor and around the unexcavated areas.

Eight, the groundwater data suggests that the source of ammonia is from the area between B-5 and the southeast sump.

Nine, operation of the pumps located at B-5 and B-7 may be influencing the local groundwater flow in the area and may be promoting the migration of ammonia impacted groundwater to these locations.

Because ammonia is highly soluble in water and the sand used as backfill material beneath the manufacturing building is relatively permeable, an effective remedial measure for capturing the water containing elevated levels of ammonia and arsenic is feasible. The Michigan Department of Natural Resources has not promulgated a cleanup standard for ammonia in groundwater. The need to develop this criteria, coupled with a need to determine the practical groundwater withdrawal rate, precludes us from estimating the time period under which the groundwater can be remediated.

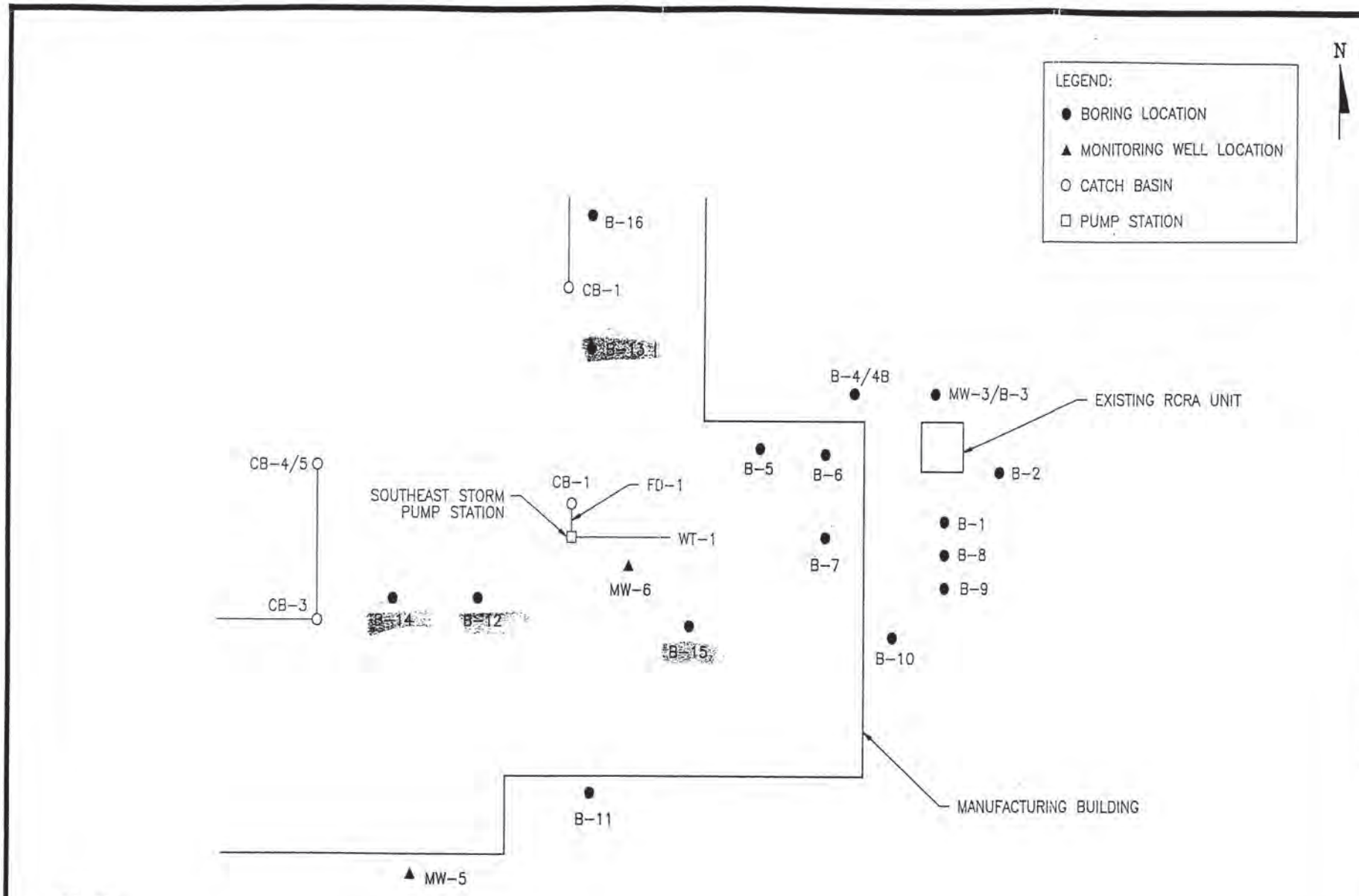


FIGURE 1
BORING LOCATION MAP
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-01 06/23/94 T.S.

The Dragun Corporation

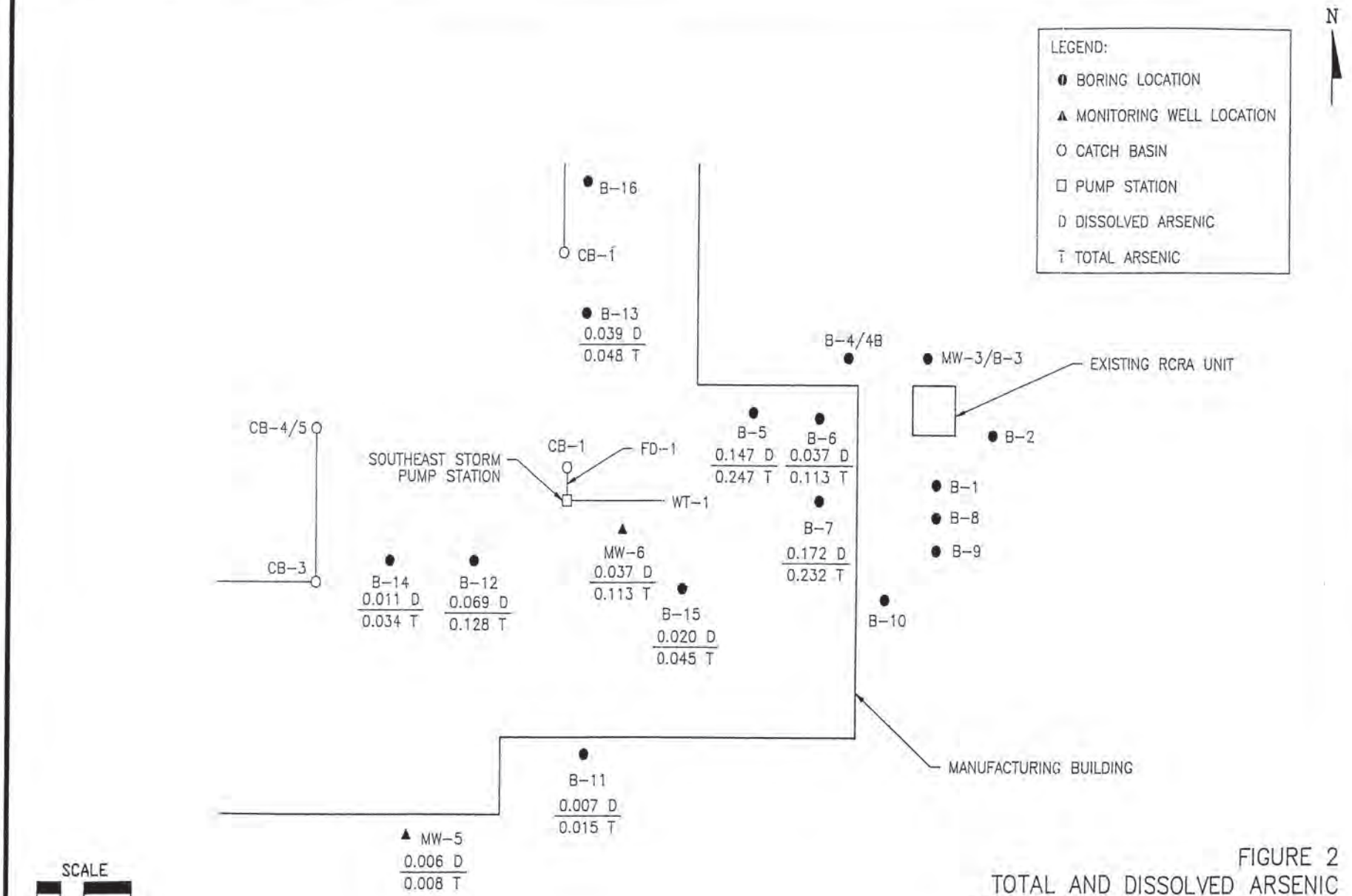


FIGURE 2
TOTAL AND DISSOLVED ARSENIC
CONCENTRATION IN GROUNDWATER
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-02 06/23/94 T.S.

