



Mr. Jim Lucas
Storage Tank Unit
Michigan Department of Environmental Quality
525 West Allegan Street
PO Box 30241
Lansing, MI 48909-7741

Subject:

Leaking Underground Storage Tank Initial Assessment Report
GM Employee Development Center
65 E. University Drive, Pontiac, MI 48342
Facility ID No. 00015260; Confirmed Release No. C-0328-06

Dear Mr. Lucas:

Enclosed is the *Initial Assessment Report (IAR)* for the General Motors Corporation (GM) Employee Development Center located at 65 East University Drive in Pontiac, Michigan. This *IAR* was prepared in accordance with the Michigan Department of Environmental Quality (MDEQ) Part 213 regulations by ARCADIS of New York, Inc. (ARCADIS BBL, formerly Blasland, Bouck & Lee, Inc. [BBL]), on behalf of GM.

Given that co-mingled contamination has been found to exist at the Site (i.e., gasoline constituents, motor oil, chlorinated solvents), GM has decided to pursue additional investigation, remediation as necessary, and closure of the release under the Part 201 program.

Sincerely,

ARCADIS of New York, Inc.

Amy L. Hoeksema, Indiana P.G. #1503
Certified Underground Storage Tank Professional

cc: Fred Rindhage, General Motors Corporation

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B0064486.003

Sep 10, 2009 15:56



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – REMEDIATION & REDEVELOPMENT DIVISION
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LEAKING UNDERGROUND STORAGE TANK INITIAL ASSESSMENT REPORT

INSTRUCTIONS: COMPLETION OF THIS REPORT WITH ALL APPLICABLE INFORMATION IS MANDATORY. Complete this form with all applicable information. The Certified Underground Storage Tank Professional (CP) and MUST sign below. Failure to submit a report within the stated time period may result in Administrative Penalties as provided for in Part 213, Section 21313a of 1994 PA 451, as amended. PLEASE RETURN THIS COMPLETED REPORT AND ASSOCIATED ATTACHMENTS TO THE APPROPRIATE RRD DISTRICT OFFICE. See form eqp4410 for a complete list of RRD district offices.

FACILITY NAME: General Motors Corporation Employee Development Center		FACILITY ID NUMBER: 00015260
STREET ADDRESS: 65 East University Drive		
CITY: Pontiac	ZIP: 48342	COUNTY: Oakland
DATE(S) RELEASE(S) DISCOVERED: 11/6/06		CONFIRMED RELEASE NUMBER(S): C-0328-06
O/O NAME: General Motors Corporation		
O/O STREET ADDRESS: 2000 Centerpoint Parkway M/C 483-520-190		STATE: MI ZIP: 48341
CONTACT PERSON: Fred Rindhage		PHONE NUMBER: 248-753-5790

ANSWER ALL QUESTIONS (DO NOT LEAVE BLANKS):

- a. Has the UST(s) been emptied? ☒ YES ☐ NO (If no, explain why):

b. Has the UST system(s) been properly closed? ☒ YES ☐ NO (If no, explain why):
- Free product present: a. Currently? ☒ YES ☐ NO If YES, total gallons recovered since last report: 0

b. Previously? ☐ YES ☒ NO If YES, total gallons recovered to date:
- Have vapors been identified in any confined spaces (basement, sewers, etc.)? ☐ YES ☒ NO
- Is or was a drinking water supply affected as a result of a release from this facility? ☐ YES ☒ NO

If YES, indicate type and number: ☐ Single family ☐ Municipal (Type I) ☐ Other (Type II or III) ☐ Municipal (SW)
- Estimated distance and direction from point of release to nearest:

a. Private well: ~2.0 miles SW b. Municipal well: Type II Public ~4.95 Miles ENE c. Surface water/wetland: Clinton River ~200 feet SE
- Has groundwater been impacted at or above Target Method Detection Limits (for metals, impact above Tier 1 unrestricted residential drinking water RBSLs)? ☒ YES ☐ NO
- Totals to date: a. cubic yards of soil remediated: ~400 yds³ b. gallons of groundwater remediated: 0
- Michigan RBCA Site Classification (1-4): 1
- | | | |
|---------|--|---|
| 9. MTBE | Has MTBE been detected in any groundwater sample?
☒ YES ☐ NO | Maximum concentration of MTBE found in groundwater. <u>87</u> ppb |
|---------|--|---|

CERTIFICATION OF REPORT COMPLETION

I, the undersigned CP, hereby attest to the best of my knowledge and belief that the statements in this document and all attachments are true, accurate, and complete. I certify that the report was submitted to the Remediation & Redevelopment Division (RRD)

on 2/5/2007 (Date submitted **REQUIRED**)

CP Original Signature - (**REQUIRED**) _____ Date _____

Amy L. Hoeksema, Indiana P.G. #1503

PRINT CP's Name

CP ID 0346

ADDRESS 10559 Citation Drive Suite 100 Brighton, MI 48116

PRINT QC PROJECT MANAGER'S NAME _____

ARCADIS of New York, Inc.

NAME OF CONSULTING FIRM

QC ID: Z00306

PHONE: (810) 229-8594 FAX: (810) 229-8837

Sep 10, 2009 15:56

Instructions - Utilize the following checklist to ensure that all required information is provided in the Initial Assessment Report (IAR). Include this checklist as the table of contents. The order in which the information is provided is at your discretion. Each page of the report (including the cover sheet, table of contents, appendices, figures, etc.) should be consecutively numbered. The location column should be completed with the appropriate page number for each item. You may reference previously submitted materials by specifying the location within that document. Maps, tables, figures, etc. should be combined as appropriate.

All information required by Part 213 to be included in the IAR **must** be provided, and all sections of the report must be completed. If any items are not applicable to the site, provide a justification regarding the absence of this information in the appropriate section of the report.

Section	Table of Contents	Page
1.0	<u>INITIAL RESPONSE TO RELEASES</u>	
A.	Provide the date and time the release(s) was/were discovered and reported.	4
B.	Indicate what portion of the underground storage tank (UST) system is, or is believed to be, the source of the release.	4
C.	Describe how the release was discovered.	4
D.	Describe any tank tightness testing performed in response to this release and provide the following: 1. Date of the testing 2. Method of testing 3. Results of the testing	NA
E.	List all former and existing USTs at this facility including the following information for each of these tanks: 1. Tank ID Number (as registered) 2. Contents (past/present, if gasoline specify grade and whether leaded or unleaded) 3. Size of the UST 4. Whether the tank was identified as a leaking underground storage tank (LUST) 5. Whether the tank has been emptied and/or removed. If a LUST, provide an explanation if not emptied or removed.	1-3
F.	Describe the initial response actions which were performed at this site, as specified in Sections 21307(2)(a) through (c), and (3)(a) and (b).	4 & 5
2.0	<u>REPORTING AND RESPONSE FOLLOWING THE DISCOVERY OF FREE PRODUCT</u>	
	If free product has not been discovered, proceed to Section 3.0.	
A.	Describe initial response actions performed at this site to address the presence of free product as specified in Sections 21307(2)(c) and (f), and (3)(b) and (c), 21308a(1)(b)(xviii). Refer to the Storage Tank Division Operational Memorandum No. 7, <i>Identification, Reporting, and Recovery of Free Product at LUST Sites</i> .	6
B.	Attach the RRD Free Product Recovery Status Report (EQP 3850).	NA
C.	Include a schedule for subsequent Free Product Report submittals.	NA

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3.0 SITE CHARACTERIZATION INFORMATION

3.1 SCALED SITE MAPS

A. Provide a scaled area map (or maps) which includes the following:	
1. Site boundaries in relation to the surrounding area and the nearest major roads.	Figures 1 & 3
2. Location and depth of nearby underground sewers and utility lines.	Figure 2
3. Location of nearby surface waters or wetlands.	Figure 1
4. Location and screened depth of all off-site wells (municipal, residential, production, irrigation, etc.) within two years groundwater travel time of the property line, which may be dependent on the pumping rates of the identified well(s).	Page 7
5. Location of all nearby delineated well-head protection areas.	Page 7
B. Provide a scaled site map (or maps) which includes the following:	
1. Location of fill ports, piping, dispensers, and other pertinent system components for all UST systems currently or formerly at the facility (<i>prior to excavation if tanks have been removed</i>).	Figure 2
2. Location of the release and the component of the LUST system from which the release occurred.	Figure 2, 4 & 5
3. Location of adjacent buildings, roadways, paved areas, or other structures.	Figure 3
4. Location of all on-site wells and screened intervals.	Figure 5
5. Location of soil, groundwater, surface water, sediment or air samples, as applicable.	Figure 2, 4 & 5
6. Excavation dimensions and sample locations if applicable.	Figure 4

3.2 SCALED CROSS-SECTIONAL DIAGRAMS

A. Provide scaled cross-sectional diagrams of buried utility corridors, including the pipe diameter, the type of backfill, and the trench depth.	Figures 7&8
B. Provide scaled cross-sectional diagrams depicting the soil lithology and the contaminant distribution, including sampling intervals and boring depths.	Figures 7&8
C. Provide scaled cross-sectional diagrams depicting the site hydrogeology, including the groundwater potentiometric surface, the monitoring well screened intervals, and sampling intervals.	Figures 7&8

3.3 SOIL CONDITIONS AND CHARACTERISTICS

A. Describe the soils encountered in the vadose zone.	12
B. Describe any soil contamination which has been detected.	13 Table 1 & Figure 4
C. Describe any soil remediation or disposal activities performed to date, including the total volume of soil remediated or disposed. Indicate the disposal location, and provide proof of disposal (e.g., invoices, not load tickets).	13

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D.	Provide a site diagram which identifies the estimated horizontal and vertical extent of on-site and off-site soil contamination. Include the maximum concentrations and sample depths.	Figure 4
E.	Provide an estimate of the volume of impacted soil remaining in the vadose zone.	13
F.	Describe steps that have been taken, or will be taken, to secure access to <u>off-site</u> properties, including easements and right-of-ways, to complete the delineation of the extent of the <u>off-site</u> impact of the release to soil. Include the names and addresses of potentially affected off-site property owners.	14 & Appendix E
G.	Provide the schedule for completing the delineation of the extent of the <u>off-site</u> impact of the release to soil.	14 & Appendix E
H.	Provide a table with field screening and laboratory data showing the results of all soil sampling performed to date for the required parameters. Refer to the Storage Tank Division Operational Memorandum No. 14, <i>Analytical Parameters and Methods, Sample Handling, and Preservation for Petroleum Releases</i> . 1. Sample ID 2. Sample depth 3. Date of collection 4. Dates of extraction and analysis 5. Method Detection Limits 6. Analytical method or field screening instrument	Tables 1&3 and Pages 9-12
(NOTE: The RRD may request copies of the laboratory data sheets, chain-of-custody forms, and all available QA/QC information.)		
I.	Provide a table which compares the maximum remaining soil contaminant concentrations for each required parameter to the appropriate RBSLs as provided in Storage Tank Division Operational Memorandum No. 4, <i>Tier I Lookup Tables for Risk-Based Corrective Action at Leaking Underground Storage Tank Sites</i> . If residential leaching to groundwater RBSLs are not utilized for comparison, provide an explanation.	Table 1
J.	Provide soil boring logs.	Appendix D
K.	Identify any known soil contamination not related to the release and the source, if known.	Page 13 Table 1 Figure 4
3.4 GROUNDWATER CONDITIONS AND CHARACTERISTICS		
A.	Describe the site hydrogeology, and include the following: 1. Depth to groundwater and method of determination. 2. Whether the groundwater is potable and/or not in an aquifer. Provide the basis for this determination. Refer to Storage Tank Division Operational Memorandum No.11, <i>Criteria to Eliminate the Potable Groundwater Pathway</i>.	14-17 14 14&15

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3.	Whether the groundwater is currently used as a source of drinking water, either residential or municipal.	14&15
4.	Whether groundwater is being used for a purpose other than drinking water.	15
5.	Whether more than one groundwater unit is present beneath the site.	15
6.	Depth to bottom of water-bearing layer.	15
7.	Predominant soil type in water-bearing stratum (e.g., sand, silt).	15
8.	Effective porosity of water-bearing stratum (in $\text{cm}^3_{\text{void}}/\text{cm}^3_{\text{matrix}}$), and describe how it was determined.	16
9.	Hydraulic conductivity, and describe how it was determined.	15&16
10.	Groundwater flow rate and direction.	14
11.	Lateral component of the hydraulic gradient.	16
12.	Hydrogeologic conditions that could influence flow direction.	17
13.	Magnitude and direction of the vertical component of the hydraulic gradient.	16
B.	Attach copies of the following:	
1.	Boring logs	Appendix D
2.	Well construction diagrams	Appendix D
3.	Potentiometric surface map	Figure 6
4.	Elevation data (USGS datum preferred), including top-of-casing, and grade elevations, and depth to groundwater	Table 5
C.	Provide scaled maps and cross-sectional diagrams, showing the screened and/or sampling interval, which depict the extent of impact and the maximum concentrations.	Figures 4, 5, 7 & 8
D.	Indicate whether more than one groundwater unit has been impacted.	15
E.	Describe any groundwater remediation activities performed to date, including the total volume of groundwater remediated and the disposition of this groundwater.	15
F.	Provide an indication of whether the plume currently extends off-site.	15
G.	Describe steps that have been taken, or will be taken, to secure access to <u>off-site</u> properties, including easements and right-of-ways, for the purpose of completing the delineation of the extent of the release to groundwater, and provide the names and addresses of off-site property owners.	17 & Appendix E
H.	Provide the schedule for completing the delineation of the extent of the off-site impact of the release to groundwater.	17 & Appendix F
I.	Provide a table with field screening and laboratory data showing the results of all groundwater sampling performed to date for the required parameters. Refer to the Storage Tank Division Operational Memorandum No. 14. The table should include the following:	Tables 2&4
1.	Sample ID	
2.	Sample depth and/or screened interval	
3.	Date of collection	
4.	Dates of extraction and analysis	
5.	Method Detection Limits	
6.	Analytical method or field screening instrument	

(NOTE: The RRD may request copies of the laboratory data sheets, chain-of-custody forms, and all available QA/QC information.)

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J.	Provide a table which compares the maximum remaining groundwater contaminant concentrations for each required parameter to the appropriate RBSLs as provided in Storage Tank Division Operational Memorandum No. 4. If residential health-based/aesthetic drinking water criteria are not utilized for comparison, provide an explanation.	Table 2
K.	Identify any known groundwater contamination not related to the release and the source, if known.	Page 15 Table 2 & Figure 5
3.5	CONDITIONS AND CHARACTERISTICS IN OTHER ENVIRONMENTAL MEDIA	
A.	Describe the evaluations conducted to determine if other environmental media have been impacted.	17
B.	Describe the extent and distribution of any contamination present in any environmental media other than soil or groundwater.	NA
C.	Describe any actions taken or planned in response to contamination in other environmental media.	NA
D.	Describe steps that have been taken, or will be taken, to secure access to <u>off-site</u> properties, including easements and right-of-ways, to complete the delineation of the extent of the <u>off-site</u> impact of the release to the other specified environmental media. Provide names and addresses of potentially affected off-site property owners.	NA
E.	Provide a schedule for completing the delineation of the extent of the <u>off-site</u> impact of the release to the other specified environmental media.	NA
F.	Provide a table with the field screening and laboratory data showing the results of all sampling performed to date in the other specified environmental media.	NA
	(NOTE: The RRD may request copies of the laboratory data sheets, chain-of-custody forms, and all available QA/QC information.)	
G.	Identify any known contamination in the other specified media not related to the release, and the source if known.	NA
4.0	<u>SITE CLASSIFICATION</u>	
A.	Indicate the current Site Classification Level, in accordance with Storage Tank Division Operational Memorandum No. 5, <i>Leaking Underground Storage Tank (LUST) Site Classification System</i> .	18

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- B. Provide a justification for this classification. Identify the current conditions that are the basis of the classification, and dates that the prescribed initial response actions were implemented.

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5.0 RESULTS OF THE RBCA EVALUATION

5.1 EXPOSURE PATHWAY CHARACTERIZATION

- A. Identify and describe the following (Figure 2, Exposure Scenario Evaluation Flowchart, provided in the *ASTM RBCA E 1739-95*, may be utilized):

- | | |
|-------------------------------------|-------|
| 1. Potential source(s) | 19-22 |
| 2. Potential transport mechanism(s) | 19-22 |
| 3. Potential exposure routes(s) | 19-22 |
| 4. Potential receptor(s) | 19-22 |

- B. List each possible exposure pathway(s) for each land use, and sensitive habitat (if applicable) for the site. Provide an explanation for eliminating any pathways.

19-22

NOTE: A complete pathway must include three necessary elements:

- 1) a source (e.g., contamination)*
- 2) a mechanism by which the contamination can become available to result in exposures at the source or via migration to other locations (e.g., free product and contaminated groundwater movement along a buried utility corridor)*
- 3) an individual who may come into contact, ingest, or inhale the contamination at the point of exposure (e.g., a utility maintenance worker digging to repair the line).*

Examples of a complete pathway include:

- 1) inhalation of impacted soils by an on-site construction worker.*
- 2) impacted soils leaching into potable ground water and being used by a nearby resident for drinking and bathing.*
- 3) inhalation of vapors resulting from the migration of free product by a neighboring industrial worker.*
- 4) impacted groundwater discharging to wetlands.*

5.2 OPTIONAL TIER II EVALUATION

- A. Indicate whether a site-specific Tier II or evaluation has been conducted for this site.

22

- B. If applicable, identify and justify where alternate assumptions or site-specific information were used in place of the default assumptions as defined in the Storage Tank Division Operational Memorandum No. 4.

NA

- C. Provide the calculations and reference citations supporting the development of the relevant Tier II SSTLs.

NA

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- D. Provide a table which compares the maximum remaining contaminant concentrations for each required parameter for all media to the appropriate RBSLs (as provided in the Storage Tank Division Operational Memorandum No. 4), and the calculated SSTLs. Identify all applicable land use scenario(s), and indicate whether or not there is an exceedance of the RBSLs or the SSTLs.

NA

5.3 PROPOSED FOLLOW-UP ACTIVITIES

- A. Based on the results of the Tier I or optional Tier II evaluation, indicate the follow-up activities proposed for the site, (e.g., site closure; interim corrective action with subsequent reevaluation; final corrective action to achieve Tier I RBSLs or Tier II SSTLs; or perform further site-specific Tier II or Tier III evaluation to establish alternative SSTLs that meet the target risk goals).

22&23

- B. Provide justification for the option chosen.

22&23

- C. Provide a Work Plan and implementation schedule that describes the proposed site characterization activities to be performed to determine the horizontal and vertical extent of contamination. Include a scaled site map depicting proposed sampling locations.

22&23
Appendix
E&F

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LFR
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Imagine the result

General Motors Corporation

**Leaking Underground Storage
Tank Initial Assessment Report**

Employee Development Center
65 East University Drive
Pontiac, Michigan 48342

February 5, 2007



Christopher S. Peters, C.P.G.
Vice President

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Initial Assessment Report (IAR)

Employee Development Center

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February 5, 2007

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Table 2	Groundwater Sample Laboratory Analytical Results
Table 3	Summary of Soil Sample Extraction and Analysis Dates
Table 4	Summary of Groundwater Sample Extraction and Analysis Dates
Table 5	Well Elevations and Water Levels

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Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Surrounding Properties Map
Figure 4	Soil Sampling Results – November and December 2006
Figure 5	Groundwater Sampling Results – November and December 2006
Figure 6	Groundwater Flow Map
Figure 7	Geologic Cross-Section A-A'
Figure 8	Geologic Cross-Section B-B'

Appendices

Appendix A	Release Reporting Documents
Appendix B	Soil Excavation Documents
Appendix C	Laboratory Data
Appendix D	Soil Boring/Monitoring Well Logs
Appendix E	Work Plan
Appendix F	Delineation Schedule



IAR

Employee Development
Center

Introduction

This Initial Assessment Report (IAR) for the GM Employee Development Center (EDC) has been prepared in accordance with the Michigan Department of Environmental Quality (MDEQ) Part 213 regulations by ARCADIS of New York, Inc. (ARCADIS BBL, formerly Blasland, Bouck & Lee, Inc. [BBL]), on behalf of General Motors Corporation (GM) for submittal to the MDEQ Remediation and Redevelopment Division (RRD). The GM EDC is located at 65 East University Drive in Pontiac, Michigan (herein referred to as the "Site"; see Figure 1).

Purpose

The purpose of this report is to present a summary of initial assessment activities which addresses a confirmed release (Incident Number C-0328-06) associated with a former gasoline underground storage tank (UST) and additional subsurface sources such as a former waste oil/spill UST, existing, abandoned and former trench drains, abandoned underground hydraulic lifts, an abandoned oil/sand separator, and an abandoned dynamometer at the Site.

Site Location and Description

The Site is located at 65 East University Drive in Pontiac, Michigan within a commercial and residential area. There is one 40,459 square foot Site building situated on a 3.7 acre parcel of land. The Site building is two stories with a basement and was constructed as an automobile dealership (referred to as the "Pontiac Store") owned and operated by Pontiac Motor Division from the early to mid 1950s to 1978. Use of the Site was converted in 1978, when the Site was operated by GM's Truck and Bus Division as Plant 13. The Site building was utilized by GM's Truck and Bus Division as an engineering center for the construction of prototype vehicles and associated engineering development activities. These activities ceased in 1992. The Site building was remodeled in 1994 for use as a training and employee development center. The Site building operated as a training and employee development center from 1994 through January 2007. GM is in the process of vacating the Site building at which time current Site activities will cease.

Background

The Site formerly had two USTs which consisted of a 1,000-gallon gasoline UST (Tank #2) and a 1,000-gallon waste oil UST (Tank #1) which was converted to a dilute sulfuric acid overflow/spill UST. The USTs were installed on April 4, 1950 and were



IAR

Employee Development
Center

located outside the northeast corner of the Site building. The locations of the former USTs are shown on Figure 2. GM Site personnel indicated that the UST contained unleaded gasoline at the time of removal; however, historical UST registration documentation does not specify whether the UST contained unleaded or leaded gasoline. According to a *Leaking Underground Storage Tank Release Closure Report* prepared by Conestoga-Rovers & Associates, Inc. (CRA) on December 22, 1995, the former gasoline UST was abandoned and filled with sand in 1980. Inland Waters removed the two 1,000-gallon USTs and an associated gasoline dispenser in December 1990. Soil confirmation samples were collected and analytical results identified two samples containing benzene, toluene, ethylbenzene, and xylenes (BTEX) constituents at concentrations exceeding Michigan Act 307 Type A background levels, which were applicable at the time CRA's report was written. On June 7, 1991, a release from the two USTs was reported to MDEQ as a leaking underground storage tank (LUST) case (Release ID C-1142-91) (CRA, 12/22/95).

On April 7, 1992, Enkon Environmental Services, Inc. (Enkon) performed a subsurface investigation in the vicinity of the two former UST locations. Benzene was detected in two of the soil samples at concentrations exceeding Michigan Act 307 Type B 20 Drinking Water Cleanup Criteria, which were applicable at the time Enkon's report was written (Enkon, 4/22/92). On January 7, 1993, Pickering Environmental Consultants, Inc. (PECI) performed a subsurface investigation in the vicinity of the former waste oil/spill UST. Benzene and ethylbenzene were detected in one of the soil samples at a concentration exceeding Michigan Act 307 Type B 20X Drinking Water Cleanup Criteria, which were applicable at the time PECI's report was written (PECI, 2/22/93). On March 16 and 17, 1995, CRA performed a subsurface investigation in the vicinity of the two former USTs (CRA, 12/22/95). Except for arsenic, no parameters were detected above the Michigan Tier 1 Residential Direct Contact Criteria for soil or the Risk Based Screening Levels (RBSLs), which were applicable at the time CRA's report was written, in the soil samples. CRA concluded that arsenic was detected at a concentration close to the background level for arsenic in Erie Lobe clays (11 milligrams per kilogram [mg/kg]) and was not considered to be associated with the former USTs. Groundwater was reportedly not encountered during UST excavation and subsequent investigation activities. CRA concluded that the release had been remediated to current Michigan Residential Criteria and no exposure pathways were identified. CRA submitted its *Leaking Underground Storage Tank Release Closure Report* to the MDEQ for the two USTs. According to the MDEQ's Leaking Underground Storage Tank database on the Internet, the release case (Release ID C-1142-91) was closed by the MDEQ on December 22, 1995.



IAR

Employee Development
Center

Although LUST case C-1142-91 was closed by the MDEQ, closure activities associated with the former USTs were focused in the area of the tanks and not the piping or dispenser associated with the gasoline UST.

In November and December 2006, ARCADIS BBL performed a due diligence subsurface soil and groundwater investigation of the Site. Twenty-five soil borings were completed, and one extraction well and four monitoring wells were installed as part of subsurface investigation activities. Soil samples were collected from each soil boring location and one of the monitoring wells based on field observations. A groundwater grab sample was collected from fourteen of the twenty-five soil boring locations. In addition, groundwater samples were collected from the on-Site monitoring wells after proper development and following proper groundwater sampling procedures. Evidence of gasoline contamination was detected and confirmed via soil and groundwater analytical results in the area of underground piping and former dispenser assumed to be associated with former gasoline UST. In addition to contamination associated with the former gasoline UST, solvent contamination was confirmed via analytical results in areas under and around the Site building.

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1. Initial Response to Release

1.1 Date and Time of Confirmed Release

On November 6, 2006, as part of a due diligence investigation, evidence of gasoline contamination in the area of underground piping and former dispenser assumed to be associated with the former gasoline UST which was removed in 1990. Evidence of gasoline contamination included elevated photoionization detector (PID) readings, and observations of staining in soil cuttings and a sheen on the groundwater. ARCADIS BBL also noted petroleum odors in the vicinity of underground piping and former dispenser associated with the former gasoline UST during completion of soil borings and groundwater sampling. Gasoline contamination was also confirmed via soil and groundwater analytical results. After receipt of analytical results, ARCADIS BBL reported a confirmed release to the MDEQ on November 14, 2006 at 11:24 am. The MDEQ assigned Incident Number C-0328-06 to this release case. On November 14, 2006, the MDEQ issued a response letter to GM regarding the confirmed release report. The MDEQ's response letter indicated that the confirmed release report was in violation of the Waste and Hazardous Materials Division (WHMD) reporting requirement within 24 hours of discovery. ARCADIS BBL evaluated analytical results and available documentation on behalf of GM before reporting the release versus reporting the release within 24 hours of observation in the field. Based on follow-up conversations between ARCADIS BBL and Mr. Jim Lucas of the WHMD-Storage Tank Unit, the MDEQ rescinded the violation. Since the gasoline UST and dispenser were removed in 1990, tank tightness testing was not performed in response to this release. A copy of ARCADIS BBL's Confirmed Release Report and the MDEQ's response letter are included in Appendix A.

1.2 Initial Response Actions

As previously described, twenty-five soil borings were completed, and one extraction well and four monitoring wells were installed as part of subsurface investigation activities. Soil samples were collected from each soil boring location and one of the monitoring wells based on field observations. A groundwater grab sample was collected from fourteen of the twenty-five soil boring locations. Upon completion of subsurface investigation activities, all boreholes completed by ARCADIS BBL were properly grouted and sealed with cement. In addition to grouting and sealing each of the boring locations, GM is in the process of vacating the Site building and current Site activities will cease upon their exit.



