Corrective Measures Proposal

Pontiac North Campus

General Motors Corporation
Pontiac, Michigan

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ENCORE
Environmental Corporate Remediation

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LIST OF APPENDICES

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LIST OF ACRONYMS

amsl	Above Mean Sea Level
AOI	Area of Interest
AST	Aboveground Storage Tank
AVS/SEM	Acid volatile sulfide/simultaneously extracted metals
BERA	Baseline Ecological Risk Assessment
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BTU	British Thermal Units
CCR	Current Conditions Report
CEC	Clayton Environmental Consultants
CET	Carlo Environmental Technologies, Inc.
CMP	Corrective Measures Proposal
CMS	Corrective Measures Study
COC	Constituent of Concern
CoPC	Chemical of Potential Concern
CPC	Chevrolet-Pontiac-Canada Group
CPI	Corrugated Plate Interceptor
CRA	Conestoga-Rovers & Associates
CSA	Closed Container Storage Area
CY	Cubic Yards
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
ERA	Ecological Risk Assessment
Facility	GM Pontiac North Campus Site
FOIA	Freedom of Information Act
FSP	Field Sampling Plan
GAC	Granular Activated Carbon
GCC	Groundwater Contact Criteria
GIS	Geographical Information System
GM	General Motors Corporation
GMC	General Motors Corporation
GMNA	General Motors North America
gpd	Gallons per Day
GSI	Groundwater-Surface Water Interface
GTI	Groundwater Technologies, Inc.
HI	Hazard Index
HQ	Hazard Quotient
HSA	Hollow-stem Auger

HVO	Halogenated Volatile Organic Compound
ID	Inner Diameter
IDC	Michigan NREPA Part 201 Generic Industrial Direct Contact Criteria
IDWC	Michigan NREPA Part 201 Generic Industrial Drinking Water Criteria
IGVIC	Michigan NREPA Part 201 Generic Industrial Groundwater Volatilization to Indoor Air Inhalation Criteria
IM	Interim Measure
IPSIC	Michigan NREPA Part 201 Generic Industrial Particulate Soil Inhalation Criteria
ISVIC	Michigan NREPA Part 201 Generic Industrial Soil Volatilization to Indoor Air Inhalation Criteria
IVSIC	Michigan NREPA Part 201 Generic Industrial Infinite Source Volatile Soil Inhalation Criteria
IWTP	Industrial Wastewater Treatment Plant
LNAPL	Light Non-aqueous Phase Liquid
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
MERA	Michigan Environmental Response Act
MFD	Metal Fabrication Division
mg/L	Milligrams per Liter
MPS	MPS Group, Inc.
MTBE	Methyl-tert-butyl-ether
NET	National Environmental Testing
NFA	No Further Action
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
NREPA	Natural Resources and Environmental Protection Act (1994 PA 451, as amended)
OBG	O'Brien and Gere
ORC®	Oxygen Releasing Compound
OSHA	Occupational Safety and Health Administration
PAH	Purgable Aromatic Hydrocarbon
PA/VSI	Preliminary Assessment/Visual Site Inspection
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PNA	Polynuclear Aromatic Hydrocarbon
PNC	Pontiac North Campus
POTW	Publicly Owned Treatment Works
PRC	PRC Environmental Management, Inc.
PSB	Pontiac School Board
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
RAGS	USEPA Risk Assessment Guidance for Superfund
RAP	Remedial Action Plan
RBCA	Risk Based Corrective Action

RCRA	Resource Conservation and Recovery Act
RDC	Michigan NREPA Part 201 Generic Residential Direct Contact Criteria
RDWP	Michigan NREPA Part 201 Generic Residential Drinking Water Protection Criteria
RDWC	Michigan NREPA Part 201 Generic Residential Drinking Water Criteria
RFI	RCRA Facility Investigation
RGVIC	Michigan NREPA Part 201 Generic Residential Groundwater Volatilization to Indoor Air Inhalation Criteria
RPSIC	Michigan NREPA Part 201 Generic Residential Particulate Soil Inhalation Criteria
RSVIC	Residential Soil Volatilization to Indoor Inhalation
SAA	Satellite Accumulation Area
SERA	Screening Environmental Risk Assessment
SF	Square Feet
SPO	Service Parts Operations
SVE	Soil Vapor Extraction
SVIAIC	Michigan NREPA Part 201 Generic Soil Volatilization to Indoor Air Inhalation Criteria
SVOC	Semi-Volatile Organic Compound
SWDF	Stormwater Detention Facility
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCDD	2,3,7,8- Tetrachlorodibenzo-p-dioxin
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEC	Testing Engineers and Consultants
TEQ	Toxicity Equivalents
TEF	Toxicity Equivalence Factors
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
TSD	Treatment Storage and Disposal
UCL	Upper Confidence Limit
U.S.EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VA	Voluntary Corrective Action Agreement
VOC	Volatile Organic Compound
VSI	Visual Site Inspection
VSR	Verification of Soil Remediation
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

1.1 GENERAL

On October 10, 2000, the U.S. Environmental Protection Agency (U.S. EPA) and General Motors Corporation (GM) entered into a Performance Based Voluntary Corrective Action Agreement (The Agreement) for the Pontiac North Campus (PNC) located in Pontiac, Michigan (Site). The 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 U.S. EPA corrective action guidance documentation. This Corrective Measures Proposal (CMP) for the Site was prepared by Encore Environmental Consortium, L.L.C. (EEC) for Environmental Corporate Remediation (ENCORE), a wholly owned subsidiary of GM. This CMP summarizes interim measures (IMs) at the facility since the effective date of The Agreement and describes the proposed corrective measures and rationale for the selection of the corrective measures.

Comprising approximately 595 acres, the Site is located in the city of Pontiac, Oakland County, Michigan (see Figure 1-1). Surrounding areas consist of residential subdivisions and mixed commercial and light industrial use properties. The Site encompasses four facilities as follows (see Figure 1-2):

- 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; (U.S. EPA ID No. MID 005356910);
- GMC Central Foundry Division - Pontiac Plant, One Pontiac Plaza, Pontiac, Michigan 48340 (U.S. EPA ID No. MID 085470102) (Now demolished);
- CPC – Pontiac; GM Metal Fabricating Division Pontiac; 220 E. Columbia Ave, Pontiac, Michigan 48340 (U.S. EPA ID No. MID 005356886); and
- GMC Warehousing and Distribution Division; Service Parts and Operations; 9251 Joslyn Rd, Pontiac, Michigan 48340 (U.S. EPA ID No. MID 076331289).