The Dragun Corporation

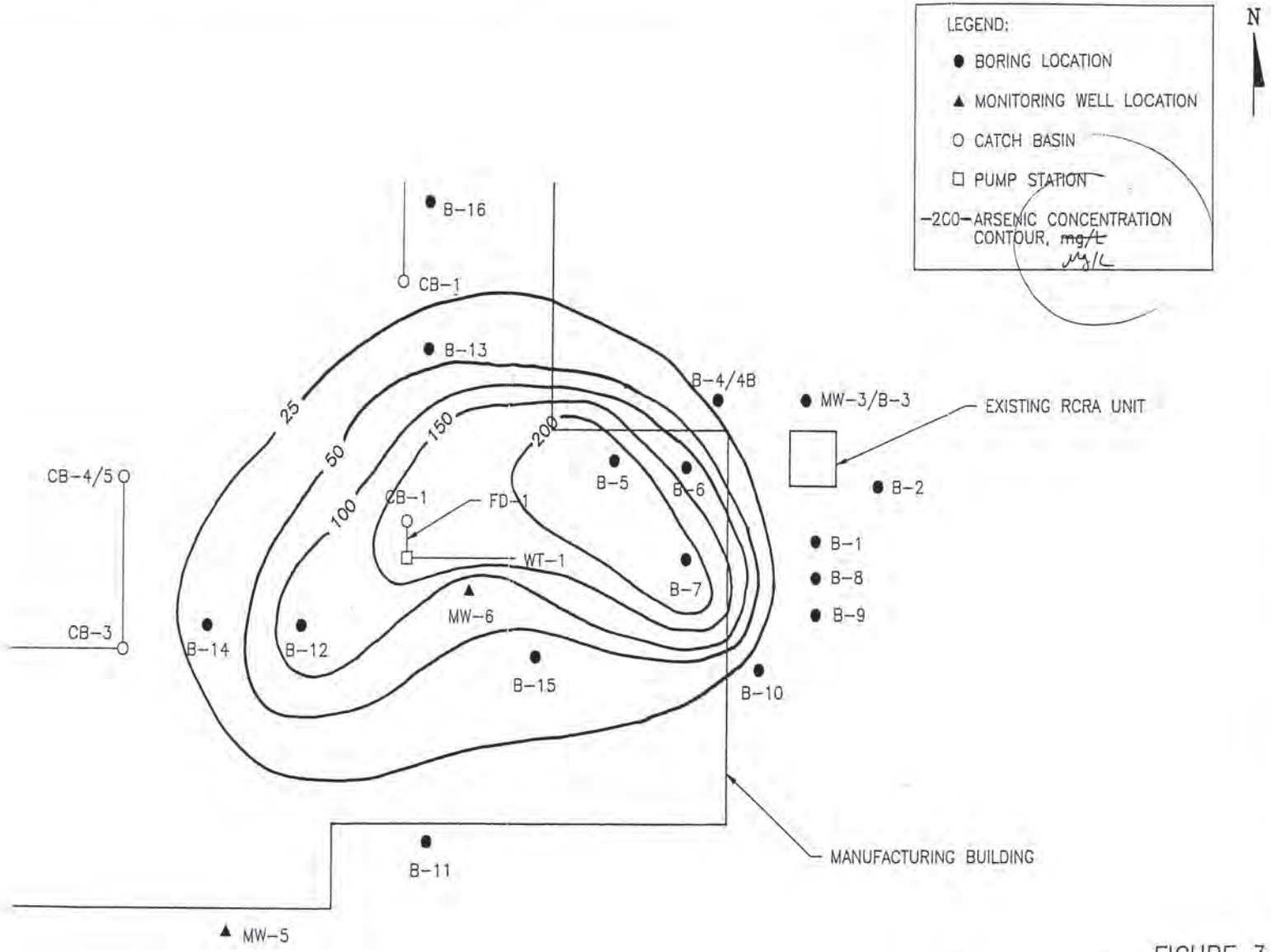


FIGURE 3
ARSENIC ISO-CONCENTRATION MAP
GROUNDWATER DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-03 06/23/94 T.S.

The Dragun Corporation

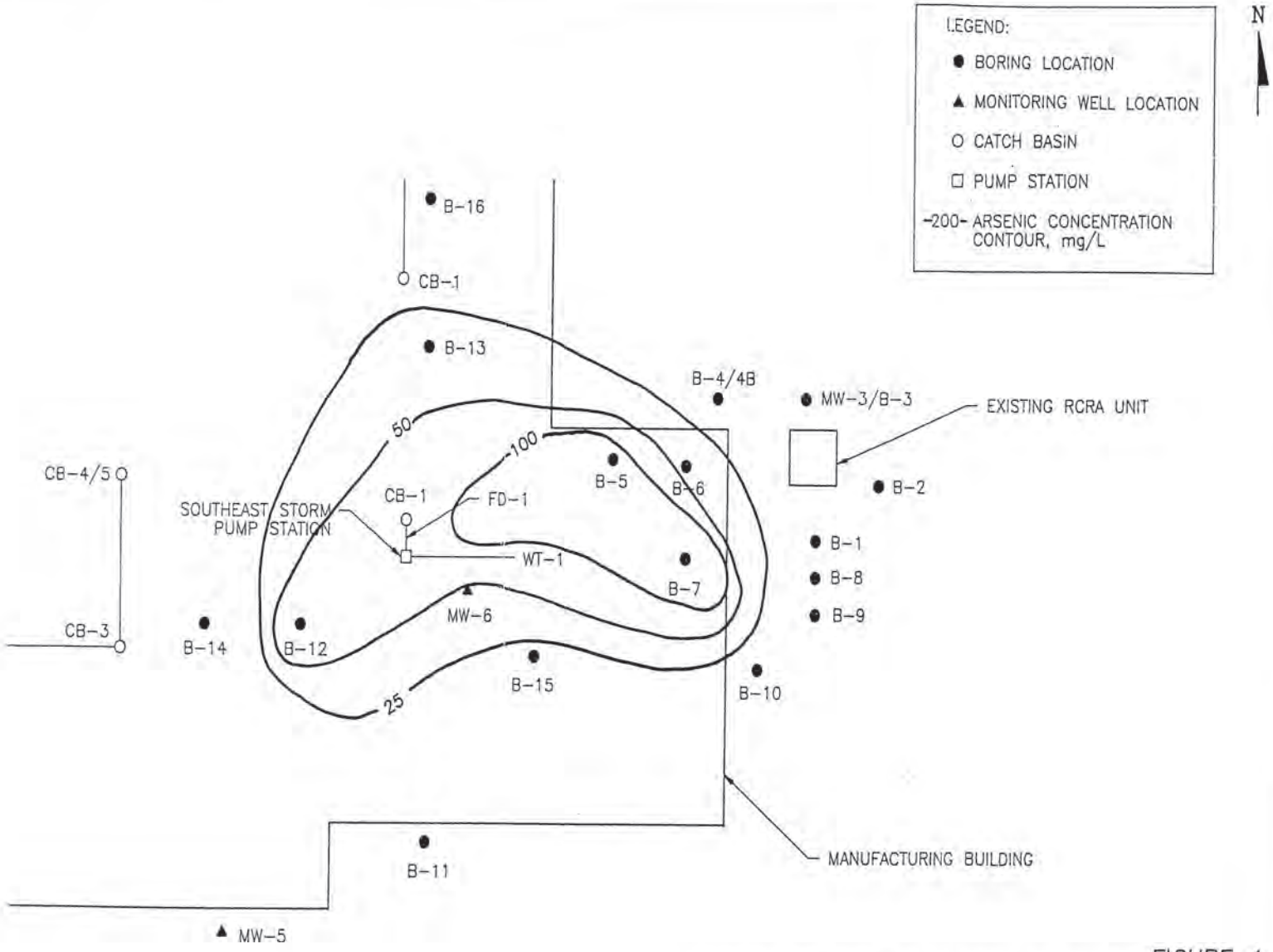


FIGURE 4
DISSOLVED ARSENIC ISO-CONCENTRATION MAP
GROUNDWATER TESTING DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-04 06/23/94 T.S.

