RCRA Facility Investigation (RFI) Report Pontiac North Campus

General Motors Corporation
Pontiac, Michigan

MID 005356910, MID 085470102
MID 005356886, MID 076331289

April 29, 2002

ENCORE
Environmental Corporate Remediation

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Acronyms

amsl	Above mean sea level
AOI	Area of interest
AST	Aboveground storage tank
AVS/SEM	Acid volatile sulfide/simultaneously extracted metals
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylene
BTU	British thermal units
CCR	Current Conditions Report
CMS	Corrective Measures Study
COC	Constituent of Concern
CPC	Chevrolet-Pontiac-Canada Group
CRA	Conestoga-Rovers & Associates
CSA	Closed Container Storage Area
DA	Demolition Area
DEP	Department of Environmental Protection
DNAPL	Dense non-aqueous phase liquid
EEC	Encore Environmental Consortium, LLC
EI	Environmental indicator
ELPO	Electrodeposition
ENCORE	Environmental Corporate Remediation
Facility	GM Pontiac North Campus Site
FSP	Field Sampling Plan
GAC	Granular-Activated Carbon
GCC	Groundwater Contact Criteria
GIS	Geographical information system
GM	General Motors Corporation
GMC	General Motors Corporation
HSA	Hollow-stem Auger
ID	Inner Diameter
IDC	Industrial Direct Contact Criteria
IDWC	Industrial Drinking Water Criteria
IGVIC	Industrial Groundwater Volatilization to Indoor Air Inhalation Criteria
IM	Interim Measure
IPSIC	Industrial Particulate Soil Inhalation Criteria
ISVIC	Industrial Soil Volatilization to Indoor Air Inhalation Criteria
IVSIC	Industrial Infinite Source Volatile Soil Inhalation Criteria
LNAPL	Light non-aqueous phase liquid
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MFD	Metal Fabrication Division
MTBE	Methyl-tert-butyl-ether
NFA	No Further Action
NPDES	National Pollutant Discharge Elimination System
NREPA	Natural Resources and Environmental Protection Act (1994 PA 451, as amended)
NTU	Nepholometric Turbidity Units
PA/VSI	Preliminary Assessment/Visual Site Inspection

PCB	Polychlorinated biphenyl
PID	Photoionization detector
PNC	Pontiac North Campus
PRC	PRC Environmental Management, Inc.
PSB	Pontiac School Board Property
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RAGS	USEPA Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RDC	Residential Direct Contact Criteria
RDWC	Residential Drinking Water Criteria
RFI	RCRA Facility Investigation
RGVIC	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria
RPSIC	Residential Particulate Soil Inhalation Criteria
RVSIC	Residential Infinite Source Volatile Soil Inhalation Criteria
SPO	Service Parts Operations
SVIAIC	Soil Volatilization to Indoor Air Inhalation Criteria
SVOC	Semi-volatile organic compounds
SWRF	Stormwater Retention Facility
SWMU	Soil waste management unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxicity Equivalents
TEF	Toxicity Equivalence Factors
TOC	Total organic carbon
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground storage tank
VOC	Volatile organic compounds
WWTP	Wastewater treatment plant

1. Introduction

1.1 General

On October 10, 2000, the U.S. Environmental Protection Agency (USEPA) and General Motors Corporation (GM) entered into a Voluntary Corrective Action Agreement (Voluntary Agreement) for the Pontiac North Campus (PNC) located in Pontiac, Michigan (Site). The Voluntary Agreement calls for GM to work independently and voluntarily to investigate and, as necessary, stabilize and remediate releases of hazardous waste or hazardous constituents at or from the Site in accordance with the Resource Conservation and Recovery Act (RCRA) and relevant USEPA corrective action guidance documentation. This RCRA Facilities Investigation (RFI) Report for the Site was prepared by Encore Environmental Consortium, L.L.C. for Environmental Corporate Remediation (ENCORE), a wholly owned subsidiary of GM. This Report presents the results of the RFI for the Site.

The Site encompasses approximately 595 acres in the northwest quadrant of the City of Pontiac, Michigan (see Figure 1-1). The Site covers four facilities (see Figure 1-2), including:

- Chevrolet-Pontiac-Canada Group (CPC) Pontiac Fiero Assembly Plant (formerly General Motors Corporation [GMC] Fisher Body Division); GMNA Property Management Fiero Facility; Baldwin Ave; Pontiac, Michigan 48340; (USEPA ID No. MID 005356910);
- GMC Central Foundry Division - Pontiac Plant; One Pontiac Plaza; Pontiac, Michigan 48340 (USEPA ID No. MID 085470102);
- CPC – Pontiac; GM Metal Fabricating Division Pontiac; 220 E. Columbia Ave; Pontiac, Michigan 48340 (USEPA ID No. MID 005356886); and
- GMC Warehousing and Distribution Division; Service Parts Operations; 9251 Joslyn Rd; Pontiac, Michigan 48340 (USEPA ID No. MID 076331289).

Because Site operations have changed significantly in recent years, this RFI Report groups operations according to current activities. Figure 1-3 shows each of these Site operational areas and offsite areas, while Figure 1-4 shows an overlay of the operational areas and the facility boundaries. During the completion of the RFI, offsite areas were identified for investigation. These operational and offsite areas are as follows:

Operational Areas

- Fiero;
- Demolition Area (DA);
- Metal Fabrication Division (MFD);
- Powertrain; and
- Service Parts Operation (SPO).

Offsite Areas

- Pontiac School Board (PSB) Property;
- Harris Lake;
- Terry Lake; and
- Osmun Lake

1.2 Purpose

GM performed the RFI pursuant to the Voluntary Agreement to determine whether the Areas of Interest (AOIs) identified in the Current Conditions Report (CCR) (ENCORE, 2001a) as requiring Further Action have released

hazardous waste or hazardous constituents that may pose an unacceptable risk to human health and the environment. The CCR and CCR Addendum #1 (ENCORE, 2002a) were prepared in part to provide details of historical and current operations at the Site, previous investigations and remedial activities, RCRA regulatory history, historical and current waste management practices, and specific areas targeted for investigation. The CCR and CCR Addendum #1 were submitted in accordance with Section V(1)(a) of the Voluntary Agreement. The RFI was conducted in accordance with an RFI Work Plan (ENCORE, 2001d) and supplemental Work Plan Addenda #s 1, 2, and 3 (ENCORE, 2001e, 2001f, 2002b) for additional phases of field investigation. The fieldwork for the RFI was performed from June 2001 through February 2002. Concurrent with the RFI a Storm Sewer Interim Measure (IM) investigation was implemented to address polychlorinated biphenyls (PCBs) identified at storm sewer Outfall 001.

The information in this RFI Report describes the procedures, methods, and results of the field investigations conducted during the RFI. The information includes a comparison of the RFI data with Michigan Part 201 generic risk-based screening criteria to identify whether a potential release of hazardous waste or hazardous constituents has occurred from each AOI. Where a potential release is identified, the nature and extent of hazardous constituents in the environmental media characterized during the RFI are discussed. A human health risk evaluation is included in the RFI Report to provide a basis for evaluating whether the presence of these hazardous constituents pose an unacceptable risk to human health. A separate baseline human health risk assessment was prepared for Harris Lake. An ecological risk assessment was performed on Harris Lake to determine if Site-related constituents present an unacceptable ecological risk.

1.3 RFI Objectives and Approach

The objectives of the RFI Work Plan (ENCORE, 2001d) and Work Plan Addenda #s 1, 2, and 3 (ENCORE, 2001e, 2001f, 2002b) were to detail the investigations necessary to:

- Determine Sitewide hydrogeologic conditions, as necessary, to properly investigate releases from AOIs;
- Characterize the nature and extent of releases of hazardous waste and/or hazardous constituents in environmental media at the Site;
- Assess potential risk to human health and the environment associated with releases of hazardous waste and/or hazardous constituents;
- Provide sufficient data to support the RCRA corrective action environmental indicators determination;
- Determine whether interim corrective measures are necessary to control current unacceptable risks, if any, to human health;
- Determine whether a corrective measures study is necessary to mitigate current and future unacceptable risks, if any, to human health and the environment; and
- Determine the impact, if any, from discharges from the Site to offsite areas.

1.4 Report Organization

The RFI Report is organized as follows:

- Section 2 provides an overview of the RFI; including a summary of the AOIs, and other areas investigated during the RFI, a summary of the phases of the RFI field investigations and the general approach; and interim measures conducted during the RFI.
- Section 3 discusses the environmental setting in the vicinity of the Site, including information on surface water hydrology, geology, hydrogeology, background soil characteristics, land use, and groundwater use.
- Section 4 presents a summary and discussion of the RFI results for each of the AOIs and other areas investigated, including areas where interim measures were conducted before and during the RFI for previously identified releases. The discussion for each area investigated includes a summary of the scope of

the field investigation, a summary and evaluation of the RFI and historic data, and a discussion of whether a potential release above screening criteria has been identified.

- Section 5 presents a human health risk evaluation that evaluates the releases at areas identified in Section 4 to determine whether corrective measures are warranted. Potential risk under these scenarios is evaluated either by estimating the cumulative cancer and non-cancer risks (for exposures to soil and sediment) or by deriving risk-based criteria (for exposures to groundwater).
- Section 6 provides the summary and conclusions of the RFI Report.
- Section 7 lists the references cited in the RFI Report.
- Tables
- Figures
- Appendix A contains the complete compound lists for Target Compound List (TCL) volatile organic compounds (VOCs); TCL semi-volatile organic compounds (SVOCs); inorganics; PCBs, total cyanide (cyanide), hexavalent chromium.
- Appendix B contains the Bathymetry Surveys completed by Chris Ransome and Associates for Harris Lake and Osmun Lake.
- Appendix C contains the calculations and field data used to determine the hydraulic conductivity values.
- Appendix D contains the soil boring logs and monitoring well construction logs for all the soil borings and groundwater monitoring wells installed during the RFI and groundwater monitoring wells sampled during the RFI.
- Appendix E contains summary tables that show all the RFI soil, groundwater, sediment, sediment oil, surface water, and fish data. Data for field quality control samples (e.g., field duplicates and blanks) are also included in Appendix E.
- Appendix F contains summaries of the results of the data review and data validation. The complete data deliverables provided by the laboratories that performed the analysis of the samples collected during the RFI are available upon request.
- Appendix G contains the Massachusetts Department of Environmental Protection (MADEP) report documenting that a specific brand of bentonite pellets commonly used in monitoring well construction contains acetone as a coating agent.
- Appendix H contains the Zymax Forensics light nonaqueous phase liquid (LNAPL) fingerprint report.
- Appendix I contains the risk evaluation calculations performed, and related supporting information.
- Appendix J contains the Baseline Human Health Risk Assessment for Harris Lake.
- Appendix K contains the Screening Ecological Risk Assessment for Harris Lake.
- Appendix L contains the Total and Dissolved Inorganics Comparison.
- Appendix M contains the Storm Sewer Supplemental IM Report.

2. RFI Overview

The CCR (ENCORE, 2001a) identified 64 AOIs based on a review of Site historical and current usage information that indicates a potential for known or suspected areas of prior release of hazardous waste or hazardous constituents. The CCR (ENCORE, 2001a) discussed each AOI with respect to description, historical and current operations, previous remedial investigations and actions, and current status, and identified 30 AOIs requiring further action. The remaining 34 AOIs have sufficient information to support No Further Action (NFA). A new AOI (F-15) was identified during the RFI as requiring Further Action along with offsite areas (PSB property, Harris Lake, Terry and Osmun Lakes). This report presents information obtained during the RFI for the 31 Further Action AOIs plus the off-Site areas (excluding Terry and Osmun Lakes), at location shown on Figure 2-1.

This section provides a general description of the Site location, field investigation performed during the RFI, investigation methods, laboratory procedures, and ongoing IM. A detailed description of the historical and current operations at the Site, a review of historical topographic and Sanborn maps and aerial photographs, RCRA regulatory history, and historical and current waste management practices is presented in the CCR (ENCORE, 2001a) and CCR Addendum #1 (ENCORE, 2002a).

2.1 Site Location

Comprising approximately 595 acres, the Site is located in the City of Pontiac, Oakland County, Michigan (see Figure 1-1). The Site is bounded to the south by Montcalm Avenue, to the west by Baldwin Avenue and the Grand Trunk Western Railroad Line, to the east by Joslyn Avenue and a plant service road, and to the north by Walton Boulevard and the Grand Trunk Western Railroad Line. Surrounding areas consist of residential subdivisions and mixed commercial and light industrial use properties. A detailed description of area demographics and environmental setting is provided in Section 3.

2.2 Areas of Investigation Overview

The Site is divided into five onsite operational areas along with offsite areas to the south. Each of these areas is briefly described in the subsequent paragraphs with detailed discussions presented in the CCR (ENCORE, 2001a) and CCR Addendum #1 (ENCORE, 2002a). These areas are:

- Fiero;
- Demolition Area (DA);
- Metal Fabrication Division (MFD);
- Powertrain;
- Service Parts Operation (SPO); and
- Offsite Areas.

2.2.1 Fiero

The Fiero plant area comprises approximately 81 acres located at the southwestern portion of the Site, including Plant 17 (Figure 1-3). The area is currently used for prototyping, storage and other non-manufacturing processes.

2.2.2 Demolition Area (DA)

The DA consists of approximately 48 acres of the south-central portion of the Site. There are currently no buildings or operations within the DA portion of the Site. The three former main operational buildings (the Foundry [Plant 6], Final Vehicle Assembly [Plant 8], and Engine Construction [Plant 9]) were demolished in 1995, 1997, and 1997, respectively. Since 1996, the DA has been the subject of ongoing soil and groundwater investigations. The former plant locations are shown on Figure 1-3.

2.2.3 Metal Fabrication Division (MFD)

The MFD area consists of approximately 236 acres in the center of the Site (Figure 1-3). It also represents the most active area of the Site with regard to current manufacturing operations. Plants currently located in the MFD area include Plants 5, 11, 12, 14, 15, 23, 25, 33, 49, 56, and ELPO. Also present in the MFD area is a wastewater treatment plant (WWTP), which is located directly west of Plants 5 and 23.

2.2.4 Powertrain

The Powertrain area consists of approximately 150 acres located along the eastern portion of the Site (Figure 1-3). The Powertrain area primarily consists of office space contained within the Powertrain Headquarters Building and the Powertrain Engineering Building. A gasoline underground storage tank (UST) farm and fueling station occupy the southwest corner of the Powertrain Headquarters Building. Test laboratories and office space are located in the Emissions Control Building. Paved parking areas and roadways occupy much of the land. A vacant area exists where former Plant 18 was located.

2.2.5 Service Parts Operation (SPO)

The SPO area consists of approximately 80 acres of land located at the northern portion of the Site (Figure 1-3) and includes Warehouse Storage and Shipping & Receiving operations, parts painting (Plant 75), and a large truck parking lot (north of Plants 25 and 33). The building and adjacent paved roadways and parking areas encompass nearly all of this area. There were no Further Action AOIs identified for SPO, therefore, this Operational Area will not be discussed further.

2.2.6 Offsite Areas

- Pontiac School Board (PSB) Property

The area currently owned by the City of Pontiac School Board (PSB) (Figure 1-3) historically included Howard Lake, the first of a chain of four lakes. Howard Lake is believed to have taken up part of the southwest corner of the property. A series of open ditches traversed the PSB property from the Site to Harris Lake, and it is believed that these ditches historically conveyed storm water from the Site to the lakes.

- Harris Lake

A review of historical maps shows that the shape and size of Harris Lake (Figure 1-3) has changed over the years. The lake appears to have become smaller, indicating that it has likely been used as a fill area. In addition, some foundry sand was observed during previous on-shore activities. A fill area is located along the north shore. It is believed that Harris Lake received storm water runoff from the Site via a series of ditches and culverts.

- Terry Lake

Terry Lake is located downstream of Harris Lake (Figure 1-1). Terry Lake receives surface water from Harris Lake.

- Osmun Lake

Osmun Lake is located downstream of Terry Lake (Figure 1-1). Osmun Lake receives surface water from Terry Lake along with storm water discharge from Fiero via Outfall 002.

2.3 Field Investigation

2.3.1 Areas Investigated

This section is organized with respect to the four onsite operational areas with Further Action AOIs and the offsite areas of investigation that make up the RFI. These areas are:

- Fiero;
- DA;
- MFD;
- Powertrain; and
- Offsite Areas.

Each operational area and the AOIs, which require Further Action as presented in the CCR and CCR Addendum #1, are discussed below (see Figure 2-1).

Fiero

- AOI F-7: Wastewater Collection Sumps
- AOI F-8: Former Paint Sludge Storage Area
- AOI F-12: Coal Storage Area
- AOI F-13: Former Oily Pea Gravel, Concrete, and Debris Area
- AOI F-14: Fuel Aboveground Storage Tank (AST) Area
- AOI F-15: Oil/Solvent Catch Basin

Demolition Area

- AOI W-1: West Yard
- AOI W-3: Former Plant 8 Flammable Liquid Storage Tank Farm
- AOI W-5: Plant 8 Basement AST Area
- AOI W-6: Former Plant 8 Flammable Materials Storage Building
- AOI W-8: Former Plant 9 Basement AST Area
- AOI W-9: Former Central Foundry (Plant 6) Resin Spill and UST
- AOI W-10: Railroad Marshalling Area Drainage System
- AOI W-11: Salvage Yard Sump Drain
- AOI W-13: Montcalm Substation

Metal Fabrication Division

- AOI M-1: Wastewater Treatment Plant
- AOI M-2: Former Plating Operations Area
- AOI M-4: Plant 25 Former Gasoline UST and Current Gasoline AST Location
- AOI M-5: Former A-2 Fill Area
- AOI M-7: ELPO Building
- AOI M-9: Plant 11 Heat Treat Oil Storage Area

- AOI M-11: Plant 12 Former Gasoline Storage Area
- AOI M-13: ASTs Area West of Plant 14
- AOI M-16: Plant 25 Basement Sump Area
- AOI M-17: Plant 15 Southern Piping Trench
- AOI M-19: Plant 5 Southern Access Railway
- AOI M-21: Plant 14 Transformer Station
- AOI M-23: Plants 25, 33, and 75 Substation and Power Building
- AOI M-24: Plant 12 Transformer Oil Spill
- AOI M-25: Plant 33 Basement Sump Area

Powertrain

- AOI P-6: Emissions Control Building Former UST Farm and Former Stoddard Solvent AST

Offsite Areas

- PSB Property
- Harris Lake
- Terry Lake
- Osmun Lake

2.3.2 RFI Field Investigation Overview

The RFI field investigation was initiated in June 2001. Based on preliminary laboratory results obtained during the RFI field investigation and information obtained from the CCR Addendum #1, supplemental field investigations were implemented. The field investigations supplemental to the RFI Work Plan were presented in:

- Addendum #1: City of Pontiac School Bus Maintenance Facility and Harris Lake (ENCORE, 2001e);
- Addendum #2: AOIs M-9, F-7, F-8, and F-15 (ENCORE, 2001f); and
- Addendum #3: Stage III – AOI and Harris Lake - Follow-up Investigation (ENCORE, 2002b).

Field investigations for the 31 AOIs and offsite areas identified for investigation in the RFI Work Plan and Addenda #s 1 and 2 were completed in February 2002. Field investigations for RFI Work Plan Addendum #3 were initiated in December 2001 and completed in February 2002.

The methods and procedures used in the field investigation conducted during the implementation of the RFI Work Plan and supplemental Work Plan Addenda #s 1, 2, and 3 are summarized in Section 2.3.4. All RFI objectives, sampling methodologies, and analytical procedures were in accordance with those presented in the RFI Work Plan, including the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), except as noted in Section 4. Samples were submitted for an AOI-specific list of analytes and may have included analysis for TCL VOCs, TCL SVOCs, metals (inorganics), PCBs, total cyanide (cyanide), hexavalent chromium, and dioxins. The AOI specific constituent list was developed based on historical chemical usage at the AOI. Complete compound lists for TCL VOCs, TCL SVOCs, inorganics, and dioxins are provided in Appendix A. The results of the investigation are summarized and discussed in Section 4. A summary of field investigations performed and laboratory analysis for each AOI is provided in Table 2-1.

2.3.3 RFI Field Methods and Procedures

The following paragraphs summarize the field methods and procedures implemented during the completion of the RFI. All sampling methodologies and analytical procedures were in accordance with those presented in the RFI Work Plan (ENCORE, 2001d) and supplemental Work Plan addenda, including the FSP and QAPP except as noted in Section 4.

Surface soil samples were collected as detailed in the RFI Work Plan (ENCORE, 2001d). Surface soil samples were collected at the 0 to 2-foot interval using a hand auger or direct-push (i.e., Geoprobe) sampling technique.

Soil borings were completed as detailed in the RFI Work Plan (ENCORE, 2001d). Soil borings were advanced using either hollow-stem auger (HSA) drilling or direct-push (Geoprobe) sampling technique. To provide a vertical profile of the subsurface, soil samples were collected continuously for visual classification using split-spoon sampling or direct-push methods from the ground surface to the bottom of each boring. Three soil samples were collected from each borehole and submitted for laboratory analysis for the AOI specific list of constituents. Soil samples submitted for laboratory analysis consisted of soil collected from the following intervals: 0 to 2 feet, 8 to 10 feet, and the 2-foot interval immediately above the water table interface. An additional 2-foot soil interval may have been submitted for analysis if it exhibited elevated photoionization detector (PID) readings or had visual staining and/or odor.

Monitoring wells were installed utilizing the spun-casing technique and were constructed of 2-inch inner diameter (ID) continuous-wire-wrapped polyvinyl chloride (PVC) screen with 10-foot screens. Monitoring wells were installed as detailed in the RFI Work Plan (ENCORE, 2001d). Due to height restrictions inside of buildings and Site access problems at some locations, drill rig modifications to this drilling method and well construction materials had to be implemented. At locations where the drill rig with spun casing capabilities could not gain access due to height restrictions, monitoring wells were installed through 4.25-inch HSA with a traditional drill rig (the well materials used were consistent with those stipulated in the RFI Work Plan [ENCORE, 2001d]). At the locations where the Geoprobe drill rig was used to install the monitoring wells (either due to extreme low overhead clearance or in areas of extreme terrain), 4.25-inch HSA were utilized. In addition, at these locations the well material was comprised of 2-inch ID, machine-slotted, prepacked well screens. The prepacked well screens are the same as traditional well screens with the exception that the screen is surrounded by a 4-inch diameter wire mesh that is filled with filter sand. The prepacked well screens are then installed through the HSA in order to provide an adequate filter pack. Details as to exact locations and modifications to monitoring well installation are discussed in Section 2.3.4.

Monitoring wells were developed by first removing a quantity of water equal to three times the volume of water lost during drilling (i.e., drilling water lost to the formation). Low-flow development techniques were then utilized to develop the well at 2-foot increments for the saturated length of the entire well screen.

Groundwater samples were collected using low-flow purge and sample approach in accordance to the guidelines presented in the FSP (ENCORE, 2001d). As groundwater was purged from each of the monitoring wells, field parameters (temperature, specific conductance, DO, and pH) were recorded. Sample collection was initiated when all the parameters stabilized and the turbidity stabilized below 5 nepholometric turbidity units (NTUs). In some instances, turbidity was not measured below 5 NTUs, but where readings did stabilize at a level higher for a period of greater than 1 hour, sample collection was initiated. A summary of field parameters is provided in Table 2-3.

For the first round groundwater quality samples were collected with a peristaltic pump or bladder pump (depth to water greater than 30 feet). For the second round of sample collection, all non-VOC parameters were collected with a peristaltic pump and samples for VOCs were collected with a disposable bailer. In wells where the depth to water was greater than 30 feet, a Grundfos submersible pump was used for sample collection.

During the first round of groundwater sampling, samples were collected and submitted for PCBs, dioxins, and inorganics analysis. During the second round of groundwater sampling, samples were collected for inorganic analysis for total and dissolved concentrations, and for PCBs and dioxin.

Sediment samples were collected as detailed in the RFI Work Plan (ENCORE, 2001b). Sediment samples were collected at discrete intervals using either a Ponar® sampler or Lexan® tubing.

2.3.4 RFI Field Activities

Sitewide Hydrogeologic Investigation

Based on the limited amount of available information for the Site hydrogeologic setting, a Sitewide hydrogeologic investigation was initiated. The purpose of this investigation was to provide groundwater flow information necessary for final placement of the AOI groundwater monitoring wells. A total of 30 groundwater monitoring wells were installed within three hydrogeologic zones with 19 installed within the shallow water table zone, five installed within the intermediate glaciolacustrine zone and six installed within the upper sand and gravel zone.

Groundwater elevations were obtained periodically from each of these wells to determine a generalized groundwater flow direction for the Site. This information was used in part to determine the final placement of monitoring wells installed as part of the AOI investigations.

Two rounds of groundwater samples were collected from each of the Sitewide monitoring wells installed. In addition, the hydraulic conductivity for each of the wells was calculated either from information obtained during low-flow sampling or from slug tests performed.

To assess soil background metal concentrations, soil borings SB-01 through SB-03 were completed (Figure 2-2). Soil samples were collected from each of these borings from the 0 to 2-foot interval. Soil samples were also collected from the installation of select monitoring wells (MWP1, MWF2, GWM3, and GWP6) to be used in the evaluation of the soil background metal concentrations. Additional soil borings (BP01 and BP04) were performed at GWP6 to delineate arsenic concentration in soil.

AOI and AOI Follow-up Investigation

The investigation proposed for each AOI are described in the RFI Work Plan and RFI Work Plan Addenda #1 and #3 (including types and numbers of borings, numbers of monitoring wells installed, and analytical suites). A summary of this investigation is also provided in Table 2-1. The preliminary data evaluated during the completion of the RFI were used to implement a follow-up investigation at specific AOIs (F-7, F-8, F-15, W-1, W-8, W-9, W-10, M-1, M-2, M-4, M-5, M-9, M-16, M-19, and P-6).

Pit and sump inspections were completed at AOIs F-7, F-8, F-15, W-6, W-10, M-9, M-16, M-17, and M-25. The pits and sumps were inspected to identify the condition of the sump including staining and broken or cracked concrete. Based on these observations, additional investigations were completed in the form of soil borings and monitoring well installations at AOIs M-9, F-7, F-8, and F-15.

Test pits were completed at AOI W-1 to characterize the fill placed in the former settling basin. The test pits were completed using a backhoe to excavate the soil. Soil samples were collected and submitted for laboratory analysis.

All monitoring wells installed during AOI and AOI follow-up investigations were shallow wells with screened intervals that straddle the water table. The majority of the monitoring wells were installed using the spun-casing technology and were constructed with a 10-foot long, wire-wrapped, PVC well screen (0.010-inch slot) with the following exceptions. Due to height restrictions inside of buildings (i.e., drill rig with spun casing capabilities did not have the height clearance), monitoring wells MWM9-01, MWM2-06, MWM2-07 and MWM7-03 were installed with 4.25-inch augers using a traditional drill rig. Due the extremely low clearance at monitoring well location MWM2-08, the Geoprobe 66DT drill rig was used to install the well. Monitoring well MWM2-08 was installed with 4.25-inch augers, and the well material consisted of a 10-foot-long, machine-slotted PVC prepacked well screen.

Two monitoring wells were installed along the seepage face along Montcalm Avenue, downgradient from LNAPL Area No. 1 (AOI W-1) to obtain water samples representative of the surface water seep in this location. Both of these monitoring wells (MWW1-02 and MWW1-03) were installed with the Geoprobe 66 DT drill rig

because of limited access and the steep grade. The well material for both of these wells consisted of a 10-foot-long; machine-slotted PVC, prepacked well screen.

At AOI M-5, groundwater samples were scheduled to be collected from existing monitoring well MW1-99. Upon inspection of the well, it was determined that the well was damaged and groundwater samples could not be collected. Monitoring well MW1-99 was abandoned by first pulling the well from the ground, overdrilling with 4.25-inch augers (i.e., drilling to a point lower than elevation than the monitoring well was set), and backfilling with a cement/bentonite slurry.

After a monitoring well was installed, a total of three times the amount of water lost to the formation during drilling was removed. Monitoring wells were then developed using low-flow sampling methodology. Two rounds of groundwater samples were collected from each of the monitoring wells installed during the AOI investigation. Only one round of groundwater samples was collected from monitoring wells installed during the AOI follow-up investigation.

The hydraulic conductivity for each of the monitoring wells was calculated either from information obtained during low-flow sampling or from slug tests. Groundwater elevations, including measurement for LNAPL at select monitoring wells, were obtained on a regular basis.

PCBs were delineated in the soil at AOI M-1 and AOI W-9. In these areas, soil samples were collected with a Geoprobe to assess the horizontal and vertical distribution of PCBs. Soil samples were collected in a 5- to 20-foot horizontal grid pattern at 2-foot intervals from ground surface to the top of the water table. These soil samples were field-screened with a bioassay field screening kit. Additional step-out borings were completed until the PCB field screening results were less than the screening criteria of 20 milligrams per kilogram (mg/kg) or until obstructions (e.g., building foundation and underground utilities) were encountered. The soil samples screened onsite that did not exceed the screening criteria were submitted to the laboratory for verification along with 10% of the samples that exceeded the screening criteria of 20 mg/kg.

Pontiac School Board (PSB) Property

Based on information obtained during the preparation of the CCR Addendum #1 (ENCORE, 2002a), a sediment sampling, soil boring, and monitoring well installation program was completed at the PSB property. The work was performed in accordance with the RFI Work Plan Addendum #1 (ENCORE, 2001e).

Historical information indicates that at least two drainage ditches may have conveyed storm water from the Site to Harris Lake via the PSB property. An abandoned corrugated metal storm sewer pipe occupies the location of the historical ditch alignment. A total of 10 soil borings were completed along the approximate alignment of the former ditches. Soil borings were completed from ground surface to the top of the water table. Soil samples were submitted for analysis for VOCs, SVOCs, PCBs, and inorganics.

Soil and sediment samples were collected from catch basins and manholes along the abandoned storm sewer. Sediment samples were collected from within the pipes extending from the manhole or catch basins. Test pits were excavated at abandoned catch basins and manholes, and soil samples were collected from the bedding material around the outside of the pipes. Soil and sediment samples were submitted for analysis for VOCs, SVOCs, PCBs, inorganics, and dioxins.

A total of two monitoring wells were installed at the downgradient portion of the PSB property in the vicinity of the culvert that crosses Saginaw Street and discharges into Harris Lake. Two rounds of groundwater samples were collected from these monitoring wells. Groundwater samples were submitted for analysis for VOCs, SVOCs, PCBs, and inorganics.

Harris Lake

A surface soil, surface water, sediment, fish sampling, sediment oil, and bathymetry investigative program was performed for Harris Lake. The work was completed in accordance with the RFI Work Plan Addenda #s 1 and

3. The types of samples collected (e.g., surface water, sediment, and soil) and the analytical suite for samples analyzed is provided in Table 2-1.

A total of 10 surface water samples were collected along the shoreline of Harris Lake. The samples were collected in a manner that avoided disturbance to the bottom sediment.

As part of the RFI Work Plan Addendum #1 sampling effort, 13 sediment samples were collected at the 0 to 2-inch interval from 10 locations. In addition, sediment samples were collected from 10 locations from the 0 to 6-inch interval. Ten of the sediment sampling locations were collected from the near shore area with three samples collected from the middle of the lake. As a part of RFI Work Plan Addendum #3 sampling effort, sediment samples were collected at multiple depths from an additional 13 locations along the shoreline of Harris Lake. A sediment sample was collected to a depth where marl was encountered (approximately 1 to 2 feet). Sediment samples were collected using Lexan® tubing or a Ponar® grab sampler.

An oil sample was obtained from the sediment at location SDHS-09. Sediment was collected and placed into a 5 gallon container which was agitated, thereby releasing oil. The accumulated oil was collected and placed into appropriate sample containers for laboratory analysis of SVOCs, PCBs and dioxins.

A total of 10 soil borings were completed on the north side, and a total of three borings were completed on the south side of Harris Lake. The borings were completed from the ground surface to the top of the water table in areas of suspected fill material.

A permit was obtained from the Michigan Department of Natural Resources (MDNR) to complete the fish sampling program for Harris Lake. Originally the fish were to be trapped using trap nets. However, due to difficult weather conditions, a variance to the permit was obtained from the MDNR to use gill nets. Two types of fish samples were sent to the lab: both fillets of individual fish and whole fish from the same species that were composited were submitted for laboratory analysis.

In addition, a bathymetry survey was completed for Harris Lake. A copy of the bathymetry report is provided in Appendix B.

Terry Lake

A total of three sediment samples were collected from Terry Lake. The work was completed in accordance with the RFI Work Plan Addendum #3. The sediment samples were collected in the area receiving discharge from Harris Lake. Samples were submitted for analysis for VOCs, SVOCs, PCBs, and inorganics.

Osmun Lake

Six sediment samples were obtained from Osmun Lake. Three samples were collected from the area receiving discharge from the Fiero storm sewer, and three sediment samples were collected from the Terry Lake outlet to Osmun Lake. Samples were submitted for analysis for VOCs, SVOCs, PCBs, and inorganics.

In addition, a bathymetry survey was completed for Osmun Lake. A copy of the bathymetry report is provided in Appendix B.

LNAPL Investigation

A LNAPL was detected in the water table zone in the West Yard (AOI W-1) during previous investigations and in two additional areas during the implementation of the RFI. In addition, LNAPL was also detected in the Montcalm Production well; this production well is screened in the lower sand and gravel zone. The following paragraphs detail the investigations for LNAPL in both the water table zone (shallow) and the lower sand and gravel zone (deep).

- Shallow LNAPL

During the implementation of the RFI, two areas of LNAPL were encountered within the water table zone in AOIs W-10 and W-8 (LNAPL Areas No. 2 and 3, respectively). A delineation program was performed at each

location to determine the horizontal extent of the LNAPL. In addition, LNAPL Area 1 was further delineated to the east, north, and southwest. LNAPL Areas No. 1 and 2 are shown on Figure 2-3, and LNAPL Area No 3 is shown on Figure 2-4. It should be noted that LNAPL Areas No. 1 and 2 commingle and the exact delineation of the individual LNAPL was not performed.

Even though LNAPL Area No. 1 (Figure 2-3) was previously delineated, there remained uncertainty as to the accuracy of the delineation to the east because the methods used to delineate LNAPL Area 1 differed from those used to define LNAPL Areas No. 2 and 3. LNAPL Area No. 1 was delineated by PID readings and visual observations of soil cuttings during drilling, whereas LNAPL Areas No. 2 and 3 were delineated by screening soil cuttings with a fluorescent/ultraviolet light. A total of 12 borings were completed with a Geoprobe in the eastern portion of LNAPL Area No. 1. The soil borings were completed to a depth of approximately 10 feet below the water table. The soils were then screened onsite with a fluorescent/ultraviolet light to detect the presence or absence of LNAPL. Based on these results, a monitoring well was installed to confirm the delineation.

The initial investigation at LNAPL Area No. 2 (Figure 2-3) involved the collection of soils with a Geoprobe. These soil samples were collected continuously from ground surface down to a depth of approximately 10 feet below the water table. The soils were then screened onsite with a fluorescent/ultraviolet light to detect the presence or absence of LNAPL. Four temporary 1-inch diameter piezometers were installed on all four sides of the monitoring well when LNAPL was detected to identify localized groundwater flow. Based on these results, two monitoring wells were installed upgradient and downgradient of the suspected LNAPL pool, and one monitoring well was installed within the LNAPL area.

The depth to groundwater in LNAPL Area No. 3 (Figure 2-4) was too deep to reliably use a Geoprobe. At this location, a conventional drill rig was used to install permanent wells to delineate the LNAPL. A total of four monitoring wells were installed around monitoring well MWW8-03 encountered and accumulated LNAPL. Four additional monitoring wells were then installed around MWW8-03 (to the north, south, east, and west) that did not encounter LNAPL. Two temporary piezometers were installed in the area to aid in identifying groundwater flow direction. The four wells that do not have LNAPL present served as the upgradient, downgradient, and two lateral wells for delineation.

- Deep LNAPL

LNAPL was observed at the Montcalm Production Well (Figure 2-3) during purging for sample collection and as a thickness on top of the water column. The Montcalm Production Well was installed in the 1950s to a depth of 180 feet, predominately screened in the sand and gravel zone beneath the basal till layer. The production well was installed to supply coolant water to the foundry. There is no additional information for this well. To evaluate whether LNAPL is present in the lower sand and gravel zone, three deep monitoring wells (DWD10, DWD12, and DWD13) were installed in this zone. Two additional monitoring wells (GWD9 and GWD11) were installed in the upper sand and gravel zones (above the basal till layer) adjacent to the new deep wells to provide vertical hydraulic gradient between the various groundwater zones.

The Montcalm Production Well was abandoned by pumping neat cement, via a tremie pipe, from the bottom of the well to the ground surface. A licensed Michigan water well driller oversaw the operation and filed the appropriate forms with the MDEQ.

2.4 Laboratory Procedures

The analytical suites for all samples that were submitted to the laboratory were specific to each AOI and offsite area and are summarized in Table 2-1. All methods and procedures for the analysis are presented in the QAPP and summarized in Table 2-2. Field screening for PCBs was also performed using bioassay colorimetric techniques.

The only variation to these methods was for the analysis of thallium in groundwater samples. The analytical method was modified from the first round of groundwater sampling to the second. The method was modified from Method SW846-6010B to Method SW846-6020 to lower the detection limit and the reporting limit. The data results from the collection of surface water samples and the first round of groundwater samples showed detections of thallium above the screening criteria. However, because the reporting limit was so close to the screening criteria, incidents of false detections were reported. To eliminate this problem, the analytical method was switched from SW846-6010B (reporting limit of 10 milligrams per liter [mg/L] and detection limit of 5 mg/L) to SW846-6020 (reporting limit of 1 mg/L and detection limit of 0.018 mg/L) to lower the detection limit, and thus to eliminate the potential for false positives that would exceed the screening criteria.

2.5 Storm Sewer IM Investigation

As a result of the detections of PCBs within the onsite storm sewer system and the Storm Water Retention Facility (SWRF) in June 1999, GM initiated the Environmental Review of PCB Issues and Storm Sewer Interim Measures (ENCORE, 2001b). The purpose of the IM was to summarize the potential correlation between the detections of PCBs and the historical and/or current occurrence of PCBs at the Site and to provide the information required to execute a successful storm sewer rehabilitation program. The Draft Storm Sewer IM (ENCORE, 2001c) identified areas requiring the completion of additional investigation and tasks prior to proceeding with storm sewer rehabilitation efforts. These additional activities were presented in the Draft Environmental Review of PCB Issues and Storm Sewer IM (ENCORE, 2001b). The Storm Sewer Supplemental IM Report (ENCORE, 2002c) is provided as Appendix M.

3. Environmental Setting

3.1 Location/Physiology

The Site is located in the City of Pontiac, Michigan as shown on Figure 1-1. The Site occupies portions of Sections 16, 17, 20, and 21 of Pontiac Township, Range 10E, Township 03N, in Oakland County.

The topography of the Site vicinity is characterized by relatively low relief and is defined by glacial melt deposits, as described in Section 3.8.1. The regional topography is also defined by direct or indirect glacial deposits but varies in relief, depending on depositional processes as described in Section 3.4.

3.2 Climate

Oakland County's weather is generally temperate, with an average winter temperature of 25.3° F and an average summer temperature of 70.2° F. The sun shines 38% of the time during the winter and 67% of the time in the summer. Average seasonal snowfall is 34.6 inches. Average annual precipitation is 29.7 inches with 58% (17.2 inches) occurring between the months of April and September. The average relative humidity for Oakland County is 80% (Feenstra, 1982). The prevailing winds are typically from the northwest in the winter months and the southwest in the summer months.

3.3 Land Use and Demographic Data

3.3.1 Land Use Patterns

The Site is zoned for industrial use, and areas surrounding the Site are zoned for either residential, commercial, or industrial use (Figure 3-1). Two city-owned parks (Perry Park and Oakland Park) are located south of the Site, and one (Jaycee Park) is located to the north. Residential neighborhoods are located east and west of the Site and also near the middle portion of the Site, south of SPO.

3.3.2 Economy, Population, and Housing Trends

The economy in the Pontiac area is primarily supported by manufacturing. Manufacturing accounts for approximately 81% of total revenue for businesses located in Pontiac (U.S. Census Bureau, 1997). In addition, manufacturing provided approximately 70% of the income earned by employees working in Pontiac.

Residents of Pontiac work in several industries, including manufacturing (22%), retail (19%), health services (11%) and education (9%). Unemployment, as of 1990, was relatively high with 14% of Pontiac residents in the labor force unemployed (U.S. Census Bureau, 1990).

The population of Pontiac has steadily dropped over the last 10 years falling from 71,166 in 1990 to 66,337 in 2000 (7% drop) reflecting a downturn in manufacturing as well as a trend in migration from older urban areas like Pontiac.

With the declining population, the number of vacant housing units has increased from 1,816 in 1990 to 2,102 in 2000, even though the total number of housing units decreased from 26,593 to 26,336 over the same period. Of the 24,234 occupied housing units, 53% are occupied by the owner and 47% are occupied by renters.

3.3.3 Site Redevelopment Plans

Portions of the Site are intended for "Brownfield" redevelopment. Currently, the U.S. Postal Service is evaluating a portion of the Demolition Area to build a 700,000 square foot distribution center. The City of Pontiac is also in the process of purchasing land for the building of city streets through portions of the Site to service future redevelopment.

3.4 Regional Geology

East-central Oakland County is characterized by glaciofluvial deposits that are common to Oakland County. The regional overburden material consists of glacial till composed mainly of clay and some sands. Overburden material is regionally underlain by shales of Early Mississippian age.

3.4.1 Overburden

Continental glaciers advanced into this area of Michigan at least twice, once in each of the last two glacial stages of the Illinoian and Wisconsinan glaciers of the Pleistocene epoch. During the Wisconsinan stage, ice sheets of the Huron-Erie glacial lobe advanced from the southeast across the area of the Site. During the advance and retreat of this ice sheet, a series of end moraines (Fort Wayne, Defiance, and Birmingham) and a thick sequence of ground moraine (glacial till) composed of clay, silt, and rock fragments were deposited in this area. As the ice sheet retreated to the southeast, large volumes of meltwater formed glacial Lake Maumee between the Fort Wayne Moraine and the retreating glacier. The ice again advanced, forming the Defiance Moraine, and subsequently retreated, forming glacial Lake Arkona. As the ice advanced yet again from the east, the Birmingham Moraine was formed.

Pleistocene glaciation deposited glacial drift in a thickness of over 400 feet in parts of Oakland County. The buried bedrock surface is highly irregular. The Site is located in an area that is part of the lake plain of southeastern Michigan, formed by lakes that were ancestral to the present Great Lakes. Dunes, offshore bars, and lake-bottom sands, silts, and clays associated with the lakes are found in Oakland County. Figure 3-2 presents the regional surficial geology.

3.4.2 Bedrock

Oakland County is located along the southeast side of the Michigan Basin, a "bowl-like" feature in which the sedimentary rocks dip inward from all directions toward the center of the Lower Peninsula of Michigan.

The Coldwater Shale, of Early Mississippian age, is the first bedrock formation encountered in the area. The shale is primarily gray to dark gray. Other lithologies within this unit include red fossiliferous or nonfossiliferous shale, carbonate (limestone or dolomite), siltstone, and sandstone. Total thickness of the Coldwater Shale ranges across the Michigan Basin. In the vicinity of the Site, the unit may be up to 1,300 feet thick (Westjohn and Weaver, 1996). Located beneath the Coldwater Shale are sedimentary formations of the Berea Sandstone - Bedford Shale unit. Figure 3-3 presents the regional bedrock geology.

3.5 Regional Hydrogeology

Regional groundwater flow is typically to the south and east corresponding in general to flow within the Clinton River watershed. Water-bearing formations exist in both the unconsolidated and bedrock formations. In the

Site area, four distinct water-bearing units are identified: unconfined water table aquifer, glacial aquifer, sand and gravel outwash aquifer and bedrock aquifer. Each is described below.

Unconfined water table zone

The upper glacial deposits (till and glaciolacustrine) of the area contain an unconfined water table influenced by seasonal precipitation, local drainage patterns, and topography. The water table is located at a depth of approximately 10 to 30 feet below ground surface. The unconfined water table zone is not used for water supply purposes. The use of this zone as a potable supply is generally prohibited by Michigan Department of Public Health regulations (Part 127 of Act 368 [Groundwater Quality Control], 1978) because it is at a depth of less than 25 feet.

Glacial zone

The regional glacial till is extensive, both areally and vertically. The glacial till moraines consist of poorly stratified clays, sand, and gravel that are not laterally continuous. This material does not transmit large quantities of water, and as a result, water-bearing zones within this unit are not considered significant aquifers. However, in some areas, glacial outwash underlies the moraine material. In the vicinity of the Site, the outwash appears in a more complex, bedded sequence with the moraine. It is within these interbedded layers of outwash that larger quantities of water can be yielded over longer periods of time. Figure 3-4 identifies the Site within the regional aquifer characterization.

Sand and gravel outwash zone

The regional sand and gravel aquifer is composed of glacial outwash that generally consists of beds of well-sorted sand and gravel. This regional aquifer unit underlies the glacial till and the interbedded local outwash aquifers described above at a depth of approximately 150 feet. This unit is considered the most important aquifer in the region because it provides storage for large quantities of water that can be used for both residential and industrial supplies.

Bedrock zone

On a regional basis, the Coldwater Shale and Bedford Shale are commonly considered nonproductive aquifers, typically yielding only small amounts of water. However, on a local basis, within parts of the region, the Coldwater Shale contains beds of sandstone. This occasional sandstone layer and the Berea Sandstone (where present) yield enough water for residential use. A more abundant water supply is found at greater depths but its use is impractical due to depth and significant increases in mineral content.

3.6 Surface Water/Drainage

Within the Site boundaries, surface water drainage is controlled by building and paved area drainage patterns. Storm water from the roofs of Site structures is directed through roof drains and downspouts to exterior Site surfaces or through underground piping to the storm sewer system. The majority of the site is paved, therefore a majority of the storm water runoff from exterior Site surfaces enters into catch basins that discharge to the storm sewer system. There are six storm water discharge points from the Site, as shown on Figure 3-5. The storm water outfalls from the Site are:

- Fiero Outfall 001 to Harris Lake;
- Fiero Outfall 002 to Osmun Lake via Augusta Drain;
- MFD Outfall 001 to Storm Water Retention and treatment facility then to the City of Pontiac storm sewer;
- MFD Outfall 002 to Clinton River via City of Pontiac Sewer;
- Powertrain Outfall 010 to Clinton River via City of Pontiac Sewer; and

- Powertrain Outfall 011 to Clinton River via City of Pontiac Sewer.

Storm water from MFD Outfall 001, which is discharged to the City of Pontiac sewer, is treated prior to discharge because of the presence of PCBs in previous samples collected from the outfall.

Regarding local surface water drainage, the nearest surface water bodies to the Site are Harris Lake, Terry Lake, and Osmun Lake, which are approximately 600 to 3,200 feet southwest to west of the Site. These lakes discharge into the Clinton River, which is located approximately 5,200 feet south of the Site.

On a regional scale, the Site is located within the Clinton River watershed, which includes an area of approximately 760 square miles within Oakland and Macomb counties. The Clinton River discharges into Lake St. Clair (approximately 25 miles to the east), which is used as a municipal water supply for the City of Detroit and surrounding communities, including the City of Pontiac.

3.7 Groundwater Use

Groundwater in the area near the Site is not used as a municipal water supply source. Local drinking water is supplied by the City of Detroit, which is obtained from Lake St. Clair.

There are no municipal drinking water supply wells within a 5-mile radius of the Site (USEPA, 2000). The area surrounding the Site is on municipal water supply from the City of Detroit (MDNR, 1987). The nearest private well is approximately 5,000 feet from the Site (Superior, 2000).

There are no production wells currently on Site. The last remaining production well was abandoned on February 27, 2002 (Montcalm Production Well).

3.8 Site Geology/Hydrogeology

This section describes the geologic setting for the site based on available monitoring well and borehole data. Data developed during previous investigations along with information obtained during the implementation of the RFI were used for this assessment.

3.8.1 Site Geology

The Site overburden geology consists of four principal units: fill material, glaciolacustrine, glacial outwash, and basal till. Fill material is a generic term referring to reworked native soils, foundry sands, and imported soils resulting from preparation of the Site construction and reworking of the land over time. Glaciolacustrine deposits, composed of silts, clays with lenses of sands and gravels, are the most laterally continuous and thickest type of deposit present. Sand and gravel outwash is fairly extensive immediately above the basal till. Basal till is found across the entire site. In addition to these four units, a peat and marl unit is also present in the area of Harris Lake and the southwestern area of the Site. Subsurface stratigraphic data for the RFI are summarized in Table 3-1. Five geologic cross-sections were constructed across the Site along traverses shown on Figure 3-6. These cross-sections are labeled A-A′ (Figure 3-7), B-B′ (Figure 3-8), C-C′ (Figure 3-9), D-D′ (Figure 3-10), and E-E′ (Figure 3-11). The Site stratigraphy as depicted on these cross-sections is discussed below.

Fill Material

Regrading and construction activities at the Site have resulted in the placement of reworked native soils and imported foreign soils. Fill material is present across the areas of the Site that have had either existing or former buildings present or other construction activities (e.g., loading docks, fill areas [AOI M-5], parking lots). These fill materials consist mainly of spent foundry sand that contain a variety of debris including slag fragments and steel casings. Intermixed with the foundry sand is gravel, gray clay stringers, clayey fill material, and light

brown sand. Fill material, where present, can be up to 30 feet in depth but is typically between 4 to 8 feet in thickness.

In the area of the West Yard (AOI W-1), Former Central Foundry (AOI W-9), and the Railroad Marshalling Area (AOI W-10), the fill material is primarily foundry sand. In other areas of the Demolition Area, the fill material consists primarily of construction debris that was used to backfill old basements. Fill material in the remaining areas of the Site consists primarily of reworked native soils.

The fill material is thickest in the southwestern portion of the Site, primarily in the West Yard. In this area it is upwards of 30 feet thick in the area of monitoring wells MW32-99 and MWD4, as shown on cross-sections A-A′ (Figure 3-7) and B-B′ (Figure 3-8). As depicted on cross-section B-B' (Figure 3-8) the fill material extends southwest and terminates at Harris Lake. This indicates that fill material was placed in the immediate area of Harris Lake (which is supported by historical air photos and soil boring logs from soil borings completed around Harris Lake). In addition, cross-section A-A′ (Figure 3-7) shows that the fill material pinches out to the east (at the east edge of the Former Central Foundry - AOI W-9). Beneath these fill deposits in the southwestern portion of the Site and around Harris Lake, a peat and marl layer is present.

Along cross-section C-C' (Figure 3-9), the eastern portion only shows fill material at SPO (northern extent) and at Powertrain (location of previous tank excavation and backfill), whereas the area along the rest of cross-section C-C' shows native material (i.e., absence of fill material).

There is an absence of fill material across portions of the Site as shown on cross-section D-D' (Figure 3-10). The fill material becomes less continuous and not as thick farther north on the Site. In the area of AOIs M-16 and M-4, the fill material is only approximately 4 feet thick, as shown on cross-section B-B′ (Figure 3-8).

Cross-section E-E' (Figure 3-11) illustrates that the fill material is present across the West Yard and extends westward across Fiero. The fill material is approximately 10 feet thick in this area, and majority of the fill material in the area of monitoring wells MWF12-01 and MWF12-02 consists of coal from GM's power plant. Farther east from Fiero the fill material is no longer present.

Glaciolacustrine Deposits Interbedded Outwash Deposits

Immediately underlying the fill material are glaciolacustrine deposits (see Figures 3-7 to 3-11). The glaciolacustrine deposits are highly variable with a wide variation in grain size and density; however, a majority of these deposits consist of clays, silts, and fine sands. The glaciolacustrine deposits are usually described as brown to gray, fine to coarse sand with varying amounts of silt and clay. Some of the glaciolacustrine deposits are composed primarily of fine to coarse sand and gravel or silt and clay. The majority of the glaciolacustrine deposits are water-bearing; however, there are areas composed primarily of clays and silts in which there is very minimal groundwater.

The glaciolacustrine deposits are present from either ground surface or immediately below the fill material down to the upper outwash deposits. These glaciolacustrine deposits range in thickness from approximately 70 feet in the northern portion of the Site, as shown on cross-sections B-B' and C-C' (Figures 3-8 and 3-9), to more than 100 feet thick in the southern portion of the Site.

Near the east-central portion of the Site there is an isolated pocket of ablation till within the glaciolacustrine deposits (Figure 3-9). The ablation till is composed of gray gravelly clay.

Found within the glaciolacustrine deposits are interbedded outwash deposits. The most prominent of these outwash deposits is shown on cross-section A-A' (Figure 3-7). This outwash deposit extends the entire length of the Site from east to west and ranges in thickness from a few feet to over 40 feet. However, this same outwash deposit extends only partway onto the Site, as seen on cross-section E-E' (Figure 3-11). This outwash deposit appears to be hydraulically connected to Harris Lake, as shown on cross-section B-B' (Figure 3-8).

Other interbedded outwash deposits are illustrated on cross-sections A-A′ through D-D′ (Figures 3-7 through 3-10).

Upper Outwash Deposits

Immediately underlying the glaciolacustrine deposits is the first in a series of areal extensive glacial outwash deposits referred to as the upper outwash deposit. This upper outwash deposit is composed primarily of gray, fine to coarse sands and fine to coarse gravels, with some silt. This outwash deposit is continuous across the Site and is situated on top of the upper basal till unit. The upper outwash deposit ranges in thickness from 5 to 30 feet, as shown on cross-sections A-A', B-B', C-C', and D-D' (Figures 3-7 through 3-10). This upper outwash deposit dips slightly (approximately 20 feet) across the Site from the northwest to the southeast, which follows the dip of the underlying till deposits.

In the northern part of the Site, a small basal till unit is interbedded within the upper outwash deposits, as shown on cross-sections B-B' and C-C' (Figures 3-8 and 3-9). This basal till unit is only approximately 20 feet thick. From cross-sections B-B' and C-C' (Figures 3-8 and 3-9), it appears that this basal till unit is continuous across the Site from east to west but only extends a short distance south onto the Site before pinching out.

Basal Till Deposits

Basal till deposits at the Site are generally described as gray clay with silt, fine to medium sand, and some gravel. In addition to its poorly sorted (heterogeneous) grain size distribution, the till exhibits a higher density than the overlying glaciolacustrine deposits, as evidenced by increased blow counts recorded during split-spoon sampling.

The basal till is present across the entire Site, as presented in cross-sections A-A', B-B', C-C', and D-D' (Figures 3-7 through 3-10). This basal till unit was encountered in all the deep monitoring wells (GWM3, GWS2, GWF4, GWP6, GWP3, GWD8, GWD9, and GWD11) installed as part of the Sitewide hydrogeologic investigation. The base of the basal till unit can only be seen in the southern portion of the Site, as shown on cross-section A-A' (Figure 3-7) where monitoring wells (DWD10 and DWD12) were advanced through the basal till into the lower outwash deposits. The basal till unit ranges in thickness from 20 to 60 feet, as shown on cross-section A-A' (Figure 3-7), and the surface of this basal till dips gently toward the southeast. The basal till is expected to act as a vertical barrier to any potential migration of groundwater or Site-related constituents.

In the southern portion of the Site, a second (lower) basal till unit is present, as depicted on cross-section A-A' (Figure 3-7). This basal till unit is generally described as gray clay, fine to medium sand, and some gravel. The thickness of the lower basal till unit could not be determined because borings in this area were not advanced deep enough to penetrate this unit. Between these two basal till units there is an outwash deposit (discussed below). The multiple sequence of basal till and glacial outwash represent a stagnation period in the retreat of the ice sheet where oscillation, retreat, and readvancement occurred.

Lower Outwash Deposits

A deeper outwash layer overlays an additional basal till unit evident only in the southern portion of the Site (deeper monitoring wells were only installed in the southern portion of the Site). These outwash deposits are composed primarily of gray, fine to coarse sands and fine to coarse gravels, with some silt. These deposits are found between the upper and lower basal till units and range in thickness from 15 to 25 feet. Only the deep monitoring wells (DWD10, DWD12, and DWD13) were installed within these lower outwash deposits.

3.8.2 Site Hydrogeologic Setting

Unconfined Water Table Zone

Groundwater is present in the fill material and unconfined glaciolacustrine deposits at the Site. Groundwater elevation measurements were obtained periodically throughout the duration of the RFI. As additional monitoring wells were installed and surveying was completed, subsequent rounds of groundwater level measurements were collected. These data are presented in Table 3-2 and include water levels obtained on October 1 and 2, 2001; October 8 and 9, 2001; November 7 and 8; 2001, January 2 and 3, 2002; and February 7 and 8, 2002. Top of water table groundwater maps (Figure 3-12) for February 7 and 8, 2002 (Figure 3-12) and January 2 and 3, 2002 (Figure 3-12b) were generated for the unconfined water table from data presented in Table 3-2. Site groundwater is typically found at depths ranging from 4 to 35 feet below ground surface (bgs) in this zone. In general, the groundwater flow direction follows the topography of the Site, with the apparent horizontal component of the groundwater flow to the southwest toward a series of small lakes (Harris, Terry, and Osmun). The horizontal hydraulic gradient across the Site is 0.0047 (as calculated from MWS1 to MWD6). These monitoring wells are located in the northeast and southwest corners of the Site, respectively, along the main axis of groundwater flow. However, there are localized groundwater flow variations as shown on Figure 3-12. In the area of Former Plant 9 (AOI W-8), there is a large groundwater depression at monitoring well MWW8-03. There is a large sewer (72-inch diameter) that is located in this immediate area, which suggests that the sewer is leaking and acting as a groundwater collection point. There is a large groundwater mound located in the area of the West Yard (AOI W-1) and Railroad Marshalling Area (W-10), which is most likely associated with the storm sewer system below the tracks, which has been plugged.