Figure 1-3 shows each of the Site operational areas and off-Site areas, while Figure 1-4 shows an overlay of the operational areas and the facility boundaries. The operational areas discussed in this document are as follows:

- Fiero;
- Demolition Area (DA);
- Metal Fabrication Division (MFD);

- Powertrain; and
- Service Parts Operation (SPO).

The following off-Site areas are also discussed in this document:

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

Sixty-four Areas of Interest (AOIs) were identified as part of the Current Conditions Report (CCR [ENCORE, 2001a]), as follows:

- Seven SWMUs identified by GM in the 1986 Certification Regarding Potential Releases from Solid Waste Management Units (GM, 1986);
- SWMUs identified by PRC in the Fiero PA/VSI Report (PRC, 1992); and
- 46 other AOIs identified by GM as a result of a thorough review of historical GM files, Freedom of Information Act (FOIA) requests to regulatory agencies, discussions with GM personnel, and multiple Site walkthroughs.

These AOIs are presented on Figure 1-5. An additional three AOIs were subsequently identified since the completion of the RCRA Facility Investigation (RFI) Report (ENCORE, 2002a), as well as four off-Site areas where potential impacts had occurred from Site operations. These off-Site areas and additional AOIs are also shown on Figure 1-5. Additionally, Site storm sewers are included in this report based on current environmental impacts identified during the RFI process. The status of all AOIs and the off-Site areas are summarized in Table 1-1.

The following activities associated with the RCRA Corrective Action have been completed to date:

- The Agreement for RCRA Corrective Action between GM and the U.S. EPA became effective on October 30, 2000;
- The CCR was submitted to the U.S. EPA on January 31, 2001 (ENCORE, 2001a);
- The Quality Assurance Project Plan (QAPP) was submitted to the U.S. EPA on May 15, 2001 as an appendix to the RFI Work Plan (ENCORE, 2001b);
- The RFI Work Plan was submitted to the U.S. EPA on May 15, 2001 (ENCORE, 2001b);

- Addendum No. 1 to the RFI Work Plan for investigations of the Pontiac School Bus (PSB) Maintenance Facility and Harris Lake was submitted to the U.S. EPA on August 14, 2001 (ENCORE, 2001c);
- Addendum No. 2 to the RFI Work Plan was submitted to the U.S. EPA on September 10, 2001 (ENCORE, 2001d);
- Addendum No. 3 to the RFI Work Plan was submitted to the U.S. EPA on February 6, 2002 (ENCORE, 2002a). The addendum covered investigations at AOIs W-1, W-8, W-9, W-10, M-1, M-2, M-4, M-5, M-16, M-19, and P-6 as well as LNAPL delineation at LNAPL Areas No. 1, No.2, and No. 3. In addition, further investigations were proposed at PSB and Harris Lake;
- Addendum No. 1 to the CCR (Harris Lake) was submitted to the U.S. EPA on February 13, 2002 (ENCORE, 2002b);
- RFI field activities commenced the week of June 11, 2001 with the first round of groundwater sampling completed the week of September 17, 2001;
- Field activities associated with the RFI Work Plan Addenda No. 1 and No. 2 (ENCORE, 2001c and d) were completed the week of October 15, 2001;
- Field activities associated with RFI Work Plan Addendum No. 3 (ENCORE, 2002awere completed February 19, 2002;
- Field activities associated with the delineation of the LNAPL Areas No. 1, No. 2, and No. 3 were completed February 19, 2002;
- The Harris Lake Baseline Risk Assessment was submitted to the U.S. EPA on April 30, 2002 as an appendix to the RFI Report (ENCORE, 2002c);
- The draft RFI (ENCORE, 2002c) and RCRA Environmental Indicators [EI (Environ, 2002)] Reports were submitted to the U.S. EPA on April 30, 2002;
- Response to U.S. EPA comments on the draft RFI and EI Reports were submitted to the U.S. EPA on July 30, 2002;
- Additional comments from the U.S. EPA on the EI (Environ, 2002) and RFI Report (ENCORE, 2002c) were received on December 6, 2002;
- Responses to U.S. EPA comments on the EI (Environ, 2002) and RFI Report (ENCORE, 2002c) were provided on December 6, 2002;
- Work Plan for the Storm Sewer Pipe Removal at the PSB Property was submitted to the U.S. EPA on February 14, 2003, and revised on March 11, 2003 (ENCORE, 2003a);
- RFI Work Plan Addendum No. 4 for LNAPL delineation at AOI M-2 was submitted to the U.S. EPA on March 14, 2003 (ENCORE, 2003b);

- Baseline Ecological Risk Assessment for Harris Lake was completed on April 1, 2003 (ENCORE, 2003c);
- RFI Work Plan Addendum No. 5 for the investigation of the pipeline release at AOI P-9 was submitted to the U.S. EPA on April 10, 2003 (ENCORE, 2003d);
- RFI Work Plan Addendum No. 6 for the investigation of the former Plant 18 (AOI P-10) was submitted to the U.S. EPA on April 10, 2003 (ENCORE, 2003e);
- RFI Work Plan Addendum No. 7 for the investigation of the trestle pipeline release at AOI P-11 was submitted to the U.S. EPA on April 10, 2003 (ENCORE, 2003f);
- RFI Work Plan Addendum No. 8 for the investigation of AOIs F-7, F-15, M-1, M-4, M-5, M-16, M-25, and P-6 was submitted to the U.S. EPA on May 19, 2003 (ENCORE, 2003g);
- RFI Work Plan Addendum No. 9 for the supplemental investigation of DA was submitted to the U.S. EPA on August 1, 2003 (ENCORE, 2003h);
- RFI Work Plan Addendum No. 8A, amending RFI Work Plan Addendum No. 8, was submitted to the U.S. EPA on August 26, 2003 (ENCORE, 2003i); and
- RFI Supplemental Report No. 1 (ENCORE, 2003j) was submitted to the U.S. EPA on November 26, 2003 as an addendum to the RFI Report (ENCORE, 2002c), and in conjunction with this CMP.

1.2 PURPOSE AND SCOPE

The purpose of this document is to propose final corrective measures for those AOIs that were identified in the RFI Report (ENCORE, 2002c) and RFI Supplemental Report No. 1 (ENCORE, 2003j) as having the potential to have released hazardous waste or hazardous constituents that may pose an unacceptable risk to human health and the environment. It was concluded that these AOIs require further action to mitigate the identified environmental conditions.