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Based on observations of stained soil and evidence of a sheen on the groundwater in soil borings B-6 and B-16, on December 1, 2006, ARCADIS BBL installed an extraction well (EW-1) in the vicinity of boring B-16 outside the northeast portion of the Site building (as shown on Figures 2 and 5). EW-1 was installed to determine the presence of free product and to recover free product as necessary if observed. However, at this time free product has not been observed or measured in EW-1. After soil boring B-6 was completed, ARCADIS BBL obtained a product sample from B-6. A copy of the finger print analytical results of product sample B-6 is included in Appendix C. Due to accessibility issues and safety concerns of Site building occupants, ARCADIS BBL did not install an extraction well in the vicinity of boring location B-6 inside the northern portion of the Site building during initial assessment activities. However, ARCADIS BBL will install an extraction well in the vicinity of boring B-6 in the next phase of investigation.

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Alex Rothchild
LFR
Sep 10, 2009 15:56



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2. Reporting and Response Following the Discovery of Free Product

2.1 Initial Response Actions

During due diligence investigation activities, staining and evidence of a sheen was observed in soil cuttings, and evidence of a sheen on groundwater inside the Site building and outside the Site building in the vicinity of the former gasoline dispenser was noted. In an effort to determine if free product is present and to recover free product, if necessary, ARCADIS BBL installed an extraction well (EW-1) in the vicinity of the former gasoline dispenser. However, free product has not been observed or measured in EW-1 to date. After soil boring B-6 was completed, ARCADIS BBL obtained a product sample from B-6. A copy of the finger print analytical results of product sample B-6 is included in Appendix C. As previously mentioned, due to accessibility issues and safety concerns of Site building occupants, ARCADIS BBL did not install an extraction well in the vicinity of boring location B-6 inside the northern portion of the Site building during initial assessment activities. However, ARCADIS BBL will install an extraction well in the vicinity of boring B-6 in the next phase of investigation activities. In addition, ARCADIS BBL will continue to monitor EW-1 for free product on a periodic basis. Upon the presence of free product in EW-1, ARCADIS BBL will submit a Free Product Recovery Status Report to the MDEQ as appropriate.



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3. Site Characterization Information

3.1 Scaled Site Maps

Scaled Site maps include Figures 1, 2, 3, 4, 5, 6, 7, and 8.

Figure 1 shows the location of the Site, the major surrounding area, and the Clinton River, which is located approximately 200 feet southeast of the southern Site boundary. As part of the initial assessment activities, a search was completed to determine the presence and/or location of private or municipal wells, and well-head protection areas in the vicinity of the Site. The search concluded that there are no water production wells (either private or municipal) within 3.58 to 8.76 feet of the Site, which is the two year groundwater travel time of the property line. The nearest private water well is located approximately 2 miles southwest and upgradient of the Site in the City of Pontiac. This private well is owned by Consumers Energy Company, and the use of the well is identified as "other" on the water well and pump record. In addition, the water well and pump record indicated that a screen was not installed in this private well. The nearest Type II public water well is located approximately 4.95 miles east-northeast and upgradient of the Site in the City of Auburn Hills. This Type II public water well is screened from 89 to 98 feet bgl. Furthermore, the search concluded that there are no well-head protection areas in the City of Pontiac. The search was completed by using the MDEQ Wellogis water well database and reviewing MDEQ Well-Head Protection Area Maps on the Internet. The Site and the City of Pontiac receive water through the City of Pontiac Department of Public Works and Utilities from the Detroit Water and Sewer Department (DWSD). The DWSD obtains its drinking water from the Detroit River and Lake Huron.

Figure 2 shows the overall Site, including location of former USTs and associated components, location of former UST excavations, potential subsurface pollution sources, location of monitoring wells and soil borings completed by ARCADIS BBL, and on-Site utilities.

Figure 3 shows the Site and surrounding properties including adjacent buildings, roadways and paved areas.

Figure 4 shows previous soil boring locations in the vicinity of the two former USTs, soil sampling results where exceedances were detected, and the approximate extent of soil contamination in the vadose zone.

Figure 5 shows groundwater sampling results where exceedances were detected.



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Figure 6 shows the groundwater flow direction at the Site.

Figure 7 shows geologic cross-section A-A', which depicts buried utilities, utility pipe diameters, and utility elevations. Due to unavailable historical information, the type of backfill associated with the buried utilities is unknown.

Figure 8 shows geologic cross-section B-B', which depicts buried utilities, utility pipe diameters, and utility elevations. Due to unavailable historical information, the type of backfill associated with the buried utilities is unknown.

3.2 Soil Conditions and Characteristics

On November 6, 8, and 30, 2006, ARCADIS BBL performed a due diligence subsurface investigation of the Site. Soil borings B-1 through B-25 were advanced using direct push technology (DPT). Based on analytical results of the due diligence subsurface investigation, ARCADIS BBL installed four monitoring wells (MW-2, MW-3, MW-4 and MW-5) and one extraction well (EW-1) on-Site on December 1, 2006 (Figures 2 and 5).

Soil samples were collected continuously, starting at the ground surface, at 2-foot intervals by utilizing DPT. Soil samples that were collected for laboratory analysis were placed in appropriate sample jars and shipped to a certified laboratory. Groundwater grab samples were collected by installing a temporary 2-inch diameter PVC well screen in the open borehole. Groundwater was purged out of the temporary wells until the groundwater turbidity became visibly clear. A groundwater grab sample was then collected and placed in appropriate sample jars. Boreholes were backfilled with bentonite chips and the surface sealed with concrete.

Monitoring wells were installed equipped with 10-foot, 2-inch diameter PVC well screens. The extraction well was installed with a 4-inch diameter PVC well screen. Monitoring wells were installed with the well screen straddling the water table (approximately 3-feet of the well screen above the water table and 7-feet below). Monitoring wells were installed with flush-mount well protectors. Monitoring and extraction wells were developed until field parameters (temperature, specific conductivity, pH, and temperature) stabilized. Groundwater samples were collected using low-flow groundwater sampling procedures.

Because the field investigation was originally initiated as part of a due diligence subsurface soil and groundwater investigation the standards and requirements outlined in MDEQ Operational Memorandum No. 2 were not completely adhered to. However,



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due to the initial findings of the investigation the standards presented in MDEQ Operational Memorandum No. 2 will be followed for all subsequent investigations.

ARCADIS BBL screened the soil samples in the field with a MiniRae PID. The following summary table provides a description of the soil borings completed including sample identification (ID), location, boring depth, sample depth, field observations and PID measurements:

Boring / Well ID	Boring Location	Total Depth of Boring (feet below ground level [bgl])	Sample Depth (feet bgl)	Observations at Depths	PID Measurements at Depth of Observation
B-1	Outside SE of Building in Paved Lot	10	8-9	No staining or odors	Background
B-2	Outside ESE Corner of Building	15	8-10	No staining or odors	Background
B-3	Outside ESE Side of Building	15	8-10	No staining or odors	Background
B-4	Outside E Side of Building	10	0-2	No staining or odors	Background
B-5	Outside ENE Side of Building	15	9-10	No staining or odors	Background
B-6	Inside NE Portion of Building	12	4-6	Slight to strong odor from 4.5 to 12 ft interval. Sheen observed on groundwater and soil cuttings.	64 parts per million (ppm)
B-7	Inside NE Portion of Building	8	2-4	Strong odor from 4 to 8 ft interval	15 ppm



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Boring / Well ID	Boring Location	Total Depth of Boring (feet below ground level [bgl])	Sample Depth (feet bgl)	Observations at Depths	PID Measurements at Depth of Observation
B-8	Inside NW Portion of Building	12	7.5-9.5	Strong odor and sheen on groundwater from 9.5 to 12 ft interval.	Background
B-9	Inside NW Portion of Building	12	7.5-9.5	Strong odor from 9 to 12 ft interval	22 ppm
B-10	Outside W Side of Building	15	13-15	No staining or odors.	Background
B-11	Outside W Side of Building	10	5-6	No staining or odors	Background
B-12	Outside WNW Side of Building	15	8-10	No staining or odors	Background
B-13	Outside NW Corner of Building	20	18-20	No staining or odors	Background
B-14	Outside NW Corner of Building	10	5-7	Strong petroleum odor with no staining from 7 ft interval. Slight petroleum odor with no staining from 7 to 10 ft interval. Slight sheen on water.	70.5 ppm
B-15	Outside N Side of Building	10	6-8	Slight petroleum odor with no staining from 5 to 5.5 ft interval and 8 to 10 ft interval. Strong petroleum odor with no staining from 5.5 to 8 ft interval.	226 ppm



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Boring / Well ID	Boring Location	Total Depth of Boring (feet below ground level [bgl])	Sample Depth (feet bgl)	Observations at Depths	PID Measurements at Depth of Observation
B-16	Outside NNE Corner of Building	10	4-5	Slight petroleum odor with no staining from 0.25 to 4 ft interval. Strong petroleum odor with staining from 4 to 5 ft interval and 6 to 6.5 ft interval. Strong odor with no staining from 5 to 6 ft interval. Dark sheen observed on soil cuttings from 6 to 6.5 ft interval. Slight odor with staining from 6.5 to 10 ft interval. Sheen also observed on groundwater.	173 to 382 ppm
B-17	Outside Further N of Building	10	4-6	Strong petroleum odor and uniform staining with sheen on water from 2 to 7 ft interval.	267 to 299
B-18	Outside NE of NW Corner of Building	10	1-2	No staining or odors	Background
B-19	Outside Further N of NE Corner of Building	10	0.5-1.5	No staining or odors	Background
B-20	Outside Further N of B-17	15	3.5-4.5	Slight odor with no staining from 4.5 to 5 ft interval.	0.6 ppm
B-21	Inside NW Portion of Building	12	2-4	Strong odor and sheen on groundwater from 9.5 to 12 ft interval.	Background
B-22	Outside NNW Corner of Building	8	1-3	Strong odor from 0.3 to 8 ft interval. Sheen observed on groundwater.	2.8 to 38 ppm
B-23	Outside N of B- 16	8	2-4	No staining or odors	Background



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Boring / Well ID	Boring Location	Total Depth of Boring (feet below ground level [bgl])	Sample Depth (feet bgl)	Observations at Depths	PID Measurements at Depth of Observation
B-24	Outside NNW of B-15	8	2-4	No staining or odors	Background
B-25	Outside N of NW Building Corner	8	2-4	No staining or odors	Background
EW-1	Outside NNE Corner of Building	13	NS	NA	NA
MW-2	NW Portion of Site	15	0-2 & 3-5	No staining or odors	Background
MW-3	Outside NW Corner of Building	15	NS	Slight odor and slight sheen on groundwater from 10 to 15 ft interval.	NA
MW-4	Eastern Corner of Site	15	NS	No staining or odors	Background
MW-5	Outside ESE Building Corner	17	NS	NA	NA

The soils encountered in the vadose zone consist primarily of light reddish brown to grayish brown clay with trace to little sand and gravel. The clay has a dry to moist condition and soft to hard consistency. Light reddish brown to black sand is found in lesser amounts primarily in the western half of the site. The sand is loose and has a dry to moist condition. The lithology is characterized in the soil boring logs contained in Appendix D and shown in the geologic cross-sections (Figures 7 and 8).



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3.2.1 Analytical Results

A complete summary of soil contamination at concentrations that exceed the MDEQ Part 201 and Part 213 Risk Based Screening Levels (RBSLs) (RRD Operational Memorandum No. 1, 1/23/06) are listed in Table 1 and shown on Figure 4. Table 1 and Figure 4 also depict the maximum concentrations for each parameter detected in soil. Copies of the analytical laboratory reports and chain-of-custody documentation are included in Appendix C.

The field investigation was originally initiated as part of a due diligence subsurface soil and groundwater investigation. Because of this the analytical methods (detection limits) presented in MDEQ Operational Memorandum No. 2 may not have been completely adhered to. However, due to the initial findings of the investigation the standards presented in MDEQ Operational Memorandum No. 2 will be followed for all subsequent investigations.

3.2.2 Soil Remediation and Disposal Activities

ARCADIS BBL reviewed a Generator's Waste Material Profile Sheet completed by Inland Waters on February 15, 1991 associated with the removal of the former 1,000-gallon gasoline UST and former 1,000-gallon spill/waste oil UST. According to the waste material profile sheet, an estimated volume of 400 cubic yards of soil was excavated during the removal of the former 1,000-gallon gasoline UST and former 1,000-gallon spill/waste oil UST. The excavated areas for each of the former USTs and associated soil sample locations are shown on Figure 4. The waste material profile sheet designated the soil as a non-regulated non-hazardous waste. However, documentation reviewed did not include the disposal location of excavated soil and proof of disposal. A copy of Inland Water's Generator's Waste Material Profile Sheet is included in Appendix B. Approximately 7 cubic yards of soil cuttings derived from subsurface investigation activities conducted by ARCADIS BBL are properly drummed and labeled on-Site waiting additional characterization and disposal.

3.2.3 Impacted Soil in the Vadose Zone

Based on analytical data from our initial assessment activities, the estimated volume of impacted soil remaining in the vadose zone is approximately 675 cubic yards. The estimated extent of impacted soil remaining in the vadose zone is shown on Figure 4.



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3.2.4 Steps and Schedule for Off-Site Delineation

ARCADIS BBL will obtain access agreements and right-of-way permits with adjacent property owners to continue delineation activities. On January 26, 2007, ARCADIS BBL submitted a Notice of Migration of Contamination to the MDEQ and City of Pontiac. As off-Site delineation activities continue, these Notices of Migration of Contamination will be updated. At this time, the following adjacent property owner was notified:

Mr. Mark J. Hotz
City Attorney
City of Pontiac Law Department
4745 Woodward Avenue
Pontiac, Michigan 48342

A work plan for completing the delineation of the extent of off-Site soil impact is provided in Appendix E. In addition, a schedule for completing such delineation activities is provided in Appendix F.

3.3 Groundwater Conditions and Characteristics

Groundwater was encountered at the Site from approximately 3 to 11 feet below ground level. The monitoring wells at the Site were surveyed by Atwell-Hicks on December 11, 2006. Water levels were measured on December 11, 2006. Based on the groundwater elevation information obtained by Atwell-Hicks and ARCADIS BBL during this investigation, the groundwater flow direction was determined to be radial from an apparent mound in the vicinity of the former gasoline UST area. Monitoring well construction diagrams are included in Appendix C. Groundwater elevations are shown on Table 5. The approximate groundwater flow direction is shown on Figure 6.

Based on criteria listed in the MDEQ RRD Operational Memorandum No. 11 (8/25/97), groundwater at the Site is in an aquifer and can be considered potable. However, groundwater at the Site is currently not used as a source of drinking water. The Site and the City of Pontiac receive water through the City of Pontiac Department of Public Works and Utilities from the DWSD. The DWSD obtains its drinking water from the Detroit River and Lake Huron. The City of Pontiac currently requires that properties connect to city water and sewer if water mains and sewers are located within 200 feet of their property (City of Pontiac Sewer Ordinance, 2000). In addition, based on ARCADIS BBL's well search using the MDEQ Wellogis water well database, the nearest private water well is located approximately 2 miles southwest and upgradient



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of the Site in the City of Pontiac. This private well is owned by Consumers Energy Company, and the use of the well is identified as "other" on the water well and pump record. In addition, the water well and pump record indicated that a screen was not installed in this private well. The nearest Type II public water well is located approximately 4.95 miles east-northeast and upgradient of the Site in the City of Auburn Hills. This Type II public water well is screened from 89 to 98 feet bgl and the static water level was reported as 50 feet bgl. Groundwater is not used for any purposes at the Site. Based on ARCADIS BBL's well search using the MDEQ Wellogig water well database, private uses of groundwater off-Site include irrigation and industrial use.

3.3.1 Analytical Results

A complete summary of groundwater contamination at concentrations that exceed the MDEQ Part 201 and Part 213 Groundwater RBSLs (RRD Operational Memorandum No. 1, 1/23/06) are listed in Table 2 and shown on Figure 5. Table 2 and Figure 5 also depict the maximum concentrations for each parameter detected in groundwater. Copies of the analytical laboratory reports and chain-of-custody documentation are included in Appendix C.

3.3.2 Site Hydrogeology

Based on subsurface investigation activities performed to date, it is unknown at this time whether more than one groundwater unit is present beneath the Site. Therefore, it is unknown whether more than one groundwater unit has been impacted. Information obtained from the Type II public water well and pump record indicated a static water level of 50 feet bgl. No groundwater remediation activities have occurred at the Site to date. The initial assessment activities completed to date have not included the installation of monitoring wells off-Site. Therefore, it is unknown at this time whether groundwater contamination extends off-Site.

Based on borings completed to date, the depth to the bottom of water-bearing layer is 18 feet bgl due to the presence of a clay, low permeable layer. The predominant soil type in the water bearing stratum is fine to coarse grained sand with lenses of sandy clay.

Hydraulic conductivity values were calculated for three monitoring wells using the Walton, 1962 specific capacity test technique completed during well development. Well development activities were completed using a whale pump. The following table illustrates how hydraulic conductivity was estimated for the Site:



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Well ID	MW-2	MW-3	MW-5
Storativity (specific yield – similar to effective porosity - estimated)	0.25	0.1	0.25
Pumping Period (minute)	65	62	35
Water Removed (Liters)	19.5	24.8	17.5
Initial Water level (ft) below Measurement Point	6.07	5.01	10.35
Final Water level (ft) below Measurement Point	6.45	5.25	10.45
Sand Pack Top (ft, bgl)	2	3	5
Sand Pack Bottom (ft, bgl)	13	15	17
Assumed Sand Pack Porosity	0.3	0.3	0.3
Total Well Depth (ft, bgl)	13	15	17
Well Casing Diameter (inch)	2	2	2
Well Borehole Diameter (inch)	8.25	8.25	8.25
Reference Point Elevation (ft, above ground level [agl])	-0.44	-0.4	-0.66
Water Removed from Well Storage (gallon)	0.06	0.04	0.02
Water Removed from Sandpack (gallon)	0.30	0.19	0.08
Water Removed from Aquifer (gallon)	4.79	6.32	4.53
K (ft/day)	1.66	3.91	17.53

Geometric
 mean for K = **4.85**

Notes:

1. Specific capacity test reduction based on technique described in Walton, W.C. 1962. Selected Analytical Methods for Well and Aquifer Evaluation, Illinois State Water Survey, Bulletin 19.

The horizontal hydraulic gradient was calculated using the groundwater elevation data collected on December 11, 2006. The gradient was estimated along two separate flow paths using the Groundwater Flow Map (Figure 6). The horizontal hydraulic gradient of Cross-Section A-A' was determined to be 0.02 ft/ft. The horizontal hydraulic gradient of Cross-Section B-B' was determined to be 0.03 ft/ft. The geometric mean of these values is 0.025 ft/ft and was used to calculate an estimate of groundwater flow velocity. The vertical hydraulic gradient could not be determined at this time because of the lack of data. It will be determined through upcoming investigations.

The groundwater flow velocity was calculated using the equation for seepage velocity, as described in C.W. Fetter Applied Hydrogeology, 1994. The geometric mean of the hydraulic conductivity and geometric mean of the horizontal gradient was used in the groundwater flow velocity calculation. For an effective porosity of 10%, the groundwater flow velocity was calculated to be 0.012 ft/day. For an effective porosity of 25%, the groundwater flow velocity was calculated to be 0.0049 ft/day.



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The Augusta Relief Drain, which consists of two 10.5 foot diameter concrete pipes, extends northwest to southeast in the central portion of the Site. The Augusta Relief Drain piping is located approximately 10 to 15 feet bgl, which is below the groundwater table. The Augusta Relief Drain leads into the Clinton River, which is located approximately 200 feet southeast of the Site. The Augusta Relief Drain and other local utility corridors may influence the on-Site flow direction.

3.3.3 Steps and Schedule for Off-Site Delineation

ARCADIS BBL will obtain access agreements and right-of-way permits with adjacent property owners to continue delineation activities. On January 26, 2007, ARCADIS BBL submitted a Notice of Migration of Contamination to the MDEQ and City of Pontiac. As off-Site delineation activities continue, these Notices of Migration of Contamination will be updated. At this time, the following adjacent property owner was notified:

Mr. Mark J. Hotz
City Attorney
City of Pontiac Law Department
4745 Woodward Avenue
Pontiac, Michigan 48342

A work plan for completing the delineation of the extent of off-Site groundwater impact is provided in Appendix E. In addition, a schedule for completing such delineation activities is provided in Appendix F.

3.4 Conditions and Characteristics in Other Environmental Media

Based on initial assessment activities completed to date, ARCADIS BBL has not identified other environmental media at the Site. Therefore, at this time, ARCADIS BBL has not conducted evaluations to determine if other environmental media have been impacted at the Site.



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4. Site Classification

The facility was classified based on the current and projected degree of threat to the public and the environment using the MDEQ Remediation and Redevelopment Division (RRD) Operational Memorandum No. 3, *Part 213 Leaking Underground Storage Tank (LUST) Classification System* (8/21/03). It was determined that the facility is a Class 1 Site posing an immediate threat to human health, safety, environment, or sensitive environmental receptors. This classification was based on visible evidence of staining in soil cuttings, and a sheen on the groundwater in soil boring locations B-6 and B-16 during subsurface investigation activities in November and December 2006. In addition, a product sample was collected from soil boring location B-6. Furthermore, laboratory analytical results confirmed the presence of contaminated soils and groundwater in exceedance of applicable criteria throughout the Site. On December 1, 2006, ARCADIS BBL installed extraction well (EW-1) in the vicinity of boring B-16 outside the northeast portion of the Site building. EW-1 was installed to determine the presence of free product and to recover free product as necessary if observed. However, at this time free product has not been observed or measured in EW-1.

The 40,459 square foot Site building occupies the southwest portion of the 3.7 acre Site. The remaining portions of the Site are paved with asphalt or concrete, which eliminates the direct contact exposure of on-Site soils. In addition, the Site and the City of Pontiac receive water through the City of Pontiac Department of Public Works and Utilities from the DWSD. The DWSD obtains its drinking water from the Detroit River and Lake Huron. Furthermore, the City of Pontiac currently requires that properties connect to city water and sewer if water mains and sewers are located within 200 feet of their property (City of Pontiac Sewer Ordinance, 2000).



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5. Results of the RBCA Evaluation

5.1 Exposure Pathway Characterization

In order to determine the applicable Risk Based Screening Levels (RBSLs) for the Site, an exposure evaluation was completed to identify the relevant exposure pathways that exist at the Site. A pathway must include the following three elements:

1. a source or release from a source;
2. an exposure route or transport mechanism; and
3. a point of exposure.

This section presents the potential exposure pathways and a determination of whether each pathway is relevant, reasonable, and/or complete. As part of the exposure evaluation, ARCADIS BBL has obtained data where available regarding the depth of utilities on the Site.

- Water Main: approximately 6 to 7 feet bgl (estimate provided by City of Pontiac Engineering Division)
- Sanitary Sewer Piping: approximately 10.5 feet bgl (estimate provided by City of Pontiac Engineering Division)
- Natural Gas Line: approximately 3.5 to 5.5 feet bgl (estimate based on historical "Plot Plan" provided by GM)
- Storm Sewer Piping: approximately 2.5 to 8.2 feet bgl (estimate based on survey of accessible manhole covers)
- Augusta Relief Drain Piping: approximately 10 to 15 feet bgl (estimate provided by Oakland County Drain Commissioner)

5.1.1 Relevant Exposure Pathways-Soil

The potential soil exposure pathways are discussed below.

Soil Contamination Risks for Direct Contact Exposure

Impacted soil is present below the asphalt parking lot and Site building. This exposure pathway is relevant and reasonable because utility workers could possibly come into contact with impacted soil present at 2 to 8 feet bgl, and Part 201 and Part 213 Residential and Commercial I Direct Contact RBSLs are therefore applicable. However, concentrations of various constituents in soil were not detected above the Part 201 and Part 213 Residential and Commercial I Direct Contact RBSLs.



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Soil Contamination Risks from Ambient Air and Indoor Air Inhalation Exposure

This exposure pathway is relevant because exposure could occur from windblown particulates and from volatilization of potential constituents into ambient air if the concrete in the Site building or asphalt were removed and the soil disturbed, and Part 201 and Part 213 Residential and Commercial I Volatile Soil Inhalation (VSI) and Particulate Soil Inhalation (PSI) RBSLs are therefore applicable. However, concentrations of various constituents in soil were not detected above the Part 201 and Part 213 Residential and Commercial I VSI and PSI RBSLs.

Soil Contamination Risk for Drinking Water Uses of Groundwater

This is a relevant exposure pathway because constituents in impacted soil could leach into the groundwater, and ultimately into potential drinking water supplies. Therefore, Part 201 and Part 213 Residential and Commercial I Drinking Water Protection (RDW) RBSLs are applicable and, as shown in Table 1, concentrations of constituents exceed these RBSLs at several locations. However, this is not a reasonable exposure pathway because the groundwater is not used as a source of drinking water, potable water is distributed by municipal systems, and the City of Pontiac currently requires that properties connect to city water and sewer if water mains and sewers are located within 200 feet of their property. In addition, based on ARCADIS BBL's search for private or municipal wells using the MDEQ Welllogic water well database, the closest well is a private well located approximately 2 miles southwest and upgradient of the Site. The nearest Type II public well is located approximately 4.95 miles east-northeast and upgradient of the Site. Therefore, the drinking water pathway is considered to be reliably restricted.

Soil Contamination Risk for Groundwater to Pose Dermal Contact Hazard

This is a relevant and reasonable exposure pathway as constituents in impacted soil could leach into groundwater present within 11 feet of the ground surface and within the utility corridors, and result in the potential for dermal exposure to utility workers. Therefore, this exposure pathway is reasonable and, Part 201 and Part 213 Residential and Commercial I Groundwater Contact Protection (GCP) RBSLs are applicable. However, concentrations of constituents in soil were not detected above the Part 201 and Part 213 Residential and Commercial GCP RBSLs.



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Soil Contamination Risk for Groundwater to Pose Surface Water Hazard

This is a relevant exposure pathway because constituents may leach from soil into groundwater that may enter the storm sewers and Augusta Relief Drain sewers and ultimately lead to the Clinton River. Therefore, Part 201 and Part 213 Residential and Commercial I Groundwater/Surface Water Interface Protection (GSIP) RBSLs are applicable, and concentrations of several constituents in soil exceed Part 201 and Part 213 Residential and Commercial I GSIP RBSLs, as shown in Table 1. Since the on-Site storm sewers and Augusta Relief Drain sewers lead directly to the Clinton River, which is approximately 200 feet southeast of the Site, this exposure pathway is relevant. The evaluation of groundwater exposure pathway risks discussed below provides additional information on this relevant exposure pathway.

5.1.2 Relevant Exposure Pathways-Groundwater

The potential groundwater exposure pathways are discussed below.