Located in the southwest portion of the Site is a groundwater seep along Montcalm Avenue east of the Saginaw gate. Monitoring wells MWW1-02 and MWW1-03 were installed along the seep (Figure 3-12). The data presented in Table 3-2 indicate that the groundwater elevation is at ground surface. In this area, the topography drops off and intercepts the water table, creating the seepage. This area is hydraulically at the downgradient portion of the Site.

In addition to the localized groundwater flow onsite, there are also Site areas where groundwater was not present within the interval targeted for well placement. At monitoring wells MWM25-01, MWM9-01, MWP6-05, MWP6-06, and MWP6-08, groundwater failed to recharge after installation. This is due to the fact that the glaciolacustrine deposits in the immediate areas where the wells were installed are not abundant in water-bearing materials (sands) and more abundant in clays and silts. There are also areas in which underground storage tanks (USTs) (AOIs M-4 and P-6) were removed as part of previous remedial actions. These excavations are backfilled with imported sand (cross-sections B-B' and C-C', Figures 3-8 and 3-9), which may support a perched groundwater system.

Glaciolacustrine Zone

Intermediate groundwater monitoring wells (IWF3, IWP2, IWP5, IWM2, and IWD7) were installed in the glaciolacustrine deposits as part of the Sitewide hydrogeologic investigation. These intermediate monitoring wells were installed in well clusters with monitoring wells installed in the unconfined water table and the upper sand and gravel outwash zone to allow for determination of vertical groundwater flow information. Water levels were obtained from these monitoring wells with these data presented in Table 3-2. During the RFI groundwater monitoring well IWP2 was dry due to the tight nature of the soils the well screen is situated in.

Upper Sand and Gravel Outwash Zone

Groundwater level measurements were collected periodically throughout the duration of the RFI. As additional monitoring wells were installed and surveying was completed additional groundwater level measurements were collected. These data are presented in Table 3-2. A groundwater potentiometric map (Figure 3-13) for February 7 and 8, 2002 was generated for the upper sand and gravel outwash aquifer from data presented in Table 3-2.

The groundwater potentiometric surface in the sand and gravel aquifer is typically measured at depths ranging from 40 to 75 feet. In general, the horizontal component of the groundwater flow is to the south-southeast toward the Clinton River, which is the regional groundwater discharge point. The horizontal hydraulic gradient across the Site is 0.0045 (as calculated from GWM3 to GWP3). These monitoring wells are located in the northwest and southeast corners of the site, respectively, along the main axis of groundwater flow.

Lower Sand and Gravel Outwash Zone

A total of three groundwater monitoring wells (DWD10, DWD12, and DWD13) were installed in the lower sand and gravel outwash zone. One round of groundwater level measurements was obtained with these data presented in Table 3-2. Based on these data, the groundwater flow direction is similar to the upper sand and gravel zone, being toward the southeast.

Vertical Groundwater Flow

To determine vertical groundwater flow at the Site, equipotential lines were plotted and a flow net was developed on each of the cross-sections for the Site (Figures 3-7 to 3-11). As shown on each of the cross-sections, groundwater flow in the glaciolacustrine and upper outwash deposits (above the basal till) is primarily downward.

Vertical hydraulic gradients were calculated for each of the nested sets of monitoring wells across the Site. The vertical gradients were calculated for the water table monitoring well and the corresponding monitoring well installed in the upper sand and gravel outwash zone in each set (MWM1 and GWM3, MWS1 and GWS2, MWF2 and GWF4, MWD6 and GWD8, MWP4 and GWP6, and MWP1 and GWP3). In addition, the vertical hydraulic gradients were calculated based on two sets of monitoring wells constructed in the upper and lower sand and gravel outwash (GWD9 and DWD10 and GWD11 and DWD12).

In all instances, the vertical gradient is downward. The vertical hydraulic gradient between the water table zone and the upper sand and gravel outwash monitoring wells located on the north and west sides of the Site ranges from 0.37 to 0.47 (MWM1 and GWM3 - 0.38, MWS1 and GWS2 - 0.38, MWF2 and GWF4 - 0.42, and MWD6 and GWD8 - 0.37). The vertical hydraulic gradient between the water table zone and the upper sand and gravel outwash monitoring wells located on the north and east central and southeastern sides of the Site ranges from 0.65 to 0.71 (MWP4 and GWP6 - 0.65, and MWP1 and GWP3 - 0.71). The vertical hydraulic gradients between the monitoring wells installed in the upper and lower sand and gravel outwash zones were 0.12 between monitoring wells GWD9 and DWD10 and 0.37 between monitoring wells GWD9 and DWD10.

3.8.3 In-situ Hydraulic Conductivity Test Results

Hydraulic conductivity values were estimated from the data obtained from monitoring wells during low-flow sampling. In addition, in-situ rising-head hydraulic conductivity tests (slug tests) were also performed on a select number of monitoring wells installed during the RFI for which the above method was unable to give an accurate determination of the hydraulic conductivity.

During the first and second rounds of groundwater sampling, select parameters were recorded at regular intervals during low-flow purging and sampling for each monitoring well. In addition to the water quality parameters (e.g., temperature, turbidity, and pH), additional parameters were also recorded. These parameters included time purging was initiated, initial water level and water levels during purging, purge rate, time purging was completed, and total volume purged. In-situ horizontal conductivity values were calculated for each of the monitoring wells using the QSTRANSX program for unconfined, partially penetrating overburden wells (for the monitoring wells that straddle the water table) or for partially confined overburden wells (for the monitoring wells that were installed in the deeper sand and gravel outwash aquifer). A summary of hydraulic conductivity data for the monitoring wells at which hydraulic conductivity tests were conducted is presented in Table 3-3. The calculations and field data are presented in Appendix C.

Rising-head hydraulic conductivity tests (slug tests) were performed on select wells, which did not exhibit drawdown during low flow sampling due to their unanticipated high yield. These slug tests were performed in accordance with ASTM D4044-96. In-situ horizontal conductivity values were calculated for each of the monitoring wells using the AQTESOLV® program for unconfined, partially penetrating overburden wells (for the monitoring wells that straddle the water table) or for partially confined overburden wells (for the monitoring wells that were installed in the deeper sand and gravel outwash aquifer).

The range of hydraulic conductivities of the monitoring wells installed in the unconfirmed water table zone is 1.5×10^{0} to 2.34×10^{-5} cm/sec. The range of hydraulic conductivities in the intermediate zone (glaciolacustrine deposits) is 2.5×10^{-4} to $< 10^{-7}$ cm/sec (based on dry well IWP2). The range of hydraulic conductivities in the upper and lower sand and gravel zones are 4.3×10^{-1} to 1.1×10^{-4} cm/sec and 1.6×10^{-3} to 6.0×10^{-3} cm/sec, respectively.

3.9 Background Soil Characterization

Background soil samples were collected during the RFI to characterize naturally occurring levels of metals in soil at the Site. Consistent with the RFI Work Plan, background soil samples were collected from six locations where no manufacturing or management of production materials or wastes are known to have occurred. The locations where the background soil samples were collected are shown in Figure 3-4. At each location, one sample was collected from 0 to 2 ft bgs, another from 6 to 8 ft bgs, and another was collected from just above the water table. The boring logs for these samples are provided in Appendix D and the analytical data are provided in Appendix E.

The concentrations of metals in the samples from the 0 to 2 ft bgs interval are the most representative of background exposures to metals in soil because surface soil is encountered more often than deeper soil. Therefore, the data from the surface interval are used in calculating background soil concentrations for the Site. The metal concentrations in background soil from the surficial soil are summarized in Table 3-4, which also include summary statistics describing the concentration distributions. Table 3-4 also includes statistical prediction limits for determining whether concentrations of metals from elsewhere at the Site are within background levels, and MDEQ's Part 201 mean background concentrations for metals in soil. Prediction limits were not calculated for antimony, cadmium, mercury, selenium, or thallium, because these metals were either not detected or did not have enough detected concentrations to calculate prediction limits.

The upper prediction limits on the table are nonparametric bootstrap prediction limits (Efron and Tibshirani 1998) calculated from 6,000 bootstrap replications and at a 0.01 level of significance. Nonparametric bootstrap statistical limits are more reliable than parametric statistical limits because, unlike parametric limits, they do not rely on assumptions about distribution shapes that are often difficult to justify. A concentration of a metal lower than or equal to its upper prediction limit is considered to be within background levels; a concentration higher than its upper prediction limit is considered to be higher than background levels.

The higher of the MDEQ background soil concentration or the calculated prediction interval was used for comparisons with metal concentrations in samples from elsewhere at the Site, except for arsenic and zinc. The calculated prediction interval for arsenic and zinc appear higher than their expected background ranges, so the highest concentration detected among the background samples are used instead.

4. Investigation Results and Discussion

The results of the field investigations conducted during the RFI are discussed in this section. The discussion is divided into subsections corresponding to the AOIs and off-site areas that were investigated. Each subsection includes a description of the areas investigated, the scope of the field investigations, a summary of the results, and discussion of the results with respect to whether a potentially significant release of hazardous constituents has been identified and if so, the nature and extent of the release.

The identification of a potentially significant release at an area is based on comparison of the characterization data collected during the RFI with generic risk-based screening criteria. The approach for evaluating the soil, groundwater, sediment, and surface water data is discussed below.

Soil

The soil characterization data are compared with screening criteria that are based on the Michigan Part 201 generic cleanup criteria that the MDEQ has developed under the authority of the Natural Resources and Environmental Protection Act (NREPA) (1994 PA 451, as amended). The specific Part 201 criteria used for identifying soil contamination are those based on direct contact, inhalation of soil vapor and particulate in ambient air, and inhalation of soil vapor in indoor air (MDEQ 2000).

For the evaluation of soil data from the AOIs and the seep at the southern Site boundary (which are located on-site), the Part 201 criteria for evaluating soil at industrial sites are used. These criteria are appropriate based on current and reasonably expected future land use at the Site, as discussed in Section 2.3. For the evaluation of soil data from Harris Lake and the Pontiac School Board property (which are located off-site), the Part 201 criteria for evaluating soil at residential sites are used, although neither area is currently residential. Both the industrial and residential Part 201 criteria were derived by the MDEQ based on a cancer risk of 10^{-5} and a hazard quotient (HQ) of 1, and use. They are also derived from exposure factors that reflect conservative assumptions about the magnitude, frequency, and duration of exposures, which in combination are intended to provide estimates of exposures that are higher than actual exposures to a large portion (90% to 99%) of the population.

A potentially significant release is identified at an area when the highest concentrations of the constituents detected in soil at the area are higher than these screening criteria. It should be noted that an area with constituents at concentrations in soil that are higher than these screening criteria does not mean that it necessarily poses an unacceptable risk; it only means that the potential for the area to pose an unacceptable risk should be evaluated considering site-specific factors. The site-specific evaluation of potential risks posed by constituents in an area where a potentially significant release is identified is addressed by further risk-based evaluations that are discussed in Section 5.

Groundwater

In a manner similar to that discussed above for screening soil characterization data, the groundwater monitoring data collected during the RFI are compared with generic risk-based screening criteria to identify whether a potentially significant release from an area to groundwater has occurred. The groundwater monitoring data are compared with screening criteria based on the Michigan Part 201 generic cleanup criteria that the MDEQ has developed under the authority of the NREPA. The specific Part 201 criteria used for identifying groundwater contamination in all three saturated zones are those based on residential drinking water use (MDEQ 2000), although none of these saturated zones currently serve as a drinking water supply for the Site. In addition, the Part 201 criteria based on inhalation of groundwater vapor in indoor air and the criteria based on direct contact by workers conducting excavations (MDEQ 2000) are also used to identify contamination in the shallow saturated zone, which is within approximately 10 ft below ground surface at some parts of the Site. Inorganic

data from both dissolved and total concentrations were developed for the Site. A comparison of these data is provided in Appendix L. For the purpose of this RFI, the dissolved inorganic data was utilized.

It should be noted that the groundwater screening criteria described above include criteria that are designed to be protective of potential exposures via drinking water use and represent highly conservative screening criteria for evaluating groundwater that is not a current or reasonably expected future drinking water supply. Therefore, the presence of groundwater with constituent concentrations higher than these generic screening criteria does not mean that the groundwater necessarily poses an unacceptable risk; it only means that the potential for the groundwater to pose an unacceptable risk should be evaluated considering site-specific factors. The site-specific evaluation of potential risks posed by constituents in groundwater where a potentially significant release is identified is addressed by further risk-based evaluations that are discussed in Section 5.

Sediment and Surface Water

Generic risk-based screening criteria for evaluating the significance of potential exposure to sediments and surface water are not well established. Therefore, as a conservative approach to the identification of a potentially significant release to sediment and surface water, the sediment and surface water characterization data collected during the RFI are compared with the generic risk-based screening criteria described above for evaluating the soil and groundwater characterization data, respectively.

Discussion of the RFI field investigations in the following subsections begins with data collected as part of the site-wide hydrogeologic investigation that are not located at a specific AOI. Then the data collected at the AOIs located at the Fiero Plant are discussed, followed by discussion of the data collected at the Demolition Area, the Metal Fabrication Division, Powertrain, and discussion of data collected at the off-site areas. Each subsection includes tables comparing the RFI characterization data for an area with the screening criteria discussed above. In addition, the tables also compare the RFI data at the AOIs with more conservative screening criteria based on the Part 201 criteria for residential soil. These additional comparisons are provided as another point of reference only, and are not used as bases for identifying the presence of a potentially significant release because these criteria are unnecessarily conservative for this Site, as discussed above. Each subsection also includes figures that show the spatial distribution of the RFI data for constituents having at least one concentration higher than the most conservative screening criteria in any media at any AOI. Tables 4-1 through 4-3 present a listing of the Site-specific constituents of concern (COC). The figures for the off-site areas show the spatial distribution of the RFI data for constituents having at least one concentration higher than the screening criteria in the media sampled at those areas.

4.1 Sitewide Hydrogeologic Study

A Sitewide hydrogeologic investigation was performed as the initial work activity for the RFI. Based on the limited amount of available information on the Site hydrogeologic setting, the implementation of the Sitewide study was crucial to understanding Site hydrogeologic conditions as a basis for AOI investigations. The intent of the Sitewide study is to provide the following information:

- Groundwater flow directions in the upper water table groundwater system;
- Groundwater flow direction in the lower sand and gravel zone;
- Vertical hydraulic gradients between the upper water table zone, the intermediate glaciolacustrine zone, and the upper sand and gravel zone;
- Hydraulic conductivity values for the upper water table zone, the intermediate glaciolacustrine zone, and the upper sand and gravel zone;
- Influence of the storm sewer system on groundwater flow; and
- Sitewide groundwater quality for the upper water table zone, the intermediate glaciolacustrine zone, and the upper sand and gravel zone.

To provide these data, the Sitewide investigation consisted of installation of wells at 12 locations across the site with up to three wells per location (upper water table, intermediate clay/till, and lower sand and gravel zone). An additional seven water table wells were installed close to the main storm sewer system to obtain data on localized influence of the storm sewer on groundwater elevations. Locations of these wells are shown on Figures 4-1 through 4-5.

4.1.1 Scope and Results

The scope of the field investigations involved collection of soil and groundwater samples to determine the general condition of the Site as a whole.

The following is a summary of the Sitewide sampling activities completed for each medium. Where a well or boring has been assigned to an individual AOI, that location and associated data are discussed in the specific AOI section. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted.

Soil Boring Samples

Locations of soil borings associated with the Sitewide hydrogeologic investigation are shown on Figure 4-7. These locations are representative of areas not associated with an AOI and include locations SB-01, SB-02, SB-03, MWM1, GWM3, MWM4, MWF2, MWM6, MWM7, MWF1, MWP1, MWM9, GWP6, IWP5, and GWS2. Soil samples were submitted for laboratory analysis for VOCs, SVOCs, and inorganics. Soil samples from GWM3, GWP6, GWS2, MWF1, and MWF2 were also analyzed for PCBs based on historic usage of PCBs near these locations. Four additional soil borings (BP-01 through BP-04) were installed near GWP6 to evaluate arsenic concentration in soils. Boring logs are provided in Appendix D. All other soil boring locations initially installed as part of the Sitewide hydrogeologic investigation are now associated with an AOI, and these data are discussed in the AOI-specific section.

Groundwater Samples

Two rounds of groundwater quality samples were obtained from three hydrostratigraphic intervals (water table, intermediate, and upper sand and gravel.) The water table wells included MWM1, MWM4, MWM5, MWM6, MWM7, MWF1, MWF2, MWP1, MWM9, MWP4, and MWS1. Intermediate wells included IWM2, IWF3, and IWP5. Upper soil and ground zone wells included GWM3, GWF4, GWP3, GWP6, and GWS2. Locations of these are shown on Figure 4-8. Groundwater quality samples were submitted for laboratory analysis for VOCs, SVOCs, and inorganics. Select wells (MWM5, MWM6, MWM7, and MWM9) also included PCB analysis based on historic usage of PCBs near these locations. All other groundwater monitoring wells installed as part of the Sitewide hydrogeologic investigation are now associated with an AOI, and these data are discussed in the AOI-specific section.

The number of locations from which samples were collected for each medium and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	VOCs	SVOCs	PCBs	Inorganics
Soil Boring	24	30	30	10	30
Groundwater – Water table	11	22	22	36	23
Groundwater – Intermediate	3	5	9	8	3
Groundwater – Upper Sand & Gravel	5	12	12	12	8

Summaries of the analytical data for the soil, shallow groundwater, and intermediate and deep groundwater samples are shown in Tables 4-4, 4-5 and 4-6, respectively. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is provided in Appendix F.

4.1.2 Discussion of Results

The concentrations of constituents detected in soil and groundwater were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

Soil Boring Samples

Of the constituents detected in the selected Sitewide soil boring samples, only arsenic and manganese were detected at concentrations that exceed screening criteria. Arsenic was detected in the sample collected from the 0 to 2-foot interval of GWP6 at a concentration of 134 mg/kg, which exceeds the Industrial Direct Contact (IDC) of 61 mg/kg. Because this concentration is unusually high and no source of arsenic could be identified in the area, a new sample was collected from the 0 to 2-foot interval at GWP6 and four borings, BP-01 through BP-04, located at a radius of approximately 5 feet from GWP6 to verify this result. The concentration of arsenic in the new sample at GWP6 is 5.36 mg/kg and the concentrations in the four surrounding samples range from 2.66 to 5.17 mg/kg. The original concentration of 134 mg/kg was not confirmed by the verification samples, and, therefore, is considered an anomaly. Accordingly, the arsenic concentration at GWP6 is best represented by the average of the concentration among the five verification samples (i.e., 4.3 mg/kg).

Groundwater Samples

There were no constituents detected in the groundwater samples from the Sitewide water table wells detected at concentrations that exceed screening criteria.

Of the constituents detected in the groundwater samples from the Sitewide intermediate wells, only acetone and bis(2-ethylhexyl)phthalate were detected at concentrations that exceed screening criteria. Acetone concentrations that exceed the IDWC of 2.1 mg/L were detected in second-round samples submitted from IWF3, IWM2 and IWP5, with a maximum concentration of 13 mg/L.

Of the constituents detected in the groundwater samples from the Sitewide upper sand and gravel wells, only acetone was detected at concentrations that exceed the screening criteria. Acetone concentrations that exceed the IDWC of 2.1 mg/L were detected in first-round sample submitted from GWP6, with a maximum concentration of 7.1 mg/L.

A summary of groundwater monitoring well locations and analytical results showing locations of applicable exceedances is presented on Figure 4-8.

4.1.3 Conclusions

It is likely that the presence of acetone in the intermediate and upper sand and gravel wells is a result of residual contamination from the bentonite pellets used for well construction (see Appendix G) and is not representative of actual groundwater quality.

4.2 Fiero

4.2.1 Wastewater Collection Sumps (AOI F-7)

AOI F-7 consists of a series of six wastewater collection sumps located in the Powerhouse, south of Plant 17. These sumps were identified as a solid waste management unit (SWMU) (SWMU 7) in the Fiero Preliminary Assessment/Visual Site Inspection (PA/VSI) Report (PRC, 1992); therefore, the sumps are considered an AOI.

There have been no known releases from the wastewater collection sumps. The Fiero PA/VSI Report stated that during the VSI the condition of the sumps was good. However, during the walkthrough completed as part of the preparation of the CCR, these sumps were noted to be full of liquids and could not be inspected.

As part of the RFI activities the sumps were cleaned and inspected in June 2001. Of the six sumps, two were associated with alkali-oily activities. Upon inspection, both of these sumps were observed to have cracked and broken sections of concrete. The remaining four sumps are associated with lime, fly-ash, and neutralization processes and therefore were not considered for subsequent investigation. These sumps were inspected and showed signs of pitting. These sumps will be repaired and abandoned dependent upon Site needs.

4.2.1.1 Scope and Results

The scope of the field investigations at AOI F-7 involved cleaning and inspecting the sumps to assess structural integrity. Based on the inspection, soil borings and groundwater quality samples were collected downgradient from each of the two sumps associated with alkali-oily activities to determine whether a potential release in excess of screening criteria has occurred.

The following is a summary of the sampling activities completed for each medium at AOI F-7. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted. A summary of field investigations performed is presented in Table 2-1.

Soil Boring Samples

Locations of soil borings associated with the installation of two monitoring wells (MWF7-01 and MWF7-02) are shown on Figure 4-9. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Soil boring logs are provided in Appendix D.

Groundwater Samples

Groundwater samples were collected from two monitoring wells (MWF7-01 and MWF7-02) that were installed downgradient from the two sumps associated with alkali-oily activities. Well locations are shown on Figure 4-10. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The number of locations from which samples were collected for each medium and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	VOCs	SVOCs	PCBs	Inorganics
Soil Boring	2	6	6	6	6
Groundwater	2	4	4	4	4

Summaries of the analytical data for the soil and groundwater samples are shown in Tables 4-7 and 4-8, respectively. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is provided in Appendix F.

4.2.1.2 Discussion of Results

The concentrations of constituents detected in soil and groundwater were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

Soil Boring Samples

The concentrations of constituents detected in the soil boring samples collected from AOI F-7 exceed the screening criteria for chromium. Chromium (total) was detected at MWF7-01 (8-10 feet) at a concentration of 335 mg/kg, which exceeds IPSIC for hexavalent chromium (240 mg/kg). Figure 4-9 provides a summary of sample locations and analytical results for soil.

Groundwater Samples

Two VOCs were detected at concentrations that exceed screening criteria. 1,1-Dichloroethene concentrations exceed the IDWC (0.007 mg/L) in both samples submitted from MWF7-02 (0.0091 mg/L and 0.02 mg/L) and tetrachloroethene concentration exceeds the IDWC (0.005 mg/L) in the second round sample submitted from MWF7-02 (0.0063 mg/L).

SVOCs or inorganics were not detected at concentrations that exceed screening criteria. A summary of groundwater monitoring well locations and analytical results is shown on Figure 4-10.

4.2.1.3 Conclusions

The RFI soil and groundwater data from AOI F-7 indicate that a release has occurred to soil and groundwater at AOI F-7. Chromium (total) was detected at a concentration exceeding applicable Part 201 screening criteria for hexavalent chromium in the soil sample collected from the 8 to 10-foot interval at MWF7-01. Both 1,1-dichloroethene and tetrachloroethene were detected in groundwater at concentrations that exceed screening criteria. Based on these results, the AOI will be evaluated further in Section 5, Risk Evaluation.

Table 2-1 presents a summary of the data, conclusions, and proposed activity for the AOI.

4.2.2 Former Paint Sludge Storage Area (AOI F-8)

AOI F-8 consists of a former paint sludge storage area located north of the paint and mixing building. This area previously managed solid wastes and was also identified as SWMU 8 in the Fiero PA/VSI Report (PRC, 1992); therefore, the area is considered an AOI.

The Fiero PA/VSI Report stated that there had been no documented releases from the former paint sludge storage area and the concrete was observed to be in good condition with no evidence of a release (PRC, 1992). However, the pad was covered with salt and could not be inspected during the August 2000 Site walk completed as part of the CCR preparation.

As part of the RFI activities, the former paint sludge storage area, currently used as a salt pad for storing road salt, was cleaned and inspected in July 2001. The salt pad appeared to be intact with some minor cracking. The salt pad is surrounded by a concrete trench system which leads to a sump on the south side of the pad. The sump was black-stained at the bottom and had a 4-inch pipe on the south side. The concrete in the sump did not appear to have been a solid pour, thus resulting in poor contact between pours. Several cracks were observed in the concrete pad, some of which had aperture openings of up to 2 millimeters.

4.2.2.1 Scope and Results

The scope of the field investigations at AOI F-8 involved cleaning and inspecting the pad and sump to assess their structural integrity. Based on the results of the inspection, a monitoring well was installed downgradient from the pad and sump to determine if a potential release in excess of applicable Part 201 criteria has occurred.

The following is a summary of the sampling activities completed for each medium at AOI F-8. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted. A summary of field investigations performed is presented in Table 2-1.

Soil Boring Samples

The location of the soil boring associated with the installation of groundwater monitoring well MWF8-01 is shown on Figure 4-11. Soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Soil boring logs are provided in Appendix D.

Groundwater Samples

Groundwater samples were collected from monitoring well MWF8-01, which was installed downgradient from the pad and sump to determine groundwater quality conditions. The well location is shown on Figure 4-10. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The number of locations from which samples were collected for each medium and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	VOCs	SVOCs	PCBs	Inorganics
Soil Boring	1	3	3	3	3
Groundwater	1	2	2	2	2

Summaries of the analytical data for the soil and groundwater samples are shown in Tables 4-9 and 4-10, respectively. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is provided in Appendix F.

4.2.2.2 Discussion of Results

The concentrations of constituents detected in soil borings and groundwater were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

Soil Boring Samples

The concentrations of constituents detected in the soil samples collected from AOI F-8 do not exceed screening criteria. Soil sample locations and analytical results are summarized on Figure 4-11.

Groundwater Samples

Thallium was detected in the first-round groundwater sample collected from MWF8-01 at a concentration of 0.0054 mg/L, which exceeds the IDWC of 0.002 mg/L. No other constituents were detected at concentrations that exceed screening criteria. Groundwater monitoring well locations and analytical results are summarized on Figure 4-10.

4.2.2.3 Conclusions

The RFI soil and groundwater data from AOI F-8 do not indicate that a release has occurred at AOI F-8. Concentrations detected in soil do not exceed screening criteria. The one detection of Thallium in groundwater is a result of the analytical methodology and not indicative of actual groundwater quality. The trench and sump associated with this AOI will be properly closed.

Table 2-1 presents a summary of the data and conclusions for this AOI.

4.2.3 Coal Storage Area (AOI F-12)

AOI F-12 consists of a coal storage area located southeast of the powerhouse. Also located within the northern footprint of the coal storage pile is the Closed Container Storage Area (CSA) (AOI F-3). It has been reported that historic activities at the coal storage area included adding waste solvent to the coal to increase British Thermal Unit (BTU) efficiency. The coal storage area is considered an AOI because of this reported practice.

4.2.3.1 Scope and Results

The scope of the field investigations at AOI F-12 involved collection of soil and groundwater samples to determine whether a potential release exceeding applicable Part 201 criteria has occurred from the coal storage area.

The following is a summary of the sampling activities completed for each medium at AOI F-12. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted. A summary of field investigations performed is presented in Table 2-1.

Soil Boring Samples

Locations of soil borings associated with the installation of two monitoring wells (MWF12-01 and MWF12-02) are shown on Figure 4-9. Samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Soil samples from the boring associated with MWF12-01 were submitted from four intervals. An additional soil sample was collected at the 12 to 14-foot interval and submitted for laboratory analysis because a discoloration in the soil was observed. Soil boring logs are provided in Appendix D.

Groundwater Samples

Groundwater samples were collected from two monitoring wells (MWF12-01 and MWF12-02), installed downgradient from the coal storage area. Well locations are shown on Figure 4-10. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The number of locations from which samples were collected for each medium and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	VOCs	SVOCs	PCBs	Inorganics
Soil Boring	2	7	7	7	7
Groundwater	2	4	4	4	4

Summaries of the analytical data for the soil and groundwater samples are shown in Tables 4-11 and 4-12, respectively. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is provided in Appendix F.

4.2.3.2 Discussion of Results

The concentrations of constituents detected in soil and groundwater were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

Soil Boring Samples

The concentrations of constituents detected in the soil boring samples from AOI F-12 do not exceed screening criteria. A summary of soil sample locations and analytical results is shown on Figure 4-9.

Groundwater Samples

The concentrations of constituents detected in the groundwater samples from AOI F-12 do not exceed screening criteria. A summary of groundwater monitoring well locations and analytical results is shown on Figure 4-10.

4.2.3.3 Conclusions

The soil and groundwater data from AOI F-12 do not indicate that a release has occurred to soils or groundwater at AOI F-12. Concentrations of constituents detected in soil and groundwater do not exceed the applicable Part 201 screening criteria. No further action or investigation is warranted for this area.

Table 2-1 presents a summary of the data and conclusions for this AOI.

4.2.4 Former Oily Pea Gravel, Concrete, and Debris (AOI F-13)

AOI F-13 consists of an area that formerly contained oily pea gravel, concrete, and debris, located south of the assembly plant scale, at the northeast corner of Plant 17. This area is considered an AOI because of the historical presence of oily material.

The oily material was removed in February 1996; however, there is no documentation describing these removal activities nor is there any analytical data pertaining to the soils remaining in place below the excavation.

4.2.4.1 Scope and Results

The scope of the field investigations at AOI F-13 involved collection of soil samples to determine whether a potential release exceeding applicable Part 201 criteria has occurred to soils from the former oily pea gravel, concrete, and debris area.

The following is a summary of the soil sampling activities completed at AOI F-13. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted. A summary of field investigations performed is presented in Table 2-1.

Three soil borings (BF13-01, BF13-02, and BF13-03) were completed within the footprint of the previously excavated soils to determine residual soil quality. Locations are shown on Figure 4-11. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Due to a shallow water table in the vicinity of BF13-01, samples for that boring were submitted only from the 0 to 2 and 8 to 10-foot intervals. Soil boring logs are provided in Appendix D.

The number of locations from which soil samples were collected and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	VOCs	SVOCs	PCBs	Inorganics
Soil Boring	3	8	8	8	8

A summary of the analytical data for the soil samples is shown in Table 4-13. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is also provided in Appendix F.

4.2.4.2 Discussion of Results

The concentrations of constituents detected in soil were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

The concentrations of constituents detected in the soil boring samples collected from AOI F-13 do not exceed screening criteria. A summary of soil sample locations and analytical results is shown on Figure 4-11.

4.2.4.3 Conclusions

The RFI soil data from AOI F-13 do not indicate that a release has occurred to soils at AOI F-13. Concentrations of constituents detected in the soil do not exceed the applicable Part 201 screening criteria. No further action or investigation is warranted for this area.

Table 2-1 presents a summary of the data and conclusions for this AOI.

4.2.5 Fuel AST Area (AOI F-14)

AOI F-14 consists of a fuel AST area located west of the low-pressure fly ash storage silos. The fuel AST area is considered an AOI because of the materials (diesel fuel and gasoline) stored in the ASTs.

The 300-gallon diesel fuel AST and 560-gallon gasoline AST have been removed. The 1,000-gallon diesel fuel AST is still in use and is located within a secondary containment area. There have been no documented releases from any of these ASTs; however, there is no documentation of closure activities for the removal of the ASTs.

4.2.5.1 Scope and Results

The scope of the field investigations at AOI F-14 involved collection of soil samples to determine whether a potential release in excess of applicable Part 201 criteria has occurred from the fuel AST area.

The following is a summary of the soil sampling activities completed at AOI F-14. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted. A summary of field investigations performed is presented in Table 2-1.

Two soil borings (BF14-01 and BF14-02) were completed at the locations shown on Figure 4-9. The samples were submitted for laboratory analysis for BTEX, SVOCs, and lead. Soil boring logs are provided in Appendix D.

The number of locations from which soil samples were collected and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	BTEX	SVOCs	Lead
Soil Boring	2	6	6	6

A summary of the analytical data for the soil samples is shown in Table 4-14. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is also provided in Appendix F.

4.2.5.2 Discussion of Results

The concentrations of constituents detected in soil were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

The concentrations of constituents detected in the soil boring samples from AOI F-14 do not exceed screening criteria. A summary of sample locations and soil analytical data is shown on Figure 4-9.

4.2.5.3 Conclusions

The RFI soil data from AOI F-14 do not indicate that a release has occurred to soils at AOI F-14. Concentrations of constituents detected in the soil do not exceed the applicable Part 201 screening criteria. No further action or investigation is warranted for this area.

Table 2-1 presents a summary of the data and conclusions for this AOI.

4.2.6 Oil/Solvent Catch Basin (AOI F-15)

AOI F-15 is a catch basin that is located in the south loading dock at Fiero Plant 17. Petroleum-like odors were reported emanating from the catch basin. The oil/solvent catch basin (AOI F-15) was cleaned and inspected. Materials within the catch basin included oil and sludge that contained chlorinated solvents. The catch basin showed evidence of pitting and cracking and was stained throughout.

4.2.6.1 Scope and Results

The scope of the field investigations at AOI F-15 involved cleaning and inspecting the catch basin to assess its structural integrity. Based on the inspection, soil and groundwater samples were collected to determine whether a potential release exceeding the applicable Part 201 criteria has occurred from the oil/solvent catch basin.

The following is a summary of the sampling activities completed for each medium at AOI F-15. Samples were collected in accordance with the procedures discussed in Section 2.3, except as otherwise noted. A summary of field investigations performed are presented in Table 2-1.

Soil Boring Samples

Two soil borings (BF15-01 and BF15-02) were completed. Boring BF15-01 was completed adjacent to the catch basin, while BF15-02 was completed beneath the bottom of the catch basin to determine whether the soil had been impacted by contents of the catch basin. The boring locations are shown on Figure 4-9. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Soil boring logs are provided in Appendix D.

The location of the soil boring associated with the installation of monitoring well (MWF15-01) is shown on Figure 4-9. Samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

Groundwater Samples

Two rounds of groundwater samples were collected from one monitoring well (MWF15-01) with its location shown on Figure 4-10. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The number of locations from which samples were collected for each medium and the number of samples analyzed for each analyte group are as follows:

Medium	Locations	VOCs	SVOCs	PCBs	Inorganics
Soil Boring	3	9	9	9	9
Groundwater	1	2	2	2	2

Summaries of the analytical data for the soil and groundwater samples are shown in Tables 4-15 and 4-16, respectively. The analytical data for all samples are provided in Appendix E. Complete documentation of the data review and validation is provided in Appendix F.

4.2.6.2 Discussion of Results

The concentrations of constituents detected in soil and groundwater were compared with the MDEQ Part 201 industrial criteria as discussed in Section 4.0.

Soil Boring Samples

The concentrations of constituents detected in the soil borings from AOI F-15 exceed screening criteria in the sample collected from 0 to 2-foot interval from soil boring BF15-02. Tetrachloroethene (PCE) was detected in this sample at a concentration of 81 mg/kg, which exceeds the Industrial Soil Volatilization to Indoor Air Inhalation Criteria (ISVIC) of 60 mg/kg. 1,1-Dichloroethene was detected at a concentration of 2.2 mg/kg, which exceeds the ISVIC of 0.33 mg/kg.

Groundwater Samples

The concentrations of constituents detected in both the first and second rounds of groundwater sampling from AOI F-15 do not exceed screening criteria. A summary of the groundwater monitoring well location and analytical data is shown on Figure 4-10.

4.2.6.3 Conclusions

The RFI soil data from AOI F-15 indicate that a release exceeding screening criteria has occurred at AOI F-15. Concentrations of constituents detected in groundwater do not exceed screening criteria.

Table 2-1 presents a summary of the data, conclusions, and proposed activity for this AOI.

4.3 Demolition Area

4.3.1 West Yard (AOI W-1)

AOI W-1 consists of the West Yard, an area of approximately 20 acres located in the southwest corner of the DA. It is bounded to the south by Montcalm Avenue, to the west by the Grand Trunk Western Railroad, to the

5. Human Health Risk Evaluation

Section 4 discussed the results of the RFI field investigation for each AOI and off-site area that was investigated and compared the site characterization data with conservative generic risk-based screening criteria to identify whether a potentially significant release of hazardous constituents as occurred. The environmental media that have been identified to have been affected by potentially significant releases and the primary contaminants affecting each medium are summarized Section 5.1. The potential for exposure to these media are discussed in Section 5.2 and the significance of these potential exposures is evaluated in Section 5.3. The results of the evaluation are summarized in Section 5.4.

5.1 Potentially Significant Releases

As discussed in Section 4.0, a potentially significant release is identified based on comparison of the RFI characterization data for soil, groundwater, sediment, and surface water with conservative generic risk-based screening criteria. Environmental media that have been affected by a potentially significant release of hazardous constituents are considered "contaminated". The results of the comparisons discussed in Section 4 are summarized for soil, groundwater, sediment, and surface water in Sections 5.1.1 to 5.1.4.

5.1.1 Soil

The tables for Section 4 summarized the soil characterization data for each AOI and off-site area, as well as the ratios of the highest measured concentrations for each constituent at each area to the screening criteria. As discussed in Section 4.0, the screening criteria for soil are the MDEQ Part 201 generic cleanup criteria based on direct contact, inhalation of soil vapor and particulate in ambient air, and inhalation of soil vapor in indoor air. The comparison of soil data from the AOIs and the seep at the southern Site boundary (which are located on-site) used the Part 201 criteria for evaluating soil at industrial sites. The comparison of soil data from Harris Lake and the Pontiac School Board property (which are located off-site) used the Part 201 criteria for evaluating soil at residential sites, although neither area is currently residential. Both the industrial and residential Part 201 criteria were derived by the MDEQ based on a cancer risk of 10 5 and a HQ of 1.

A potentially significant release to soil at an area is identified in the Section 4 tables by comparing the highest site-related concentration of each chemical in surface and subsurface soil at the area to the screening criteria. As a conservative assumption, all concentrations of organic chemicals are assumed to be site-related. For inorganic chemicals, site-related concentrations are considered those that are higher than the site-specific background levels shown in the Section 4 soil tables, which are summarized in Table 4-4 and discussed in Section 3.9. Ratios of the highest site-related concentrations in surface or subsurface soil to the screening criteria that exceed 1 are considered indications of a potentially significant release to soil and the soil at the area is considered "contaminated". As shown in the Section 4 tables, the ratios for certain constituents exceed 1 at the following AOIs:

AOI F-7	AOI M-1	AOI W-1
AOI F-15	AOI M-2	AOI W-5
	AOI M-5	AOI W-8
	AOI M-19	AOI W-9
		AOI W-10

Among these AOIs, only AOIs F-15 and M-2 have constituents with concentrations that are higher than the screening criteria based on inhalation of soil vapor in indoor air (i.e., 1,1 dichloroethene and tetrachloroethene at AOI F-15, and 1,1-dichloroethene at AOI M-2). In addition to these AOIs, Harris Lake and the Pontiac School Board property also have constituents with concentrations in surface and subsurface soil that exceed the soil screening criteria.

In addition to the soil characterization data summarized in the Section 4 tables, chemical characterization data for light nonaqueous-phase liquids (LNAPLs) were collected during the RFI. As discussed in Section 4.8, these LNAPLs are found in subsurface soil at the water table in AOIs W-1, W-8, and W 10. The chemical characterization data for the LNAPL at each of these AOIs are summarized in Tables 4-18, 4-26, and 4-32, respectively. Although soil sampling conducted during the RFI did not specifically target the depth interval in which the LNAPL layer fluctuates with the water table (the smear zone), a theoretical upper bound on the concentration of a LNAPL constituent in the smear zone soil (Csoil) can be estimated as follows:

where CNAPL is the concentration of a chemical in the LNAPL, □NAPL is the density of the LNAPL (approximately 0.9 kg/L), n is the total porosity of the soil (assumed to be 0.43), and □soil is the dry bulk density of the soil (assumed to be 1.5 kg/L). The assumed soil porosity and bulk density are the default values USEPA recommended in the Soil Screening Guidance (USEPA 1996). This calculation assumes 100% NAPL saturation of the soil voids and is highly conservative since typical NAPL residual saturation does not exceed 20% to 50%, depending on the type of NAPL and soil.

The upper-bound smear zone soil concentrations estimated using the highest concentrations detected in the LNAPL at each AOI are shown in Table 5-1, and are compared with the soil screening criteria discussed above. As shown in Table 5-1, a few constituents have upper-bound smear zone soil concentrations that exceed the screening criteria (1,1-dichloroethene, benzo(a)pyrene, PCBs, and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ) at AOI W-1, phenanthrene at AOI W-8, and PCBs at AOI W-10). However, the upper-bound estimates for some of these constituents (benzo(a)pyrene, 2,3,7,8-TCDD, and phenanthrene) are only slightly higher than the screening criteria. In fact, the ratios of these estimates to the screening criteria should not be considered to be higher than 1 for any practical purpose, because the estimates assume a LNAPL saturation that is at least two times higher than the typical range of residual saturation. That is, the ratios for these constituents actually show that the true concentrations of the constituents in the smear zone soil almost certainly do not meet the definition of "contamination".

The potential for human exposure to the constituents in soil and LNAPL-containing soil with concentrations higher than the screening criteria is discussed in Section 5.2 and the significance of any potential exposure is discussed in Section 5.4. Section 5.4 also includes discussion of potential exposures of workers to the LNAPLs at AOIs W-1, W-8, and W-10 during subsurface construction activities that the soil screening criteria do not address (e.g., dermal contact with LNAPL).

5.1.2 Groundwater

Groundwater quality data were collected from four saturated zones during the RFI, as discussed in Section 3.8. Data from monitoring wells screened in the unconfined saturated zone are summarized in Table 5-2a, and data from monitoring wells screened in the intermediate saturated zone (glaciolacustrine deposits) and in the deep saturated zones (upper and lower sand and gravel outwash deposits) are summarized in Table 5-2b. Where appropriate based on the locations of the monitoring wells, the groundwater data on these tables are grouped and summarized by AOI or area. Data from monitoring wells not specifically associated with a particular AOI (or area) are summarized as a group under "site-wide hydrogeologic investigation" (SWHI). The locations of the monitoring wells are shown on Figures 4-8, 4-10, 4-13, 4-15, 4-18, 4-21, 4-23, and 4-26.

Tables 5-2a and 5-2b show the detected constituents, their detection frequencies and range of detected concentrations, and the ratios of the highest measured concentrations to the screening criteria. The screening

criteria for groundwater are the MDEQ Part 201 generic cleanup criteria. The specific Part 201 criteria used here for identifying a potentially significant release for all four saturated zones are those based on residential drinking water use (MDEQ 2000), although none of these saturated zones currently serve as a drinking water supply for the Site or the immediate vicinity. In addition, the Part 201 criteria based on inhalation of groundwater vapor in indoor air and the criteria based on direct contact by workers conducting excavations (MDEQ 2000) are also used to identify contamination in the unconfined saturated zone, which is as shallow as 10 ft below ground surface at some locations.

A potentially significant release to groundwater is identified in Tables 5-2a and 5-2b by comparing the highest concentration of each chemical in groundwater at an area to the screening criteria. The ratios of the highest concentrations to each set of screening criteria are shown in Tables 5-2a and 5-2b. Ratios higher than 1 are considered indications of a potentially significant release to groundwater and the groundwater is considered "contaminated".

As shown in Table 5-2a, organic chemicals with concentrations higher than the screening criteria in the shallow groundwater consist primarily of several volatile organic compounds (VOCs), each of which is found at such concentrations at only one to three AOIs. No VOC has a concentration higher than the criteria based on inhalation of vapors in indoor air. Other organic chemicals with concentrations higher than the screening criteria include bis(2-ethylhexyl)phthalate, PCBs, and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ). Like the VOCs, the presence of these chemicals at these concentrations is limited to only a few AOIs. Only one concentration of bis(2-ethylhexyl)phthalate (at AOI W-10) in 133 samples of shallow groundwater across the Site is higher than the screening criteria. This chemical is generally considered a common laboratory contaminant (USEPA 1989). The presence of PCBs and 2,3,7,8-TCDD TEQ in groundwater at concentrations higher than the screening criteria are likely related to the presence of these chemicals in LNAPLs on the water table at AOIs W-1 and W-8, as discussed in the Section 5.2.

Several metals are also present in the shallow groundwater at concentrations higher than the screening criteria, as shown in Table 5-2a. The most prevalent of these are manganese, thallium, and vanadium. As discussed in the Section 3, the only thallium concentrations higher than the screening criteria were those that were obtained by Method 6010B, which was the method originally specified in the RFI Work Plan. Based on a review of the thallium results from the initial phase of field work, USEPA and GM determined that Method 6010B has a high potential for false detection of thallium at low concentrations in aqueous matrices (groundwater and surface water), and identified Method 6020 as a more appropriate method. All thallium analyses in subsequent phases of field work were done using Method 6020. The data from several groundwater and surface water samples that were analyzed using Method 6010B and were still available for reanalysis using Method 6020 confirm that the thallium concentrations obtained using Method 6010B are all either false detections or are far higher than actual concentrations. The thallium concentrations obtained by Method 6020 do not exceed the screening criteria.

The groundwater data from the intermediate saturated zones have only five chemicals with concentrations higher than the screening criteria (acetone, bis(2-ethylhexyl)phthalate, lead, thallium, vanadium), as shown in Table 5-2a. Except for acetone, these chemicals have concentrations higher than the screening criteria in only one monitoring well in the intermediate saturated zone, and may not be associated with a release. For example, bis(2-ethylhexyl)phthalate was detected at a concentration of 0.0088 mg/L at monitoring well IDW7. This is the only concentration of the chemical that is higher than the screening criterion of 0.006 mg/L in the intermediate and deep zones; and as noted above, there is only one concentration in the shallow groundwater that is higher than the screening criterion. Overall, this chemical was detected in only 7 of 158 groundwater samples. Therefore, the concentration of bis(2-ethylhexyl)phthalate in well IDW7 is unlikely to be the result of a release.

In the deep saturated zones, the only chemical with concentrations higher than a screening criterion is acetone. However, the presence of acetone in the groundwater samples appears to be unrelated to a release at any AOI, since acetone concentrations in soil at the AOIs are low (maximum of 2.2 mg/kg among 570 samples) and would not account for the acetone concentrations observed in the groundwater samples. As discussed earlier,

the presence of acetone in the groundwater samples is likely associated with well construction materials (coated bentonite pellets), and therefore, the presence of acetone is not considered groundwater contamination for the purposes of the EI determinations.

The potential for human exposure to these constituents in groundwater is discussed in Section 5.2, and the significance of any potential exposure is discussed in Section 5.3.

5.1.3 Sediment

Sediment data were collected at Harris Lake, Osmun Lake, Terry Lake, and the Pontiac School Board property, as summarized in the tables for Section 4. Sediment samples were not collected at any other AOI. The screening criteria for sediment in the Section 4 tables are the same as the screening criteria for soil. The use of soil screening criteria for evaluating sediment data is highly conservative because potential exposure of receptors to sediment is expected to be much lower than potential exposure of receptors to soil.

The Section 4 tables compare the highest site-related concentration of each chemical in sediment detected at each area to the screening criteria. Site-related concentrations for metals are estimated in the same way as discussed in Section 5.1.1. The ratios of the highest site-related concentrations in sediment to the screening criteria are shown in the Section 4 tables. Ratios higher than 1 are considered indications of a potentially significant release to sediment and the sediment is considered "contaminated". As shown in the Section 4 tables, the chemicals with concentrations higher than the screening criteria are limited to certain polycyclic aromatic hydrocarbons (PAHs) and a few inorganics (antimony, arsenic, and lead) and cyanide.

In addition to the sediment characterization data summarized in the Section 4 tables, oil characterization data were also collected from Harris Lake where oil is present in sediment at some locations. The chemical characterization data for the oil are summarized in the Section 4 tables. These concentrations are not compared with screening criteria, but the significance of potential exposures to the oil and oil-containing sediment is evaluated in the Baseline Human Health Risk Assessment for Harris Lake, Michigan (Appendix J).

The potential for human exposure to these chemicals in sediment is discussed in Section 5.2, and the significance of any potential exposure is discussed in Section 5.3.

5.1.4 Surface Water

Surface water data were collected at Harris Lake and Outfall 001, and are summarized in Table 5-3a, which show the detected constituents, their detection frequencies, their range of detected concentrations, and the ratio of the highest measured concentration to the screening criteria. The screening criteria for surface water in Table 5-3a are the same as the screening criteria for groundwater in the intermediate and deep saturated zones that are discussed in Section 5.1.2. These screening criteria, which are based on residential drinking water use, are highly conservative since these surface waters are not drinking water sources, and the most likely potential human exposure would be via direct contact during recreation.

As shown in Table 5-3a, thallium is the only chemical in the Harris Lake surface water that has concentrations higher than the screening criterion. Among the Outfall 001 data, lead and thallium are the only chemicals with concentrations higher than the screening criteria. However, only one concentration of lead in surface water exceeds the screening criterion, and this concentration (0.0077 mg/L) is actually lower than the maximum contaminant level (MCL) of 0.015 mg/L established under the federal Safe Drinking Water Act. For lead, the MCL is a more appropriate drinking water criterion than the MDEQ Part 201 criterion which is actually not a drinking water criterion, but corresponds to an assumed concentration MDEQ uses for deriving its soil lead screening criterion. As such, the Part 201 criterion for lead is not an appropriate criterion for identifying surface water (or groundwater) contamination.

All the thallium concentrations that exceed the screening criterion were analyzed using Method 6010B; but no thallium concentration analyzed using Method 6020 exceeds the screening criterion. As discussed in the RFI Report and in Section 2.2.2, data for aqueous matrices (including groundwater and surface water) obtained by Method 6020 are more reliable than those obtained by Method 6010B. The data from three surface water samples that were analyzed using Method 6010B and were still available for reanalysis using Method 6020 confirm that the thallium concentrations obtained using Method 6010B are false detections. Therefore, the surface water data from Harris Lake and Outfall 001 do not indicate any contamination.

The surface water data collected from the seep at the southern Site boundary are summarized in Table 5-3b, which shows the detected constituents, their detection frequencies, their range of detected concentrations, and the ratio of the highest measured concentration to the screening criteria. The screening criteria for seep water in Table 5-3b are Part 201 generic cleanup criteria based on direct contact by workers conducting excavations (MDEQ 2000). These criteria are appropriate for evaluating the seep water because they conservative than a trespasser or visitor scenario. The most likely potential human exposure to this water would be via occasional direct contact by occasional passersby who might walk through the water. As shown in Table 5-3b, no chemical in the seep water has concentrations higher than the screening criteria. Therefore, surface water at the seep is not contaminated.

5.2 Exposure Pathways

The potential for exposure to media affected by the potentially significant releases identified in Section 5.1 under current conditions and reasonably expected future land use is discussed below.

Soil

Contaminated soil identified at AOIs F-7, F-15, M-2, M-5, and M-19 is covered by building floors or pavement, which prevents current exposure of workers engaged in routine activities or exposure of trespassers. However, potential exposure of workers engaged in subsurface construction activities at these AOIs is possible. Contaminated soil at AOIs M-1, W-1, W-5, W-8, W-9, and W-10 is not covered or not entirely covered, so potential exposure of workers engaged in routine activities and subsurface construction activities, and exposure of trespassers is possible. At AOIs W-1, W-8, and W-10, potential exposure of workers via direct contact with LNAPLs in the surface soil during subsurface construction activities is also possible.

For concentrations that exceed the screening criteria based on inhalation of indoor air (which are identified at only AOIs F-15 and M-2), only the concentrations at AOI F-15 are under currently occupied buildings; the concentrations at AOI M-2 were collected from outdoor locations. Therefore, potential exposure of workers via inhalation of indoor air is possible at AOI F-15, but not at AOI M-2.

The soil contamination identified at Harris Lake and the Pontiac School Board property is off-site. However, neither area is currently used for residential purposes. Potential current exposures to soil at Harris Lake include potential exposure of visitors and recreational users who might occasionally visit the Lake. A detailed discussion of the potential scenarios for current and reasonably expected future human exposures at Harris Lake is provided in the Baseline Human Health Risk Assessment for Harris Lake, Michigan. At the Pontiac School Board property, current exposure of workers engaged in routine activities and subsurface construction activities, and exposure of trespassers is possible.

Groundwater

As discussed in Section 3.7, the Site and the immediate vicinity obtain potable water from Lake St. Clair through the City of Detroit, and do not rely on local groundwater in any of the saturated zones as a drinking water supply. Therefore, drinking water exposure of workers and residents at and around the Site is not expected. However, potential exposure of workers to groundwater in the shallow saturated zone during subsurface construction activities is possible because the water table at the Site at many locations is shallower

than the expected maximum excavation depths of 10 to 12 ft bgs. No current exposure to groundwater in the intermediate and deep saturated zones is expected because these zones are deeper than the expected maximum excavation depths, and groundwater from these zones is not currently used for any purpose at the Site or in the immediate vicinity.

Sediment

Current exposure of visitors and recreational users who might occasionally contact sediment in Harris Lake, Osmun Lake, and Terry Lake is possible. A detailed discussion of potential human exposures at Harris Lake under current and reasonably expected future land uses is provided in the Baseline Human Health Risk Assessment for Harris Lake, Michigan (Appendix J).

The contaminated sediment identified at the Pontiac School Board property is actually material that was collected from inside a storm sewer pipe that formerly conveyed storm water across that area to Harris Lake. As such, the potential for exposure to the material, if any, is very limited. Also, the sewer pipe is being removed so there will be no potential for exposure to material in the pipe.

The potential significance of exposures via the complete pathways identified above is discussed in Section 5.3.

5.3 Significance of Potential Exposures

The significance of potential exposures, from complete exposure pathways, identified in Section 5.2 is discussed below.

5.3.1 Soil

The significance of potential exposures to soil contamination can be evaluated by estimating the cumulative cancer and noncancer risks associated with the potential exposures and comparing them with the USEPA-established levels for determining whether corrective measures are warranted under RCRA Corrective Action. Under USEPA policy, corrective measures are not warranted when the site-related cumulative cancer risk does not exceed 10-4 and the noncancer hazard index (HI) does not exceed 1 (61 FR 19432, May 1, 1996; USEPA 1991b).

Upper-bound estimates of high-end cumulative cancer and noncancer risks for potential exposure of workers to soil at the AOIs identified in Section 5.1.1 are shown in Table 5-4. These upper-bound estimates are calculated using the highest concentration of each constituent detected in soil at each area, and the conservative exposure factors that were used to derive the USEPA Region 9 risk-based PRGs for soil in generic commercial/industrial settings (USEPA 2000). High-end cumulative cancer and noncancer risk estimates for an area would be lower if concentrations representative of the area were used instead of the highest concentrations, and if site-specific exposure factors were used to account for the magnitude, frequency, and duration of exposures appropriate for the particular area, as would be done in risk assessments following USEPA guidance (1989).

As summarized in Table 5-4, these upper-bound estimates of cumulative cancer risk and HI do not exceed 10-4 or 1, respectively, for AOIs F-7, F-15, M-5, and W-8. This means that there are no unacceptable current exposures at these AOIs, except these calculations do not address the potential for indoor air exposure at AOI F-15 which is further evaluated below. Potential exposures at AOIs M-1, M-2, M-19, W-1, W-5, W-9, and W-10 are further evaluated below by developing conservative estimates of the average concentrations for certain chemicals at each AOI to provide more representative concentrations to which receptors might be exposed under current conditions.

Conservative estimates of the average concentrations are calculated as 95% upper confidence limits (UCLs) on the means of surface (0 to 2 ft) and depth-averaged (0 to 10 ft) concentrations at each sampling location for

evaluating potential exposure of routine workers/trespassers and construction workers, respectively. Data that consist of non-detects are conservatively replaced with one-half sample quantitation limits (SQLs), and unusually high SQLs are handled as recommended in USEPA guidance (USEPA 1989).

The 95% UCL for each chemical is calculated using the nonparametric bootstrap method known as the bias-corrected and accelerated (BCa) method with 4,000 bootstrap replications (Efron and Tibshirani 1998). A nonparametric bootstrap confidence interval does not rely on assumptions about the data's underlying probability distribution which are often difficult to confirm, but instead are based on statistical re-sampling of the empirical distribution of the observed concentrations. For an empirical distribution that is approximately normal, the bootstrap confidence interval will be essentially the same as the normal confidence interval. For an empirical distribution that is not normal, however, the bootstrap prediction interval will be more accurate than a confidence interval calculated assuming a normal (or even lognormal) distribution (USEPA 1997b).

Table 5-5 shows the high-end estimates of cumulative cancer risk and HI for AOIs M-1, M-2, M 19, W 1, W-5, W-9 and W-10 that are based on 95% UCLs for certain chemicals at each AOI. The chemicals chosen for 95% UCL calculations at each AOI are those with maximum concentrations that contribute most significantly to the cumulative cancer and noncancer risks. Using 95% UCLs for these chemicals and maximum concentrations for other chemicals still overestimates cumulative risks, but is an efficient approach that is consistent with USEPA guidance (1989; page 6-25). As shown on this table, these high-end estimates of cumulative cancer risk and HI do not exceed 10-4 or 1, respectively. This means that there is no unacceptable current exposure to soil at these AOIs. The calculation of these cumulative cancer and noncancer risk estimates is provided in Appendix I.1 and is discussed below.