This CMP discusses all AOIs and off-Site areas identified during activities associated with the CCR (ENCORE, 2001a) and RFI (ENCORE, 2002c). Those AOIs and off-Site areas were concluded to require further action after completion of RFI activities which are discussed in detail with respect to the scope and results of the respective investigations. Any IMs implemented at the Site since the effective date of The Agreement are also discussed. A Site habitat evaluation and an evaluation of human health risks associated with current and potential land uses at the Site are also presented. Final corrective measures are proposed for each respective AOI and off-Site area following a discussion of available alternatives.

The following criteria are addressed with respect to each proposed corrective measure proposed (U.S. Department of Energy, 2000):

1. Long-term reliability and effectiveness, along with the degree of certainty that remedies will remain protective of human health and the environment, considering, as appropriate: the magnitude of risks that will remain at a site from untreated hazardous wastes and hazardous constituents and treatment residuals, and the reliability of any containment systems and institutional controls;
2. Reduction of toxicity, mobility, or volume through treatment of hazardous wastes and hazardous constituents, including how treatment is used to address principal threats posed by the facility, and the degree to which remedies employ treatment that reduces the toxicity, mobility, or volume of hazardous waste and hazardous constituents, considering, as appropriate: the treatment processes to be used and the amount of hazardous waste and hazardous constituents that will be treated; the degree to which treatment is irreversible; and the types of treatment residuals that will be produced;
3. Short-term effectiveness and short-term risks remedies pose, along with the amount of time it will take for remedy design, construction, and implementation;
4. Ease or difficulty of remedy implementation, considering, as appropriate: the technical feasibility of constructing, operating, and monitoring the remedy; the administrative feasibility of coordinating with and obtaining necessary approvals and permits from other agencies; and the availability of services and materials, including capacity and location of needed treatment, storage, and disposal services;
5. Capital as well as operation and maintenance costs, and the net present value of these costs;
6. The degree to which remedies are acceptable to the surrounding community; and
7. The degree to which remedies are acceptable to the state in which the facility is located.

1.3 DOCUMENT ORGANIZATION

This CMP document is organized as follows:

- Section 2.0 provides general Site information describing Site location, current & historical operations, regulatory history, land use, demographics, and environmental setting;
- Section 3.0 discusses the AOIs that the CCR (ENCORE, 2001a) concluded to require no further action (NFA) (i.e., not included in the RFI);
- Section 4.0 presents evaluations of each AOI and off-Site area included in the RFI Report (ENCORE, 2002c) or the RFI Supplemental Report No. 1 (ENCORE, 2003j);
- Section 5.0 provides descriptions of any IMs implemented at the Site following the effective date of The Agreement;

- Section 6.0 provides an evaluation of groundwater quality at the downgradient perimeter of the Site;
- Section 7.0 presents a Site habitat evaluation;
- Section 8.0 discusses the assessment of Site risks to human-health with respect to anticipated and future land-use;
- Section 9.0 provides an evaluation of all corrective measures considered for each AOI;
- Section 10.0 presents the final control measures proposed for each AOI; and
- Section 11.0 lists references.

2.0 FACILITY BACKGROUND

This section provides a general description of the Site location, 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. In addition, the Site environmental setting is discussed.

2.1 CURRENT AND HISTORICAL OPERATIONS

This subsection contains information regarding current and historical operations at each of the five operational areas at the Site as shown on Figure 1-3. Information regarding the Site prior to development in 1924 was not available.

Historically, a wide range of automotive-related production processes, including car assembly, engine assembly, plating, heat treating, painting, metal stamping, machining, foundry operations, metal casting, and wastewater treatment activities, have been performed at the Site. Currently, the Site is used for metal fabrication, warehousing, and engineering. Many of the plants have changed designations during the life of the facility. Table 2-1 presents a summary of historical and current plant designations and associated activities. The locations of the plants, with current designations, are shown on Figure 1-3.

Since initiation of the of the corrective action (CA) activities, various Site development activities have occurred at the Site. These changes are summarized as follows:

- Improvements to Beverly Avenue and construction of Glenwood Avenue road extension from Montcalm to Beverly Avenue;
- Construction of new administrative building along Joslyn Avenue in the eastern portion of Powertrain; and
- Ongoing construction of parking lots throughout Powertrain.

2.1.1 FIERO

The Fiero operational area consists of approximately 81 acres located at the southwestern portion of the Site (Figure 1-3) and includes Plant 17. Currently, this area is used for prototyping, storage, and other non-production purposes.

Operations began at the Fiero facility in 1925 as the GMC Fisher Body Plant. This Plant supplied closed-type automotive bodies for the Oakland Motor Car Company, located at the Site. In 1932, the Oakland Motor Car Company became the Pontiac Motor Division. In 1935, the original GMC Fisher Body Plant, located at the Site, combined operations with the GMC

Fisher Body Pontiac Plant with operations consisting of metal fabrication, soft trim fabrication, and body assembly. In 1942, operations at the Fiero facility converted to defense production work, which included production of military vehicle parts.

The facility was modernized to a two-line automotive assembly and operated from 1959 to 1961. In August 1982, the facility ceased operations, and the Pontiac Motor Division took possession of the Site and renamed it Fiero. From 1983 to 1988, the Pontiac Fiero was assembled in Plant 17 on a one-car assembly line. The plant was divided into a body shop, chassis department, paint shop, and trim department. Fiero assembly operations ceased in August 1988. Since 1988, the facility has been used for various non-production purposes, including storage and prototyping.

Current and historical wastes generated from car assembly at Fiero may have included scrap metal and metalworking fluids and oils (petroleum-based, oil-water emulsions, or synthetic emulsions), paints, paint solvents, and plasticizers. A wastewater treatment plant was in operation at the Site from 1973 to 1983 and managed wastewater, wastewater treatment sludge, paint sludge, and bonderite sludge.

2.1.2 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 and various IMs that will be discussed in Section 6. The former plant locations are shown on Figure 1-3.

Construction of the Foundry (Plant 6) and Final Vehicle Assembly Plant (Plant 8) took place from 1927 to 1929. During this time, operations within these plants included production of parts and cars for the Oakland Motor Car Company. Expansions of the Foundry took place in 1937, 1940, 1941, 1945, 1946, 1957, and 1962. Expansions to Plant 8 took place in 1956, 1960, 1962, 1963, 1964, and 1970. Fisher Body Division commenced construction of the Engine Construction Building (Plant 9) in 1925, with construction completed by the mid-1930s. Expansions to Plant 9 took place in 1945, 1954, 1959, and 1967. In 1987, operations in Plants 6, 8, and 9 ceased. Plant 6 was demolished in 1995, and Plants 8 and 9 were demolished in 1997.