Groundwater Risks to Drinking Water Uses

Potential exposure associated with drinking impacted groundwater is a relevant pathway; therefore, Part 201 and Part 213 Residential and Commercial Drinking Water (DW) RBSLs are applicable. Concentrations of several constituents in groundwater exceed Part 201 and Part 213 RDW and IDW RBSLs, as shown in Table 2. However, this is not a reasonable exposure pathway because the groundwater is not used as a source of drinking water, potable water is distributed by municipal systems, and the City of Pontiac currently requires that properties connect to city water and sewer if water mains and sewers are located within 200 feet of their property. In addition, based on ARCADIS BBL's search for private or municipal wells using the MDEQ Wellogic water well database, the closest well is a private well located approximately 2 miles southwest and upgradient of the Site. The nearest Type II public well is located approximately 4.95 miles east-northeast and upgradient of the Site. Therefore, the drinking water pathway is considered to be reliably restricted.

Groundwater Risks to Dermal (Utility Work) Exposure

Potential dermal exposure to impacted groundwater by utility workers is a relevant and reasonable pathway because the depth to groundwater is shallow (less than 11 feet bgl). Based on the depths of on-Site utility corridors, Part 201 and Part 213 Residential and Commercial I Groundwater Contact (GC) RBSLs are applicable. However,



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concentrations of constituents in groundwater were not detected above the Part 201 and Part 213 Residential and Commercial GC RBSLs.

Groundwater Risks to Indoor Air

Based on the presence of the Site building, this exposure pathway is relevant and Part 201 and Part 213 Residential and Commercial I Volatilization to Indoor Air (VIA) RBSLs apply. Benzene in groundwater grab sample B-9, which was collected beneath the Site building, exceeds the reasonable Part 201 Part 213 Residential and Commercial I VIA RBSL, as shown in Table 2. Upon completion of subsurface investigation activities, all boreholes completed by ARCADIS BBL were properly sealed with a cement bentonite grout. In addition, GM is in the process of vacating the Site building.

Groundwater Risks to Surface Water

This pathway is relevant because on-Site storm sewers and Augusta Relief Drain sewers could conduct groundwater to the Clinton River. Therefore, Part 201 and Part 213 Residential and Commercial I RBSLs for Groundwater Surface Water Interface (GSI) RBSLs are applicable, and concentrations of several constituents in groundwater at the Site currently exceed Part 201 and Part 213 GSI RBSLs, as shown in Table 2. At this time, ARCADIS BBL has not determined if groundwater is migrating along the bedding material of the on-Site sewers, which lead to the Clinton River. Additional delineation activities will be performed to determine the significance of this pathway.

5.2 Optional Tier II Evaluation

Due to the small size of the Site and amount of analytical data available for the Site, a site-specific Tier II evaluation was not completed for the Site. Concentrations of constituents found in soil and groundwater at the Site are compared to Part 201 and Part 213 RBSLs (MDEQ RRD Operational Memorandum No. 1, 1/23/06).

5.3 Proposed Follow-Up Activities

Based on the results of the Tier I evaluation, ARCADIS BBL plans to conduct interim corrective action measures as required under Part 201 in order to eliminate the threat to human health, safety, and environment. Upon completion of interim corrective actions, ARCADIS BBL will conduct final corrective action measures to close the Site so GM can sell the property if desired.



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A work plan for completing the delineation of the extent of on-Site and off-Site soil and groundwater impact is provided in Appendix E. In addition, a schedule for completing such delineation activities is provided in Appendix F.

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6. References

Enkon Environmental Services, Inc. April 22, 1992, Subsurface Soils Investigation, GMC Truck Plant #13, 65 University Drive, Pontiac, Michigan 48342.

Pickering Environmental Consultant, Inc. February 22, 1993, Report of Findings GM North America Platform Engineering Facility-Plant #13, 65 University Drive, Pontiac, Michigan 48342.

Conestoga-Rovers and Associates. April 2, 1993, Site Investigation Work Plan Pontiac Truck Engineering Center (Plant 13) Site, 65 University Drive, Pontiac, Michigan 48342.

C.W. Fetter. 1994, Applied Hydrogeology – Second Edition, Columbus, Ohio.

Conestoga-Rovers and Associates. December 22, 1995, Leaking Underground Storage Tank Release Closure Report, 65 University Drive, Pontiac, Michigan 48342.

Encore Environmental Consortium. July 1, 2005, Phase I Environmental Site Assessment, General Motors Corporation Employee Development Center, 65 E. University Drive, Pontiac, Michigan.



Tables

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SOIL SAMPLE LABORATORY ANALYTICAL RESULTS

Sample ID:	Units	Michigan Residential and Commercial I Soil Cleanup Criteria and Risk Based Screening Levels				Michigan Industrial and Commercial II, III, & IV Soil Cleanup Criteria and Risk Based Screening Levels				B-1 Outside SE of Building in Paved Lot	B-2 Outside East-SE Corner of Building - Boiler Room Sump Area	B-3 Outside East-SE Side of Building - Boiler Room Sump & Elevator Lift Area	B-4 Outside East Side of Building - Elevator Lift Area	B-5 Outside East-NE Side of Building - Former Service / Hydraulic Lift Area	B-6 Inside Northeast Portion of Building Near Hydraulic Lift South of Dispenser Area	B-7 Inside Northeast Portion of Building Near Hydraulic Lift Further South	B-8 Inside Northwest Portion of Building Near Hydraulic Lift	B-9 Inside Northwest Portion of Building Near Hydraulic Lift Further South	B-10 Outside West Side of Building - Vicinity of Hydraulic Lift	B-11 Outside West Side of Building - Vicinity of Hydraulic Lift	B-12 Outside West-NW Side of Building - Oil-Sand Separator	B-13 Outside NW Corner of Building - Dyno Pit / Oil-Sand Separator	B-14 Outside NW Corner of Building - Trench & Dyno Pit	B-15 Outside North Side of Building - Trench
		Ground-Water Protection	Indoor Air	Ambient Air	Direct Contact Criteria	Ground-Water Protection	Indoor Air	Ambient Air	Direct Contact Criteria	11/6/2006 8-9'	11/6/2006 8-10'	11/6/2006 8-10'	11/6/2006 0-2'	11/6/2006 9-10'	11/30/2006 4-6'	11/30/2006 2-4'	11/30/2006 7.5-9.5'	11/30/2006 7.5-9.5'	11/8/2006 13-15'	11/8/2006 5-6'	11/8/2006 8-10'	11/6/2006 18-20'	11/6/2006 5-7'	11/6/2006 6-8'
Analytical Parameter																								
TPH (EPA Method 418.1)	mg/kg	none	none	none	none	none	none	none	none	23	55	26	55	22	27	26	<11	16	16	22	22	23	1,000	710
PAHs (EPA Method 8310)																								
1-Methylnaphthalene	ug/kg	none	none	none	none	none	none	none	none	NA	NA	NA	NA	NA	<22	<4.2	<3.6	19	NA	NA	NA	NA	57	400
2-Methylnaphthalene	ug/kg	57,000	none	none	8.1E+06	57,000	none	none	2.6E+07	NA	NA	NA	NA	NA	<22	<4.2	<3.6	35	NA	NA	NA	NA	110	760
Acenaphthene	ug/kg	4,400	1.9E+08	8.1E+07	4.1E+07	4,400	3.5E+08	9.7E+07	1.3E+08	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	15	<12
Acenaphthylene	ug/kg	5,900	1.6E+06	2.2E+06	1.6E+06	5,900	3.0E+06	2.7E+06	1.6E+06	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	<12	<12
Anthracene	ug/kg	41,000	1.00E+09	1.4E+09	2.3E+08	41,000	1.00E+09	1.6E+09	7.3E+08	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	15	<12
Benzo(a)anthracene	ug/kg	none	none	none	20,000	none	none	none	80,000	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	58	<12
Benzo(a)pyrene	ug/kg	none	none	1.5E+06	2000	none	none	1.9E+06	8000	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	62	20
Benzo(b)fluoranthene	ug/kg	none	none	none	20000	none	none	none	80,000	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	34	<12
Benzo(g,h,i)perylene	ug/kg	none	none	8.0E+08	2.5E+06	none	none	3.5E+08	7.0E+06	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	59	38
Benzo(k)fluoranthene	ug/kg	none	none	none	200000	none	none	none	800,000	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	22	<12
Chrysene	ug/kg	none	none	none	2.0E+06	none	none	none	8.0E+06	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	51	20
Dibenz(a,h)anthracene	ug/kg	none	none	none	2000	none	none	none	8000	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	17	<12
Fluoranthene	ug/kg	5,500	1.0E+09	7.4E+08	4.6E+07	5500	1.0E+09	8.8E+08	1.3E+08	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	85	20
Fluorene	ug/kg	5,300	5.8E+08	1.3E+08	2.7E+07	5300	1.0E+09	1.5E+08	8.7E+07	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	<12	<12
Indeno(1,2,3-cd)pyrene	ug/kg	none	none	none	20,000	none	none	none	80,000	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	36	13
Naphthalene	ug/kg	35,000 (DW), 870 (GSIP), 2.1E+06 (GWC)	250,000	300,000	1.6E+07	1.0E+05 (DW), 870 (GSIP), 2.1E+06 (GWC)	470,000	350,000	5.2E+07	NA	NA	NA	NA	NA	<22	<4.2	<3.6	86	NA	NA	NA	NA	52	780
Phenanthrene	ug/kg	5,300	2.8E+06	160,000	1.6E+06	5300	5.1E+06	190,000	5.2E+06	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	87	51
Pyrene	ug/kg	480,000	1.0E+09	6.5E+08	2.9E+07	480,000	1.0E+09	7.8E+08	8.4E+07	NA	NA	NA	NA	NA	<22	<4.2	<3.6	<3.5	NA	NA	NA	NA	100	42
Other Target PAHs	ug/kg	various	various	various	various	various	various	various	various	NA	NA	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND
VOCs (EPA Method 8260B)																								
1,1,1-Trichloroethane	ug/kg	none	none	none	none	none	none	none	none	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	<6.4	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,1,2,2-Tetrachloroethane	ug/kg	170	4,300	10,000	53,000	170	23,300	34,000	2.4E+05	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	<6.4	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,1,2-Trichloroethane	ug/kg	none	none	none	none	none	none	none	none	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	<6.4	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,1-Dichloroethane	ug/kg	15,000	2.3E+05	2.1E+06	8.9E+05	15,000	4.3E+05	2.5E+06	8.9E+05	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	<6.4	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,1-Dichloroethene	ug/kg	140	62	1,100	2.0E+05	140	330	3700	5.7E+05	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	<6.4	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,2,4-Trimethylbenzene	ug/kg	570	1.5E+05	2.1E+07	1.1E+05	570	1.1E+05	2.5E+07	1.1E+05	NA	NA	NA	NA	NA	6.6	<6.4	<5.5	6.4	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	ug/kg	100	2,100	6,200	91,000	100	11,000	21,000	4.2E+05	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	22	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,2-Dichloropropane	ug/kg	100	4,000	25,000	1.4E+05	100	7,400	30,000	5.5E+05	<5.7	<5.5	<5.2	<5.5	<5.4	<5.5	<6.4	<5.5	<5.3	<5.5	<5.6	<5.4	<5.6	<6	<6.2
1,3,5-Trimethylbenzene	ug/kg	1,100	94,000	1.6E+07	94,000	1,100	94,000	1.9E+07	94,000	NA	NA	NA	NA	NA	<5.5	<6.4	<5.5	8.5	NA	NA	NA	NA	NA	NA
2-Butanone	ug/kg	44,000	2.7E+7	2.9E+07	2.7E+07	44,000	2.7E+7	3.5E+07	2.7E+07	<23	<22	<21	<22	<22	<22	<26	<22	<21	<22	<22	<23	<24	<25	<25
2-Hexanone	ug/kg	20,000	9.9E+05	1.1E+06	2.5E+06	20,000	1.8E+06	1.3E+06	2.5E+06	<11	<11	<10	<11	<11	<11	<13	<11	<11	<11	<11	<11	<12	<12	<12
4-Methyl-2-pentanone	ug/kg	36,000	2.7E+06	4.5E+07	2.7E+06	36,000	2.7E+06	5.3E+07	2.7E+06	<11	<11	<10	<11	<11	<11	<13	<11	<11	<11	<11	<11	<12	<12	<12
Acetone	ug/kg	15,000	1.1E+08	1.3E+08																				

SOIL SAMPLE LABORATORY ANALYTICAL RESULTS

Sample ID:	Units	Michigan Residential and Commercial I Soil Cleanup Criteria and Risk Based Screening Levels				Michigan Industrial and Commercial II, III, & IV Soil Cleanup Criteria and Risk Based Screening Levels				B-16 Outside North-NE Corner of Building - Former Gas Dispenser	B-17 Outside Further North of North Side of Building - Release Delineation	B-18 Outside NE of NW Corner of Building - Release Delineation	B-19 Outside Further North of NE Corner of Building - Release Delineation	B-20 Outside Further North of B-17 & Sewer Line - Release Delineation	B-21 Inside Northwest Portion of Building - Release Delineation	B-22 Outside North-NW Corner of Building - Release Delineation	B-23 Outside North of B- 16 and Former Gas Dispenser - Release Delineation	B-24 Outside - NNW of B- 15 - Release Delineation	B-25 Outside - North of NW Building Corner and B-14 - Release Delineation	MW-2 Northwest Portion of Site - Release Delineation Monitoring Well	MW-2 Northwest Portion of Site - Release Delineation Monitoring Well
		Ground-Water Protection	Indoor Air	Ambient Air	Direct Contact Criteria	Ground-Water Protection	Indoor Air	Ambient Air	Direct Contact Criteria	11/6/2006 4-5'	11/8/2006 4-6'	11/8/2006 1-2'	11/8/2006 0.5-1.5'	11/8/2006 3.5-4.5'	11/30/2006 2-4'	11/30/2006 1-3'	11/30/2006 2-4'	11/30/2006 2-4'	11/30/2006 2-4'	12/1/2006 0-2'	12/1/2006 3-5'
Analytical Parameter																					
TPH (EPA Method 418.1)	mg/kg	none	none	none	none	none	none	none	none	250	19	12	2,000	12	18	210	12	<12	11	18	17
PAHs (EPA Method 8310)																					
1-Methylnaphthalene	ug/kg	none	none	none	none	none	none	none	none	15000	NA	NA	18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
2-Methylnaphthalene	ug/kg	57,000	none	none	8.1E+06	57,000	none	none	2.6E+07	29000	NA	NA	29	NA	<4.1	26	<4	<3.9	<3.7	<4	<3.7
Acenaphthene	ug/kg	4,400	1.9E+08	8.1E+07	4.1E+07	4,400	3.5E+08	9.7E+07	1.3E+08	170	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Acenaphthylene	ug/kg	5,900	1.6E+06	2.2E+06	1.6E+06	5,900	3.0E+06	2.7E+06	1.6E+06	1100	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Anthracene	ug/kg	41,000	1.00E+09	1.4E+09	2.3E+08	41,000	1.00E+09	1.6E+09	7.3E+08	<11	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Benz(a)anthracene	ug/kg	none	none	none	20,000	none	none	none	80,000	<11	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Benzo(a)pyrene	ug/kg	none	none	1.5E+06	2000	none	none	1.9E+06	8000	<11	NA	NA	<18	NA	<4.1	36	<4	<3.9	<3.7	<4	<3.7
Benzo(b)fluoranthene	ug/kg	none	none	none	20000	none	none	none	80,000	<11	NA	NA	<18	NA	<4.1	27	<4	<3.9	<3.7	<4	<3.7
Benzo(g,h,i)perylene	ug/kg	none	none	8.0E+08	2.5E+06	none	none	3.5E+08	7.0E+06	<11	NA	NA	<18	NA	<4.1	65	<4	<3.9	<3.7	<4	<3.7
Benzo(k)fluoranthene	ug/kg	none	none	none	200000	none	none	none	800,000	<11	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Chrysene	ug/kg	none	none	none	2.0E+06	none	none	none	8.0E+06	<11	NA	NA	<18	NA	<4.1	34	<4	<3.9	<3.7	<4	<3.7
Dibenz(a,h)anthracene	ug/kg	none	none	none	2000	none	none	none	8000	<11	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Fluoranthene	ug/kg	5,500	1.0E+09	7.4E+08	4.6E+07	5500	1.0E+09	8.8E+08	1.3E+08	11	NA	NA	<18	NA	<4.1	51	<4	<3.9	<3.7	<4	<3.7
Fluorene	ug/kg	5,300	5.8E+08	1.3E+08	2.7E+07	5300	1.0E+09	1.5E+08	8.7E+07	61	NA	NA	<18	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Indeno(1,2,3-cd)pyrene	ug/kg	none	none	none	20,000	none	none	none	80,000	<11	NA	NA	<18	NA	<4.1	34	<4	<3.9	<3.7	<4	<3.7
Naphthalene	ug/kg	35,000 (DW), 870 (GSIP), 2.1E+06 (GWC)	250,000	300,000	1.6E+07	1.0E+05 (DW), 870 (GSIP), 2.1E+06 (GWC)	470,000	350,000	5.2E+07	12,000	NA	NA	110	NA	<4.1	<23	<4	<3.9	<3.7	<4	<3.7
Phenanthrene	ug/kg	5,300	2.8E+06	160,000	1.6E+06	5300	5.1E+06	190,000	5.2E+06	82	NA	NA	<18	NA	<4.1	35	<4	<3.9	<3.7	<4	<3.7
Pyrene	ug/kg	480,000	1.0E+09	6.5E+08	2.9E+07	480,000	1.0E+09	7.8E+08	8.4E+07	50	NA	NA	<18	NA	<4.1	94	<4	<3.9	<3.7	<4	<3.7
Other Target PAHs	ug/kg	various	various	various	various	various	various	various	various	ND	NA	NA	ND	NA	ND	ND	ND	ND	ND	ND	ND
VOCs (EPA Method 8260B)																					
1,1,1-Trichloroethane	ug/kg	none	none	none	none	none	none	none	none	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,1,2,2-Tetrachloroethane	ug/kg	170	4,300	10,000	53,000	170	23,300	34,000	2.4E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,1,2-Trichloroethane	ug/kg	none	none	none	none	none	none	none	none	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,1-Dichloroethane	ug/kg	15,000	2.3E+05	2.1E+06	8.9E+05	15,000	4.3E+05	2.5E+06	8.9E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,1-Dichloroethene	ug/kg	140	62	1,100	2.0E+05	140	330	3700	5.7E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,2,4-Trimethylbenzene	ug/kg	570	1.5E+05	2.1E+07	1.1E+05	570	1.1E+05	2.5E+07	1.1E+05	NA	NA	NA	NA	NA	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,2-Dichloroethane	ug/kg	100	2,100	6,200	91,000	100	11,000	21,000	4.2E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,2-Dichloropropane	ug/kg	100	4,000	25,000	1.4E+05	100	7,400	30,000	5.5E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
1,3,5-Trimethylbenzene	ug/kg	1,100	94,000	1.6E+07	94,000	1,100	94,000	1.9E+07	94,000	NA	NA	NA	NA	NA	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
2-Butanone	ug/kg	44,000	2.7E+7	2.9E+07	2.7E+07	44,000	2.7E+7	3.5E+07	2.7E+07	<24	<21	<24	<21	<24	<25	<23	<24	<24	<25	<22	<22
2-Hexanone	ug/kg	20,000	9.9E+05	1.1E+06	2.5E+06	20,000	1.8E+06	1.3E+06	2.5E+06	<11	<13	<12	<11	<12	<12	<11	<12	<12	<11	<12	<11
4-Methyl-2-pentanone	ug/kg	36,000	2.7E+06	4.5E+07	2.7E+06	36,000	2.7E+06	5.3E+07	2.7E+06	<11	<12	<10	<11	<12	<12	<11	<12	<12	<11	<12	<11
Acetone	ug/kg	15,000	1.1E+08	1.3E+08	2.3E+07	15,000	1.1E+08	1.6E+08	7.3E+06	<110	<130	<120	<110	<120	<120	<110	<120	<120	<110	<120	<110
Benzene	ug/kg	100 (DW)	1,600	13,000	1.8E+05	100 (DW)	8,400	45,000	4.0E+05	<5.7	<6.3	<6.1	<5.3	220	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Bromodichloromethane	ug/kg	1,600	1,200	9,100	1.1E+05	1,600	6,400	31,000	4.0E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Bromoform	ug/kg	1,600	1.5E+05	9.0E+05	8.2E+05	1,600	7.7E+05	3.1E+06	8.7E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Bromomethane	ug/kg	200	860	11,000	3.2E+05	200	1,600	13,000	1.0E+06	<11	<13	<12	<11	<12	<12	<11	<12	<12	<11	<12	<11
Carbon disulfide	ug/kg	16,000	76,000	1.3E+06	2.8E+05	16,000	1.4E+05	1.6E+06	2.8E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Carbon tetrachloride	ug/kg	100	190	3,500	96,000	100	990	12,000	3.9E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Chlorobenzene	ug/kg	940	1.2E+05	7.7E+05	2.6E+05	940	2.2E+5	9.2E+05	2.6E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Chloroethane	ug/kg	8,600	9.5E+05	3.0E+07	9.5E+05	8,600	9.5E+05	3.6E+07	9.5E+05	<11	<13	<12	<11	<12	<12	<11	<12	<12	<11	<12	<11
Chloroform	ug/kg	1,600	7,200	45,000	1.2E+06	1,600	38,000	1.5E+05	1.5E+06	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Chloromethane	ug/kg	5,200	2,300	40,000	1.1E+06	5,200	10,000	1.2E+05	1.1E+06	<11	<13	<12	<11	<12	<12	<11	<12	<12	<11	<12	<5.6
Dibromochloromethane	ug/kg	1,600	3,900	24,000	1.1E+05	1,600	21,000	80,000	5.0E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Ethylbenzene	ug/kg	1,500 (DW), 360 (GSIP), 1.4E+05 (GWC)	87,000	7.2E+05	1.4E+05	1,500 (DW), 360 (GSIP), 1.4E+05 (GWC)	1.4E+05	2.4E+06	1.4E+05	34,000	8.8	<6.1	<5.3	30	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Methylene chloride	ug/kg	100	45,000	2.1E+05	1.3E+06	100	2.4E+05	7.0E+05	2.3E+06	<5.7	<6.3	<6.1	<5.3	<6	8.6	9.2	8.4	9.5	10	<6.1	<5.6
Styrene	ug/kg	2,200 (DW), 900 (GSIP), 88,000 (GWC)	2.5E+05	9.7E+05	4.0E+05	2,200 (DW), 900 (GSIP), 88,000 (GWC)	5.2E+05	3.3E+06	5.2E+05	<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Tetrachloroethene	ug/kg	11,000	1.8E+05	88,000		60,000	6.0E+05	88,000		<5.7	<6.3	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Toluene	ug/kg	16,000 (DW), 2,800 (GSIP), 2.5E+05 (GWC)	2.5E+05	2.8E+06	2.5E+05	16,000 (DW), 2,800 (GSIP), 2.5E+05 (GWC)	2.5E+05	3.3E+06	2.5E+05	1,900 J	13	<6.1	<5.3	<6	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Trichloroethene	ug/kg	100 (DW), 4,000 (GSIP), 4.4E+05 (GWC)	7,100	78,000	5.0E+05	100 (DW), 4,000 (GSIP), 4.4E+05 (GWC)	37,000	2.6E+05	5.0E+05	<5.7	<6.3	35	<5.3	140	<6.2	<5.7	<6	<5.9	<5.6	<6.1	<5.6
Vinyl chloride	ug/kg	40	270	4,200	3,800	40	2,800	29,000	34,000	<11	<13	<12	<11	<12	<12	<11	<12	<12	<11	<12	<5.6
cis-1,2-Dichloroethene	ug/kg	1,400	22,000	1.8E+05	6.4E+05	1,400	41,000	2.1E+05	6.4E+05	<5.7	<6.3	<6.1	<5.3	86	<6.2						

TABLE 1

**EMPLOYEE DEVELOPMENT CENTER
65 EAST UNIVERSITY
PONTIAC, MI**

SOIL SAMPLE LABORATORY ANALYTICAL RESULTS

Notes:

Exceedances: Cleanup Criteria and Risk Based Screening Level Exceedances are bold and double bordered.
Maximum Cleanup Criteria and Risk Based Screening Level Exceedances are highlighted.
Samples with TPH results greater than 100 mg/kg are bold.
Samples with TPH results greater than 100 mg/kg were analyzed for PAHs.

bgl: below ground level

J: Estimated value between method detection limit and practical quantitation limit.

NS: Not sampled.

ND / <: Not detected / < detection limit

NA: Not analyzed.

Soil Cleanup Criteria: - Part 201 (Environmental Remediation) and Part 213 (Leaking Underground Storage Tanks) of the Michigan Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451 (Revised January 23, 2006). Referenced are both Residential & Commercial I and Industrial & Commercial II, III, IV Cleanup Criteria and Screening Levels.

- Groundwater Protection Criteria: Lowest value of Drinking Water Protection Criteria (DW), Groundwater/Surface Water Interface Protection Criteria (GSIP), and Groundwater Contact Protection Criteria (GWC).
- Indoor Air: Soil Volatilization to Indoor Air Inhalation Criteria.
- Ambient Air: Lowest Value of Infinite Source Volatile Soil Inhalation Criteria, Finite Source 2.5 Meter Thickness, and Particulate Soil Inhalation Criteria.
- Direct Contact: Lowest Value of Direct Contact Criteria and Soil Saturation Concentration Screening Levels.

(C): Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat. Concentrations greater than Csat are acceptable cleanup criteria for this pathway where a site-specific demonstration indicates that free-phase material containing a hazardous substance is not present.