The Dragun Corporation

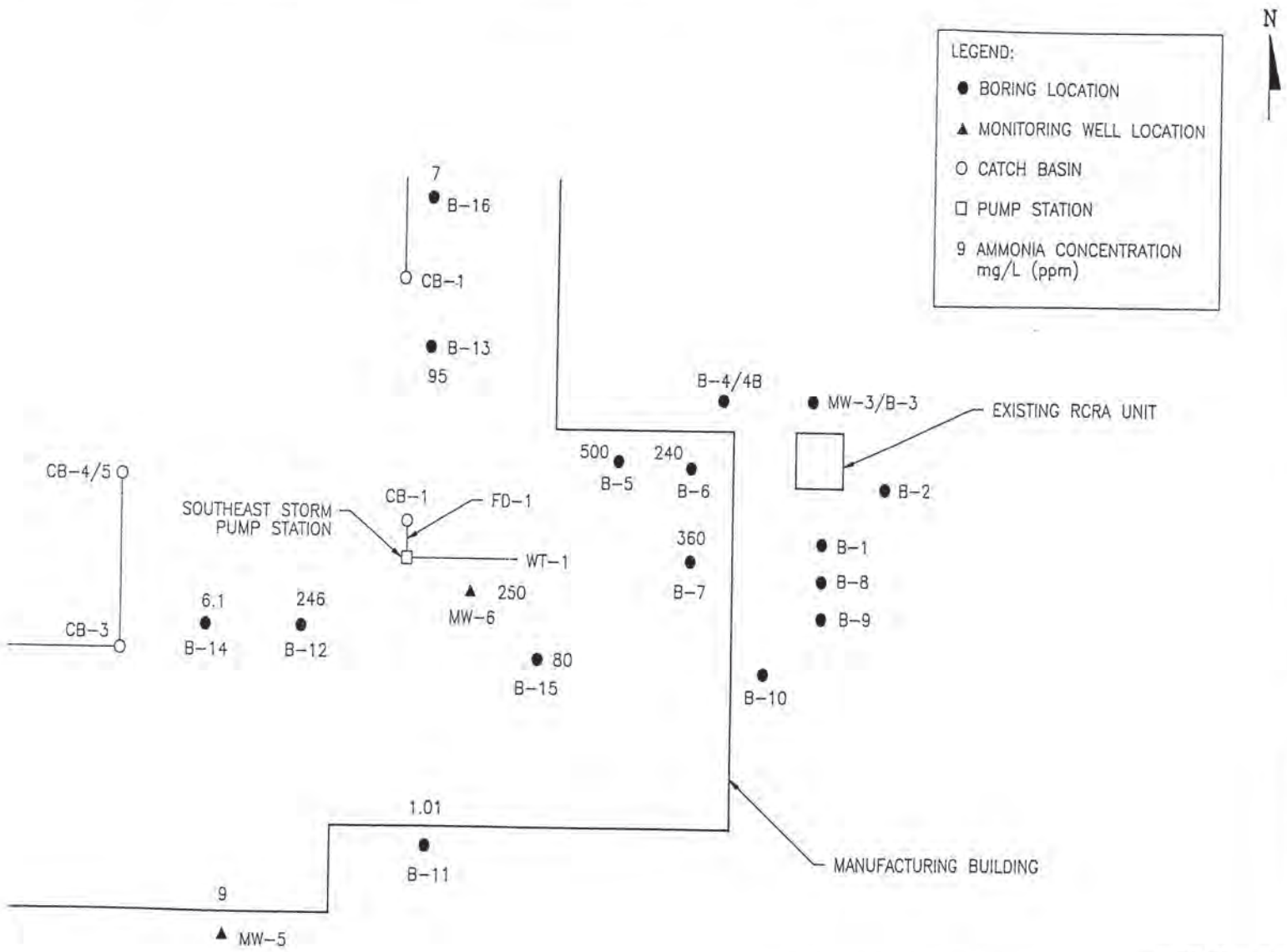


FIGURE 5
AMMONIA CONCENTRATION IN GROUNDWATER
FIELD TESTING DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-05 06/23/94 T.S.

The Dragun Corporation

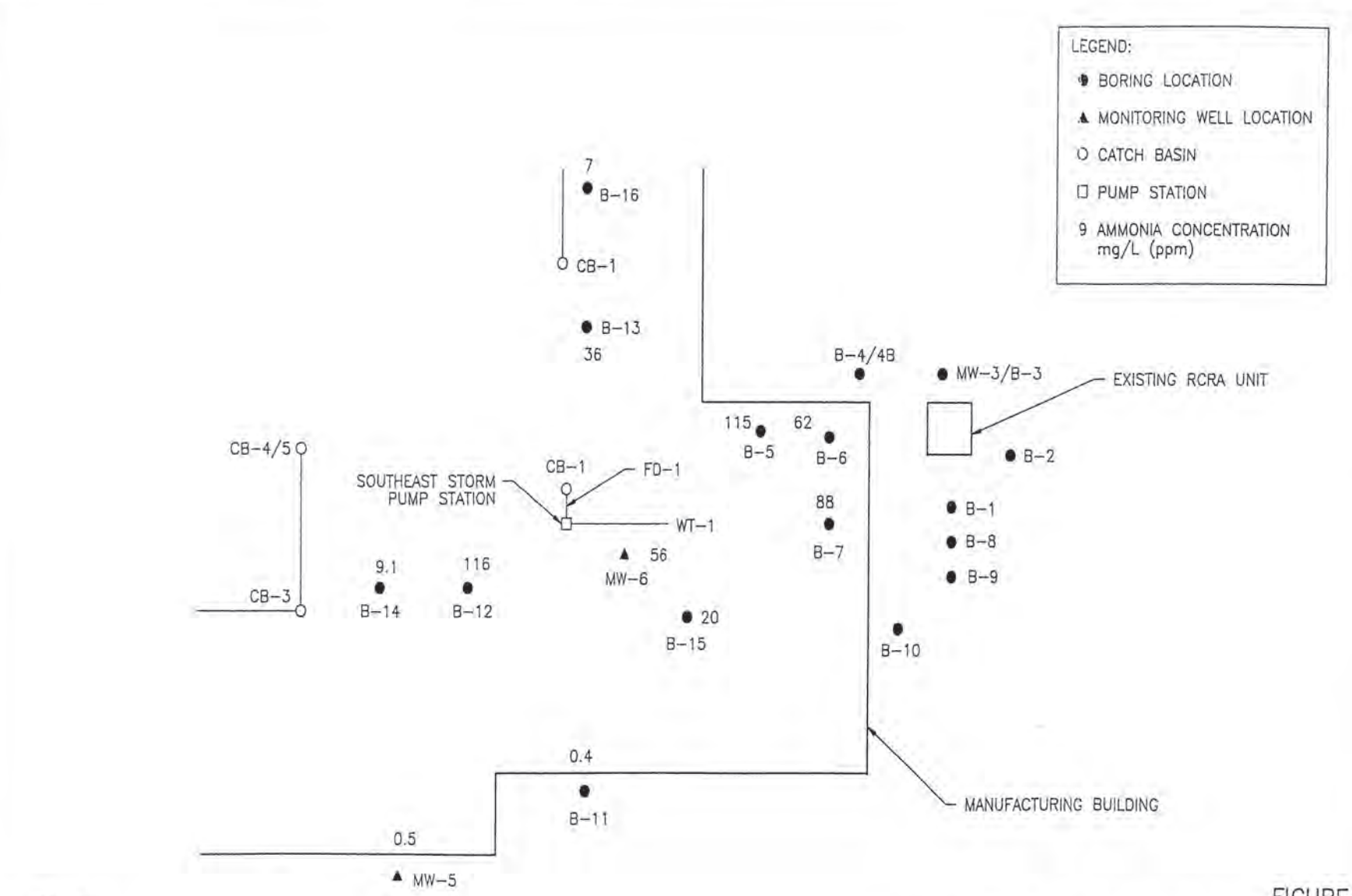


FIGURE 6
AMMONIA CONCENTRATION IN GROUNDWATER
LABORATORY TESTING DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-06 06/23/94 T.S.