West of the Foundry (Plant 6) is an area referred to as the West Yard (see Figure 1-3). The West Yard was used for material disposal activities, including foundry sand disposal, refuse disposal, sludge dumping, and trash burning. An area designated as the Railroad Marshalling Area, located along the western side of the West Yard, was used for temporary storage of railcars loaded with scrap metal prior to being shipped off-Site. Also located in the West Yard were the Flammable Liquids Storage Building, the Compressor Building, and the Salvage Building. The

Salvage Building, which included a refuse incinerator, was constructed in 1945 to separate reusable material from unusable wastes. The Salvage Building was demolished in 1998. The Compressor Building was constructed in the early 1970s and subsequently demolished in 1998. Also located in this area are the Montcalm Substation and the former crane bay.

In the 1970s, the West Yard was divided between two GM business units. The eastern and central portion of the West Yard became a portion of the Central Foundry Division, and the western area became property of the Automotive Manufacturing and Support Operations (Pontiac Motor Division, later CPC). In 1982, CPC constructed a Hazardous Waste Storage Pad to store hazardous waste for periods greater than 90 days. Closure activities for the Hazardous Waste Storage Pad were initiated in July 1988 by CPC.

Current and historical wastes generated in the DA may have included wastewater (which may have contained cadmium and lead), calcium carbide desulphurization slag, baghouse dust, and foundry sand. Additionally, solvents may have been used for cleaning.

2.1.3 METAL FABRICATION DIVISION (MFD)

The MFD area consists of approximately 236 acres in the central portion of the Site (Figure 1-3) that contains the only active area of the Site with current manufacturing operations. Plants currently located in the MFD area include Plants 5, 11, 12, 14, 15, 23, 25, 33, 49, 56, and electrodeposition (ELPO). Also present in the MFD area is a wastewater treatment plant (WWTP), which is located directly west of Plants 5 and 23. The locations of each of these plants and the WWTP are shown on Figure 1-3. Table 2-1 provides a cross-reference of historical and current plant identification numbers.

Plant 11 is currently used for repair work and maintenance activities. Plants 12 and 56 are currently vacant for potential demolition. Plants 14, 15, 49, and the eastern portion of Plants 5 and 23 include pressed metal operations, maintenance operations, and other support activities. The eastern portion of Plants 5 and 23 also includes axle and differential operations. The western portion of Plants 5 and 23 are used to store miscellaneous machine parts and also contains a waste storage and accumulation area. Plants 25 and 33 are undergoing renovation.

A significant portion of the MFD area is covered with paved parking areas, roadways, pallet storage areas, and truck trailer storage areas.

Plants 5 and 56 were originally constructed in 1927 and were used for the storage and final shipping of automobiles for the Oakland Motor Car Company. By 1945, Plant 56, originally designated Plant 2, had been converted for metal plating operations, and Plant 5 had been converted for axle operations. Metal plating operations at Plant 56 ceased in 1987. Plant 11, originally designated as Plant 1, and was constructed in 1945 as the heat-treating plant.

Expansions to these buildings took place in 1958, 1963, 1964, 1966, and 1969, with Plant 5 subsequently being subdivided into Plants 5 and 23.

The Car Storage and Shipping Building (Plant 12) was constructed from 1950 to 1951 and was expanded in 1963. Two pressed metal plants (Plant 14 and Plant 15) were added in 1951 and 1952, respectively. Plant 14 was expanded in 1966. Plant 15 was expanded in 1954 and 1966. The Car Finishing Plant (Plant 16) was added in 1954. Plant 16 has since been demolished. Plant 49 was constructed in 1965 as a storage and shipping plant with an expansion occurring in 1969.

A chassis parts and machining plant (formerly Plant 51, currently Plant 25) was constructed from 1967 to 1968 and expanded in 1971. In 1981, an engine plant (formerly Plant 55, currently Plant 33) was constructed adjacent to Plant 25.

The ELPO Building is divided into two operations, with the northern portion used for enamel, lacquer, painting, and phosphating operations and the southern portion used as a chemical storage room, a flammable materials storage room, and a paint mix room with painting booths. The ELPO Building was originally constructed in 1927 as the Frame Storage Building. It was used to introduce frames to Plant 8. In 1955, the southern portion of the ELPO Building was constructed as the Apprentice School. In the late 1970s, both sections were converted to their present usage of parts painting and storage.

In 1957, the on-Site WWTP was constructed to treat alkali-oily wastewater and metallic wastewater. The WWTP treats both alkali-oily wastewater and strong metallic wastewater.

In 2002, Glenwood Road was extended from the south end of the Site north toward Beverly Avenue and then extending northward to Columbia Avenue. Improvements to Beverly Avenue were also completed. The Glenwood Road extension and Beverly Avenue improvements were completed by the city of Pontiac and are currently maintained by the city.

Current and historical wastes generated in the MFD area from metal finishing, electroplating, and painting/finishing may include solvents, paint-related wastes, and metal- and cyanide-containing wastes.

2.1.4 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 were located in the

Emissions Control Building. Paved parking areas and roadways occupy much of the land. A vacant area also exists where former Plant 18 was located (see Figure 1-3).

The Powertrain Headquarters Building was constructed in 1967, with a cafeteria adjoining the building constructed in 1990. The Powertrain Engineering Building was constructed between 1966 and 1970. A former car wash, located west of the Powertrain Engineering Building, was constructed in 1967, and was subsequently demolished in 1998. The Emissions Control Building was constructed between 1966 and 1970 and is still present.

On the west portion of the current Powertrain area, an Engine plant (Plant 18) was constructed in 1942 and was expanded in 1953. Plant 18 ceased operations and was demolished in 1998.

A new administration building was also built directly south of Powertrain in 2002/2003. Parking lots are currently being constructed in the area west of the new building and in the vicinity of former Plant 18.

Current and historical wastes generated at Powertrain may have included general trash and nonhazardous wastes, paint-related materials, waste solvents, laboratory wastes, batteries, and waste gasoline and diesel fuel.

2.1.5 SERVICE PARTS OPERATIONS (SPO)

The SPO area consists of 80 acres of land located at the northern portion of the Site (Figure 1-3) and includes Warehouse Storage and Shipping & Receiving operations and parts painting (Plant 75). The building and adjacent paved roadways and parking areas encompass nearly all of this area.

The eastern portion of Plant 75 was built in 1964. Several expansions of Plant 75 occurred until the 1990s.

Current and historical wastes generated at the SPO area may have included paint-related material, parts washer solvent, plant trash, light ballast, and scrap auto parts (including leaded batteries).

2.2 RCRA REGULATORY HISTORY

A history of the Site with respect to RCRA compliance activities for each of the four facilities shown on Figure 1-2 is presented in the following sections.