EMPLOYEE DEVELOPMENT CENTER
65 EAST UNIVERSITY
PONTIAC, MI

GROUNDWATER SAMPLE LABORATORY ANALYTICAL RESULTS

Sample ID:	Units	Michigan Groundwater Cleanup Criteria and Risk Based Screening Levels							B-1 Outside SE of Building in Paved Lot	B-2 Outside East-SE Corner of Building - Boiler Room Sump Area	B-3 Outside East-SE Side of Building - Boiler Room Sump & Elevator Lift Area	B-4 Outside East Side of Building - Elevator Lift Area	B-5 Outside East-NE Side of Building - Former Service / Hydraulic Lift Area	B-6 Inside Northeast Portion of Building Near Hydraulic Lift South of Dispenser Area	B-7 Inside Northeast Portion of Building Near Hydraulic Lift Further South	B-8 Inside Northwest Portion of Building Near Hydraulic Lift	B-9 Inside Northwest Portion of Building Near Hydraulic Lift Further South	B-10 Outside West Side of Building - Vicinity of Hydraulic Lift	B-11 Outside West Side of Building - Vicinity of Hydraulic Lift	B-12 Outside West- NW Side of Building - Oil- Sand Separator	B-13 Outside NW Corner of Building - Dyno Pit / Oil-Sand Separator	B-14 Outside NW Corner of Building - Trench & Dyno Pit	B-15 Outside North Side of Building - Trench	B-16 Outside North- NE Corner of Building - Former Gas Dispenser	
		Residential & Commercial I Drinking Water Criteria & RBSLs	Industrial & Commercial II, III, IV Drinking Water Criteria & RBSLs	Groundwater Surface Water Interface Criteria & RBSLs	Residential & Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Industrial & Commercial II, III, IV Groundwater Volatilization to Indoor Air Inhalation Criteria & RBSLs	Groundwater Contact Criteria & RBSLs	Flammability and Explosivity Screening Level	11/8/2006	11/8/2006	11/8/2006	11/8/2006	11/8/2006	NS***	11/30/2006	11/30/2006	11/30/2006	11/8/2006	11/8/2006	11/8/2006	11/8/2006	11/8/2006	11/8/2006	11/8/2006	
Date Collected:								NA	10-15	NA	5-10	NA	NA	3-8	7-12	7-12	NA	NA	10-15	NA	5-10	5-10	5-10		
Screened Interval (feet bgl):								NA	10-15	NA	5-10	NA	NA	3-8	7-12	7-12	NA	NA	10-15	NA	5-10	5-10	5-10		
Analytical Parameter																									
TPH (EPA Method 418.1)	mg/L	none	none	none	none	none	none	NS **	0.9	NS **	0.9	NS *	NS***	8.3	NS****	7.7	NS *	NS **	< 0.5	NS *	1.5	4.9	71		
Semivolatile Hydrocarbons (EPA Method 8015B)																									
Gasoline Range Organics	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
Diesel Range Organics	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
Fuel Oil	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
Hydraulic Fluid	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
Kerosene	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
Mineral Spirits	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
Motor Oil	mg/L	none	none	none	none	none	none	NS **	NS	NS**	NS	NS*	NS***	NS	NS****	NS	NS*	NS**	NS	NS*	NS	NS	NS	NS	
PAH (EPA Method 8310)																									
1-Methylnaphthalene	ug/L	none	none	none	none	none	none	NS **	NA	NS **	NA	NS *	NS***	20	NS****	14	NS *	NS **	NA	NS *	26	27	210		
2-Methylnaphthalene	ug/L	260	750	ID	ID	ID	25,000 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	35	NS****	23	NS *	NS **	NA	NS *	19	24	270	
Acenaphthene	ug/L	1,300	3,800	19	4,200 (S)	4,200 (S)	4,200 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	0.48	NS****	0.16	NS *	NS **	NA	NS *	0.14	0.22	1.5	
Acenaphthylene	ug/L	52	150	ID	3,900 (S)	3,900 (S)	3,900 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	0.87	NS****	0.15	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Anthracene	ug/L	43 (S)	43 (S)	ID	43 (S)	43 (S)	43 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Benzo(a)anthracene	ug/L	2.1	8.5	ID	NLV	NLV	9.4 (S,AA)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	0.28	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Benzo(a)pyrene	ug/L	5.0 (A)	5.0 (A)	ID	NLV	NLV	1.0 (M,AA); 0.64	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Benzo(b)fluoranthene	ug/L	1.5 (S, AA)	1.5 (S, AA)	ID	ID	ID	1.5 (S,AA)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Benzo(g,h,i)perylene	ug/L	1.0 (M); 0.26 (S)	1.0 (M); 0.26 (S)	NA	NLV	NLV	1.0 (M,AA); 0.26	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Benzo(k)fluoranthene	ug/L	1.0 (M); 0.8 (S)	1.0 (M); 0.8 (S)	NA	NLV	NLV	1.0 (M,AA); 0.8 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Chrysene	ug/L	1.6 (S)	1.6 (S)	ID	ID	ID	1.6 (S,AA)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Dibenz(a,h)anthracene	ug/L	2.0 (M); 0.21	2.0 (M); 0.85	ID	NLV	NLV	2.0 (M,AA); 0.31	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Fluoranthene	ug/L	210 (S)	210 (S)	1.6	210 (S)	210 (S)	210 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Fluorene	ug/L	880	2,000 (S)	12	2,000 (S)	2,000 (S)	2,000 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Indeno(1,2,3-cd)pyrene	ug/L	2.0 (M); 0.022 (S)	2.0 (M); 0.022 (S)	ID	NLV	NLV	2.0 (M, AA); 0.022	ID	NS **	NA	NS **	NA	NS *	NS***	<0.17	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Naphthalene	ug/L	520	1,500	13	31,000 (S)	31,000 (S)	31,000 (S)	NA	NS **	NA	NS **	NA	NS *	NS***	100	NS****	36	NS *	NS **	NA	NS *	27	34	320	
Phenanthrene	ug/L	52	150	2.4	1,000 (S)	1,000 (S)	1,000 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	0.46	NS****	0.29	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Pyrene	ug/L	140 (S)	140 (S)	ID	140 (S)	140 (S)	140 (S)	ID	NS **	NA	NS **	NA	NS *	NS***	0.31	NS****	<0.14	NS *	NS **	NA	NS *	< 0.11	< 0.1	< 0.12	
Other Target PAHs	ug/L	various	various	various	various	various	various	various	NS **	NA	NS **	NA	NS *	NS***	ND	NS****	ND	NS *	NS **	NA	NS *	ND	ND	ND	
VOCs (EPA Method 8260)																									
1,1,1-Trichloroethane	ug/L	200 (A)	200 (A)	200	6.6E+05	1.3E+06 (S)	1.3E+06 (S)	ID	NS **	<5	NS **	<5	NS *	NS***	<5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	ug/L	8.5	35	78 (X)	12,000	77,000	4,700	ID	NS **	<5	NS **	<5	NS *	NS***	<5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	<5
1,1,2-Trichloroethane	ug/L	5.0 (A)	5.0 (A)	330 (X)	17,000	1.1E+05	21,000	NA	NS **	<5	NS **	<5	NS *	NS***	<5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	<5
1,1-Dichloroethane	ug/L	880	2,500	740	1.0E+06	2.3E+06	2.4E+06	3.8E+05	NS **	<5	NS **	<5	NS *	NS***	<5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	<5
1,1-Dichloroethene	ug/L	7.0 (A)	7.0 (A)	65 (X)	200	1,300	11,000	97,000	NS **	<5	NS **	<5	NS *	NS***	<5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	<5
1,2,4-Trimethylbenzene	ug/L	63 (E)	63 (E)	17	56,000 (S)	56,000 (S)	56,000 (S)	56,000 (S)	NS**	NA	NS**	NA	NS*	NS***	970	<5	1200	NS*	NS**	NA	NS*	NA	NA	NA	NA
1,2-Dichloroethane	ug/L	5.0 (A)	5.0 (A)	360 (X)	9,600	59,000	19,000	2.5E+06	NS **	<5	NS **	<5	NS *	NS***	5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	39
1,2-Dichloropropane	ug/L	5.0 (A)	5.0 (A)	290 (X)	16,000	36,000	16,000	5.5E+05	NS **	<5	NS **	<5	NS *	NS***	<5	<5	<5	NS *	NS **	<5	NS *	<5	<5	<5	<5
1,3,5-Trimethylbenzene	ug/L	72 (E)	72 (E)	45	61,000 (S)	61,000 (S)	61,000 (S)	ID	NS**	NA	NS**	NA	NS*	NS***	310	<5	370 J	NS*	NS**	NA	NS*	NA	NA	NA	NA
2-Butanone	ug/L	13,000	38,000	2,200	2.4E+08 (S)	2.4E+08 (S)	2.4E+08 (S)	ID	NS **	<20	NS **	<20	NS *	NS***	<20	<20	<20	NS *	NS **	<20	NS *	<20	<20	<20	<20

Notes:
See Page 3 of 3

**EMPLOYEE DEVELOPMENT CENTER
65 EAST UNIVERSITY
PONTIAC, MICHIGAN**

GROUNDWATER SAMPLE LABORATORY ANALYTICAL RESULTS

Notes:

Exceedances: Cleanup criteria exceedances are bold and double bordered.

NS *: Not sampled. Borehole was dry (tight clay) with no indication of groundwater.

NS **: Not sampled. Groundwater observed in borehole after two-day recovery period, but did not recover enough volume to obtain a sample.

NS***: Not Sampled due to sheen observed in borehole.

NS****: Not sampled. Groundwater did not recover enough volume to obtain a sample within limited time constraints.

NA: Not analyzed.

ND / <: Not detected / < detection limit

Cleanup Criteria: Part 201 (Environmental Remediation) and Part 213 (Leaking Underground

Storage Tanks) of the Michigan Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451 (Revised January 23, 2006). Referenced are both Residential & Commercial I and Industrial & Commercial II, III, IV Cleanup Criteria and Screening Levels.

No TPH criteria exist; however, additional PAH constituents tested if detected TPH exceeded 1 mg/L.

(A) Criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.

(D) Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 parts per billion (ppb).

(E) Criterion is the aesthetic drinking water value, as required by section 20120a(5) of the act.

(L) Criteria for lead are derived using a biologically based model, as allowed for under section 20120a(10) of the act, and are not calculated using the algorithms and assumptions specified in pathway-specific rules. The generic residential drinking water criterion of 4 µg/L is linked to the generic soil direct contact criterion of 400 mg/kg. A higher concentrations in the drinking water, up to the state action level or 15 µg/L, may be allowed as a site-specific remedy, and still allow for drinking water use, under section 20120a(2) of the act if soil concentration are appropriately lower than 400 mg/kg. If a site specific criterion is approved based on this subdivision, a notice shall be filed on the deed for all property where the groundwater concentrations will exceed 4 µg/L to provide notice of the potential for unacceptable risk if soil or groundwater concentrations increase.

(M) Calculated criterion is below the analytical Target Detection Limit (TDL), therefore, the criterion defaults to the TDL.

(S) Criterion defaults to the hazardous substance-specific water solubility limit.

(AA) Comparison to these criteria may take into account an evaluation of whether the hazardous substances are adsorbed to particulates rather than dissolved in water and whether filtered groundwater samples were used to evaluate groundwater.

“ID” means insufficient data to develop criterion

(G) Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water. The final chronic value (FCV) for the protection of aquatic life shall be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg CaCO₃/L, use 400 mg CaCO₃/L for the FCV calculation. The FCV formula provides values in units of ug/L or ppb. The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV), and the surface water human non-drinking water value (HNDV).

(X) The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. For a groundwater discharge to the Great Lakes and their connecting waters or discharge in close proximity to a water supply intake in inland surface waters, the generic GSI criterion shall be the surface water human drinking water value (HDV) listed in the table in this footnote, except for those HDV indicated with an asterisk. For HDV with an asterisk, the generic GSI criterion shall be the lowest of the HDV, the WV, and the calculated FCV. see formulas in footnote (G). Soil protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria based on the HDV shall be as listed in the table in this footnote, except for those values with an asterisk. Soil GSI protection criteria for compounds with an asterisk shall be the greater of 20 times the GSI criterion or the GSI soil-water partition values using the GSI criteria developed with the procedure.

(W) Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 ug/L. Concentrations of trihalomethanes in soil shall be added together to determine compliance with the drinking water protection criterion of 1,600 ug/kg.

Table 3
EMPLOYEE DEVELOPMENT CENTER
65 EAST UNIVERSITY DRIVE
PONTIAC, MICHIGAN

SUMMARY OF SOIL SAMPLE EXTRACTION AND ANALYSIS DATES

Boring ID	Sample Collection Date	TPH (EPA Method 418.1)		PAHs (EPA Method 8310)		VOCs (EPA Method 8260 B)		MTBE (EPA Method 8021B)		Total Lead (EPA Method 6010B)		PCBs (EPA Method 8082)	
		Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date
B-1	11/06/2006	11/09/2006	11/10/2006	NA	NA	11/07/2006	11/07/2006	NA	NA	NS	NS	NS	NS
B-2	11/06/2006	11/09/2006	11/10/2006	NA	NA	11/07/2006	11/07/2006	NA	NA	NS	NS	NS	NS
B-3	11/06/2006	11/09/2006	11/10/2006	NA	NA	11/07/2006	11/07/2006	NA	NA	NS	NS	NS	NS
B-4	11/06/2006	11/09/2006	11/10/2006	NA	NA	11/07/2006	11/07/2006	NA	NA	NS	NS	NS	NS
B-5	11/06/2006	11/09/2006	11/10/2006	NA	NA	11/07/2006	11/07/2006	NA	NA	NS	NS	NS	NS
B-6	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-7	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-8	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/01/2006	12/01/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-9	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-10	11/08/2006	11/13/2006	11/13/2006	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-11	11/08/2006	11/13/2006	11/13/2006	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-12	11/08/2006	11/13/2006	11/13/2006	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-13	11/06/2006	11/09/2006	11/10/2006	NA	NA	11/07/2006	11/07/2006	NA	NA	NS	NS	NS	NS
B-14	11/06/2006	11/09/2006	11/10/2006	11/08/2006	11/10/2006	11/07/2006	11/09/2006	11/14/2006	11/16/2006	11/14/2006	11/15/2006	12/07/2006	12/07/2006
B-15	11/06/2006	11/09/2006	11/10/2006	11/07/2006 11/08/2006	11/10/2006	11/07/2006	11/09/2006	11/14/2006	11/16/2006	11/14/2006	11/15/2006	12/07/2006	12/07/2006
B-16	11/06/2006	11/09/2006	11/10/2006	11/08/2006	11/09/2006 11/10/2006	11/07/2006	11/07/2006 11/09/2006	11/14/2006	11/16/2006	11/14/2006	11/15/2006	NS	NS
B-17	11/08/2006	11/13/2006	11/13/2006	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-18	11/08/2006	11/13/2006	11/13/2006	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-19	11/08/2006	11/13/2006	11/13/2006	11/14/2006	11/16/2006	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-20	11/08/2006	11/13/2006	11/13/2006	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS	NS	NS
B-21	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/01/2006	12/01/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-22	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-23	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-24	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
B-25	11/30/2006	12/05/2006	12/05/2006	12/01/2006	12/04/2006	12/02/2006	12/02/2006	12/02/2006	12/04/2006	NS	NS	NS	NS
MW-2 (0-2')	12/01/2006	12/05/2006	12/05/2006	12/04/2006	12/06/2006	12/04/2006	12/04/2006	12/04/2006	12/04/2006	NS	NS	NS	NS
MW-2 (3-5')	12/01/2006	12/05/2006	12/05/2006	12/04/2006	12/06/2006	12/04/2006	12/04/2006	12/04/2006	12/04/2006	NS	NS	NS	NS

Table 4
EMPLOYEE DEVELOPMENT CENTER
65 EAST UNIVERSITY DRIVE
PONTIAC, MICHIGAN

SUMMARY OF GROUNDWATER SAMPLE EXTRACTION AND ANALYSIS DATES

Boring ID	Sample Collection Date	TPH (EPA Method 418.1)		Semivolatile Hydrocarbons (EPA Method 8015B)		PAHs (EPA Method 8310)		VOCs (EPA Method 8260 B)		MTBE (EPA Method 8021B)		Dissolved Metals (EPA Method 6010B)	
		Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date	Extraction Date	Analysis Date
B-2	11/08/2006	11/11/2006	11/13/2006	NS	NS	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS
B-4	11/08/2006	11/11/2006	11/13/2006	NS	NS	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS
B-7	11/30/2006	12/05/2006	12/05/2006	NS	NS	12/01/2006	12/05/2006	12/05/2006	12/05/2006	12/05/2006	12/05/2006	NS	NS
B-8	11/30/2006	NS	NS	NS	NS	NS	NS	12/04/2006	12/04/2006	12/03/2006	12/03/2006	NS	NS
B-9	11/30/2006	12/05/2006	12/05/2006	NS	NS	12/01/2006	12/05/2006	12/04/2006	12/04/2006	12/05/2006	12/05/2006	NS	NS
B-12	11/08/2006	11/11/2006	11/13/2006	NS	NS	NA	NA	11/09/2006	11/09/2006	NA	NA	NS	NS
B-14	11/08/2006	11/11/2006	11/13/2006	NS	NS	11/14/2006	11/15/2006 11/16/2006	11/09/2006	11/09/2006	11/17/2006	11/17/2006	NS	NS
B-15	11/08/2006	11/11/2006	11/13/2006	NS	NS	11/14/2006	11/15/2006 11/16/2006	11/09/2006	11/09/2006 11/10/2006	11/17/2006	11/17/2006	11/15/2006	11/22/2006
B-16	11/08/2006	11/11/2006	11/13/2006	NS	NS	11/14/2006	11/15/2006 11/16/2006 11/17/2006	11/09/2006	11/09/2006 11/10/2006	11/17/2006	11/17/2006	11/15/2006	11/22/2006
B-17	11/08/2006	11/11/2006	11/13/2006	NS	NS	11/14/2006	11/15/2006 11/16/2006	11/09/2006	11/09/2006 11/10/2006	NA	NA	NS	NS
B-18	11/08/2006	11/11/2006	11/13/2006	NS	NS	11/14/2006	11/16/2006	11/10/2006	11/10/2006	NA	NA	NS	NS
B-19	11/08/2006	11/11/2006	11/13/2006	NS	NS	NA	NA	11/10/2006	11/10/2006	NA	NA	NS	NS
B-20	11/08/2006	11/11/2006	11/13/2006	NS	NS	NA	NA	11/10/2006	11/10/2006	NA	NA	NS	NS
B-21	11/30/2006	NS	NS	NS	NS	NS	NS	12/04/2006	12/04/2006 12/05/2006	12/05/2006	12/05/2006	NS	NS
EW-1	12/11/2006	NS	NS	12/14/2006	12/15/2006	12/13/2006	12/14/2006	12/12/2006	12/12/2006 12/13/2006	12/15/2006	12/15/2006	12/14/2006	12/17/2006
MW-2	12/11/2006	NS	NS	12/14/2006	12/14/2006	12/13/2006	12/13/2006	12/12/2006	12/12/2006	12/14/2006	12/14/2006	12/14/2006	12/17/2006
MW-3	12/11/2006	NS	NS	12/14/2006	12/14/2006	12/13/2006	12/14/2006	12/12/2006	12/12/2006 12/13/2006	12/15/2006	12/15/2006	12/14/2006	12/17/2006
MW-4	12/11/2006	NS	NS	12/14/2006	12/14/2006	12/13/2006	12/14/2006	12/13/2006	12/13/2006	12/14/2006	12/14/2006	12/14/2006	12/17/2006
MW-5	12/11/2006	NS	NS	12/14/2006	12/14/2006 12/15/2006	12/13/2006	12/14/2006	12/12/2006	12/12/2006	12/14/2006	12/14/2006	12/14/2006	12/17/2006

**EMPLOYEE DEVELOPMENT CENTER
65 EAST UNIVERSITY
PONTIAC, MICHIGAN**

WELL ELEVATIONS AND WATER LEVELS

Monitoring/Extraction Well ID	Northing	Easting	Ground Elevations	Top/Casing Elevations	Casing Size (inches)	Depth to Groundwater (feet bgl)
EW-1	417593.2	13412851.7	917.2	916.91	4	3.76
MW-2	417694.9	13412826.7	917.9	917.46	2	6.07
MW-3	417562.5	13412755.1	917.3	916.9	2	5.01
MW-4	417541.2	13413172.1	913.1	912.78	2	2.57
MW-5	417422.5	13412930.9	916.8	916.14	2	10.35

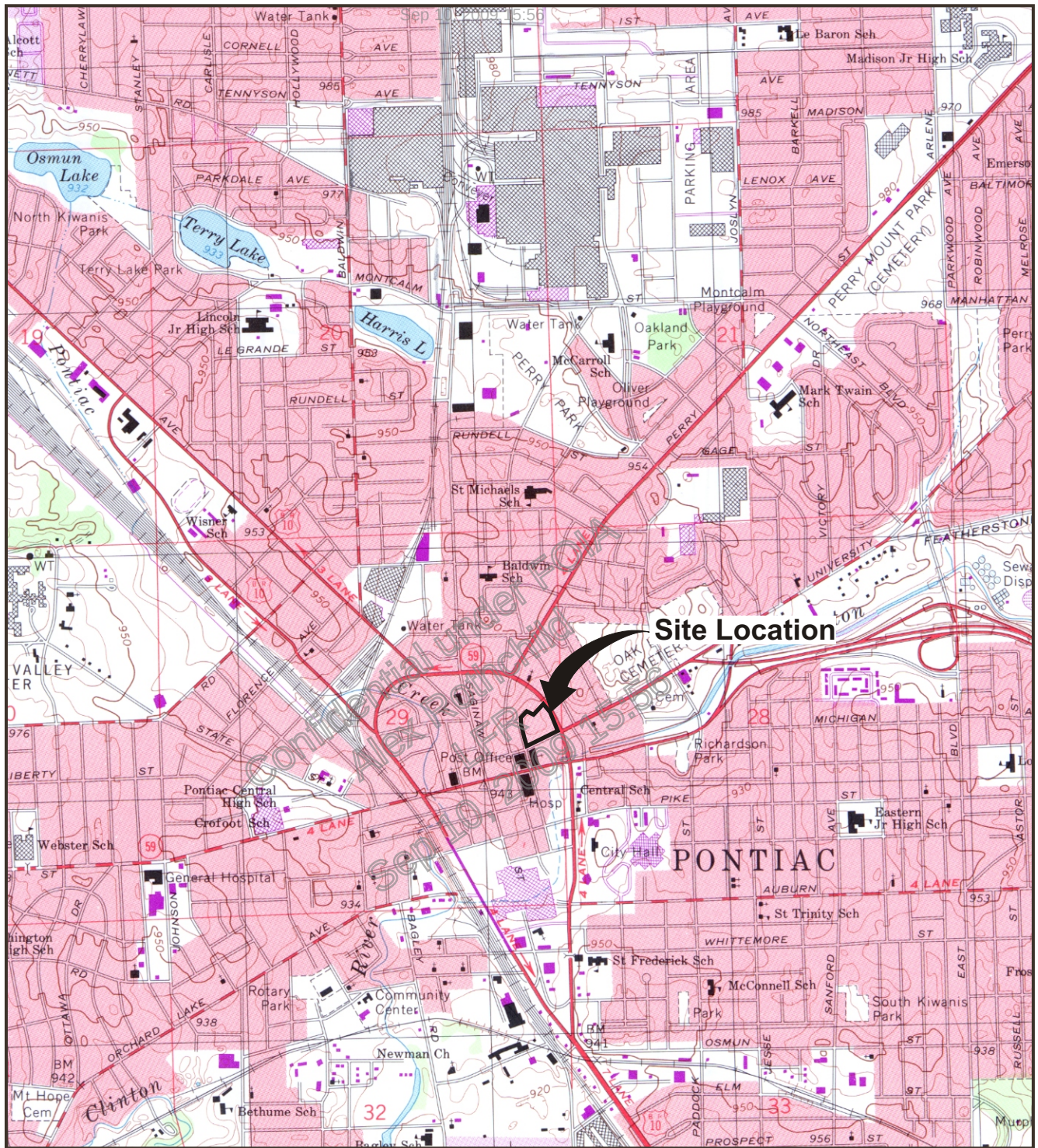
Notes:

1. Elevations are based on feet above the North American Vertical Datum of 1988 (NAVD88).
2. Coordinates are on the Michigan State Plane Coordinate System.
3. Elevations and coordinates were determined during Atwell Hicks December 11, 2006 survey.



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Figures



REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quads., Pontiac North, Michigan, 1971.

2000' 0 2000'
Approximate Scale: 1" = 2000'



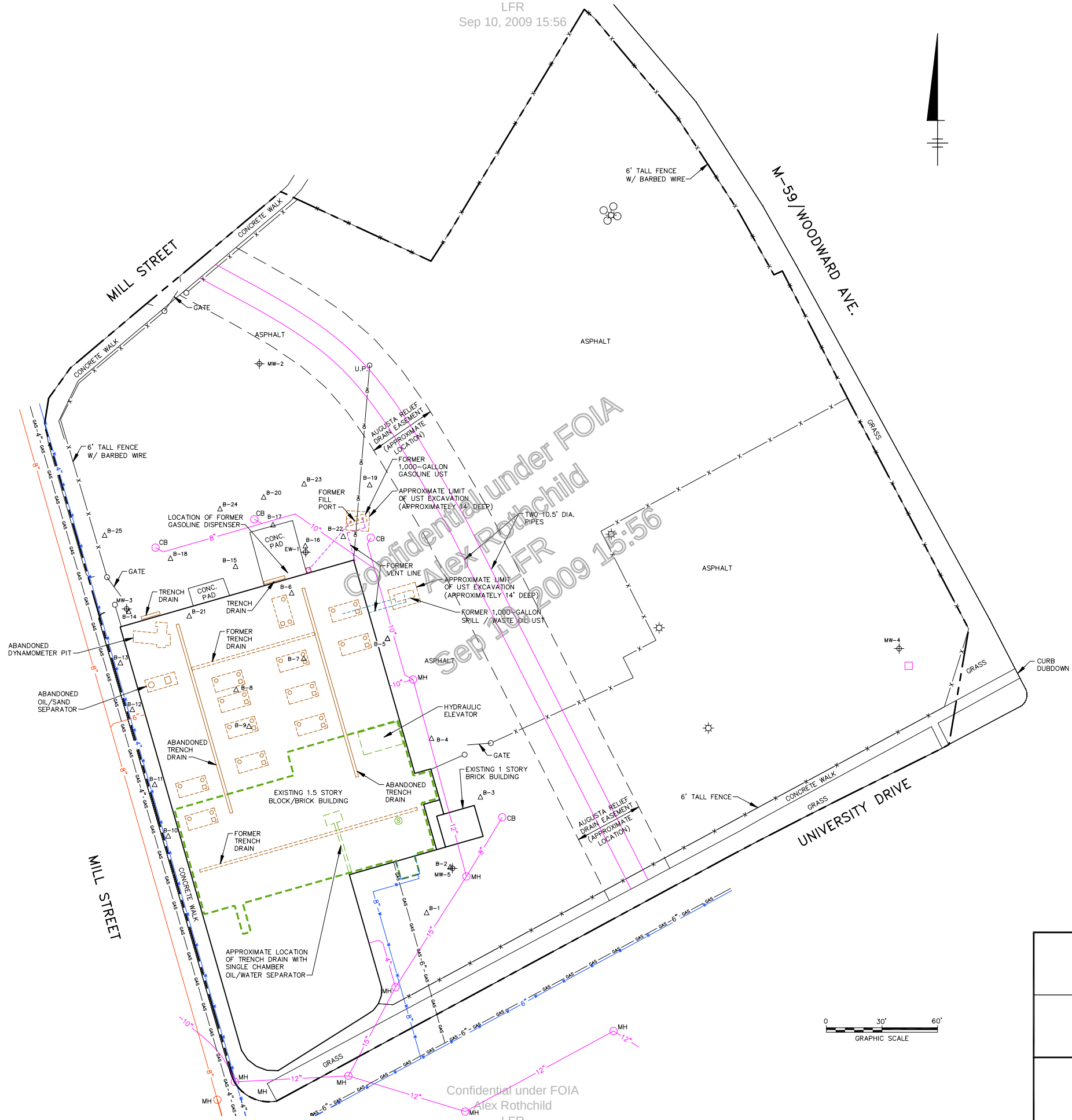
Area Enlargement

GENERAL MOTORS CORPORATION
EMPLOYEE DEVELOPMENT CENTER
65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

SITE LOCATION MAP

BRL-85-PFS LAYER: ON=*, OFF=REF*
J: 2007/6/4 8:00:31 64486001.dwg SAVED: 1/23/2007 4:21 PM LAYOUT: 2 PAGES: 2 PLOT: 1/23/2007 4:22 PM BY: ATOX
PROJECT NAME: 64486001
REF: 64486001
IMAGES: 64486001