AOI F-15 (Oil/Solvent Catch Basin)

Potential exposure of workers via inhalation of soil vapor in indoor air is theoretically possible at AOI F-15, based on the concentrations of 1,1-dichloroethene and tetrachloroethene at boring BF15-02 that are higher than the screening criteria. However, these concentrations are not expected to pose a significant risk to workers via inhalation of indoor air when the screening criteria are adjusted to use occupational air standards, rather than the inhalation benchmarks that MDEQ used in deriving the criteria. The Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs) for 1,1 dichloroethene and tetrachloroethene are 4 mg/m3 and 678 mg/m3, respectively. By comparison, the inhalation benchmarks for 1,1-dichloroethene and tetrachloroethene that MDEQ used in deriving the screening criteria are approximately 0.0002 mg/m3 and 0.02 mg/m3, respectively. The PELs are appropriate for evaluating exposure of workers via inhalation of indoor air, and would give soil screening criteria that are much higher than the concentrations of these chemicals in soil at boring BF15-02. Therefore, the concentrations of 1,1-dichloroethene and tetrachloroethene in soil at AOI F-15 do not pose an unacceptable risk.

AOI M-1 (Wastewater Treatment Plant)

Potential exposure of routine workers to surface soil in unpaved areas and potential exposure of construction workers to surface and subsurface soil at AOI M-1 are possible. The estimates of cancer risk and HQ shown in Appendix I.1 are calculated using the maximum concentrations of each chemical detected at AOI M-1, except 95% UCLs are used for PCBs and cyanide. The bootstrap 95% UCLs on the mean concentrations are approximately 3.3 and 4.6 mg/kg, for PCBs and cyanide, respectively. As shown in Table 5-5, the estimated high-end cumulative cancer risk and HI at AOI M-1 based on these exposure concentrations are approximately 2 x 10-5 and 0.5, respectively.

The calculations in Appendix I.1 assume that workers contact contaminated soil during the entire workday for 250 days per year and 25 years (EPA 2000). However, the frequency of potential exposure of workers to soil at AOI M-1 is expected to be much lower. Currently, most of the areas where concentrations are higher than the screening criteria are covered with gravel. No routine or construction activity is being conducted or planned in these areas, so workers currently have little opportunity for direct contact with soil in this area. Accordingly, the

Lake under both current and reasonably expected future use do not pose unacceptable risk. Potential current exposures to soil at the Pontiac School Board property also are not expected to pose unacceptable risk. This can be seen by comparing the data from the Pontiac School Board property to the Part 201 screening criteria for evaluating soil at industrial sites. The Section 4 tables show that no constituent in soil samples from this area has a concentration that exceeds the Part 201 criteria for soil at industrial sites.

5.3.2 Groundwater

As discussed in Section 5.2, potential current exposure to groundwater at and around the Site is limited to worker contact with groundwater in the shallow saturated zone during excavation activities that extend into the water table. Screening criteria for evaluating the significance of these potential current exposures do not need to include the Part 201 generic cleanup criteria that are based on residential drinking water use, which are used in the evaluation discussed in Section 5.1.2. Instead, the evaluation of significance is more appropriately conducted using only the Part 201 criteria that are based on worker contact with groundwater while performing excavations. Comparison of the data from wells screened in the shallow saturated zone with these criteria is included in the right-most column in Table 5-2a. The ratios in this column show that the only instances where concentrations exceed these screening criteria are for 2,3,7,8-TCDD TEQ at AOIs W-1 and W-8, and for PCBs at AOI W-1. However, these concentrations were "total" rather than dissolved-phase measurements. The dissolved-phase concentration for dioxin and PCBs at AOI W-1 (also shown on Table 5-2a) do not exceed the groundwater direct contact criteria. No dissolved-phase groundwater data for dioxin were collected at AOI W-8.

The interpretation of these total groundwater concentrations for dioxin and PCBs should recognize that direct comparison of the concentrations with the groundwater contact criteria would not be consistent with the basis for the criteria. As discussed below, these groundwater concentrations at AOIs W-1 and W-8 likely include very large contributions of dioxin and PCBs from minute quantities of LNAPL in the groundwater samples. But the groundwater contact criteria were derived for evaluating only aqueous-phase concentrations (MDEQ 2000), rather than concentrations that include both an aqueous-phase and a nonaqueous-phase.

As noted in Section 5.1.2 and discussed earlier, the presence of dioxin and PCBs in groundwater at AOIs W-1 and W-8 is likely associated with the presence of LNAPLs that contain dioxin and PCBs. When the source of the dioxin and PCBs in groundwater is LNAPL, the theoretical maximum aqueous-phase concentrations can be estimated by the effective solubility of the chemicals. For example, the effective solubility of dioxin for the LNAPLs at AOIs W-1 and W 8 are approximately 10 14 to 10 17 mg/L, which is calculated using the highest dioxin concentrations in the LNAPLs, an assumed LNAPL molecular weight of 150 g/mole, and a dioxin aqueous solubility of 1 x 10-5 mg/L. This means that the groundwater dioxin concentrations of approximately 2 x 10-8 mg/L at AOIs W-1 and W-8 actually consist of both a small aqueous component and a much larger LNAPL component. Based on the dioxin concentrations in the LNAPL, the groundwater samples likely included a minute amount of LNAPL (approximately 0.003% to 0.3%) that contributed most of the dioxin in the groundwater samples.

As noted above, the Part 201 groundwater contact criteria were derived based on dermal contact with chemicals in the aqueous-phase. Therefore, only the aqueous-phase component of dioxin and PCBs in the groundwater samples from AOIs W-1 and W-8 should be compared with the groundwater contact criteria. This comparison would show that the aqueous-phase concentrations in these groundwater samples (estimated using the effective solubility discussed above, or available dissolved-phase groundwater data) are well below the groundwater contact criteria. This means that the aqueous-phase concentrations in the groundwater do not pose a significant risk to workers who might contact groundwater while performing occasional excavations.

The significance of potential exposure of workers to constituents in LNAPL during occasional excavations is evaluated in Appendix I.2, and the results of the calculations are summarized in Section 5.3.1. The results show

Metal Fabrication Division

- AOI M-7: ELPO Building
- AOI M-9: Plant 11 Heat Treat Oil Storage Area
- AOI M-11: Plant 12 Former Gasoline Storage Area
- AOI M-13: ASTs Area West of Plant 14
- AOI M-16: Plant 25 Basement Sump
- AOI M-17: Plant 15 Southern Piping Trench
- AOI M-21: Plant 14 Transformer Station
- AOI M-23: Plants 25, 33, and 75 Substation and Power Building
- AOI M-24: Plant 12 Transformer Oil Spill
- AOI M-25: Plant 33 Basement Sump Area

The results of the RFI indicate that no further investigation of these areas is warranted. However, further activities will be completed at AOI F-7 (Wastewater Collection Sumps), AOI F-8 (Former Paint Sludge Storage Area), and AOI M-9 (Plant 11 Heat Treat Oil Storage Area). The two sumps associated with AOI F-7 are to remain active. These two sumps were noted to have concrete, which was cracked, therefore they will be repaired. The sumps at AOI F-8 and AOI F-9 are no longer in use and will be abandoned.

6.2 AOIs Discussed in Risk Evaluation

A release of hazardous constituents was identified at 13 AOIs and four offsite areas, based on a conservative approach in which the highest concentrations of a constituent at an AOI or offsite area were compared against generic risk-based screening criteria. Using the RFI characterization data on the nature and extent of constituents at these areas, the health significance of these releases under current and reasonably expected future land use were evaluated. The findings of the RFI field investigation and conclusions of the risk evaluation are summarized below:

Fiero

AOI F-7: Waste Water Collection Sump

A release was identified based on the presence of 1,1-DCE and TCE within groundwater. However, the results of the risk evaluation indicate that this area does not pose an unacceptable health risk, therefore, No Further Action is required.

AOI F-15: Oil/Solvent Catch Basin

A release was identified based on the presence of PCE in the soil at concentrations greater than the screening criteria. However, the area is paved and there are no exposure pathways. No Further Action is required.

Demolition Area

AOI W-1: West Yard

A release was identified based on the presence of lead, manganese, chromium and PCBs in the soil and select VOCs, inorganics, PCBs, and dioxins in the groundwater at concentrations higher than the screening criteria. In addition an LNAPL pool was identified in this AOI. This AOI will be evaluated further in the CMS.

AOI W-5: Plant 8 Basement AST Area

A release was identified based on the presence of PCBs in soil and antimony, thallium, and vanadium in groundwater at concentrations higher than the screening criteria. This area will be evaluated further in the CMS.

Tables

ENCORE
Environmental Corporate Remediation

Table 2-1:
GENERAL MOTORS CORPORATION, PONTIAC NORTH CAMPUS
RCRA FACILITY INVESTIGATION

SUMMARY OF RFI ACTIVITIES, RESULTS, AND PROPOSED FURTHER ACTIVITY

Area ID	AOI Description	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Applicable Part 201 Criteria		Proposed Activity
					Soil	Groundwater	
F-7	Wastewater Collection Sumps • Located in the basement of the Powerhouse	• Industrial wastewater	• Clean and inspect sumps • Installed 2 groundwater monitoring wells	VOCs SVOCs PCBs Inorganics	Total Chromium (335 mg/kg)	1,1-DCE (0.02 mg/L) TCE (0.0063 mg/L)	Sump pits to be repaired.
F-8	Paint Sludge Storage Area • Located north of Building 17 • The concrete pad is 12 by 24 feet and is unbermed • It is covered with a corrugated roof	• Storage of non-hazardous paint sludge and sludge from filtering waste bonderite	• Road salt removed and concrete pad, trench, and sump was inspected for integrity of concrete • Installed 1 groundwater monitoring well	VOCs SVOCs PCBs Inorganics	No exceedances	Thallium (0.0054 mg/L)	Trench and sump to be properly abandoned.
F-12	Coal Storage Area • Located southeast of the Powerhouse • This area used for stockpiling coal for the Powerhouse • Reported solvents added to coal to increase BTU	• Coal	• Installed 2 groundwater monitoring wells	VOCs SVOCs PCBs Inorganics	No exceedances	No exceedances	No Further Action.
F-13	Oily pea gravel, concrete, and debris • Located at the northeast corner of Plant 17 • The oily material was removed in February 1996	• Oily pea gravel, concrete, and debris	• Completed 3 soil borings	VOCs SVOCs PCBs Inorganics	No exceedances	Groundwater not analyzed	No Further Action.

Table 2-1:
GENERAL MOTORS CORPORATION, PONTIAC NORTH CAMPUS
RCRA FACILITY INVESTIGATION

SUMMARY OF RFI ACTIVITIES, RESULTS, AND PROPOSED FURTHER ACTIVITY

Area ID	AOI Description	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Applicable Part 201 Criteria		Proposed Activity
					Soil	Groundwater	
F-14	Fuel AST Area • Located west of the low-pressure fly ash storage silos • The area includes three ASTs: 1,000-gallon diesel tank (relocated), 300-gallon diesel tank (removed), and a 560-gallon gasoline tank (removed) • Current 1,000-gallon diesel tank has secondary containment • Former location no containment	• Diesel fuel and gasoline	• Completed 2 soil borings	BTEX SVOCs Lead	No exceedances	Groundwater not analyzed	No Further Action.
F-15	Oil/Solvent Catch Basin • Located in the Fiero Loading dock • Contents of catch basin was an oil sludge • Catch basin cleaned and inspected	• Unknown	• Completed 2 soil borings • Installed 1 groundwater monitoring well	VOCs SVOCs PCBs Inorganics	PCE (81 mg/kg) 1,1 DCE (2.2 mg/kg)	No exceedances	Catch basin to be properly abandoned.

TABLE 4-7

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	6	2	6.80E-01	6.95E-01	7.10E-01	2.20E-03	7.40E-02		1.10E+05	6E-06	1.60E+05	4E-06	1.70E+08	4E-09	1.10E+05	6E-06	1.10E+05	6E-06	1.30E+05	5E-06	3.90E+08	2E-09	2.30E+04	3E-05
VOC	Benzene	71-43-2	A	6	2	1.30E-01	1.45E-01	1.60E-01	6.80E-04	1.70E-02		8.40E+00	2E-02	4.50E+01	4E-03	4.70E+05	3E-07	4.00E+02	4E-04	1.60E+00	1E-01	1.30E+01	1E-02	3.80E+05	4E-07	1.80E+02	9E-04
VOC	Bromodichloromethane	75-27-4	B2	6	1	1.70E-03	1.70E-03	1.70E-03	1.20E-03	1.90E-02		6.40E+00	3E-04	3.10E+01	5E-05	1.10E+05	2E-08	7.50E+02	2E-06	1.20E+00	1E-03	9.10E+00	2E-04	8.40E+04	2E-08	1.10E+02	2E-05
VOC	Bromoform	75-25-2	B2	6					1.70E-03	3.10E-02		7.70E+02		3.10E+03		3.60E+06		8.70E+02		1.50E+02		9.00E+02		2.80E+06		8.20E+02	
VOC	Bromomethane	74-83-9	D	6					1.90E-03	5.00E-02		1.60E+00		1.30E+01		1.50E+05		1.60E+03		8.60E-01		1.10E+01		3.30E+05		3.20E+02	
VOC	2-Butanone	78-93-3	D	6	2	2.10E-01	2.20E-01	2.30E-01	2.80E-03	8.00E-02		2.70E+04	9E-06	3.50E+04	7E-06	2.90E+07	8E-09	2.70E+04	9E-06	2.70E+04	9E-06	2.90E+04	8E-06	6.70E+07	3E-09	2.70E+04	9E-06
VOC	Carbon Disulfide	75-15-0		6					8.10E-04	6.70E-02		1.40E+02		1.60E+03		2.10E+07		2.80E+02		7.60E+01		1.30E+03		4.70E+07		2.80E+02	
VOC	Carbon Tetrachloride	56-23-5	B2	6					1.00E-03	1.90E-02		9.90E-01		1.20E+01		1.70E+05		3.90E+02		1.90E-01		3.50E+00		1.30E+05		9.60E+01	
VOC	Chlorobenzene	108-90-7	D	6					5.40E-04	1.60E-02		2.20E+02		9.20E+02		2.10E+06		2.60E+02		1.20E+02		7.70E+02		4.70E+06		2.60E+02	
VOC	Chloroethane	75-00-3		6					2.30E-03	7.10E-02		9.50E+02		3.60E+04		2.90E+08		9.50E+02		9.50E+02		3.00E+04		6.70E+08		9.50E+02	
VOC	Chloroform	67-66-3	B2	6	3	6.30E-03	3.88E-02	5.70E-02	8.50E-04	9.90E-03		3.80E+01	2E-03	1.50E+02	4E-04	1.60E+06	4E-08	1.50E+03	4E-05	7.20E+00	8E-03	4.50E+01	1E-03	1.30E+06	4E-08	1.20E+03	5E-05
VOC	Chloromethane	74-87-3	D	6					1.40E-03	2.90E-02		1.20E+01		1.40E+02		6.10E+06		1.10E+03		2.30E+00		4.00E+01		4.90E+06		1.10E+03	
VOC	Cumene	98-82-8	D	6	2	1.10E-01	1.10E-01	1.10E-01	7.30E-04	7.80E-03		3.90E+02	3E-04	2.00E+03	6E-05	2.60E+06	4E-08	3.90E+02	3E-04	3.90E+02	3E-04	1.70E+03	6E-05	5.80E+06	2E-08	3.90E+02	3E-04
VOC	Cyclohexane	110-82-7		6	3	5.30E-02	1.28E+00	2.20E+00	1.00E-03	1.30E-03																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	6					1.70E-03	1.60E-01		1.20E+00		1.50E+01		5.90E+03		1.20E+00		1.20E+00		1.30E+01		1.30E+04		1.20E+00	
VOC	Dibromochloromethane	124-48-1	C	6					1.10E-03	2.50E-02		2.10E+01		8.00E+01		1.60E+05		6.10E+02		3.90E+00		2.40E+01		1.30E+05		1.10E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	6					1.20E-03	3.60E-02		3.60E+00		5.80E+00		1.80E+04		6.60E-01		6.70E-01		1.70E+00		1.40E+04		9.20E-02	
VOC	1,2-Dichlorobenzene	95-50-1	D	6					7.40E-04	3.10E-02		2.10E+02		4.60E+04		4.40E+07		2.10E+02		2.10E+02		3.90E+04		1.00E+08		2.10E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	6					8.30E-04	1.80E-02								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	6					7.00E-04	3.10E-02		1.00E+02		2.60E+02		5.70E+05		2.90E+03		1.90E+01		7.70E+01		4.50E+05		4.00E+02	
VOC	Dichlorodifluoromethane	75-71-8		6					1.10E-03	7.30E-02		1.00E+03		6.30E+04		1.50E+09		1.00E+03		9.00E+02		5.30E+04		3.30E+09		1.00E+03	
VOC	1,1-Dichloroethane	75-34-3	C	6	3	1.90E-03	1.23E-02	2.90E-02	6.00E-04	2.70E-02		4.30E+02	7E-05	2.50E+03	1E-05	1.50E+07	2E-09	8.90E+02	3E-05	2.30E+02	1E-04	2.10E+03	1E-05	3.30E+07	9E-10	8.90E+02	3E-05
VOC	1,2-Dichloroethane	107-06-2	B2	6					7.60E-04	2.10E-02		1.10E+01		2.10E+01		1.50E+05		6.40E+02		2.10E+00		6.20E+00		1.20E+05		9.10E+01	
VOC	1,1-Dichloroethene	75-35-4	C	6	1	9.10E-03	9.10E-03	9.10E-03	1.20E-03	3.30E-02		3.30E-01	3E-02	3.70E+00	2E-03	7.80E+04	1E-07	5.70E+02	2E-05	6.20E-02	1E-01	1.10E+00	8E-03	6.20E+04	1E-07	2.00E+02	5E-05
VOC	cis-1,2-Dichloroethene	156-59-2	D	6					8.70E-04	3.10E-02		4.20E+01		2.10E+02		1.00E+06		6.40E+02		2.30E+01		1.80E+02		2.30E+06		6.40E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		6					7.60E-04	3.50E-02		4.30E+01		3.30E+02		2.10E+06		1.40E+03		2.30E+01		2.80E+02		4.70E+06		1.40E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	6					7.80E-04	1.80E-02		7.40E+00		3.00E+01		1.20E+05		5.50E+02		4.00E+00		2.50E+01		2.70E+05		1.40E+02	
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	6					8.90E-04	2.30E-02		1.00E-02		3.10E-02		5.00E+02		6.20E+02		1.00E-02		1.00E-02		4.00E+02		1.30E+02	
VOC	Ethyl Benzene	100-41-4	D	6	3	1.40E-02	1.61E-01	2.50E-01	6.10E-04	7.40E-04		1.40E+02	2E-03	1.10E+04	2E-05	2.90E+07	9E-09	1.40E+02	2E-03	1.40E+02	2E-03	9.50E+03	3E-05	6.70E+07	4E-09	1.40E+02	2E-03
VOC	2-Hexanone	591-78-6		6					1.80E-03	5.80E-02		1.80E+03		1.30E+03		1.20E+06		2.50E+03		9.90E+02		1.10E+03		2.70E+06		2.50E+03	
VOC	Methyl Acetate	79-20-9		6	2	2.50E-01	3.00E-01	3.50E-01	1.10E-03	4.50E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		6					8.70E-04	2.10E-02		5.90E+03		3.00E+04		8.80E+07		5.90E+03		5.90E+03		2.50E+04		2.00E+08		1.80E+03	
VOC	4-Methyl-2-pentanone	108-10-1		6					2.00E-03	5.60E-02		2.70E+03		5.30E+04		6.00E+07		2.70E+03		2.70E+03		4.50E+04		1.40E+08		2.70E+03	
VOC	Methylcyclohexane	108-87-2		6	3	1.30E-01	3.04E+00	4.90E+00	6.10E-04	7.40E-04																	
VOC	Methylene Chloride	75-09-2	B2	6					1.40E-03	7.90E-02		2.40E+02		7.00E+02		8.30E+06		2.30E+03		4.50E+01		2.10E+02		6.60E+06		1.30E+03	
VOC	Styrene	100-42-5		6					5.20E-04	3.30E-02		5.20E+02		3.30E+03		6.90E+06		5.20E+02		2.50E+02		9.70E+02		5.50E+06		4.00E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	6					1.90E-03	2.10E-02		2.30E+01		3.40E+01		6.80E+04		3.70E+02		4.30E+00		1.00E+01		5.40E+04		5.30E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	6	5	2.80E-03	2.97E-01	9.30E-01	2.00E-02	2.00E-02		6.00E+01	2E-02	6.00E+02	2E-03	6.80E+06	1E-07	8.80E+01	1E-02	1.10E+01	8E-02	1.80E+02	5E-03	5.40E+06	2E-07	8.80E+01	1E-02
VOC	Toluene	108-88-3	D	6	5	7.10E-04	5.21E-01	1.50E+00	9.90E-03	9.90E-03		2.50E+02	6E-03	3.30E+03	5E-04	1.20E+07	1E-07	2.50E+02	6E-03	2.50E+02	6E-03	2.80E+03	5E-04	2.70E+07	6E-08	2.50E+02	6E-03
VOC	1,2,4-Trichlorobenzene	120-82-1	D	6					9.30E-04	2.10E-02		1.10E+03		3.40E+04		1.10E+07		1.10E+03		1.10E+03		2.80E+04		2.50E+07		9.90E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	6	6	4.50E-03	6.83E-01	1.80E+00				4.60E+02	4E-03	4.50E+03	4E-04	2.90E+07	6E-08	4.60E+02	4E-03	2.50E+02	7E-03	3.80E+03	5E-04	6.70E+07	3E-08	4.60E+02	4E-03
VOC	1,1,2-Trichloroethane	79-00-5	C	6					1.20E-03	3.10E-02		2.40E+01		5.70E+01		2.50E+05		9.20E+02		4.60E+00		1.70E+01		1.90E+05		1.80E+02	
VOC	Trichloroethene	79-01-6	C-B2	6	2	2.80E-03	2.89E-02	5.50E-02	7.90E-04	3.30E-02		3.70E+01	1E-03	2.60E+02	2E-04	2.30E+06	2E-08	5.00E+02	1E-04	7.10E+00	8E-03	7.80E+01	7E-04	1.80E+06	3E-08	5.00E+02	1E-04
VOC	Trichlorofluoromethane	75-69-4		6					1.10E-03	3.60E-02		5.60E+02		1.10E+05		1.70E+09		5.60E+02		5.60E+02		9.20E+04		3.80E+09		5.60E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		6					9.70E-04	7.10E-02		5.50E+02		2.10E+05		2.30E+09		5.50E+02		5.50E+02		1.80E+05		5.10E+09		5.50E+02	
VOC	Vinyl Chloride	75-01-4	A	6					1.50E-03	2.10E-02		1.50E-01		1.50E+00		4.70E+04		2.90E+01		2.80E-02		4.40E-01		3.70E+04		4.00E+00	
VOC	Xylenes (total)	1330-20-7	D	6	2	2.80E+00	3.15E+00	3.50E+00	2.00E-03	1.90E-02		1.50E+02	2E-02	5.40E+04	6E-05	1.30E+08	3E-08	1.50E+02	2E-02	1.50E+02	2E-02	4.60E+04	8E-05	2.90E+08	1E-08	1.50E+02	2E-02
SVOC	Acenaphthene	83-32-9		6					5.30E-02	7.50E-02		3.50E+05		9.70E+04		6.20E+06		2.00E+05		1.90E+05		8.10E+04		1.40E+07		4.10E+04	
SVOC	Acenaphthylene	208-96-8	D	6					4.80E-02	6.90E-02		3.00E+03		2.70E+03		1.00E+06		8.00E+03		1.60E+03		2.20E+03		2.30E+06		1.60E+03	
SVOC	Acetophenone	98-86-2	D	6					5.20E-02	7.40E-02		1.10E+03		5.20E+04		1.40E+07		1.10E+03		1.10E+03		4.40E+04		3.30E+07		1.10E+03	
SVOC	Anthracene	120-12-7	D	6	1	6.70E-02	6.70E-02	6.70E-02	5.00E-02	7.20E-02		1.00E+06	7E-08	1.60E+06	4E-08	2.90E+07	2E-09	1.00E+06	7E-08	1.00E+06	7E-08	1.40E+06	5E-08	6.70E+07	1E-09	2.30E+05	3E-07
SVOC	Atrazine	1912-24-9		6					1.50E-01	2.20E-01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		6					1.80E-01	2.50E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	6	2	3.20E-01	3.70E-01	4.20E-01	5.70E-02	7.00E-02								1.00E+02	4E-03							2.00E+01	2E-02
SVOC	Benzo(a)pyrene	50-32-8	B2	6	2	3.50E-01	3.75E-01	4.00E-01	6.20E-02	7.70E-02						1.90E+03	2E-04	1.00E+01	4E-02					1.50E+03	3E-04	2.00E+00	2E-01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	6	2	4.10E-01	5.05E-01	6.00E-01	6.00E-02	7.40E-02								1.00E+02	6E-03							2.00E+01	3E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	6	2	1.90E-01	2.45E-01	3.00E-01	5.70E-02	7.00E-02						3.50E+05	9E-07	9.10E+03	3E-05					8.00E+05	4E-07	2.50E+03	1E-04
SVOC	Benzo(k)fluoranthene	207-08-9	B2	6	2	1.70E-01	2.05E-01	2.40E-01	5.50E-02	6.80E-02								1.00E+03	2E-04							2.00E+02	1E-03
SVOC	Biphenyl	92-52-4		6					1.40E-01	2.10E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	6					4.80E-02	6.90E-02																	

TABLE 4-7

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6					5.30E-02	7.50E-02		4.40E+01		1.30E+01		1.20E+04		8.90E+01		8.30E+00		3.80E+00		9.40E+03		1.30E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	6	3	1.10E-01	1.44E+00	3.90E+00	5.60E-02	6.00E-02						8.90E+05	4E-06	1.00E+04	4E-04					7.00E+05	6E-06	2.80E+03	1E-03
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	6					6.30E-02	9.00E-02																	
SVOC	Butylbenzylphthalate	85-68-7	C	6	2	2.70E-01	3.35E-01	4.00E-01	5.30E-02	6.50E-02						2.10E+07	2E-08	3.10E+02	1E-03					4.70E+07	9E-09	3.10E+02	1E-03
SVOC	Caprolactam	105-60-2		6					1.90E-01	2.70E-01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	6					5.40E-02	7.70E-02								3.70E+03								5.30E+02	
SVOC	4-Chloro-3-methylphenol	59-50-7		6					5.30E-02	7.50E-02								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		6					5.30E-02	7.50E-02																	
SVOC	2-Chloronaphthalene	91-58-7		6					4.90E-02	7.10E-02								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		6					5.40E-02	7.70E-02								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		6					5.40E-02	7.70E-02																	
SVOC	Chrysene	218-01-9	B2	6	2	4.30E-01	4.40E-01	4.50E-01	4.70E-02	5.90E-02								1.00E+04	5E-05							2.00E+03	2E-04
SVOC	Di-n-butylphthalate	84-74-2	D	6					1.50E-01	2.20E-01						1.50E+06		7.60E+02						3.30E+06		7.60E+02	
SVOC	Di-n-octylphthalate	117-84-0		6					5.60E-02	8.00E-02								2.80E+04								6.90E+03	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	6	1	6.70E-02	6.70E-02	6.70E-02	5.30E-02	7.50E-02								1.00E+01	7E-03							2.00E+00	3E-02
SVOC	Dibenzofuran	132-64-9	D	6	2	6.00E-02	1.65E-01	2.70E-01	5.20E-02	6.40E-02																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	6					4.00E-02	5.80E-02						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		6					5.20E-02	7.40E-02						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	6					1.50E-01	2.20E-01						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		6					8.20E-02	1.20E-01						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	6					1.60E-01	2.40E-01						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		6					1.60E-01	2.40E-01								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		6					1.10E-01	1.60E-01																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	6					4.70E-02	6.80E-02						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	6					4.90E-02	7.10E-02																	
SVOC	Fluoranthene	206-44-0	D	6	2	6.20E-01	6.60E-01	7.00E-01	5.80E-02	7.10E-02		1.00E+06	7E-07	8.90E+05	8E-07	4.10E+06	2E-07	1.80E+05	4E-06	1.00E+06	7E-07	7.40E+05	9E-07	9.30E+06	8E-08	4.60E+04	2E-05
SVOC	Fluorene	86-73-7	D	6					4.90E-02	7.10E-02		1.00E+06		1.50E+05		4.10E+06		1.30E+05		5.80E+05		1.30E+05		9.30E+06		2.70E+04	
SVOC	Hexachlorobenzene	118-74-1	B2	6					5.80E-02	8.30E-02		2.20E+02		5.60E+01		8.50E+03		5.10E+01		4.10E+01		1.70E+01		6.80E+03		8.90E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	6					4.60E-02	6.60E-02		3.50E+02		4.60E+02		1.80E+05		3.50E+02		1.30E+02		1.30E+02		1.40E+05		1.00E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	6					6.20E-02	8.90E-02								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	6					4.90E-02	7.10E-02		7.90E+01		6.60E+02		1.00E+05		1.10E+03		4.00E+01		5.50E+02		2.30E+05		2.30E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	6	2	1.90E-01	2.10E-01	2.30E-01	7.20E-02	8.90E-02								1.00E+02	2E-03							2.00E+01	1E-02
SVOC	Isophorone	78-59-1	C	6					4.50E-02	6.50E-02						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		6	2	2.40E-01	7.20E-01	1.20E+00	4.90E-02	6.10E-02								4.00E+04	3E-05							8.10E+03	1E-04
SVOC	Methylphenol (summed)	1319-77-3		6					4.80E-02	6.90E-02						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	6	2	1.40E-01	4.85E-01	8.30E-01	5.00E-02	6.30E-02		4.70E+02	2E-03	3.50E+02	2E-03	8.80E+04	9E-06	8.00E+04	1E-05	2.50E+02	3E-03	3.00E+02	3E-03	2.00E+05	4E-06	1.60E+04	5E-05
SVOC	2-Nitroaniline	88-74-4		6					4.70E-02	6.80E-02																	
SVOC	3-Nitroaniline	99-09-2	C	6					1.40E-01	2.10E-01																	
SVOC	4-Nitroaniline	100-01-6	C	6					7.00E-02	1.00E-01																	
SVOC	Nitrobenzene	98-95-3	D	6					4.70E-02	6.80E-02		4.90E+02		4.60E+03		1.50E+06		4.90E+02		4.90E+02		3.90E+03		3.30E+06		1.00E+02	
SVOC	2-Nitrophenol	88-75-5		6					4.70E-02	6.80E-02								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		6					2.00E-01	2.80E-01																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	6					5.00E-02	7.20E-02								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	6					4.50E-02	6.50E-02						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	6					5.40E-02	7.70E-02																	
SVOC	Pentachlorophenol	87-86-5	B2	6					1.20E-01	1.80E-01						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	6	2	3.90E-01	5.65E-01	7.40E-01	5.40E-02	6.60E-02		5.10E+03	1E-04	1.90E+02	4E-03	2.90E+03	3E-04	8.00E+03	9E-05	2.80E+03	3E-04	1.60E+02	5E-03	6.70E+03	1E-04	1.60E+03	5E-04
SVOC	Phenol	108-95-2	D	6					5.00E-02	7.20E-02						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	6	2	5.20E-01	5.40E-01	5.60E-01	5.30E-02	6.50E-02		1.00E+06	6E-07	7.80E+05	7E-07	2.90E+06	2E-07	1.10E+05	5E-06	1.00E+06	6E-07	6.50E+05	9E-07	6.70E+06	8E-08	2.90E+04	2E-05
SVOC	2,4,5-Trichlorophenol	95-95-4		6					5.70E-02	8.10E-02						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	6					6.50E-02	9.30E-02						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	6	2	1.49E+00	1.58E+00	1.67E+00	2.10E-02	2.60E-02		1.60E+04	1E-04	8.10E+02	2E-03	6.50E+03	3E-04	2.00E+01	8E-02	3.00E+03	6E-04	2.40E+02	7E-03	5.20E+03	3E-04	4.00E+00	4E-01
INORG	Antimony	7440-36-0		6	2	6.46E-01	1.86E+00	3.08E+00	5.05E-01	6.26E-01						5.90E+03	5E-04	1.20E+03	3E-03					1.30E+04	2E-04	1.80E+02	2E-02
INORG	Arsenic	7440-38-2	A	6	6	3.35E+00	1.15E+01	3.94E+01			1.32E+01					9.10E+02	3E-02	6.10E+01	4E-01					7.20E+02	4E-02	7.60E+00	**3E+00**
INORG	Barium	7440-39-3	D	6	6	6.82E+00	5.69E+01	2.05E+02			1.10E+02					1.50E+05	6E-04	2.50E+05	4E-04					3.30E+05	3E-04	3.70E+04	3E-03
INORG	Beryllium	7440-41-7	B1	6	3	6.49E-02	4.75E-01	9.95E-01	4.74E-02	5.87E-02	1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	6	6	9.36E-02	2.06E-01	4.12E-01			1.20E+00					2.20E+03		4.10E+03						1.70E+03		5.50E+02	
INORG	Chromium (total)	7440-47-3		6	6	4.64E+00	6.69E+01	3.35E+02			4.92E+01					2.40E+02	**1E+00**	1.70E+04	2E-02					2.60E+02	**1E+00**	2.50E+03	1E-01
INORG	Cobalt	7440-48-4		6	6	2.21E+00	4.64E+00	7.16E+00			1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	6	6	4.18E+00	1.85E+01	3.91E+01			3.20E+01					5.90E+04	1E-04	1.40E+05	5E-05					1.30E+05	5E-05	2.00E+04	4E-04

TABLE 4-7

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
INORG	Lead	7439-92-1	B2	6	6	2.60E+00	1.01E+02	4.96E+02			4.92E+01					4.40E+04	1E-02	9.00E+02	5E-01					1.00E+05	4E-03	4.00E+02	**1E+00**
INORG	Manganese	7439-96-5	D	6	6	1.70E+02	2.38E+02	3.03E+02			5.10E+02					1.50E+03		1.70E+05						3.30E+03		2.50E+04	
INORG	Mercury	7439-97-6	D	6	2	2.93E-01	2.98E-01	3.02E-01	8.70E-03	1.07E-02	1.30E-01							1.10E+03	2E-04							1.60E+02	1E-03
INORG	Nickel	7440-02-0	A	6	6	5.55E+00	3.34E+01	1.34E+02			3.01E+01					1.60E+04	6E-03	2.70E+05	4E-04					1.30E+04	8E-03	4.00E+04	3E-03
INORG	Selenium	7782-49-2	D	6	3	5.11E-01	4.01E+00	1.05E+01	3.19E-01	3.45E-01	4.10E-01					5.90E+04	2E-04	1.80E+04	6E-04					1.30E+05	8E-05	2.60E+03	4E-03
INORG	Silver	7440-22-4	D	6					1.55E-01	2.21E-01						2.90E+03		1.70E+04						6.70E+03		2.50E+03	
INORG	Thallium	7440-28-0		6	1	9.12E-01	9.12E-01	9.12E-01	5.15E-01	6.38E-01								2.40E+02	4E-03							3.50E+01	3E-02
INORG	Vanadium	7440-62-2		6	6	4.89E+00	1.23E+01	2.15E+01			3.28E+01							1.00E+04								7.50E+02	
INORG	Zinc	7440-66-6	D	6	6	1.75E+01	5.26E+01	1.19E+02			4.70E+01							1.00E+06	7E-05							1.70E+05	4E-04

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-8

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	Acetone	67-64-1	T	D	4					5.10E-04	1.00E-02	1.00E+06		3.10E+04		1.00E+06	
VOC	Benzene	71-43-2	T	A	4					1.60E-04	1.00E-03	3.60E+01		1.10E+01		5.60E+00	
VOC	Bromodichloromethane	75-27-4	T	B2	4	2	2.00E-03	2.10E-03	2.20E-03	1.70E-04	1.00E-03	3.80E+01	6E-05	1.40E+01	2E-04	4.80E+00	5E-04
VOC	Bromoform	75-25-2	T	B2	4					1.80E-04	1.00E-03	3.10E+03		1.40E+02		4.80E+02	
VOC	Bromomethane	74-83-9	T	D	4					2.00E-04	1.00E-03	9.00E+00		7.00E+01		4.00E+00	
VOC	2-Butanone	78-93-3	T	D	4					4.10E-04	1.00E-02	2.40E+05		2.40E+05		2.40E+05	
VOC	Carbon Disulfide	75-15-0	T		4	1	4.70E-04	4.70E-04	4.70E-04	2.00E-04	1.00E-03	5.50E+02	9E-07	1.20E+03	4E-07	2.50E+02	2E-06
VOC	Carbon Tetrachloride	56-23-5	T	B2	4					1.20E-04	1.00E-03	2.40E+00		4.60E+00		3.70E-01	
VOC	Chlorobenzene	108-90-7	T	D	4					1.40E-04	1.00E-03	4.70E+02		8.60E+01		2.10E+02	
VOC	Chloroethane	75-00-3	T		4	2	3.30E-03	4.00E-03	4.70E-03	2.60E-04	1.00E-03	5.70E+03	8E-07	4.40E+02	1E-05	5.70E+03	8E-07
VOC	Chloroform	67-66-3	T	B2	4	3	2.90E-04	6.10E-03	9.50E-03	1.40E-04	1.40E-04	1.80E+02	5E-05	1.50E+02	6E-05	2.80E+01	3E-04
VOC	Chloromethane	74-87-3	T	D	4	1	2.80E-04	2.80E-04	2.80E-04	1.30E-04	1.00E-03	5.20E+01	5E-06	4.90E+02	6E-07	8.60E+00	3E-05
VOC	Cumene	98-82-8	T	D	4					1.20E-04	1.00E-03	5.60E+01		5.60E+01		5.60E+01	
VOC	Cyclohexane	110-82-7	T		4					1.30E-04	1.00E-03						
VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4					6.20E-04	2.00E-03	1.20E+00		3.90E-01		1.20E+00	
VOC	Dibromochloromethane	124-48-1	T	C	4					2.60E-04	1.00E-03	1.10E+02		1.80E+01		1.50E+01	
VOC	1,2-Dibromoethane	106-93-4	T	B2	4					2.20E-04	1.00E-03	1.50E+01		2.50E-02		2.40E+00	
VOC	1,2-Dichlorobenzene	95-50-1	T	D	4					1.10E-04	1.00E-03	1.60E+02		1.60E+02		1.60E+02	
VOC	1,3-Dichlorobenzene	541-73-1	T	D	4					1.50E-04	1.00E-03			2.00E+00			
VOC	1,4-Dichlorobenzene	106-46-7	T	C	4					1.70E-04	1.00E-03	7.40E+01		6.40E+00		1.60E+01	
VOC	Dichlorodifluoromethane	75-71-8	T		4					2.60E-04	2.00E-03	3.00E+02		3.00E+02		2.20E+02	
VOC	1,1-Dichloroethane	75-34-3	T	C	4	4	6.00E-03	1.18E-02	2.30E-02			2.30E+03	1E-05	2.40E+03	1E-05	1.00E+03	2E-05
VOC	1,2-Dichloroethane	107-06-2	T	B2	4					2.10E-04	1.00E-03	5.90E+01		1.90E+01		9.60E+00	
VOC	1,1-Dichloroethene	75-35-4	T	C	4	4	1.10E-03	7.85E-03	2.00E-02			1.30E+00	2E-02	1.10E+01	2E-03	2.00E-01	1E-01
VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4	4	2.30E-04	3.88E-04	5.60E-04			2.20E+02	3E-06	2.00E+02	3E-06	9.60E+01	6E-06
VOC	trans-1,2-Dichloroethene	156-60-5	T		4					1.50E-04	5.00E-04	2.00E+02		2.20E+02		8.50E+01	
VOC	1,2-Dichloropropane	78-87-5	T	B2	4					1.70E-04	1.00E-03	3.60E+01		1.60E+01		1.60E+01	
VOC	1,3-Dichloropropene (summed)	542-75-6	T	B2	4					2.70E-04	1.00E-03	1.30E-02		1.30E+01		2.00E-03	
VOC	Ethyl Benzene	100-41-4	T	D	4					1.20E-04	1.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	2-Hexanone	591-78-6	T		4					4.60E-04	1.00E-02	8.80E+03		5.20E+03		4.20E+03	
VOC	Methyl Acetate	79-20-9	T		4					4.10E-04	1.00E-02						
VOC	Methyl tert-butyl ether	1634-04-4	T		4					1.30E-04	5.00E-03	4.70E+04		6.90E+02		4.70E+04	
VOC	4-Methyl-2-pentanone	108-10-1	T		4					2.30E-04	1.00E-02	2.00E+04		1.30E+04		2.00E+04	
VOC	Methylcyclohexane	108-87-2	T		4					1.50E-04	1.00E-03						
VOC	Methylene Chloride	75-09-2	T	B2	4					3.40E-04	1.00E-03	1.40E+03		2.20E+02		2.20E+02	
VOC	Styrene	100-42-5	T		4					1.50E-04	1.00E-03	3.10E+02		9.70E+00		1.70E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4					2.50E-04	1.00E-03	7.70E+01		4.70E+00		1.20E+01	
VOC	Tetrachloroethene	127-18-4	T	C-B2	4	4	5.60E-04	3.39E-03	6.30E-03			1.70E+02	4E-05	1.20E+01	5E-04	2.50E+01	3E-04
VOC	Toluene	108-88-3	T	D	4	3	2.00E-04	2.23E-04	2.60E-04	1.80E-04	1.80E-04	5.30E+02	5E-07	5.30E+02	5E-07	5.30E+02	5E-07
VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4					1.70E-04	1.00E-03	3.00E+02		1.90E+01		3.00E+02	
VOC	1,1,1-Trichloroethane	71-55-6	T	D	4	4	6.30E-03	8.43E-03	1.00E-02			1.30E+03	8E-06	1.30E+03	8E-06	6.60E+02	2E-05
VOC	1,1,2-Trichloroethane	79-00-5	T	C	4					3.00E-04	1.00E-03	1.10E+02		2.10E+01		1.70E+01	

TABLE 4-8

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	Trichloroethene	79-01-6	T	C-B2	4	2	3.90E-04	4.05E-04	4.20E-04	1.40E-04	1.00E-03	9.70E+01	4E-06	3.70E+01	1E-05	1.50E+01	3E-05
VOC	Trichlorofluoromethane	75-69-4	T		4					2.80E-04	1.00E-03	1.10E+03		1.10E+03		1.10E+03	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4					3.20E-04	1.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	Vinyl Chloride	75-01-4	T	A	4					1.50E-04	1.00E-03	6.90E-01		5.70E-01		1.10E-01	
VOC	Xylenes (total)	1330-20-7	T	D	4					3.30E-04	1.00E-03	1.90E+02		1.90E+02		1.90E+02	
SVOC	Acenaphthene	83-32-9	T		4					8.00E-04	5.00E-03	4.20E+00		4.20E+00		4.20E+00	
SVOC	Acenaphthylene	208-96-8	T	D	4					7.10E-04	5.00E-03	3.90E+00		3.90E+00		3.90E+00	
SVOC	Acetophenone	98-86-2	T	D	4					2.60E-03	1.00E-02	6.10E+03		6.10E+03		6.10E+03	
SVOC	Anthracene	120-12-7	T	D	4					6.80E-04	5.00E-03	4.30E-02		4.30E-02		4.30E-02	
SVOC	Atrazine	1912-24-9	T		4					2.50E-03	5.00E-03			5.40E+00			
SVOC	Benzaldehyde	100-52-7	T		4					2.80E-03	1.00E-02						
SVOC	Benzo(a)anthracene	56-55-3	T	B2	4					7.00E-04	5.00E-03			9.40E-03			
SVOC	Benzo(a)pyrene	50-32-8	T	B2	4					7.30E-04	5.00E-03			5.00E-03			
SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4					9.40E-04	5.00E-03			2.00E-03			
SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4					8.50E-04	5.00E-03			5.00E-03			
SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4					8.40E-04	5.00E-03			5.00E-03			
SVOC	Biphenyl	92-52-4	T		4					2.60E-03	1.00E-02						
SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4					8.70E-04	5.00E-03						
SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4					9.70E-04	5.00E-03	2.10E+02		5.70E+00		3.80E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4					2.70E-03	5.00E-03			3.20E-01			
SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4					8.80E-04	5.00E-03						
SVOC	Butylbenzylphthalate	85-68-7	T	C	4					8.80E-04	5.00E-03			2.70E+00			
SVOC	Caprolactam	105-60-2	T		4	1	4.10E-03	4.10E-03	4.10E-03	2.50E-03	1.00E-02			3.90E+05	1E-08		
SVOC	Carbazole	86-74-8	T	B2	4					8.20E-04	1.00E-02			7.40E+00			
SVOC	4-Chloro-3-methylphenol	59-50-7	T		4					9.90E-04	5.00E-03			7.90E+01			
SVOC	4-Chloroaniline	106-47-8	T		4					6.10E-04	1.00E-02						
SVOC	2-Chloronaphthalene	91-58-7	T		4					8.50E-04	5.00E-03			6.70E+00			
SVOC	2-Chlorophenol	95-57-8	T		4					1.00E-03	5.00E-03			9.40E+01			
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4					7.90E-04	5.00E-03						
SVOC	Chrysene	218-01-9	T	B2	4					7.50E-04	5.00E-03			5.00E-03			
SVOC	Di-n-butylphthalate	84-74-2	T	D	4					6.70E-04	5.00E-03			1.10E+01			
SVOC	Di-n-octylphthalate	117-84-0	T		4					1.10E-03	5.00E-03			4.00E-01			
SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4					7.90E-04	5.00E-03			5.00E-03			
SVOC	Dibenzofuran	132-64-9	T	D	4					1.10E-03	5.00E-03						
SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4					9.30E-04	2.00E-02			1.80E-01			
SVOC	2,4-Dichlorophenol	120-83-2	T		4					8.50E-04	1.00E-02			4.80E+01			
SVOC	Diethylphthalate	84-66-2	T	D	4					6.50E-04	5.00E-03			1.10E+03			
SVOC	2,4-Dimethylphenol	105-67-9	T		4					8.50E-04	5.00E-03			5.20E+02			
SVOC	Dimethylphthalate	131-11-3	T	D	4					7.60E-04	5.00E-03			4.20E+03			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4					1.30E-03	2.00E-02			9.50E+00			
SVOC	2,4-Dinitrophenol	51-28-5	T		4					3.00E-03	2.00E-02						
SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4					7.90E-04	5.00E-03			8.60E+00			

TABLE 4-8

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4					5.70E-04	5.00E-03						
SVOC	Fluoranthene	206-44-0	T	D	4					8.10E-04	5.00E-03	2.10E-01		2.10E-01		2.10E-01	
SVOC	Fluorene	86-73-7	T	D	4					1.00E-03	5.00E-03	2.00E+00		2.00E+00		2.00E+00	
SVOC	Hexachlorobenzene	118-74-1	T	B2	4					7.40E-04	5.00E-03	3.00E+00		4.60E-03		4.40E-01	
SVOC	Hexachlorobutadiene	87-68-3	T	C	4					7.30E-04	5.00E-03	3.20E+00		4.00E-01		1.60E+00	
SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4					1.10E-03	5.00E-03			1.80E+00			
SVOC	Hexachloroethane	67-72-1	T	C	4					7.40E-04	5.00E-03	5.00E+01		1.90E+00		2.70E+01	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4					6.30E-04	5.00E-03			5.00E-03			
SVOC	Isophorone	78-59-1	T	C	4					6.30E-04	5.00E-03			9.90E+02			
SVOC	2-Methylnaphthalene	91-57-6	T		4					6.40E-04	5.00E-03			2.50E+01			
SVOC	Methylphenol (summed)	1319-77-3	T		4					1.30E-03	5.00E-03			8.10E+02			
SVOC	Naphthalene	91-20-3	T	C	4					7.50E-04	5.00E-03	3.10E+01		3.10E+01		3.10E+01	
SVOC	2-Nitroaniline	88-74-4	T		4					7.00E-04	2.00E-02						
SVOC	3-Nitroaniline	99-09-2	T	C	4					7.10E-04	2.00E-02						
SVOC	4-Nitroaniline	100-01-6	T	C	4					1.30E-03	2.00E-02						
SVOC	Nitrobenzene	98-95-3	T	D	4					8.10E-04	5.00E-03	2.10E+03		1.10E+01		2.10E+03	
SVOC	2-Nitrophenol	88-75-5	T		4					2.10E-03	5.00E-03			7.90E+01			
SVOC	4-Nitrophenol	100-02-7	T		4					1.90E-03	2.00E-02						
SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4					1.40E-03	5.00E-03			3.50E+01			
SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4					6.70E-04	5.00E-03			3.60E-01			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4					7.80E-04	5.00E-03						
SVOC	Pentachlorophenol	87-86-5	T	B2	4					2.40E-03	5.00E-03			2.00E-01			
SVOC	Phenanthrene	85-01-8	T	D	4					8.20E-04	5.00E-03	1.00E+00		1.00E+00		1.00E+00	
SVOC	Phenol	108-95-2	T	D	4					2.60E-03	5.00E-03			2.90E+04			
SVOC	Pyrene	129-00-0	T	D	4					1.10E-03	5.00E-03	1.40E-01		1.40E-01		1.40E-01	
SVOC	2,4,5-Trichlorophenol	95-95-4	T		4					1.20E-03	5.00E-03			1.70E+02			
SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4					1.70E-03	5.00E-03			1.00E+01			
P/PCB	PCBs (summed)	1336-36-3	D	B2	2					2.00E-04	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
P/PCB	PCBs (summed)	1336-36-3	T	B2	4					8.20E-05	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
INORG	Antimony	7440-36-0	D		4	1	3.00E-03	3.00E-03	3.00E-03	2.20E-03	2.50E-02			6.80E+01	4E-05		
INORG	Antimony	7440-36-0	T		4					2.20E-03	2.50E-02			6.80E+01			
INORG	Arsenic	7440-38-2	D	A	4	2	1.24E-02	2.70E-02	4.16E-02	3.90E-03	1.00E-02			4.30E+00	1E-02		
INORG	Arsenic	7440-38-2	T	A	4	2	2.36E-02	2.68E-02	3.00E-02	3.90E-03	1.00E-02			4.30E+00	7E-03		
INORG	Barium	7440-39-3	D	D	4	4	1.85E-02	3.55E-02	6.46E-02					1.40E+04	5E-06		
INORG	Barium	7440-39-3	T	D	4	4	1.73E-02	3.58E-02	5.72E-02					1.40E+04	4E-06		
INORG	Beryllium	7440-41-7	D	B1	4					5.40E-04	1.00E-03			2.90E+02			
INORG	Beryllium	7440-41-7	T	B1	4					5.40E-04	1.00E-03			2.90E+02			
INORG	Cadmium	7440-43-9	D	B1	4					2.80E-04	5.00E-03			1.90E+02			
INORG	Cadmium	7440-43-9	T	B1	4	1	3.80E-04	3.80E-04	3.80E-04	2.80E-04	5.00E-03			1.90E+02	2E-06		
INORG	Chromium (total)	7440-47-3	D		4					1.40E-03	1.00E-02			4.60E+02			
INORG	Chromium (total)	7440-47-3	T		4	2	1.50E-03	2.20E-03	2.90E-03	1.40E-03	1.00E-02			4.60E+02	6E-06		
INORG	Cobalt	7440-48-4	D		4					1.30E-03	2.00E-02			2.40E+03			

TABLE 4-8

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-7 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
INORG	Cobalt	7440-48-4	T		4					1.30E-03	2.00E-02			2.40E+03			
INORG	Copper	7440-50-8	D	D	4	1	1.54E-02	1.54E-02	1.54E-02	4.20E-03	5.00E-03			7.40E+03	2E-06		
INORG	Copper	7440-50-8	T	D	4	1	1.79E-02	1.79E-02	1.79E-02	4.20E-03	5.00E-03			7.40E+03	2E-06		
INORG	Lead	7439-92-1	D	B2	4					2.50E-03	3.00E-03						
INORG	Lead	7439-92-1	T	B2	4	1	3.00E-03	3.00E-03	3.00E-03	2.50E-03	3.00E-03						
INORG	Manganese	7439-96-5	D	D	4	4	1.10E-03	7.82E-02	2.69E-01					9.10E+03	3E-05		
INORG	Manganese	7439-96-5	T	D	4	4	1.50E-03	7.48E-02	2.34E-01					9.10E+03	3E-05		
INORG	Mercury	7439-97-6	D	D	4					6.90E-05	2.00E-04			5.60E-02			
INORG	Mercury	7439-97-6	T	D	4	1	1.70E-04	1.70E-04	1.70E-04	6.90E-05	2.00E-04			5.60E-02	3E-03		
INORG	Nickel	7440-02-0	D	A	4	2	2.70E-03	3.15E-03	3.60E-03	2.20E-03	2.00E-02			7.40E+04	5E-08		
INORG	Nickel	7440-02-0	T	A	4	2	4.10E-03	4.50E-03	4.90E-03	2.20E-03	2.00E-02			7.40E+04	7E-08		
INORG	Selenium	7782-49-2	D	D	4					4.50E-03	5.00E-03			9.70E+02			
INORG	Selenium	7782-49-2	T	D	4					4.50E-03	5.00E-03			9.70E+02			
INORG	Silver	7440-22-4	D	D	4					1.50E-03	5.00E-03			1.50E+03			
INORG	Silver	7440-22-4	T	D	4					1.50E-03	5.00E-03			1.50E+03			
INORG	Thallium	7440-28-0	D		4	1	2.50E-05	2.50E-05	2.50E-05	1.80E-05	1.00E-02			1.30E+01	2E-06		
INORG	Thallium	7440-28-0	T		4	1	2.50E-05	2.50E-05	2.50E-05	1.80E-05	1.00E-02			1.30E+01	2E-06		
INORG	Vanadium	7440-62-2	D		4	3	8.40E-04	9.51E-03	2.47E-02	8.20E-04	8.20E-04			9.70E+02	3E-05		
INORG	Vanadium	7440-62-2	T		4	2	7.80E-03	1.25E-02	1.71E-02	8.20E-04	1.00E-02			9.70E+02	2E-05		
INORG	Zinc	7440-66-6	D	D	4	2	1.58E-02	1.83E-02	2.08E-02	1.20E-02	2.00E-02			1.10E+05	2E-07		
INORG	Zinc	7440-66-6	T	D	4	3	1.24E-02	6.55E-02	1.69E-01	2.00E-02	2.00E-02			1.10E+05	2E-06		