The Dragun Corporation

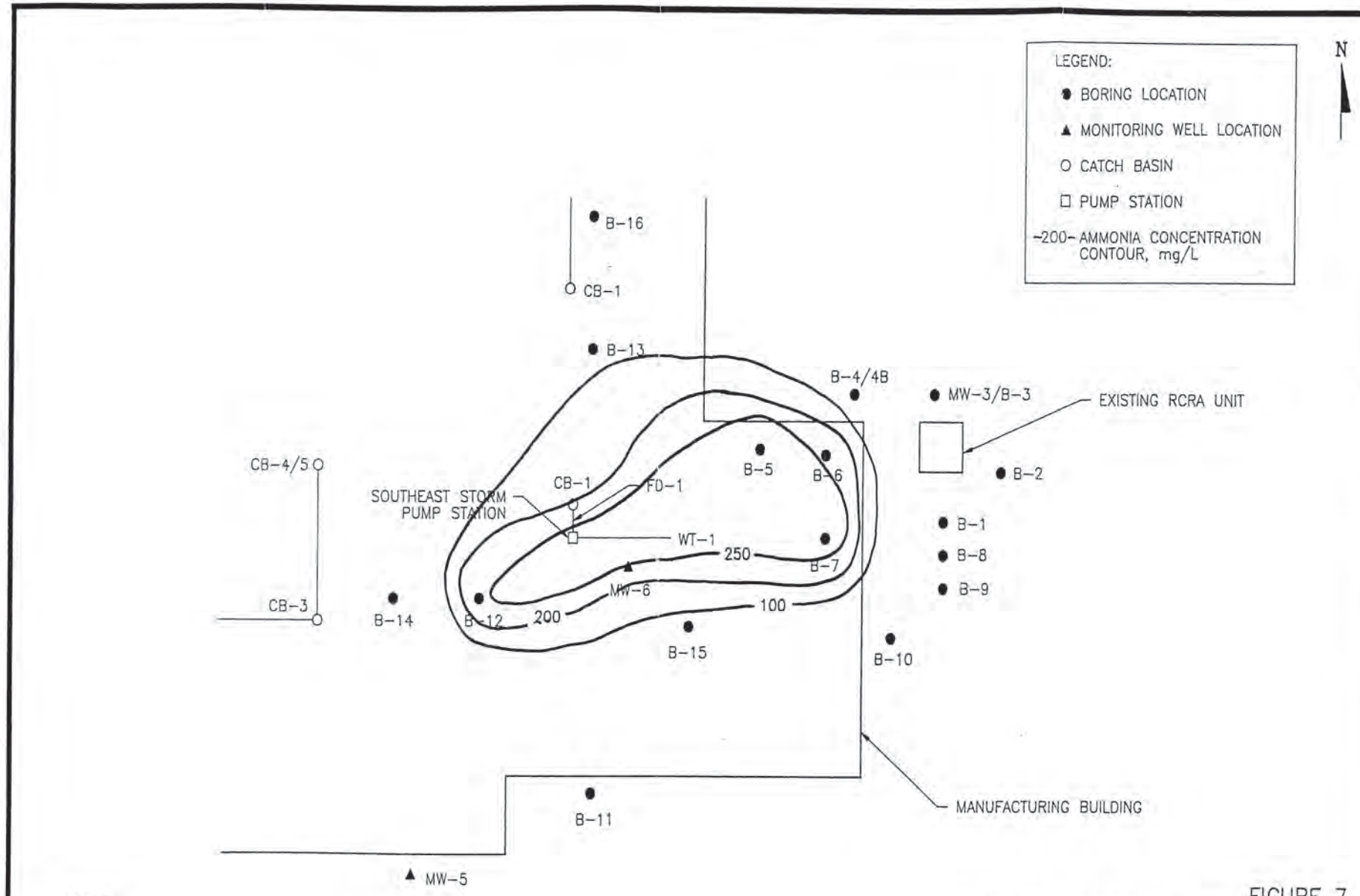


FIGURE 7
AMMONIA ISO-CONCENTRATION MAP
FIELD GROUNDWATER DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-07 06/23/94 T.S.