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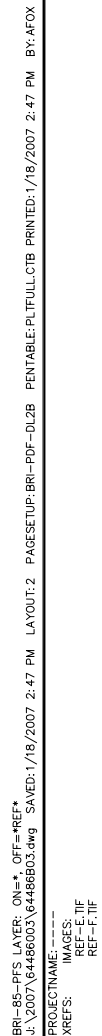
- LEGEND:
- APPROXIMATE PROPERTY BOUNDARY LINE
 - BUILDING
 - FENCE
 - APPROXIMATE BASEMENT OUTLINE
 - LIGHT POLE
 - UTILITY POLE
 - AUGUSTA RELIEF DRAIN EASEMENT (APPROXIMATE 1-015 FEET BGL)
 - 12" STORM SEWER (APPROXIMATELY 2.5 TO 8.2 FEET BGL)
 - STORM MANHOLE / CATCH BASIN
 - CATCH BASIN
 - 8" SANITARY SEWER (APPROXIMATELY 10.5 FEET BGL)
 - SANITARY MANHOLE
 - GAS - 4" - GAS (APPROXIMATELY 3.5 TO 5.5 FEET BGL)
 - 6" WATER (APPROXIMATELY 6 TO 7 FEET BGL)
 - GASOLINE UNDERGROUND PIPING
 - SPILL / WASTE OIL UNDERGROUND PIPING
 - OVERHEAD ELECTRIC
 - SOIL BORING LOCATION (ARCADIS BBL; 11/06-12/06)
 - MONITORING WELL LOCATION (ARCADIS BBL; 11/06-12/06)
 - UNDERGROUND POST
 - ABANDONED DUAL-POST UNDERGROUND HYDRAULIC LIFT
 - 50-GALLON HYDRAULIC OIL TANK
 - SUMP

- NOTES:
1. BASE MAP INFORMATION SUPPLIED BY ATWELL HICKS PLANIMETRIC, SOIL BORING AND MONITORING WELL SURVEY OF A PARCEL OF LAND, DATED 12-13-06.
 2. ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). COORDINATES ARE ON THE MICHIGAN STATE PLANE COORDINATE SYSTEM.
 3. MONITORING WELL, SOIL BORING AND MANHOLE LOCATIONS WERE SURVEYED BY ATWELL HICKS ON DECEMBER 11, 2006.
 4. UNDERGROUND UTILITY INFORMATION INCLUDING GAS LINE DEPTH SUPPLIED BY GENERAL MOTORS CORPORATION, FROM A FIGURE ENTITLED "PLOT PLAN", DATED 12-14-51, AT A SCALE OF 1/16"=1'-0".
 5. UTILITY DEPTHS FOR STORM SEWER PROVIDED BY ATWELL HICKS. UTILITY DEPTHS FOR WATER AND SANITARY SEWER PROVIDED BY CITY OF PONTIAC ENGINEERING DIVISION. UTILITY DEPTH FOR AUGUSTA RELIEF DRAIN PROVIDED BY OAKLAND COUNTY DRAIN COMMISSIONER.
 6. AUGUSTA RELIEF DRAIN PIPES ARE ASSUMED TO BE SIDE TO SIDE.
 7. BGL = BELOW GROUND LEVEL

GENERAL MOTORS CORPORATION
EMPLOYEE DEVELOPMENT CENTER
65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

SITE MAP

ARCADIS BBL
infrastructure, environment, facilities



BRL-85-ADF LAYER: ON=*, OFF=REF*
J: 2007/64486003/64486001.dwg SAVED: 2/1/2007 10:53 AM LAYOUT: 2 PAGES: 2/2 PENTABLE: PLT/Full.CTB PRINTED: 2/1/2007 10:53 AM BY: AFOX
PROJECT NAME: 64486003
XREFS: 64486001
IMAGES: 64486001

B-16 (4-5 feet bgl)		
Naphthalene (ug/kg)	870 (GSIP)	12,000
Ethylbenzene (ug/kg)	360 (GSIP) & 1,500 (DW)	34,000
Xylenes, Total (ug/kg)	700 (GSIP) & 5,600 (DW)	103,000
MTBE (ug/kg)	800 (DW)	4,200

B-20 (3.5-4.5 feet bgl)		
Benzene (ug/kg)	100 (DW)	220
Trichloroethene	100 (DW)	140

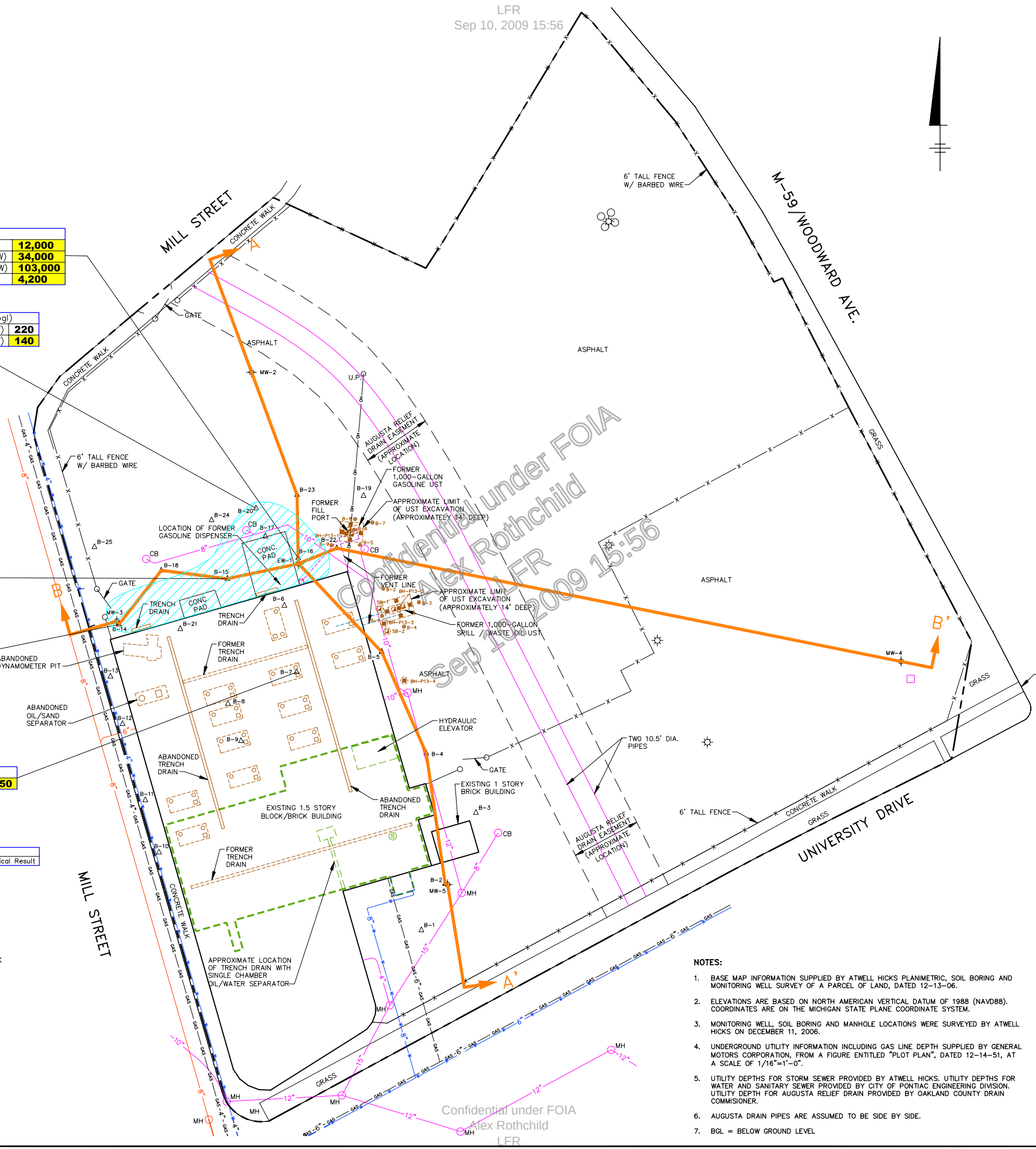
B-15 (6-8 feet bgl)		
Ethylbenzene (ug/kg)	360 (GSIP) & 1,500 (DW)	20,000
Toluene (ug/kg)	2,800 (GSIP) & 16,000 (DW)	21,000
Xylenes, Total (ug/kg)	700 (GSIP) & 5,600 (DW)	85,000
MTBE (ug/kg)	800 (DW)	4,200

B-14 (5-7 feet bgl)		
Ethylbenzene (ug/kg)	360 (GSIP) & 1,500 (DW)	3,500
Xylenes, Total (ug/kg)	700 (GSIP) & 5,600 (DW)	8,220

B-7 (2-4 feet bgl)		
Benzene (ug/kg)	100 (DW)	750

SOIL BORING ID (SAMPLE DEPTH)		
Analytical Test Parameter	Soil Cleanup Criteria and Risk Based Screening Level*	Analytical Result

- NOTES:
- DW = RESIDENTIAL AND COMMERCIAL I, AND COMMERCIAL II, III, IV AND INDUSTRIAL DRINKING WATER PROTECTION CRITERIA
 - GSIP = GROUNDWATER/SURFACE WATER INTERFACE PROTECTION CRITERIA
 - ug/kg = MICROGRAMS PER KILOGRAM
 - LISTED CONCENTRATIONS EXCEED THE LISTED RESIDENTIAL AND COMMERCIAL I, AND COMMERCIAL II, III, & IV GROUNDWATER PROTECTION SOIL CLEANUP CRITERIA AND RISK BASED SCREENING LEVELS.
 - HIGHLIGHTED CONCENTRATIONS REPRESENT THE MAXIMUM SOL CLEANUP CRITERIA AND RISK BASED SCREENING LEVEL EXCEEDANCES.



LEGEND:

- APPROXIMATE PROPERTY BOUNDARY LINE
- BUILDING
- x-x- FENCE
- - - APPROXIMATE BASEMENT OUTLINE
- ☼ LIGHT POLE
- U.P. ○ UTILITY POLE
- - - AUGUSTA RELIEF DRAIN EASEMENT (APPROXIMATELY 10 TO 15 FEET BGL)
- 12" STORM SEWER (APPROXIMATELY 2.5 TO 8.2 FEET BGL)
- STORM MANHOLE / CATCH BASIN
- CATCH BASIN
- 8" SANITARY SEWER (APPROXIMATELY 10.5 FEET BGL)
- SANITARY MANHOLE
- 4" GAS (APPROXIMATELY 3.5 TO 5.5 FEET BGL)
- 6" WATER (APPROXIMATELY 6 TO 7 FEET BGL)
- - - GASOLINE UNDERGROUND PIPING
- - - SPILL / WASTE OIL UNDERGROUND PIPING
- OH OH OVERHEAD ELECTRIC
- △ SOIL BORING LOCATION (ARCADIS BBL; 11/06-12/06)
- MW-1 MONITORING WELL LOCATION (ARCADIS BBL; 11/06-12/06)
- EXCAVATION SIDEWALL SAMPLE LOCATION (INLAND WATERS; 3/91)
- EXCAVATION FLOOR SAMPLE LOCATION (INLAND WATERS; 3/91)
- PREVIOUS SOIL BORING LOCATION (ENKON; 4/92)
- PREVIOUS SOIL BORING LOCATION (PICKERING ENVIRONMENTAL ASSOCIATES; 1/93)
- PREVIOUS SOIL BORING LOCATION (CRA; 3/95)
- A A' CROSS SECTION LOCATOR
- UNDERGROUND POST
- ABANDONED DUAL-POST UNDERGROUND HYDRAULIC LIFT
- 50-GALLON HYDRAULIC OIL TANK
- SUMP
- Approximate extent of soil contamination

- NOTES:
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PONTIAC, MICHIGAN 48342

SOIL SAMPLING RESULTS -
NOVEMBER AND DECEMBER 2006

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
4

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LEGEND:

- APPROXIMATE PROPERTY BOUNDARY LINE
- BUILDING
- FENCE
- APPROXIMATE BASEMENT OUTLINE
- LIGHT POLE
- UTILITY POLE
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- STORM MANHOLE / CATCH BASIN
- CATCH BASIN
- 8" SANITARY SEWER (APPROXIMATELY 10.5 FEET BGL)
- SANITARY MANHOLE
- GAS (APPROXIMATELY 3.5 TO 5.5 FEET BGL)
- WATER (APPROXIMATELY 6 TO 7 FEET BGL)
- GASOLINE UNDERGROUND PIPING
- SPILL / WASTE OIL UNDERGROUND PIPING
- OVERHEAD ELECTRIC
- SOIL BORING LOCATION (ARCADIS BBL; 11/06-12/06)
- MONITORING WELL LOCATION (ARCADIS BBL; 11/06-12/06)
- CROSS SECTION LOCATOR
- UNDERGROUND POST
- ABANDONED DUAL-POST UNDERGROUND HYDRAULIC LIFT
- 50-GALLON HYDRAULIC OIL TANK
- SUMP

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65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

GROUNDWATER SAMPLING RESULTS
- NOVEMBER AND DECEMBER 2006



B-17 (5-10 feet bgl)

Naphthalene (ug/L)	13 (GSI)	45
1,2-Dichloroethane (ug/L)	5 (DW)	8
Benzene (ug/L)	5 (DW) & 200 (GSI)	1,400
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	1,200
Toluene (ug/L)	140 (GSI) & 790 (DW)	1,400
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	4,990

B-15 (5-10 feet bgl)

Naphthalene (ug/L)	13 (GSI)	34
Benzene (ug/L)	5 (DW)	180
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	1,100
Toluene (ug/L)	140 (GSI) & 790 (DW)	2,600
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	5,100
MTBE (ug/L)	40 (DW)	60

B-21 (7-12 feet bgl)

1,2,4-Trimethylbenzene (ug/L)	17 (GSI) & 63 (DW)	2,800
1,3,5-Trimethylbenzene (ug/L)	45 (GSI) & 72 (DW)	750 J
Benzene (ug/L)	5 (DW) & 200 (GSI)	4,600
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	4,100
Toluene (ug/L)	140 (GSI) & 790 (DW)	20,000
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	18,900

MW-3 (5-15 feet bgl)

1,2,4-Trimethylbenzene (ug/L)	17 (GSI)	40
1,2-Dichloroethane (ug/L)	5 (DW)	14
1,2-Dichloropropane (ug/L)	45 (GSI) & 72 (DW)	140
Benzene (ug/L)	5 (DW) & 200 (GSI)	3,000
Ethylbenzene (ug/L)	18 (GSI)	54
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	327

B-14 (5-10 feet bgl)

Naphthalene (ug/L)	13 (GSI)	27
Benzene (ug/L)	5 (DW)	37
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	130
Tetrachloroethylene (ug/L)	5 (DW)	8
Xylenes, Total (ug/L)	35 (GSI)	267

B-7 (3-8 feet bgl)

Naphthalene (ug/L)	13 (GSI)	100
1,2,4-Trimethylbenzene (ug/L)	17 (GSI) & 63 (DW)	970
1,3,5-Trimethylbenzene (ug/L)	45 (GSI) & 72 (DW)	310
Benzene (ug/L)	5 (DW) & 200 (GSI)	420
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	1,400
Toluene (ug/L)	140 (GSI) & 790 (DW)	3,000
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	5,500

B-12 (10-15 feet bgl)

Trichloroethene (ug/L)	5 (DW)	17
------------------------	--------	----

B-9 (7-12 feet bgl)

Naphthalene (ug/L)	13 (GSI)	36
1,2,4-Trimethylbenzene (ug/L)	17 (GSI) & 63 (DW)	1,200
1,3,5-Trimethylbenzene (ug/L)	45 (GSI) & 72 (DW)	370 J
Benzene (ug/L)	5 (DW) & 200 (GSI) & 5,600 (Res. VIA)	7,200
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	860
Toluene (ug/L)	140 (GSI)	560
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	3,020

B-4 (5-10 feet bgl)

Trichloroethene (ug/L)	5 (DW)	8
------------------------	--------	---

BORING/MONITORING WELL ID (SCREENED INTERVAL)

Analytical Test Parameter	Groundwater Cleanup Criteria and Risk Based Screening Level*	Analytical Result
---------------------------	--	-------------------

- NOTES:
- DW = RESIDENTIAL AND COMMERCIAL I, AND COMMERCIAL II, III, IV, AND INDUSTRIAL DRINKING WATER PROTECTION CRITERIA
 - GSI = GROUNDWATER/SURFACE WATER INTERFACE CRITERIA
 - Res. VIA = RESIDENTIAL & COMMERCIAL I GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
 - ug/L = MICROGRAMS/LITER
 - J = ESTIMATED VALUE BETWEEN METHOD DETECTION LIMIT AND PRACTICAL QUANTITATION LIMIT
 - *6. LISTED CONCENTRATIONS EXCEED THE LISTED RESIDENTIAL AND COMMERCIAL I, AND COMMERCIAL II, III, & IV GROUNDWATER SOIL CLEANUP CRITERIA AND RISK BASED SCREENING LEVELS
 - HIGHLIGHTED CONCENTRATIONS REPRESENT THE MAXIMUM GROUNDWATER CLEANUP CRITERIA AND RISK BASED SCREENING LEVEL EXCEEDANCES.

MW-5 (7-17 feet bgl)

Trichloroethene (ug/L)	5 (DW)	11
------------------------	--------	----

B-16 (5-10 feet bgl)

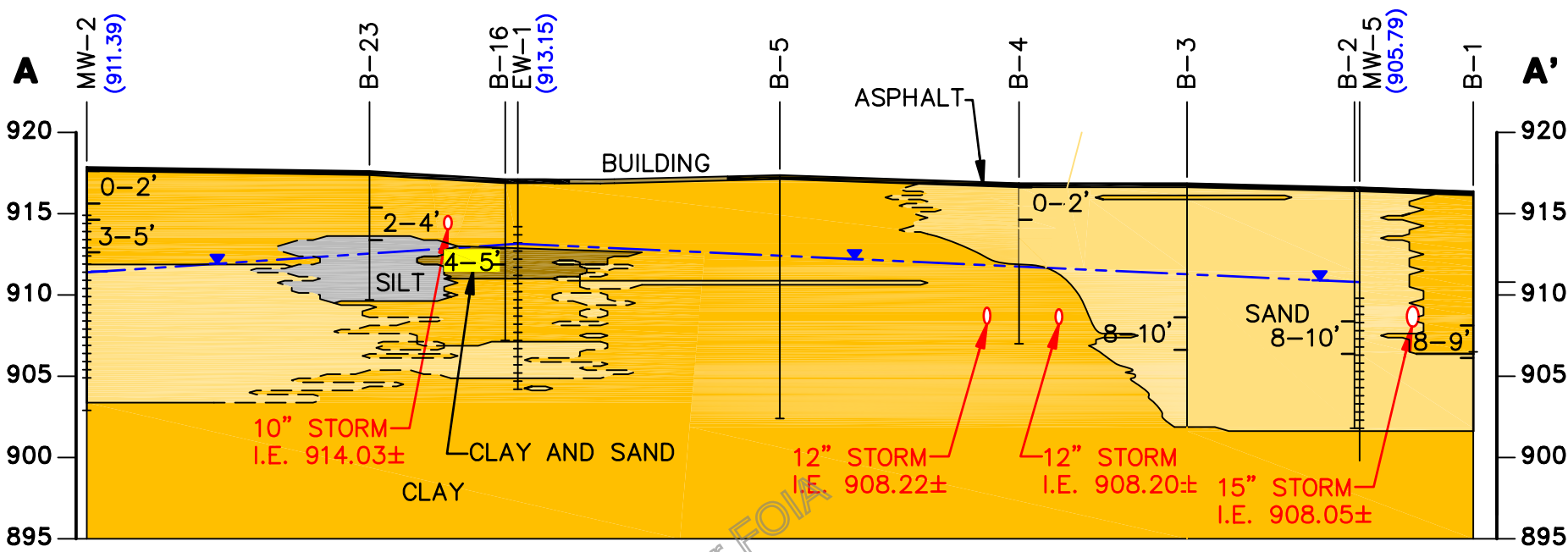
2-Methylnaphthalene (ug/L)	260 (DW)	270
Naphthalene (ug/L)	13 (GSI)	320
1,2-Dichloroethane (ug/L)	5 (DW)	39
Benzene (ug/L)	5 (DW) & 200 (GSI)	730
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	1,300
Toluene (ug/L)	140 (GSI)	350
Vinyl chloride (ug/L)	2 (DW) & 15 (GSI)	270 J
cis-1,2-Dichloroethene (ug/L)	70 (DW)	170
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	3,630
MTBE (ug/L)	40 (DW)	87

EW-1 (3-13 feet bgl)

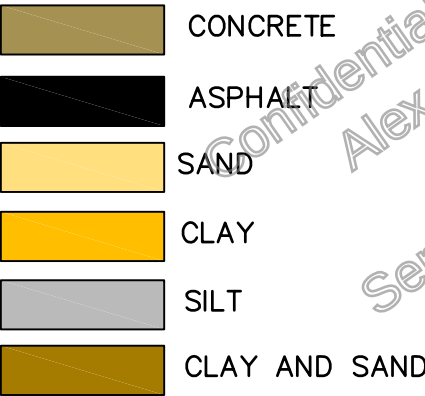
Naphthalene (ug/L)	13 (GSI)	280
1,2,4-Trimethylbenzene (ug/L)	17 (GSI) & 63 (DW)	790
1,2-Dichloroethane (ug/L)	5 (DW)	13
1,3,5-Trimethylbenzene (ug/L)	45 (GSI) & 72 (DW)	190
Benzene (ug/L)	5 (DW) & 200 (GSI)	930
Ethylbenzene (ug/L)	18 (GSI) & 74 (DW)	1,500
Toluene (ug/L)	140 (GSI)	520
Xylenes, Total (ug/L)	35 (GSI) & 280 (DW)	5,600
MTBE (ug/L)	40 (DW)	85
Total Lead (ug/L)	0.004 (DW)	0.00734

BRL-85-A0F LAYER: ON=*, OFF=REF*
J: 2007/64486003/6448602.dwg PENTABLE:PLT/FULL.CTB PRINTED: 2/1/2007 10:49 AM BY: AFOX
PROJECT NAME: 64486003
REFS: 64486001
64486001





LEGEND:

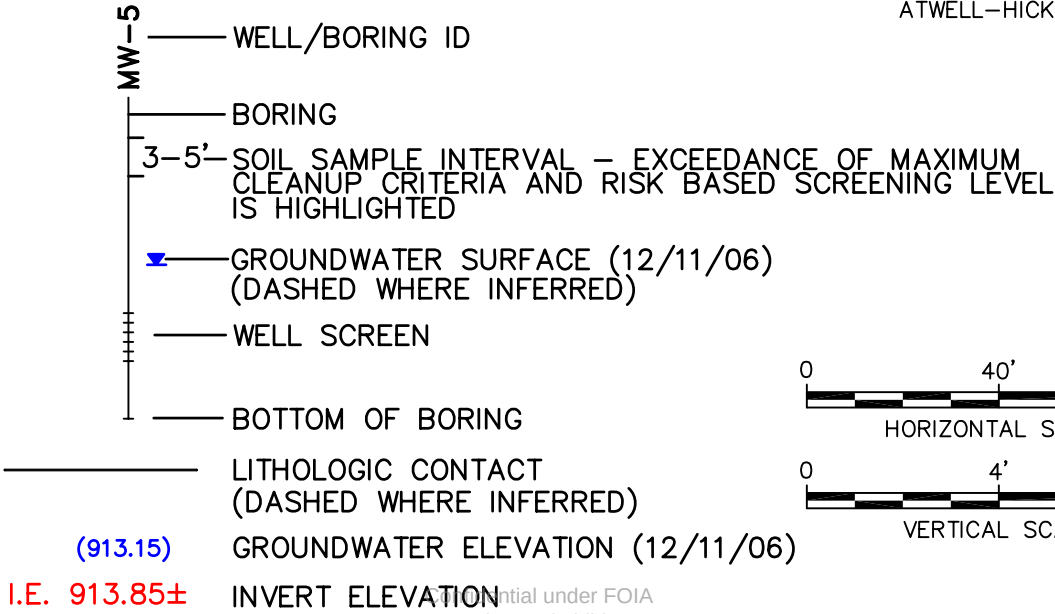


NOTE:

UTILITY INFORMATION SUPPLIED BY ATWELL HICKS
PLANIMETRIC, SOIL BORING AND MONITORING WELL
SURVEY OF A PARCEL OF LAND AT A SCALE
1"=50' DATED 12-13-06

UNDERGROUND UTILITY INFORMATION SUPPLIED BY
GENERAL MOTORS CORPORATION, FROM A FIGURE
ENTITLED "PLOT PLAN", DATED 12-14-51 AT A
SCALE OF 1/16"=1'-0".

UTILITY DEPTHS FOR STORM SEWER PROVIDED BY
ATWELL-HICKS.

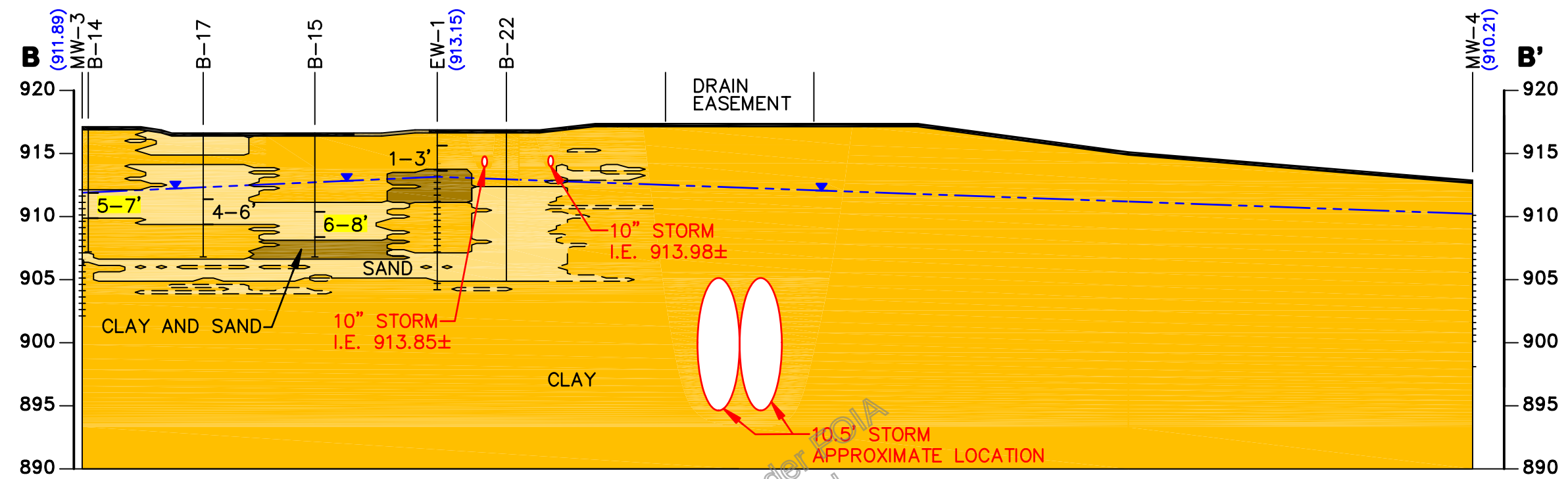


GENERAL MOTORS CORPORATION
EMPLOYEE DEVELOPMENT CENTER
65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

GEOLOGIC CROSS-SECTION A-A'

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
7



LEGEND:

- CONCRETE
- ASPHALT
- SAND
- CLAY
- SILT
- CLAY AND SAND

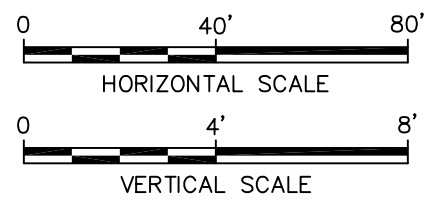
- WELL/BORING ID
- BORING
- 5-7' SOIL SAMPLE INTERVAL - EXCEEDANCE OF MAXIMUM CLEANUP CRITERIA AND RISK BASED SCREENING LEVEL IS HIGHLIGHTED
- GROUNDWATER SURFACE (12/11/06) (DASHED WHERE INFERRED)
- WELL SCREEN
- BOTTOM OF BORING
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION (12/11/06) (913.15)
- INVERT ELEVATION I.E. 913.85±

NOTE:

UTILITY INFORMATION SUPPLIED BY ATWELL HICKS PLANIMETRIC, SOIL BORING AND MONITORING WELL SURVEY OF A PARCEL OF LAND AT A SCALE 1"=50' DATED 12-13-06

UNDERGROUND UTILITY INFORMATION SUPPLIED BY GENERAL MOTORS CORPORATION, FROM A FIGURE ENTITLED "PLOT PLAN", DATED 12-14-51 AT A SCALE OF 1/8"=1'-0".