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-9

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	3	1	9.50E-03	9.50E-03	9.50E-03	2.30E-02	2.50E-02		1.10E+05	9E-08	1.60E+05	6E-08	1.70E+08	6E-11	1.10E+05	9E-08	1.10E+05	9E-08	1.30E+05	7E-08	3.90E+08	2E-11	2.30E+04	4E-07
VOC	Benzene	71-43-2	A	3					5.80E-03	6.30E-03		8.40E+00		4.50E+01		4.70E+05		4.00E+02		1.60E+00		1.30E+01		3.80E+05		1.80E+02	
VOC	Bromodichloromethane	75-27-4	B2	3					5.80E-03	6.30E-03		6.40E+00		3.10E+01		1.10E+05		7.50E+02		1.20E+00		9.10E+00		8.40E+04		1.10E+02	
VOC	Bromoform	75-25-2	B2	3					5.80E-03	6.30E-03		7.70E+02		3.10E+03		3.60E+06		8.70E+02		1.50E+02		9.00E+02		2.80E+06		8.20E+02	
VOC	Bromomethane	74-83-9	D	3					1.20E-02	1.30E-02		1.60E+00		1.30E+01		1.50E+05		1.60E+03		8.60E-01		1.10E+01		3.30E+05		3.20E+02	
VOC	2-Butanone	78-93-3	D	3	1	3.60E-03	3.60E-03	3.60E-03	2.30E-02	2.50E-02		2.70E+04	1E-07	3.50E+04	1E-07	2.90E+07	1E-10	2.70E+04	1E-07	2.70E+04	1E-07	2.90E+04	1E-07	6.70E+07	5E-11	2.70E+04	1E-07
VOC	Carbon Disulfide	75-15-0		3					5.80E-03	6.30E-03		1.40E+02		1.60E+03		2.10E+07		2.80E+02		7.60E+01		1.30E+03		4.70E+07		2.80E+02	
VOC	Carbon Tetrachloride	56-23-5	B2	3					5.80E-03	6.30E-03		9.90E-01		1.20E+01		1.70E+05		3.90E+02		1.90E-01		3.50E+00		1.30E+05		9.60E+01	
VOC	Chlorobenzene	108-90-7	D	3					5.80E-03	6.30E-03		2.20E+02		9.20E+02		2.10E+06		2.60E+02		1.20E+02		7.70E+02		4.70E+06		2.60E+02	
VOC	Chloroethane	75-00-3		3					1.20E-02	1.30E-02		9.50E+02		3.60E+04		2.90E+08		9.50E+02		9.50E+02		3.00E+04		6.70E+08		9.50E+02	
VOC	Chloroform	67-66-3	B2	3					5.80E-03	6.30E-03		3.80E+01		1.50E+02		1.60E+06		1.50E+03		7.20E+00		4.50E+01		1.30E+06		1.20E+03	
VOC	Chloromethane	74-87-3	D	3					1.20E-02	1.30E-02		1.20E+01		1.40E+02		6.10E+06		1.10E+03		2.30E+00		4.00E+01		4.90E+06		1.10E+03	
VOC	Cumene	98-82-8	D	3					5.80E-03	6.30E-03		3.90E+02		2.00E+03		2.60E+06		3.90E+02		3.90E+02		1.70E+03		5.80E+06		3.90E+02	
VOC	Cyclohexane	110-82-7		3					1.20E-02	1.30E-02																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	3					1.20E-02	1.30E-02		1.20E+00		1.50E+01		5.90E+03		1.20E+00		1.20E+00		1.30E+01		1.30E+04		1.20E+00	
VOC	Dibromochloromethane	124-48-1	C	3					5.80E-03	6.30E-03		2.10E+01		8.00E+01		1.60E+05		6.10E+02		3.90E+00		2.40E+01		1.30E+05		1.10E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	3					5.80E-03	6.30E-03		3.60E+00		5.80E+00		1.80E+04		6.60E-01		6.70E-01		1.70E+00		1.40E+04		9.20E-02	
VOC	1,2-Dichlorobenzene	95-50-1	D	3					5.80E-03	6.30E-03		2.10E+02		4.60E+04		4.40E+07		2.10E+02		2.10E+02		3.90E+04		1.00E+08		2.10E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	3					5.80E-03	6.30E-03								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	3					5.80E-03	6.30E-03		1.00E+02		2.60E+02		5.70E+05		2.90E+03		1.90E+01		7.70E+01		4.50E+05		4.00E+02	
VOC	Dichlorodifluoromethane	75-71-8		3					1.20E-02	1.30E-02		1.00E+03		6.30E+04		1.50E+09		1.00E+03		9.00E+02		5.30E+04		3.30E+09		1.00E+03	
VOC	1,1-Dichloroethane	75-34-3	C	3					5.80E-03	6.30E-03		4.30E+02		2.50E+03		1.50E+07		8.90E+02		2.30E+02		2.10E+03		3.30E+07		8.90E+02	
VOC	1,2-Dichloroethane	107-06-2	B2	3					5.80E-03	6.30E-03		1.10E+01		2.10E+01		1.50E+05		6.40E+02		2.10E+00		6.20E+00		1.20E+05		9.10E+01	
VOC	1,1-Dichloroethene	75-35-4	C	3					5.80E-03	6.30E-03		3.30E-01		3.70E+00		7.80E+04		5.70E+02		6.20E-02		1.10E+00		6.20E+04		2.00E+02	
VOC	cis-1,2-Dichloroethene	156-59-2	D	3					5.80E-03	6.30E-03		4.20E+01		2.10E+02		1.00E+06		6.40E+02		2.30E+01		1.80E+02		2.30E+06		6.40E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		3					5.80E-03	6.30E-03		4.30E+01		3.30E+02		2.10E+06		1.40E+03		2.30E+01		2.80E+02		4.70E+06		1.40E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	3					5.80E-03	6.30E-03		7.40E+00		3.00E+01		1.20E+05		5.50E+02		4.00E+00		2.50E+01		2.70E+05		1.40E+02	
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	3					5.80E-03	6.30E-03		1.00E-02		3.10E-02		5.00E+02		6.20E+02		1.00E-02		1.00E-02		4.00E+02		1.30E+02	
VOC	Ethyl Benzene	100-41-4	D	3					5.80E-03	6.30E-03		1.40E+02		1.10E+04		2.90E+07		1.40E+02		1.40E+02		9.50E+03		6.70E+07		1.40E+02	
VOC	2-Hexanone	591-78-6		3					2.30E-02	2.50E-02		1.80E+03		1.30E+03		1.20E+06		2.50E+03		9.90E+02		1.10E+03		2.70E+06		2.50E+03	
VOC	Methyl Acetate	79-20-9		3					1.20E-02	1.30E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		3					2.30E-02	2.50E-02		5.90E+03		3.00E+04		8.80E+07		5.90E+03		5.90E+03		2.50E+04		2.00E+08		1.80E+03	
VOC	4-Methyl-2-pentanone	108-10-1		3					2.30E-02	2.50E-02		2.70E+03		5.30E+04		6.00E+07		2.70E+03		2.70E+03		4.50E+04		1.40E+08		2.70E+03	
VOC	Methylcyclohexane	108-87-2		3					1.20E-02	1.30E-02																	
VOC	Methylene Chloride	75-09-2	B2	3					5.80E-03	6.30E-03		2.40E+02		7.00E+02		8.30E+06		2.30E+03		4.50E+01		2.10E+02		6.60E+06		1.30E+03	
VOC	Styrene	100-42-5		3					5.80E-03	6.30E-03		5.20E+02		3.30E+03		6.90E+06		5.20E+02		2.50E+02		9.70E+02		5.50E+06		4.00E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	3					5.80E-03	6.30E-03		2.30E+01		3.40E+01		6.80E+04		3.70E+02		4.30E+00		1.00E+01		5.40E+04		5.30E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	3					5.80E-03	6.30E-03		6.00E+01		6.00E+02		6.80E+06		8.80E+01		1.10E+01		1.80E+02		5.40E+06		8.80E+01	
VOC	Toluene	108-88-3	D	3	3	1.50E-03	2.83E-03	5.00E-03				2.50E+02	2E-05	3.30E+03	2E-06	1.20E+07	4E-10	2.50E+02	2E-05	2.50E+02	2E-05	2.80E+03	2E-06	2.70E+07	2E-10	2.50E+02	2E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	D	3					5.80E-03	6.30E-03		1.10E+03		3.40E+04		1.10E+07		1.10E+03		1.10E+03		2.80E+04		2.50E+07		9.90E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	3					5.80E-03	6.30E-03		4.60E+02		4.50E+03		2.90E+07		4.60E+02		2.50E+02		3.80E+03		6.70E+07		4.60E+02	
VOC	1,1,2-Trichloroethane	79-00-5	C	3					5.80E-03	6.30E-03		2.40E+01		5.70E+01		2.50E+05		9.20E+02		4.60E+00		1.70E+01		1.90E+05		1.80E+02	
VOC	Trichloroethene	79-01-6	C-B2	3					5.80E-03	6.30E-03		3.70E+01		2.60E+02		2.30E+06		5.00E+02		7.10E+00		7.80E+01		1.80E+06		5.00E+02	
VOC	Trichlorofluoromethane	75-69-4		3					1.20E-02	1.30E-02		5.60E+02		1.10E+05		1.70E+09		5.60E+02		5.60E+02		9.20E+04		3.80E+09		5.60E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		3					5.80E-03	6.30E-03		5.50E+02		2.10E+05		2.30E+09		5.50E+02		5.50E+02		1.80E+05		5.10E+09		5.50E+02	
VOC	Vinyl Chloride	75-01-4	A	3					1.20E-02	1.30E-02		1.50E-01		1.50E+00		4.70E+04		2.90E+01		2.80E-02		4.40E-01		3.70E+04		4.00E+00	
VOC	Xylenes (total)	1330-20-7	D	3					1.20E-02	1.30E-02		1.50E+02		5.40E+04		1.30E+08		1.50E+02		1.50E+02		4.60E+04		2.90E+08		1.50E+02	
SVOC	Acenaphthene	83-32-9		3					3.50E-01	4.00E-01		3.50E+05		9.70E+04		6.20E+06		2.00E+05		1.90E+05		8.10E+04		1.40E+07		4.10E+04	
SVOC	Acenaphthylene	208-96-8	D	3					3.50E-01	4.00E-01		3.00E+03		2.70E+03		1.00E+06		8.00E+03		1.60E+03		2.20E+03		2.30E+06		1.60E+03	
SVOC	Acetophenone	98-86-2	D	3					3.50E-01	4.00E-01		1.10E+03		5.20E+04		1.40E+07		1.10E+03		1.10E+03		4.40E+04		3.30E+07		1.10E+03	
SVOC	Anthracene	120-12-7	D	3					3.50E-01	4.00E-01		1.00E+06		1.60E+06		2.90E+07		1.00E+06		1.00E+06		1.40E+06		6.70E+07		2.30E+05	
SVOC	Atrazine	1912-24-9		3					3.50E-01	4.00E-01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		3					3.50E-01	4.00E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	3					3.50E-01	4.00E-01								1.00E+02								2.00E+01	
SVOC	Benzo(a)pyrene	50-32-8	B2	3					3.50E-01	4.00E-01						1.90E+03		1.00E+01						1.50E+03		2.00E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	3					3.50E-01	4.00E-01								1.00E+02								2.00E+01	
SVOC	Benzo(g,h,i)perylene	191-24-2	D	3					3.50E-01	4.00E-01						3.50E+05		9.10E+03						8.00E+05		2.50E+03	
SVOC	Benzo(k)fluoranthene	207-08-9	B2	3					3.50E-01	4.00E-01								1.00E+03								2.00E+02	
SVOC	Biphenyl	92-52-4		3					3.50E-01	4.00E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3					3.50E-01	4.00E-01																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3					3.50E-01	4.00E-01		4.40E+01		1.30E+01		1.20E+04		8.90E+01		8.30E+00		3.80E+00		9.40E+03		1.30E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	3	2	5.70E-02	8.85E-02	1.20E-01	4.00E-01	4.00E-01						8.90E+05	1E-07	1.00E+04	1E-05					7.00E+05	2E-07	2.80E+03	4E-05

TABLE 4-9

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	3					3.50E-01	4.00E-01																	
SVOC	Butylbenzylphthalate	85-68-7	C	3					3.50E-01	4.00E-01						2.10E+07		3.10E+02						4.70E+07		3.10E+02	
SVOC	Caprolactam	105-60-2		3					3.50E-01	4.00E-01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	3					3.50E-01	4.00E-01								3.70E+03								5.30E+02	
SVOC	4-Chloro-3-methylphenol	59-50-7		3					3.50E-01	4.00E-01								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		3					1.40E+00	1.60E+00																	
SVOC	2-Chloronaphthalene	91-58-7		3					3.50E-01	4.00E-01								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		3					3.50E-01	4.00E-01								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		3					3.50E-01	4.00E-01																	
SVOC	Chrysene	218-01-9	B2	3					3.50E-01	4.00E-01								1.00E+04								2.00E+03	
SVOC	Di-n-butylphthalate	84-74-2	D	3					3.50E-01	4.00E-01						1.50E+06		7.60E+02						3.30E+06		7.60E+02	
SVOC	Di-n-octylphthalate	117-84-0		3					3.50E-01	4.00E-01								2.80E+04								6.90E+03	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	3					3.50E-01	4.00E-01								1.00E+01								2.00E+00	
SVOC	Dibenzofuran	132-64-9	D	3					3.50E-01	4.00E-01																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	3					2.10E+00	2.40E+00						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		3					3.50E-01	4.00E-01						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	3					3.50E-01	4.00E-01						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		3					3.50E-01	4.00E-01						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	3					3.50E-01	4.00E-01						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		3					1.80E+00	2.00E+00								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		3					1.80E+00	2.00E+00																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	3					3.50E-01	4.00E-01						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	3					3.50E-01	4.00E-01																	
SVOC	Fluoranthene	206-44-0	D	3					3.50E-01	4.00E-01		1.00E+06		8.90E+05		4.10E+06		1.80E+05		1.00E+06		7.40E+05		9.30E+06		4.60E+04	
SVOC	Fluorene	86-73-7	D	3					3.50E-01	4.00E-01		1.00E+06		1.50E+05		4.10E+06		1.30E+05		5.80E+05		1.30E+05		9.30E+06		2.70E+04	
SVOC	Hexachlorobenzene	118-74-1	B2	3					3.50E-01	4.00E-01		2.20E+02		5.60E+01		8.50E+03		5.10E+01		4.10E+01		1.70E+01		6.80E+03		8.90E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	3					3.50E-01	4.00E-01		3.50E+02		4.60E+02		1.80E+05		3.50E+02		1.30E+02		1.30E+02		1.40E+05		1.00E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	3					3.50E-01	4.00E-01								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	3					1.00E-01	1.20E-01		7.90E+01		6.60E+02		1.00E+05		1.10E+03		4.00E+01		5.50E+02		2.30E+05		2.30E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3					3.50E-01	4.00E-01								1.00E+02								2.00E+01	
SVOC	Isophorone	78-59-1	C	3					3.50E-01	4.00E-01						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		3					3.50E-01	4.00E-01								4.00E+04								8.10E+03	
SVOC	Methylphenol (summed)	1319-77-3		3					3.50E-01	4.00E-01						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	3					3.50E-01	4.00E-01		4.70E+02		3.50E+02		8.80E+04		8.00E+04		2.50E+02		3.00E+02		2.00E+05		1.60E+04	
SVOC	2-Nitroaniline	88-74-4		3					1.80E+00	2.00E+00																	
SVOC	3-Nitroaniline	99-09-2	C	3					1.80E+00	2.00E+00																	
SVOC	4-Nitroaniline	100-01-6	C	3					1.80E+00	2.00E+00																	
SVOC	Nitrobenzene	98-95-3	D	3					3.50E-01	4.00E-01		4.90E+02		4.60E+03		1.50E+06		4.90E+02		4.90E+02		3.90E+03		3.30E+06		1.00E+02	
SVOC	2-Nitrophenol	88-75-5		3					3.50E-01	4.00E-01								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		3					1.80E+00	2.00E+00																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	3					3.50E-01	4.00E-01								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3					3.50E-01	4.00E-01						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3					3.50E-01	4.00E-01																	
SVOC	Pentachlorophenol	87-86-5	B2	3					3.60E+00	4.10E+00						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	3					3.50E-01	4.00E-01		5.10E+03		1.90E+02		2.90E+03		8.00E+03		2.80E+03		1.60E+02		6.70E+03		1.60E+03	
SVOC	Phenol	108-95-2	D	3					3.50E-01	4.00E-01						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	3					3.50E-01	4.00E-01		1.00E+06		7.80E+05		2.90E+06		1.10E+05		1.00E+06		6.50E+05		6.70E+06		2.90E+04	
SVOC	2,4,5-Trichlorophenol	95-95-4		3					3.50E-01	4.00E-01						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3					3.50E-01	4.00E-01						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	3					3.50E-02	4.00E-02		1.60E+04		8.10E+02		6.50E+03		2.00E+01		3.00E+03		2.40E+02		5.20E+03		4.00E+00	
INORG	Antimony	7440-36-0		3					2.09E+00	2.41E+00						5.90E+03		1.20E+03						1.30E+04		1.80E+02	
INORG	Arsenic	7440-38-2	A	3	3	2.63E+00	3.08E+00	3.86E+00			1.32E+01					9.10E+02		6.10E+01						7.20E+02		7.60E+00	
INORG	Barium	7440-39-3	D	3	3	4.60E+00	8.15E+00	1.35E+01			1.10E+02					1.50E+05		2.50E+05						3.30E+05		3.70E+04	
INORG	Beryllium	7440-41-7	B1	3					1.05E-01	1.20E-01	1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	3	3	7.78E-02	1.44E-01	2.61E-01			1.20E+00					2.20E+03		4.10E+03						1.70E+03		5.50E+02	
INORG	Chromium (total)	7440-47-3		3	3	3.88E+00	4.56E+00	5.63E+00			4.92E+01					2.40E+02		1.70E+04						2.60E+02		2.50E+03	
INORG	Cobalt	7440-48-4		3	3	1.83E+00	2.47E+00	3.47E+00			1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	3	3	4.13E+00	8.94E+00	1.52E+01			3.20E+01					5.90E+04		1.40E+05						1.30E+05		2.00E+04	
INORG	Lead	7439-92-1	B2	3	3	2.26E+00	3.68E+00	4.95E+00			4.92E+01					4.40E+04		9.00E+02						1.00E+05		4.00E+02	
INORG	Manganese	7439-96-5	D	3	3	1.17E+02	2.28E+02	3.22E+02			5.10E+02					1.50E+03		1.70E+05						3.30E+03		2.50E+04	
INORG	Mercury	7439-97-6	D	3	1	9.90E-03	9.90E-03	9.90E-03	3.46E-02	3.97E-02	1.30E-01							1.10E+03								1.60E+02	
INORG	Nickel	7440-02-0	A	3	3	4.62E+00	6.69E+00	9.03E+00			3.01E+01					1.60E+04		2.70E+05						1.30E+04		4.00E+04	

TABLE 4-9

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
INORG	Selenium	7782-49-2	D	3					5.24E-01	6.02E-01	4.10E-01					5.90E+04		1.80E+04						1.30E+05		2.60E+03	
INORG	Silver	7440-22-4	D	3					5.24E-01	6.02E-01						2.90E+03		1.70E+04						6.70E+03		2.50E+03	
INORG	Thallium	7440-28-0		3	3	6.97E-01	7.89E-01	9.43E-01										2.40E+02	4E-03							3.50E+01	3E-02
INORG	Vanadium	7440-62-2		3	3	4.84E+00	7.21E+00	1.01E+01			3.28E+01							1.00E+04								7.50E+02	
INORG	Zinc	7440-66-6	D	3	3	1.54E+01	2.50E+01	3.65E+01			4.70E+01							1.00E+06								1.70E+05	

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	Acetone	67-64-1	T	D	2					5.10E-04	1.00E-02	1.00E+06		3.10E+04		1.00E+06	
VOC	Benzene	71-43-2	T	A	2					1.60E-04	1.00E-03	3.60E+01		1.10E+01		5.60E+00	
VOC	Bromodichloromethane	75-27-4	T	B2	2					1.70E-04	1.00E-03	3.80E+01		1.40E+01		4.80E+00	
VOC	Bromoform	75-25-2	T	B2	2					1.80E-04	1.00E-03	3.10E+03		1.40E+02		4.80E+02	
VOC	Bromomethane	74-83-9	T	D	2					2.00E-04	1.00E-03	9.00E+00		7.00E+01		4.00E+00	
VOC	2-Butanone	78-93-3	T	D	2					4.10E-04	1.00E-02	2.40E+05		2.40E+05		2.40E+05	
VOC	Carbon Disulfide	75-15-0	T		2					2.00E-04	1.00E-03	5.50E+02		1.20E+03		2.50E+02	
VOC	Carbon Tetrachloride	56-23-5	T	B2	2					1.20E-04	1.00E-03	2.40E+00		4.60E+00		3.70E-01	
VOC	Chlorobenzene	108-90-7	T	D	2					1.40E-04	1.00E-03	4.70E+02		8.60E+01		2.10E+02	
VOC	Chloroethane	75-00-3	T		2					2.60E-04	1.00E-03	5.70E+03		4.40E+02		5.70E+03	
VOC	Chloroform	67-66-3	T	B2	2	2	9.60E-04	1.88E-03	2.80E-03			1.80E+02	2E-05	1.50E+02	2E-05	2.80E+01	1E-04
VOC	Chloromethane	74-87-3	T	D	2					1.30E-04	1.00E-03	5.20E+01		4.90E+02		8.60E+00	
VOC	Cumene	98-82-8	T	D	2					1.20E-04	1.00E-03	5.60E+01		5.60E+01		5.60E+01	
VOC	Cyclohexane	110-82-7	T		2					1.30E-04	1.00E-03						
VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2					6.20E-04	2.00E-03	1.20E+00		3.90E-01		1.20E+00	
VOC	Dibromochloromethane	124-48-1	T	C	2					2.60E-04	1.00E-03	1.10E+02		1.80E+01		1.50E+01	
VOC	1,2-Dibromoethane	106-93-4	T	B2	2					2.20E-04	1.00E-03	1.50E+01		2.50E-02		2.40E+00	
VOC	1,2-Dichlorobenzene	95-50-1	T	D	2					1.10E-04	1.00E-03	1.60E+02		1.60E+02		1.60E+02	
VOC	1,3-Dichlorobenzene	541-73-1	T	D	2					1.50E-04	1.00E-03			2.00E+00			
VOC	1,4-Dichlorobenzene	106-46-7	T	C	2					1.70E-04	1.00E-03	7.40E+01		6.40E+00		1.60E+01	
VOC	Dichlorodifluoromethane	75-71-8	T		2					2.60E-04	2.00E-03	3.00E+02		3.00E+02		2.20E+02	
VOC	1,1-Dichloroethane	75-34-3	T	C	2					1.60E-04	1.00E-03	2.30E+03		2.40E+03		1.00E+03	
VOC	1,2-Dichloroethane	107-06-2	T	B2	2					2.10E-04	1.00E-03	5.90E+01		1.90E+01		9.60E+00	
VOC	1,1-Dichloroethene	75-35-4	T	C	2					2.40E-04	1.00E-03	1.30E+00		1.10E+01		2.00E-01	
VOC	cis-1,2-Dichloroethene	156-59-2	T	D	2					2.20E-04	5.00E-04	2.20E+02		2.00E+02		9.60E+01	
VOC	trans-1,2-Dichloroethene	156-60-5	T		2					1.50E-04	5.00E-04	2.00E+02		2.20E+02		8.50E+01	
VOC	1,2-Dichloropropane	78-87-5	T	B2	2					1.70E-04	1.00E-03	3.60E+01		1.60E+01		1.60E+01	
VOC	1,3-Dichloropropene (summed)	542-75-6	T	B2	2					2.70E-04	1.00E-03	1.30E-02		1.30E+01		2.00E-03	
VOC	Ethyl Benzene	100-41-4	T	D	2					1.20E-04	1.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	2-Hexanone	591-78-6	T		2					4.60E-04	1.00E-02	8.80E+03		5.20E+03		4.20E+03	
VOC	Methyl Acetate	79-20-9	T		2					4.10E-04	1.00E-02						
VOC	Methyl tert-butyl ether	1634-04-4	T		2					1.30E-04	5.00E-03	4.70E+04		6.90E+02		4.70E+04	
VOC	4-Methyl-2-pentanone	108-10-1	T		2					2.30E-04	1.00E-02	2.00E+04		1.30E+04		2.00E+04	
VOC	Methylcyclohexane	108-87-2	T		2					1.50E-04	1.00E-03						
VOC	Methylene Chloride	75-09-2	T	B2	2					3.40E-04	1.00E-03	1.40E+03		2.20E+02		2.20E+02	

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	Styrene	100-42-5	T		2					1.50E-04	1.00E-03	3.10E+02		9.70E+00		1.70E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2					2.50E-04	1.00E-03	7.70E+01		4.70E+00		1.20E+01	
VOC	Tetrachloroethene	127-18-4	T	C-B2	2					2.30E-04	1.00E-03	1.70E+02		1.20E+01		2.50E+01	
VOC	Toluene	108-88-3	T	D	2					1.80E-04	1.00E-03	5.30E+02		5.30E+02		5.30E+02	
VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2					1.70E-04	1.00E-03	3.00E+02		1.90E+01		3.00E+02	
VOC	1,1,1-Trichloroethane	71-55-6	T	D	2					1.50E-04	1.00E-03	1.30E+03		1.30E+03		6.60E+02	
VOC	1,1,2-Trichloroethane	79-00-5	T	C	2					3.00E-04	1.00E-03	1.10E+02		2.10E+01		1.70E+01	
VOC	Trichloroethene	79-01-6	T	C-B2	2					1.40E-04	1.00E-03	9.70E+01		3.70E+01		1.50E+01	
VOC	Trichlorofluoromethane	75-69-4	T		2					2.80E-04	1.00E-03	1.10E+03		1.10E+03		1.10E+03	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2					3.20E-04	1.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	Vinyl Chloride	75-01-4	T	A	2					1.50E-04	1.00E-03	6.90E-01		5.70E-01		1.10E-01	
VOC	Xylenes (total)	1330-20-7	T	D	2					3.30E-04	1.00E-03	1.90E+02		1.90E+02		1.90E+02	
SVOC	Acenaphthene	83-32-9	T		2					8.00E-04	5.00E-03	4.20E+00		4.20E+00		4.20E+00	
SVOC	Acenaphthylene	208-96-8	T	D	2					7.10E-04	5.00E-03	3.90E+00		3.90E+00		3.90E+00	
SVOC	Acetophenone	98-86-2	T	D	2					2.60E-03	1.00E-02	6.10E+03		6.10E+03		6.10E+03	
SVOC	Anthracene	120-12-7	T	D	2					6.80E-04	5.00E-03	4.30E-02		4.30E-02		4.30E-02	
SVOC	Atrazine	1912-24-9	T		2					2.50E-03	5.00E-03			5.40E+00			
SVOC	Benzaldehyde	100-52-7	T		2					2.80E-03	1.00E-02						
SVOC	Benzo(a)anthracene	56-55-3	T	B2	2					7.00E-04	5.00E-03			9.40E-03			
SVOC	Benzo(a)pyrene	50-32-8	T	B2	2					7.30E-04	5.00E-03			5.00E-03			
SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2					9.40E-04	5.00E-03			2.00E-03			
SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2					8.50E-04	5.00E-03			5.00E-03			
SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2					8.40E-04	5.00E-03			5.00E-03			
SVOC	Biphenyl	92-52-4	T		2					2.60E-03	1.00E-02						
SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2					8.70E-04	5.00E-03						
SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2					9.70E-04	5.00E-03	2.10E+02		5.70E+00		3.80E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2					2.70E-03	5.00E-03			3.20E-01			
SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2					8.80E-04	5.00E-03						
SVOC	Butylbenzylphthalate	85-68-7	T	C	2					8.80E-04	5.00E-03			2.70E+00			
SVOC	Caprolactam	105-60-2	T		2					2.50E-03	1.00E-02			3.90E+05			
SVOC	Carbazole	86-74-8	T	B2	2					8.20E-04	1.00E-02			7.40E+00			
SVOC	4-Chloro-3-methylphenol	59-50-7	T		2					9.90E-04	5.00E-03			7.90E+01			
SVOC	4-Chloroaniline	106-47-8	T		2					6.10E-04	1.00E-02						
SVOC	2-Chloronaphthalene	91-58-7	T		2					8.50E-04	5.00E-03			6.70E+00			
SVOC	2-Chlorophenol	95-57-8	T		2					1.00E-03	5.00E-03			9.40E+01			

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2					7.90E-04	5.00E-03						
SVOC	Chrysene	218-01-9	T	B2	2					7.50E-04	5.00E-03			5.00E-03			
SVOC	Di-n-butylphthalate	84-74-2	T	D	2					6.70E-04	5.00E-03			1.10E+01			
SVOC	Di-n-octylphthalate	117-84-0	T		2					1.10E-03	5.00E-03			4.00E-01			
SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2					7.90E-04	5.00E-03			5.00E-03			
SVOC	Dibenzofuran	132-64-9	T	D	2					1.10E-03	5.00E-03						
SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	2					9.30E-04	2.00E-02			1.80E-01			
SVOC	2,4-Dichlorophenol	120-83-2	T		2					8.50E-04	1.00E-02			4.80E+01			
SVOC	Diethylphthalate	84-66-2	T	D	2					6.50E-04	5.00E-03			1.10E+03			
SVOC	2,4-Dimethylphenol	105-67-9	T		2					8.50E-04	5.00E-03			5.20E+02			
SVOC	Dimethylphthalate	131-11-3	T	D	2					7.60E-04	5.00E-03			4.20E+03			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2					1.30E-03	2.00E-02			9.50E+00			
SVOC	2,4-Dinitrophenol	51-28-5	T		2					3.00E-03	2.00E-02						
SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2					7.90E-04	5.00E-03			8.60E+00			
SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2					5.70E-04	5.00E-03						
SVOC	Fluoranthene	206-44-0	T	D	2					8.10E-04	5.00E-03	2.10E-01		2.10E-01		2.10E-01	
SVOC	Fluorene	86-73-7	T	D	2					1.00E-03	5.00E-03	2.00E+00		2.00E+00		2.00E+00	
SVOC	Hexachlorobenzene	118-74-1	T	B2	2					7.40E-04	5.00E-03	3.00E+00		4.60E-03		4.40E-01	
SVOC	Hexachlorobutadiene	87-68-3	T	C	2					7.30E-04	5.00E-03	3.20E+00		4.00E-01		1.60E+00	
SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	2					1.10E-03	5.00E-03			1.80E+00			
SVOC	Hexachloroethane	67-72-1	T	C	2					7.40E-04	5.00E-03	5.00E+01		1.90E+00		2.70E+01	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2					6.30E-04	5.00E-03			5.00E-03			
SVOC	Isophorone	78-59-1	T	C	2					6.30E-04	5.00E-03			9.90E+02			
SVOC	2-Methylnaphthalene	91-57-6	T		2					6.40E-04	5.00E-03			2.50E+01			
SVOC	Methylphenol (summed)	1319-77-3	T		2					1.30E-03	5.00E-03			8.10E+02			
SVOC	Naphthalene	91-20-3	T	C	2					7.50E-04	5.00E-03	3.10E+01		3.10E+01		3.10E+01	
SVOC	2-Nitroaniline	88-74-4	T		2					7.00E-04	2.00E-02						
SVOC	3-Nitroaniline	99-09-2	T	C	2					7.10E-04	2.00E-02						
SVOC	4-Nitroaniline	100-01-6	T	C	2					1.30E-03	2.00E-02						
SVOC	Nitrobenzene	98-95-3	T	D	2					8.10E-04	5.00E-03	2.10E+03		1.10E+01		2.10E+03	
SVOC	2-Nitrophenol	88-75-5	T		2					2.10E-03	5.00E-03			7.90E+01			
SVOC	4-Nitrophenol	100-02-7	T		2					1.90E-03	2.00E-02						
SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2					1.40E-03	5.00E-03			3.50E+01			
SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2					6.70E-04	5.00E-03			3.60E-01			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2					7.80E-04	5.00E-03						

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
SVOC	Pentachlorophenol	87-86-5	T	B2	2					2.40E-03	5.00E-03			2.00E-01			
SVOC	Phenanthrene	85-01-8	T	D	2					8.20E-04	5.00E-03	1.00E+00		1.00E+00		1.00E+00	
SVOC	Phenol	108-95-2	T	D	2					2.60E-03	5.00E-03			2.90E+04			
SVOC	Pyrene	129-00-0	T	D	2					1.10E-03	5.00E-03	1.40E-01		1.40E-01		1.40E-01	
SVOC	2,4,5-Trichlorophenol	95-95-4	T		2					1.20E-03	5.00E-03			1.70E+02			
SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2					1.70E-03	5.00E-03			1.00E+01			
P/PCB	PCBs (summed)	1336-36-3	D	B2	1					2.00E-04	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
P/PCB	PCBs (summed)	1336-36-3	T	B2	2					8.20E-05	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
INORG	Antimony	7440-36-0	D		2					2.20E-03	2.50E-02			6.80E+01			
INORG	Antimony	7440-36-0	T		2					2.20E-03	2.50E-02			6.80E+01			
INORG	Arsenic	7440-38-2	D	A	2					3.90E-03	1.00E-02			4.30E+00			
INORG	Arsenic	7440-38-2	T	A	2					3.90E-03	1.00E-02			4.30E+00			
INORG	Barium	7440-39-3	D	D	2	2	5.46E-02	5.61E-02	5.75E-02					1.40E+04	4E-06		
INORG	Barium	7440-39-3	T	D	2	2	5.49E-02	5.66E-02	5.82E-02					1.40E+04	4E-06		
INORG	Beryllium	7440-41-7	D	B1	2					5.40E-04	1.00E-03			2.90E+02			
INORG	Beryllium	7440-41-7	T	B1	2					5.40E-04	1.00E-03			2.90E+02			
INORG	Cadmium	7440-43-9	D	B1	2	1	3.20E-04	3.20E-04	3.20E-04	5.00E-03	5.00E-03			1.90E+02	2E-06		
INORG	Cadmium	7440-43-9	T	B1	2					2.80E-04	5.00E-03			1.90E+02			
INORG	Chromium (total)	7440-47-3	D		2					1.40E-03	1.00E-02			4.60E+02			
INORG	Chromium (total)	7440-47-3	T		2					1.40E-03	1.00E-02			4.60E+02			
INORG	Cobalt	7440-48-4	D		2	2	1.40E-03	2.10E-03	2.80E-03					2.40E+03	1E-06		
INORG	Cobalt	7440-48-4	T		2	1	3.00E-03	3.00E-03	3.00E-03	1.30E-03	1.30E-03			2.40E+03	1E-06		
INORG	Copper	7440-50-8	D	D	2					4.20E-03	5.00E-03			7.40E+03			
INORG	Copper	7440-50-8	T	D	2					4.20E-03	5.00E-03			7.40E+03			
INORG	Lead	7439-92-1	D	B2	2					2.50E-03	3.00E-03						
INORG	Lead	7439-92-1	T	B2	2					2.50E-03	3.00E-03						
INORG	Manganese	7439-96-5	D	D	2	1	3.60E-01	3.60E-01	3.60E-01	9.00E-04	9.00E-04			9.10E+03	4E-05		
INORG	Manganese	7439-96-5	T	D	2	2	1.06E-01	2.35E-01	3.64E-01					9.10E+03	4E-05		
INORG	Mercury	7439-97-6	D	D	2					6.90E-05	2.00E-04			5.60E-02			
INORG	Mercury	7439-97-6	T	D	2					6.90E-05	2.00E-04			5.60E-02			
INORG	Nickel	7440-02-0	D	A	2	2	6.20E-03	6.45E-03	6.70E-03					7.40E+04	9E-08		
INORG	Nickel	7440-02-0	T	A	2	2	5.00E-03	6.35E-03	7.70E-03					7.40E+04	1E-07		
INORG	Selenium	7782-49-2	D	D	2					4.50E-03	5.00E-03			9.70E+02			
INORG	Selenium	7782-49-2	T	D	2					4.50E-03	5.00E-03			9.70E+02			
INORG	Silver	7440-22-4	D	D	2					1.50E-03	5.00E-03			1.50E+03			

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-8 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
INORG	Silver	7440-22-4	T	D	2					1.50E-03	5.00E-03			1.50E+03			
INORG	Thallium	7440-28-0	D		2	2	4.10E-05	2.72E-03	5.40E-03					1.30E+01	4E-04		
INORG	Thallium	7440-28-0	T		2	1	4.30E-05	4.30E-05	4.30E-05	1.00E-02	1.00E-02			1.30E+01	3E-06		
INORG	Vanadium	7440-62-2	D		2					8.20E-04	1.00E-02			9.70E+02			
INORG	Vanadium	7440-62-2	T		2					8.20E-04	1.00E-02			9.70E+02			
INORG	Zinc	7440-66-6	D	D	2	1	1.33E-02	1.33E-02	1.33E-02	1.20E-02	1.20E-02			1.10E+05	1E-07		
INORG	Zinc	7440-66-6	T	D	2	1	2.12E-02	2.12E-02	2.12E-02	1.20E-02	1.20E-02			1.10E+05	2E-07		

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-11

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	7					1.80E-03	2.50E-03		1.10E+05		1.60E+05		1.70E+08		1.10E+05		1.10E+05		1.30E+05		3.90E+08		2.30E+04	
VOC	Benzene	71-43-2	A	7					5.60E-04	7.60E-04		8.40E+00		4.50E+01		4.70E+05		4.00E+02		1.60E+00		1.30E+01		3.80E+05		1.80E+02	
VOC	Bromodichloromethane	75-27-4	B2	7					1.00E-03	1.40E-03		6.40E+00		3.10E+01		1.10E+05		7.50E+02		1.20E+00		9.10E+00		8.40E+04		1.10E+02	
VOC	Bromoform	75-25-2	B2	7					1.40E-03	1.90E-03		7.70E+02		3.10E+03		3.60E+06		8.70E+02		1.50E+02		9.00E+02		2.80E+06		8.20E+02	
VOC	Bromomethane	74-83-9	D	7					1.50E-03	2.10E-03		1.60E+00		1.30E+01		1.50E+05		1.60E+03		8.60E-01		1.10E+01		3.30E+05		3.20E+02	
VOC	2-Butanone	78-93-3	D	7					2.30E-03	3.20E-03		2.70E+04		3.50E+04		2.90E+07		2.70E+04		2.70E+04		2.90E+04		6.70E+07		2.70E+04	
VOC	Carbon Disulfide	75-15-0		7					6.70E-04	9.10E-04		1.40E+02		1.60E+03		2.10E+07		2.80E+02		7.60E+01		1.30E+03		4.70E+07		2.80E+02	
VOC	Carbon Tetrachloride	56-23-5	B2	7					8.60E-04	1.20E-03		9.90E-01		1.20E+01		1.70E+05		3.90E+02		1.90E-01		3.50E+00		1.30E+05		9.60E+01	
VOC	Chlorobenzene	108-90-7	D	7					4.50E-04	6.10E-04		2.20E+02		9.20E+02		2.10E+06		2.60E+02		1.20E+02		7.70E+02		4.70E+06		2.60E+02	
VOC	Chloroethane	75-00-3		7					1.90E-03	2.60E-03		9.50E+02		3.60E+04		2.90E+08		9.50E+02		9.50E+02		3.00E+04		6.70E+08		9.50E+02	
VOC	Chloroform	67-66-3	B2	7					7.10E-04	9.60E-04		3.80E+01		1.50E+02		1.60E+06		1.50E+03		7.20E+00		4.50E+01		1.30E+06		1.20E+03	
VOC	Chloromethane	74-87-3	D	7					1.10E-03	1.50E-03		1.20E+01		1.40E+02		6.10E+06		1.10E+03		2.30E+00		4.00E+01		4.90E+06		1.10E+03	
VOC	Cumene	98-82-8	D	7					6.00E-04	8.20E-04		3.90E+02		2.00E+03		2.60E+06		3.90E+02		3.90E+02		1.70E+03		5.80E+06		3.90E+02	
VOC	Cyclohexane	110-82-7		7					8.60E-04	1.20E-03																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	7					1.40E-03	1.90E-03		1.20E+00		1.50E+01		5.90E+03		1.20E+00		1.20E+00		1.30E+01		1.30E+04		1.20E+00	
VOC	Dibromochloromethane	124-48-1	C	7					9.50E-04	1.30E-03		2.10E+01		8.00E+01		1.60E+05		6.10E+02		3.90E+00		2.40E+01		1.30E+05		1.10E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	7					1.00E-03	1.40E-03		3.60E+00		5.80E+00		1.80E+04		6.60E-01		6.70E-01		1.70E+00		1.40E+04		9.20E-02	
VOC	1,2-Dichlorobenzene	95-50-1	D	7					6.10E-04	8.30E-04		2.10E+02		4.60E+04		4.40E+07		2.10E+02		2.10E+02		3.90E+04		1.00E+08		2.10E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	7					6.90E-04	9.40E-04								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	7					5.80E-04	7.80E-04		1.00E+02		2.60E+02		5.70E+05		2.90E+03		1.90E+01		7.70E+01		4.50E+05		4.00E+02	
VOC	Dichlorodifluoromethane	75-71-8		7					9.50E-04	1.30E-03		1.00E+03		6.30E+04		1.50E+09		1.00E+03		9.00E+02		5.30E+04		3.30E+09		1.00E+03	
VOC	1,1-Dichloroethane	75-34-3	C	7					5.00E-04	6.80E-04		4.30E+02		2.50E+03		1.50E+07		8.90E+02		2.30E+02		2.10E+03		3.30E+07		8.90E+02	
VOC	1,2-Dichloroethane	107-06-2	B2	7					6.30E-04	8.50E-04		1.10E+01		2.10E+01		1.50E+05		6.40E+02		2.10E+00		6.20E+00		1.20E+05		9.10E+01	
VOC	1,1-Dichloroethene	75-35-4	C	7					1.00E-03	1.40E-03		3.30E-01		3.70E+00		7.80E+04		5.70E+02		6.20E-02		1.10E+00		6.20E+04		2.00E+02	
VOC	cis-1,2-Dichloroethene	156-59-2	D	7					7.20E-04	9.80E-04		4.20E+01		2.10E+02		1.00E+06		6.40E+02		2.30E+01		1.80E+02		2.30E+06		6.40E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		7					6.30E-04	8.50E-04		4.30E+01		3.30E+02		2.10E+06		1.40E+03		2.30E+01		2.80E+02		4.70E+06		1.40E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	7					6.40E-04	8.80E-04		7.40E+00		3.00E+01		1.20E+05		5.50E+02		4.00E+00		2.50E+01		2.70E+05		1.40E+02	
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	7					7.40E-04	1.00E-03		1.00E-02		3.10E-02		5.00E+02		6.20E+02		1.00E-02		1.00E-02		4.00E+02		1.30E+02	
VOC	Ethyl Benzene	100-41-4	D	7					5.10E-04	6.90E-04		1.40E+02		1.10E+04		2.90E+07		1.40E+02		1.40E+02		9.50E+03		6.70E+07		1.40E+02	
VOC	2-Hexanone	591-78-6		7					1.50E-03	2.00E-03		1.80E+03		1.30E+03		1.20E+06		2.50E+03		9.90E+02		1.10E+03		2.70E+06		2.50E+03	
VOC	Methyl Acetate	79-20-9		7					9.50E-04	1.30E-03																	
VOC	Methyl tert-butyl ether	1634-04-4		7					7.20E-04	9.80E-04		5.90E+03		3.00E+04		8.80E+07		5.90E+03		5.90E+03		2.50E+04		2.00E+08		1.80E+03	
VOC	4-Methyl-2-pentanone	108-10-1		7					1.60E-03	2.20E-03		2.70E+03		5.30E+04		6.00E+07		2.70E+03		2.70E+03		4.50E+04		1.40E+08		2.70E+03	
VOC	Methylcyclohexane	108-87-2		7	1	6.00E-04	6.00E-04	6.00E-04	5.90E-04	6.90E-04																	
VOC	Methylene Chloride	75-09-2	B2	7					1.10E-03	1.50E-03		2.40E+02		7.00E+02		8.30E+06		2.30E+03		4.50E+01		2.10E+02		6.60E+06		1.30E+03	
VOC	Styrene	100-42-5		7					4.30E-04	5.80E-04		5.20E+02		3.30E+03		6.90E+06		5.20E+02		2.50E+02		9.70E+02		5.50E+06		4.00E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	7					1.50E-03	2.10E-03		2.30E+01		3.40E+01		6.80E+04		3.70E+02		4.30E+00		1.00E+01		5.40E+04		5.30E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	7					1.00E-03	1.40E-03		6.00E+01		6.00E+02		6.80E+06		8.80E+01		1.10E+01		1.80E+02		5.40E+06		8.80E+01	
VOC	Toluene	108-88-3	D	7	7	6.40E-04	1.55E-03	2.30E-03				2.50E+02	9E-06	3.30E+03	7E-07	1.20E+07	2E-10	2.50E+02	9E-06	2.50E+02	9E-06	2.80E+03	8E-07	2.70E+07	9E-11	2.50E+02	9E-06
VOC	1,2,4-Trichlorobenzene	120-82-1	D	7					7.70E-04	1.00E-03		1.10E+03		3.40E+04		1.10E+07		1.10E+03		1.10E+03		2.80E+04		2.50E+07		9.90E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	7					7.90E-04	1.10E-03		4.60E+02		4.50E+03		2.90E+07		4.60E+02		2.50E+02		3.80E+03		6.70E+07		4.60E+02	
VOC	1,1,2-Trichloroethane	79-00-5	C	7					1.00E-03	1.40E-03		2.40E+01		5.70E+01		2.50E+05		9.20E+02		4.60E+00		1.70E+01		1.90E+05		1.80E+02	
VOC	Trichloroethene	79-01-6	C-B2	7					6.50E-04	8.90E-04		3.70E+01		2.60E+02		2.30E+06		5.00E+02		7.10E+00		7.80E+01		1.80E+06		5.00E+02	
VOC	Trichlorofluoromethane	75-69-4		7					9.50E-04	1.30E-03		5.60E+02		1.10E+05		1.70E+09		5.60E+02		5.60E+02		9.20E+04		3.80E+09		5.60E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		7					8.00E-04	1.10E-03		5.50E+02		2.10E+05		2.30E+09		5.50E+02		5.50E+02		1.80E+05		5.10E+09		5.50E+02	
VOC	Vinyl Chloride	75-01-4	A	7					1.20E-03	1.60E-03		1.50E-01		1.50E+00		4.70E+04		2.90E+01		2.80E-02		4.40E-01		3.70E+04		4.00E+00	
VOC	Xylenes (total)	1330-20-7	D	7					1.60E-03	2.20E-03		1.50E+02		5.40E+04		1.30E+08		1.50E+02		1.50E+02		4.60E+04		2.90E+08		1.50E+02	
SVOC	Acenaphthene	83-32-9		7					5.30E-02	6.00E-02		3.50E+05		9.70E+04		6.20E+06		2.00E+05		1.90E+05		8.10E+04		1.40E+07		4.10E+04	
SVOC	Acenaphthylene	208-96-8	D	7					4.90E-02	5.60E-02		3.00E+03		2.70E+03		1.00E+06		8.00E+03		1.60E+03		2.20E+03		2.30E+06		1.60E+03	
SVOC	Acetophenone	98-86-2	D	7					5.20E-02	5.90E-02		1.10E+03		5.20E+04		1.40E+07		1.10E+03		1.10E+03		4.40E+04		3.30E+07		1.10E+03	
SVOC	Anthracene	120-12-7	D	7					5.10E-02	5.80E-02		1.00E+06		1.60E+06		2.90E+07		1.00E+06		1.00E+06		1.40E+06		6.70E+07		2.30E+05	
SVOC	Atrazine	1912-24-9		7					1.60E-01	1.80E-01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		7					1.80E-01	2.00E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	7	1	8.30E-02	8.30E-02	8.30E-02	5.70E-02	6.50E-02								1.00E+02	8E-04							2.00E+01	4E-03
SVOC	Benzo(a)pyrene	50-32-8	B2	7	1	8.10E-02	8.10E-02	8.10E-02	6.20E-02	7.10E-02						1.90E+03	4E-05	1.00E+01	8E-03					1.50E+03	5E-05	2.00E+00	4E-02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	7	1	1.40E-01	1.40E-01	1.40E-01	6.00E-02	6.90E-02								1.00E+02	1E-03							2.00E+01	7E-03
SVOC	Benzo(g,h,i)perylene	191-24-2	D	7	1	7.20E-02	7.20E-02	7.20E-02	5.70E-02	6.50E-02						3.50E+05	2E-07	9.10E+03	8E-06					8.00E+05	9E-08	2.50E+03	3E-05
SVOC	Benzo(k)fluoranthene	207-08-9	B2	7					5.50E-02	6.30E-02								1.00E+03								2.00E+02	
SVOC	Biphenyl	92-52-4		7					1.40E-01	1.70E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	7					4.90E-02	5.60E-02																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	7					5.30E-02	6.00E-02		4.40E+01		1.30E+01		1.20E+04		8.90E+01		8.30E+00		3.80E+00		9.40E+03		1.30E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	7	2	7.60E-02	8.15E-02	8.70E-02	5.60E-02	6.40E-02						8.90E+05	1E-07	1.00E+04	9E-06					7.00E+05	1E-07	2.80E+03	3E-05

TABLE 4-11

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	7					6.30E-02	7.20E-02																	
SVOC	Butylbenzylphthalate	85-68-7	C	7	1	1.30E-01	1.30E-01	1.30E-01	5.30E-02	6.00E-02						2.10E+07	6E-09	3.10E+02	4E-04					4.70E+07	3E-09	3.10E+02	4E-04
SVOC	Caprolactam	105-60-2		7					1.90E-01	2.10E-01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	7					5.40E-02	6.20E-02								3.70E+03								5.30E+02	
SVOC	4-Chloro-3-methylphenol	59-50-7		7					5.30E-02	6.00E-02								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		7					5.30E-02	6.00E-02																	
SVOC	2-Chloronaphthalene	91-58-7		7					5.00E-02	5.70E-02								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		7					5.40E-02	6.20E-02								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		7					5.40E-02	6.20E-02																	
SVOC	Chrysene	218-01-9	B2	7	1	1.20E-01	1.20E-01	1.20E-01	4.80E-02	5.50E-02								1.00E+04	1E-05							2.00E+03	6E-05
SVOC	Di-n-butylphthalate	84-74-2	D	7					1.60E-01	1.80E-01						1.50E+06		7.60E+02						3.30E+06		7.60E+02	
SVOC	Di-n-octylphthalate	117-84-0		7					5.60E-02	6.40E-02								2.80E+04								6.90E+03	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	7					5.30E-02	6.00E-02								1.00E+01								2.00E+00	
SVOC	Dibenzofuran	132-64-9	D	7	1	1.30E-01	1.30E-01	1.30E-01	5.20E-02	5.90E-02																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	7					4.00E-02	4.60E-02						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		7					5.20E-02	5.90E-02						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	7	1	2.10E-01	2.10E-01	2.10E-01	1.60E-01	1.80E-01						1.50E+06	1E-07	7.40E+02	3E-04					3.30E+06	6E-08	7.40E+02	3E-04
SVOC	2,4-Dimethylphenol	105-67-9		7					8.30E-02	9.50E-02						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	7					1.70E-01	1.90E-01						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		7					1.70E-01	1.90E-01								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		7					1.10E-01	1.30E-01																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	7					4.80E-02	5.50E-02						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	7					5.00E-02	5.70E-02																	
SVOC	Fluoranthene	206-44-0	D	7	1	1.50E-01	1.50E-01	1.50E-01	5.80E-02	6.60E-02		1.00E+06	2E-07	8.90E+05	2E-07	4.10E+06	4E-08	1.80E+05	8E-07	1.00E+06	2E-07	7.40E+05	2E-07	9.30E+06	2E-08	4.60E+04	3E-06
SVOC	Fluorene	86-73-7	D	7					5.00E-02	5.70E-02		1.00E+06		1.50E+05		4.10E+06		1.30E+05		5.80E+05		1.30E+05		9.30E+06		2.70E+04	
SVOC	Hexachlorobenzene	118-74-1	B2	7					5.80E-02	6.60E-02		2.20E+02		5.60E+01		8.50E+03		5.10E+01		4.10E+01		1.70E+01		6.80E+03		8.90E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	7					4.70E-02	5.30E-02		3.50E+02		4.60E+02		1.80E+05		3.50E+02		1.30E+02		1.30E+02		1.40E+05		1.00E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	7					6.20E-02	7.10E-02								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	7					5.00E-02	5.70E-02		7.90E+01		6.60E+02		1.00E+05		1.10E+03		4.00E+01		5.50E+02		2.30E+05		2.30E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	7					7.20E-02	8.30E-02								1.00E+02								2.00E+01	
SVOC	Isophorone	78-59-1	C	7					4.60E-02	5.20E-02						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		7	1	6.30E-01	6.30E-01	6.30E-01	5.00E-02	5.70E-02								4.00E+04	2E-05							8.10E+03	8E-05
SVOC	Methylphenol (summed)	1319-77-3		7					4.90E-02	5.60E-02						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	7	1	3.90E-01	3.90E-01	3.90E-01	5.10E-02	5.80E-02		4.70E+02	8E-04	3.50E+02	1E-03	8.80E+04	4E-06	8.00E+04	5E-06	2.50E+02	2E-03	3.00E+02	1E-03	2.00E+05	2E-06	1.60E+04	2E-05
SVOC	2-Nitroaniline	88-74-4		7					4.80E-02	5.50E-02																	
SVOC	3-Nitroaniline	99-09-2	C	7					1.40E-01	1.70E-01																	
SVOC	4-Nitroaniline	100-01-6	C	7					7.00E-02	8.10E-02																	
SVOC	Nitrobenzene	98-95-3	D	7					4.80E-02	5.50E-02		4.90E+02		4.60E+03		1.50E+06		4.90E+02		4.90E+02		3.90E+03		3.30E+06		1.00E+02	
SVOC	2-Nitrophenol	88-75-5		7					4.80E-02	5.50E-02								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		7					2.00E-01	2.30E-01																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	7					5.10E-02	5.80E-02								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	7					4.60E-02	5.20E-02						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	7					5.40E-02	6.20E-02																	
SVOC	Pentachlorophenol	87-86-5	B2	7					1.20E-01	1.40E-01						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	7	1	2.80E-01	2.80E-01	2.80E-01	5.40E-02	6.20E-02		5.10E+03	5E-05	1.90E+02	1E-03	2.90E+03	1E-04	8.00E+03	4E-05	2.80E+03	1E-04	1.60E+02	2E-03	6.70E+03	4E-05	1.60E+03	2E-04
SVOC	Phenol	108-95-2	D	7					5.10E-02	5.80E-02						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	7	1	1.60E-01	1.60E-01	1.60E-01	5.30E-02	6.00E-02		1.00E+06	2E-07	7.80E+05	2E-07	2.90E+06	6E-08	1.10E+05	1E-06	1.00E+06	2E-07	6.50E+05	2E-07	6.70E+06	2E-08	2.90E+04	6E-06
SVOC	2,4,5-Trichlorophenol	95-95-4		7					5.70E-02	6.50E-02						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	7					6.50E-02	7.50E-02						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	7					2.10E-02	2.40E-02		1.60E+04		8.10E+02		6.50E+03		2.00E+01		3.00E+03		2.40E+02		5.20E+03		4.00E+00	
INORG	Antimony	7440-36-0		7					5.07E-01	5.81E-01						5.90E+03		1.20E+03						1.30E+04		1.80E+02	
INORG	Arsenic	7440-38-2	A	7	6	1.97E+00	6.45E+00	1.19E+01	3.50E-01	3.50E-01	1.32E+01					9.10E+02		6.10E+01						7.20E+02		7.60E+00	
INORG	Barium	7440-39-3	D	7	6	4.36E+00	1.19E+01	3.25E+01	1.51E-01	1.51E-01	1.10E+02					1.50E+05		2.50E+05						3.30E+05		3.70E+04	
INORG	Beryllium	7440-41-7	B1	7	6	1.00E-01	3.51E-01	9.36E-01	5.36E-02	5.36E-02	1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	7	5	1.35E-01	2.70E-01	5.68E-01	5.00E-02	5.01E-02	1.20E+00					2.20E+03		4.10E+03						1.70E+03		5.50E+02	
INORG	Chromium (total)	7440-47-3		7	6	3.40E+00	5.53E+00	9.63E+00	4.43E-01	4.43E-01	4.92E+01					2.40E+02		1.70E+04						2.60E+02		2.50E+03	
INORG	Cobalt	7440-48-4		7	6	1.64E+00	5.56E+00	1.53E+01	1.75E-01	1.75E-01	1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	7	6	4.83E+00	1.32E+01	2.92E+01	3.15E-01	3.15E-01	3.20E+01					5.90E+04		1.40E+05						1.30E+05		2.00E+04	
INORG	Lead	7439-92-1	B2	7	6	2.01E+00	5.50E+00	1.80E+01	2.80E-01	2.80E-01	4.92E+01					4.40E+04		9.00E+02						1.00E+05		4.00E+02	
INORG	Manganese	7439-96-5	D	7	6	6.29E+01	1.86E+02	2.68E+02	1.75E-01	1.75E-01	5.10E+02					1.50E+03		1.70E+05						3.30E+03		2.50E+04	
INORG	Mercury	7439-97-6	D	7	1	4.71E-02	4.71E-02	4.71E-02	8.70E-03	1.00E-02	1.30E-01							1.10E+03								1.60E+02	
INORG	Nickel	7440-02-0	A	7	6	5.20E+00	1.33E+01	1.93E+01	3.15E-01	3.15E-01	3.01E+01					1.60E+04		2.70E+05						1.30E+04		4.00E+04	

TABLE 4-11

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
INORG	Selenium	7782-49-2	D	7	1	1.11E+00	1.11E+00	1.11E+00	3.21E-01	3.67E-01	4.10E-01					5.90E+04	1E-05	1.80E+04	4E-05					1.30E+05	5E-06	2.60E+03	3E-04
INORG	Silver	7440-22-4	D	7					1.55E-01	1.78E-01						2.90E+03		1.70E+04						6.70E+03		2.50E+03	
INORG	Thallium	7440-28-0		7					5.17E-01	5.93E-01								2.40E+02								3.50E+01	
INORG	Vanadium	7440-62-2		7	6	5.09E+00	7.74E+00	1.21E+01	1.51E-01	1.51E-01	3.28E+01							1.00E+04								7.50E+02	
INORG	Zinc	7440-66-6	D	7	6	2.30E+01	5.26E+01	1.20E+02	1.40E+00	1.40E+00	4.70E+01							1.00E+06	7E-05							1.70E+05	4E-04