2.2.1 CPC PONTIAC FIERO ASSEMBLY PLANT OF GMC (U.S. EPA ID NO. MID 005356910)

GM submitted a Notification of Hazardous Waste Activity (U.S. EPA Form 8700-12) on August 8, 1980 (GM, 1980c) and a RCRA Part A Permit Application on November 11, 1980 (GM, 1980e). The Part A Permit Application listed the GMC Fisher Body Division Pontiac as a treatment, storage, and disposal (TSD) facility. The permit cited processes requiring container storage (S01), tank storage (S02), tank treatment (T01), and other treatment (T04). In the June 1985 revision to the Part A Permit Application, the name of the facility was changed to CPC Pontiac Fiero Assembly Plant of GMC (GM, 1985b).

A discussion of the Interim Status Units for the CPC Pontiac Fiero Assembly Plant of GMC is provided below. Available RCRA Part A Permit Applications and related correspondence were presented in the CCR (ENCORE, 2001a).

2.2.1.1 CONTAINER STORAGE

The container storage interim status unit was located outside Plant 17 in the southwest driveway adjacent to the railroad tracks. The container storage area had an 18,700 gallon capacity and was used to store F001, F002, F007, F008, F003, F005, F010, F011, F017, and D001 waste (GM, 1980c). GM removed all waste codes except D001 waste in the June 1985 Part A Permit Application revision (GM, 1985c). GM received clean closure for the container storage area in February 1988 (Michigan Department of Natural Resources (MDNR), 1988a). A new container storage area was constructed on the south side of the storage dock of the assembly plant to replace the former container storage area (GM, 1985b). The new area had the same storage capacity as the former area and was used to store D001, F001, and F003 wastes (GM, 1987e). A closure report for the new container storage area was submitted in January 1995 RUST (RUST, 1995); however, GM has not received official notification of clean closure from the Michigan Department of Environmental Quality (MDEQ).

2.2.1.2 TANK STORAGE AND TREATMENT

In the November 1980 Part A Permit Application, the interim status units for tank storage (600,000 gallon capacity), tank treatment (768,000 gallons per day [gpd] capacity), and other treatment (3,501,600 gpd capacity) were associated to the WWTP (GM, 1980e). The November 1980 Part A permit application cited 384,000 gpd wastewater treatment sludge dewatering, 3,110,400 gpd paint sludge dewatering, and 86,400 gpd bonderite sludge dewatering in the "other treatment" (T04) treatment category. The WWTP stored and/or treated F018, F006, F009, F017, and D002 wastes. The tank storage, tank treatment, and other treatment processes associated with the WWTP were removed from the Part A Permit Application in June 1985 due to the January 4, 1985 RCRA Amendments (GM, 1985b).

A new interim status (IM) unit for tank storage was included in the June 1985 Part A Permit Application revision. The interim status unit was the waste purge thinner UST, located north of Plant 17 and west of the paint mix building. The unit had a capacity of 12,000 gallons and was used to store D001 waste (GM, 1985b). The waste category was changed to F005 waste in the February 1986 Part A Permit Application revision (GM, 1986b). A closure report for the waste purge thinner UST was submitted in January 1995 RUST (RUST, 1995); however, GM has not received official notification of clean closure from the MDEQ.

2.2.2 GMC CENTRAL FOUNDRY DIVISION PONTIAC PLANT (U.S. EPA ID NO. MID 085470102)

GM submitted a Notification of Hazardous Waste Activity in August 1980 (GM, 1980a) and a RCRA Part A Permit application to the U.S. EPA on November 17, 1980 (GM, 1980f). The Part A Permit application listed the GMC Central Foundry Division Pontiac plant as a TSD facility. The permit cited processes requiring container storage (S01) and treatment (T04). The container storage and treatment area was located west of the northern end of the former casting plant. Baghouse dust (D006) was the only waste listed on the application.

In February 1981, GM received a letter from the U.S. EPA (waste analysis program) that the baghouse dust stored at the plant did not meet the definition of a hazardous waste under 40 CFR Part 261.24 (U.S. EPA, 1981). The Arc Furnace Baghouse Dust EP Toxicity Study by Clayton Environmental Consultants, Inc. (CEC) confirmed the previous U.S. EPA findings (CEC, 1981).

Based on the CEC report, GM withdrew the RCRA Part A Permit application in July 1982 (GM, 1982b). Based on the information submitted by GM, the U.S. EPA (waste management branch) confirmed that the baghouse dust was not defined as a hazardous waste (40 CFR 261.3); therefore, they concluded that the facility was not required to have a hazardous waste permit under Section 3005 of RCRA (U.S. EPA, 1983).

The RCRA Part A permit application and associated correspondence were presented in the CCR (ENCORE, 2001a).

2.2.3 CPC PONTIAC OF GENERAL MOTORS CORPORATION (U.S. EPA ID NO. MID 005356886)

GM submitted a Notification of Hazardous Waste Activity on August 8, 1980 (GM, 1980b) and a RCRA Part A permit application on November 18, 1980 (GM, 1980g). The Part A Permit Application listed the Pontiac Motor Division of GMC as a TSD facility. The permit cited process codes for container storage (S01), tank storage (S02), surface impoundment storage (S04), tank treatment (T01), surface impoundment treatment (T02) and other treatment (T04).

The facility name was changed to CPC Pontiac of General Motors Corporation in the June 1985 Part A Permit application revision (GM, 1985a). A discussion of Interim Status Units for CPC Pontiac of General Motors Corporation is presented below. Available RCRA Part A Permit Applications and associated correspondence were previously provided in the CCR (ENCORE, 2001a).

2.2.3.1 CONTAINER STORAGE

In the November 1980 Part A Permit Application, container storage at the facility was listed with a total capacity of 222,100 gallons (GM, 1980g). According to the map included with the November 1980 Part A Permit Application, there were numerous container storage areas throughout the facility. These areas were used to store F001, F002, F003, D001, F005, F006, F012, F018, F007, F008, F009, F010, F011, and F017 wastes. The number of container storage areas was reduced in the September 1982 Part A Permit Application revision due to the removal of paint sludge from hazardous classification (GM, 1982c). The only container storage area that retained interim status was the barrel storage area located southwest of the former engine plant.

The barrel storage area was a diked concrete pad with a storage capacity of 45,000 gallons and was used to store D001 waste. GM revised the Part A Permit Application in January 1986 to address revisions to the solvent listings. As a result, the F001, F005, and D008 wastes were cited for the barrel storage area (GM, 1986a). In November 1987, GM informed the U.S. EPA that they wanted to convert their hazardous waste operations to "generator only" status. GM indicated that they had recently enclosed a portion of their barrel storage area and that they intended to use the enclosed area for accumulation of hazardous waste (GM, 1987d).