UTILITY DEPTHS FOR STORM SEWER PROVIDED BY ATWELL-HICKS.



GENERAL MOTORS CORPORATION
EMPLOYEE DEVELOPMENT CENTER
65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

GEOLOGIC CROSS-SECTION B-B'

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
8

BR1-85-ADF LAYER: ON=*, OFF=REF*
J:\2007\64486003\64486001.dwg
PROJECTNAME: 64411X01.GIF
XREFS: 64411X01.GIF
PENTABLE: PLT\FULL.CTB
PRINTED: 1/30/2007 3:46 PM
BY: AFOX
PAGESETUP: 1/30/2007 3:46 PM
LAYOUT: B-B'
LAYER: B-B'
PAGESETUP: 1/30/2007 3:46 PM
LAYER: B-B'
PAGESETUP: 1/30/2007 3:46 PM
LAYER: B-B'



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Alex Rothchild
LFR
Sep 10, 2009 15:56

Appendix A

Release Reporting Documents

***** -COMM. JOURNAL- ***** DATE NOV-14-2006 ***** TIME 11:25 *****
Sep 10, 2009 15:56

MODE = MEMORY TRANSMISSION

START=NOV-14 11:24

END=NOV-14 11:25

FILE NO.=735

STN NO.	COMM.	ONE-TOUCH/ ABBR NO.	STATION NAME/EMAIL ADDRESS/TELEPHONE NO.	PAGES	DURATION
001	OK	B	15173352245--	003/003	00:00:30

***** UF-8000 v2 *****

- ***** -

18102298837- *****



10559 Citation Drive • Suite 100 • Brighton, MI 48116
Tel (810) 229-8594 • Fax (810) 229-8837
www.bblinc.com

FACSIMILE TRANSMISSION

TO: MDEQ, WHAD
FROM: Brad Saunders
DATE: November 14, 2006

FAX #: 1-517-335-2245

BBL PROJECT #:

PAGES: 3 (including cover sheet)

☒ Original will not follow

☐ Original will follow by: _____

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NOTES:

RE: Confirmed Release Report

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Tel (810) 229-8594 • Fax (810) 229-8837
www.bbl-inc.com

FACSIMILE TRANSMISSION

TO: MDEQ, WHMO

FAX #: 1-517-335-2245

FROM: Brad Saunders

BBL PROJECT #:

DATE: November 14, 2006

PAGES: 3 (including cover sheet)

☒ Original will not follow

☐ Original will follow by: _____

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NOTES:

RE: Confirmed Release Report



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - WASTE AND HAZARDOUS MATERIALS DIVISION
PO BOX 30241, LANSING, MI 48909-7741, Phone 517-335-2690, Fax 517-335-2245, E-mail DEQ-STD-TANKS@state.mi.us

RELEASE REPORT: ☐ SUSPECTED ☒ CONFIRMED

THIS INFORMATION IS REQUIRED UNDER 1994 PA 451, AS AMENDED (Act 451). FAILURE TO COMPLY WITH THE PROVISIONS OF THIS ACT MAY RESULT IN A MISDEMEANOR AND/OR CIVIL PENALTIES NOT TO EXCEED \$5000 PER DAY, PER TANK.

INSTRUCTIONS: This form applies to releases of petroleum and hazardous substances from underground storage tanks regulated under Part 211, Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (PA 451).

The owner or operator must report suspected and confirmed releases to the Waste And Hazardous Materials Division (WHMD) within 24 hours of discovery. The report may be made by a consultant on behalf of the owner/operator. Phone 1-800-MICHUST, FAX this form to 517-335-2245, or submit the web form from the WHMD web site www.state.mi.us/std. All information on this form must be provided regardless of whether the release is reported by telephone, FAX, or web form. For further information see Page 2.

WHMD USE ONLY	
FACILITY NUMBER	ENTRY DATE
UPGRADE/CANCEL DATE	INCIDENT NUMBER
DATE REPORTED	TIME REPORTED ☐ AM ☐ PM
REPORTED BY: ☐ PHONE ☐ FAX ☐ VOICE MAIL ☐ E-MAIL ☐ REGULAR MAIL	
Signature	

PERSON REPORTING RELEASE Brad Saunders		COMPANY (IF NOT OWNER/OPERATOR) Blasland Bouck & Lee, Inc.		TELEPHONE NUMBER: (810) 229-8823 x104	
TANK REMOVAL CONTRACTOR Not Applicable		CONTRACTOR CONTACT ---		CONTRACTOR TELEPHONE NUMBER: (---) ---	
I. OWNERSHIP OF TANKS			II. LOCATION OF TANKS		
NAME OF OWNER (CORPORATION, INDIVIDUAL, ETC.) General Motors Corporation			FACILITY NAME OR COMPANY SITE IDENTIFIER GM Pontiac Development Center		
STREET ADDRESS 2000 Centerpoint Pkwy, Mail Code: 483-520-190			STREET ADDRESS (P O Box Not Acceptable) 65 East University		
CITY Pontiac	STATE Michigan	ZIP CODE 48341-3147	CITY Pontiac	COUNTY Oakland	STATE MI
TELEPHONE NUMBER (248) 753-5790		TELEPHONE NUMBER 248-753-5790			
DATE RELEASE DISCOVERED: November 6, 2006			CONTACT PERSON FOR LOCATION Fred Rindhage		
TIME RELEASE DISCOVERED: ☐ AM ☒ PM					
TANK NUMBER ¹ (if known)	#2				
SIZE OF TANK (gallons)	1,000 (former)				
SUBSTANCE RELEASED	Gasoline				
CAUSE OF RELEASE (Check all that apply)	☐ Tank ☒ Piping ☐ Spill Protection ☐ Overfill Protection ☒ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)
HOW WAS LEAK DETECTED (Check all that apply)	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☒ Stained Soil ☒ Petroleum Odors ☒ Analytical Data ☒ Free Product and/or Oil Sheen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Sheen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Sheen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Sheen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Sheen in Groundwater
COMMENTS (attach additional sheets if necessary): See Attachment					

DISTRIBUTION: WHMD, FACILITY FILE, DISTRICT OFFICE, OWNER

¹ Copy this page for additional tanks if needed.

**Attachment to November 14, 2006 Confirmed Release Report
GM Pontiac Development Center
65 East University Pontiac, MI 48342**

RE: MDEQ UST Facility ID 15260

As part of a routine due diligence investigation, evidence of gasoline contamination was detected and recently confirmed via analytical results in area of underground piping and former dispenser assumed to be associated with former gasoline UST which was removed from the ground in 1990. A previous LUST report (Release ID C-1142-91), several investigations conducted from 1990-1995, and closure in the area of the gasoline UST and another UST (Dec. 22, 1995) focused in the area of the tanks but not the piping or dispenser associated with the gasoline UST.

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Alex Rothchild
LFR
Sep 10, 2009 15:56



JENNIFER M. GRANHOLM
GOVERNOR

Confidential under FOIA
Alex Rothchild
LFR
SEP 10 2009 15:56
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING
Sep 10, 2009 15:56



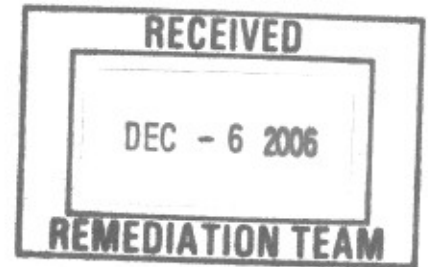
STEVEN E. CHESTER
DIRECTOR

November 14, 2006

CERTIFIED MAIL

GM Corp Truck Group
2100 S Opdyke Rd
MC 483-606-186
Pontiac, MI 48341-3155

Dear GM Corp Truck Group :



SUBJECT: Facility ID No. 00015260, Confirmed Release No. C-0328-06
Gm Truck & Bus Group Plant 13
65 University Dr, Pontiac, MI 48342-2359, Oakland County

On November 14, 2006, the Department of Environmental Quality (DEQ), Waste and Hazardous Materials Division (WHMD), was notified of a release of a regulated substance from an underground storage tank (UST) system at the subject location. Enclosed is a copy of the confirmed release report.

Pursuant to Part 213, Leaking Underground Storage Tanks, of the natural Resources and Environmental Protection Act, 1994 PA 451, as amended, you are responsible for hiring a Qualified Underground Storage Tank Consultant to conduct the required corrective actions at this location. Please see the enclosed information regarding the hiring of a QUC. If you do not agree that you are responsible for conducting corrective actions at this facility, you may submit supporting documentation to the Remediation and Redevelopment Division (RRD) of the DEQ within 30 days from receipt of this letter that demonstrates you are not responsible for the release.

The RRD may audit or oversee all aspects of corrective actions undertaken pursuant to Part 213. Please be advised that the owner or operator may be subject to penalties for not submitting the reports outlined in Part 213. In addition, Section 21324 of Part 213 provides that a person who submits, or causes to be submitted, false or misleading information may be prosecuted for fraud.

Please note that you are required to notify the WHMD of any changes to your UST system using the form EQP3821 Registration of Underground Storage Tanks.

Please include the facility identification number in any further communications with the DEQ. Correspondence, including reports required under Part 213, should be submitted to the RRD SE Michigan District Office, 27700 Donald Court, Warren, MI 48092-2793. Should you have questions regarding this letter, or need additional information, please contact the SE Michigan District Office at (586) 753-3700.

Sincerely,

Jim Lucas
Storage Tank Unit
Waste and Hazardous Materials Division

Enclosures

cc: SE Michigan District Office, RRD



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - WASTE AND HAZARDOUS MATERIALS DIVISION
PO BOX 30241, LANSING, MI 48909-7741, Phone 517-335-2690, Fax 517-335-2245, E-mail DEQ-STD-TANKS@state.mi.us

RELEASE REPORT: ☐ SUSPECTED ☒ CONFIRMED

THIS INFORMATION IS REQUIRED UNDER 1994 PA 451, AS AMENDED (Act 451). FAILURE TO COMPLY WITH THE PROVISIONS OF THIS ACT MAY RESULT IN A MISDEMEANOR AND/OR CIVIL PENALTIES NOT TO EXCEED \$5000 PER DAY, PER TANK.

INSTRUCTIONS: This form applies to releases of petroleum and hazardous substances from underground storage tanks regulated under Part 211, Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (PA 451).

The owner or operator must report suspected and confirmed releases to the Waste And Hazardous Materials Division (WHMD) within 24 hours of discovery. The report may be made by a consultant on behalf of the owner/operator, Phone 1-800-MICHUST, FAX this form to 517-335-2245, or submit the web form from the WHMD web site www.state.mi.us/std. All information on this form must be provided regardless of whether the release is reported by telephone, FAX, or web form. For further information see Page 2.

WHMD USE ONLY

FACILITY NUMBER 15260	ENTRY DATE 11/14/06
UPGRADE/CANCEL DATE	INCIDENT NUMBER C-0328-06
DATE REPORTED 11/14/2006	TIME REPORTED 11:25 AM ☒ AM ☐ PM
REPORTED BY: ☐ PHONE ☒ FAX ☐ VOICE MAIL ☐ E-MAIL ☐ REGULAR MAIL	
Signature James C. LIND	

PERSON REPORTING RELEASE Brad Saunders		COMPANY (IF NOT OWNER/OPERATOR) Bladland, Bouck & Lee, Inc.		TELEPHONE NUMBER: (810) 229-8823 x104	
TANK REMOVAL CONTRACTOR Not Applicable		CONTRACTOR CONTACT		CONTRACTOR TELEPHONE NUMBER: () -	
I. OWNERSHIP OF TANKS			II. LOCATION OF TANKS		
NAME OF OWNER (CORPORATION, INDIVIDUAL, ETC.) General Motors Corporation			FACILITY NAME OR COMPANY SITE IDENTIFIER Gm Pontiac Development Center		
STREET ADDRESS 2000 Centerpoint Pkwy, Mail Code: 483-520-190			STREET ADDRESS (P O Box Not Acceptable) 65 East University		
CITY Pontiac	STATE Michigan	ZIP CODE 48341-3147	CITY Pontiac	COUNTY Oakland	STATE MI
TELEPHONE NUMBER (248) 753-5790			TELEPHONE NUMBER (248) 753-5790		
DATE RELEASE DISCOVERED: November 6, 2006			CONTACT PERSON FOR LOCATION Fred Rindhage		
TIME RELEASE DISCOVERED: ☐ AM ☒ PM					
TANK NUMBER ¹ (if known)	#2				
SIZE OF TANK (gallons)	1,000 (former)				
SUBSTANCE RELEASED	Gasoline				
CAUSE OF RELEASE (Check all that apply)	☐ Tank ☒ Piping ☐ Spill Protection ☐ Overfill Protection ☒ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)	☐ Tank ☐ Piping ☐ Spill Protection ☐ Overfill Protection ☐ Dispenser ☐ Unknown ☐ Other (provide details in comments)
HOW WAS LEAK DETECTED (Check all that apply)	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☒ Stained Soil ☒ Petroleum Odors ☒ Analytical Data ☒ Free Product and/or Oil Shoen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Shoen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Shoen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Shoen in Groundwater	☐ Tank Removal ☐ Inventory Records ☐ Repairs ☐ Stained Soil ☐ Petroleum Odors ☐ Analytical Data ☐ Free Product and/or Oil Shoen in Groundwater
COMMENTS (attach additional sheets if necessary): See Attachment					

DISTRIBUTION: WHMD, FACILITY FILE, DISTRICT OFFICE, OWNER

¹ Copy this page for additional tanks if needed.

**Attachment to November 14, 2006 Confirmed Release Report
GM Pontiac Development Center
65 East University Pontiac, MI 48342**

RE: MDEQ UST Facility ID 15260

As part of a routine due diligence investigation, evidence of gasoline contamination was detected and recently confirmed via analytical results in area of underground piping and former dispenser assumed to be associated with former gasoline UST which was removed from the ground in 1990. A previous LUST report (Release ID C-1142-91), several investigations conducted from 1990-1995, and closure in the area of the gasoline UST and another UST (Dec. 22, 1995) focused in the area of the tanks but not the piping or dispenser associated with the gasoline UST.

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Alex Rothchild
LFR
Sep 10, 2009 15:56



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LFR
Sep 10, 2009 15:56

Appendix B

Soil Excavation Documents



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Appendix C

Laboratory Data



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Sep 10, 2009 15:56

Appendix D

Soil Boring/Monitoring Well Logs

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417398.2
Easting: 13412917.0
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 916.5
Descriptions By: Beth Reimer

Boring ID: B-1
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-5'	3'	0.0			ASPHALT. Light reddish brown SILTY CLAY, soft to hard, plastic, dry to moist, no odor detected and no staining observed.	Borehole backfilled with soil cuttings.
5									
910		2	5-10'	5'	0.0	CL		Few small layers of very fine to coarse SAND from 5.5-6' bgs.	
10									
905								End of boring at 10' bgs.	
15									



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

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Alex Rothchild
LFR
Sep 10, 2009 15:56

Northing: 417422.9
Easting: 13412929.7
Casing Elevation: NA
Borehole Depth: 15' bgs
Surface Elevation: 916.9
Descriptions By: Beth Reimer

Boring ID: B-2
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-5'	3'	0.0			ASPHALT. Dark brown grading into dark olive gray then light reddish brown, very fine to fine SAND and SILT, moist to dry, no odor detected and no staining observed.	
5									
910		2	5-10'	3'	0.0	SM			
10									
905		3	10-15'	1'	0.0			Some black Silt with light reddish brown Silt, very soft, loose, wet.	
15								End of boring at 15' bgs.	

Confidential under FOIA
Alex Rothchild
LFR
Sep 10, 2009 15:56

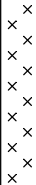
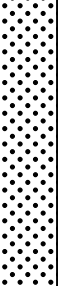
Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.



Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417460.7
Easting: 13412946.1
Casing Elevation: NA
Borehole Depth: 15' bgs
Surface Elevation: 916.9
Descriptions By: Beth Reimer

Boring ID: B-3
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-5'	3'	0.0	SP CL		ASPHALT. Dark brown to black, very fine to medium SAND, trace fine to medium Gravel, moist. Light reddish brown CLAY, soft. Light reddish brown, poorly sorted, very fine to coarse SAND, few fine Gravel, loose, dry to moist.	 Borehole backfilled with soil cuttings.
5						SP			
910		2	5-10'	3.5'	0.0				
10									
905		3	10-15'	3.75'	0.0	SM		Alternating layers of loose medium to coarse SAND as above, and reddish brown SILT with some very fine to fine Sand, wet.	
15								End of boring at 15' bgs.	



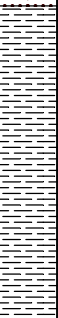
Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.
No odors detected and no staining observed.

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

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Northing: 417492.4
Easting: 13412919.6
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 917.0
Descriptions By: Beth Reimer

Boring ID: B-4
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-5'	1.5'	0.0	SM		ASPHALT. Light reddish brown to black, very fine to medium SAND and SILT, little to trace Clay, very soft, wet.	 Borehole backfilled with soil cuttings.
5									
910		2	5-10'	2'	0.0	CL		Light reddish brown CLAY, few fine to medium Gravel, hard, non-plastic, dry.	
10									
905								End of boring at 10' bgs.	
15									



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.
No odors detected and no staining observed.

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417546.3
Easting: 13412895.9
Casing Elevation: NA
Borehole Depth: 15' bgs
Surface Elevation: 917.4
Descriptions By: Beth Reimer

Boring ID: B-5
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-5'	4.25'	0.0	CL		ASPHALT. Brown to light reddish brown CLAY, little fine to medium Gravel, very hard, plastic, dry.	
5						SM		Light reddish brown SILTY SAND, very fine to medium Sand, moist.	
						CL		Reddish brown CLAY, mixed with dark brown to black Sand and Gravel, dry.	
						SM		Light reddish brown SILTY SAND, moist.	
910		2	5-10'	5'	0.0			Light reddish brown CLAY grading into gray to gray brown CLAY, few fine to medium Gravel, very hard, medium plasticity, dry.	
10						CL			
905		3	10-15'	5'	0.0				
15								End of boring at 15' bgs.	

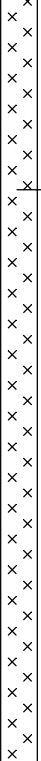
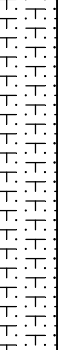


Remarks: NA = not applicable/ not available
bgs = below ground surface
Groundwater was not encountered. No temporary well installed.
No odors detected and no staining observed.

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

Northing: 417570.8
Easting: 13412844.1
Casing Elevation: NA
Borehole Depth: 12' bgs
Surface Elevation: 916.9
Descriptions By: Wayne Patterson

Boring ID: B-6
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-4'	3.5'	0.0	CL		Concrete. Brownish gray LEAN CLAY, soft, moist, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	3.5'	64	GP		Gray GRAVEL and SAND, dry, dense, slight odor.	
910								Gray fine SILTY SAND, dense, wet, strong odor, sheen.	
10		3	8-12'	NA	NA	SM		Becoming fine to coarse grained, sheen observed, strong odor.	
905									
15								End of boring at 12' bgs.	

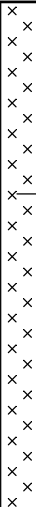
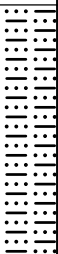


Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

Northing: 417535.5
Easting: 13412850.6
Casing Elevation: NA
Borehole Depth: 8' bgs
Surface Elevation: 916.8
Descriptions By: Wayne Patterson

Boring ID: B-7
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-4'	3.5'	0.0	CL		Concrete. Brown LEAN CLAY, little mottling with gray color, stiff, dry to moist, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4'	15	ML		Grayish brown SILTY SAND, wet, strong odor.	
910									
10								End of boring at 8' bgs.	
905									
15									



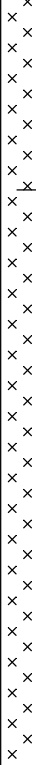
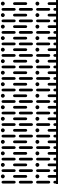
Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

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Northing: 417518.6
Easting: 13412814.1
Casing Elevation: NA
Borehole Depth: 12' bgs
Surface Elevation: 916.9
Descriptions By: Wayne Patterson

Boring ID: B-8
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-4'	3'	0.0	SM		Concrete. Brown fine SILTY SAND, trace Gravel, trace coarse Sand, dense, dry, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4'	0.0	CL		Brown LEAN CLAY, few fine to coarse Sand, trace Gravel, stiff, dry, no odor.	
910						SM/CL		Brown SILTY SAND and CLAY, moist, dense and stiff, no odor.	
10		3	8-12'	3.5'	0.0	SP		Gray fine SAND, trace fine Gravel and coarse Sand, dense, wet, sheen, strong odor.	
905									
								End of boring at 12' bgs.	
15									



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

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Northings: 417498.9
Easting: 13412821.1
Casing Elevation: NA
Borehole Depth: 12' bgs
Surface Elevation: 916.9
Descriptions By: Wayne Patterson

Boring ID: B-9
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-4'	2'	0.0	SP		Concrete. Brown fine to coarse SAND, trace Silt, dry, dense, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4'	0.0	CL		Brown SANDY CLAY, little fine to coarse Sand, trace Gravel, stiff, dry, no odor.	
910		3	8-12'	3.5'	22	SP		Grayish brown fine SAND, dry, strong odor. Wet.	
10									
905									
								End of boring at 12' bgs.	
15									



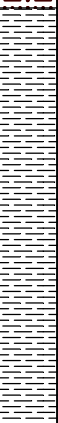
Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

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Northings: 417439.6
Easting: 13412777.5
Casing Elevation: NA
Borehole Depth: 15' bgs
Surface Elevation: 917.0
Descriptions By: Beth Reimer

Boring ID: B-10
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-5'	2.5'	0.0	SM		CONCRETE. Black to very dark brown SILTY SAND, very fine to fine Sand, loose, moist.	 Borehole backfilled with soil cuttings.
5									
910		2	5-10'	3.5'	0.0			Dry to moist.	
10									
905		3	10-15'	5'	0.0	CL		Light reddish brown grading into gray brown CLAY with some Silt and few very fine Sand, some layers of loose Sandy Silt, stiff, plastic, moist. Few very thin layers of fine to medium Sand, hard, medium plasticity, moist.	
15								End of boring at 15' bgs.	



Remarks: NA = not applicable/ not available
bgs = below ground surface
No groundwater was encountered. No temporary well installed.
No odors detected and no staining observed.

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417467.4
Easting: 13412770.2
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 917.3
Descriptions By: Beth Reimer

Boring ID: B-11
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-5'	4'	0.0	SP		CONCRETE.	
						CL		Black to very dark brown, fine SAND, moist to wet.	
						SP		Light reddish brown CLAY, little fine to medium Gravel, few fine Sand, hard, plastic, dry to moist.	
						SP		Reddish brown, very fine to medium SAND, loose to medium dense, dry to moist.	
5						SM		Very dark brown to black SILTY SAND, very fine to medium Sand, loose, moist.	
						SP		Gray brown to reddish brown, medium to coarse SAND with few medium Gravel, moist.	
910		2	5-10'	5'	0.0	SP		Reddish brown, very fine to medium SAND, wet.	
						CL		Gray brown CLAY, few fine to medium Gravel, soft to stiff, plastic, wet.	
10								End of boring at 10' bgs.	
905									
15									



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.
No odors detected and no staining observed.

Date Start/Finish: 11/7/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417507.9
Easting: 13412758.1
Casing Elevation: NA
Borehole Depth: 15' bgs
Surface Elevation: 917.5
Descriptions By: Beth Reimer

Boring ID: B-12
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0	0								
		1	0-5'	3'	0.0			CONCRETE. Light reddish brown, fine to medium SAND with some Silt and Clay, loose, dry to moist.	
5	-5	2	5-10'	5'	0.0	SP		Few thin (0.25') layers of Sandy Clay, moist. Grades into gray brown to light reddish brown at 6' bgs.	
10-10		3	10-15'	5'	0.0			Wet, few fine to coarse Gravel, little pebbles.	
15-15								End of boring at 15' bgs.	



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.
No odors detected and no staining observed.

Date Start/Finish: 11/6/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417533.1
Easting: 13412751.7
Casing Elevation: NA
Borehole Depth: 20' bgs
Surface Elevation: 917.5
Descriptions By: Beth Reimer

Boring ID: B-13
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0								CONCRETE.	
915		1	0-5'	5'	0.0			Gray brown CLAY, few medium to coarse Gravel, some fine Gravel, hard, non-plastic to low plasticity, dry.	
5								Stiff to hard, medium plasticity.	
910		2	5-10'	5'	0.0				
10						CL		Dry to moist, plastic.	
905		3	10-15'	4.5'	0.0				
15									
900		4	15-20'	5'	0.0				
20								End of boring at 20' bgs.	



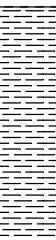
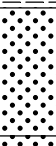
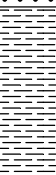
Remarks: NA = not applicable/ not available
bgs = below ground surface
No groundwater was encountered. No temporary well installed.
No odors detected and no staining observed.

Northing: 417560.9
Easting: 13412756.2
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 917.2
Descriptions By: Beth Reimer

Boring ID: B-14

Client: General Motors Worldwide Real Estate

Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-5'	5'	0.0	ML		ASPHALT. Reddish brown SILT with some Clay, dry, no odor detected and no staining observed.	
5						CL		Reddish brown CLAY, medium stiff to stiff, plastic, dry, no odor detected and no staining observed. Grades into gray brown Clay at 2.5' bgs.	
910		2	5-10'	3.5'	70.5	SP		Reddish brown, medium SAND with Clay, moist, strong odor detected and no staining observed. Black, medium SAND, wet, strong odor detected no staining observed, slight sheen on water.	
10						CL		Gray brown CLAY, few fine to medium Sand, very soft, plastic, wet, slight odor detected and no staining observed, slight sheen on water.	
15								End of boring at 10' bgs.	