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-12

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	Acetone	67-64-1	T	D	4	1	7.05E-04	7.05E-04	7.05E-04	5.10E-04	1.00E-03	1.00E+06	7E-10	3.10E+04	2E-08	1.00E+06	7E-10
VOC	Benzene	71-43-2	T	A	4					1.60E-04	3.20E-04	3.60E+01		1.10E+01		5.60E+00	
VOC	Bromodichloromethane	75-27-4	T	B2	4					1.70E-04	3.40E-04	3.80E+01		1.40E+01		4.80E+00	
VOC	Bromoform	75-25-2	T	B2	4					1.80E-04	3.60E-04	3.10E+03		1.40E+02		4.80E+02	
VOC	Bromomethane	74-83-9	T	D	4					2.00E-04	4.00E-04	9.00E+00		7.00E+01		4.00E+00	
VOC	2-Butanone	78-93-3	T	D	4					4.10E-04	8.20E-04	2.40E+05		2.40E+05		2.40E+05	
VOC	Carbon Disulfide	75-15-0	T		4					2.00E-04	4.00E-04	5.50E+02		1.20E+03		2.50E+02	
VOC	Carbon Tetrachloride	56-23-5	T	B2	4					1.20E-04	2.40E-04	2.40E+00		4.60E+00		3.70E-01	
VOC	Chlorobenzene	108-90-7	T	D	4					1.40E-04	2.80E-04	4.70E+02		8.60E+01		2.10E+02	
VOC	Chloroethane	75-00-3	T		4					2.60E-04	5.20E-04	5.70E+03		4.40E+02		5.70E+03	
VOC	Chloroform	67-66-3	T	B2	4	1	1.60E-04	1.60E-04	1.60E-04	1.40E-04	2.80E-04	1.80E+02	9E-07	1.50E+02	1E-06	2.80E+01	6E-06
VOC	Chloromethane	74-87-3	T	D	4					1.30E-04	2.60E-04	5.20E+01		4.90E+02		8.60E+00	
VOC	Cumene	98-82-8	T	D	4					1.20E-04	2.40E-04	5.60E+01		5.60E+01		5.60E+01	
VOC	Cyclohexane	110-82-7	T		4					1.30E-04	2.60E-04						
VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4					6.20E-04	1.20E-03	1.20E+00		3.90E-01		1.20E+00	
VOC	Dibromochloromethane	124-48-1	T	C	4					2.60E-04	5.20E-04	1.10E+02		1.80E+01		1.50E+01	
VOC	1,2-Dibromoethane	106-93-4	T	B2	4					2.20E-04	4.40E-04	1.50E+01		2.50E-02		2.40E+00	
VOC	1,2-Dichlorobenzene	95-50-1	T	D	4					1.10E-04	2.20E-04	1.60E+02		1.60E+02		1.60E+02	
VOC	1,3-Dichlorobenzene	541-73-1	T	D	4					1.50E-04	3.00E-04			2.00E+00			
VOC	1,4-Dichlorobenzene	106-46-7	T	C	4					1.70E-04	3.40E-04	7.40E+01		6.40E+00		1.60E+01	
VOC	Dichlorodifluoromethane	75-71-8	T		4					2.60E-04	5.20E-04	3.00E+02		3.00E+02		2.20E+02	
VOC	1,1-Dichloroethane	75-34-3	T	C	4	4	5.05E-04	3.50E-03	5.40E-03			2.30E+03	2E-06	2.40E+03	2E-06	1.00E+03	5E-06
VOC	1,2-Dichloroethane	107-06-2	T	B2	4					2.10E-04	4.20E-04	5.90E+01		1.90E+01		9.60E+00	
VOC	1,1-Dichloroethene	75-35-4	T	C	4	3	1.21E-03	2.50E-03	3.50E-03	2.40E-04	2.40E-04	1.30E+00	3E-03	1.10E+01	3E-04	2.00E-01	2E-02
VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4					2.20E-04	4.40E-04	2.20E+02		2.00E+02		9.60E+01	
VOC	trans-1,2-Dichloroethene	156-60-5	T		4					1.50E-04	3.00E-04	2.00E+02		2.20E+02		8.50E+01	
VOC	1,2-Dichloropropane	78-87-5	T	B2	4					1.70E-04	3.40E-04	3.60E+01		1.60E+01		1.60E+01	
VOC	1,3-Dichloropropene (summed)	542-75-6	T	B2	4					2.70E-04	5.40E-04	1.30E-02		1.30E+01		2.00E-03	
VOC	Ethyl Benzene	100-41-4	T	D	4					1.20E-04	2.40E-04	1.70E+02		1.70E+02		1.70E+02	
VOC	2-Hexanone	591-78-6	T		4					4.60E-04	9.20E-04	8.80E+03		5.20E+03		4.20E+03	
VOC	Methyl Acetate	79-20-9	T		4					4.10E-04	8.20E-04						
VOC	Methyl tert-butyl ether	1634-04-4	T		4					1.30E-04	2.60E-04	4.70E+04		6.90E+02		4.70E+04	
VOC	4-Methyl-2-pentanone	108-10-1	T		4					2.30E-04	4.60E-04	2.00E+04		1.30E+04		2.00E+04	
VOC	Methylcyclohexane	108-87-2	T		4					1.50E-04	3.00E-04						
VOC	Methylene Chloride	75-09-2	T	B2	4					3.40E-04	6.80E-04	1.40E+03		2.20E+02		2.20E+02	
VOC	Styrene	100-42-5	T		4					1.50E-04	3.00E-04	3.10E+02		9.70E+00		1.70E+02	

TABLE 4-12

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4					2.50E-04	5.00E-04	7.70E+01		4.70E+00		1.20E+01	
VOC	Tetrachloroethene	127-18-4	T	C-B2	4					2.30E-04	4.60E-04	1.70E+02		1.20E+01		2.50E+01	
VOC	Toluene	108-88-3	T	D	4	1	4.70E-04	4.70E-04	4.70E-04	1.80E-04	3.60E-04	5.30E+02	9E-07	5.30E+02	9E-07	5.30E+02	9E-07
VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4					1.70E-04	3.40E-04	3.00E+02		1.90E+01		3.00E+02	
VOC	1,1,1-Trichloroethane	71-55-6	T	D	4	4	1.38E-04	2.06E-02	3.50E-02			1.30E+03	3E-05	1.30E+03	3E-05	6.60E+02	5E-05
VOC	1,1,2-Trichloroethane	79-00-5	T	C	4					3.00E-04	6.00E-04	1.10E+02		2.10E+01		1.70E+01	
VOC	Trichloroethene	79-01-6	T	C-B2	4	1	1.40E-04	1.40E-04	1.40E-04	1.40E-04	2.80E-04	9.70E+01	1E-06	3.70E+01	4E-06	1.50E+01	9E-06
VOC	Trichlorofluoromethane	75-69-4	T		4					2.80E-04	5.60E-04	1.10E+03		1.10E+03		1.10E+03	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4					3.20E-04	6.40E-04	1.70E+02		1.70E+02		1.70E+02	
VOC	Vinyl Chloride	75-01-4	T	A	4					1.50E-04	3.00E-04	6.90E-01		5.70E-01		1.10E-01	
VOC	Xylenes (total)	1330-20-7	T	D	4	1	3.48E-04	3.48E-04	3.48E-04	3.30E-04	6.60E-04	1.90E+02	2E-06	1.90E+02	2E-06	1.90E+02	2E-06
SVOC	Acenaphthene	83-32-9	T		4					8.00E-04	8.00E-04	4.20E+00		4.20E+00		4.20E+00	
SVOC	Acenaphthylene	208-96-8	T	D	4					7.10E-04	7.10E-04	3.90E+00		3.90E+00		3.90E+00	
SVOC	Acetophenone	98-86-2	T	D	4					2.60E-03	2.60E-03	6.10E+03		6.10E+03		6.10E+03	
SVOC	Anthracene	120-12-7	T	D	4					6.80E-04	6.80E-04	4.30E-02		4.30E-02		4.30E-02	
SVOC	Atrazine	1912-24-9	T		4					2.50E-03	2.50E-03			5.40E+00			
SVOC	Benzaldehyde	100-52-7	T		4					2.80E-03	2.80E-03						
SVOC	Benzo(a)anthracene	56-55-3	T	B2	4					7.00E-04	7.00E-04			9.40E-03			
SVOC	Benzo(a)pyrene	50-32-8	T	B2	4					7.30E-04	7.30E-04			5.00E-03			
SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4					9.40E-04	9.40E-04			2.00E-03			
SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4					8.50E-04	8.50E-04			5.00E-03			
SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4					8.40E-04	8.40E-04			5.00E-03			
SVOC	Biphenyl	92-52-4	T		4					2.60E-03	2.60E-03						
SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4					8.70E-04	8.70E-04						
SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4					9.70E-04	9.70E-04	2.10E+02		5.70E+00		3.80E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4					2.70E-03	2.70E-03			3.20E-01			
SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4					8.80E-04	8.80E-04						
SVOC	Butylbenzylphthalate	85-68-7	T	C	4					8.80E-04	8.80E-04			2.70E+00			
SVOC	Caprolactam	105-60-2	T		4					2.50E-03	2.50E-03			3.90E+05			
SVOC	Carbazole	86-74-8	T	B2	4					8.20E-04	8.20E-04			7.40E+00			
SVOC	4-Chloro-3-methylphenol	59-50-7	T		4					9.90E-04	9.90E-04			7.90E+01			
SVOC	4-Chloroaniline	106-47-8	T		2					6.10E-04	6.10E-04						
SVOC	2-Chloronaphthalene	91-58-7	T		4					8.50E-04	8.50E-04			6.70E+00			
SVOC	2-Chlorophenol	95-57-8	T		4					1.00E-03	1.00E-03			9.40E+01			
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4					7.90E-04	7.90E-04						
SVOC	Chrysene	218-01-9	T	B2	4					7.50E-04	7.50E-04			5.00E-03			

TABLE 4-12

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
SVOC	Di-n-butylphthalate	84-74-2	T	D	4					6.70E-04	6.70E-04			1.10E+01			
SVOC	Di-n-octylphthalate	117-84-0	T		4					1.10E-03	1.10E-03			4.00E-01			
SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4					7.90E-04	7.90E-04			5.00E-03			
SVOC	Dibenzofuran	132-64-9	T	D	4					1.10E-03	1.10E-03						
SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4					9.30E-04	9.30E-04			1.80E-01			
SVOC	2,4-Dichlorophenol	120-83-2	T		4					8.50E-04	8.50E-04			4.80E+01			
SVOC	Diethylphthalate	84-66-2	T	D	4					6.50E-04	6.50E-04			1.10E+03			
SVOC	2,4-Dimethylphenol	105-67-9	T		4					8.50E-04	8.50E-04			5.20E+02			
SVOC	Dimethylphthalate	131-11-3	T	D	4					7.60E-04	7.60E-04			4.20E+03			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4					1.30E-03	1.30E-03			9.50E+00			
SVOC	2,4-Dinitrophenol	51-28-5	T		4					3.00E-03	3.00E-03						
SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4					7.90E-04	7.90E-04			8.60E+00			
SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4					5.70E-04	5.70E-04						
SVOC	Fluoranthene	206-44-0	T	D	4					8.10E-04	8.10E-04	2.10E-01		2.10E-01		2.10E-01	
SVOC	Fluorene	86-73-7	T	D	4					1.00E-03	1.00E-03	2.00E+00		2.00E+00		2.00E+00	
SVOC	Hexachlorobenzene	118-74-1	T	B2	4					7.40E-04	7.40E-04	3.00E+00		4.60E-03		4.40E-01	
SVOC	Hexachlorobutadiene	87-68-3	T	C	4					7.30E-04	7.30E-04	3.20E+00		4.00E-01		1.60E+00	
SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4					1.10E-03	1.10E-03			1.80E+00			
SVOC	Hexachloroethane	67-72-1	T	C	4					7.40E-04	7.40E-04	5.00E+01		1.90E+00		2.70E+01	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4					6.30E-04	6.30E-04			5.00E-03			
SVOC	Isophorone	78-59-1	T	C	4					6.30E-04	6.30E-04			9.90E+02			
SVOC	2-Methylnaphthalene	91-57-6	T		4					6.40E-04	6.40E-04			2.50E+01			
SVOC	Methylphenol (summed)	1319-77-3	T		4					1.30E-03	1.30E-03			8.10E+02			
SVOC	Naphthalene	91-20-3	T	C	4					7.50E-04	7.50E-04	3.10E+01		3.10E+01		3.10E+01	
SVOC	2-Nitroaniline	88-74-4	T		4					7.00E-04	7.00E-04						
SVOC	3-Nitroaniline	99-09-2	T	C	4					7.10E-04	7.10E-04						
SVOC	4-Nitroaniline	100-01-6	T	C	4					1.30E-03	1.30E-03						
SVOC	Nitrobenzene	98-95-3	T	D	4					8.10E-04	8.10E-04	2.10E+03		1.10E+01		2.10E+03	
SVOC	2-Nitrophenol	88-75-5	T		4					2.10E-03	2.10E-03			7.90E+01			
SVOC	4-Nitrophenol	100-02-7	T		4					1.90E-03	1.90E-03						
SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4					1.40E-03	1.40E-03			3.50E+01			
SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4					6.70E-04	6.70E-04			3.60E-01			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4					7.80E-04	7.80E-04						
SVOC	Pentachlorophenol	87-86-5	T	B2	4					2.40E-03	2.40E-03			2.00E-01			
SVOC	Phenanthrene	85-01-8	T	D	4					8.20E-04	8.20E-04	1.00E+00		1.00E+00		1.00E+00	
SVOC	Phenol	108-95-2	T	D	4					2.60E-03	2.60E-03			2.90E+04			

TABLE 4-12

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
SVOC	Pyrene	129-00-0	T	D	4					1.10E-03	1.10E-03	1.40E-01		1.40E-01		1.40E-01	
SVOC	2,4,5-Trichlorophenol	95-95-4	T		4					1.20E-03	1.20E-03			1.70E+02			
SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4					1.70E-03	1.70E-03			1.00E+01			
P/PCB	PCBs (summed)	1336-36-3	D	B2	2					8.20E-05	8.20E-05	4.50E-02		3.30E-03		4.50E-02	
P/PCB	PCBs (summed)	1336-36-3	T	B2	4					8.20E-05	8.20E-05	4.50E-02		3.30E-03		4.50E-02	
INORG	Antimony	7440-36-0	D		4					2.20E-03	2.20E-03			6.80E+01			
INORG	Antimony	7440-36-0	T		4	1	1.65E-03	1.65E-03	1.65E-03	2.20E-03	2.20E-03			6.80E+01	2E-05		
INORG	Arsenic	7440-38-2	D	A	4					3.90E-03	3.90E-03			4.30E+00			
INORG	Arsenic	7440-38-2	T	A	4					3.90E-03	3.90E-03			4.30E+00			
INORG	Barium	7440-39-3	D	D	4	4	3.70E-02	4.69E-02	6.92E-02					1.40E+04	5E-06		
INORG	Barium	7440-39-3	T	D	4	4	3.53E-02	4.49E-02	6.69E-02					1.40E+04	5E-06		
INORG	Beryllium	7440-41-7	D	B1	4	2	4.70E-04	4.70E-04	4.70E-04	5.40E-04	5.40E-04			2.90E+02	2E-06		
INORG	Beryllium	7440-41-7	T	B1	4					5.40E-04	5.40E-04			2.90E+02			
INORG	Cadmium	7440-43-9	D	B1	4					2.80E-04	2.80E-04			1.90E+02			
INORG	Cadmium	7440-43-9	T	B1	4					2.80E-04	2.80E-04			1.90E+02			
INORG	Chromium (total)	7440-47-3	D		4					1.40E-03	1.40E-03			4.60E+02			
INORG	Chromium (total)	7440-47-3	T		4					1.40E-03	1.40E-03			4.60E+02			
INORG	Cobalt	7440-48-4	D		4	2	2.88E-03	3.31E-03	3.75E-03	1.30E-03	1.30E-03			2.40E+03	2E-06		
INORG	Cobalt	7440-48-4	T		4	2	2.93E-03	3.41E-03	3.90E-03	1.30E-03	1.30E-03			2.40E+03	2E-06		
INORG	Copper	7440-50-8	D	D	4					4.20E-03	4.20E-03			7.40E+03			
INORG	Copper	7440-50-8	T	D	4					4.20E-03	4.20E-03			7.40E+03			
INORG	Lead	7439-92-1	D	B2	4					2.50E-03	2.50E-03						
INORG	Lead	7439-92-1	T	B2	4					2.50E-03	2.50E-03						
INORG	Manganese	7439-96-5	D	D	4	4	1.20E+00	1.32E+00	1.46E+00					9.10E+03	2E-04		
INORG	Manganese	7439-96-5	T	D	4	4	1.11E+00	1.23E+00	1.35E+00					9.10E+03	1E-04		
INORG	Mercury	7439-97-6	D	D	4					6.90E-05	6.90E-05			5.60E-02			
INORG	Mercury	7439-97-6	T	D	4					6.90E-05	6.90E-05			5.60E-02			
INORG	Nickel	7440-02-0	D	A	4	4	3.40E-03	4.03E-03	5.45E-03					7.40E+04	7E-08		
INORG	Nickel	7440-02-0	T	A	4	2	3.70E-03	5.13E-03	6.55E-03	2.20E-03	2.20E-03			7.40E+04	9E-08		
INORG	Selenium	7782-49-2	D	D	4					4.50E-03	4.50E-03			9.70E+02			
INORG	Selenium	7782-49-2	T	D	4	2	3.43E-03	3.43E-03	3.43E-03	4.50E-03	4.50E-03			9.70E+02	4E-06		
INORG	Silver	7440-22-4	D	D	4					1.50E-03	1.50E-03			1.50E+03			
INORG	Silver	7440-22-4	T	D	4					1.50E-03	1.50E-03			1.50E+03			
INORG	Thallium	7440-28-0	D		4	4	2.90E-05	3.47E-04	1.29E-03					1.30E+01	1E-04		
INORG	Thallium	7440-28-0	T		4	4	1.90E-05	3.44E-04	1.29E-03					1.30E+01	1E-04		
INORG	Vanadium	7440-62-2	D		4					8.20E-04	8.20E-04			9.70E+02			

TABLE 4-12

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-12 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
INORG	Vanadium	7440-62-2	T		4					8.20E-04	8.20E-04			9.70E+02			
INORG	Zinc	7440-66-6	D	D	4					1.20E-02	1.20E-02			1.10E+05			
INORG	Zinc	7440-66-6	T	D	4					1.20E-02	1.20E-02			1.10E+05			

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-13

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-13 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	8					1.80E-02	2.30E-02		1.10E+05		1.60E+05		1.70E+08		1.10E+05		1.10E+05		1.30E+05		3.90E+08		2.30E+04	
VOC	Benzene	71-43-2	A	8					4.40E-03	5.80E-03		8.40E+00		4.50E+01		4.70E+05		4.00E+02		1.60E+00		1.30E+01		3.80E+05		1.80E+02	
VOC	Bromodichloromethane	75-27-4	B2	8					4.40E-03	5.80E-03		6.40E+00		3.10E+01		1.10E+05		7.50E+02		1.20E+00		9.10E+00		8.40E+04		1.10E+02	
VOC	Bromoform	75-25-2	B2	8					4.40E-03	5.80E-03		7.70E+02		3.10E+03		3.60E+06		8.70E+02		1.50E+02		9.00E+02		2.80E+06		8.20E+02	
VOC	Bromomethane	74-83-9	D	8					8.80E-03	1.20E-02		1.60E+00		1.30E+01		1.50E+05		1.60E+03		8.60E-01		1.10E+01		3.30E+05		3.20E+02	
VOC	2-Butanone	78-93-3	D	8					1.80E-02	2.30E-02		2.70E+04		3.50E+04		2.90E+07		2.70E+04		2.70E+04		2.90E+04		6.70E+07		2.70E+04	
VOC	Carbon Disulfide	75-15-0		8	1	1.60E-03	1.60E-03	1.60E-03	4.40E-03	5.80E-03		1.40E+02	1E-05	1.60E+03	1E-06	2.10E+07	8E-11	2.80E+02	6E-06	7.60E+01	2E-05	1.30E+03	1E-06	4.70E+07	3E-11	2.80E+02	6E-06
VOC	Carbon Tetrachloride	56-23-5	B2	8					4.40E-03	5.80E-03		9.90E-01		1.20E+01		1.70E+05		3.90E+02		1.90E-01		3.50E+00		1.30E+05		9.60E+01	
VOC	Chlorobenzene	108-90-7	D	8					4.40E-03	5.80E-03		2.20E+02		9.20E+02		2.10E+06		2.60E+02		1.20E+02		7.70E+02		4.70E+06		2.60E+02	
VOC	Chloroethane	75-00-3		8					8.80E-03	1.20E-02		9.50E+02		3.60E+04		2.90E+08		9.50E+02		9.50E+02		3.00E+04		6.70E+08		9.50E+02	
VOC	Chloroform	67-66-3	B2	8					4.40E-03	5.80E-03		3.80E+01		1.50E+02		1.60E+06		1.50E+03		7.20E+00		4.50E+01		1.30E+06		1.20E+03	
VOC	Chloromethane	74-87-3	D	8					8.80E-03	1.20E-02		1.20E+01		1.40E+02		6.10E+06		1.10E+03		2.30E+00		4.00E+01		4.90E+06		1.10E+03	
VOC	Cumene	98-82-8	D	8					4.40E-03	5.80E-03		3.90E+02		2.00E+03		2.60E+06		3.90E+02		3.90E+02		1.70E+03		5.80E+06		3.90E+02	
VOC	Cyclohexane	110-82-7		8					8.80E-03	1.20E-02																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	8					8.80E-03	1.20E-02		1.20E+00		1.50E+01		5.90E+03		1.20E+00		1.20E+00		1.30E+01		1.30E+04		1.20E+00	
VOC	Dibromochloromethane	124-48-1	C	8					4.40E-03	5.80E-03		2.10E+01		8.00E+01		1.60E+05		6.10E+02		3.90E+00		2.40E+01		1.30E+05		1.10E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	8					4.40E-03	5.80E-03		3.60E+00		5.80E+00		1.80E+04		6.60E-01		6.70E-01		1.70E+00		1.40E+04		9.20E-02	
VOC	1,2-Dichlorobenzene	95-50-1	D	8					4.40E-03	5.80E-03		2.10E+02		4.60E+04		4.40E+07		2.10E+02		2.10E+02		3.90E+04		1.00E+08		2.10E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	8					4.40E-03	5.80E-03								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	8					4.40E-03	5.80E-03		1.00E+02		2.60E+02		5.70E+05		2.90E+03		1.90E+01		7.70E+01		4.50E+05		4.00E+02	
VOC	Dichlorodifluoromethane	75-71-8		8					8.80E-03	1.20E-02		1.00E+03		6.30E+04		1.50E+09		1.00E+03		9.00E+02		5.30E+04		3.30E+09		1.00E+03	
VOC	1,1-Dichloroethane	75-34-3	C	8					4.40E-03	5.80E-03		4.30E+02		2.50E+03		1.50E+07		8.90E+02		2.30E+02		2.10E+03		3.30E+07		8.90E+02	
VOC	1,2-Dichloroethane	107-06-2	B2	8					4.40E-03	5.80E-03		1.10E+01		2.10E+01		1.50E+05		6.40E+02		2.10E+00		6.20E+00		1.20E+05		9.10E+01	
VOC	1,1-Dichloroethene	75-35-4	C	8					4.40E-03	5.80E-03		3.30E-01		3.70E+00		7.80E+04		5.70E+02		6.20E-02		1.10E+00		6.20E+04		2.00E+02	
VOC	cis-1,2-Dichloroethene	156-59-2	D	8					4.40E-03	5.80E-03		4.20E+01		2.10E+02		1.00E+06		6.40E+02		2.30E+01		1.80E+02		2.30E+06		6.40E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		8					4.40E-03	5.80E-03		4.30E+01		3.30E+02		2.10E+06		1.40E+03		2.30E+01		2.80E+02		4.70E+06		1.40E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	8					4.40E-03	5.80E-03		7.40E+00		3.00E+01		1.20E+05		5.50E+02		4.00E+00		2.50E+01		2.70E+05		1.40E+02	
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	8					4.40E-03	5.80E-03		1.00E-02		3.10E-02		5.00E+02		6.20E+02		1.00E-02		1.00E-02		4.00E+02		1.30E+02	
VOC	Ethyl Benzene	100-41-4	D	8					4.40E-03	5.80E-03		1.40E+02		1.10E+04		2.90E+07		1.40E+02		1.40E+02		9.50E+03		6.70E+07		1.40E+02	
VOC	2-Hexanone	591-78-6		8					1.80E-02	2.30E-02		1.80E+03		1.30E+03		1.20E+06		2.50E+03		9.90E+02		1.10E+03		2.70E+06		2.50E+03	
VOC	Methyl Acetate	79-20-9		8	1	1.50E-03	1.50E-03	1.50E-03	8.80E-03	1.20E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		8					1.80E-02	2.30E-02		5.90E+03		3.00E+04		8.80E+07		5.90E+03		5.90E+03		2.50E+04		2.00E+08		1.80E+03	
VOC	4-Methyl-2-pentanone	108-10-1		8					1.80E-02	2.30E-02		2.70E+03		5.30E+04		6.00E+07		2.70E+03		2.70E+03		4.50E+04		1.40E+08		2.70E+03	
VOC	Methylcyclohexane	108-87-2		8					8.80E-03	1.20E-02																	
VOC	Methylene Chloride	75-09-2	B2	8					4.40E-03	5.80E-03		2.40E+02		7.00E+02		8.30E+06		2.30E+03		4.50E+01		2.10E+02		6.60E+06		1.30E+03	
VOC	Styrene	100-42-5		8					4.40E-03	5.80E-03		5.20E+02		3.30E+03		6.90E+06		5.20E+02		2.50E+02		9.70E+02		5.50E+06		4.00E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	8					4.40E-03	5.80E-03		2.30E+01		3.40E+01		6.80E+04		3.70E+02		4.30E+00		1.00E+01		5.40E+04		5.30E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	8	7	8.30E-03	4.92E-02	1.20E-01	5.60E-03	5.60E-03		6.00E+01	2E-03	6.00E+02	2E-04	6.80E+06	2E-08	8.80E+01	1E-03	1.10E+01	1E-02	1.80E+02	7E-04	5.40E+06	2E-08	8.80E+01	1E-03
VOC	Toluene	108-88-3	D	8	6	1.10E-03	1.92E-03	3.30E-03	5.70E-03	5.80E-03		2.50E+02	1E-05	3.30E+03	1E-06	1.20E+07	3E-10	2.50E+02	1E-05	2.50E+02	1E-05	2.80E+03	1E-06	2.70E+07	1E-10	2.50E+02	1E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	D	8					4.40E-03	5.80E-03		1.10E+03		3.40E+04		1.10E+07		1.10E+03		1.10E+03		2.80E+04		2.50E+07		9.90E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	8	6	9.00E-04	5.30E-03	1.50E-02	5.40E-03	5.50E-03		4.60E+02	3E-05	4.50E+03	3E-06	2.90E+07	5E-10	4.60E+02	3E-05	2.50E+02	6E-05	3.80E+03	4E-06	6.70E+07	2E-10	4.60E+02	3E-05
VOC	1,1,2-Trichloroethane	79-00-5	C	8					4.40E-03	5.80E-03		2.40E+01		5.70E+01		2.50E+05		9.20E+02		4.60E+00		1.70E+01		1.90E+05		1.80E+02	
VOC	Trichloroethene	79-01-6	C-B2	8					4.40E-03	5.80E-03		3.70E+01		2.60E+02		2.30E+06		5.00E+02		7.10E+00		7.80E+01		1.80E+06		5.00E+02	
VOC	Trichlorofluoromethane	75-69-4		8					8.80E-03	1.20E-02		5.60E+02		1.10E+05		1.70E+09		5.60E+02		5.60E+02		9.20E+04		3.80E+09		5.60E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		8					4.40E-03	5.80E-03		5.50E+02		2.10E+05		2.30E+09		5.50E+02		5.50E+02		1.80E+05		5.10E+09		5.50E+02	
VOC	Vinyl Chloride	75-01-4	A	8					8.80E-03	1.20E-02		1.50E-01		1.50E+00		4.70E+04		2.90E+01		2.80E-02		4.40E-01		3.70E+04		4.00E+00	
VOC	Xylenes (total)	1330-20-7	D	8					8.80E-03	1.20E-02		1.50E+02		5.40E+04		1.30E+08		1.50E+02		1.50E+02		4.60E+04		2.90E+08		1.50E+02	
SVOC	Acenaphthene	83-32-9		8					3.40E-01	3.60E-01		3.50E+05		9.70E+04		6.20E+06		2.00E+05		1.90E+05		8.10E+04		1.40E+07		4.10E+04	
SVOC	Acenaphthylene	208-96-8	D	8					3.40E-01	3.60E-01		3.00E+03		2.70E+03		1.00E+06		8.00E+03		1.60E+03		2.20E+03		2.30E+06		1.60E+03	
SVOC	Acetophenone	98-86-2	D	8					3.40E-01	3.60E-01		1.10E+03		5.20E+04		1.40E+07		1.10E+03		1.10E+03		4.40E+04		3.30E+07		1.10E+03	
SVOC	Anthracene	120-12-7	D	8					3.40E-01	3.60E-01		1.00E+06		1.60E+06		2.90E+07		1.00E+06		1.00E+06		1.40E+06		6.70E+07		2.30E+05	
SVOC	Atrazine	1912-24-9		8					3.40E-01	3.60E-01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		8					3.40E-01	3.60E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	8	1	1.60E-01	1.60E-01	1.60E-01	3.40E-01	3.50E-01								1.00E+02	2E-03							2.00E+01	8E-03
SVOC	Benzo(a)pyrene	50-32-8	B2	8	1	1.80E-01	1.80E-01	1.80E-01	3.40E-01	3.50E-01						1.90E+03	9E-05	1.00E+01	2E-02					1.50E+03	1E-04	2.00E+00	9E-02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	8	1	2.10E-01	2.10E-01	2.10E-01	3.40E-01	3.50E-01								1.00E+02	2E-03							2.00E+01	1E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	8	1	1.30E-01	1.30E-01	1.30E-01	3.40E-01	3.50E-01						3.50E+05	4E-07	9.10E+03	1E-05					8.00E+05	2E-07	2.50E+03	5E-05
SVOC	Benzo(k)fluoranthene	207-08-9	B2	8	1	1.20E-01	1.20E-01	1.20E-01	3.40E-01	3.50E-01								1.00E+03	1E-04							2.00E+02	6E-04
SVOC	Biphenyl	92-52-4		8					3.40E-01	3.60E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	8					3.40E-01	3.60E-01																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	8					3.40E-01	3.60E-01		4.40E+01		1.30E+01		1.20E+04		8.90E+01		8.30E+00		3.80E+00		9.40E+03		1.30E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	8					3.40E-01	3.60E-01						8.90E+05		1.00E+04						7.00E+05		2.80E+03	

TABLE 4-13

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-13 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	8					3.40E-01	3.60E-01																	
SVOC	Butylbenzylphthalate	85-68-7	C	8					3.40E-01	3.60E-01						2.10E+07		3.10E+02						4.70E+07		3.10E+02	
SVOC	Caprolactam	105-60-2		8					3.40E-01	3.60E-01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	8					3.40E-01	3.60E-01								3.70E+03								5.30E+02	
SVOC	4-Chloro-3-methylphenol	59-50-7		8					3.40E-01	3.60E-01								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		8					1.30E+00	1.40E+00																	
SVOC	2-Chloronaphthalene	91-58-7		8					3.40E-01	3.60E-01								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		8					3.40E-01	3.60E-01								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		8					3.40E-01	3.60E-01																	
SVOC	Chrysene	218-01-9	B2	8	1	1.80E-01	1.80E-01	1.80E-01	3.40E-01	3.50E-01								1.00E+04	2E-05							2.00E+03	9E-05
SVOC	Di-n-butylphthalate	84-74-2	D	8					3.40E-01	3.60E-01						1.50E+06		7.60E+02						3.30E+06		7.60E+02	
SVOC	Di-n-octylphthalate	117-84-0		8					3.40E-01	3.60E-01								2.80E+04								6.90E+03	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	8					3.40E-01	3.60E-01								1.00E+01								2.00E+00	
SVOC	Dibenzofuran	132-64-9	D	8					3.40E-01	3.60E-01																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	8					2.10E+00	2.20E+00						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		8					3.40E-01	3.60E-01						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	8					3.40E-01	3.60E-01						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		8					3.40E-01	3.60E-01						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	8					3.40E-01	3.60E-01						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		8					1.70E+00	1.90E+00								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		8					1.70E+00	1.90E+00																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	8					3.40E-01	3.60E-01						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	8					3.40E-01	3.60E-01																	
SVOC	Fluoranthene	206-44-0	D	8	1	3.00E-01	3.00E-01	3.00E-01	3.40E-01	3.50E-01		1.00E+06	3E-07	8.90E+05	3E-07	4.10E+06	7E-08	1.80E+05	2E-06	1.00E+06	3E-07	7.40E+05	4E-07	9.30E+06	3E-08	4.60E+04	7E-06
SVOC	Fluorene	86-73-7	D	8					3.40E-01	3.60E-01		1.00E+06		1.50E+05		4.10E+06		1.30E+05		5.80E+05		1.30E+05		9.30E+06		2.70E+04	
SVOC	Hexachlorobenzene	118-74-1	B2	8					3.40E-01	3.60E-01		2.20E+02		5.60E+01		8.50E+03		5.10E+01		4.10E+01		1.70E+01		6.80E+03		8.90E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	8					3.40E-01	3.60E-01		3.50E+02		4.60E+02		1.80E+05		3.50E+02		1.30E+02		1.30E+02		1.40E+05		1.00E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	8					3.40E-01	3.60E-01								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	8					1.00E-01	1.10E-01		7.90E+01		6.60E+02		1.00E+05		1.10E+03		4.00E+01		5.50E+02		2.30E+05		2.30E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	8	1	1.10E-01	1.10E-01	1.10E-01	3.40E-01	3.50E-01								1.00E+02	1E-03							2.00E+01	6E-03
SVOC	Isophorone	78-59-1	C	8					3.40E-01	3.60E-01						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		8					3.40E-01	3.60E-01								4.00E+04								8.10E+03	
SVOC	Methylphenol (summed)	1319-77-3		8					3.40E-01	3.60E-01						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	8					3.40E-01	3.60E-01		4.70E+02		3.50E+02		8.80E+04		8.00E+04		2.50E+02		3.00E+02		2.00E+05		1.60E+04	
SVOC	2-Nitroaniline	88-74-4		8					1.70E+00	1.90E+00																	
SVOC	3-Nitroaniline	99-09-2	C	8					1.70E+00	1.90E+00																	
SVOC	4-Nitroaniline	100-01-6	C	8					1.70E+00	1.90E+00																	
SVOC	Nitrobenzene	98-95-3	D	8					3.40E-01	3.60E-01		4.90E+02		4.60E+03		1.50E+06		4.90E+02		4.90E+02		3.90E+03		3.30E+06		1.00E+02	
SVOC	2-Nitrophenol	88-75-5		8					3.40E-01	3.60E-01								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		8					1.70E+00	1.90E+00																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	8					3.40E-01	3.60E-01								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	8					3.40E-01	3.60E-01						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	8					3.40E-01	3.60E-01																	
SVOC	Pentachlorophenol	87-86-5	B2	8					3.50E+00	3.70E+00						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	8	1	1.40E-01	1.40E-01	1.40E-01	3.40E-01	3.50E-01		5.10E+03	3E-05	1.90E+02	7E-04	2.90E+03	5E-05	8.00E+03	2E-05	2.80E+03	5E-05	1.60E+02	9E-04	6.70E+03	2E-05	1.60E+03	9E-05
SVOC	Phenol	108-95-2	D	8					3.40E-01	3.60E-01						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	8	1	3.00E-01	3.00E-01	3.00E-01	3.40E-01	3.50E-01		1.00E+06	3E-07	7.80E+05	4E-07	2.90E+06	1E-07	1.10E+05	3E-06	1.00E+06	3E-07	6.50E+05	5E-07	6.70E+06	4E-08	2.90E+04	1E-05
SVOC	2,4,5-Trichlorophenol	95-95-4		8					3.40E-01	3.60E-01						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	8					3.40E-01	3.60E-01						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	8					3.40E-02	3.60E-02		1.60E+04		8.10E+02		6.50E+03		2.00E+01		3.00E+03		2.40E+02		5.20E+03		4.00E+00	
INORG	Antimony	7440-36-0		8					2.05E+00	2.20E+00						5.90E+03		1.20E+03						1.30E+04		1.80E+02	
INORG	Arsenic	7440-38-2	A	8	8	2.26E+00	3.61E+00	7.54E+00			1.32E+01					9.10E+02		6.10E+01						7.20E+02		7.60E+00	
INORG	Barium	7440-39-3	D	8	8	4.90E+00	8.24E+00	2.89E+01			1.10E+02					1.50E+05		2.50E+05						3.30E+05		3.70E+04	
INORG	Beryllium	7440-41-7	B1	8	1	1.02E-01	1.02E-01	1.02E-01	1.03E-01	1.06E-01	1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	8	8	8.56E-02	1.33E-01	2.00E-01			1.20E+00					2.20E+03		4.10E+03						1.70E+03		5.50E+02	
INORG	Chromium (total)	7440-47-3		8	8	3.30E+00	4.31E+00	5.50E+00			4.92E+01					2.40E+02		1.70E+04						2.60E+02		2.50E+03	
INORG	Cobalt	7440-48-4		8	8	1.69E+00	2.08E+00	3.14E+00			1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	8	8	4.38E+00	6.10E+00	1.17E+01			3.20E+01					5.90E+04		1.40E+05						1.30E+05		2.00E+04	
INORG	Lead	7439-92-1	B2	8	8	2.64E+00	3.83E+00	9.93E+00			4.92E+01					4.40E+04		9.00E+02						1.00E+05		4.00E+02	
INORG	Manganese	7439-96-5	D	8	8	1.13E+02	1.36E+02	1.50E+02			5.10E+02					1.50E+03		1.70E+05						3.30E+03		2.50E+04	
INORG	Mercury	7439-97-6	D	8	1	5.78E-02	5.78E-02	5.78E-02	3.39E-02	3.50E-02	1.30E-01							1.10E+03								1.60E+02	
INORG	Nickel	7440-02-0	A	8	8	3.89E+00	5.31E+00	8.85E+00			3.01E+01					1.60E+04		2.70E+05						1.30E+04		4.00E+04	

TABLE 4-13

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-13 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
INORG	Selenium	7782-49-2	D	8	1	4.77E-01	4.77E-01	4.77E-01	5.13E-01	5.31E-01	4.10E-01					5.90E+04	1E-06	1.80E+04	4E-06					1.30E+05	5E-07	2.60E+03	3E-05
INORG	Silver	7440-22-4	D	8					5.13E-01	5.51E-01						2.90E+03		1.70E+04						6.70E+03		2.50E+03	
INORG	Thallium	7440-28-0		8					1.03E+00	1.10E+00								2.40E+02								3.50E+01	
INORG	Vanadium	7440-62-2		8	8	5.46E+00	6.42E+00	7.81E+00			3.28E+01							1.00E+04								7.50E+02	
INORG	Zinc	7440-66-6	D	8	8	1.74E+01	2.02E+01	2.31E+01			4.70E+01							1.00E+06								1.70E+05	

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-14

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-14 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Benzene	71-43-2	A	6					4.50E-03	5.60E-03		8.40E+00		4.50E+01		4.70E+05		4.00E+02		1.60E+00		1.30E+01		3.80E+05		1.80E+02	
VOC	Ethyl Benzene	100-41-4	D	6					4.50E-03	5.60E-03		1.40E+02		1.10E+04		2.90E+07		1.40E+02		1.40E+02		9.50E+03		6.70E+07		1.40E+02	
VOC	Toluene	108-88-3	D	6	2	1.10E-03	1.20E-03	1.30E-03	4.50E-03	5.60E-03		2.50E+02	5E-06	3.30E+03	4E-07	1.20E+07	1E-10	2.50E+02	5E-06	2.50E+02	5E-06	2.80E+03	5E-07	2.70E+07	5E-11	2.50E+02	5E-06
VOC	Xylenes (total)	1330-20-7	D	6					4.50E-03	5.60E-03		1.50E+02		5.40E+04		1.30E+08		1.50E+02		1.50E+02		4.60E+04		2.90E+08		1.50E+02	
SVOC	Acenaphthene	83-32-9		6					3.70E-01	4.10E-01		3.50E+05		9.70E+04		6.20E+06		2.00E+05		1.90E+05		8.10E+04		1.40E+07		4.10E+04	
SVOC	Acenaphthylene	208-96-8	D	6					3.70E-01	4.10E-01		3.00E+03		2.70E+03		1.00E+06		8.00E+03		1.60E+03		2.20E+03		2.30E+06		1.60E+03	
SVOC	Acetophenone	98-86-2	D	6					3.70E-01	4.10E-01		1.10E+03		5.20E+04		1.40E+07		1.10E+03		1.10E+03		4.40E+04		3.30E+07		1.10E+03	
SVOC	Anthracene	120-12-7	D	6					3.70E-01	4.10E-01		1.00E+06		1.60E+06		2.90E+07		1.00E+06		1.00E+06		1.40E+06		6.70E+07		2.30E+05	
SVOC	Atrazine	1912-24-9		6					3.70E-01	4.10E-01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		6					3.70E-01	4.10E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	6	2	7.70E-02	1.29E-01	1.80E-01	3.80E-01	4.10E-01								1.00E+02	2E-03							2.00E+01	9E-03
SVOC	Benzo(a)pyrene	50-32-8	B2	6	2	7.70E-02	1.24E-01	1.70E-01	3.80E-01	4.10E-01						1.90E+03	9E-05	1.00E+01	2E-02					1.50E+03	1E-04	2.00E+00	9E-02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	6	2	6.70E-02	1.49E-01	2.30E-01	3.80E-01	4.10E-01								1.00E+02	2E-03							2.00E+01	1E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	6	1	1.10E-01	1.10E-01	1.10E-01	3.70E-01	4.10E-01						3.50E+05	3E-07	9.10E+03	1E-05					8.00E+05	1E-07	2.50E+03	4E-05
SVOC	Benzo(k)fluoranthene	207-08-9	B2	6	1	1.10E-01	1.10E-01	1.10E-01	3.70E-01	4.10E-01								1.00E+03	1E-04							2.00E+02	6E-04
SVOC	Biphenyl	92-52-4		6					3.70E-01	4.10E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	6					3.70E-01	4.10E-01																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6					3.70E-01	4.10E-01		4.40E+01		1.30E+01		1.20E+04		8.90E+01		8.30E+00		3.80E+00		9.40E+03		1.30E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	6					3.70E-01	4.10E-01						8.90E+05		1.00E+04						7.00E+05		2.80E+03	
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	6					3.70E-01	4.10E-01																	
SVOC	Butylbenzylphthalate	85-68-7	C	6					3.70E-01	4.10E-01						2.10E+07		3.10E+02						4.70E+07		3.10E+02	
SVOC	Caprolactam	105-60-2		6					3.70E-01	4.10E-01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	6					3.70E-01	4.10E-01								3.70E+03								5.30E+02	
SVOC	4-Chloro-3-methylphenol	59-50-7		6					3.70E-01	4.10E-01								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		6					1.50E+00	1.60E+00																	
SVOC	2-Chloronaphthalene	91-58-7		6					3.70E-01	4.10E-01								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		6					3.70E-01	4.10E-01								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		6					3.70E-01	4.10E-01																	
SVOC	Chrysene	218-01-9	B2	6	2	8.30E-02	1.47E-01	2.10E-01	3.80E-01	4.10E-01								1.00E+04	2E-05							2.00E+03	1E-04
SVOC	Di-n-butylphthalate	84-74-2	D	6					3.70E-01	4.10E-01						1.50E+06		7.60E+02						3.30E+06		7.60E+02	
SVOC	Di-n-octylphthalate	117-84-0		6					3.70E-01	4.10E-01								2.80E+04								6.90E+03	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	6					3.70E-01	4.10E-01								1.00E+01								2.00E+00	
SVOC	Dibenzofuran	132-64-9	D	6					3.70E-01	4.10E-01																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	6					2.30E+00	2.50E+00						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		6					3.70E-01	4.10E-01						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	6					3.70E-01	4.10E-01						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		6					3.70E-01	4.10E-01						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	6					3.70E-01	4.10E-01						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		6					1.90E+00	2.10E+00								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		6					1.90E+00	2.10E+00																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	6					3.70E-01	4.10E-01						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	6					3.70E-01	4.10E-01																	
SVOC	Fluoranthene	206-44-0	D	6	2	1.20E-01	2.70E-01	4.20E-01	3.80E-01	4.10E-01		1.00E+06	4E-07	8.90E+05	5E-07	4.10E+06	1E-07	1.80E+05	2E-06	1.00E+06	4E-07	7.40E+05	6E-07	9.30E+06	5E-08	4.60E+04	9E-06
SVOC	Fluorene	86-73-7	D	6					3.70E-01	4.10E-01		1.00E+06		1.50E+05		4.10E+06		1.30E+05		5.80E+05		1.30E+05		9.30E+06		2.70E+04	
SVOC	Hexachlorobenzene	118-74-1	B2	6					3.70E-01	4.10E-01		2.20E+02		5.60E+01		8.50E+03		5.10E+01		4.10E+01		1.70E+01		6.80E+03		8.90E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	6					3.70E-01	4.10E-01		3.50E+02		4.60E+02		1.80E+05		3.50E+02		1.30E+02		1.30E+02		1.40E+05		1.00E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	6					3.70E-01	4.10E-01								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	6					1.10E-01	1.30E-01		7.90E+01		6.60E+02		1.00E+05		1.10E+03		4.00E+01		5.50E+02		2.30E+05		2.30E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	6	1	8.80E-02	8.80E-02	8.80E-02	3.70E-01	4.10E-01								1.00E+02	9E-04							2.00E+01	4E-03
SVOC	Isophorone	78-59-1	C	6					3.70E-01	4.10E-01						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		6					3.70E-01	4.10E-01								4.00E+04								8.10E+03	
SVOC	Methylphenol (summed)	1319-77-3		6					3.70E-01	4.10E-01						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	6					3.70E-01	4.10E-01		4.70E+02		3.50E+02		8.80E+04		8.00E+04		2.50E+02		3.00E+02		2.00E+05		1.60E+04	
SVOC	2-Nitroaniline	88-74-4		6					1.90E+00	2.10E+00																	
SVOC	3-Nitroaniline	99-09-2	C	6					1.90E+00	2.10E+00																	
SVOC	4-Nitroaniline	100-01-6	C	6					1.90E+00	2.10E+00																	
SVOC	Nitrobenzene	98-95-3	D	6					3.70E-01	4.10E-01		4.90E+02		4.60E+03		1.50E+06		4.90E+02		4.90E+02		3.90E+03		3.30E+06		1.00E+02	
SVOC	2-Nitrophenol	88-75-5		6					3.70E-01	4.10E-01								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		6					1.90E+00	2.10E+00																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	6					3.70E-01	4.10E-01								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	6					3.70E-01	4.10E-01						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	6					3.70E-01	4.10E-01																	

TABLE 4-14

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-14 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	Pentachlorophenol	87-86-5	B2	6					3.80E+00	4.30E+00						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	6	1	1.20E-01	1.20E-01	1.20E-01	3.70E-01	4.10E-01		5.10E+03	2E-05	1.90E+02	6E-04	2.90E+03	4E-05	8.00E+03	2E-05	2.80E+03	4E-05	1.60E+02	8E-04	6.70E+03	2E-05	1.60E+03	8E-05
SVOC	Phenol	108-95-2	D	6					3.70E-01	4.10E-01						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	6	2	1.30E-01	2.30E-01	3.30E-01	3.80E-01	4.10E-01		1.00E+06	3E-07	7.80E+05	4E-07	2.90E+06	1E-07	1.10E+05	3E-06	1.00E+06	3E-07	6.50E+05	5E-07	6.70E+06	5E-08	2.90E+04	1E-05
SVOC	2,4,5-Trichlorophenol	95-95-4		6					3.70E-01	4.10E-01						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	6					3.70E-01	4.10E-01						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
INORG	Lead	7439-92-1	B2	6	6	3.74E+00	1.74E+01	3.97E+01			4.92E+01					4.40E+04		9.00E+02						1.00E+05		4.00E+02	

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-15

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	9	3	6.50E-03	2.01E-01	5.70E-01	2.20E-02	1.10E+00		1.10E+05	5E-06	1.60E+05	4E-06	1.70E+08	3E-09	1.10E+05	5E-06	1.10E+05	5E-06	1.30E+05	4E-06	3.90E+08	1E-09	2.30E+04	2E-05
VOC	Benzene	71-43-2	A	9	2	1.70E-02	2.85E-02	4.00E-02	5.60E-04	3.75E-01		8.40E+00	5E-03	4.50E+01	9E-04	4.70E+05	9E-08	4.00E+02	1E-04	1.60E+00	3E-02	1.30E+01	3E-03	3.80E+05	1E-07	1.80E+02	2E-04
VOC	Bromodichloromethane	75-27-4	B2	9					1.00E-03	3.75E-01		6.40E+00		3.10E+01		1.10E+05		7.50E+02		1.20E+00		9.10E+00		8.40E+04		1.10E+02	
VOC	Bromoform	75-25-2	B2	9					1.40E-03	3.75E-01		7.70E+02		3.10E+03		3.60E+06		8.70E+02		1.50E+02		9.00E+02		2.80E+06		8.20E+02	
VOC	Bromomethane	74-83-9	D	9					1.60E-03	7.50E-01		1.60E+00		1.30E+01		1.50E+05		1.60E+03		8.60E-01		1.10E+01		3.30E+05		3.20E+02	
VOC	2-Butanone	78-93-3	D	9	3	3.90E-03	7.53E-03	1.10E-02	2.30E-02	1.50E+00		2.70E+04	4E-07	3.50E+04	3E-07	2.90E+07	4E-10	2.70E+04	4E-07	2.70E+04	4E-07	2.90E+04	4E-07	6.70E+07	2E-10	2.70E+04	4E-07
VOC	Carbon Disulfide	75-15-0		9					6.70E-04	3.75E-01		1.40E+02		1.60E+03		2.10E+07		2.80E+02		7.60E+01		1.30E+03		4.70E+07		2.80E+02	
VOC	Carbon Tetrachloride	56-23-5	B2	9					8.60E-04	3.75E-01		9.90E-01		1.20E+01		1.70E+05		3.90E+02		1.90E-01		3.50E+00		1.30E+05		9.60E+01	
VOC	Chlorobenzene	108-90-7	D	9					4.50E-04	3.75E-01		2.20E+02		9.20E+02		2.10E+06		2.60E+02		1.20E+02		7.70E+02		4.70E+06		2.60E+02	
VOC	Chloroethane	75-00-3		9	3	6.30E-03	2.52E-01	6.30E-01	1.10E-02	7.50E-01		9.50E+02	7E-04	3.60E+04	2E-05	2.90E+08	2E-09	9.50E+02	7E-04	9.50E+02	7E-04	3.00E+04	2E-05	6.70E+08	9E-10	9.50E+02	7E-04
VOC	Chloroform	67-66-3	B2	9					7.10E-04	3.75E-01		3.80E+01		1.50E+02		1.60E+06		1.50E+03		7.20E+00		4.50E+01		1.30E+06		1.20E+03	
VOC	Chloromethane	74-87-3	D	9					1.10E-03	7.50E-01		1.20E+01		1.40E+02		6.10E+06		1.10E+03		2.30E+00		4.00E+01		4.90E+06		1.10E+03	
VOC	Cumene	98-82-8	D	9					6.10E-04	3.75E-01		3.90E+02		2.00E+03		2.60E+06		3.90E+02		3.90E+02		1.70E+03		5.80E+06		3.90E+02	
VOC	Cyclohexane	110-82-7		9	1	1.10E-01	1.10E-01	1.10E-01	8.60E-04	7.50E-01																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	9					1.40E-03	8.00E-01		1.20E+00		1.50E+01		5.90E+03		1.20E+00		1.20E+00		1.30E+01		1.30E+04		1.20E+00	
VOC	Dibromochloromethane	124-48-1	C	9					9.50E-04	3.75E-01		2.10E+01		8.00E+01		1.60E+05		6.10E+02		3.90E+00		2.40E+01		1.30E+05		1.10E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	9					1.00E-03	3.75E-01		3.60E+00		5.80E+00		1.80E+04		6.60E-01		6.70E-01		1.70E+00		1.40E+04		9.20E-02	
VOC	1,2-Dichlorobenzene	95-50-1	D	9					6.10E-04	3.75E-01		2.10E+02		4.60E+04		4.40E+07		2.10E+02		2.10E+02		3.90E+04		1.00E+08		2.10E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	9					6.90E-04	3.75E-01								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	9					5.80E-04	3.75E-01		1.00E+02		2.60E+02		5.70E+05		2.90E+03		1.90E+01		7.70E+01		4.50E+05		4.00E+02	
VOC	Dichlorodifluoromethane	75-71-8		9					9.50E-04	7.50E-01		1.00E+03		6.30E+04		1.50E+09		1.00E+03		9.00E+02		5.30E+04		3.30E+09		1.00E+03	
VOC	1,1-Dichloroethane	75-34-3	C	9	5	1.30E-02	1.88E+00	6.50E+00	5.50E-03	2.70E-01		4.30E+02	2E-02	2.50E+03	3E-03	1.50E+07	4E-07	8.90E+02	7E-03	2.30E+02	3E-02	2.10E+03	3E-03	3.30E+07	2E-07	8.90E+02	7E-03
VOC	1,2-Dichloroethane	107-06-2	B2	9					6.30E-04	3.75E-01		1.10E+01		2.10E+01		1.50E+05		6.40E+02		2.10E+00		6.20E+00		1.20E+05		9.10E+01	
VOC	1,1-Dichloroethene	75-35-4	C	9	3	7.10E-02	7.93E-01	2.20E+00	1.00E-03	2.70E-01		3.30E-01	**7E+00**	3.70E+00	6E-01	7.80E+04	3E-05	5.70E+02	4E-03	6.20E-02	**4E+01**	1.10E+00	**2E+00**	6.20E+04	4E-05	2.00E+02	1E-02
VOC	cis-1,2-Dichloroethene	156-59-2	D	9					7.30E-04	3.75E-01		4.20E+01		2.10E+02		1.00E+06		6.40E+02		2.30E+01		1.80E+02		2.30E+06		6.40E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		9					6.30E-04	3.75E-01		4.30E+01		3.30E+02		2.10E+06		1.40E+03		2.30E+01		2.80E+02		4.70E+06		1.40E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	9					6.50E-04	3.75E-01		7.40E+00		3.00E+01		1.20E+05		5.50E+02		4.00E+00		2.50E+01		2.70E+05		1.40E+02	
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	9					7.40E-04	3.75E-01		1.00E-02		3.10E-02		5.00E+02		6.20E+02		1.00E-02		1.00E-02		4.00E+02		1.30E+02	
VOC	Ethyl Benzene	100-41-4	D	9	2	2.80E-02	1.14E-01	2.00E-01	5.10E-04	3.75E-01		1.40E+02	1E-03	1.10E+04	2E-05	2.90E+07	7E-09	1.40E+02	1E-03	1.40E+02	1E-03	9.50E+03	2E-05	6.70E+07	3E-09	1.40E+02	1E-03
VOC	2-Hexanone	591-78-6		9					1.50E-03	1.50E+00		1.80E+03		1.30E+03		1.20E+06		2.50E+03		9.90E+02		1.10E+03		2.70E+06		2.50E+03	
VOC	Methyl Acetate	79-20-9		9					9.50E-04	7.50E-01																	
VOC	Methyl tert-butyl ether	1634-04-4		9					7.30E-04	1.50E+00		5.90E+03		3.00E+04		8.80E+07		5.90E+03		5.90E+03		2.50E+04		2.00E+08		1.80E+03	
VOC	4-Methyl-2-pentanone	108-10-1		9					1.60E-03	1.50E+00		2.70E+03		5.30E+04		6.00E+07		2.70E+03		2.70E+03		4.50E+04		1.40E+08		2.70E+03	
VOC	Methylcyclohexane	108-87-2		9	1	2.40E-01	2.40E-01	2.40E-01	5.10E-04	7.50E-01																	
VOC	Methylene Chloride	75-09-2	B2	8	2	9.30E-02	9.45E-02	9.60E-02	1.10E-03	3.75E-01		2.40E+02	4E-04	7.00E+02	1E-04	8.30E+06	1E-08	2.30E+03	4E-05	4.50E+01	2E-03	2.10E+02	5E-04	6.60E+06	1E-08	1.30E+03	7E-05
VOC	Styrene	100-42-5		9					4.30E-04	3.75E-01		5.20E+02		3.30E+03		6.90E+06		5.20E+02		2.50E+02		9.70E+02		5.50E+06		4.00E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	9					1.60E-03	3.75E-01		2.30E+01		3.40E+01		6.80E+04		3.70E+02		4.30E+00		1.00E+01		5.40E+04		5.30E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	9	6	1.70E-03	1.53E+01	8.10E+01	1.00E-03	1.40E-02		6.00E+01	**1E+00**	6.00E+02	1E-01	6.80E+06	1E-05	8.80E+01	9E-01	1.10E+01	**7E+00**	1.80E+02	5E-01	5.40E+06	2E-05	8.80E+01	9E-01
VOC	Toluene	108-88-3	D	8	6	7.00E-04	3.31E-02	1.80E-01	2.20E-01	3.75E-01		2.50E+02	7E-04	3.30E+03	5E-05	1.20E+07	2E-08	2.50E+02	7E-04	2.50E+02	7E-04	2.80E+03	6E-05	2.70E+07	7E-09	2.50E+02	7E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	9					7.70E-04	3.75E-01		1.10E+03		3.40E+04		1.10E+07		1.10E+03		1.10E+03		2.80E+04		2.50E+07		9.90E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	9	3	6.60E-02	3.09E+01	9.10E+01	8.00E-04	2.20E-01		4.60E+02	2E-01	4.50E+03	2E-02	2.90E+07	3E-06	4.60E+02	2E-01	2.50E+02	4E-01	3.80E+03	2E-02	6.70E+07	1E-06	4.60E+02	2E-01
VOC	1,1,2-Trichloroethane	79-00-5	C	9	1	2.70E-01	2.70E-01	2.70E-01	1.00E-03	3.75E-01		2.40E+01	1E-02	5.70E+01	5E-03	2.50E+05	1E-06	9.20E+02	3E-04	4.60E+00	6E-02	1.70E+01	2E-02	1.90E+05	1E-06	1.80E+02	2E-03
VOC	Trichloroethene	79-01-6	C-B2	9	3	4.30E-02	6.57E-02	9.00E-02	6.60E-04	1.70E-01		3.70E+01	2E-03	2.60E+02	3E-04	2.30E+06	4E-08	5.00E+02	2E-04	7.10E+00	1E-02	7.80E+01	1E-03	1.80E+06	5E-08	5.00E+02	2E-04
VOC	Trichlorofluoromethane	75-69-4		9					9.50E-04	7.50E-01		5.60E+02		1.10E+05		1.70E+09		5.60E+02		5.60E+02		9.20E+04		3.80E+09		5.60E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		9					8.00E-04	3.75E-01		5.50E+02		2.10E+05		2.30E+09		5.50E+02		5.50E+02		1.80E+05		5.10E+09		5.50E+02	
VOC	Vinyl Chloride	75-01-4	A	9	1	1.10E-01	1.10E-01	1.10E-01	1.20E-03	7.50E-01		1.50E-01	7E-01	1.50E+00	7E-02	4.70E+04	2E-06	2.90E+01	4E-03	2.80E-02	**4E+00**	4.40E-01	3E-01	3.70E+04	3E-06	4.00E+00	3E-02
VOC	Xylenes (total)	1330-20-7	D	9	3	3.20E-02	4.61E-01	1.10E+00	1.60E-03	7.50E-01		1.50E+02	7E-03	5.40E+04	2E-05	1.30E+08	8E-09	1.50E+02	7E-03	1.50E+02	7E-03	4.60E+04	2E-05	2.90E+08	4E-09	1.50E+02	7E-03
SVOC	Acenaphthene	83-32-9		9	1	8.30E-02	8.30E-02	8.30E-02	5.80E-02	3.90E-01		3.50E+05	2E-07	9.70E+04	9E-07	6.20E+06	1E-08	2.00E+05	4E-07	1.90E+05	4E-07	8.10E+04	1E-06	1.40E+07	6E-09	4.10E+04	2E-06
SVOC	Acenaphthylene	208-96-8	D	9					5.30E-02	3.90E-01		3.00E+03		2.70E+03		1.00E+06		8.00E+03		1.60E+03		2.20E+03		2.30E+06		1.60E+03	
SVOC	Acetophenone	98-86-2	D	9	1	1.80E-01	1.80E-01	1.80E-01	5.70E-02	3.90E-01		1.10E+03	2E-04	5.20E+04	3E-06	1.40E+07	1E-08	1.10E+03	2E-04	1.10E+03	2E-04	4.40E+04	4E-06	3.30E+07	5E-09	1.10E+03	2E-04
SVOC	Anthracene	120-12-7	D	9					5.60E-02	3.90E-01		1.00E+06		1.60E+06		2.90E+07		1.00E+06		1.00E+06		1.40E+06		6.70E+07		2.30E+05	
SVOC	Atrazine	1912-24-9		9					1.70E-01	3.90E-01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		9					1.90E-01	3.90E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	9	1	7.60E-02	7.60E-02	7.60E-02	6.30E-02	3.90E-01								1.00E+02	8E-04							2.00E+01	4E-03
SVOC	Benzo(a)pyrene	50-32-8	B2	9					6.80E-02	3.90E-01						1.90E+03		1.00E+01						1.50E+03		2.00E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	9					6.60E-02	3.90E-01								1.00E+02								2.00E+01	
SVOC	Benzo(g,h,i)perylene	191-24-2	D	9					6.30E-02	3.90E-01						3.50E+05		9.10E+03						8.00E+05		2.50E+03	
SVOC	Benzo(k)fluoranthene	207-08-9	B2	9					6.00E-02	3.90E-01								1.00E+03								2.00E+02	
SVOC	Biphenyl	92-52-4		9					1.60E-01	3.90E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	9					5.30E-02	3.90E-01																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	9					5.80E-02	3.90E-01		4.40E+01		1.30E+01		1.20E+04		8.90E+01		8.30E+00		3.80E+00		9.40E+03		1.30E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	9	4	2.90E-01	6.20E-01	9.60E-01	6.10E-02	3.80E-01						8.90E+05	1E-06	1.00E+04	1E-04					7.00E+05	1E-06	2.80E+03	3E-04