2.2.3.2 TANK STORAGE AND TREATMENT

In the November 1980 Part A Permit Application, the interim status units for tank storage (496,700-gallon capacity), tank treatment (3,000,000 gpd capacity), and other treatment (500 gpd capacity) were associated with the WWTP (GM, 1980g). The WWTP interim status unit was removed from the Part A Permit Application in September 1982 based on exemption by rule for wastewater treatment facilities (GM, 1982c).

GM submitted a revised Part A Permit Application in March 1984 due to the construction of a 950-gallon bulk ignitable-liquid storage tank adjacent to the Emissions Control building (GM, 1984a). This tank was subsequently removed from the Part A Permit Application in September 1986 because the tank storage was regulated under 40 CFR 262.34 and should not have been included on the Part A Permit Application (GM, 1986e).

GM submitted a revised Part A Permit Application in June 1985 due to the January 1985 RCRA amendments that defined recycled wastes as hazardous. A 7,000-gallon tank in the ELPO

building was issued interim status (GM, 1985b). This tank was used to store thinner (F005 waste). The thinner tank was removed from the Part A Permit Application in August 1987 because it had not been used to store waste for greater than 90 days (GM, 1987b).

2.2.3.3 SURFACE IMPOUNDMENT STORAGE AND TREATMENT

In the November 1980 Part A Permit Application, interim status units for surface impoundments were listed with a total storage capacity of 7,507,000 gallons and a total treatment capacity of 100,000 gpd (GM, 1980g). These units were used for F001, F006, F012, F018, F007, F008, F009, F010, F017, and P030 wastes. The surface impoundment interim status units included various wastewater transfer sumps and two sludge consolidation areas.

The wastewater transfer sumps were located throughout the facility. The storage and treatment sumps were removed from the Part A Permit Application in September 1982 because they did not meet the definition of a surface impoundment (GM, 1982c).

One of the sludge consolidation areas was located adjacent to the container storage area in the southwest corner of the facility and had a capacity of 3,858,000 gallons. This sludge consolidation area was removed from the Part A Permit Application in September 1982 because it was no longer used (GM, 1982c).

The other sludge consolidation area was located adjacent to the WWTP and had a capacity of 240,000 gallons. On September 15, 1981, GM submitted a petition to the U.S. EPA to delist wastewater sludge from electroplating operations (F006), based on the characteristics of the sludge generated at the facility (GM, 1981b). On January 18, 1982, GM submitted a similar petition to the MDNR (GM, 1982a). The U.S. EPA granted the facility a temporary delisting for F006 waste in November 1982 (U.S. EPA, 1982). The MNDR issued the facility a redesignation of waste in June 1983 (MDNR, 1983a). As a result of the temporary exclusion granted by the U.S. EPA, the WWTP sludge consolidation area was removed from the Part A Permit Application in September 1982 (it was also noted that the area should be classified as a waste pile [S03]) (GM, 1982c). In April 1986, the U.S. EPA denied the facility's petition to delist wastewater treatment sludge from electroplating operations and indicated that the temporary exclusion would be revoked in May 1986 (U.S. EPA, 1986). Because the electroplating sludge waste was no longer stored in the waste pile, GM did not submit a Part B Permit Application. Additionally, because the waste remained on-Site for less than 90 days, GM did not submit a revised Part A Permit Application (GM, 1986). In 1987, GM notified the U.S. EPA that the electroplating process had been removed and the electroplating waste was no longer generated (GM, 1987a).

2.2.4 GMC WAREHOUSING AND DISTRIBUTION DIVISION (U.S. EPA ID NO. MID 076331289)

GM submitted a Notification of Hazardous Waste Activity (U.S. EPA Form 8700-12) on August 18, 1980 (GM, 1980d) and a RCRA Part A Permit Application to the U.S. EPA on November 18, 1980 (GM, 1980h). The Notification of Hazardous Waste Activity listed GMC Warehousing and Distribution Division as a hazardous waste generator.

2.3 HISTORICAL AND CURRENT WASTE MANAGEMENT PRACTICES

This subsection presents a description of historical and current waste management practices.

2.3.1 HISTORICAL WASTE MANAGEMENT PRACTICES

Between 1926 and 1979, the northern portion of the Site in the vicinity of Plants 25 and 33 was used by GM for placing non-salvage waste materials used in engine assembly, car assembly, foundry operations, painting and stamping, engine machining, metal plating, and wastewater treatment. In addition to the direct disposal of industrial process material into this fill area, waste was reportedly burned or partially burned at the salvage building incinerator and transported to the fill area for disposal. Waste disposal was also performed in the West Yard Area, and also included filling and burning of various waste products.

The WWTP, which began operations in 1957, has consisted essentially of two separate batch treatment systems. The first is for the treatment of metallic-acidic wastewaters, including hexavalent chromium, paint wastes, and powerhouse boiler blowdown. The second is for the treatment of alkali-oily wastewater. A separate WWTP was also in operation at Fiero from 1973 to 1983. The Fiero WWTP treated paint and bonderite sludge.

Process wastewaters from Plant 56 and Plant 5 were historically generated from the plating and axle manufacturing operations and were transported by overhead piping to the WWTP for treatment prior to discharge to the city of Pontiac publicly owned treatment works (POTW). When the electroplating operations were active, cyanide wastewaters were also treated by the WWTP. In 1987, GM ceased electroplating operations.

2.3.2 CURRENT WASTE MANAGEMENT PRACTICES

Containerized nonhazardous wastes generated throughout the MFD area are transported to a waste storage area located in the western portion of Plant 23. Wastes are accumulated and shipped off-Site for disposal from this location.

Four satellite hazardous waste storage areas exist on Site. The first is located in the ELPO Building, the second is located in the Powertrain Engineering Building, and two are located at Fiero. According to plant personnel, all hazardous wastes are shipped off-Site within three days of accumulation.

Sanitary and treated process wastewater and noncontact cooling water are discharged into the city of Pontiac's sanitary sewer system. Stormwater runoff from the rooftops of on-Site structures is conveyed through roof drains and downspouts to either exterior surfaces or underground storm sewer reaches. A significant portion of stormwater runoff from exterior surfaces is conveyed through catch basins and manholes to the on-Site storm sewer system. There are currently ten permitted stormwater outfall compliance points from the Site. The Site storm sewer system is discussed in more detail in Section 4.4.