The Dragun Corporation

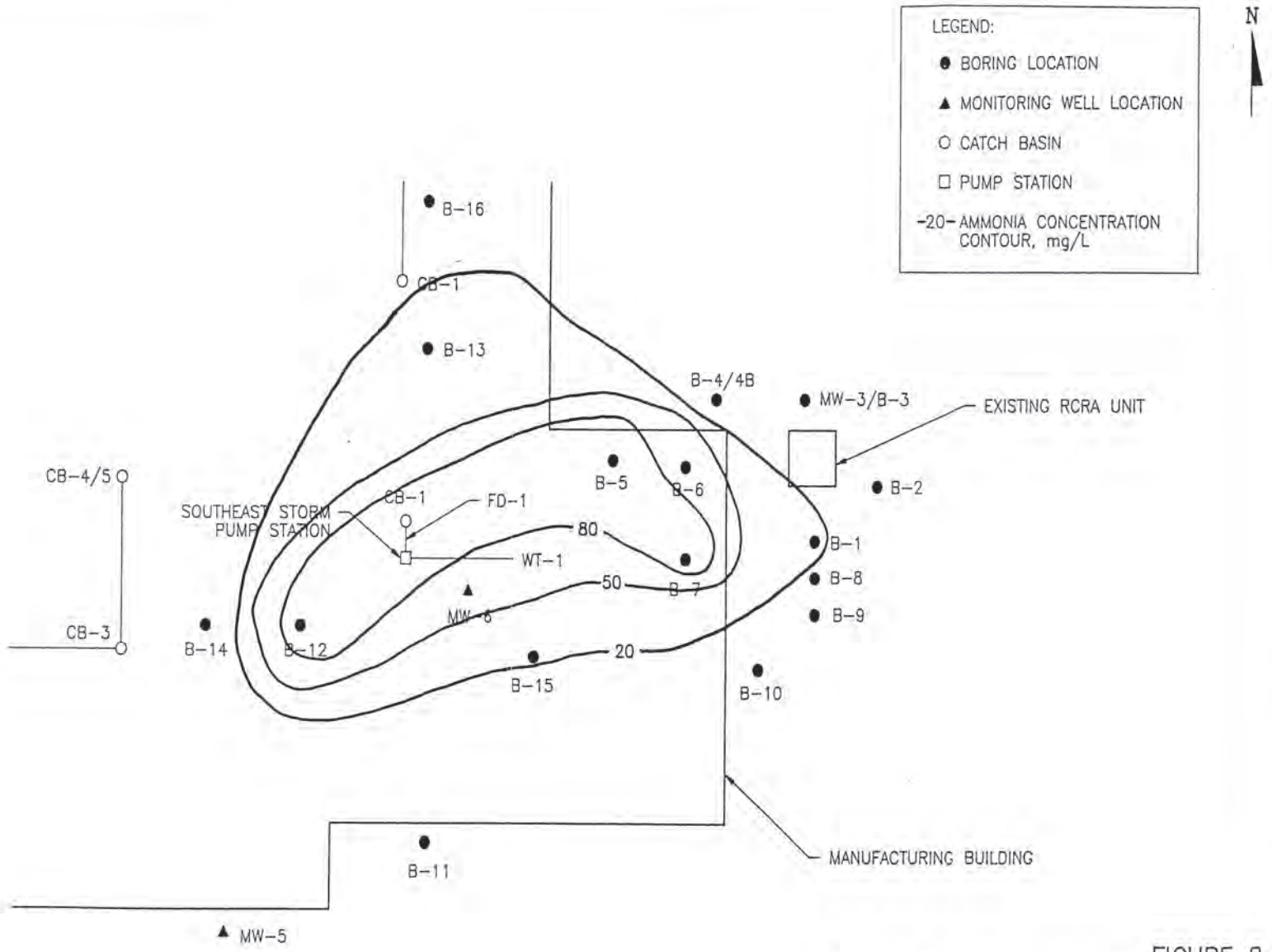


FIGURE 8
AMMONIA ISO-CONCENTRATION MAP
LABORATORY GROUNDWATER DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-08 06/23/94 T.S.

The Dragun Corporation

TABLES

Table 1. Measurement of Field Parameters for Groundwater Samples
Southeast Sump Area
General Motors Nodular Iron Plant
Saginaw, Michigan

Parameter	MW-5 (5-12-94)	MW-6 (5-12-94)	B-5 (5-12-94)	B-6 (5-12-94)	B-7 (5-12-94)	B-11 (5-13-94)	B-12 (5-13-94)	B-13 (5-13-94)	B-14 (5-13-94)	B-15 (5-12-94)	B-16* (5-19-94)
pH	7.22	8.23	10.40	11.38	11.48	8.59	9.67	11.59	10.99	11.29	-
Conductivity , umhos/cm	583	1860	1085	3190	853	774	1191	1660	873	617	-
Ammonia (mg/L)	9	250	500	240	360	1.01	246	95	6.1	80	7

NOTE: *= Sample collected and tested by General Motors Corporation Staff

Attachment B
Wetland Delineation (Niswander)

NISWANDER ENVIRONMENTAL
Finding solutions in a complex world

9436 Maltby Road
Brighton, MI 48116
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July 22, 2015

Mr. Patrick Schaffer
Menard, Inc. – Properties Division
5101 Menard Drive
Eau Claire, WI 54703

Subject: *Wetland Delineation*
38.86-Acre Racer Trust Property
Buena Vista Township, Saginaw County, MI
NE 1424

Dear Mr. Schaffer:

Niswander Environmental was contracted in July 2015 to complete a wetland delineation on 38.86-acre property (Property) located at 2100 Veterans Memorial Parkway in Section 8 of Buena Vista Township, Saginaw County, Michigan (T12N, R5E). The Property is a former industrial complex that was decommissioned and demolished over 10 years ago. Currently, this disturbed site is a vacant brownfield that is dominated by wetland, old field, meadow, and/or young successional forested habitat. Russian olive and cottonwood dominate much of the land, particularly in the north. The central portions of the site are primarily scrub-shrub wetland. Areas in the south consist of open meadow and old field. Please refer to Photos 1 and 2 in the attached Photographic Log for a representation of the upland portions of the Property.

Niswander Environmental assessed the Property for existing wetlands, watercourses, and floodplains, and delineated the wetland features. During the on-site investigation, **Niswander Environmental identified five (5) wetlands within the Property (Figure 1 – Wetland Location Map)**. The following is a report detailing the results of Niswander Environmental's investigation.

SUPPORTING DOCUMENTATION

Wetlands and Watercourses

Prior to the site investigation, Niswander Environmental completed a thorough review of available State and County GIS data, online resources, wetland maps, historic aerial photos, topographic maps, soil maps, and other materials. Infrared and color aerial photographs (Michigan Geospatial Digital Library – MiGDL, 1998, 2005, and 2012) and 2014 color aerial photographs (GoogleEarth) were obtained and evaluated for any remarkable features. A review of National Wetland Inventory (NWI), Michigan Department of Environmental Quality (MDEQ) Final Wetland Inventory Map, and Saginaw County GIS data was conducted to determine the likely presence, location, size and type of wetlands that may be located on the Property. The United States Fish and Wildlife Service (USFWS) produce the NWI data

through aerial photograph interpretation. The MDEQ Final Wetland Inventory Map was created from the NWI, USDA Soils Map, and Land Cover, as mapped by the Michigan Resource Inventory System (MIRIS).

Review of the available wetland maps, including the NWI and MDEQ Final Wetland Inventory Map for Saginaw County, did not identify wetlands or hydric soil on the Property, likely because this Property contained an industrial facility until recently. These maps, however, may not always accurately show the extent or existence of wetland systems in a specific area or correctly identify the wetlands present since they were primarily generated through aerial interpretation. Wetland inventory maps are utilized for preliminary analysis only. Field investigations are always necessary to determine the actual existence and type of wetlands in a given area.

METHODS

Wetlands and Watercourses

Potential wetland areas within the Property were evaluated in the field using the procedures outlined in the US Army Corps of Engineers *1987 Wetland Delineation Manual* (*"87 Manual"*), and the Northeast/NorthCentral Supplement to the *"87 Manual"* as required by the State of Michigan, Department of Environmental Quality, under Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, PA451 of 1994, as amended (NREPA). According to these procedures, wetlands are identified by the presence of hydric soils, signs of hydrology indicators, and dominant hydrophytic vegetation.

Hydric soil indicators were assessed in the field through soil pits that were dug in and around potential wetland areas. A soil is considered hydric if it meets requirements as stated in the Natural Resources Conservation Service *Field Indicators of Hydric Soils in the United* States (Version 7.0, 2010), which specifies parameters such as soil matrix color, amount and contrast of redox concentrations or depletions, and depth and thickness for a specific soil type such as loamy, clayey, or sandy soils. Soils were not reviewed in areas with standing or flowing water since these areas are assumed to be hydric.

Signs of hydrology within potential wetland areas were also investigated. Standing water or saturated soils, water marks on trees, drift lines, sediment deposits, and water-stained leaves (among others) are considered primary indicators of hydrology, while secondary signs include drainage patterns, moss trim lines, crayfish burrows, and surface soil cracks. Either one primary or two secondary indicators are necessary in determining the presence of wetland hydrology.

Dominant vegetation for wetland areas are typically determined by estimating the most common species of tree, shrub, and forb layers. The top dominants are visually estimated for each layer or strata, and the indicator status of each dominant species is then determined. An indicator status of obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU) and/or upland (UPL) is typically assigned to each plant species on the U.S. Army Corps of Engineers *National Wetland Plant List (http://rsgisias.crrel.usace.army.mil/NWPL/)*. An area has hydrophytic (wetland) vegetation when, under normal circumstances, more than 50 percent of the composition of the dominant species from all strata are OBL, FACW, and/or FAC species. An area has non-hydrophytic vegetation when 50 percent or more of the composition of the dominant species from all strata are FACU and/or UPL species. Areas

that meet the three criteria of hydric soils, wetland hydrology, and hydrophytic vegetation are considered wetlands. The perimeter of a wetland is typically determined by locating areas where one of these three criteria is no longer present (*i.e.*, where wetland vegetation transitions to upland vegetation or where signs of hydrology are no longer apparent, etc.).

The wetland boundary was flagged and GPS'd in the field, and then digitized into a GIS database (Figure 1 – Wetland Location Map). The actual wetland boundary should be surveyed and incorporated into any development plans to determine the exact size, shape, and location of the wetland.