TABLE 4-15

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	9					6.90E-02	3.90E-01																	
SVOC	Butylbenzylphthalate	85-68-7	C	9					5.80E-02	3.90E-01						2.10E+07		3.10E+02						4.70E+07		3.10E+02	
SVOC	Caprolactam	105-60-2		9					2.00E-01	3.90E-01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	9	1	6.30E-02	6.30E-02	6.30E-02	5.90E-02	3.90E-01								3.70E+03	2E-05							5.30E+02	1E-04
SVOC	4-Chloro-3-methylphenol	59-50-7		9					5.80E-02	3.90E-01								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		9					5.80E-02	1.60E+00																	
SVOC	2-Chloronaphthalene	91-58-7		9					5.50E-02	3.90E-01								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		9					5.90E-02	3.90E-01								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		9					5.90E-02	3.90E-01																	
SVOC	Chrysene	218-01-9	B2	9	1	2.00E-01	2.00E-01	2.00E-01	5.20E-02	3.90E-01								1.00E+04	2E-05							2.00E+03	1E-04
SVOC	Di-n-butylphthalate	84-74-2	D	9					1.70E-01	3.90E-01						1.50E+06		7.60E+02						3.30E+06		7.60E+02	
SVOC	Di-n-octylphthalate	117-84-0		9					6.10E-02	3.90E-01								2.80E+04								6.90E+03	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	9					5.80E-02	3.90E-01								1.00E+01								2.00E+00	
SVOC	Dibenzofuran	132-64-9	D	9	1	8.30E-02	8.30E-02	8.30E-02	5.70E-02	3.90E-01																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	9					4.40E-02	2.40E+00						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		9					5.70E-02	3.90E-01						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	9					1.70E-01	3.90E-01						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		9					9.10E-02	3.90E-01						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	9					1.80E-01	3.90E-01						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		9					1.80E-01	2.00E+00								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		9					1.30E-01	2.00E+00																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	9					5.20E-02	3.90E-01						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	9					5.50E-02	3.90E-01																	
SVOC	Fluoranthene	206-44-0	D	9	1	4.40E-01	4.40E-01	4.40E-01	6.40E-02	3.90E-01		1.00E+06	4E-07	8.90E+05	5E-07	4.10E+06	1E-07	1.80E+05	2E-06	1.00E+06	4E-07	7.40E+05	6E-07	9.30E+06	5E-08	4.60E+04	1E-05
SVOC	Fluorene	86-73-7	D	9	1	8.20E-02	8.20E-02	8.20E-02	5.50E-02	3.90E-01		1.00E+06	8E-08	1.50E+05	5E-07	4.10E+06	2E-08	1.30E+05	6E-07	5.80E+05	1E-07	1.30E+05	6E-07	9.30E+06	9E-09	2.70E+04	3E-06
SVOC	Hexachlorobenzene	118-74-1	B2	9					6.40E-02	3.90E-01		2.20E+02		5.60E+01		8.50E+03		5.10E+01		4.10E+01		1.70E+01		6.80E+03		8.90E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	9					5.10E-02	3.90E-01		3.50E+02		4.60E+02		1.80E+05		3.50E+02		1.30E+02		1.30E+02		1.40E+05		1.00E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	9					6.80E-02	3.90E-01								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	9					5.50E-02	1.20E-01		7.90E+01		6.60E+02		1.00E+05		1.10E+03		4.00E+01		5.50E+02		2.30E+05		2.30E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	9					8.00E-02	3.90E-01								1.00E+02								2.00E+01	
SVOC	Isophorone	78-59-1	C	9					5.00E-02	3.90E-01						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		9	2	1.80E-01	6.40E-01	1.10E+00	5.50E-02	3.80E-01								4.00E+04	3E-05							8.10E+03	1E-04
SVOC	Methylphenol (summed)	1319-77-3		9	1	2.60E-01	2.60E-01	2.60E-01	5.30E-02	3.90E-01						2.90E+06	9E-08	5.60E+04	5E-06					6.70E+06	4E-08	1.10E+04	2E-05
SVOC	Naphthalene	91-20-3	C	9	4	1.20E-01	2.78E-01	6.30E-01	5.60E-02	3.70E-01		4.70E+02	1E-03	3.50E+02	2E-03	8.80E+04	7E-06	8.00E+04	8E-06	2.50E+02	3E-03	3.00E+02	2E-03	2.00E+05	3E-06	1.60E+04	4E-05
SVOC	2-Nitroaniline	88-74-4		9					5.20E-02	2.00E+00																	
SVOC	3-Nitroaniline	99-09-2	C	9					1.60E-01	2.00E+00																	
SVOC	4-Nitroaniline	100-01-6	C	9					7.70E-02	2.00E+00																	
SVOC	Nitrobenzene	98-95-3	D	9					5.20E-02	3.90E-01		4.90E+02		4.60E+03		1.50E+06		4.90E+02		4.90E+02		3.90E+03		3.30E+06		1.00E+02	
SVOC	2-Nitrophenol	88-75-5		9					5.20E-02	3.90E-01								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		9					2.20E-01	2.00E+00																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	9					5.60E-02	3.90E-01								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	9					5.00E-02	3.90E-01						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	9					5.90E-02	3.90E-01																	
SVOC	Pentachlorophenol	87-86-5	B2	9					1.40E-01	4.10E+00						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	9	1	9.50E-01	9.50E-01	9.50E-01	5.90E-02	3.90E-01		5.10E+03	2E-04	1.90E+02	5E-03	2.90E+03	3E-04	8.00E+03	1E-04	2.80E+03	3E-04	1.60E+02	6E-03	6.70E+03	1E-04	1.60E+03	6E-04
SVOC	Phenol	108-95-2	D	9	1	4.50E-01	4.50E-01	4.50E-01	5.60E-02	3.90E-01						1.80E+07	3E-08	1.20E+04	4E-05					4.00E+07	1E-08	1.20E+04	4E-05
SVOC	Pyrene	129-00-0	D	9	1	2.30E-01	2.30E-01	2.30E-01	5.80E-02	3.90E-01		1.00E+06	2E-07	7.80E+05	3E-07	2.90E+06	8E-08	1.10E+05	2E-06	1.00E+06	2E-07	6.50E+05	4E-07	6.70E+06	3E-08	2.90E+04	8E-06
SVOC	2,4,5-Trichlorophenol	95-95-4		9					6.30E-02	3.90E-01						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	9					7.20E-02	3.90E-01						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	9	1	4.50E-02	4.50E-02	4.50E-02	2.30E-02	1.90E-01		1.60E+04	3E-06	8.10E+02	6E-05	6.50E+03	7E-06	2.00E+01	2E-03	3.00E+03	2E-05	2.40E+02	2E-04	5.20E+03	9E-06	4.00E+00	1E-02
INORG	Antimony	7440-36-0		9	1	3.13E-01	3.13E-01	3.13E-01	2.80E-01	2.39E+00						5.90E+03	5E-05	1.20E+03	3E-04					1.30E+04	2E-05	1.80E+02	2E-03
INORG	Arsenic	7440-38-2	A	9	9	1.87E+00	7.60E+00	2.93E+01			1.32E+01					9.10E+02	2E-02	6.10E+01	3E-01					7.20E+02	2E-02	7.60E+00	**2E+00**
INORG	Barium	7440-39-3	D	9	9	6.66E+00	3.06E+01	6.00E+01			1.10E+02					1.50E+05		2.50E+05						3.30E+05		3.70E+04	
INORG	Beryllium	7440-41-7	B1	9	9	1.12E-01	2.39E-01	4.34E-01			1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	9	9	3.55E-02	3.07E-01	1.35E+00			1.20E+00					2.20E+03	7E-05	4.10E+03	4E-05					1.70E+03	9E-05	5.50E+02	3E-04
INORG	Chromium (total)	7440-47-3		9	9	3.51E+00	1.01E+01	1.56E+01			4.92E+01					2.40E+02		1.70E+04						2.60E+02		2.50E+03	
INORG	Cobalt	7440-48-4		9	9	1.87E+00	4.83E+00	7.64E+00			1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	9	9	7.84E+00	2.12E+01	6.50E+01			3.20E+01					5.90E+04	6E-04	1.40E+05	2E-04					1.30E+05	3E-04	2.00E+04	2E-03
INORG	Lead	7439-92-1	B2	9	9	3.67E+00	9.20E+00	3.01E+01			4.92E+01					4.40E+04		9.00E+02						1.00E+05		4.00E+02	
INORG	Manganese	7439-96-5	D	9	9	4.40E+01	2.68E+02	5.82E+02			5.10E+02					1.50E+03	5E-02	1.70E+05	4E-04					3.30E+03	2E-02	2.50E+04	3E-03
INORG	Mercury	7439-97-6	D	9	6	2.57E-02	3.09E-02	3.92E-02	1.01E-02	3.94E-02	1.30E-01							1.10E+03								1.60E+02	
INORG	Nickel	7440-02-0	A	9	9	5.38E+00	1.21E+01	1.81E+01			3.01E+01					1.60E+04		2.70E+05						1.30E+04		4.00E+04	

TABLE 4-15

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (SOIL)

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)	Site Specific Background (mg/kg)	Industrial Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Soil Volatilization to Indoor Air Inhalation Criteria	Industrial Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Industrial Infinite Source Volatile Soil Inhalation Criteria	Industrial Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Industrial Particulate Soil Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Soil Volatilization to Indoor Air Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Soil Volatilization to Indoor Air Inhalation Criteria	Residential Infinite Source Volatile Soil Inhalation Criteria (mg/kg)	Ratio of Max Detects to Residential Infinite Source Volatile Soil Inhalation Criteria	Residential Particulate Soil Inhalation Criteria (mg/kg)	Ratio of Max Detect to Residential Particulate Soil Inhalation Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
INORG	Selenium	7782-49-2	D	9	1	3.72E+00	3.72E+00	3.72E+00	1.76E-01	5.77E-01	4.10E-01					5.90E+04	6E-05	1.80E+04	2E-04					1.30E+05	3E-05	2.60E+03	1E-03
INORG	Silver	7440-22-4	D	9					8.53E-02	5.97E-01						2.90E+03		1.70E+04						6.70E+03		2.50E+03	
INORG	Thallium	7440-28-0		9	3	5.47E-01	7.21E-01	9.01E-01	2.99E-01	1.19E+00								2.40E+02	4E-03							3.50E+01	3E-02
INORG	Vanadium	7440-62-2		9	9	6.49E+00	1.29E+01	2.02E+01			3.28E+01							1.00E+04								7.50E+02	
INORG	Zinc	7440-66-6	D	9	9	2.45E+01	4.06E+01	8.04E+01			4.70E+01							1.00E+06	3E-05							1.70E+05	2E-04

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

TABLE 4-16

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	Acetone	67-64-1	T	D	2					5.10E-04	1.00E-02	1.00E+06		3.10E+04		1.00E+06	
VOC	Benzene	71-43-2	T	A	2					1.60E-04	1.00E-03	3.60E+01		1.10E+01		5.60E+00	
VOC	Bromodichloromethane	75-27-4	T	B2	2					1.70E-04	1.00E-03	3.80E+01		1.40E+01		4.80E+00	
VOC	Bromoform	75-25-2	T	B2	2					1.80E-04	1.00E-03	3.10E+03		1.40E+02		4.80E+02	
VOC	Bromomethane	74-83-9	T	D	2					2.00E-04	1.00E-03	9.00E+00		7.00E+01		4.00E+00	
VOC	2-Butanone	78-93-3	T	D	2					4.10E-04	1.00E-02	2.40E+05		2.40E+05		2.40E+05	
VOC	Carbon Disulfide	75-15-0	T		2					2.00E-04	1.00E-03	5.50E+02		1.20E+03		2.50E+02	
VOC	Carbon Tetrachloride	56-23-5	T	B2	2					1.20E-04	1.00E-03	2.40E+00		4.60E+00		3.70E-01	
VOC	Chlorobenzene	108-90-7	T	D	2					1.40E-04	1.00E-03	4.70E+02		8.60E+01		2.10E+02	
VOC	Chloroethane	75-00-3	T		2					2.60E-04	1.00E-03	5.70E+03		4.40E+02		5.70E+03	
VOC	Chloroform	67-66-3	T	B2	2	1	5.40E-04	5.40E-04	5.40E-04	1.40E-04	1.40E-04	1.80E+02	3E-06	1.50E+02	4E-06	2.80E+01	2E-05
VOC	Chloromethane	74-87-3	T	D	2	1	4.10E-04	4.10E-04	4.10E-04	1.30E-04	1.30E-04	5.20E+01	8E-06	4.90E+02	8E-07	8.60E+00	5E-05
VOC	Cumene	98-82-8	T	D	2					1.20E-04	1.00E-03	5.60E+01		5.60E+01		5.60E+01	
VOC	Cyclohexane	110-82-7	T		2					1.30E-04	1.00E-03						
VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2					6.20E-04	2.00E-03	1.20E+00		3.90E-01		1.20E+00	
VOC	Dibromochloromethane	124-48-1	T	C	2					2.60E-04	1.00E-03	1.10E+02		1.80E+01		1.50E+01	
VOC	1,2-Dibromoethane	106-93-4	T	B2	2					2.20E-04	1.00E-03	1.50E+01		2.50E-02		2.40E+00	
VOC	1,2-Dichlorobenzene	95-50-1	T	D	2					1.10E-04	1.00E-03	1.60E+02		1.60E+02		1.60E+02	
VOC	1,3-Dichlorobenzene	541-73-1	T	D	2					1.50E-04	1.00E-03			2.00E+00			
VOC	1,4-Dichlorobenzene	106-46-7	T	C	2					1.70E-04	1.00E-03	7.40E+01		6.40E+00		1.60E+01	
VOC	Dichlorodifluoromethane	75-71-8	T		2					2.60E-04	2.00E-03	3.00E+02		3.00E+02		2.20E+02	
VOC	1,1-Dichloroethane	75-34-3	T	C	2	2	2.00E-03	4.80E-03	7.60E-03			2.30E+03	3E-06	2.40E+03	3E-06	1.00E+03	8E-06
VOC	1,2-Dichloroethane	107-06-2	T	B2	2					2.10E-04	1.00E-03	5.90E+01		1.90E+01		9.60E+00	
VOC	1,1-Dichloroethene	75-35-4	T	C	2					2.40E-04	1.00E-03	1.30E+00		1.10E+01		2.00E-01	
VOC	cis-1,2-Dichloroethene	156-59-2	T	D	2					2.20E-04	5.00E-04	2.20E+02		2.00E+02		9.60E+01	
VOC	trans-1,2-Dichloroethene	156-60-5	T		2					1.50E-04	5.00E-04	2.00E+02		2.20E+02		8.50E+01	
VOC	1,2-Dichloropropane	78-87-5	T	B2	2					1.70E-04	1.00E-03	3.60E+01		1.60E+01		1.60E+01	
VOC	1,3-Dichloropropene (summed)	542-75-6	T	B2	2					2.70E-04	1.00E-03	1.30E-02		1.30E+01		2.00E-03	
VOC	Ethyl Benzene	100-41-4	T	D	2					1.20E-04	1.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	2-Hexanone	591-78-6	T		2					4.60E-04	1.00E-02	8.80E+03		5.20E+03		4.20E+03	
VOC	Methyl Acetate	79-20-9	T		2					4.10E-04	1.00E-02						
VOC	Methyl tert-butyl ether	1634-04-4	T		2					1.30E-04	5.00E-03	4.70E+04		6.90E+02		4.70E+04	
VOC	4-Methyl-2-pentanone	108-10-1	T		2					2.30E-04	1.00E-02	2.00E+04		1.30E+04		2.00E+04	
VOC	Methylcyclohexane	108-87-2	T		2					1.50E-04	1.00E-03						
VOC	Methylene Chloride	75-09-2	T	B2	2					3.40E-04	1.00E-03	1.40E+03		2.20E+02		2.20E+02	
VOC	Styrene	100-42-5	T		2					1.50E-04	1.00E-03	3.10E+02		9.70E+00		1.70E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2					2.50E-04	1.00E-03	7.70E+01		4.70E+00		1.20E+01	
VOC	Tetrachloroethene	127-18-4	T	C-B2	2	1	2.80E-04	2.80E-04	2.80E-04	2.30E-04	2.30E-04	1.70E+02	2E-06	1.20E+01	2E-05	2.50E+01	1E-05
VOC	Toluene	108-88-3	T	D	2	2	2.90E-04	3.25E-04	3.60E-04			5.30E+02	7E-07	5.30E+02	7E-07	5.30E+02	7E-07
VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2					1.70E-04	1.00E-03	3.00E+02		1.90E+01		3.00E+02	
VOC	1,1,1-Trichloroethane	71-55-6	T	D	2	1	6.10E-04	6.10E-04	6.10E-04	1.00E-03	1.00E-03	1.30E+03	5E-07	1.30E+03	5E-07	6.60E+02	9E-07

TABLE 4-16

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
VOC	1,1,2-Trichloroethane	79-00-5	T	C	2					3.00E-04	1.00E-03	1.10E+02		2.10E+01		1.70E+01	
VOC	Trichloroethene	79-01-6	T	C-B2	2					1.40E-04	1.00E-03	9.70E+01		3.70E+01		1.50E+01	
VOC	Trichlorofluoromethane	75-69-4	T		2					2.80E-04	1.00E-03	1.10E+03		1.10E+03		1.10E+03	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2					3.20E-04	1.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	Vinyl Chloride	75-01-4	T	A	2					1.50E-04	1.00E-03	6.90E-01		5.70E-01		1.10E-01	
VOC	Xylenes (total)	1330-20-7	T	D	2	1	6.40E-04	6.40E-04	6.40E-04	1.00E-03	1.00E-03	1.90E+02	3E-06	1.90E+02	3E-06	1.90E+02	3E-06
SVOC	Acenaphthene	83-32-9	T		2					8.00E-04	5.00E-03	4.20E+00		4.20E+00		4.20E+00	
SVOC	Acenaphthylene	208-96-8	T	D	2					7.10E-04	5.00E-03	3.90E+00		3.90E+00		3.90E+00	
SVOC	Acetophenone	98-86-2	T	D	2					2.60E-03	1.00E-02	6.10E+03		6.10E+03		6.10E+03	
SVOC	Anthracene	120-12-7	T	D	2					6.80E-04	5.00E-03	4.30E-02		4.30E-02		4.30E-02	
SVOC	Atrazine	1912-24-9	T		2					2.50E-03	5.00E-03			5.40E+00			
SVOC	Benzaldehyde	100-52-7	T		2					2.80E-03	1.00E-02						
SVOC	Benzo(a)anthracene	56-55-3	T	B2	2					7.00E-04	5.00E-03			9.40E-03			
SVOC	Benzo(a)pyrene	50-32-8	T	B2	2					7.30E-04	5.00E-03			5.00E-03			
SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2					9.40E-04	5.00E-03			2.00E-03			
SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2					8.50E-04	5.00E-03			5.00E-03			
SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2					8.40E-04	5.00E-03			5.00E-03			
SVOC	Biphenyl	92-52-4	T		2					2.60E-03	1.00E-02						
SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2					8.70E-04	5.00E-03						
SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2					9.70E-04	5.00E-03	2.10E+02		5.70E+00		3.80E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2					2.70E-03	5.00E-03			3.20E-01			
SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2					8.80E-04	5.00E-03						
SVOC	Butylbenzylphthalate	85-68-7	T	C	2					8.80E-04	5.00E-03			2.70E+00			
SVOC	Caprolactam	105-60-2	T		2					2.50E-03	1.00E-02			3.90E+05			
SVOC	Carbazole	86-74-8	T	B2	2					8.20E-04	1.00E-02			7.40E+00			
SVOC	4-Chloro-3-methylphenol	59-50-7	T		2					9.90E-04	5.00E-03			7.90E+01			
SVOC	4-Chloroaniline	106-47-8	T		2					6.10E-04	1.00E-02						
SVOC	2-Chloronaphthalene	91-58-7	T		2					8.50E-04	5.00E-03			6.70E+00			
SVOC	2-Chlorophenol	95-57-8	T		2					1.00E-03	5.00E-03			9.40E+01			
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2					7.90E-04	5.00E-03						
SVOC	Chrysene	218-01-9	T	B2	2					7.50E-04	5.00E-03			5.00E-03			
SVOC	Di-n-butylphthalate	84-74-2	T	D	2					6.70E-04	5.00E-03			1.10E+01			
SVOC	Di-n-octylphthalate	117-84-0	T		2					1.10E-03	5.00E-03			4.00E-01			
SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2					7.90E-04	5.00E-03			5.00E-03			
SVOC	Dibenzofuran	132-64-9	T	D	2					1.10E-03	5.00E-03						
SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	2					9.30E-04	2.00E-02			1.80E-01			
SVOC	2,4-Dichlorophenol	120-83-2	T		2					8.50E-04	1.00E-02			4.80E+01			
SVOC	Diethylphthalate	84-66-2	T	D	2					6.50E-04	5.00E-03			1.10E+03			
SVOC	2,4-Dimethylphenol	105-67-9	T		2					8.50E-04	5.00E-03			5.20E+02			
SVOC	Dimethylphthalate	131-11-3	T	D	2					7.60E-04	5.00E-03			4.20E+03			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2					1.30E-03	2.00E-02			9.50E+00			

TABLE 4-16

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
SVOC	2,4-Dinitrophenol	51-28-5	T		2					3.00E-03	2.00E-02						
SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2					7.90E-04	5.00E-03			8.60E+00			
SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2					5.70E-04	5.00E-03						
SVOC	Fluoranthene	206-44-0	T	D	2					8.10E-04	5.00E-03	2.10E-01		2.10E-01		2.10E-01	
SVOC	Fluorene	86-73-7	T	D	2					1.00E-03	5.00E-03	2.00E+00		2.00E+00		2.00E+00	
SVOC	Hexachlorobenzene	118-74-1	T	B2	2					7.40E-04	5.00E-03	3.00E+00		4.60E-03		4.40E-01	
SVOC	Hexachlorobutadiene	87-68-3	T	C	2					7.30E-04	5.00E-03	3.20E+00		4.00E-01		1.60E+00	
SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	2					1.10E-03	5.00E-03			1.80E+00			
SVOC	Hexachloroethane	67-72-1	T	C	2					7.40E-04	5.00E-03	5.00E+01		1.90E+00		2.70E+01	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2					6.30E-04	5.00E-03			5.00E-03			
SVOC	Isophorone	78-59-1	T	C	2					6.30E-04	5.00E-03			9.90E+02			
SVOC	2-Methylnaphthalene	91-57-6	T		2					6.40E-04	5.00E-03			2.50E+01			
SVOC	Methylphenol (summed)	1319-77-3	T		2					1.30E-03	5.00E-03			8.10E+02			
SVOC	Naphthalene	91-20-3	T	C	2					7.50E-04	5.00E-03	3.10E+01		3.10E+01		3.10E+01	
SVOC	2-Nitroaniline	88-74-4	T		2					7.00E-04	2.00E-02						
SVOC	3-Nitroaniline	99-09-2	T	C	2					7.10E-04	2.00E-02						
SVOC	4-Nitroaniline	100-01-6	T	C	2					1.30E-03	2.00E-02						
SVOC	Nitrobenzene	98-95-3	T	D	2					8.10E-04	5.00E-03	2.10E+03		1.10E+01		2.10E+03	
SVOC	2-Nitrophenol	88-75-5	T		2					2.10E-03	5.00E-03			7.90E+01			
SVOC	4-Nitrophenol	100-02-7	T		2					1.90E-03	2.00E-02						
SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2					1.40E-03	5.00E-03			3.50E+01			
SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2					6.70E-04	5.00E-03			3.60E-01			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2					7.80E-04	5.00E-03						
SVOC	Pentachlorophenol	87-86-5	T	B2	2					2.40E-03	5.00E-03			2.00E-01			
SVOC	Phenanthrene	85-01-8	T	D	2					8.20E-04	5.00E-03	1.00E+00		1.00E+00		1.00E+00	
SVOC	Phenol	108-95-2	T	D	2					2.60E-03	5.00E-03			2.90E+04			
SVOC	Pyrene	129-00-0	T	D	2					1.10E-03	5.00E-03	1.40E-01		1.40E-01		1.40E-01	
SVOC	2,4,5-Trichlorophenol	95-95-4	T		2					1.20E-03	5.00E-03			1.70E+02			
SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2					1.70E-03	5.00E-03			1.00E+01			
P/PCB	PCBs (summed)	1336-36-3	D	B2	1					2.00E-04	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
P/PCB	PCBs (summed)	1336-36-3	T	B2	2					8.20E-05	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
INORG	Antimony	7440-36-0	D		2					2.20E-03	2.50E-02			6.80E+01			
INORG	Antimony	7440-36-0	T		2					2.20E-03	2.50E-02			6.80E+01			
INORG	Arsenic	7440-38-2	D	A	2					3.90E-03	1.00E-02			4.30E+00			
INORG	Arsenic	7440-38-2	T	A	2					3.90E-03	1.00E-02			4.30E+00			
INORG	Barium	7440-39-3	D	D	2	2	1.78E-02	1.96E-02	2.14E-02					1.40E+04	2E-06		
INORG	Barium	7440-39-3	T	D	2	2	1.81E-02	1.98E-02	2.15E-02					1.40E+04	2E-06		
INORG	Beryllium	7440-41-7	D	B1	2					5.40E-04	1.00E-03			2.90E+02			
INORG	Beryllium	7440-41-7	T	B1	2					5.40E-04	1.00E-03			2.90E+02			
INORG	Cadmium	7440-43-9	D	B1	2					2.80E-04	5.00E-03			1.90E+02			
INORG	Cadmium	7440-43-9	T	B1	2	1	4.10E-04	4.10E-04	4.10E-04	5.00E-03	5.00E-03			1.90E+02	2E-06		

TABLE 4-16

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

DATA SUMMARY FOR AOI F-15 (GROUNDWATER)

Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Industrial GW Volatilization to Indoor Air	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria	Residential GW Volatilization to Indoor Air (mg/L)	Ratio of Max Detect to Residential GW Volatilization to Indoor Air
INORG	Chromium (total)	7440-47-3	D		2					1.40E-03	1.00E-02			4.60E+02			
INORG	Chromium (total)	7440-47-3	T		2					1.40E-03	1.00E-02			4.60E+02			
INORG	Cobalt	7440-48-4	D		2					1.30E-03	2.00E-02			2.40E+03			
INORG	Cobalt	7440-48-4	T		2	2	1.60E-03	1.65E-03	1.70E-03					2.40E+03	7E-07		
INORG	Copper	7440-50-8	D	D	2					4.20E-03	5.00E-03			7.40E+03			
INORG	Copper	7440-50-8	T	D	2					4.20E-03	5.00E-03			7.40E+03			
INORG	Lead	7439-92-1	D	B2	2					2.50E-03	3.00E-03						
INORG	Lead	7439-92-1	T	B2	2					2.50E-03	3.00E-03						
INORG	Manganese	7439-96-5	D	D	2	2	3.99E-01	5.16E-01	6.33E-01					9.10E+03	7E-05		
INORG	Manganese	7439-96-5	T	D	2	2	3.93E-01	5.25E-01	6.57E-01					9.10E+03	7E-05		
INORG	Mercury	7439-97-6	D	D	2					6.90E-05	2.00E-04			5.60E-02			
INORG	Mercury	7439-97-6	T	D	2					6.90E-05	2.00E-04			5.60E-02			
INORG	Nickel	7440-02-0	D	A	2	1	6.60E-03	6.60E-03	6.60E-03	2.00E-02	2.00E-02			7.40E+04	9E-08		
INORG	Nickel	7440-02-0	T	A	2	2	2.80E-03	5.10E-03	7.40E-03					7.40E+04	1E-07		
INORG	Selenium	7782-49-2	D	D	2					4.50E-03	5.00E-03			9.70E+02			
INORG	Selenium	7782-49-2	T	D	2					4.50E-03	5.00E-03			9.70E+02			
INORG	Silver	7440-22-4	D	D	2					1.50E-03	5.00E-03			1.50E+03			
INORG	Silver	7440-22-4	T	D	2					1.50E-03	5.00E-03			1.50E+03			
INORG	Thallium	7440-28-0	D		2	1	6.40E-05	6.40E-05	6.40E-05	1.00E-02	1.00E-02			1.30E+01	5E-06		
INORG	Thallium	7440-28-0	T		2	1	5.40E-05	5.40E-05	5.40E-05	1.00E-02	1.00E-02			1.30E+01	4E-06		
INORG	Vanadium	7440-62-2	D		2					8.20E-04	1.00E-02			9.70E+02			
INORG	Vanadium	7440-62-2	T		2					8.20E-04	1.00E-02			9.70E+02			
INORG	Zinc	7440-66-6	D	D	2					1.20E-02	2.00E-02			1.10E+05			
INORG	Zinc	7440-66-6	T	D	2					1.20E-02	2.00E-02			1.10E+05			

Notes:

1. Chem Group - Chemical Group
2. Carc Class - Carcinogen Class; Weight-of-Evidence Characterization
3. Min QL - Minimum Quantitation Limit
4. Max QL - Maximum Quantitation Limit
5. Screening Criteria is from Michigan DEQ Part 201.
6. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
7. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
8. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
9. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
10. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
11. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.

Table 5-4

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

RCRA FACILITY INVESTIGATION

ESTIMATED CUMULATIVE CANCER RISK AND HI FOR AOIs WITH "CONTAMINATED" SOIL - BASED ON MAXIMUM CONCENTRATIONS

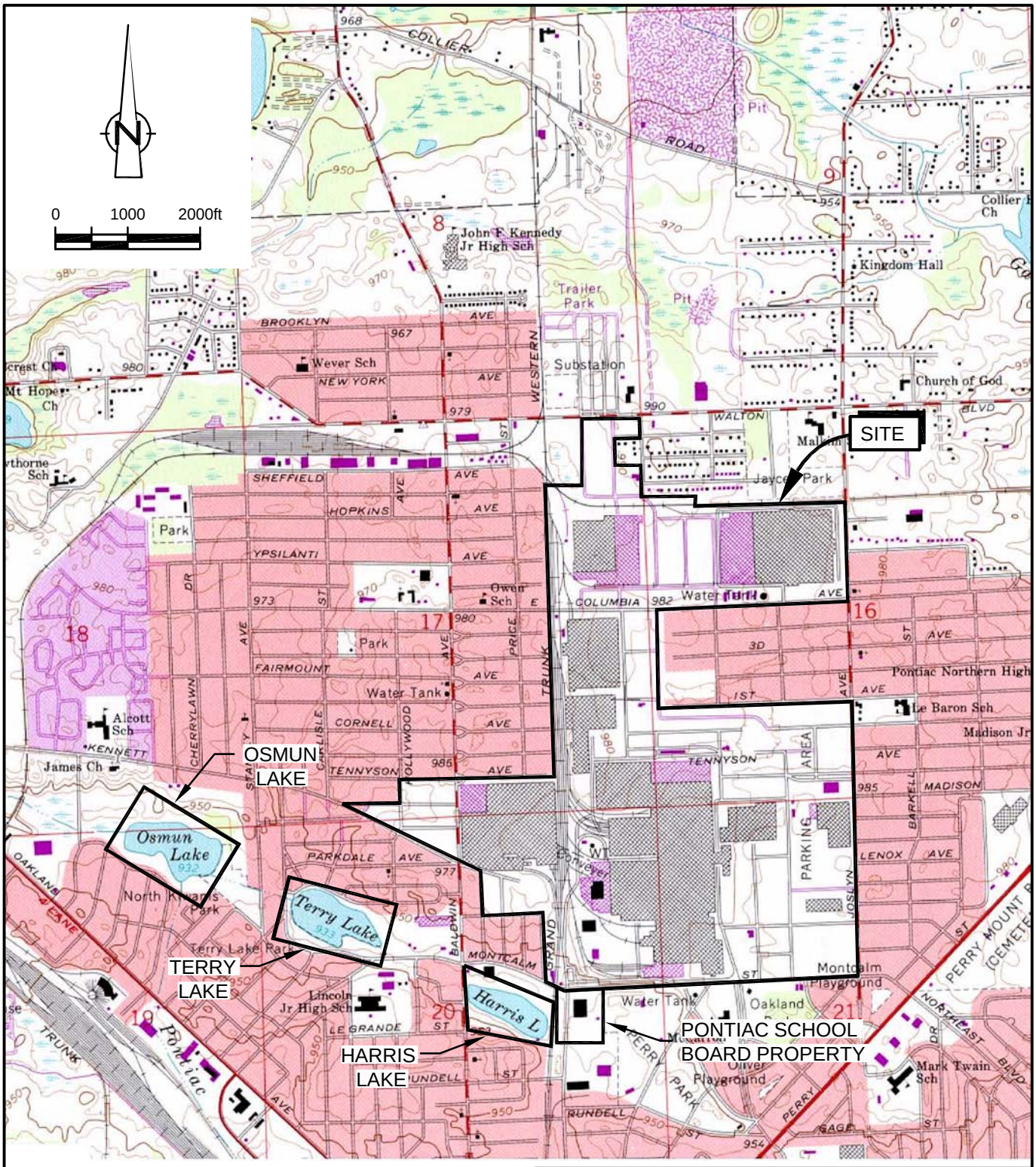
AOI	Cumulative Risk	HI
F-07	1E-05	3E-01
F-15	3E-05	2E-01
M-01	**1E-04**	**7E+00**
M-02	2E-05	**2E+00**
M-05	6E-06	2E-01
M-19	3E-05	**1E+00**
W-01	**2E-04**	**1E+01**
W-05	3E-05	**2E+00**
W-08	2E-05	5E-01
W-09	**4E-04**	**3E+01**
W-10	2E-05	**1E+00**

Table 5-5

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
RCRA FACILITY INVESTIGATION
ESTIMATED CUMULATIVE CANCER RISK HI FOR AOIs WITH "CONTAMINATED" SOILS - BASED ON MAXIMUM CONCENTRATIONS AND 95% UCLs

AOI	Cumulative Risk	HI
M-01	2E-05	5E-01
M-02	2E-05	5E-01
M-19	2E-05	7E-01
W-01	3E-05	1E+00
W-05	2E-05	6E-01
W-09	3E-05	7E-01
W-10	1E-05	4E-01

Figures



SOURCE: USGS QUADRANGLE MAP;
PONTIAC NORTH, MICHIGAN

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

SITE LOCATION

ENCORE

FIGURE
1-1

17487-17(001)GN-WA010 APR 08/2002

Operational Area	Facility Reference Number
CPC Pontiac Fiero Assembly Plant	MID005356910
GMC Central Foundry Division-Pontiac Plant	MID085470102
CPC-Pontiac	MID005356886
GMC Warehousing and Distribution Division	MID076331289

N

0 400 800ft

LEGEND

- PROPERTY BOUNDARY
- RAILROAD TRACKS
- FENCE
- FACILITY BOUNDARY
- FOOTPRINT OF FORMER STRUCTURE

CPC PONTIAC FIERO ASSEMBLY PLANT
PLANT 17
(MID005356910)

CPC-PONTIAC PLANT
(MID005356886)

GMC CENTRAL FOUNDRY DIVISION - PONTIAC PLANT
(MID085470102)

GMC WAREHOUSING AND DISTRIBUTION DIVISION
(MID076331289)

BALDWIN AVENUE

MONTCALM STREET EAST

COLUMBIA AVENUE EAST

WALTON BLVD.

JOSLYN AVENUE

MONTCALM

PLANT 12

PLANT 15

PLANT 25

PLANT 33

PLANT 5 & 23

PLANT 49

PLANT 11

FORMER PLANT 8

FORMER PLANT 9

FORMER PLANT 6

FORMER PLANT 18

PLANT 56 (OLD PLT 2)

POWER TRAIN HQ BLDG

POWERTRAIN ENGINEERING

EMISSIONS CONTROL BUILDING

ELPO BLDG

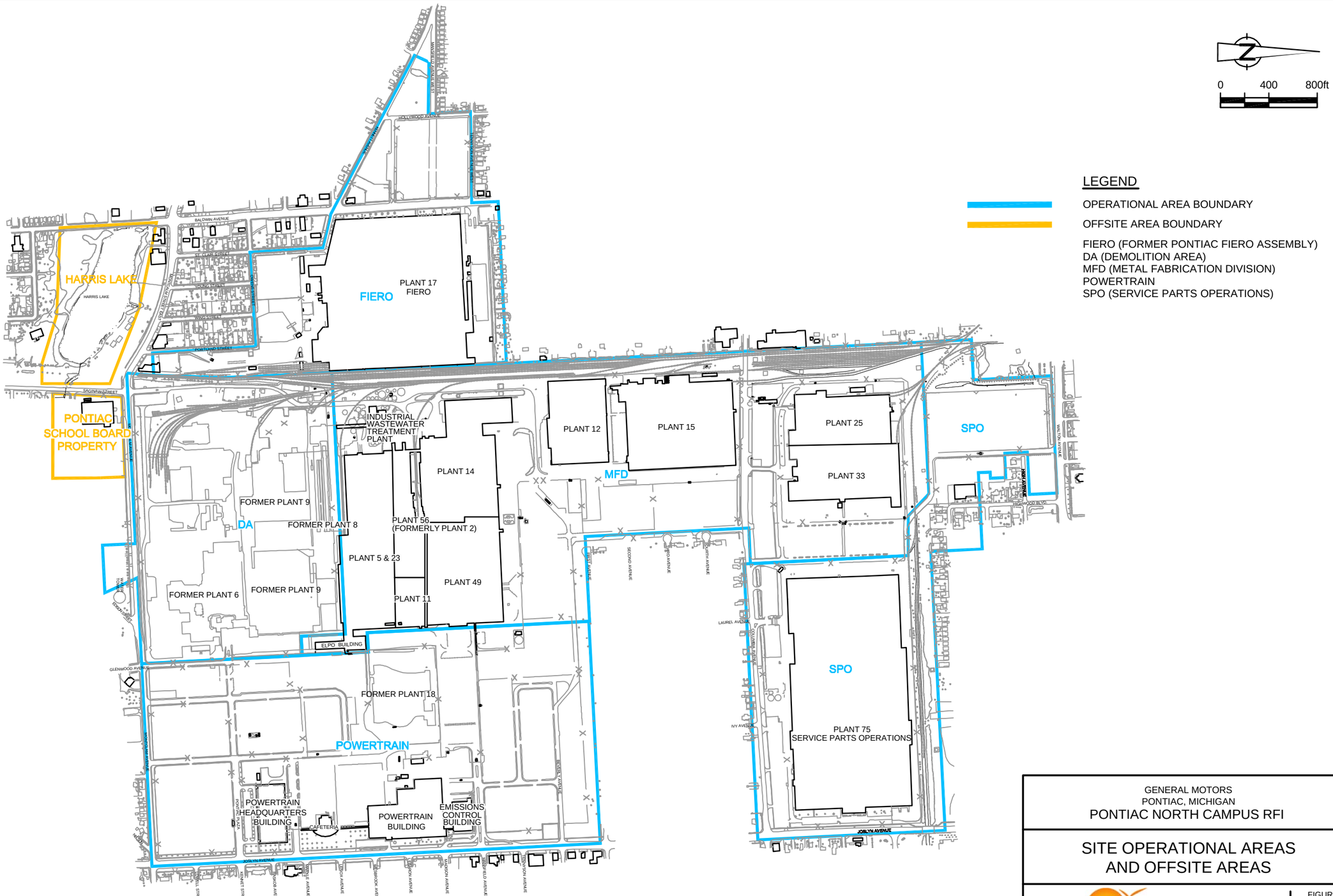
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

SITE FACILITIES

ENCORE

FIGURE
1-2

17487-17(001)GN-WA016 APR 24/2002



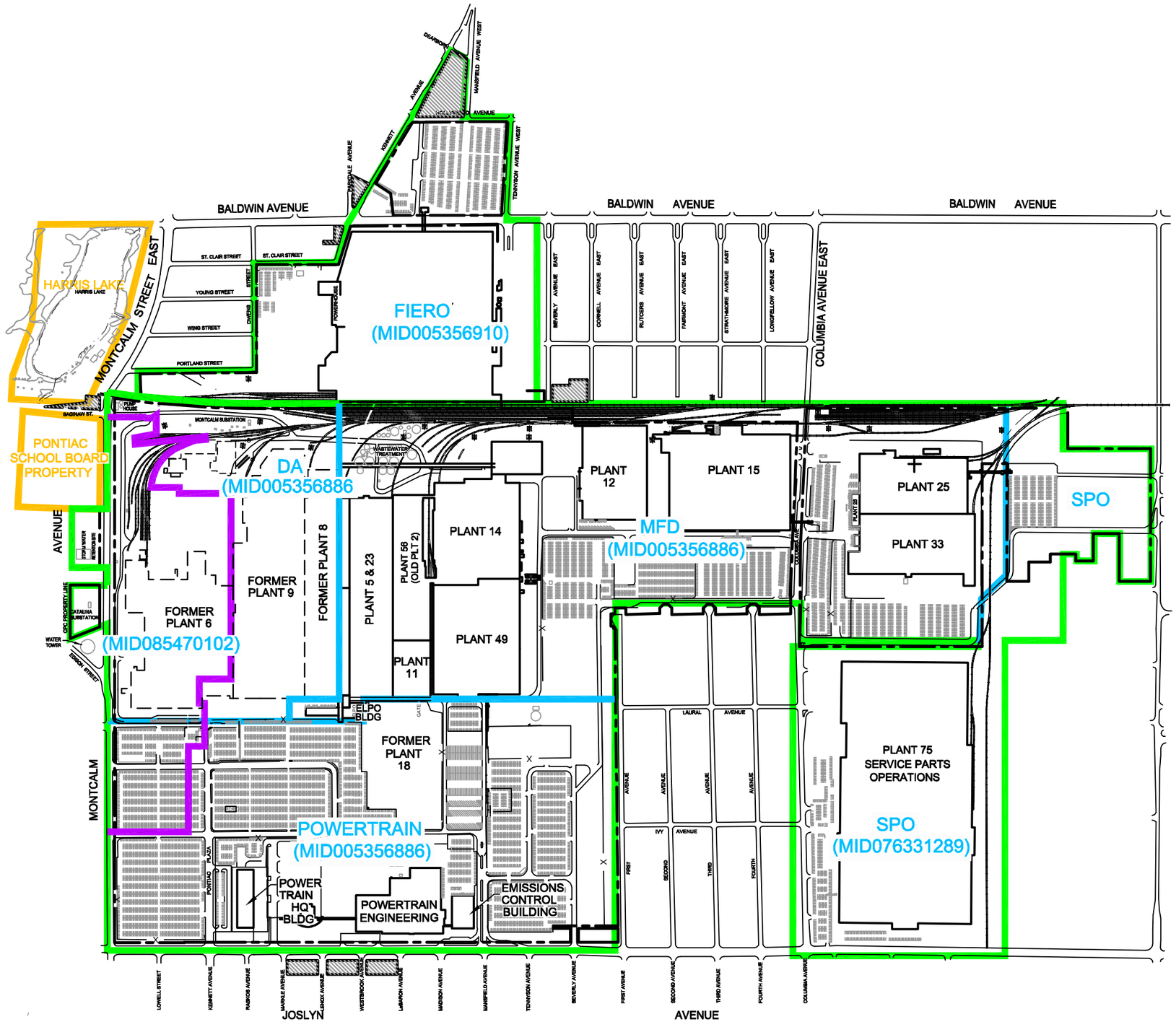
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

SITE OPERATIONAL AREAS
AND OFFSITE AREAS

ENCORE

FIGURE
1-3

17487-17(001)GN-WA008 APR 24/2002



0 400 800ft

LEGEND

- FOOTPRINT OF FORMER STRUCTURE
- PROPERTY BOUNDARY
- RAILROAD TRACKS
- FENCE
- OPERATIONAL AREA BOUNDARY
- FACILITY BOUNDARY
- COMMON OPERATIONAL AREA AND FACILITY BOUNDARY
- OFFSITE AREA BOUNDARY

FIERO (FORMER PONTIAC FIERO ASSEMBLY)
DA (DEMOLITION AREA)
MFD (METAL FABRICATION DIVISION)
POWERTRAIN
SPO (SERVICE PARTS OPERATIONS)

Operational Area	Facility USEPA ID Number
Fiero	MID005356910
Demolition Area (DA)	MID005356886
	MID085470102
Metal Fabrication Division (MFD)	MID005356886
Powertrain	MID005356886
	MID085470102
Service Parts Operations (SPO)	MID076331289

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

SUMMARY OF SITE
OPERATIONAL AREAS AND FACILITIES

ENCORE

FIGURE
1-4

17487-17(001)GN-WA017 APR 24/2002

General Motors Corp.
Pontiac, Michigan

Pontiac- North Campus RFI

Areas of Interest and Offsite Areas

ENCORE

Figure
2-1

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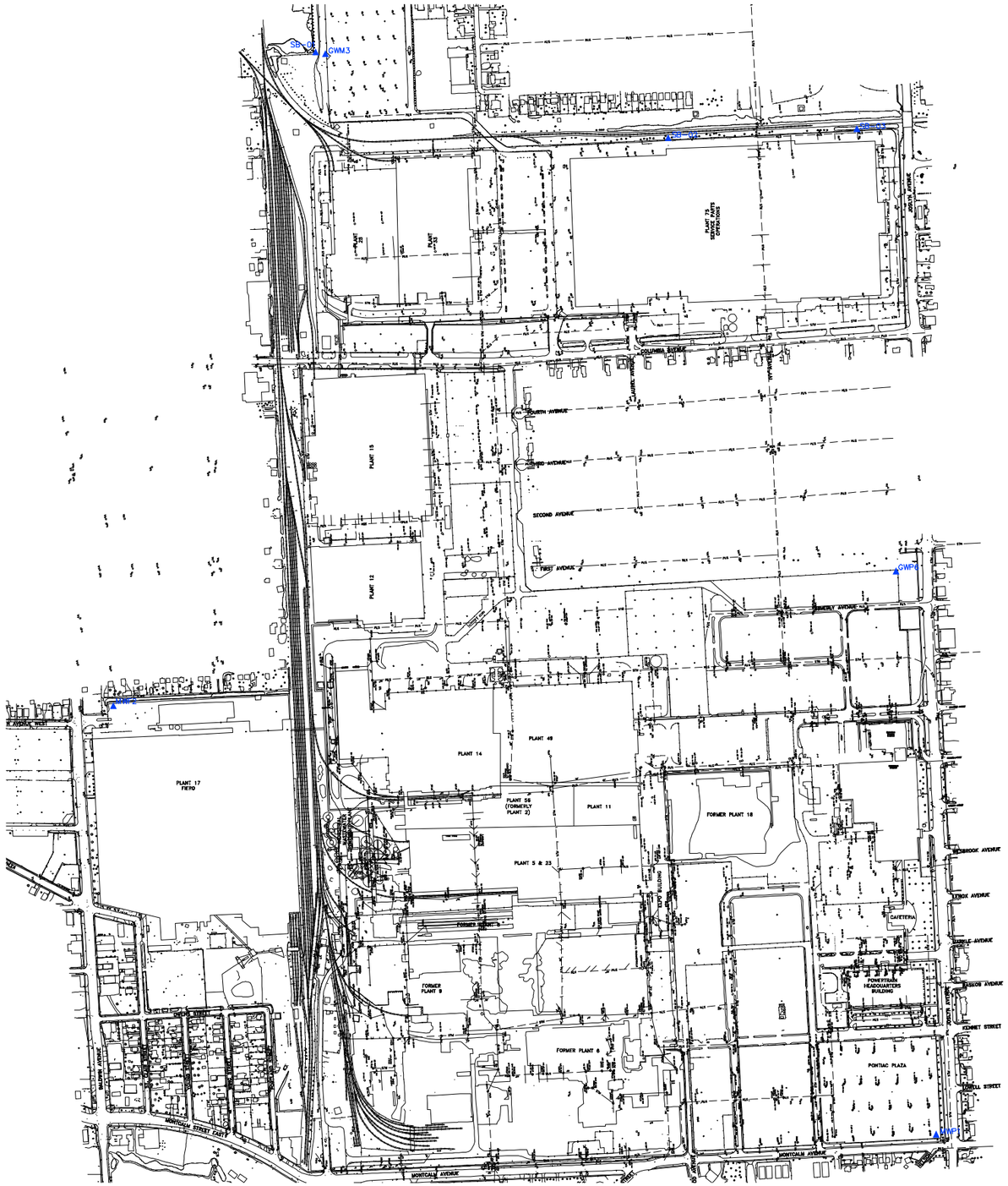


LEGEND:

BM5-02 ▲ SOIL BORING SAMPLE LOCATION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 400' 800'
GRAPHIC SCALE

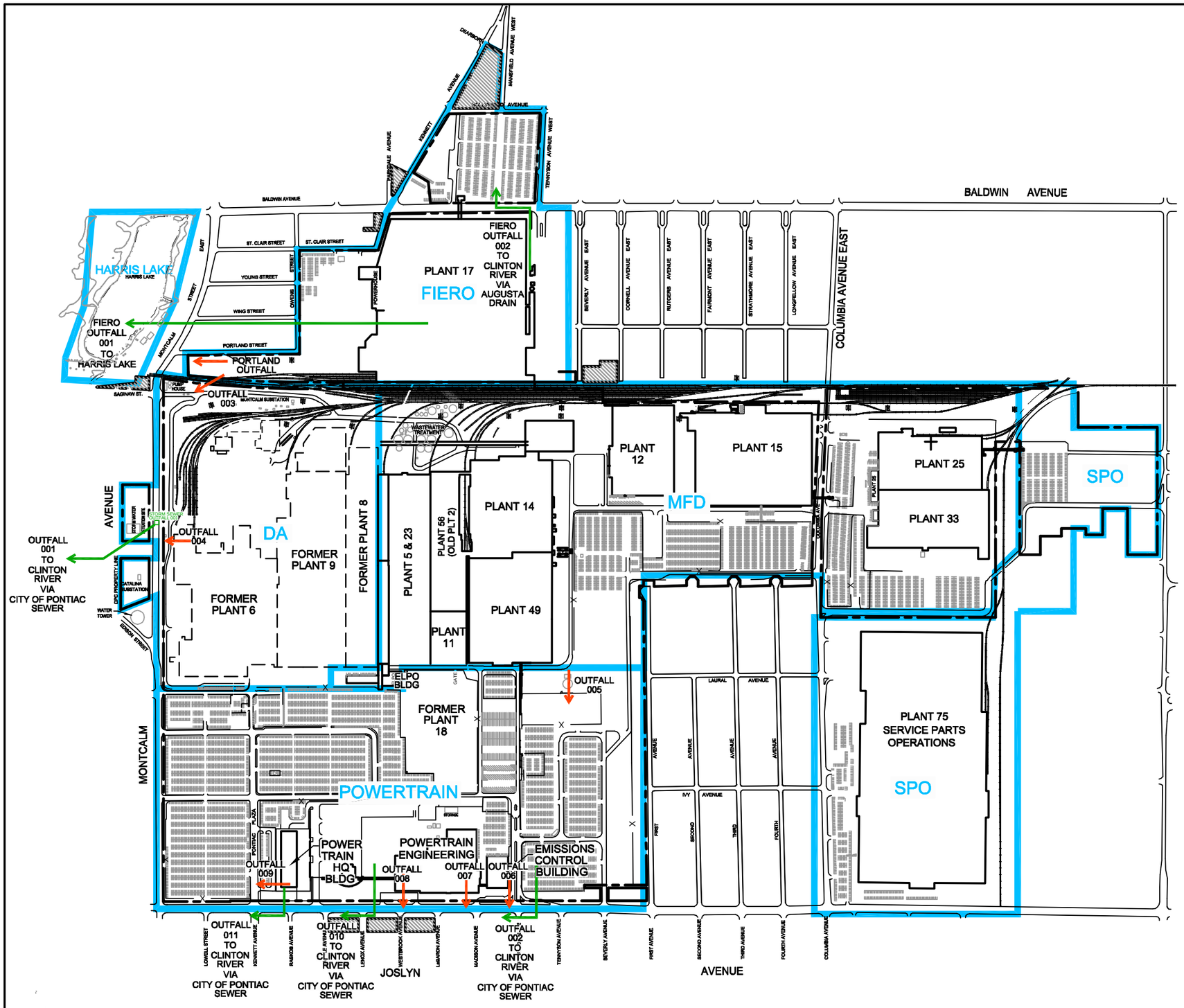
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

BACKGROUND SOIL SAMPLE LOCATIONS

ENCORE

FIGURE 2-2

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
4/25/02 SYR-54-GMS NES DJP
64411210/64411C51.DWG



LEGEND

- FOOTPRINT OF FORMER STRUCTURE
- PROPERTY BOUNDARY
- RAILROAD TRACKS
- FENCE
- AREA BOUNDARY
- STORM SEWER OUTFALL
- SANITARY SEWER OUTFALL

FIERO (FORMER PONTIAC FIERO ASSEMBLY)
DA (DEMOLITION AREA)
MFD (METAL FABRICATION DIVISION)
POWERTRAIN
SPO (SERVICE PARTS OPERATIONS)

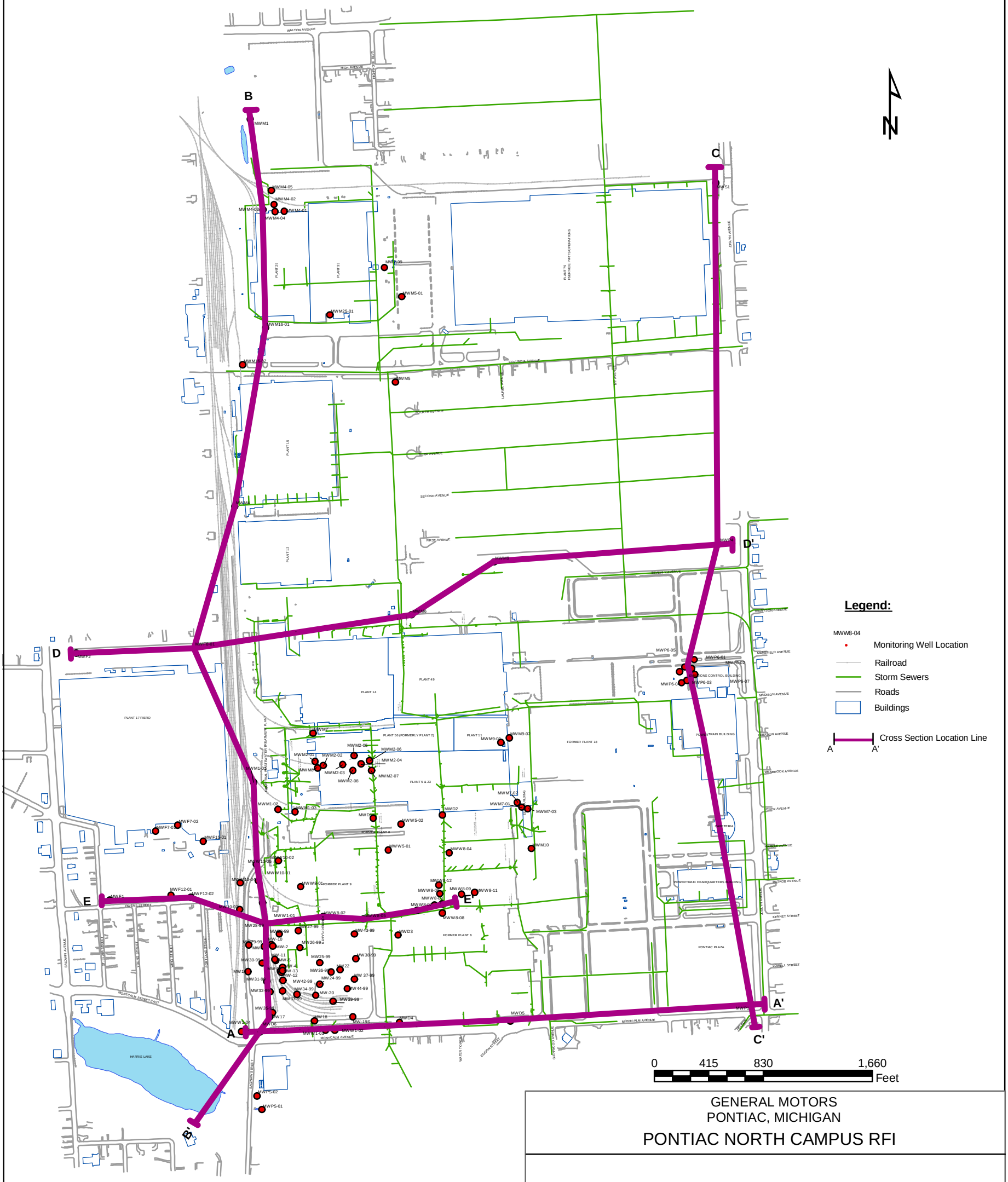
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

STORM & SANITARY SEWER OUTFALLS

ENCORE

FIGURE 3-5

17487-17(001)GN-WA011 APR 08/2002



GENERAL MOTORS
PONTIAC, MICHIGAN

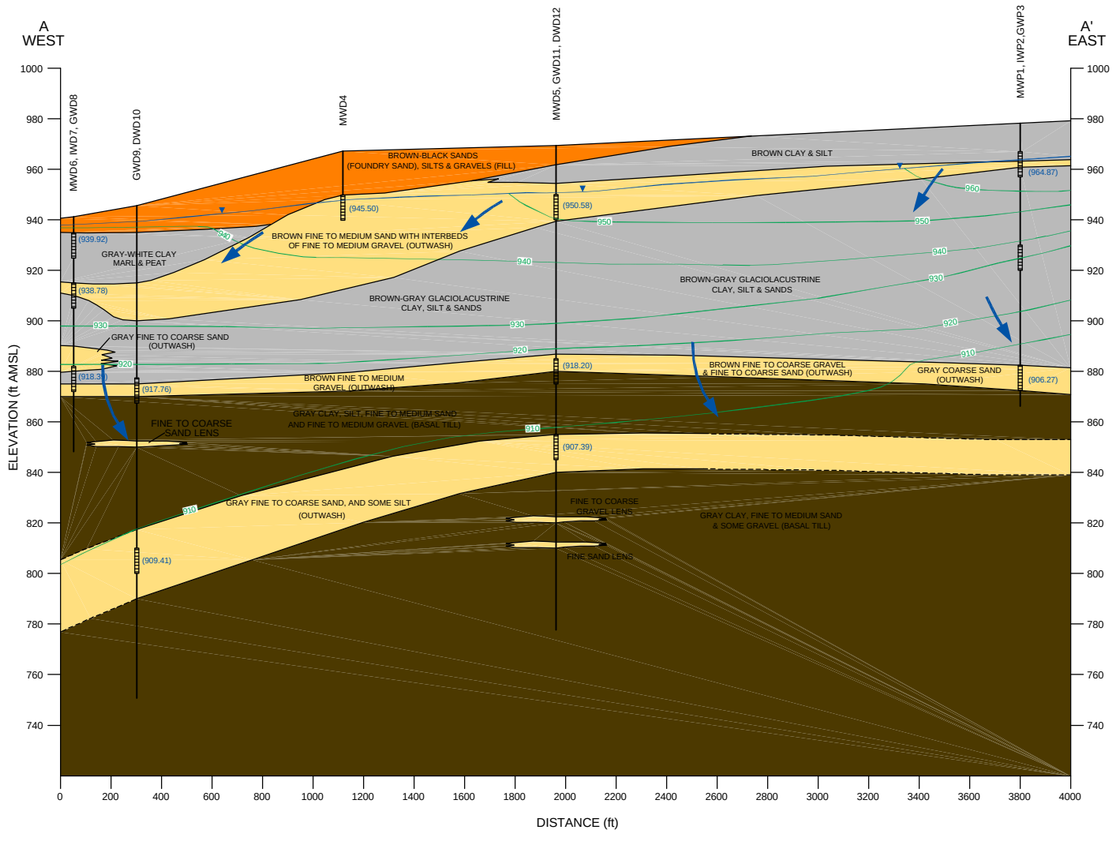
PONTIAC NORTH CAMPUS RFI

GEOLOGIC CROSS-SECTION LOCATION MAP

q:\pontiac\PontiacCrossSection.mxd

ENCORE

FIGURE
3-6



LEGEND

MWD4 — WELL OR BOREHOLE NAME

GROUND SURFACE

CLAY — STRATIGRAPHIC DESCRIPTION

(945.50) — WELL SCREEN
WATER LEVEL, FEB 7 & 8, 2002

GROUNDWATER TABLE

910 — GROUNDWATER EQUIPOTENTIAL

GROUNDWATER FLOW DIRECTION

NOTE: FOR MULTIPLE WELLS AT A SINGLE WELL CLUSTER, CLUSTER IS REPRESENTED AS A SINGLE VERTICAL LINE WITH MULTIPLE SCREEN INTERVALS.