2.4 LAND USE

The Site is zoned for industrial use, and areas surrounding the Site are zoned for a mixture of residential, commercial, and industrial use. Zoning determinations were based on a review of the city of Pontiac's zoning map (Figure 2-1). The area south of the Site is occupied by two city parks (Perry Park and Oakland Park). The areas east and west of the Site are occupied by residential neighborhoods. Additionally, a residential neighborhood is south of the SPO area in the northeast quadrant of the Site (Figure 1-3). The area north of the Site is occupied by a city park (Jaycee Park) and is also zoned for residential and industrial uses.

2.5 DEMOGRAPHICS

Manufacturing primarily supports the economy in the Pontiac area. 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.

2.6 ENVIRONMENTAL SETTING

2.6.1 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 2.7.7.1. The regional topography is also defined by direct or indirect glacial deposits but varies in relief, depending on depositional processes as described in Section 2.7.3.

2.6.2 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%. The prevailing winds are typically from the northwest in the winter months and the southwest in the summer months.

2.6.3 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.

2.6.3.1 OVERBURDEN

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 2-2 presents the regional surficial geology.

2.6.3.2 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 2-3 presents the regional bedrock geology.

2.6.4 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 (bgs). 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 2-4 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 well-sorted sand and gravel beds. 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.

2.6.5 SURFACE WATER/DRAINAGE

Storm Water at the Site is conveyed to the Site storm sewer system via catch basins and roof drains. Storm Water is then discharged from one of ten outfalls. The Site Storm Sewer system is discussed in more detail in Section 4.4.2.

2.6.6 GROUNDWATER USE

Groundwater in the area of 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 (U.S. EPA, 2000). 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).

2.6.7 SITE GEOLOGY/HYDROGEOLOGY

This section describes the geologic setting for the Site based on available monitoring well and borehole data. A detailed description of the Site geology/hydrogeology is presented on the RFI Report (ENCORE, 2002c).

2.6.7.1 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.

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 DA, 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.

Glaciolacustrine Deposits and Interbedded Outwash Deposits

Immediately underlying the fill material are glaciolacustrine deposits. 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. Found within the glaciolacustrine deposits are interbedded outwash deposits.

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.

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 unit ranges in thickness from 20 to 60 feet. The basal till is expected to act as a vertical barrier to any potential migration of groundwater or Site-related contaminants.

In the southern portion of the Site, a second (lower) basal till unit is present. 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 sequences 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.

2.6.7.2 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. Site groundwater is typically found at depths ranging from 4 to 35 feet 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 in the unconfined water table zone is 0.0047. However, there are localized groundwater flow variations 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 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. Groundwater elevation data 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. A toe drain was installed to divert this stormwater detention facility, discussed in Section 4.5.

In addition to the localized groundwater flow on-Site, there are also Site areas where groundwater was not present within the interval targeted for well placement. 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 USTs (AOIs M-4 and P-6) were removed as part of previous remedial actions. These excavations are backfilled with imported sand, which may support a perched groundwater system. A groundwater contour map presenting the top of the water table is shown on Figure 2-5.

Glaciolacustrine Zone

Intermediate groundwater monitoring wells were installed in the glaciolacustrine deposits as part of the Site-wide 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.

Upper Sand and Gravel Outwash Zone

Groundwater level measurements were collected periodically throughout the duration of the RFI. A groundwater potentiometric map for February 7 and 8, 2002 was generated for the upper sand and gravel outwash aquifer. 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 in the sand and gravel aquifer is 0.0045. 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

Three groundwater monitoring wells were installed in the lower sand and gravel outwash zone. Based on groundwater elevation data, the groundwater flow direction is similar to the upper sand and gravel zone, being toward the southeast.

Vertical Groundwater Flow

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. 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.

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.

2.6.7.3 IN-SITU HYDRAULIC CONDUCTIVITY TEST RESULTS

Hydraulic conductivity values were estimated from the data obtained from monitoring wells during low-flow sampling of monitoring wells. 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. A summary of hydraulic conductivity data for the monitoring wells at which hydraulic conductivity tests were conducted is in Table 2-2.

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.

2.6.8 BACKGROUND SOIL CHARACTERIZATION

Background soil samples were collected during the RFI to characterize naturally occurring levels of metals in soil at the Site. Samples were collected from six locations where no manufacturing or management of production materials or wastes is known to have occurred. Figure 2-6 shows the locations where the background soil samples were collected.

The metal concentrations in background soil from the surficial soil are summarized in Table 2-3, which also includes summary statistics describing the concentration distributions. Table 2-3 also includes statistical prediction limits for determining whether concentrations of metals from elsewhere at the Site are within background levels, and Michigan Natural Resources and Environmental Protection Act (NREPA) 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.

Metal concentrations in samples from elsewhere at the Site, except for arsenic and zinc, were compared to either the State default background soil concentration or the calculated prediction interval, whichever was higher. 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.

2.7 SITE REDEVELOPMENT PLANS

Portions of the Site are intended for Brownfield redevelopment. The DA is currently being evaluated for construction of a distribution center. Additionally, the city of Pontiac is in the process of purchasing land for building city streets through portions of the Site to service future redevelopment.

3.0 AOIs WHERE RFI SAMPLING NOT NECESSARY

A number of AOIs were not investigated as part of the RFI. Neither visual inspections nor examination of the available historical records during the development of the CCR (ENCORE, 2001a) could detect evidence of releases from these AOIs. It was consequently concluded in the CCR (ENCORE, 2001a) that these areas required NFA. The following sections summarize these areas.

This section is organized according to the following five operational areas that make up the Site, and a sixth area, the Site storm sewer system for Outfall 001:

- Fiero;
- DA;
- MFD;
- Powertrain;
- SPO; and

These operational areas are illustrated on Figure 1-3.

All AOIs discussed in this section were designated as NFA in the CCR (ENCORE, 2001a), because they were previously clean or closed, due to the lack of evidence of a release, or due to the nonhazardous nature of the materials managed in these areas. A breakdown of the number and type of AOIs for each area is discussed below. Each AOI is discussed according to AOI description, historical and current operations, previous remedial investigations and actions, and the conclusions of the CCR (ENCORE, 2001a).

3.1 FIERO

A total of nine AOIs associated with Fiero were concluded to require NFA in the CCR (ENCORE, 2001a). These areas are discussed in the following sections.

3.1.1 POWERHOUSE SATELLITE ACCUMULATION AREAS (AOI F-1)

AOI F-1 consists of two satellite accumulation areas (SAAs) identified as SAA1 and SAA2, which are both located in the Powerhouse south of Plant 17. SAA1 was identified as SWMU 1 in the Fiero PA/VSI Report (PRC, 1992); therefore, it was considered an AOI.