Under NREPA, wetlands are regulated if they are greater than 5 acres in size or if they are connected to or within 500 feet of an inland lake, pond, river, drain, or stream (*i.e.*, watercourse). A pond is defined in Part 303 Administrative Rules (R 281.921) as a natural or artificial pond that has permanent open water with a surface area that is more than 1 acre, but less than 5 acres. Other watercourses are regulated by the State under Part 301 (Inland Lakes and Streams) if they exhibit defined banks, a bed, and visible evidence of a continued flow or continued occurrence of water. An inland lake or stream does not include the Great Lakes, Lake St. Clair, or a lake or pond that has a surface area of less than 5 acres. It should be noted that the MDEQ has the final authority on the regulatory status of wetlands and watercourses in the State of Michigan.

FINDINGS

On July 15 and 16, 2015 Niswander Environmental conducted a wetland delineation on the Property using the *87 Manual*. Five wetlands (Wetland A - E) were identified and flagged on the Property. The limits of the wetland were flagged in the field with pink flagging labeled A1 – A80, B1 – B145, C1 – C24, D1 – D14, and E1 – E 65. The wetland delineation, once surveyed by a registered surveyor, will provide the exact shape, size, and location of the on-site wetland.

WETLANDS A, B, AND D

Wetlands A, B, and D are similar in terms of habitat type, vegetative composition, soil structure, and hydrologic indicators. They are separated from each other through access roads and driveways, and there does not appear to be a hydrologic connection (Figure 1). Each of these wetlands are classified as emergent/scrub-shrub wetlands, meaning there are portions that are dominated by woody shrubs and small trees, but there are also openings comprised primarily of herbaceous plants. Despite their diversity, these wetlands are considered to be of moderate to moderately low quality because of recent disturbance (i.e., the wetlands have developed since the demolition of the pre-existing buildings and infrastructure on the site) and contain an abundance of invasive vegetation such as Phragmites (*Phragmites australis*), red top (*Agrostis gigantea*), narrow-leaved cattail (*Typha angustifolia*), and purple loosestrife (*Lythrum salicaria*). Other common-to-abundant plants within Wetlands A, B, and D include path rush (*Juncus tenuis*), Torrey's rush (*Juncus torreyi*), sandbar willow (*Salix exigua*), cottonwood (*Populus deltoides*), slender fragrant goldenrod (*Euthamia graminifolia*), and sedge (*Carex* spp.). Wetland A contains a disturbed meadow area in the southern portion of the Property, where wildflowers such as vervain (*Verbena hastata*), late goldenrod (*Solidago gigantea*), swamp milkweed (*Asclepias incarnata*), and swamp aster (*Symphyotrichum puniceum*) along with a variety of sedges and rushes. Please refer to Photos 3 – 7 in the attached Photographic Log.

Hydrologic indicators present at the time of inspection include standing water, saturated soils, aquatic fauna, algal mats, and a positive FAC-Neutral test. Soils within each wetland proved to be similar, consisting of a sandy mucky mineral that is hydric. The upland/wetland interface was determined through topographical differences and the presence/absence of upland species such as common buckthorn (*Rhamnus cathartica*), Virginia creeper (*Parthenocissus cinquefolia*), Russian olive (*Elaeagnus angustifolia*), thistle (*Cirsium arvense*), tall goldenrod (*Solidago altissima*), Queen Anne's lace (*Daucus carota*), spotted knapweed (*Centuarea stoebe*) and various upland grasses. Upland areas generally contained a few wetland species intermixed with an abundance of upland plants, and also lacked primary indicators of hydrology. Please refer to the attached Wetland Determination Data Form for more details pertaining to Wetlands A, B, and D.

Wetland B is likely regulated by the MDEQ due to the fact that it is greater than five acres in size. Wetlands A and D are likely not regulated since they are smaller than five acres and are hydrologically isolated.

WETLAND C

Wetland C is a small, depressional wetland located within a disturbed field along Veterans Memorial Parkway (Figure 1). This emergent wetland is dominated by scouring rush (*Equisetum hymale*), meadow sedge (*Carex granularis*), and taper-tip rush (*Juncus articulatis*). Other species present within this wetland include fowl bluegrass (*Poa palustris*), Torrey's rush, spikerush (*Eleocharis obtusa*), and swamp milkweed (Photo 8; Photographic Log).

Although the interior of the wetland contained standing water, a majority of the wetland was only saturated at the time of inspection. Hydric soils were confirmed when a mucky sand was revealed. Please refer to the attached Wetland Determination Data Form for more details pertaining to Wetland C.

Wetland C is likely not regulated by the MDEQ since it is less than five acres in size and is not hydrologically connected to a regulating body of water.

WETLAND D

Wetland E is a small (~1 ac) wetland located in the northwest portion of the Property, beginning just north of the access drive (Figure 1). Like the other on-site wetlands, this wetland is disturbed but is becoming more naturalized as the years pass. Most of the wetland is classified as scrub-shrub due to the abundance of sapling cottonwood, but other portions are more open and resemble a meadow (Photos 9 and 10; Photographic Log). While no single species truly dominates, the most abundant plants within this wetland include cottonwood, sandbar willow, purple loosestrife, scouring rush, vervain, late goldenrod, slender-fragrant goldenrod, and riverbank grape (*Vitis riparia*).

Wetland E contained a few pockets of standing water, but in general was saturated at or just below the surface. Please refer to the attached Wetland Determination Data Form for more details pertaining to Wetland E.

Wetland E is likely not regulated by the MDEQ since it is less than five acres in size and is hydrologically isolated.

CONCLUSIONS

Niswander Environmental identified fives wetlands (Wetlands A, B, C, D, and E) on the Property. The approximate size and shape of the wetland is represented in Figure 1 (Wetland Location Map). A survey of the wetland delineation should be conducted to accurately determine the wetland boundaries and any potential impacts resulting from future work within this area.

It is Niswander Environmental's professional opinion that Wetland B is regulated by the MDEQ due to the fact that it is greater than 5 acres in size. The remaining four wetlands are less than 5 acres in size, and are hydrologically isolated. However, since the MDEQ has the final regulatory authority, we recommend that a Pre-Application Meeting with the MDEQ be held prior to moving forward with any potential development. A MDEQ Part 303 Permit will be necessary if impacts to regulated wetland are proposed.

We look forward to working with you to make this project a success. If you have any questions or require additional information please call us at your convenience.

Sincerely,

Jeff W. Bridgland
Ecologist
Professional Wetland Scientist #1810

Steven F. Niswander
Principal
Professional Wetland Scientist #1276

Attachments: Figure 1 – Wetland Location Map
Photographic Log
Wetland Determination Data Forms

Photographic Log

Photo 1
The Racer Trust property is a 38.86-acre site that was a former industrial facility that was demolished roughly 10-15 years ago and left fallow.

Photo 2
This disturbed property is dominated by pioneer species such as cottonwood, willow, and Russian olive.

Photographic Log

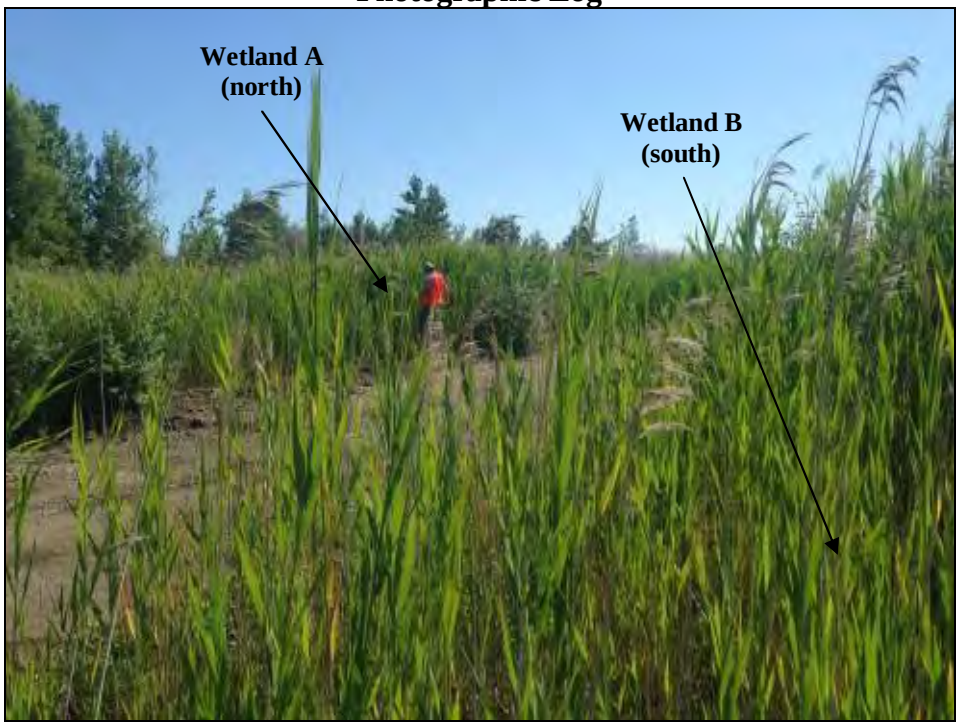

Photo 3
An access driveway splits Wetlands A and B, but there does not appear to be a hydrologic connection between the two. Along the road, these wetlands contain an abundance of invasive Phragmites.