HORIZONTAL SCALE
0 100 300ft

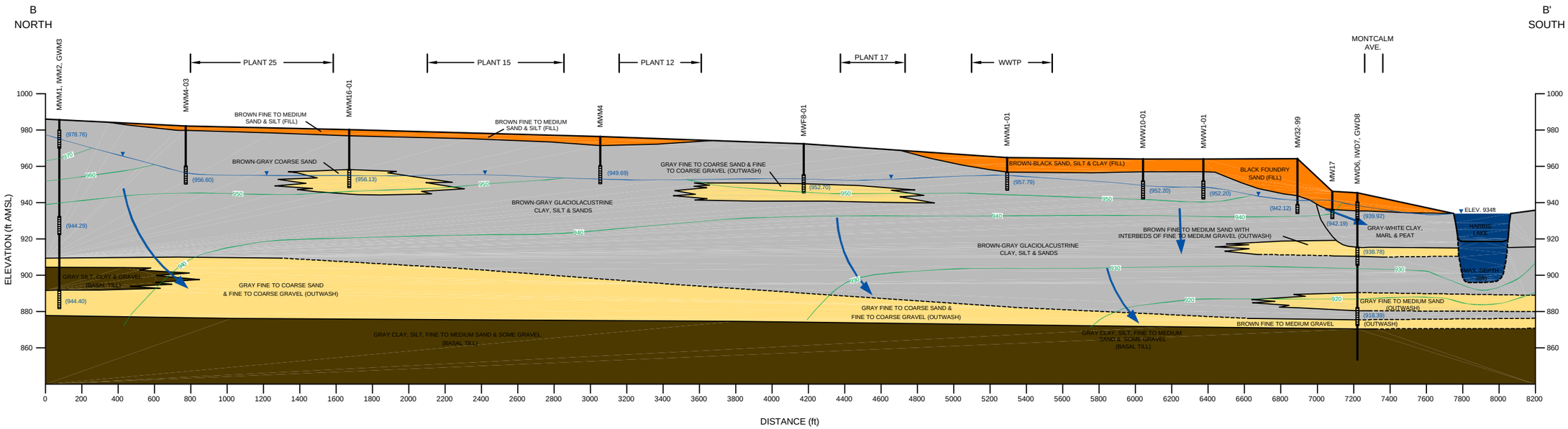
VERTICAL SCALE
0 10 30ft

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

HYDROGEOLOGIC CROSS-SECTION A-A'

ENCORE

FIGURE
3-7



LEGEND

- MWD4 — WELL OR BOREHOLE NAME
- GROUND SURFACE
- CLAY — STRATIGRAPHIC DESCRIPTION
- WELL SCREEN
- (945.50) — WATER LEVEL, FEB 7 & 8, 2002
- GROUNDWATER TABLE
- 910 — GROUNDWATER EQUIPOTENTIAL
- GROUNDWATER FLOW DIRECTION

NOTE: FOR MULTIPLE WELLS AT A SINGLE WELL CLUSTER, CLUSTER IS REPRESENTED AS A SINGLE VERTICAL LINE WITH MULTIPLE SCREEN INTERVALS.

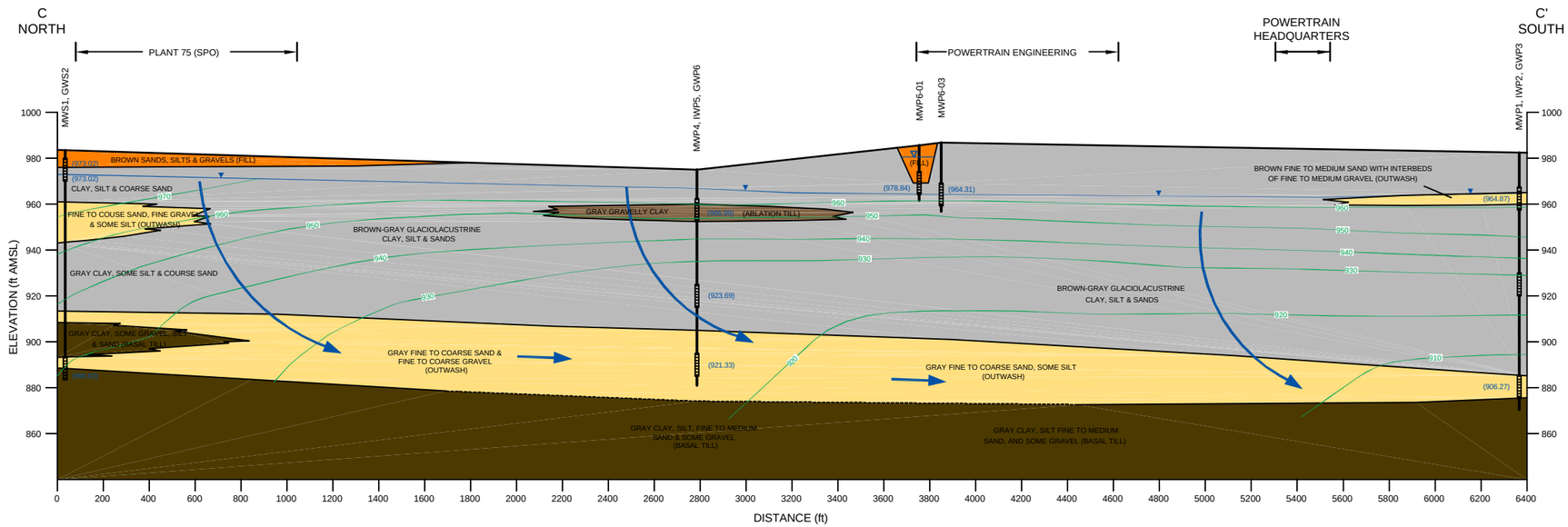
HORIZONTAL SCALE
0 100 300ft
0 10 30ft
VERTICAL SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

HYDROGEOLOGIC CROSS-SECTION B-B'

ENCORE

FIGURE
3-8



LEGEND

- MWD4 — WELL OR BOREHOLE NAME
- GROUND SURFACE
- CLAY — STRATIGRAPHIC DESCRIPTION
- (945.50) — WELL SCREEN WATER LEVEL, FEB 7 & 8, 2002
- GROUNDWATER TABLE
- 910 — GROUNDWATER EQUIPOTENTIAL
- GROUNDWATER FLOW DIRECTION
- PERCHED GROUNDWATER

NOTE: FOR MULTIPLE WELLS AT A SINGLE WELL CLUSTER, CLUSTER IS REPRESENTED AS A SINGLE VERTICAL LINE WITH MULTIPLE SCREEN INTERVALS.

HORIZONTAL SCALE
0 100 300ft
0 10 30ft
VERTICAL SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

HYDROGEOLOGIC CROSS-SECTION C-C'

ENCORE

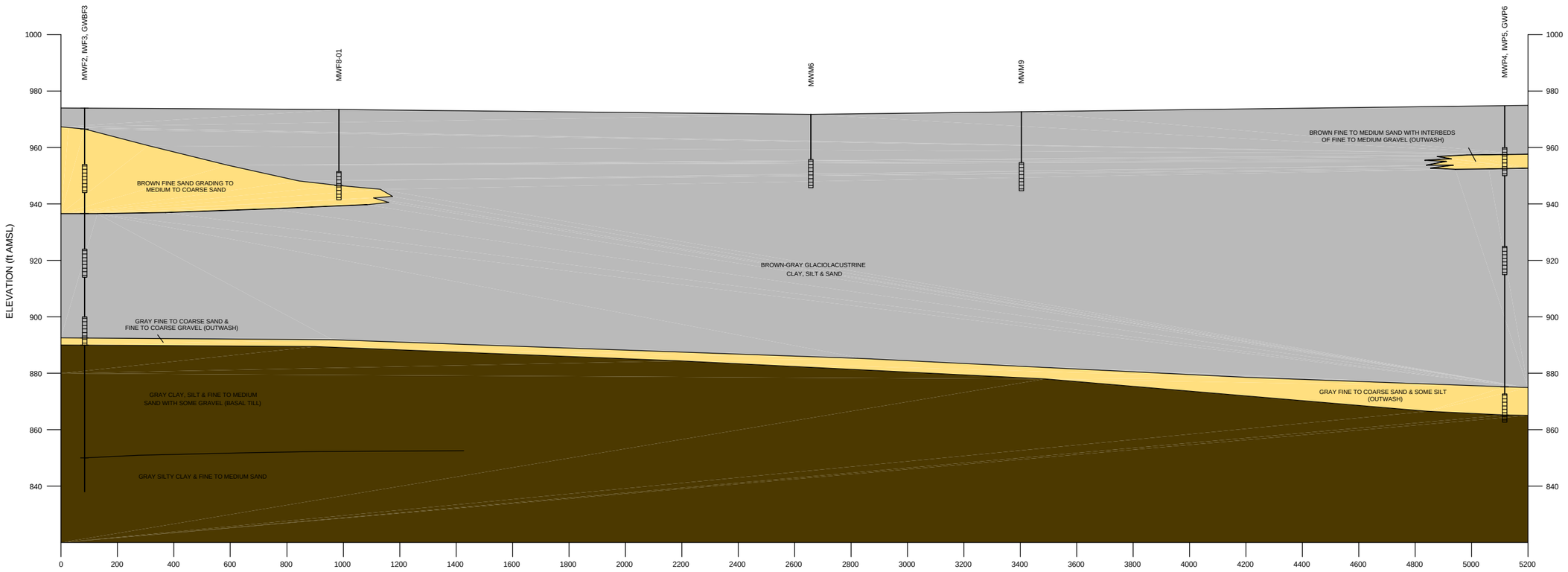
FIGURE
3-9

D

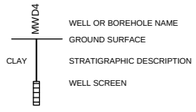
WEST

D'

EAST



LEGEND



NOTE: FOR MULTIPLE WELLS AT A SINGLE WELL CLUSTER, CLUSTER IS REPRESENTED AS A SINGLE VERTICAL LINE WITH MULTIPLE SCREEN INTERVALS.

HORIZONTAL SCALE

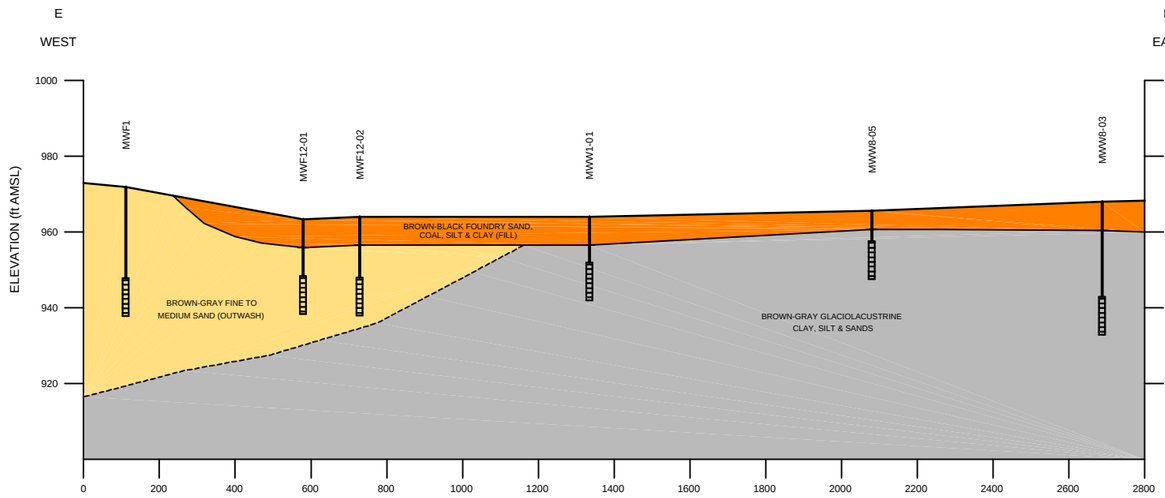
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

GEOLOGIC CROSS-SECTION D-D'

ENCORE

FIGURE
3-10

17487-17(001)GN-WA003 APR 10/2002



LEGEND

MWD4 — WELL OR BOREHOLE NAME

GROUND SURFACE

CLAY — STRATIGRAPHIC DESCRIPTION

WELL SCREEN

NOTE: FOR MULTIPLE WELLS AT A SINGLE WELL CLUSTER, CLUSTER IS REPRESENTED AS A SINGLE VERTICAL LINE WITH MULTIPLE SCREEN INTERVALS.

HORIZONTAL SCALE

0 100 200ft

VERTICAL SCALE

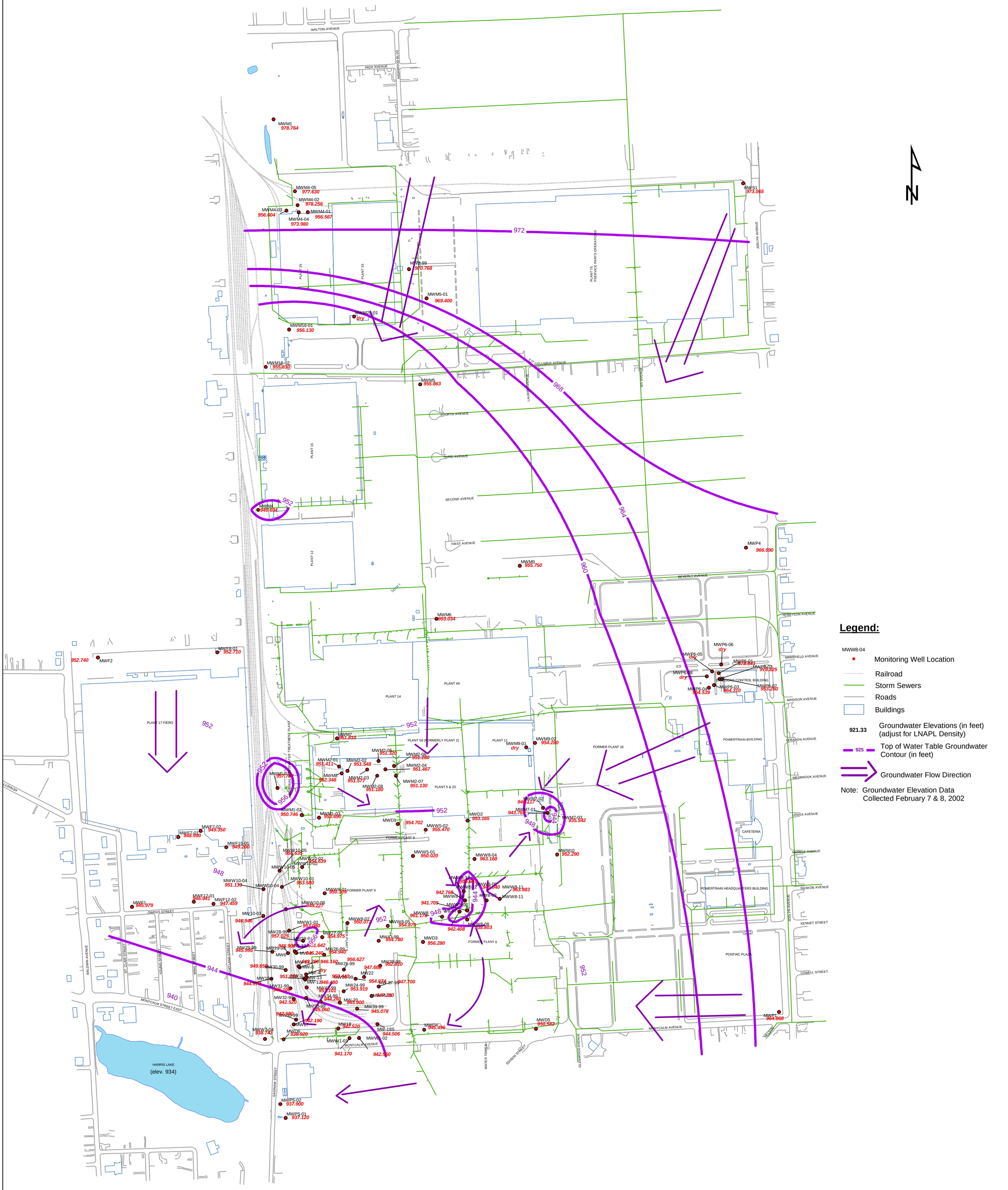
0 10 20ft

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

GEOLOGIC CROSS-SECTION E-E'

ENCORE

FIGURE
3-11



Legend:

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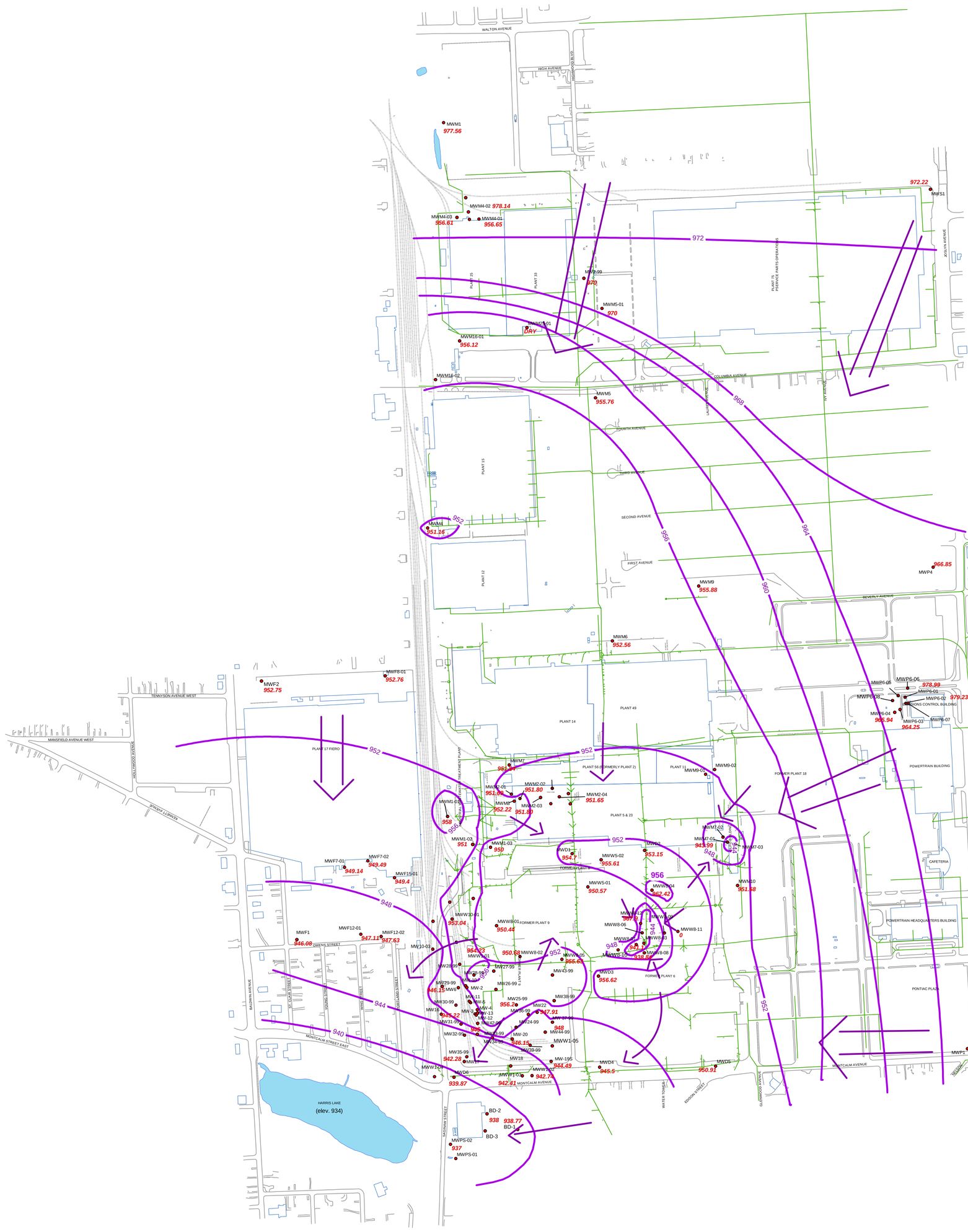
GENERAL MOTORS
PONTIAC, MICHIGAN

PONTIAC NORTH CAMPUS RFI

WATER TABLE GROUNDWATER CONTOURS

ENCORE

FIGURE
3-12



Legend:

- GW12-01 — Monitoring Wells
- Railroad
- Storm Sewers
- Roads
- Buildings
- 925 — Top of Water Table Groundwater Contour (in feet)
- Ground Water Flow Direction

0 625 1,250 2,500 Feet

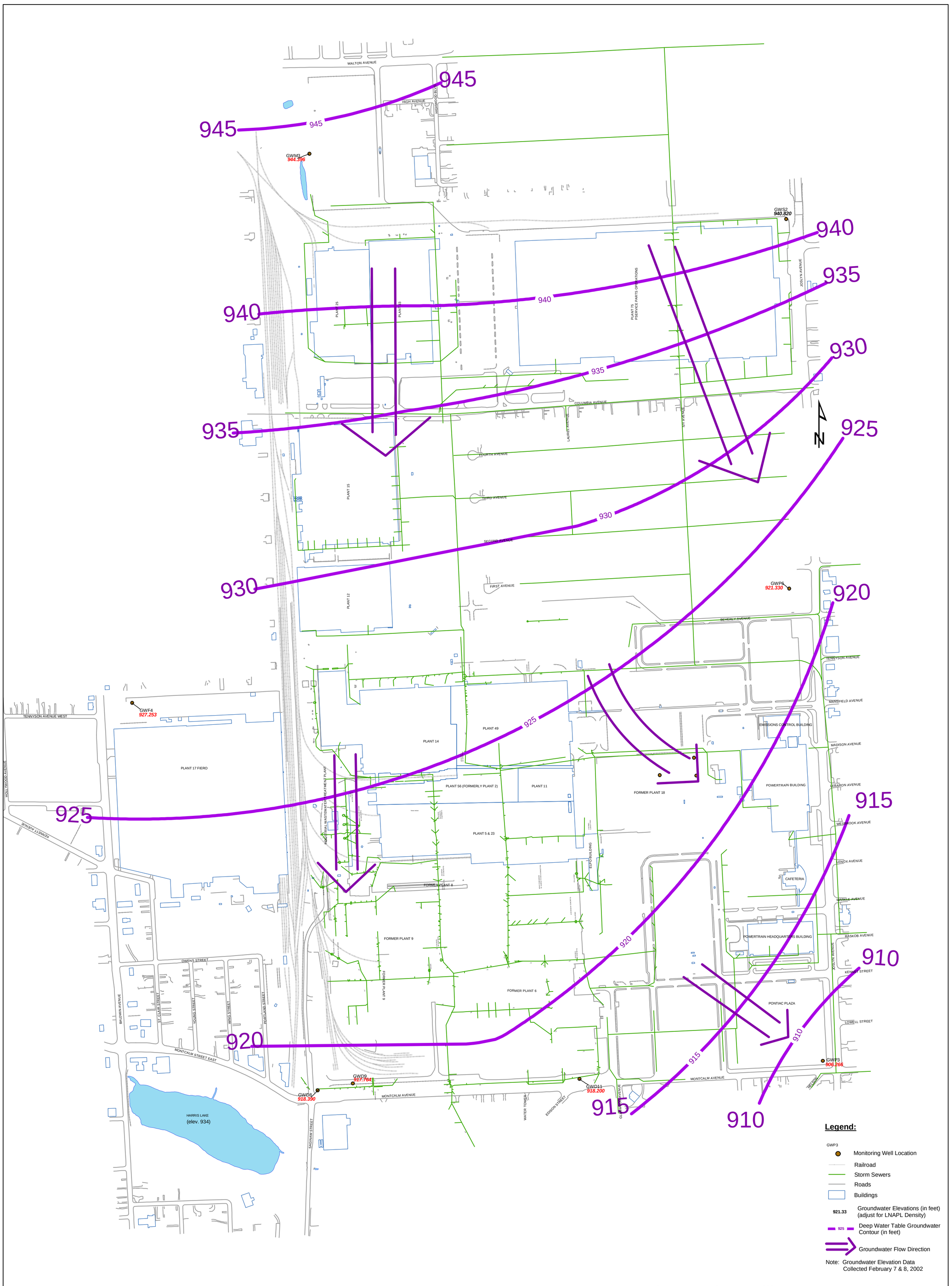
g:\pontiac\mxd\PontiacGWElevationJan2002.mxd
g:\pontiac\PrintFiles\Jan_GWData.pdf

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS RFI

WATER TABLE GROUNDWATER CONTOURS JANUARY 2002

ENCORE

FIGURE
3-12B



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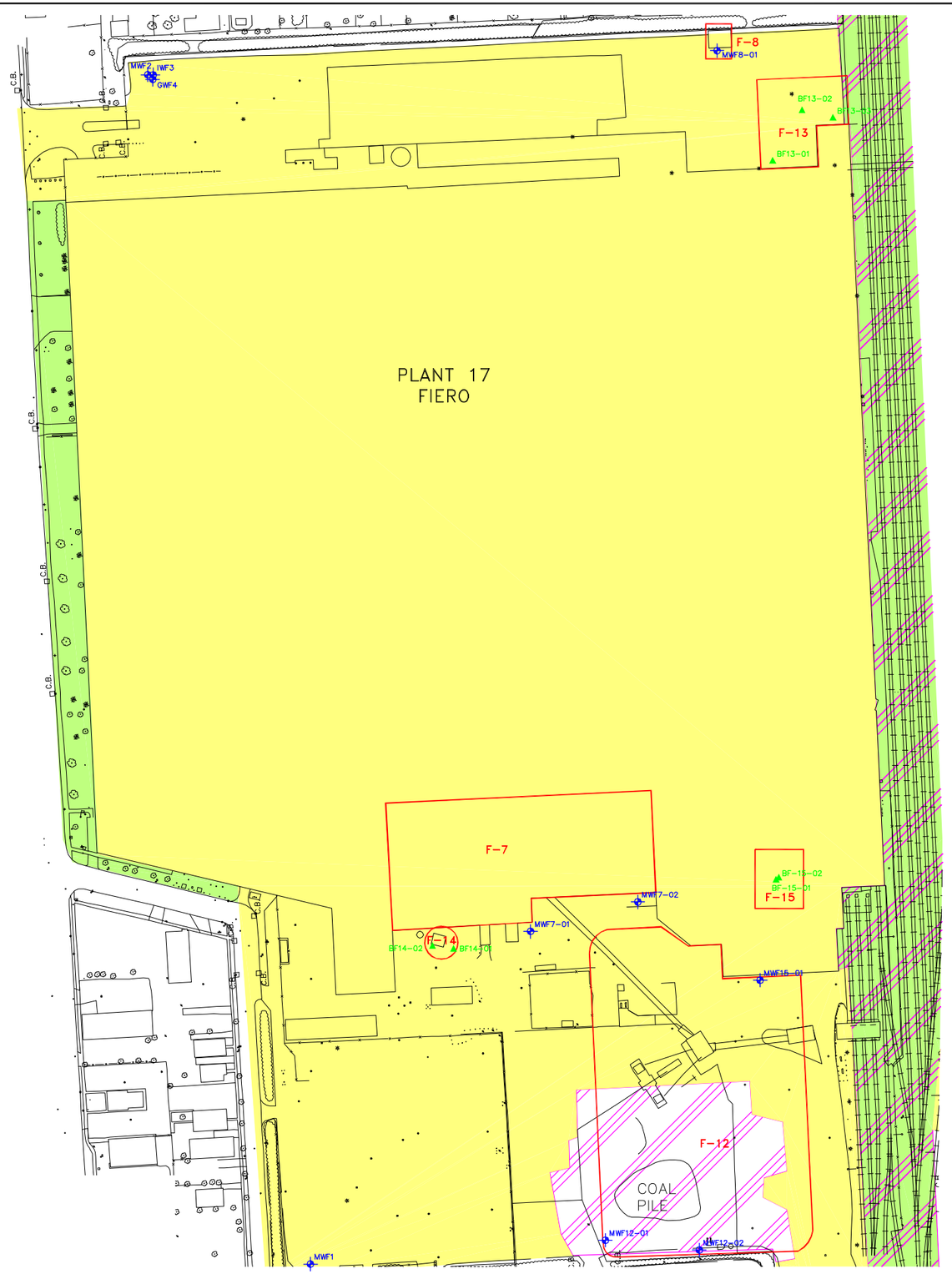
GENERAL MOTORS
PONTIAC, MICHIGAN

PONTIAC NORTH CAMPUS RFI

POTENTIOMETRIC SURFACE
UPPER OUTWASH DEPOSITS

ENCORE

FIGURE
3-13



LEGEND:

- MWM16-02 — MONITORING WELL SAMPLE LOCATION
- BM5-02 — SOIL BORING SAMPLE LOCATION
- SM23-03 — SURFACE SOIL SAMPLE LOCATION
- SDHS-21 — SEDIMENT SAMPLE LOCATION
- SWHS-07 — SURFACE WATER SAMPLE LOCATION
- APPROXIMATE AOI AREA

F-7 = POWERHOUSE BASEMENT SUMPS
F-8 = FORMER PAINT SLUDGE PAD
F-12 = COAL STORAGE AREA
F-13 = OILY PEA GRAVEL AREA
F-14 = FUEL UST
F-15 = OIL/SOLVENT PIT

- GRASS/SOIL/WEEDS
- CONCRETE/ASPHALT
- GRAVEL

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

REVISED 7/31/02

0 100' 200'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

FIERO
SAMPLE LOCATIONS AND GROUND COVER

ENCORE

FIGURE
4-1

X: 64411X0D, X01.DWG, X04.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
8/1/02 SYR-54-GMS GMS LJP
64411210/64411C48.DWG

SB-01	
Depth(ft)	0–2
1,1–Dichloroethene	NA
Benzene	NA
Tetrachloroethene	NA
Vinyl chloride	NA
Benzo(a)anthracene	NA
Benzo(a)pyrene	NA
Benzo(b)fluoranthene	NA
Butyl benzylphthalate	NA
Dibenz(a,h)anthracene	NA
Indeno(1,2,3–cd)pyrene	NA
Antimony	ND(2.18)
Arsenic	3.86
Chromium (total)	11.5
Chromium (III)	NA
Chromium (VI)	NA
Cyanide (total)	NA
Iron	NA
Lead	7.7
Manganese	272
PCBs (total)	NA
2,3,7,8–TCDD (TEQ)	NA

GWM3		
Depth(ft)	0–2	8–10
1,1–Dichloroethene	ND(0.0017)	ND(0.0012)
Benzene	ND(0.00092)	ND(0.00063)
Tetrachloroethene	ND(0.0017)	ND(0.0012)
Vinyl chloride	ND(0.002)	ND(0.0014)
Benzo(a)anthracene	ND(0.059)	ND(0.061)
Benzo(a)pyrene	0.076 J	ND(0.067)
Benzo(b)fluoranthene	0.11 J	ND(0.065)
Butyl benzylphthalate	ND(0.055)	ND(0.057)
Dibenz(a,h)anthracene	ND(0.055)	ND(0.057)
Indeno(1,2,3–cd)pyrene	ND(0.075)	ND(0.078)
Antimony	ND(0.527)	ND(0.546)
Arsenic	3.88	3.97
Chromium (total)	10.3	9.67
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Iron	NA	NA
Lead	15.5	5.58
Manganese	216	348
PCBs (total)	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA

MWM1	
Depth(ft)	5–7
1,1–Dichloroethene	ND(0.0016)
Benzene	ND(0.00088)
Tetrachloroethene	ND(0.0016)
Vinyl chloride	ND(0.0019)
Benzo(a)anthracene	ND(0.063)
Benzo(a)pyrene	ND(0.068)
Benzo(b)fluoranthene	ND(0.066)
Butyl benzylphthalate	ND(0.058)
Dibenz(a,h)anthracene	ND(0.058)
Indeno(1,2,3–cd)pyrene	ND(0.08)
Antimony	ND(0.559)
Arsenic	3.13
Chromium (total)	12.2
Chromium (III)	NA
Chromium (VI)	NA
Cyanide (total)	NA
Iron	NA
Lead	12.3
Manganese	256
PCBs (total)	NA
2,3,7,8–TCDD (TEQ)	NA

MWM5			
Depth(ft)	0–2	8–10	24–26
1,1–Dichloroethene	ND(0.0011)	ND(0.00099)	ND(0.0013)
Benzene	ND(0.00062)	ND(0.00054)	ND(0.00073)
Tetrachloroethene	ND(0.0011)	ND(0.00099)	ND(0.0013)
Vinyl chloride	ND(0.0013)	ND(0.0012)	ND(0.0016)
Benzo(a)anthracene	ND(0.064)	ND(0.061)	ND(0.057)
Benzo(a)pyrene	ND(0.069)	ND(0.066)	ND(0.062)
Benzo(b)fluoranthene	ND(0.067)	ND(0.064)	ND(0.06)
Butyl benzylphthalate	ND(0.059)	ND(0.056)	ND(0.053)
Dibenz(a,h)anthracene	ND(0.059)	ND(0.056)	ND(0.053)
Indeno(1,2,3–cd)pyrene	ND(0.081)	ND(0.077)	ND(0.073)
Antimony	ND(0.567)	ND(0.542)	ND(0.509)
Arsenic	5.46	2.83	1.18
Chromium (total)	6.3	7.43	4.05
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	5.99	3.88	2.09
Manganese	128	235	81.8
PCBs (total)	ND (0.038)	ND (0.036)	ND (0.034)
2,3,7,8–TCDD (TEQ)	NA	NA	NA

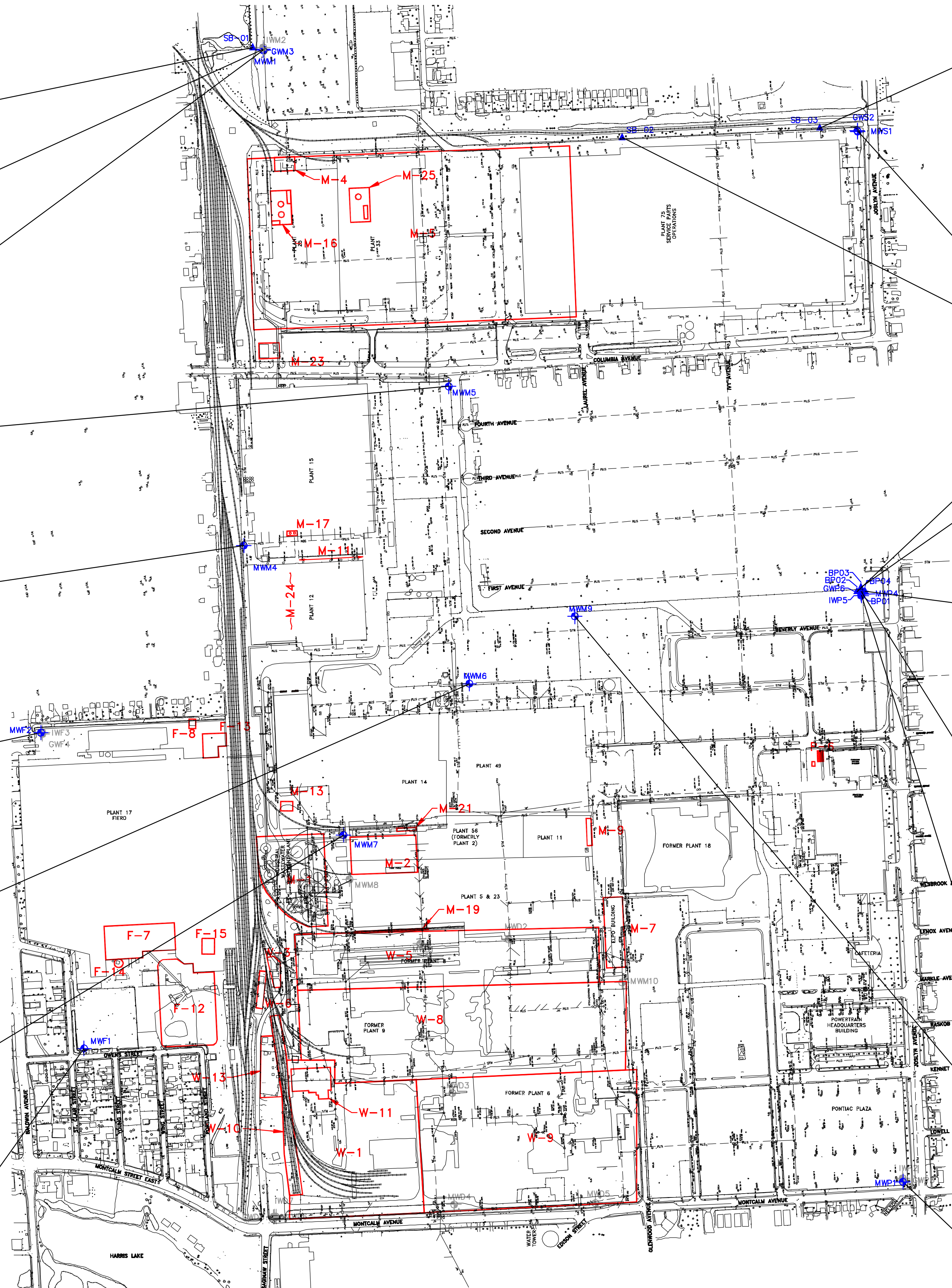
MWM4			
Depth(ft)	0–2	8–10	16–18
1,1–Dichloroethene	ND(0.0011)	ND(0.0013)	ND(0.0014)
Benzene	ND(0.00061)	ND(0.00069)	ND(0.00075)
Tetrachloroethene	ND(0.0011)	ND(0.0013)	ND(0.0014)
Vinyl chloride	ND(0.0013)	ND(0.0015)	ND(0.0016)
Benzo(a)anthracene	0.7	ND(0.065)	ND(0.072)
Benzo(a)pyrene	0.65	ND(0.071)	ND(0.078)
Benzo(b)fluoranthene	0.76	ND(0.068)	ND(0.076)
Butyl benzylphthalate	ND(0.055)	ND(0.06)	ND(0.067)
Dibenz(a,h)anthracene	0.094 J	ND(0.06)	ND(0.067)
Indeno(1,2,3–cd)pyrene	0.35 J	ND(0.083)	ND(0.092)
Antimony	ND(0.532)	ND(0.578)	ND(0.641)
Arsenic	3.88	3.5	2.98
Chromium (total)	13.1	8.06	5.21
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	17.6	4.82	3.67
Manganese	462	48.3	243
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

MWF2			
Depth(ft)	0–2	8–10	20–22
1,1–Dichloroethene	ND(0.001)	ND(0.0014)	ND(0.0013)
Benzene	ND(0.00056)	ND(0.00078)	ND(0.00072)
Tetrachloroethene	ND(0.001)	ND(0.0014)	ND(0.0013)
Vinyl chloride	ND(0.0012)	ND(0.0017)	ND(0.0015)
Benzo(a)anthracene	ND(0.062)	ND(0.059)	ND(0.061)
Benzo(a)pyrene	ND(0.068)	ND(0.064)	ND(0.067)
Benzo(b)fluoranthene	ND(0.066)	ND(0.062)	ND(0.065)
Butyl benzylphthalate	ND(0.058)	ND(0.055)	ND(0.057)
Dibenz(a,h)anthracene	ND(0.058)	ND(0.055)	ND(0.057)
Indeno(1,2,3–cd)pyrene	ND(0.079)	ND(0.075)	ND(0.078)
Antimony	ND(0.556)	ND(0.524)	ND(0.545)
Arsenic	3.15	2.97	2.66
Chromium (total)	5.08	4.22	5.17
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	ND(0.182)	NA
Iron	NA	NA	NA
Lead	2.8	3.15	2.37
Manganese	149	215	112
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

MWM6			
Depth(ft)	0–2	8–10	15–17
1,1–Dichloroethene	ND(0.0011)	ND(0.0011)	ND(0.0015)
Benzene	ND(0.00059)	ND(0.00058)	ND(0.00079)
Tetrachloroethene	ND(0.0011)	ND(0.0011)	ND(0.0015)
Vinyl chloride	ND(0.0013)	ND(0.0013)	ND(0.0017)
Benzo(a)anthracene	ND(0.065)	ND(0.064)	ND(0.06)
Benzo(a)pyrene	ND(0.071)	ND(0.07)	ND(0.065)
Benzo(b)fluoranthene	ND(0.069)	ND(0.067)	ND(0.063)
Butyl benzylphthalate	ND(0.06)	ND(0.059)	ND(0.056)
Dibenz(a,h)anthracene	ND(0.06)	ND(0.059)	ND(0.056)
Indeno(1,2,3–cd)pyrene	ND(0.083)	ND(0.081)	ND(0.076)
Antimony	ND(0.581)	ND(0.57)	ND(0.535)
Arsenic	4.21	3.69	1.22
Chromium (total)	13.9	12.5	3.5
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	6.89	6.2	2.44
Manganese	346	302	145
PCBs (total)	ND (0.039)	ND (0.039)	ND (0.036)
2,3,7,8–TCDD (TEQ)	NA	NA	NA

MWM7		
Depth(ft)	2–4	6–8
1,1–Dichloroethene	ND(0.0012)	ND(0.0012)
Benzene	ND(0.00065)	ND(0.00067)
Tetrachloroethene	ND(0.0012)	ND(0.0012)
Vinyl chloride	ND(0.0014)	ND(0.0014)
Benzo(a)anthracene	ND(0.066)	ND(0.067)
Benzo(a)pyrene	ND(0.072)	ND(0.073)
Benzo(b)fluoranthene	ND(0.069)	ND(0.07)
Butyl benzylphthalate	ND(0.061)	ND(0.062)
Dibenz(a,h)anthracene	ND(0.061)	ND(0.062)
Indeno(1,2,3–cd)pyrene	ND(0.084)	ND(0.085)
Antimony	ND(0.585)	ND(0.593)
Arsenic	3.83	4.02
Chromium (total)	8.08	7.47
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Iron	NA	NA
Lead	5.09	5.35
Manganese	81.7	264
PCBs (total)	0.053 J	0.089 J
2,3,7,8–TCDD (TEQ)	NA	NA

MWF1			
Depth(ft)	0–2	8–10	24–26
1,1–Dichloroethene	ND(0.0011)	ND(0.0013)	ND(0.0014)
Benzene	ND(0.00061)	ND(0.0007)	ND(0.00074)
Tetrachloroethene	ND(0.0011)	ND(0.0013)	0.0014 J
Vinyl chloride	ND(0.0013)	ND(0.0015)	ND(0.0016)
Benzo(a)anthracene	ND(0.064)	ND(0.066)	ND(0.058)
Benzo(a)pyrene	ND(0.07)	ND(0.072)	ND(0.063)
Benzo(b)fluoranthene	ND(0.067)	ND(0.07)	ND(0.061)
Butyl benzylphthalate	ND(0.059)	ND(0.061)	ND(0.053)
Dibenz(a,h)anthracene	ND(0.059)	ND(0.061)	ND(0.053)
Indeno(1,2,3–cd)pyrene	ND(0.081)	ND(0.084)	ND(0.073)
Antimony	ND(0.568)	ND(0.588)	ND(0.514)
Arsenic	4.73	4.06	3.37
Chromium (total)	12.3	6.66	3.37
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	6.84	4.22	1.8
Manganese	328	221	91.4
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA



SB-03	
Depth(ft)	0–2
1,1–Dichloroethene	NA [NA]
Benzene	NA [NA]
Tetrachloroethene	NA [NA]
Vinyl chloride	NA [NA]
Benzo(a)anthracene	NA [NA]
Benzo(a)pyrene	NA [NA]
Benzo(b)fluoranthene	NA [NA]
Butyl benzylphthalate	NA [NA]
Dibenz(a,h)anthracene	NA [NA]
Indeno(1,2,3–cd)pyrene	NA [NA]
Antimony	ND(2.14) [ND(2.14)]
Arsenic {RDC}	13.4 [13]
Chromium (total)	11.8 [10.6]
Chromium (III)	NA [NA]
Chromium (VI)	NA [NA]
Cyanide (total)	NA [NA]
Iron	NA [NA]
Lead	16.4 [17.1]
Manganese	218 [228]
PCBs (total)	NA [NA]
2,3,7,8–TCDD (TEQ)	NA [NA]

GWS2		
Depth(ft)	0–2	6–8
1,1–Dichloroethene	ND(0.0011)	ND(0.0013)
Benzene	ND(0.00058)	ND(0.00071)
Tetrachloroethene	ND(0.0011)	ND(0.0013)
Vinyl chloride	ND(0.0012)	ND(0.0015)
Benzo(a)anthracene	0.094 J	ND(0.067)
Benzo(a)pyrene	0.12 J	ND(0.073)
Benzo(b)fluoranthene	0.14 J	ND(0.07)
Butyl benzylphthalate	ND(0.056)	ND(0.062)
Dibenz(a,h)anthracene	ND(0.056)	ND(0.062)
Indeno(1,2,3–cd)pyrene	ND(0.076)	ND(0.085)
Antimony	ND(0.533)	ND(0.594)
Arsenic	2.75	2.36
Chromium (total)	18	8.44
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Iron	NA	NA
Lead	13.8	5.36
Manganese	434	260
PCBs (total)	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA

SB-02	
Depth(ft)	0–2
1,1–Dichloroethene	NA
Benzene	NA
Tetrachloroethene	NA
Vinyl chloride	NA
Benzo(a)anthracene	NA
Benzo(a)pyrene	NA
Benzo(b)fluoranthene	NA
Butyl benzylphthalate	NA
Dibenz(a,h)anthracene	NA
Indeno(1,2,3–cd)pyrene	NA
Antimony	0.561 J
Arsenic	22.6
Chromium (total)	60.7
Chromium (III)	NA
Chromium (VI)	NA
Cyanide (total)	NA
Iron	NA
Lead	55.1
Manganese	1090
PCBs (total)	NA
2,3,7,8–TCDD (TEQ)	NA

BP02			
Depth(ft)	0–2	2–4	4–6
1,1–Dichloroethene	NA	NA	NA
Benzene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Vinyl chloride	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Butyl benzylphthalate	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA
Indeno(1,2,3–cd)pyrene	NA	NA	NA
Antimony	NA	NA	NA
Arsenic {RDC}	5.17	5.57 [7.77]	3.81
Chromium (total)	NA	NA	NA
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	NA	NA	NA
Manganese	NA	NA	NA
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

BP04			
Depth(ft)	0–2	2–4	4–6
1,1–Dichloroethene	NA	NA	NA
Benzene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Vinyl chloride	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Butyl benzylphthalate	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA
Indeno(1,2,3–cd)pyrene	NA	NA	NA
Antimony	NA	NA	NA
Arsenic	2.66	7.49	5.15
Chromium (total)	NA	NA	NA
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	NA	NA	NA
Manganese	NA	NA	NA
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

BP03			
Depth(ft)	0–2	2–4	4–6
1,1–Dichloroethene	NA	NA	NA
Benzene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Vinyl chloride	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Butyl benzylphthalate	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA
Indeno(1,2,3–cd)pyrene	NA	NA	NA
Antimony	NA	NA	NA
Arsenic	5	2.87	3.64
Chromium (total)	NA	NA	NA
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	NA	NA	NA
Manganese	NA	NA	NA
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

GWP6					
Depth(ft)	0–2	2–4	4–6	8–10	10–12
1,1–Dichloroethene	ND(0.00075)	NA	NA	ND(0.0008)	ND(0.00081)
Benzene	ND(0.00071)	NA	NA	ND(0.00075)	ND(0.00076)
Tetrachloroethene	ND(0.00083)	NA	NA	ND(0.00088)	ND(0.0009)
Vinyl chloride	ND(0.00074)	NA	NA	ND(0.00079)	ND(0.0008)
Benzo(a)anthracene	ND(0.063)	NA	NA	ND(0.062)	ND(0.062)
Benzo(a)pyrene	ND(0.069)	NA	NA	ND(0.068)	ND(0.067)
Benzo(b)fluoranthene	ND(0.066)	NA	NA	ND(0.066)	ND(0.065)
Butyl benzylphthalate	ND(0.058)	NA	NA	ND(0.058)	ND(0.057)
Dibenz(a,h)anthracene	ND(0.058)	NA	NA	ND(0.058)	ND(0.057)
Indeno(1,2,3–cd)pyrene	ND(0.08)	NA	NA	ND(0.079)	ND(0.079)
Antimony	ND(0.56)	NA	NA	ND(0.555)	ND(0.55)
Arsenic	134	6.97 J	5.03 J	5.43	4.22
Chromium (total)	10.6	NA	NA	13.6	12.5 J
Chromium (III)	NA	NA	NA	NA	NA
Chromium (VI)	NA	NA	NA	NA	NA
Cyanide (total)	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA
Lead	20.4	NA	NA	6.4	6.51 J
Manganese	259	NA	NA	336	392
PCBs (total)	NA	NA	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA	NA	NA

BP01			
Depth(ft)	0–2	2–4	4–6
1,1–Dichloroethene	NA	NA	NA
Benzene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Vinyl chloride	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Butyl benzylphthalate	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA
Indeno(1,2,3–cd)pyrene	NA	NA	NA
Antimony	NA	NA	NA
Arsenic {RDC}	3.31	9.48	3.44
Chromium (total)	NA	NA	NA
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	NA	NA	NA
Manganese	NA	NA	NA
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

MWM9		
Depth(ft)	0–2	8–10
1,1–Dichloroethene	ND(0.0006) [ND(0.0006)]	ND(0.00067)
Benzene	ND(0.00056) [ND(0.00056)]	ND(0.00063)
Tetrachloroethene	ND(0.00066) [ND(0.00066)]	ND(0.00074)
Vinyl chloride	ND(0.00059) [ND(0.00059)]	ND(0.00066)
Benzo(a)anthracene	ND(0.061) [ND(0.063)]	ND(0.06)
Benzo(a)pyrene	ND(0.067) [ND(0.069)]	ND(0.065)
Benzo(b)fluoranthene	ND(0.065) [ND(0.067)]	ND(0.063)
Butyl benzylphthalate	ND(0.057) [ND(0.058)]	ND(0.056)
Dibenz(a,h)anthracene	ND(0.057) [ND(0.058)]	ND(0.056)
Indeno(1,2,3–cd)pyrene	ND(0.078) [ND(0.08)]	ND(0.076)
Antimony	ND(0.547) [ND(0.562)]	ND(0.534)
Arsenic	5.66 [6.2]	4.57
Chromium (total)	13.7 [16.1]	6.95
Chromium (III)	NA [NA]	NA
Chromium (VI)	NA [NA]	NA
Cyanide (total)	NA [NA]	NA
Iron	NA [NA]	NA
Lead	6.92 [8.06]	4.18
Manganese	240 [339]	260
PCBs (total)	ND (0.022) [ND (0.023)]	ND (0.022)
2,3,7,8–TCDD (TEQ)	NA [NA]	NA