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Northings: 417585.1
Easting: 13412813.8
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 916.8
Descriptions By: Beth Reimer

Boring ID: B-15

Client: General Motors Worldwide Real Estate

Location: Employee Development Center
Pontiac, Michigan

[illegible]

Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Northing: 417596.3
Easting: 13412851.5
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 917.2
Descriptions By: Beth Reimer

Boring ID: B-16

Client: General Motors Worldwide Real Estate

Location: Employee Development Center
Pontiac, Michigan

[illegible]

Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Northings: 417589.5
Easting: 13412778.7
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 916.8
Descriptions By: Beth Reimer

Boring ID: B-17

Client: General Motors Worldwide Real Estate

Location: Employee Development Center
Pontiac, Michigan

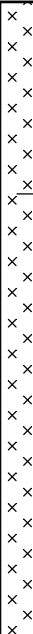
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Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/7/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417607.6
Easting: 13412834.1
Casing Elevation: NA
Borehole Depth: 10' bgs
Surface Elevation: 916.7
Descriptions By: Beth Reimer

Boring ID: B-18
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-5'	3'	0.0	SM		ASPHALT. Light reddish brown, very fine SAND and SILT, loose, moist.	 Borehole backfilled with soil cuttings.
5						CL		Gray brown CLAY, very soft, plastic, moist. Wet at 6' bgs. Light reddish brown to gray brown CLAY with some Sand and Silt, very soft to soft, plastic, wet.	
910		2	5-10'	5'	0.0				
10								End of boring at 10' bgs.	
905									
15									



Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.
No odors detected and no staining observed.

Northings: 417629.2
Easting: 13412886.3
Casing Elevation: NA
Borehole Depth: 10 bgs
Surface Elevation: 917.7
Descriptions By: Beth Reimer

Boring ID: B-19

Client: General Motors Worldwide Real Estate

Location: Employee Development Center
Pontiac, Michigan

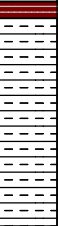
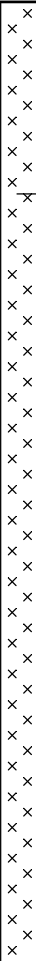
[illegible]

Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.
No odors detected and no staining observed.

Date Start/Finish: 11/7/06
Drilling Company: Altech
Driller's Name: Nick Simmons
Drilling Method: Direct Push
Sampler Size: 2" x 5' sampler

Northing: 417622.5
Easting: 13412829.0
Casing Elevation: NA
Borehole Depth: 15 bgs
Surface Elevation: 917.3
Descriptions By: Beth Reimer

Boring ID: B-20
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-5'	5'	0.6	CL		ASPHALT. Light reddish brown CLAY with SILT, hard, non-plastic to low plasticity, dry, no odors detected, no staining observed.	 Borehole backfilled with soil cuttings.
						SP		Gray brown CLAY, hard to medium stiff, plastic, dry to moist, no odors detected, no staining observed.	
5						CL		Gray to dark gray, very fine SAND, moist to wet, slight odor detected, no staining observed.	
						CL		Light reddish brown to gray CLAY as above.	
						SM		Light olive yellow and dark gray very fine to fine SAND and SILT, moist to wet, no odor detected, no staining observed.	
910		2	5-10'	5'	0.0			Light olive yellow CLAY, few very fine to fine Sand, stiff, medium plastic to plastic, moist to wet, no odor detected, no staining observed. Grading into gray brown Clay.	
10						CL			
905		3	10-15'	3.5'	0.0				
15								End of boring at 15' bgs.	



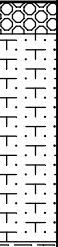
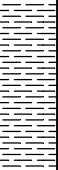
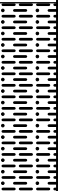
Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

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Northings: 417558.4
Easting: 13412788.8
Casing Elevation: NA
Borehole Depth: 12' bgs
Surface Elevation: 917.0
Descriptions By: Wayne Patterson

Boring ID: B-21
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-4'	3'	0.0	SM		Concrete. Brown fine SILTY SAND, trace Gravel, trace coarse Sand, dense, dry, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4'	0.0	CL		Brown LEAN CLAY, few fine to coarse Sand, trace Gravel, stiff, dry, no odor.	
910						SM/CL		Brown SILTY SAND and CLAY, moist, dense and stiff, no odor.	
10		3	8-12'	3.5'	0.0	SP		Gray fine SAND, trace fine Gravel and coarse Sand, dense, wet, sheen, strong odor,	
905								End of boring at 12' bgs.	
15									

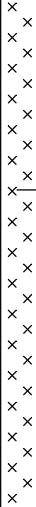
Remarks: NA = not applicable/ not available
bgs = below ground surface
Temporary PVC well installed for groundwater sampling. After sampling, temp well was removed and borehole was backfilled with soil cuttings.



Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

Northing: 417601.4
Easting: 13412872.0
Casing Elevation: NA
Borehole Depth: 8' bgs
Surface Elevation: 917.4
Descriptions By: Wayne Patterson

Boring ID: B-22
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0									
915		1	0-4'	3.5'	2.8	GP		Asphalt. Black to dark gray SAND and GRAVEL, fine to coarse angular Sand, fine angular Gravel, moist, strong odor, loose to medium dense. Wet.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4.0	38	ML		Brownish gray SANDY SILT, wet, strong odor, sheen.	
910									
10								End of boring at 8' bgs.	
905									
15									

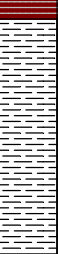
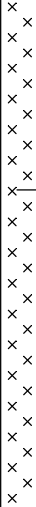


Remarks: NA = not applicable/ not available
bgs = below ground surface

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

Northing: 417629.7
Easting: 13412850.9
Casing Elevation: NA
Borehole Depth: 8' bgs
Surface Elevation: 917.7
Descriptions By: Wayne Patterson

Boring ID: B-23
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-4'	3.5	0.0	CL		Asphalt. Brown LEAN CLAY, medium stiff, dry, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	3.5'	0.0	ML		Grayish brown SANDY SILT, trace Gravel, wet, no odor.	
910									
10								End of boring at 8' bgs.	
905									
15									



Remarks: NA = not applicable/ not available
bgs = below ground surface

Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

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Northing: 417616.2
Easting: 13412805.5
Casing Elevation: NA
Borehole Depth: 8' bgs
Surface Elevation: 917.4
Descriptions By: Wayne Patterson

Boring ID: B-24
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-4'	3.5	0.0	SP		Asphalt. Brown fine SAND, trace Gravel, moist, dense, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4.0'	0.0	ML		Brownish gray SILT, wet, no odor.	
910									
10								End of boring at 8' bgs.	
905									
15									

Remarks: NA = not applicable/ not available
bgs = below ground surface
No odors detected and no staining observed.

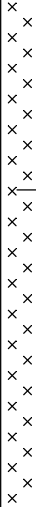
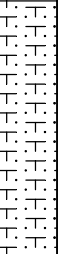


Date Start/Finish: 11/30/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push
Sampler Size: 2" x 4' sampler

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Northings: 417602.0
Easting: 13412743.2
Casing Elevation: NA
Borehole Depth: 8' bgs
Surface Elevation: 917.5
Descriptions By: Wayne Patterson

Boring ID: B-25
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0									
915		1	0-4'	3.5	0.0	SP		Asphalt. Brown fine SAND, moist, dense, no odor.	 Borehole backfilled with soil cuttings.
5		2	4-8'	4.0'	0.0	SM		Brown SILTY SAND, wet, no odor.	
910									
10								End of boring at 8' bgs.	
905									
15									

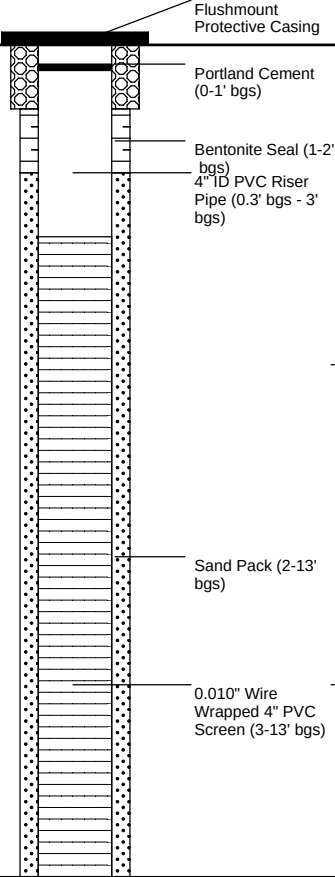


Remarks: NA = not applicable/ not available
bgs = below ground surface
No odors and no staining observed.

Date Start/Finish: 12/1/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push/HSA
Sampler Size: 2" x 5' sampler

Northing: 417593.2
Easting: 13412851.7
Casing Elevation: 916.91
Borehole Depth: 13' bgs
Surface Elevation: 917.2
Descriptions By: Wayne Patterson

Boring ID: EW-1
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
915									
0								No soil samples collected. See B-16 for soil description.	
910									
5									
905									
10									
900								End of boring at 13' bgs.	
15									

Remarks: NA = not applicable/ not available
bgs = below ground surface



Date Start/Finish: 12/1/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push/HSA
Sampler Size: 2" x 5' sampler

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Northings: 417694.9
Easting: 13412826.7
Casing Elevation: 917.46
Borehole Depth: 15 bgs
Surface Elevation: 917.9
Descriptions By: Wayne Patterson

Boring ID: MW-2
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
920									
0								ASPHALT.	Flushmount Protective Casing
915		1	0-5'	3'	0.0	CL		Brownish gray LEAN CLAY, roots, medium plasticity, stiff, moist, no odor, becoming wet and soft at 5'.	Portland Cement (0-1' bgs)
5									Bentonite Seal (1-2' bgs)
910		2	5-10'	4'	0.0			Brown fine to coarse SILTY SAND, predominately fine to medium grained, wet, loose, no odor.	2" ID PVC Riser Pipe (0.3' bgs - 3' bgs)
10						SM			Sand Pack (2-13' bgs)
905		3	10-15'	4.5'	0.0				0.010" Wire Wrapped PVC Screen (3-13' bgs)
15						CL		Brownish gray LEAN CLAY, trace fine SAND, medium stiff, medium plasticity, wet, no odor.	Natural Collapse (13-15' bgs)
								End of boring at 15' bgs.	

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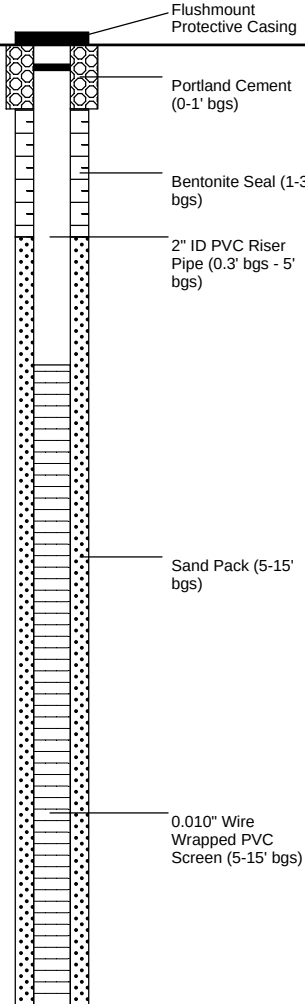
Remarks: NA = not applicable/ not available
bgs = below ground surface
No odors detected and no staining observed.



Date Start/Finish: 12/1/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push/HSA
Sampler Size: 2" x 4' sampler

Northing: NA
Easting: NA
Casing Elevation: NA
Borehole Depth: 15 bgs
Surface Elevation: NA
Descriptions By: Wayne Patterson

Boring ID: MW-3
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0	0							No soil samples collected. See B-14 for soil description.	
10	10	1	10-15'	4.0'	NA	CL		Gray brown CLAY, few fine to medium Sand, very soft, plastic, wet, slight odor detected and no staining observed, slight sheen on water.	
15	15							End of boring at 15' bgs.	

Remarks: NA = not applicable/ not available
bgs = below ground surface



Date Start/Finish: 12/1/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push/HSA
Sampler Size: 2" x 5' sampler

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Northings: 417541.2
Easting: 13413172.1
Casing Elevation: 912.78
Borehole Depth: 15' bgs
Surface Elevation: 913.1
Descriptions By: Wayne Patterson

Boring ID: MW-4
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
915									
0								ASPHALT.	Flushmount Protective Casing
		1	0-5'	3'	0.0			Grayish brown LEAN CLAY with SAND, fine to coarse subangular to angular Sand, few fine gravel, soft, moist, medium plasticity, no odor.	Portland Cement (0-1' bgs)
910								Wet.	Bentonite Seal (1-2' bgs)
5									2" ID PVC Riser Pipe (0.3' bgs - 3' bgs)
		2	5-10'	4'	0.0	CL		Brown, medium stiff.	
905									Sand Pack (2-13' bgs)
10								Gray, becoming stiff.	0.010" Wire Wrapped PVC Screen (3-13' bgs)
		3	10-15'	4'	0.0				
900									Natural Collapse (13-15' bgs)
15								End of boring at 15' bgs.	

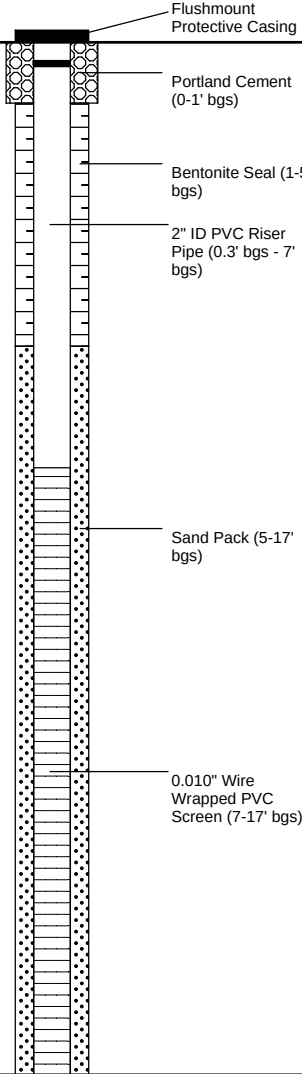
Remarks: NA = not applicable/ not available
bgs = below ground surface
No odors detected and no staining observed.



Date Start/Finish: 12/1/06
Drilling Company: Fibertec
Driller's Name: Nathan Keller
Drilling Method: Direct Push/HSA
Sampler Size: 2" x 4' sampler

Northings: 417422.5
Easting: 13412930.9
Casing Elevation: 916.14
Borehole Depth: 17' bgs
Surface Elevation: 916.8
Descriptions By: Wayne Patterson

Boring ID: MW-5
Client: General Motors Worldwide Real Estate
Location: Employee Development Center
Pontiac, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	USCS Code	Geologic Column	Stratigraphic Description	Boring Construction
0								No soil samples collected. See B-2 for soil description.	 Flushmount Protective Casing Portland Cement (0-1' bgs) Bentonite Seal (1-5' bgs) 2" ID PVC Riser Pipe (0.3' bgs - 7' bgs) Sand Pack (5-17' bgs) 0.010" Wire Wrapped PVC Screen (7-17' bgs)

Remarks: NA = not applicable/ not available
bgs = below ground surface





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Appendix E

Work Plan

Imagine the result

General Motors Corporation

Site Characterization and Delineation Work Plan

Employee Development Center
65 East University Drive
Pontiac, Michigan 48342

February 5, 2007

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**Site Characterization and
Delineation Work Plan**

Employee Development Center

Prepared for:
General Motors Corporation

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Our Ref.:
B0064486

Date:
February 5, 2007

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Site Characterization and Delineation Work Plan

Employee Development
Center

1. Introduction

This Site Characterization Work Plan describes an additional subsurface investigation to be completed for the General Motors Corporation (GM) Employee Development Center (EDC) located at 65 East University Drive in Pontiac, Michigan (herein referred to as the "Site"). The Site location is shown on Figure 1. The purpose for the additional subsurface investigation described in this work plan is to further delineate the extent of on-Site and off-Site soil and groundwater contamination identified in ARCADIS of New York, Inc.'s (ARCADIS BBL, formerly Blasland, Bouck & Lee, Inc. [BBL]) February 5, 2007 *Leaking Underground Storage Tank Initial Assessment Report (IAR)*. In addition, the subsurface investigation will also determine the presence of free product. Free product recovery and removal will be performed if it is present. All sampling methodologies, analytical procedures, data validation, and database management will be in accordance with GM's Field Method Guidelines (FMGs), which detail standard operating procedures (SOPs) for the primary field activities.

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Site Characterization and Delineation Work Plan

Employee Development
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2. Background

During completion of the initial assessment activities, soil and groundwater samples collected throughout the Site had concentrations that exceeded applicable screening criteria in soil and groundwater. As discussed in the *IAR, GM Employee Development Center* (ARCADIS BBL, February 5, 2007), the screening criteria for identifying contamination in soil and groundwater are groundwater / surface water interface criteria and drinking water criteria, even though groundwater at and in the vicinity of the Site is not a current or reasonably expected future drinking water source.

The investigation activities addressed in this work plan include the following:

- Groundwater Investigation
 - o On-Site Groundwater Investigation
 - o Off-Site Groundwater Investigation
- Soil Investigation
 - o Outside Site Building
 - o Beneath Site Building
- Free Product Investigation
- Basement Sump Investigation

Section 3 of this work plan provides a summary of the soil or groundwater investigation activities that were completed during the initial assessment activities, and a description of the additional delineation of soil and/or groundwater and free product investigation that will be performed.



Site Characterization and Delineation Work Plan

Employee Development
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3. Investigation Program

The investigation program described in this work plan addresses the delineation of on-Site soil and groundwater contamination, and the determination and extent of off-Site contamination. The investigation program also addresses free product recovery. The investigation program is discussed below in the following sections.

3.1 Groundwater Investigation

3.1.1 On-Site Groundwater Investigation

During initial assessment activities, groundwater grab samples were collected from soil borings B-2, B-4, B-7 through B-9, B-12, and B-14 through B-21 located throughout the Site. In addition, one extraction well (EW-1) and four monitoring wells (MW-2 through MW-5) were installed at the Site to determine groundwater quality.

A portion of the Augusta Relief Drain Easement extends northwest to southeast through the center portion of the Site (see Figure 2). The easement contains two 10.5-foot diameter enclosed concrete pipes that discharge to the Clinton River. The Clinton River is located approximately 200 feet southeast of the Site. The invert elevation of the storm sewer pipes is approximately 895 feet above mean sea level. Based on the shallow presence of groundwater at the Site, the backfill surrounding the Augusta Relief Drain may act as a collection point for groundwater and/or a conduit for groundwater migration.

3.1.1.1 IAR Results

Several gasoline constituents including benzene, ethylbenzene, toluene, xylenes, methyl tertiary-butyl ether (MTBE), 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected in groundwater samples collected north of the Site building and beneath the Site building during initial assessment activities. These constituents were detected at concentrations that exceed the Michigan Department of Environmental Quality's (MDEQ's) Part 201 and Part 213 Residential and Commercial I Drinking Water Criteria (RDW), Commercial II, III, IV and Industrial Drinking Water Criteria (IDW) and/or Groundwater / Surface Water Interface Criteria (GSI). Naphthalene was also detected in groundwater samples collected north of the Site building at concentrations that exceed the GSI. Several volatile organic compounds (VOCs) including 1,2-dichloroethane, 1,2-dichloropropane, cis-1,2-dichloroethene and vinyl chloride were detected in groundwater samples collected north of the Site building at concentrations



Site Characterization and Delineation Work Plan

Employee Development
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that exceed the RDW, IDW and/or GSI. Lead was also detected in groundwater sample EW-1 at a concentration that exceeds the RDW and IDW. Trichloroethene was also detected in groundwater grab samples B-2, B-4 and B-12, and groundwater sample MW-5 at concentrations that exceed the RDW and IDW.

No soil borings were completed or monitoring wells installed along the Augusta Relief Drain easement during initial assessment activities. Soil boring B-19 and monitoring well MW-2 were the closest boring and well locations installed near the drain easement. A soil sample was collected from soil boring B-19 (0.5 to 1.5 feet below ground level [bgl]) and monitoring well MW-2 (0 to 2 feet bgl). A groundwater grab sample was collected from soil boring B-19 and a groundwater sample was collected from monitoring well MW-2. Laboratory analytical results indicated that no constituents were detected above screening criteria in soil and groundwater from these samples.

3.1.1.2 Additional Investigation Activities

Seven monitoring wells (MW-6 through MW-12) will be installed along and in the vicinity of the Augusta Relief Drain easement. Two monitoring wells will be installed along the drain easement in the northern portion of the Site. Two monitoring wells will be installed along the drain easement in the central portion of the Site. Two monitoring wells will be installed along the drain easement in the southern portion of the Site. An additional monitoring well will be installed east of the August Relief Drain in the eastern portion of the Site. The locations of these proposed monitoring wells are shown on Figure 2. The purpose of these monitoring wells is to determine if groundwater that exceeds MDEQ Part 201 criteria exists in the drain easement, and to determine if the backfill surrounding the Augusta Relief Drain is acting as a conduit for groundwater migration at the Site.

Four monitoring wells (MW-13 through MW-16) will be installed inside the Site building and four monitoring wells (MW-17 through MW-20) will be installed outside the Site building. One monitoring well will be installed in the vicinity of soil boring location B-7 inside the Site building. One monitoring well will be installed in the center of the Site building. One monitoring well will be installed in the southern portion of the Site building. One monitoring well will be installed in the northeast corner of the Site building. Two monitoring wells will be installed along the Site's southern boundary. One monitoring well will be installed outside the southwestern portion of the Site building along the Site's western property boundary. One monitoring well MW-20 will be installed outside the southeast corner of the Site building. The locations of these monitoring wells are shown on Figure 2. The purpose of installing monitoring wells



Site Characterization and Delineation Work Plan

Employee Development
Center

MW-13 through MW-20 is to further define the extent of on-Site groundwater contamination and groundwater flow at the Site.

Monitoring well locations will be finalized based on field conditions. Additional monitoring wells may be installed if necessary. The monitoring wells will be installed in accordance with the procedures in the General Motor's Field Method Guidelines (FMGs). Standard monitoring well construction consists of a 10-foot section of 2-inch diameter wire wrapped PVC screen installed such that a minimum of two feet of screen is situated above the top of the water table.

During monitoring installation continuous soil samples will be collected at two-foot intervals from the ground surface to the target depth. If during soil sampling activities, the soil appears stained/discolored, exhibit an odor, or have elevated PID readings the interval(s) will be submitted for laboratory analysis for the parameters specified in Table 1.

Two rounds of groundwater samples will be collected from each of the newly installed monitoring wells, MW-6 through MW-20 and at existing extraction well EW-1 (if free product is not present). Table 2 summarizes the parameters that will be analyzed for groundwater samples collected from the proposed and existing monitoring wells. After installation activities are completed, monitoring well logs will be prepared for each of the monitoring wells.

3.1.2 Off-Site Groundwater Investigation

3.1.2.1 IAR Results

Monitoring wells were not installed off-Site during initial assessment activities. Several groundwater samples were collected on-Site near the property boundaries during initial assessment activities. Groundwater grab samples collected from soil boring locations B-2 and B-12, and groundwater sample collected from monitoring well MW-5 had detections of trichloroethene at concentrations that exceed the RDW and IDW of 5 ug/L. Groundwater grab sample collected from soil boring B-14 also had a detection of tetrachloroethylene at a concentration that exceeds the RDW and IDW. The groundwater sample collected from monitoring well MW-3 had detections of 1,2-dichloroethane and 1,2-dichloropropane at concentrations that exceed the RDW and IDW of 5 ug/L. Groundwater sample collected from monitoring well MW-3 also had a detection of 1,2,4-trimethylbenzene at a concentration that exceeds the GSI of 17 ug/L. Benzene, ethylbenzene, and total xylenes were detected in groundwater grab sample



Site Characterization and Delineation Work Plan

Employee Development
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B-14 and the groundwater sample collected from monitoring well MW-3 at concentrations that exceed the RDW, IDW and/or GSI.

3.1.2.2 Additional Investigation Activities

Two monitoring wells (MW-21 and MW-22) will be installed off-Site along Mill Street. The locations of these monitoring wells are shown on Figure 3. The locations for MW-21 and MW-22 will be finalized based on field conditions. The purpose of installing these monitoring wells is to determine if contaminants are migrating off-Site. Additional monitoring wells may be installed off-Site if necessary.

Monitoring wells MW-21 and MW-22 will be installed in accordance to the procedures in GM's FMGs. Standard monitoring well construction consists of a 10-foot section of 2-inch diameter wire wrapped PVC screen installed such that a minimum of two feet of screen is situated above the top of the water table.

During monitoring well installation continuous soil samples will be collected from the ground surface to the target depth. If during soil sampling activities the soil appears stained/discolored, exhibit an odor, or have elevated PID readings the interval(s) will be submitted for laboratory analysis for the parameters specified in Table 1.

Two rounds of groundwater sampling will be collected at monitoring wells MW-20 and MW-21. Table 2 summarizes the analytical parameters for the groundwater samples to be collected at monitoring wells MW-20 and MW-21. After installation activities are completed, monitoring well logs will be prepared for each of the monitoring wells.

3.2 Soil Investigation

3.2.1 Outside Site Building

Soil borings B-6 and B-14 through B-25 were completed during initial assessment activities to determine the presence of soil and groundwater contamination beneath the Site building. Soil borings B-6 and B-14 through B-25 were completed during initial assessment activities to determine the presence of soil and groundwater contamination outside the northern portion of the Site building.



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3.2.1.1 IAR Results

Soil Samples – Naphthalene was detected in soil sample B-16 at a concentration that exceeds the Groundwater / Surface Water Interface Protection Criteria (GSIP) of 870 micrograms per kilogram (ug/kg). Benzene was detected in soil sample B-20 (3.5 to 4.5 feet bgl) at a concentration that exceeds the RDW and IDW of 100 ug/kg. Ethylbenzene was detected in soil samples B-14 (5 to 7 feet bgl), B-15 (6 to 8 feet bgl) and B-16 (4 to 5 feet bgl) at concentrations that exceed GSIP of 360 ug/kg and, RDW and IDW of 1,500 ug/kg. Toluene was detected in soil sample B-15 at a concentration that exceeds the GSIP of 2,800 ug/kg, and RDW and IDW of 21,000 ug/kg. Xylenes were detected in soil samples B-14, B-15 and B-16 at concentrations that exceed the GSIP of 700 ug/kg, the RDW and IDW of 5,600 ug/kg. MTBE was detected in soil samples B-15 and B-16 at concentrations that exceed the RDW and IDW of 800 ug/kg. Trichloroethene was detected in soil sample B-20 at a concentration that exceeds the RDW and IDW of 100 ug/kg. No additional constituents were detected in the remaining soil borings above screening criteria.