Photo 4
Wetland A, located on the north side of the access drive, is dominated by Phragmites (although other species are present throughout).

Photographic Log

Photo 5
View facing south showing Wetland B, a large (~7+ acre) scrub-shrub wetland. This wetland is likely regulated by the MDEQ.

Photo 6
The southern portion of Wetland B is comprised primarily of meadow species as opposed to woody species that dominate further north.

Photographic Log

Photo 7
Wetland D, located in the northeast portion of the property, is primarily an emergent wetland dominated by Phragmites, cattail, sedge, and rush.

Photo 8
Wetland C is a small, isolated emergent wetland located along Veterans Memorial Highway.

Photographic Log

Photo 9
View facing north showing the scrub-shrub portion of Wetland E. This wetland contains both meadow and scrub-shrub characteristics, and is very diverse.

Photo 10
Pockets of open meadow are common throughout Wetland E. These areas contain an abundance of sedges, rushes and wildflowers such as vervain, goldenrod, milkweed, and aster.

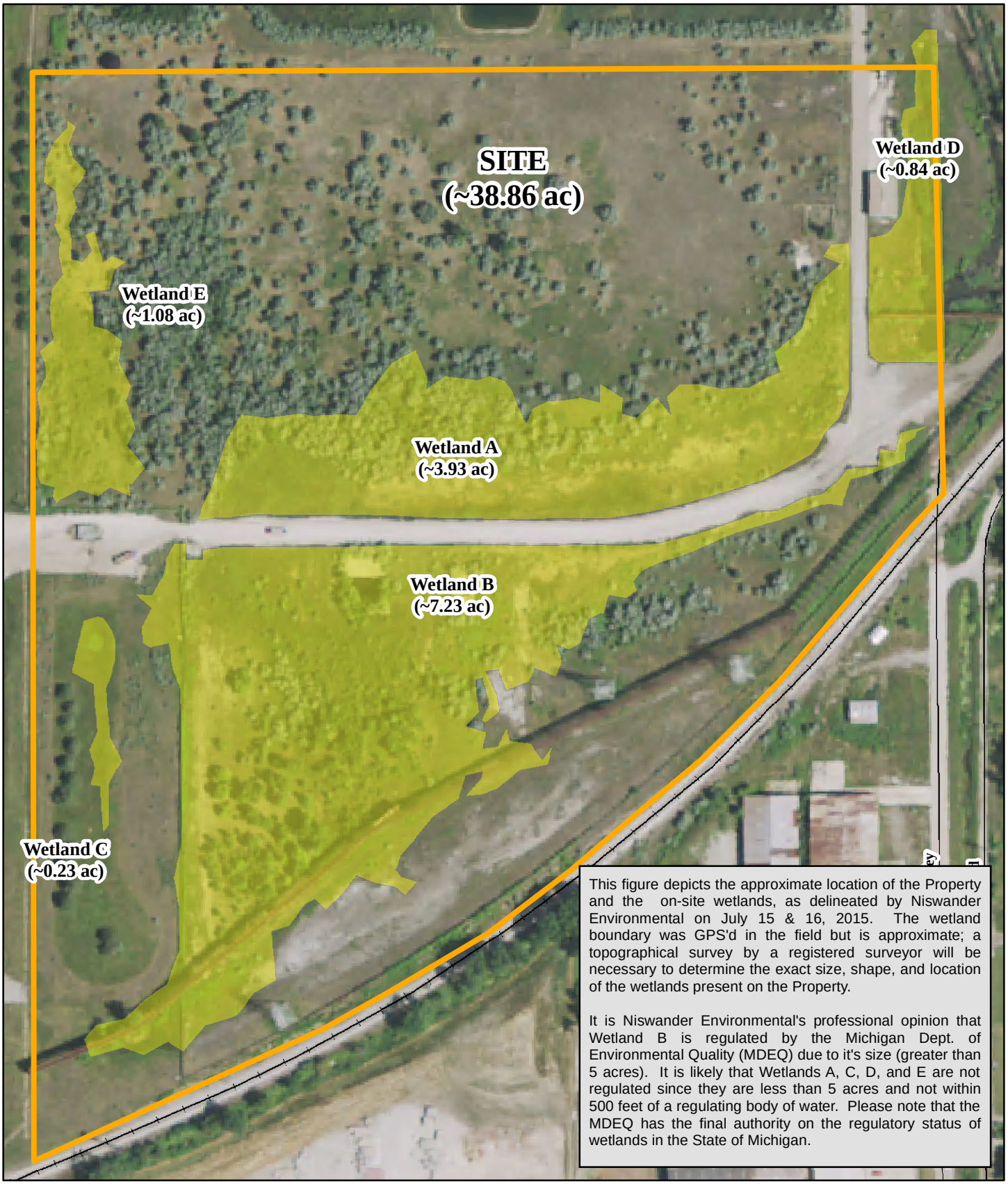

Figure 1. Wetland Location Map

NE 1424 Racer Trust Industrial Park
Client: Menard, Inc.
38.86-Acre Property at 2100 Veterans Memorial Parkway
Section 8 of Buena VistaTwp., Saginaw Co., MI (T12N, R5E)
Delineation Date: July 15 & 16, 2015
Map Created: July 16, 2015

Feet 0 100 200 400

N W E S

NISWANDER ENVIRONMENTAL
9436 Maltby Road. Brighton, MI 48116
810.225.0539 office | 810.225.0653 fax

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Menard's Saginaw City/County: Buena Vista Twp., Saginaw Co. Sampling Date: 7/15/2015

Applicant/Owner: Racer Trust State: MI Sampling Point: A, B, D

Investigator(s): J. Bridgland, T. Smith - Niswander Environmental Section, Township, Range: Sec. 8, T12N, R5E

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope %:

Subregion (LRR or MLRA): Lat: 43 27' 25.00"N Long: 83 54' 32.82"W Datum: GoogleEarth

Soil Map Unit Name: Urban Land (74) NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No x

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Wetland Data Form for Wetlands A, B, and D. Each of these three wetlands exhibit similar habitat types, vegetative composition, soils, and hydrology. Separated by an access driveway, but no apparent hydrologic connection (no culverts observed). Highly disturbed - former industrial facility that was demolished roughly 10-15 years ago, capped with soil, and left to naturally vegetate. Wetland A = ~3.93 acres (80 flags); Wetland B = ~7.23ac (145 flags); Wetland C = ~ 0.23 ac (24 flags); Wetland D = ~0.84 ac (14 flags); Wetland E = ~ 1.08 ac (65 flags). Wetland B is likely regulated due to size. It is Niswander Environmental's professional opinion that Wetlands A, C, D, and E are hydroligically isolated and smaller than five acres in size and therefore are likely not regulated by the MDEQ.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)	Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
X High Water Table (A2)	X Aquatic Fauna (B13)	Drainage Patterns (B10)
X Saturation (A3)	Marl Deposits (B15)	Moss Trim Lines (B16)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Crayfish Burrows (C8)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
X Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Stunted or Stressed Plants (D1)
Iron Deposits (B5)	Thin Muck Surface (C7)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	Shallow Aquitard (D3)
Sparsely Vegetated Concave Surface (B8)		Microtopographic Relief (D4)
		X FAC-Neutral Test (D5)

Secondary Indicators (minimum of two required)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 3
Water Table Present?	Yes X	No	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetlands A, B, and D exhibited standing water throughout much of the wetland at the time of the inspection. Much of the remainder of each wetland was saturated at the surface.