MWP1			
Depth(ft)	0–2	8–10	15–17
1,1–Dichloroethene	ND(0.0011)	ND(0.0011)	ND(0.0011)
Benzene	ND(0.0006)	ND(0.00059)	ND(0.00058)
Tetrachloroethene	ND(0.0011)	ND(0.0011)	ND(0.0011)
Vinyl chloride	ND(0.0013)	ND(0.0013)	ND(0.0012)
Benzo(a)anthracene	ND(0.061)	ND(0.064)	ND(0.063)
Benzo(a)pyrene	ND(0.067)	ND(0.069)	ND(0.069)
Benzo(b)fluoranthene	ND(0.065)	ND(0.067)	ND(0.067)
Butyl benzylphthalate	ND(0.057)	ND(0.059)	ND(0.059)
Dibenz(a,h)anthracene	ND(0.057)	ND(0.059)	ND(0.059)
Indeno(1,2,3–cd)pyrene	ND(0.078)	ND(0.081)	ND(0.08)
Antimony	ND(0.545)	ND(0.566)	ND(0.563)
Arsenic	4.74	4.66	4.66
Chromium (total)	11.1	13.7 J	12.5
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	26.4	6.23	6.92
Manganese	271	335 J	367
PCBs (total)	NA	NA	NA
2,3,7,8–TCDD (TEQ)	NA	NA	NA

LEGEND:

MWM1 — GROUNDWATER MONITORING WELL LOCATION
BP01 — SOIL BORING LOCATION
SW8–03 — SURFACE SOIL SAMPLE COLLECTION LOCATION
FENCED AREA
APPROXIMATE AOI AREA

MICHIGAN PART 201 GENERIC CRITERIA FOR SOILS

RDC – RESIDENTIAL DIRECT CONTACT CRITERIA
IDC – INDUSTRIAL DIRECT CONTACT CRITERIA
RPSIC – RESIDENTIAL PARTICULATE SOIL INHALATION CRITERIA
IPSIC – INDUSTRIAL PARTICULATE SOIL INHALATION CRITERIA
RSVIC – RESIDENTIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
ISVIC – INDUSTRIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
RVSIC – RESIDENTIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA
IVSIC – INDUSTRIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA

MICHIGAN PART 201 GENERIC CRITERIA FOR GROUNDWATER

RDWC – RESIDENTIAL DRINKING WATER CRITERIA
IDWC – INDUSTRIAL DRINKING WATER CRITERIA
RGVIC – RESIDENTIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
IGVIC – INDUSTRIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
GCC – GROUNDWATER CONTACT CRITERIA

CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE PRESENTED IN PARTS PER MILLION (ppm).
3. DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
4. ND (0.25) – CONSTITUENT NOT DETECTED, ASSOCIATED DETECTION LIMIT PRESENTED IN BRACKETS.
5. J – ESTIMATED CONCENTRATION.
6. B – LABORATORY BLANK CONTAMINATION.
7. NA – NOT ANALYZED

0 400' 800'
GRAPHIC SCALE

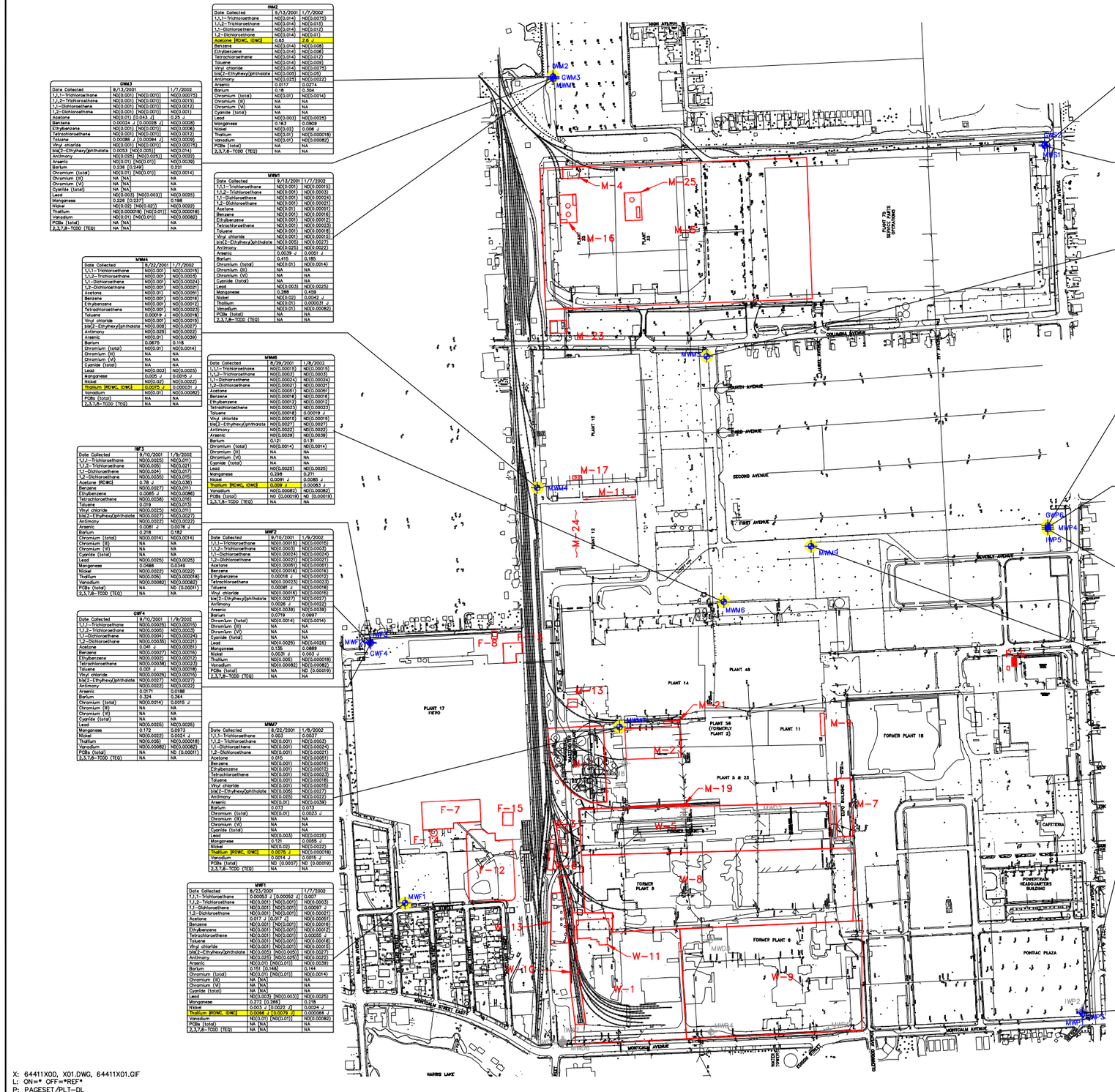
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

SITEWIDE HYDROGEOLOGIC INVESTIGATION - SOIL

ENCORE

FIGURE 4-7

X: 64411x00, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
4/25/02 SYR-54-NES GMS DJP
64411210/64411C01.DWG



GWM3		
Date Collected	9/13/2001	1/7/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00075)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0015)
1,1-Dichloroethene	ND(0.001)	ND(0.0012)
1,2-Dichloroethane	ND(0.001)	ND(0.001)
Acetone	ND(0.01) [0.043 J]	0.25 J
Benzene	0.00034 J [0.00028 J]	ND(0.0008)
Ethylbenzene	ND(0.001)	ND(0.0006)
Tetrachloroethene	ND(0.001)	ND(0.0012)
Toluene	0.00086 J [0.00094 J]	ND(0.0009)
Vinyl chloride	ND(0.001)	ND(0.00075)
bis(2-Ethylhexyl)phthalate	0.0053	ND(0.014)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.238 [0.249]	0.231
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.228 [0.237]	0.188
Nickel	ND(0.01)	ND(0.0022)
Thallium	ND(0.000018)	ND(0.000018)
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

MWM4		
Date Collected	8/22/2001	1/7/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00075)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0015)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.00091)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	0.00019 J	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.0675	0.118
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.005 J	0.0018 J
Nickel	ND(0.02)	ND(0.0022)
Thallium (ROWC, IDWC)	0.0075 J	0.000031 J
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

IMP5		
Date Collected	9/10/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.0035)	ND(0.011)
1,1,2-Trichloroethane	ND(0.008)	ND(0.021)
1,1-Dichloroethene	ND(0.004)	ND(0.017)
1,2-Dichloroethane	ND(0.0035)	ND(0.015)
Acetone (ROWC)	0.78 J	ND(0.036)
Benzene	ND(0.0027)	ND(0.011)
Ethylbenzene	0.0065 J	ND(0.0068)
Tetrachloroethene	ND(0.0038)	ND(0.016)
Toluene	0.019	ND(0.013)
Vinyl chloride	ND(0.0025)	ND(0.011)
bis(2-Ethylhexyl)phthalate	ND(0.027)	ND(0.0027)
Antimony	ND(0.0222)	ND(0.0222)
Arsenic	0.0081 J	0.0076 J
Barium	0.218	0.182
Chromium (total)	ND(0.0014)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.0025)	ND(0.0025)
Manganese	0.0488	0.0349
Nickel	ND(0.0222)	ND(0.0222)
Thallium	ND(0.0056)	ND(0.000018)
Vanadium	ND(0.00082)	ND(0.00082)
PCBs (total)	NA	ND (0.00011)
2,3,7,8- TCDD (TEQ)	NA	NA

GWF4		
Date Collected	9/10/2001	1/9/2002
1,1,1-Trichloroethane	ND(0.00625)	ND(0.00615)
1,1,2-Trichloroethane	ND(0.0025)	ND(0.0025)
1,1-Dichloroethene	ND(0.00344)	ND(0.00024)
1,2-Dichloroethane	ND(0.00035)	ND(0.00021)
Acetone	0.041 J	ND(0.0051)
Benzene	ND(0.00027)	ND(0.00016)
Ethylbenzene	ND(0.0022)	ND(0.00012)
Tetrachloroethene	ND(0.00038)	ND(0.00023)
Toluene	0.001 J	ND(0.00018)
Vinyl chloride	ND(0.00025)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.0027)	ND(0.0027)
Antimony	ND(0.0222)	ND(0.0222)
Arsenic	0.0191	0.0188
Barium	0.324	0.264
Chromium (total)	ND(0.0014)	0.0015 J
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.0025)	ND(0.0025)
Manganese	0.172	0.0373
Nickel	ND(0.0222)	0.0024 J
Thallium	ND(0.0056)	ND(0.000018)
Vanadium	ND(0.00082)	ND(0.00082)
PCBs (total)	NA	ND (0.00011)
2,3,7,8- TCDD (TEQ)	NA	NA

MWM2		
Date Collected	9/10/2001	1/9/2002
1,1,1-Trichloroethane	ND(0.00015)	ND(0.00015)
1,1,2-Trichloroethane	ND(0.0003)	ND(0.0003)
1,1-Dichloroethene	ND(0.00024)	ND(0.00024)
1,2-Dichloroethane	ND(0.00021)	ND(0.00021)
Acetone	ND(0.00051)	ND(0.00091)
Benzene	ND(0.00016)	ND(0.00016)
Ethylbenzene	0.00018 J	ND(0.00012)
Tetrachloroethene	ND(0.00023)	ND(0.00023)
Toluene	0.00081 J	ND(0.00018)
Vinyl chloride	ND(0.00015)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.0027)	ND(0.0027)
Antimony	0.0026 J	ND(0.0022)
Arsenic	ND(0.0039)	ND(0.0039)
Barium	0.0719	0.0697
Chromium (total)	ND(0.0014)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.0025)	ND(0.0025)
Manganese	0.138	0.0859
Nickel	0.0037 J	0.003 J
Thallium	ND(0.0065)	ND(0.000018)
Vanadium	ND(0.00082)	ND(0.00082)
PCBs (total)	NA	ND (0.00019)
2,3,7,8- TCDD (TEQ)	NA	NA

MWM1		
Date Collected	9/13/2001	1/7/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00075)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0015)
1,1-Dichloroethene	ND(0.001)	ND(0.0003)
1,1-Dichloroethane	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.0051)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	ND(0.001)	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	0.0039 J	0.0051 J
Barium	0.415	0.185
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.288	0.459
Nickel	ND(0.02)	0.0043 J
Thallium	ND(0.01)	0.000031 J
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

MWM5		
Date Collected	8/24/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00075)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0015)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.0051)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	ND(0.001)	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	0.0078 J	0.0042 J
Barium	0.747	0.929
Chromium (total)	0.0022 J	0.0027 J
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.817	0.567
Nickel	0.0029 J	ND(0.0022)
Thallium (ROWC, IDWC)	0.0111	ND(0.000018)
Vanadium (ROWC)	0.0054 J	0.0065 J
PCBs (total)	ND (0.0007)	ND (0.00019)
2,3,7,8- TCDD (TEQ)	NA	NA

GWP6		
Date Collected	9/18/2001	1/7/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.002)
1,1-Dichloroethene	ND(0.001)	ND(0.0016)
1,2-Dichloroethane	ND(0.001)	ND(0.0014)
Acetone	0.052	ND(0.0034)
Benzene	ND(0.001)	ND(0.0011)
Ethylbenzene	ND(0.001)	ND(0.0008)
Tetrachloroethene	ND(0.001)	ND(0.0015)
Toluene	0.00043 J	ND(0.0012)
Vinyl chloride	ND(0.001)	ND(0.001)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	0.028	0.033
Barium	0.133	0.14
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.048	0.0311
Nickel	0.0056 J	0.0024 J
Thallium	ND(0.000018)	ND(0.000018)
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

GWP5		
Date Collected	9/18/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.083)	ND(0.019)
1,1,2-Trichloroethane	ND(0.083)	ND(0.038)
1,1-Dichloroethene	ND(0.083)	ND(0.03)
1,2-Dichloroethane	ND(0.083)	ND(0.026)
Acetone (ROWC, IDWC)	5.8	21 J
Benzene	ND(0.083)	ND(0.02)
Ethylbenzene	ND(0.083)	ND(0.015)
Tetrachloroethene	ND(0.083)	ND(0.029)
Toluene	ND(0.083)	ND(0.022)
Vinyl chloride	ND(0.083)	ND(0.019)
bis(2-Ethylhexyl)phthalate	ND(0.066)	ND(0.0277)
Antimony	ND(0.025)	ND(0.0222)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.0446	0.0881
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.0744	0.0679 J
Nickel	ND(0.02)	ND(0.0222)
Thallium	ND(0.01)	ND(0.000018)
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

MWP5		
Date Collected	9/20/2001	1/10/2002
1,1,1-Trichloroethane	ND(0.015)	ND(0.038)
1,1,2-Trichloroethane	ND(0.035)	ND(0.075)
1,1-Dichloroethene	ND(0.029)	ND(0.06)
1,2-Dichloroethane	ND(0.021)	ND(0.053)
Acetone (ROWC, IDWC)	6.6 J	13
Benzene	ND(0.016)	ND(0.04)
Ethylbenzene	ND(0.012)	ND(0.03)
Tetrachloroethene	ND(0.023)	ND(0.058)
Toluene	ND(0.018)	ND(0.046)
Vinyl chloride	ND(0.015)	ND(0.038)
bis(2-Ethylhexyl)phthalate	ND(0.027)	ND(0.068)
Antimony	ND(0.022)	ND(0.022)
Arsenic	ND(0.039)	ND(0.039)
Barium	0.218	0.331
Chromium (total)	ND(0.0014)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.0025)	ND(0.0025)
Manganese	0.118	0.219 J
Nickel	0.0023 J	0.0332
Thallium (ROWC, IDWC)	0.0061 J	0.00068 J
Vanadium	ND(0.00082)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

MWP1		
Date Collected	9/12/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.00075)	ND(0.00015)
1,1,2-Trichloroethane	ND(0.0003)	ND(0.0003)
1,1-Dichloroethene	ND(0.00024)	ND(0.00024)
1,2-Dichloroethane	ND(0.00021)	ND(0.00021)
Acetone	ND(0.0035)	0.022 J
Benzene	ND(0.00016)	ND(0.00016)
Ethylbenzene	ND(0.00012)	ND(0.00012)
Tetrachloroethene	ND(0.00023)	ND(0.00023)
Toluene	ND(0.00018)	ND(0.00018)
Vinyl chloride	ND(0.00015)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.0027)	ND(0.0027)
Antimony	ND(0.0222)	ND(0.0222)
Arsenic	ND(0.0039)	0.0046 J
Barium	0.317	0.264
Chromium (total)	ND(0.0014)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.0025)	ND(0.0025)
Manganese	0.258	0.191 J
Nickel	ND(0.0222)	ND(0.0222)
Thallium	ND(0.0056)	ND(0.000018)
Vanadium	ND(0.00082)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

MWF1		
Date Collected	8/23/2001	1/7/2002
1,1,1-Trichloroethane	0.00053 J [0.00052 J]	0.007
1,1,2-Trichloroethane	ND(0.001) [ND(0.001)]	ND(0.0003)
1,1-Dichloroethene	ND(0.001) [ND(0.001)]	0.0097 J
1,2-Dichloroethane	ND(0.001) [ND(0.001)]	ND(0.00021)
Acetone	0.017 J [0.017 J]	ND(0.00091)
Benzene	ND(0.001) [ND(0.001)]	ND(0.00016)
Ethylbenzene	ND(0.001) [ND(0.001)]	ND(0.00012)
Tetrachloroethene	ND(0.001) [ND(0.001)]	0.00058 J
Toluene	ND(0.001) [ND(0.001)]	ND(0.00018)
Vinyl chloride	ND(0.001) [ND(0.001)]	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005) [ND(0.005)]	ND(0.0027)
Antimony	ND(0.025) [ND(0.025)]	ND(0.0022)
Arsenic	ND(0.01) [ND(0.01)]	ND(0.0039)
Barium	0.151 [0.148]	0.144
Chromium (total)	ND(0.01) [ND(0.01)]	ND(0.0014)
Chromium (III)	NA [NA]	NA
Chromium (VI)	NA [NA]	NA
Cyanide (total)	NA [NA]	NA
Lead	ND(0.003) [ND(0.003)]	ND(0.0025)
Manganese	0.272 [0.286]	0.218
Nickel	0.003 J [0.0022 J]	0.0024 J
Thallium (ROWC, IDWC)	0.0068 J [0.0079 J]	0.000068 J
Vanadium	ND(0.01) [ND(0.01)]	ND(0.00082)
PCBs (total)	NA [NA]	NA
2,3,7,8- TCDD (TEQ)	NA [NA]	NA

MWF3		
Date Collected	8/24/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00075)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0015)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.0051)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	ND(0.001)	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.073	0.073
Chromium (total)	ND(0.01)	0.0023 J
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.121	0.0055 J
Nickel	ND(0.02)	ND(0.0022)
Thallium (ROWC, IDWC)	0.0075 J	ND(0.000018)
Vanadium	0.0074 J	0.0015 J
PCBs (total)	ND (0.0007)	ND (0.00019)
2,3,7,8- TCDD (TEQ)	NA	NA

MWP4		
Date Collected	9/18/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00015)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0003)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	0.015 J
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	ND(0.001)	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	0.0048 J
Barium	0.212	0.118
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.0515	0.101 J
Nickel	0.0031 J	ND(0.0022)
Thallium	0.000041 J	ND(0.000018)
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	NA	NA
2,3,7,8- TCDD (TEQ)	NA	NA

MWP3		
Date Collected	8/23/2001	1/8/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00015)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0003)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	0.0052 J
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	ND(0.001)	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	0.0039 J
Barium	0.295	0.267
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.368	0.137
Nickel	0.0108 J	0.0077 J
Thallium (ROWC, IDWC)	0.018	0.00068 J
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	ND (0.0007)	ND (0.00019)
2,3,7,8- TCDD (TEQ)	NA	NA

LEGEND:

- MWM1 — GROUNDWATER MONITORING WELL LOCATION
- BP01 — SOIL BORING LOCATION
- SW8-03 — SURFACE SOIL SAMPLE COLLECTION LOCATION
- FENCED AREA
- APPROXIMATE AOI AREA

MICHIGAN PART 201 GENERIC CRITERIA FOR SOILS

RDC – RESIDENTIAL DIRECT CONTACT CRITERIA
IDC – INDUSTRIAL DIRECT CONTACT CRITERIA
RPSIC – RESIDENTIAL PARTICULATE SOIL INHALATION CRITERIA
IPSIC – INDUSTRIAL PARTICULATE SOIL INHALATION CRITERIA
RSVIC – RESIDENTIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
ISVIC – INDUSTRIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
RVSIC – RESIDENTIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA
IVSIC – INDUSTRIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA

MICHIGAN PART 201 GENERIC CRITERIA FOR GROUNDWATER

RDWC – RESIDENTIAL DRINKING WATER CRITERIA
IDWC – INDUSTRIAL DRINKING WATER CRITERIA
RGVIC – RESIDENTIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
IGVIC – INDUSTRIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
GCC – GROUNDWATER CONTACT CRITERIA

CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE PRESENTED IN PARTS PER MILLION (ppm).
3. DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
4. ND (0.25) – CONSTITUENT NOT DETECTED, ASSOCIATED DETECTION LIMIT PRESENTED IN BRACKETS.
5. J – ESTIMATED CONCENTRATION.
6. B – LABORATORY BLANK CONTAMINATION.
7. NA – NOT ANALYZED

0 400' 800'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

SITEWIDE HYDROGEOLOGIC INVESTIGATION - GROUNDWATER

ENCORE

FIGURE 4-8

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
4/25/02 SYR-54-GMS DJP
64411210/64411C02.DWG

MWF7-01			
Depth(ft)	0-2	8-10	20-22
1,1-Dichloroethene	ND(0.023)	ND(0.033)	ND(0.0015)
Benzene	0.16 J	0.13 J	ND(0.00082)
Tetrachloroethene	ND(0.02)	0.49	0.015
Vinyl chloride	ND(0.015)	ND(0.021)	ND(0.0018)
Benzo(a)anthracene	0.42	0.32 J	ND(0.059)
Benzo(a)pyrene	0.4	0.35 J	ND(0.064)
Benzo(b)fluoranthene	0.6	0.41 J	ND(0.062)
Butyl benzylphthalate	0.27 J	0.4 J	ND(0.055)
Dibenz(a,h)anthracene	0.067 J	ND(0.075)	ND(0.056)
Indeno(1,2,3-cd)pyrene	0.19 J	0.23 J	ND(0.075)
Antimony	0.648 J	3.08	ND(0.524)
Arsenic [RDC]	13.6	39.4	3.75
Chromium (total) [RPSIC, IPSIC]	38.9	335	4.64
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead [RDC]	92.6	496	2.6
Manganese	246	236	202
PCBs (total)	1.85 J	1.74 J	ND(0.035)
2,3,7,8-TCDD (TEQ)	NA	NA	NA

MWF7-02			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	ND(0.0012)	ND(0.017)	0.0091
Benzene	ND(0.00068)	ND(0.017)	ND(0.00078)
Tetrachloroethene	0.0028 J	0.93	0.047
Vinyl chloride	ND(0.0015)	ND(0.011)	ND(0.0017)
Benzo(a)anthracene	ND(0.057)	ND(0.061)	ND(0.07)
Benzo(a)pyrene	ND(0.062)	ND(0.067)	ND(0.077)
Benzo(b)fluoranthene	ND(0.06)	ND(0.065)	ND(0.074)
Butyl benzylphthalate	ND(0.053)	ND(0.057)	ND(0.065)
Dibenz(a,h)anthracene	ND(0.053)	ND(0.057)	ND(0.065)
Indeno(1,2,3-cd)pyrene	ND(0.072)	ND(0.078)	ND(0.089)
Antimony	ND(0.505)	ND(0.546)	ND(0.626)
Arsenic	3.35	4.94	4.11
Chromium (total)	4.74	9.84	8.17
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	5.7	5.23	5.46
Manganese	170	273	303
PCBs (total)	0.096 J	ND(0.117)	ND(0.111)
2,3,7,8-TCDD (TEQ)	NA	NA	NA

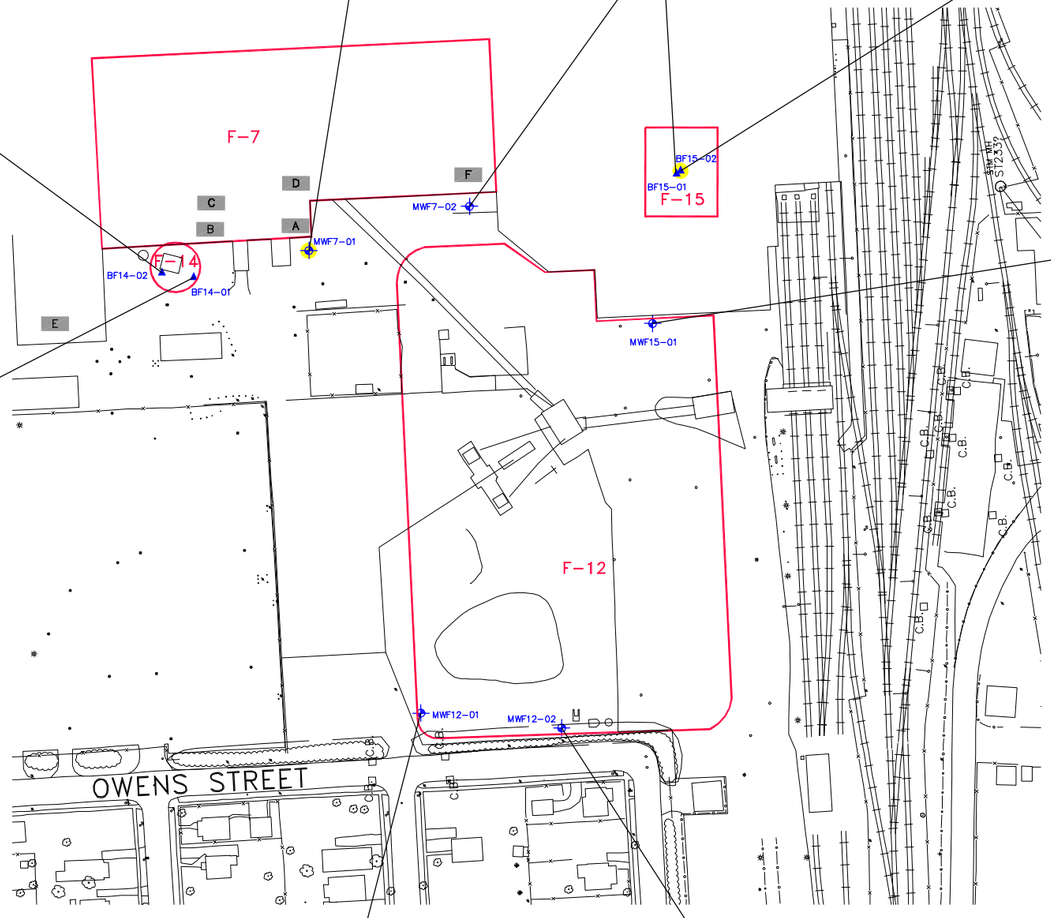
BF15-01			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	0.15 J [0.066 J]	ND(0.22)	ND(0.0056)
Benzene	ND(0.5) [ND(0.25)]	ND(0.22)	ND(0.0056)
Tetrachloroethene [RSVIC]	13 [5.7]	0.085 J	ND(0.0056)
Vinyl chloride	ND(0.99) [ND(0.51)]	ND(0.43)	ND(0.011)
Benzo(a)anthracene	ND(0.35) [ND(0.36)]	ND(0.38)	ND(0.37)
Benzo(a)pyrene	ND(0.35) [ND(0.36)]	ND(0.38)	ND(0.37)
Benzo(b)fluoranthene	ND(0.35) [ND(0.36)]	ND(0.38)	ND(0.37)
Butyl benzylphthalate	ND(0.35) [ND(0.36)]	ND(0.38)	ND(0.37)
Dibenz(a,h)anthracene	ND(0.35) [ND(0.36)]	ND(0.38)	ND(0.37)
Indeno(1,2,3-cd)pyrene	ND(0.35) [ND(0.36)]	ND(0.38)	ND(0.37)
Antimony	ND(2.13) [ND(2.2)]	ND(2.31)	ND(2.25)
Arsenic [RDC]	4.31 [4.23]	5.45	8.54
Chromium (total)	7.04 [5.27]	12.5	12.1
Chromium (III)	NA [NA]	NA	NA
Chromium (VI)	NA [NA]	NA	NA
Cyanide (total)	NA [NA]	NA	NA
Iron	NA [NA]	NA	NA
Lead	8.66 [5.43]	7.22	6.8
Manganese	242 [234]	582	341
PCBs (total)	ND(0.105) [ND(0.108)]	ND(0.114)	ND(0.57)
2,3,7,8-TCDD (TEQ)	NA [NA]	NA	NA

BF15-02			
Depth(ft)	0-2	8-10	20-24
1,1-Dichloroethene [RSVIC, ISVIC, RVSIC]	2.2 J	0.071 J	ND(0.001)
Benzene	ND(0.17)	0.017 J	ND(0.00056)
Tetrachloroethene [RSVIC, ISVIC]	81	ND(0.014)	ND(0.001)
Vinyl chloride [RSVIC]	ND(0.11)	0.11 J	ND(0.0012)
Benzo(a)anthracene	0.076 J	ND(0.063)	ND(0.063)
Benzo(a)pyrene	ND(0.072)	ND(0.069)	ND(0.068)
Benzo(b)fluoranthene	ND(0.069)	ND(0.066)	ND(0.066)
Butyl benzylphthalate	ND(0.061)	ND(0.058)	ND(0.058)
Dibenz(a,h)anthracene	ND(0.061)	ND(0.058)	ND(0.058)
Indeno(1,2,3-cd)pyrene	ND(0.084)	ND(0.08)	ND(0.08)
Antimony	ND(0.293)	ND(0.28)	0.313 J
Arsenic	4.04	1.87	4.26
Chromium (total)	14.7 J	10.5	9.87
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	30.1 J	8.35	6.07
Manganese	400 J	285	336
PCBs (total)	ND(0.04)	ND(0.038)	ND(0.038)
2,3,7,8-TCDD (TEQ)	NA	NA	NA

BF14-02			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	NA	NA	NA
Benzene	ND(0.0046)	ND(0.0049)	ND(0.0051)
Tetrachloroethene	NA	NA	NA
Vinyl chloride	NA	NA	NA
Benzo(a)anthracene	0.18 J	ND(0.41)	ND(0.38)
Benzo(a)pyrene	0.17 J	ND(0.41)	ND(0.38)
Benzo(b)fluoranthene	0.23 J	ND(0.41)	ND(0.38)
Butyl benzylphthalate	ND(0.38)	ND(0.41)	ND(0.38)
Dibenz(a,h)anthracene	ND(0.38)	ND(0.41)	ND(0.38)
Indeno(1,2,3-cd)pyrene	0.088 J	ND(0.41)	ND(0.38)
Antimony	NA	NA	NA
Arsenic	NA	NA	NA
Chromium (total)	NA	NA	NA
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	39.7	7.92	3.88
Manganese	NA	NA	NA
PCBs (total)	NA	NA	NA
2,3,7,8-TCDD (TEQ)	NA	NA	NA

BF14-01			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	NA	NA	NA
Benzene	ND(0.0045)	ND(0.0049)	ND(0.0056)
Tetrachloroethene	NA	NA	NA
Vinyl chloride	NA	NA	NA
Benzo(a)anthracene	0.077 J	ND(0.41)	ND(0.39)
Benzo(a)pyrene	0.077 J	ND(0.41)	ND(0.39)
Benzo(b)fluoranthene	0.067 J	ND(0.41)	ND(0.39)
Butyl benzylphthalate	ND(0.37)	ND(0.41)	ND(0.39)
Dibenz(a,h)anthracene	ND(0.37)	ND(0.41)	ND(0.39)
Indeno(1,2,3-cd)pyrene	ND(0.37)	ND(0.41)	ND(0.39)
Antimony	NA	NA	NA
Arsenic	NA	NA	NA
Chromium (total)	NA	NA	NA
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	38.9	10.5	3.74
Manganese	NA	NA	NA
PCBs (total)	NA	NA	NA
2,3,7,8-TCDD (TEQ)	NA	NA	NA

MWF15-01			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	ND(0.0055)	ND(0.27)	ND(0.0084)
Benzene	ND(0.0055)	0.04 J	ND(0.0084)
Tetrachloroethene	0.0017 J	1.2	0.017
Vinyl chloride	ND(0.011)	ND(0.55)	ND(0.017)
Benzo(a)anthracene	ND(0.34)	ND(0.39)	ND(0.37)
Benzo(a)pyrene	ND(0.34)	ND(0.39)	ND(0.37)
Benzo(b)fluoranthene	ND(0.34)	ND(0.39)	ND(0.37)
Butyl benzylphthalate	ND(0.34)	ND(0.39)	ND(0.37)
Dibenz(a,h)anthracene	ND(0.34)	ND(0.39)	ND(0.37)
Indeno(1,2,3-cd)pyrene	ND(0.34)	ND(0.39)	ND(0.37)
Antimony	ND(2.08)	ND(2.39)	ND(2.23)
Arsenic [RDC]	3.44	29.3	7.21
Chromium (total)	3.51	6.31	15.6
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	3.67	10.4	5.12
Manganese	137	46.5	44
PCBs (total)	0.096 J	ND(0.117)	ND(0.111)
2,3,7,8-TCDD (TEQ)	NA	NA	NA



MWF12-01				
Depth(ft)	0-2	8-10	12-14	16-18
1,1-Dichloroethene	ND(0.001)	ND(0.0013)	ND(0.0012)	ND(0.0014)
Benzene	ND(0.00056)	ND(0.00068)	ND(0.00065)	ND(0.00075)
Tetrachloroethene	ND(0.001)	ND(0.0013)	ND(0.0012)	ND(0.0014)
Vinyl chloride	ND(0.0012)	ND(0.0015)	ND(0.0014)	ND(0.0016)
Benzo(a)anthracene	0.083 J	ND(0.064)	ND(0.064)	ND(0.061)
Benzo(a)pyrene	0.081 J	ND(0.07)	ND(0.07)	ND(0.067)
Benzo(b)fluoranthene	0.14 J	ND(0.067)	ND(0.068)	ND(0.065)
Butyl benzylphthalate	0.13 J	ND(0.059)	ND(0.059)	ND(0.057)
Dibenz(a,h)anthracene	ND(0.058)	ND(0.059)	ND(0.059)	ND(0.057)
Indeno(1,2,3-cd)pyrene	ND(0.079)	ND(0.081)	ND(0.082)	ND(0.078)
Antimony	ND(0.554)	ND(0.569)	ND(0.571)	ND(0.545)
Arsenic [RDC]	11.9	4.25	ND(0.35)	10.1 J
Chromium (total)	9.63	4.73	ND(0.443)	5.95 J
Chromium (III)	NA	NA	NA	NA
Chromium (VI)	NA	NA	NA	NA
Cyanide (total)	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	18	3.68	ND(0.28)	2.01
Manganese	260	62.9	ND(0.175)	189 J
PCBs (total)	ND(0.037)	ND(0.039)	ND(0.039)	ND(0.037)
2,3,7,8-TCDD (TEQ)	NA	NA	NA	NA

MWF12-02			
Depth(ft)	0-2	8-10	15-17
1,1-Dichloroethene	ND(0.0014)	ND(0.0014)	ND(0.0014)
Benzene	ND(0.00078)	ND(0.00075)	ND(0.00074)
Tetrachloroethene	ND(0.0014)	ND(0.0014)	ND(0.0014)
Vinyl chloride	ND(0.0016)	ND(0.0016)	ND(0.0016)
Benzo(a)anthracene	ND(0.057)	ND(0.065)	ND(0.058)
Benzo(a)pyrene	ND(0.062)	ND(0.071)	ND(0.064)
Benzo(b)fluoranthene	ND(0.06)	ND(0.069)	ND(0.062)
Butyl benzylphthalate	ND(0.053)	ND(0.06)	ND(0.054)
Dibenz(a,h)anthracene	ND(0.053)	ND(0.06)	ND(0.054)
Indeno(1,2,3-cd)pyrene	ND(0.072)	ND(0.083)	ND(0.074)
Antimony	ND(0.507)	ND(0.581)	ND(0.52)
Arsenic	1.97	3.23	7.23
Chromium (total)	3.4	4.35	5.13
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	2.28	3.42	3.8
Manganese	111	268	226
PCBs (total)	ND(0.035)	ND(0.039)	ND(0.036)
2,3,7,8-TCDD (TEQ)	NA	NA	NA

LEGEND:

MWF7-01 — GROUNDWATER MONITORING WELL LOCATION

BF14-01 — SOIL BORING LOCATION

SW8-03 — SURFACE SOIL SAMPLE COLLECTION LOCATION

LOCATION WHERE NAPL HAS BEEN IDENTIFIED DURING RECENT RFI ACTIVITIES AT A MEASURABLE THICKNESS (>0.01 FEET)

APPROXIMATE AOI AREA

F-7 = POWERHOUSE BASEMENT SUMPS
F-8 = FORMER PAINT SLUDGE PAD
F-12 = COAL STORAGE AREA
F-13 = OILY PEA GRAVEL AREA
F-14 = FUEL UST
F-15 = OIL/SOLVENT PIT

MICHIGAN PART 201 GENERIC CRITERIA FOR SOILS

RDC – RESIDENTIAL DIRECT CONTACT CRITERIA
IDC – INDUSTRIAL DIRECT CONTACT CRITERIA
RPSIC – RESIDENTIAL PARTICULATE SOIL INHALATION CRITERIA
IPSIC – INDUSTRIAL PARTICULATE SOIL INHALATION CRITERIA
RSVIC – RESIDENTIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
ISVIC – INDUSTRIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
RVSIC – RESIDENTIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA
IVSIC – INDUSTRIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA

MICHIGAN PART 201 GENERIC CRITERIA FOR GROUNDWATER

RDWC – RESIDENTIAL DRINKING WATER CRITERIA
IDWC – INDUSTRIAL DRINKING WATER CRITERIA
RGVIC – RESIDENTIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
IGVIC – INDUSTRIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
GCC – GROUNDWATER CONTACT CRITERIA

CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

A — APPROXIMATE LOCATION OF SUMPS

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE PRESENTED IN PARTS PER MILLION (ppm).
3. DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
4. ND (0.25) – CONSTITUENT NOT DETECTED, ASSOCIATED DETECTION LIMIT PRESENTED IN BRACKETS.
5. J – ESTIMATED CONCENTRATION.
6. B – LABORATORY BLANK CONTAMINATION.
7. NA – NOT ANALYZED

REVISED 7/31/02

0 80' 160'
GRAPHIC SCALE

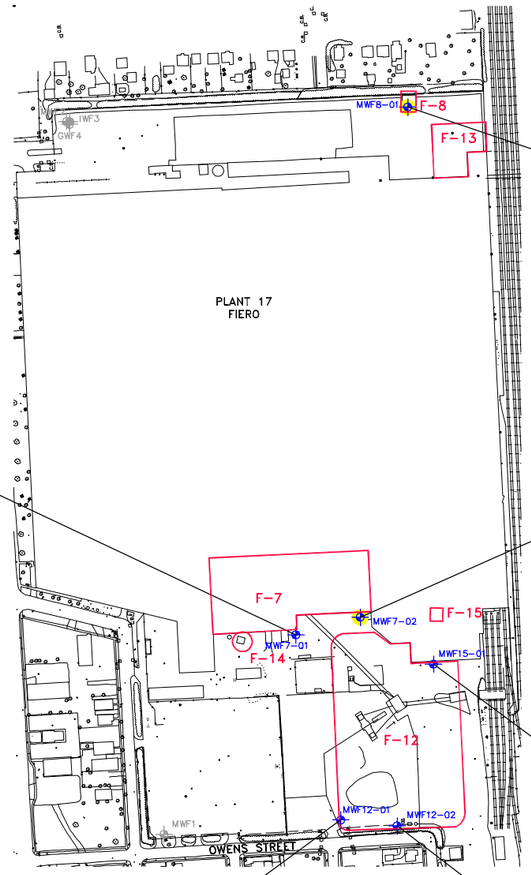
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

AOIs F-7, -12, -14 AND -15 - SOIL

ENCORE

FIGURE 4-9

X: 64411X0D, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
8/1/02 SYR-54-GMS GMS LJP
64411210/64411C17.DWG



MWF7-01		
Date Collected	10/11/2001	1/9/2002
1,1,1-Trichloroethane	0.01	0.0063
1,1,2-Trichloroethane	ND(0.001)	ND(0.0003)
1,1-Dichloroethene	0.0019	0.0011
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.00051)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00002)
Tetrachloroethene	0.002	0.00056 J
Toluene	0.0002 J	0.00021 J
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	0.003 J	ND(0.0022)
Arsenic	0.0418	0.0124
Barium	0.0386	0.0648
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.0324	0.269
Nickel	0.0036 J	0.0027 J
Thallium	ND(0.01)	0.000025 J
Vanadium (RDWC)	0.0247	0.003 J
PCBs (total)	ND (0.0007)	ND (0.00019)
2,3,7,8-TCDD (TEQ)	NA	NA

MWF8-01		
Date Collected	10/12/2001	1/9/2002
1,1,1-Trichloroethane	ND(0.001)	ND(0.00015)
1,1,2-Trichloroethane	ND(0.001)	ND(0.0003)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.00051)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00015)
Tetrachloroethene	ND(0.001)	ND(0.00023)
Toluene	ND(0.001)	ND(0.00015)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.0575	0.0546
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.38	ND(0.0009)
Nickel	0.0062 J	0.0087 J
Thallium [RDWC, IDWC]	0.0052 J	0.000041 J
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	ND (0.00007)	ND (0.00019)
2,3,7,8-TCDD (TEQ)	NA	NA

MWF7-02		
Date Collected	10/11/2001	1/9/2002
1,1,1-Trichloroethane	0.01	0.0074
1,1,2-Trichloroethane	ND(0.001)	ND(0.0003)
1,1-Dichloroethene [RDWC, IDWC]	0.02	0.0091
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.00051)
Benzene	ND(0.001)	ND(0.00018)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene [RDWC, IDWC]	0.0047	0.0063
Toluene	0.00028 J	ND(0.00018)
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.0185	0.0203
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.0103	0.0011 J
Nickel	ND(0.02)	ND(0.0022)
Thallium	ND(0.01)	ND(0.000018)
Vanadium	0.00084 J	ND(0.00082)
PCBs (total)	ND (0.0007)	ND (0.00019)
2,3,7,8-TCDD (TEQ)	NA	NA

MWF15-01		
Date Collected	10/11/2001	1/9/2002
1,1,1-Trichloroethane	ND(0.001)	0.00061 J
1,1,2-Trichloroethane	ND(0.001)	ND(0.0003)
1,1-Dichloroethene	ND(0.001)	ND(0.00024)
1,2-Dichloroethane	ND(0.001)	ND(0.00021)
Acetone	ND(0.01)	ND(0.00051)
Benzene	ND(0.001)	ND(0.00016)
Ethylbenzene	ND(0.001)	ND(0.00012)
Tetrachloroethene	0.00028 J	ND(0.00023)
Toluene	0.00036 J	0.00029 J
Vinyl chloride	ND(0.001)	ND(0.00015)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.0027)
Antimony	ND(0.025)	ND(0.0022)
Arsenic	ND(0.01)	ND(0.0039)
Barium	0.0178	0.0214
Chromium (total)	ND(0.01)	ND(0.0014)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.0025)
Manganese	0.399	0.633
Nickel	ND(0.02)	0.0066 J
Thallium	ND(0.01)	0.000064 J
Vanadium	ND(0.01)	ND(0.00082)
PCBs (total)	ND (0.00007)	ND (0.00015)
2,3,7,8-TCDD (TEQ)	NA	NA

MWF12-01		
Date Collected	9/5/2001	1/4/2002
1,1,1-Trichloroethane	0.030	0.035
1,1,2-Trichloroethane	ND(0.001)	ND(0.002)
1,1-Dichloroethene	0.0035	0.0028
1,2-Dichloroethane	ND(0.001)	ND(0.002)
Acetone	ND(0.01)	ND(0.02)
Benzene	ND(0.001)	ND(0.002)
Ethylbenzene	ND(0.001)	ND(0.002)
Tetrachloroethene	ND(0.001)	ND(0.002)
Toluene	ND(0.001)	ND(0.002)
Vinyl chloride	ND(0.001)	ND(0.002)
bis(2-Ethylhexyl)phthalate	ND(0.005)	ND(0.005)
Antimony	0.0024 J	ND(0.025)
Arsenic	ND(0.01)	ND(0.01)
Barium	0.0406	0.037
Chromium (total)	ND(0.01)	ND(0.01)
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Lead	ND(0.003)	ND(0.003)
Manganese [RDWC]	0.881	1.2 J
Nickel	0.0532 J	0.0034 J
Thallium	ND(0.01)	0.000229 J
Vanadium	ND(0.01)	ND(0.01)
PCBs (total)	ND(0.00019)	ND(0.00019)
2,3,7,8-TCDD (TEQ)	NA	NA

MWF12-02		
Date Collected	9/5/2001	1/4/2002
1,1,1-Trichloroethane	0.0002 J [ND(0.001)]	0.0013 [0.033]
1,1,2-Trichloroethane	ND(0.001) [ND(0.001)]	ND(0.001) [ND(0.001)]
1,1-Dichloroethene	ND(0.001) [ND(0.001)]	ND(0.001) [0.0023]
1,2-Dichloroethane	ND(0.001) [ND(0.001)]	ND(0.001) [ND(0.001)]
Acetone	0.00078 J [0.00063 J]	ND(0.01) [0.0018]
Benzene	ND(0.001) [ND(0.001)]	ND(0.001) [ND(0.001)]
Ethylbenzene	ND(0.001) [ND(0.001)]	ND(0.001) [ND(0.001)]
Tetrachloroethene	ND(0.001) [ND(0.001)]	ND(0.001) [ND(0.001)]
Toluene	0.00048 J [0.00046 J]	ND(0.001) [ND(0.001)]
Vinyl chloride	ND(0.001) [ND(0.001)]	ND(0.001) [ND(0.001)]
bis(2-Ethylhexyl)phthalate	ND(0.005) [ND(0.005)]	ND(0.005) [ND(0.005)]
Antimony	ND(0.025) [ND(0.025)]	ND(0.025) [ND(0.0025)]
Arsenic	ND(0.01) [ND(0.01)]	ND(0.01) [ND(0.01)]
Barium	0.0846 [0.0863]	0.052 [0.0371]
Chromium (total)	ND(0.01) [ND(0.01)]	ND(0.01) [ND(0.01)]
Chromium (III)	NA [NA]	NA [NA]
Chromium (VI)	NA [NA]	NA [NA]
Cyanide (total)	NA [NA]	NA [NA]
Lead	ND(0.003) [ND(0.003)]	ND(0.003) [ND(0.003)]
Manganese [RDWC]	1.06 [1.08]	1.74 J [1.72]
Nickel	0.0087 J [0.0095 J]	0.0044 J [0.0033 J]
Thallium	ND(0.01) [ND(0.01)]	0.000077 J [ND(0.00018)]
Vanadium	ND(0.01) [ND(0.01)]	ND(0.00082) [ND(0.00082)]
PCBs (total)	ND(0.00019) [ND(0.00019)]	ND(0.00019) [ND(0.00019)]
2,3,7,8-TCDD (TEQ)	NA [NA]	NA [NA]

LEGEND:

MWF1 GROUNDWATER MONITORING WELL LOCATION

BF13-01 SOIL BORING LOCATION

SW8-03 SURFACE SOIL SAMPLE LOCATION

LOCATION WHERE NAPL HAS BEEN IDENTIFIED DURING RECENT RFI ACTIVITIES AT A MEASURABLE THICKNESS (>0.01 FEET)

APPROXIMATE AOI AREA

F-7 = POWERHOUSE BASEMENT SUMPS
F-8 = FORMER PAINT SLUDGE PAD
F-12 = COAL STORAGE AREA
F-13 = OILY PEA GRAVEL AREA
F-14 = FUEL UST
F-15 = OIL/SOLVENT PIT

MICHIGAN PART 201 GENERIC CRITERIA FOR SOILS

RDC – RESIDENTIAL DIRECT CONTACT CRITERIA
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RSVIC – RESIDENTIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
ISVIC – INDUSTRIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
RVSIC – RESIDENTIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA
IVSIC – INDUSTRIAL INFINITE SOURCE VOLATILE SOIL INHALATION CRITERIA

MICHIGAN PART 201 GENERIC CRITERIA FOR GROUNDWATER

RDWC – RESIDENTIAL DRINKING WATER CRITERIA
IDWC – INDUSTRIAL DRINKING WATER CRITERIA
RGVIC – RESIDENTIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
IGVIC – INDUSTRIAL GROUNDWATER VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
GCC – GROUNDWATER CONTACT CRITERIA

CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE PRESENTED IN PARTS PER MILLION (ppm).
3. DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
4. ND (0.25) – CONSTITUENT NOT DETECTED, ASSOCIATED DETECTION LIMIT PRESENTED IN BRACKETS.
5. J – ESTIMATED CONCENTRATION.
6. B – LABORATORY BLANK CONTAMINATION.
7. NA – NOT ANALYZED.

0 200' 400'
GRAPHIC SCALE

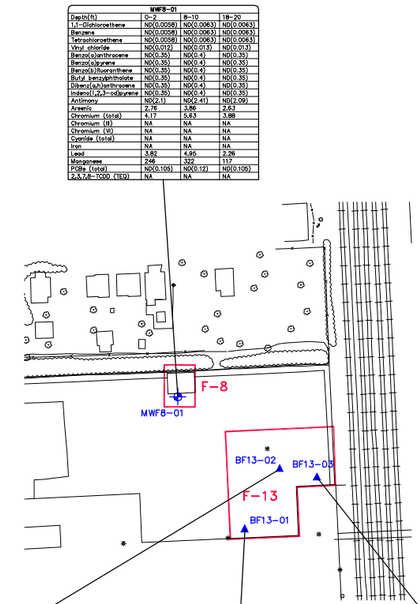
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

AOIs F-7, -8, -12 AND -15 - GROUNDWATER

ENCORE

FIGURE 4-10

X: 64411X0D, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
4/25/02 SYR-54-GMS DJP
64411210/64411C19.DWG



MWF8-01			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	ND(0.0058)	ND(0.0063)	ND(0.0063)
Benzene	ND(0.0054)	ND(0.0058)	ND(0.0058)
Tetrachloroethene	ND(0.0058)	ND(0.0063)	ND(0.0063)
Vinyl chloride	ND(0.012)	ND(0.013)	ND(0.013)
Benzo(a)anthracene	ND(0.35)	ND(0.4)	ND(0.35)
Benzo(a)pyrene	ND(0.35)	ND(0.4)	ND(0.35)
Benzo(b)fluoranthene	ND(0.35)	ND(0.4)	ND(0.35)
Butyl benzylphthalate	ND(0.35)	ND(0.4)	ND(0.35)
Dibenz(a,h)anthracene	ND(0.35)	ND(0.4)	ND(0.35)
Indeno(1,2,3-cd)pyrene	ND(0.35)	ND(0.4)	ND(0.35)
Antimony	ND(2.1)	ND(2.41)	ND(2.09)
Arsenic	2.78	3.86	2.63
Chromium (total)	4.17	5.63	3.88
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	3.82	4.85	2.28
Manganese	246	322	117
PCBs (total)	ND(0.105)	ND(0.12)	ND(0.105)
2,3,7,8-TCDD (TEQ)	NA	NA	NA

BF13-02			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	ND(0.0064)	ND(0.0058) [ND(0.0058)]	ND(0.0068)
Benzene	ND(0.0054)	ND(0.0058) [ND(0.0058)]	ND(0.0058)
Tetrachloroethene	0.0046 J	0.0066 [0.0585]	ND(0.0066)
Vinyl chloride	ND(0.011)	ND(0.012) [ND(0.011)]	ND(0.011)
Benzo(a)anthracene	ND(0.35)	ND(0.36) [ND(0.34)]	ND(0.34)
Benzo(a)pyrene	ND(0.35)	ND(0.36) [ND(0.34)]	ND(0.34)
Benzo(b)fluoranthene	ND(0.35)	ND(0.36) [ND(0.34)]	ND(0.34)
Butyl benzylphthalate	ND(0.35)	ND(0.36) [ND(0.34)]	ND(0.34)
Dibenz(a,h)anthracene	ND(0.35)	ND(0.36) [ND(0.34)]	ND(0.34)
Indeno(1,2,3-cd)pyrene	ND(0.35)	ND(0.36) [ND(0.34)]	ND(0.34)
Antimony	ND(2.11)	ND(2.12) [ND(2.083)]	ND(2.08)
Arsenic	3.1	2.26 [2.42]	3.45
Chromium (total)	4.8	3.3 [3.67]	4.79
Chromium (III)	NA	NA [NA]	NA
Chromium (VI)	NA	NA [NA]	NA
Cyanide (total)	NA	NA [NA]	NA
Iron	NA	NA [NA]	NA
Lead	3.51	2.64 [2.63]	2.93
Manganese	165	128 [134]	136
PCBs (total)	ND(0.105)	ND(0.105) [ND(0.102)]	ND(0.102)
2,3,7,8-TCDD (TEQ)	NA	NA [NA]	NA

BF13-01		
Depth(ft)	0-2	8-10
1,1-Dichloroethene	ND(0.0057)	ND(0.0064)
Benzene	ND(0.0057)	ND(0.0064)
Tetrachloroethene	0.06	0.0083
Vinyl chloride	ND(0.011)	ND(0.011)
Benzo(a)anthracene	0.16 J	ND(0.35)
Benzo(a)pyrene	0.18 J	ND(0.35)
Benzo(b)fluoranthene	0.21 J	ND(0.35)
Butyl benzylphthalate	ND(0.36)	ND(0.35)
Dibenz(a,h)anthracene	ND(0.36)	ND(0.35)
Indeno(1,2,3-cd)pyrene	0.17 J	ND(0.35)
Antimony	ND(2.2)	ND(2.1)
Arsenic	7.54	2.47
Chromium (total)	5.32	3.45
Chromium (III)	NA	NA
Chromium (VI)	NA	NA
Cyanide (total)	NA	NA
Iron	NA	NA
Lead	9.93	2.79
Manganese	124	113
PCBs (total)	ND(0.108)	ND(0.105)
2,3,7,8-TCDD (TEQ)	NA	NA

BF13-03			
Depth(ft)	0-2	8-10	18-20
1,1-Dichloroethene	ND(0.0048)	ND(0.0044)	ND(0.0066)
Benzene	ND(0.0048)	ND(0.0044)	ND(0.0066)
Tetrachloroethene	0.061	0.12	0.0093
Vinyl chloride	ND(0.0096)	ND(0.0088)	ND(0.011)
Benzo(a)anthracene	ND(0.34)	ND(0.36)	ND(0.34)
Benzo(a)pyrene	ND(0.34)	ND(0.36)	ND(0.34)
Benzo(b)fluoranthene	ND(0.34)	ND(0.36)	ND(0.34)
Butyl benzylphthalate	ND(0.34)	ND(0.36)	ND(0.34)
Dibenz(a,h)anthracene	ND(0.34)	ND(0.36)	ND(0.34)
Indeno(1,2,3-cd)pyrene	ND(0.34)	ND(0.36)	ND(0.34)
Antimony	ND(2.08)	ND(2.1)	ND(2.09)
Arsenic	4.55	2.83	3.22
Chromium (total)	4.06	3.87	6.5
Chromium (III)	NA	NA	NA
Chromium (VI)	NA	NA	NA
Cyanide (total)	NA	NA	NA
Iron	NA	NA	NA
Lead	2.92	3.39	2.98
Manganese	145	145	146
PCBs (total)	ND(0.102)	ND(0.102)	ND(0.105)
2,3,7,8-TCDD (TEQ)	NA	NA	NA

LEGEND:

MWF8-01 GROUNDWATER MONITORING WELL LOCATION

BF13-01 SOIL BORING LOCATION

SW8-03 SURFACE SOIL SAMPLE COLLECTION LOCATION

LOCATION WHERE NAPL HAS BEEN IDENTIFIED DURING RECENT RFI ACTIVITIES AT A MEASURABLE THICKNESS (>0.01 FEET)

APPROXIMATE AOI AREA

F-8 = FORMER PAINT SLUDGE PAD
F-13 = OILY PEA GRAVEL AREA

MICHIGAN PART 201 GENERIC CRITERIA FOR SOILS

RDC – RESIDENTIAL DIRECT CONTACT CRITERIA
IDC – INDUSTRIAL DIRECT CONTACT CRITERIA
RPSIC – RESIDENTIAL PARTICULATE SOIL INHALATION CRITERIA
IPSIC – INDUSTRIAL PARTICULATE SOIL INHALATION CRITERIA
RSVIC – RESIDENTIAL SOIL VOLATILIZATION TO INDOOR AIR INHALATION CRITERIA
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CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

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5. J – ESTIMATED CONCENTRATION.
6. B – LABORATORY BLANK CONTAMINATION.
7. NA – NOT ANALYZED.

0 100' 200'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS

AOIs F-8 AND -13 - SOIL

ENCORE

FIGURE
4-11

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
4/25/02 SYR-54-GMS DJP
64411210/64411C18.DWG