3.2.1.2 Additional Investigation Activities

Three soil borings (B-26 through B-28) will be completed outside, north of the Site building. The locations of soil borings B-26 through B-28 are shown on Figure 2. The locations will be finalized based on field conditions. The soil borings will be completed to delineate the extent of soil contamination outside the northern portion of the Site building. Based on field observations, additional soil borings may be completed to further delineate the extent of on-Site soil contamination.

Upon completion of soil borings, temporary PVC consisting of a 10-foot section of a 2-inch diameter wire wrapped PVC screen with a 5-foot well screen will be installed. The PVC screen will be installed such that a minimum of two feet screen is situated above the top of the water table. During soil boring installation, continuous soil samples will be collected from the ground surface to the target depth. If during soil sampling activities the soil appears stained/discolored, exhibit an odor, or have elevated PID readings the interval(s) will be submitted for laboratory analysis for the parameters specified in Table 1.

One groundwater grab sample will be collected from each of the three soil borings upon encountering groundwater. Groundwater grab samples collected from soil borings B-26 through B-28 will be submitted for laboratory analysis for parameters



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specified in Table 2. Boring logs will be prepared for each of the soil borings upon completion.

3.2.2 Beneath Site Building

An abandoned dynamometer pit and oil/sand separator exist in the northwest portion of the Site building. The units were installed in approximately 1950. The Site building was remodeled in 1994 from GM's Truck and Bus Division as an engineering center for the construction of prototype vehicles and associated engineering development activities to the Employee Development Center as it exists today. Therefore, the units were likely utilized up to the early 1990s. However, the exact date of abandonment of the dynamometer pit and oil/sand separator is unknown. The two abandoned units are located in carpeted offices that were installed during the remodeling of the Site building.

Soil boring B-7 was completed in the vicinity of an abandoned underground hydraulic lift located inside the Site building. The underground hydraulic lift was likely installed when the Site building was constructed in the early 1950s. The underground hydraulic lift was likely abandoned during remodeling activities in 1994. However, the exact date of abandonment of the dynamometer pit and oil/sand separator is unknown.

3.2.2.1 IAR Results

Due to training activities occurring in the classrooms, the area was not immediately accessible and no subsurface investigation activities could be conducted inside in the vicinity of the abandoned dynamometer pit and abandoned oil/sand separator during the initial assessment activities.

Soil Sample – Benzene was detected in soil sample B-7 (2 to 4 feet bgl) at a concentration that exceeds the RDW and IDW of 100 ug/kg.

3.2.2.2 Additional Investigation Activities

Four soil borings (B-29 through B-32) will be completed in the vicinity of the abandoned dynamometer pit and abandoned oil/sand separator. The proposed locations are shown on Figure 2. The locations will be finalized based on field conditions (interior building constraints). The soil borings will be completed to determine the presence of soil contamination in the vicinity of these abandoned units. Based on field



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observations, additional soil borings may be completed in the vicinity of these abandoned units.

Four soil borings (B-33 through B-36) will be completed in the vicinity of soil boring location B-7 to delineate the extent of soil contamination detected in soil sample B-7. The locations of soil borings B-33 through B-36 are shown on Figure 2. The locations will be finalized based on field conditions. Based on field observations, additional soil borings may be completed in the vicinity of soil boring location B-7.

During soil boring installation, continuous soil samples will be collected from the ground surface to the target depth. If during soil sampling activities the soil appears stained/discolored, exhibit an odor, or have elevated PID readings the interval(s) will be submitted for laboratory analysis for the parameters specified in Table 1.

Upon completion of soil borings, a temporary PVC well consisting of a 2-inch diameter wire wrapped PVC, 5-foot well screen will be installed. The PVC screen will be installed such that a minimum of two feet screen is situated above the top of the water table. One groundwater grab sample will be collected from each of the eight soil borings upon encountering groundwater. Grab groundwater samples collected from soil borings B-29 through B-36 will be submitted for laboratory analysis for parameters specified in Table 2. Boring logs will be prepared for each of the soil borings upon completion.

3.3 Free Product Investigation

3.3.1 IAR Results

Based on observations of stained soil and evidence of a sheen in groundwater in soil borings B-6 and B-16, on December 1, 2006, ARCADIS BBL installed an extraction well (EW-1) in the vicinity of soil boring B-16 outside the northeast portion of the Site building. EW-1 was installed to determine the presence of free product and to recover free product as necessary, if observed. However, at this time free product has not been observed or measured in EW-1. Due to accessibility issues and safety concerns of Site building occupants, ARCADIS BBL did not install an extraction well in the vicinity of soil boring B-6 inside the northern portion of the Site building during initial assessment activities.



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3.3.2 Additional Investigation Activities

Once the Site building has been completely vacated, one extraction well (EW-2) will be installed in the vicinity of soil boring B-6 inside the northern portion of the Site building. The purpose of installing this extraction well is to determine the presence of free product. If free product is detected a free product fax transmittal will be completed and forwarded to MDEQ. Initially, bi-weekly monitoring of each of the extraction wells will be completed. This schedule may be modified as necessary. If free product is detected it will be removed via bailing or pump. As required, free product thickness and the volume of product removed, if any, will be recorded during each monitoring event to evaluate potential trends.

Extraction well EW-2 will be installed in accordance to the procedures in the FMGs. The extraction well construction will consist of a 10-foot section of 4-inch diameter wire wrapped PVC screen installed such that a minimum of two feet of screen is situated above the top of the water table.

During extraction well installation continuous soil samples will be collected from the ground surface to the target depth. If during soil sampling activities the soil appears stained/discolored, exhibit an odor, or have elevated PID readings the interval(s) will be submitted for laboratory analysis for the parameters specified in Table 1.

Upon verification of free product in extraction wells EW-1 and EW-2, one product sample will be collected from each of the extraction wells for chemical and fingerprint analysis. Table 3 summarizes the analytical parameters for the product samples to be collected at extraction wells EW-1 and EW-2. Upon completion of installation, a boring log will be prepared for extraction well EW-2.

3.4 Basement Sump Investigation

One drainage sump is located in the basement boiler room of the Site building. The sump is constructed of concrete but the depth is unknown. During the initial assessment activities, the sump was full. According to GM Site personnel, floor drains located in the basement lead to the sump. However, the discharge location of the sump has not been confirmed.



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3.4.1 IAR Results

During the initial assessment activities, the water table level at the Site was unknown. Therefore, no investigation was performed for the sump due to concerns of possible flooding in the basement.

3.4.2 Additional Investigation Activities

The sump will be pumped out and inspected to determine its structural integrity by visual observation. Once the pump has recharged, up to two water samples will be collected from the sump. Water samples will be submitted for laboratory analysis for parameters specified in Table 2.

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4. Schedule

The subsurface investigation will commence following concurrence of the Work Plan by the MDEQ and once the Site building has been fully vacated. At this time, the subsurface investigation is planned to commence on April 2, 2007. A schedule of activities for the subsurface investigation is included in Appendix F of the *IAR*.

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Table 1
General Motors Corporation, Employee Development Center
Site Characterization Work Plan

Soil Boring Sampling Program

Boring /Monitoring Well Number	Sample Intervals (feet bgs)		Analysis
	0-2	Directly Above WT	
B-26*	✓	✓	VOCs, PAHs, MTBE, Lead
B-27*	✓	✓	VOCs, PAHs, MTBE, Lead
B-28*	✓	✓	VOCs, PAHs, MTBE, Lead
B-29*	✓	✓	VOCs, PAHs, MTBE, Lead
B-30*	✓	✓	VOCs, PAHs, MTBE, Lead
B-31*	✓	✓	VOCs, PAHs, MTBE, Lead
B-32*	✓	✓	VOCs, PAHs, MTBE, Lead
B-33*	✓	✓	VOCs, PAHs, MTBE, Lead
B-34*	✓	✓	VOCs, PAHs, MTBE, Lead
B-35*	✓	✓	VOCs, PAHs, MTBE, Lead
B-36*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-6*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-7*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-8*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-9*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-10*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-11*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-12*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-13*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-14*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-15*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-16*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-17*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-18*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-19*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-20*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-21*	✓	✓	VOCs, PAHs, MTBE, Lead
MW-22*	✓	✓	VOCs, PAHs, MTBE, Lead

Notes:

* Soil samples may be collected from select intervals if soil exhibits staining, odors, or high PID readings. Additional soil samples may be collected as necessary.

Table 2
General Motors Corporation, Employee Development Center
Site Characterization Work Plan

Groundwater Sampling Program

Boring/Monitoring Well Number	Analysis
B-26*	VOCs, PAHs, MTBE, Lead
B-27*	VOCs, PAHs, MTBE, Lead
B-28*	VOCs, PAHs, MTBE, Lead
B-29*	VOCs, PAHs, MTBE, Lead
B-30*	VOCs, PAHs, MTBE, Lead
B-31*	VOCs, PAHs, MTBE, Lead
B-32*	VOCs, PAHs, MTBE, Lead
B-33*	VOCs, PAHs, MTBE, Lead
B-34*	VOCs, PAHs, MTBE, Lead
B-35*	VOCs, PAHs, MTBE, Lead
B-36*	VOCs, PAHs, MTBE, Lead
EW-1**	VOCs, PAHs, MTBE, Lead
MW-2**	VOCs, PAHs, MTBE, Lead
MW-3**	VOCs, PAHs, MTBE, Lead
MW-4**	VOCs, PAHs, MTBE, Lead
MW-5**	VOCs, PAHs, MTBE, Lead
MW-6	VOCs, PAHs, MTBE, Lead
MW-7	VOCs, PAHs, MTBE, Lead
MW-8	VOCs, PAHs, MTBE, Lead
MW-9	VOCs, PAHs, MTBE, Lead
MW-10	VOCs, PAHs, MTBE, Lead
MW-11	VOCs, PAHs, MTBE, Lead
MW-12	VOCs, PAHs, MTBE, Lead
MW-13	VOCs, PAHs, MTBE, Lead
MW-14	VOCs, PAHs, MTBE, Lead
MW-15	VOCs, PAHs, MTBE, Lead
MW-16	VOCs, PAHs, MTBE, Lead
MW-17	VOCs, PAHs, MTBE, Lead
MW-18	VOCs, PAHs, MTBE, Lead
MW-19	VOCs, PAHs, MTBE, Lead
MW-20	VOCs, PAHs, MTBE, Lead

Table 2
General Motors Corporation, Employee Development Center
Site Characterization Work Plan

Groundwater Sampling Program

Boring/Monitoring Well Number	Analysis
MW-21	VOCs, PAHs, MTBE, Lead
MW-22	VOCs, PAHs, MTBE, Lead
Sump-1*	VOCs, PAHs, MTBE, Lead
Sump-2*	VOCs, PAHs, MTBE, Lead

Notes:

* - Groundwater grab sample will be collected from this location.

** - Monitoring well was installed as part of initial assessment activities.

A groundwater sample will only be collected from EW-1 if no product is observed or measured.
Additional monitoring wells may be installed as necessary.

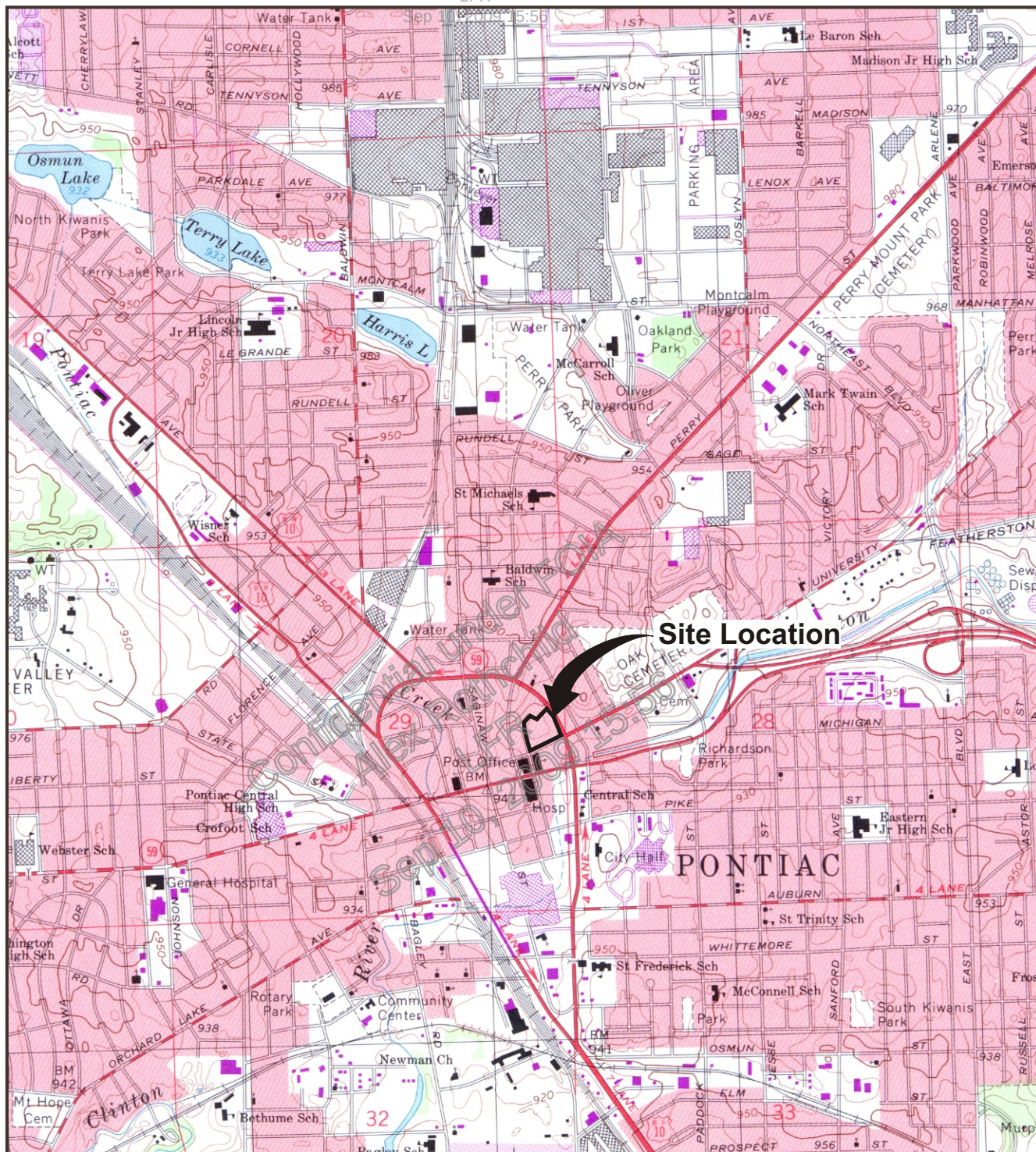
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Table 3
General Motors Corporation, Employee Development Center
Site Characterization Work Plan

Free Product Sampling Program

Extraction Well Number	Analysis
EW-1	DRO, GRO, PCBs
EW-2	DRO, GRO, PCBs

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REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quads., Pontiac North, Michigan, 1971.

2000' 0 2000'
Approximate Scale: 1" = 2000'



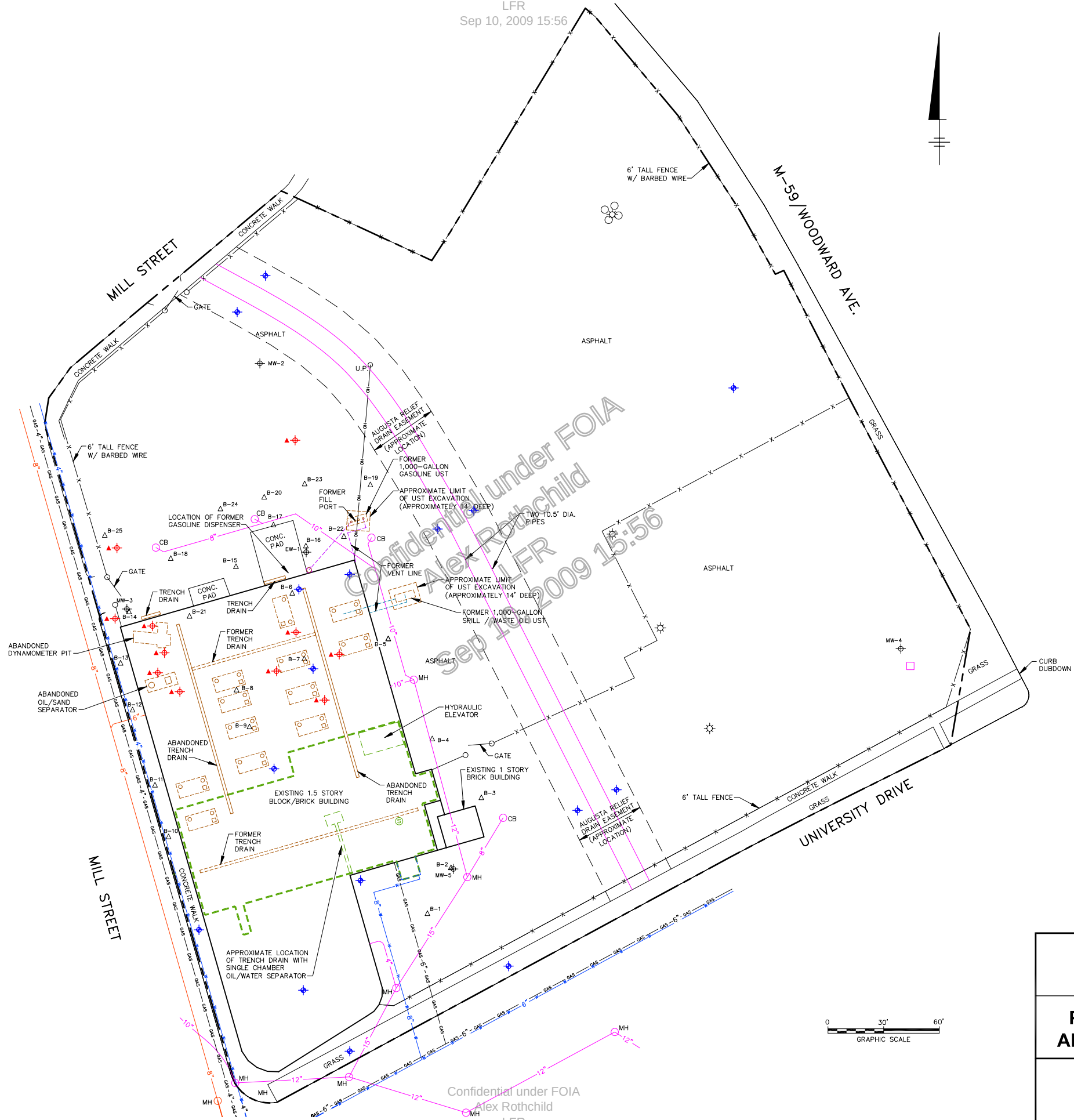
Area Enlargement

GENERAL MOTORS CORPORATION
EMPLOYEE DEVELOPMENT CENTER
65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

SITE LOCATION MAP

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REFS: IMAGES: 64486001

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- LEGEND:
- APPROXIMATE PROPERTY BOUNDARY LINE
 - BUILDING
 - FENCE
 - APPROXIMATE BASEMENT OUTLINE
 - LIGHT POLE
 - UTILITY POLE
 - AUGUSTA RELIEF DRAIN EASEMENT (APPROXIMATE 10 TO 15 FEET BGL)
 - 12" STORM SEWER (APPROXIMATELY 2.5 TO 8.2 FEET BGL)
 - STORM MANHOLE / CATCH BASIN
 - CATCH BASIN
 - 8" SANITARY SEWER (APPROXIMATELY 10.5 FEET BGL)
 - SANITARY MANHOLE
 - GAS - 4" - GAS (APPROXIMATELY 3.5 TO 5.5 FEET BGL)
 - 6" WATER (APPROXIMATELY 6 TO 7 FEET BGL)
 - GASOLINE UNDERGROUND PIPING
 - SPILL / WASTE OIL UNDERGROUND PIPING
 - OVERHEAD ELECTRIC
 - SOIL BORING LOCATION (ARCADIS BBL; 11/06-12/06)
 - MONITORING WELL LOCATION (ARCADIS BBL; 11/06-12/06)
 - UNDERGROUND POST
 - ABANDONED DUAL-POST UNDERGROUND HYDRAULIC LIFT
 - 50-GALLON HYDRAULIC OIL TANK
 - SUMP
 - PROPOSED SOIL BORING AND GROUNDWATER GRAB SAMPLE LOCATION
 - PROPOSED MONITORING WELL LOCATION

- NOTES:
1. BASE MAP INFORMATION SUPPLIED BY ATWELL HICKS PLANIMETRIC, SOIL BORING AND MONITORING WELL SURVEY OF A PARCEL OF LAND, DATED 12-13-06.
 2. ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). COORDINATES ARE ON THE MICHIGAN STATE PLANE COORDINATE SYSTEM.
 3. MONITORING WELL, SOIL BORING AND MANHOLE LOCATIONS WERE SURVEYED BY ATWELL HICKS ON DECEMBER 11, 2006.
 4. UNDERGROUND UTILITY INFORMATION INCLUDING GAS LINE DEPTH SUPPLIED BY GENERAL MOTORS CORPORATION, FROM A FIGURE ENTITLED "PLOT PLAN", DATED 12-14-51, AT A SCALE OF 1/16"=1'-0".
 5. UTILITY DEPTHS FOR STORM SEWER PROVIDED BY ATWELL HICKS. UTILITY DEPTHS FOR WATER AND SANITARY SEWER PROVIDED BY CITY OF PONTIAC ENGINEERING DIVISION. UTILITY DEPTH FOR AUGUSTA RELIEF DRAIN PROVIDED BY OAKLAND COUNTY DRAIN COMMISSIONER.
 6. AUGUSTA RELIEF DRAIN PIPES ARE ASSUMED TO BE SIDE TO SIDE.
 7. BGL = BELOW GROUND LEVEL

GENERAL MOTORS CORPORATION
EMPLOYEE DEVELOPMENT CENTER
65 E. UNIVERSITY DRIVE
PONTIAC, MICHIGAN 48342

PROPOSED ON-SITE SOIL BORING
AND MONITORING WELL LOCATIONS

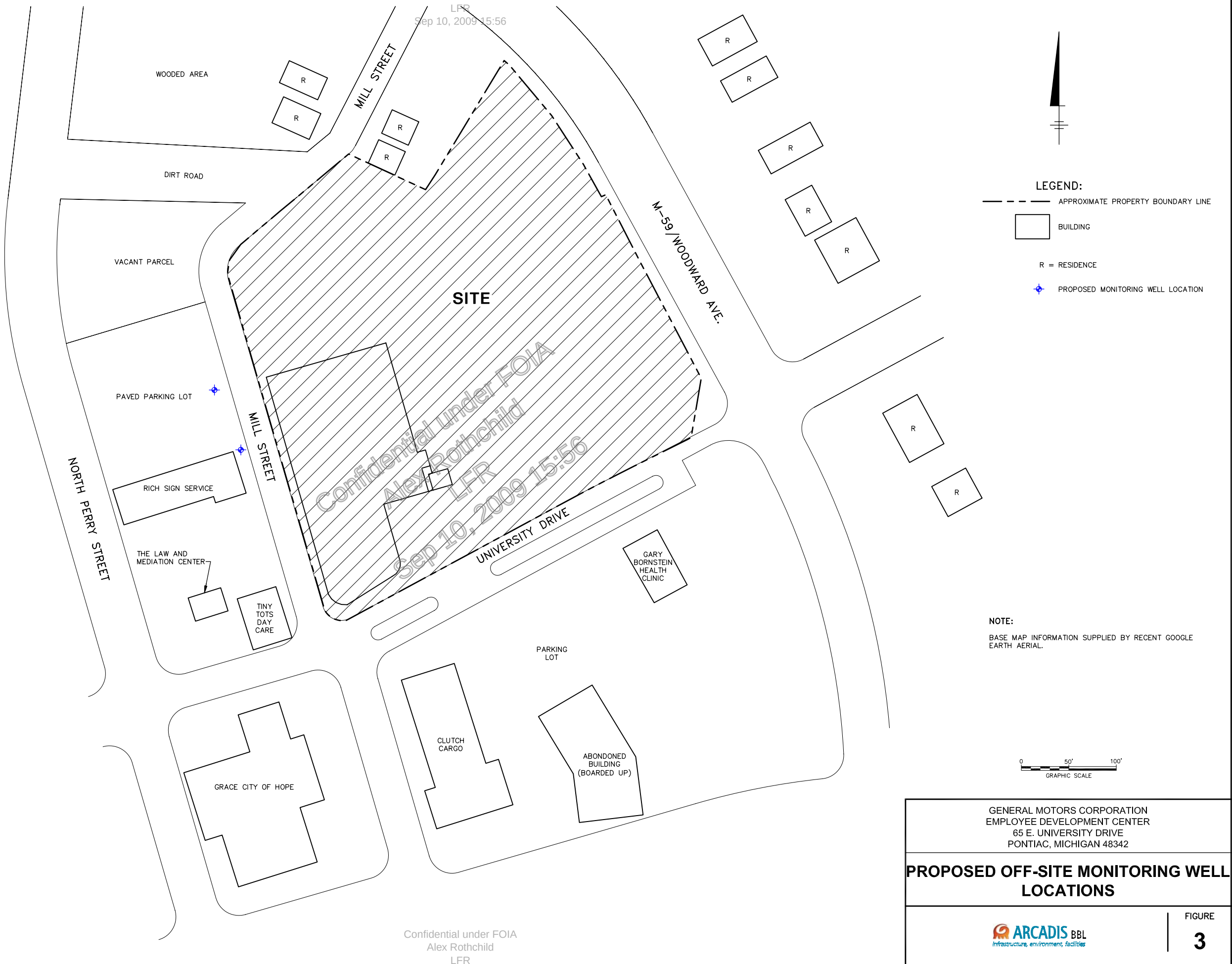


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Appendix F

Delineation Schedule

GM Employee Development Center

65 E. University Drive

Pontiac, Michigan

64486.003

Site Characterization and Delineation Schedule

ID	Duration	Task Name	Start	Finish	April	May	June	July	August
1	10 days	First Phase of Field Work	Mon 4/2/07	Fri 4/13/07					
2	5 days	Sample Monitoring Wells	Mon 4/16/07	Fri 4/20/07					
3	10 days	Evaluate Data and Recommendations	Mon 5/21/07	Fri 6/1/07					
4	5 days	Purpose Future Investigation Activities	Mon 6/4/07	Fri 6/8/07					
5	10 days	Second Phase of Field Work (if required)	Mon 6/18/07	Fri 6/29/07					
6	10 days	Report Preparation	Mon 7/30/07	Fri 8/10/07					

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Task



Milestone



External Tasks



Split



Summary



External Milestone



Progress



Project Summary



Deadline



Notes: See on additional page.

Notes:

1. First phase of field activities include completion of on-Site soil borings, installation of on-Site extraction well and monitoring wells, and installation of off-Site monitoring wells. The sump investigation will also be conducted during this time frame.
2. First phase of field work activities will also include soil sampling from soil borings and monitoring wells, and groundwater grab sampling from soil boring locations as necessary.
3. Extraction wells will be checked for the presence of free product on a bi-weekly basis. This schedule may be modified based on observations.
4. Second phase of field work activities including second round of groundwater sampling from monitoring wells, and completion of additional soil borings and installation of additional monitoring wells if necessary.

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