VEGETATION – Use scientific names of plants. Sampling Point: A, B, D

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Eastern Cottonwood	10	Yes	FAC
2. Russian-Olive	10	Yes	FACU
3. Black Willow	2	No	OBL
4.			
5.			
6.			
7.			
	22	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. Sandbar Willow	65	Yes	
2. Silky Dogwood	10	No	
3. European Buckthorn	10	No	
4. Russian-Olive	10	No	
5.			
6.			
7.			
	95	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Common Reed	80	Yes	FACW
2. Purple Loosestrife	50	Yes	OBL
3. Narrow-Leaf Cat-Tail	40	Yes	OBL
4. Torrey's Rush	40	Yes	FACW
5. Late Goldenrod	25	No	FACW
6. ***Juncus tenuis***	25	No	FAC
7. ***Agrostis gigantea***	20	No	FACW
8. Common Fox Sedge	10	No	OBL
9. Flat-Top Goldentop	10	No	FACW
10. Swamp Milkweed	5	No	OBL
11. water plantain	5	No	OBL
12. Bebb's Sedge	5	No	OBL
	315	=Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. ***Vitis riparia***	10	Yes	FAC
2.			
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	117	x 1 =	117
FACW species	175	x 2 =	350
FAC species	45	x 3 =	135
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	347 (A)		642 (B)

Prevalence Index = B/A = 1.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Other species present include vervain, swamp aster, chairmakers rush, soft rush, green bulrush, joe-pye weed, boneset, taper-tip rush, and Indian hemp. Northern portions of Wetland A dominated 99% by Phragmites. Southern portions of Wetland B contain disturbed meadow. Upland/Wetland interface determined by presence of upland species such as spotted knapweed, russian olive, tall goldenrod, Virginia creeper, orchard grass, Queen Anne's lace, and/or thistle.

SOIL

Sampling Point A, B, D

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	95	7.5YR 3/4	5	C	M	Mucky Sand	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ? Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Menard's Saginaw City/County: Buena Vista Twp., Saginaw Co. Sampling Date: 7/15/2015

Applicant/Owner: Racer Trust State: MI Sampling Point: C

Investigator(s): J. Bridgland, T. Smith - Niswander Environmental Section, Township, Range: Sec. 8, T12N, R5E

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope %:

Subregion (LRR or MLRA): Lat: 43 27' 25.00"N Long: 83 54' 32.82"W Datum: GoogleEarth

Soil Map Unit Name: Urban Land (74) NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No x

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Small, depressional PEM located within overgrown grassy field. Roughly 0.23 acres (24 flags). Likely not regulated due to lack of size and hydrologically isolated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 1
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Interior portions of Wetland C contained standing water, but a majority of the wetland was saturated at the surface at the time of inspection

VEGETATION – Use scientific names of plants. Sampling Point: C

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. ***Equisetum hyemale***	50	Yes	FAC
2. ***Carex granularis***	50	Yes	FACW
3. ***Juncus articulatus***	30	No	OBL
4. ***Poa palustris***	15	No	FACW
5. ***Juncus torreyi***	5	No	FACW
6. ***Eleocharis obtusa***	5	No	OBL
7. ***Asclepias incarnata***	1	No	OBL
8. Carex vulpinoidea	1	No	OBL
9. ***Scirpus cyperinus***	1	No	OBL
10. ***Agrostis gigantea***	1	No	FACW
11. ***Solidago gigantea***	1	No	FACW
12.			
	160 =Total Cover		
Woody Vine Stratum (Plot size: 15 ft.)			
1. ***Vitis riparia***	5	Yes	FAC
2.			
3.			
4.			
	5 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	38	x 1 =	38
FACW species	72	x 2 =	144
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		347 (B)

Prevalence Index = B/A = 2.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Dominated by scouring rush, C. granularis (or C. pellita), and taper-tip rush. Upland/Wetland interface determined by subtle slope, presence of upland grasses and thistle.

SOIL

Sampling Point C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	95	7.5YR 3/4	5	C	M	Mucky Sand	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ? Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Menard's Saginaw City/County: Buena Vista Twp., Saginaw Co. Sampling Date: 7/16/2015

Applicant/Owner: Racer Trust State: MI Sampling Point: E

Investigator(s): J. Bridgland - Niswander Environmental Section, Township, Range: Sec. 8, T12N, R5E

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope %:

Subregion (LRR or MLRA): Lat: 43 27' 25.00"N Long: 83 54' 32.82"W Datum: GoogleEarth

Soil Map Unit Name: Urban Land (74) NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No x

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
PSS wetland with open meadow portions; diverse; hummocky, portions marginally wetland (mesic); Approximately 1.08 ac (65 flags). Likely not regulated due to size and lack of hydrologic connectivity.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 4

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Very few pockets of standing water; portions saturated at surface, but mostly below the surface (@ roughly 4")

VEGETATION – Use scientific names of plants. Sampling Point: E

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Populus deltoides***	30	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. ***Populus deltoides***	50	Yes	FAC
2. ***Salix interior***	20	Yes	FACW
3. ***Russian olive***	10	No	FACU
4. ***Cornus amomum***	5	No	FACW
5.			
6.			
7.			
	85	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. ***Lythrum salicaria***	35	Yes	OBL
2. ***Equisetum hyemale***	25	Yes	FAC
3. ***Verbena hastata***	25	Yes	FACW
4. ***Solidago gigantea***	20	Yes	FACW
5. ***Euthamia graminifolia***	20	Yes	FACW
6. ***Agrostis gigantea***	15	No	FACW
7. ***Carex vulpinoidea***	15	No	OBL
8. ***Apocynum cannabinum***	15	No	FACW
9. ***Juncus torreyi***	10	No	FACW
10. ***Phragmites australis***	10	No	FACW
11. ***Juncus tenuis***	10	No	FAC
12. ***Juncus articulatus***	5	No	OBL
	205	=Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. ***Vitis riparia***	20	Yes	FAC
2.			
3.			
4.			
	20	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	140	x 2 =	280
FAC species	135	x 3 =	405
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	340 (A)		780 (B)

Prevalence Index = B/A = 2.29

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Wetland E is dominated by cottonwood, sandbar willow, purple loosestrife, and grapevine. Abundant and common species include vervain, late goldenrod, scouring rush, slender-fragrant goldenrod, fox seddge, red top, and Indian hemp. Upland/Wetland interface marked by presence of Virginia creeper, russian olive, tall goldenrod, thistle, and poison ivy.

SOIL

Sampling Point E

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/2	100					Loamy/Clayey	
1-3	2.5Y 4/3	90	7.5YR 3/4	10	C	M	Sandy	Distinct redox concentrations
3-4	10YR 4/1	100					Sandy	
4-12	10YR 2/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ? Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** ____

Remarks:

Disturbed ground appears to have been capped with sand. Very hardpack sand at 12" (almost concrete-like). Water filled holed within 30 min to 10", but apparent that it was saturated at about 4".

Attachment C
Photographic Log of Inspection

Photo 1 – View of Gauge Drain and electrical panel for pump station for Crow Island Landfill , west towards the Saginaw River 04-11-2019

Site Photographs

Photo 2 – View of Gauge Drain, south looking towards GM Landfill 04-11-2019

Photo 3 – GM Landfill monitoring well (MW-7) 04-11-2019

Photo 4 – Close up of slag area 04-11-2019

Photo 5 – Slag area 04-11-2019