SAA2 was not identified as a SWMU in the Fiero PA/VSI Report (PRC, 1992); however, it was identified as an AOI due to its proximity to SAA1.

SAA1 is located in the basement of the Powerhouse and consists of one 55-gallon drum that stores waste paint thinner and is placed directly on the concrete floor. SAA1 has been active since August 1988, when Plant 17 ceased assembly operations.

SAA2 is located in the compressor room of the Powerhouse and consists of approximately fifteen 55-gallon drums that store waste oils. When a drum is filled, it is transferred to Plant 5 for disposal.

There have been no documented releases from either SAA1 or SAA2 and no investigations or remedial actions have been conducted in association with SAA1 or SAA2.

During an August 2000 Site walkthrough, which evaluated potential AOIs for the CCR (ENCORE, 2001a), both of the SAAs were observed to be in good condition (i.e., the concrete was not cracked, no extensive staining was observed).

Based on a visual Site walkover, lack of documented releases, and information in the Fiero PA/VSI Report (PRC, 1992), the CCR (ENCORE, 2001a) recommended NFA for AOI F-1.

3.1.2 WASTE GASOLINE ACCUMULATION AREA (AOI F-2)

AOI F-2 consists of a waste gasoline accumulation area located in the maintenance area of Plant 17. This area was previously identified as a SWMU (SWMU 2) in the Fiero PA/VSI Report (PRC, 1992); therefore, this area was considered an AOI.

The waste gasoline accumulation area consists of one 55-gallon drum used to store waste gasoline with the drum placed directly on the concrete floor. The Fiero PA/VSI Report (PRC, 1992) stated that this area had been operational since at least August 1988, when the plant ceased assembly operations.

There have been no documented releases related to the waste gasoline accumulation area and no investigations or remedial actions have been conducted in association with the waste gasoline accumulation area.

During an August 2000 Site walkthrough, the area indicated on the Site figure provided in the Fiero PA/VSI Report (PRC, 1992) was located. However, there was no evidence of a waste gasoline accumulation area being present. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI F-2.

3.1.3 CONTAINER STORAGE AREA (CSA) (AOI F-3)

AOI F-3 consists of a CSA (RCRA Interim Status Unit) located on the south side of the storage dock, outside the assembly plant. This area managed both liquid and solid waste and was

previously identified on the Part A Permit Application (GM, 1987e) and as a SWMU (SWMU 3) in the Fiero PA/VSI Report (PRC, 1992); therefore, the area was considered an AOI.

The CSA (RCRA Interim Status Unit) was constructed in July 1986 to replace the closed CSA (AOI F-4). The CSA managed both solid and liquid wastes generated from a number of areas in the Fiero assembly plant. The CSA consisted of a concrete pad that was approximately 65 feet by 90 feet, with a thickness of 8 inches. The area was partially bermed with 1- to 4-foot-high concrete berms. The pad's concrete joints are sealed and if a release occurred, it was routed through a collection sump to the existing WWTP located on the MFD portion of the Site. Wastes were stored in this area for more than 90 days. Wastes included ignitable waste, chlorinated solvents, and various paint wastes. The maximum capacity of the CSA was three hundred-eighty 55-gallon drums. When the Fiero Plant ceased automobile assembly activities in August 1988, GM closed the CSA. Closure activities were completed in 1989 Techna (Techna, 1990).

Two aboveground storage tanks (ASTs) were located in a separately contained area in the southwest corner of the CSA. GM originally planned to use the tanks for waste oil storage but decided that the tanks were not required and they were never used.

There have been no documented releases from the CSA.

Previous investigations included a soil investigation as part of the CSA closure activities, and a supplemental soil and groundwater investigation. Remedial actions consisted of the CSA closure activities.

Prior to closure activities, the wastes stored on the CSA were removed, transported, and disposed of at a hazardous waste treatment or disposal facility. GM cleaned and decontaminated the concrete pad, the collection sump, and the trench and piping.

Techna (1990) collected 21 confirmation soil samples as part of the closure activities, and recommended additional investigation at the CSA because select volatile organic compounds (VOCs) in soil were above the applicable criteria at that time Techna (Techna, 1990).

In August 1991, Testing, Engineers and Consultants, Inc. (TEC) conducted an additional subsurface investigation at the CSA (TEC, 1992). TEC collected soil samples and groundwater samples where tetrachloroethene (PCE) and 1,1,1-trichloroethene exceeded Michigan Type B soil criteria values. RUST (1995) concluded from the previous data that the VOCs present in soils below the CSA were most likely attributable to historical activities.

In January 1995, GM submitted a RCRA Closure Report for the CSA to MDNR RUST (RUST, 1995). This report summarized the two previous investigations conducted at the CSA. MDNR

sent a letter to GM on March 31, 1995 stating that the agency would begin reviewing the RCRA Closure Report in early 1996 (MDNR, 1995a). No further communication was noted in the files.

Subsequently, GM prepared a revised closure report and is pursuing final closure certification from the MDEQ. Based on the closure activities described previously, the CCR (ENCORE, 2001a) recommended NFA for the CSA.

3.1.4 CLOSED CONTAINER STORAGE AREA (CSA) (AOI F-4)

AOI F-4 consists of a closed CSA (RCRA Interim Status Unit) located outside Plant 17 in the southwest driveway, adjacent to the railroad tracks. This area managed both liquid and solid waste and was previously identified on the Part A Permit Application (GM, 1980e) and as a SWMU (SWMU 4) in the Fiero PA/VSI Report (PRC, 1992); therefore, the area was considered an AOI.

The closed CSA was in operation from before 1977 to August 1985. The closed CSA was situated on a bermed concrete pad. Wastes were stored in this area for greater than 90 days. Wastes included scraped sealers, adhesives, paint thinners, and waste solvents. The maximum capacity of the closed CSA was three hundred-seventy 55-gallon drums. The closed CSA was dismantled, removed, and paved.

There were no documented releases from the closed CSA. Previous investigations and remedial actions consisted of closure of the CSA.

GM submitted a closure plan to MDNR for the closed CSA in April 1986 (after the area was out of service) (GM, 1986b). Closure certification was submitted to MDNR in November 1986 (GM, 1986k). GM received clean closure certification of the area from the MDNR in February 1988 (MDNR, 1988a). Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI F-4.

3.1.5 FORMER FIERO WASTEWATER TREATMENT PLANT (WWTP) (AOI F-5)

AOI F-5 consists of the former Fiero WWTP located along Portland Street, 100 yards north of Owens Street. This area was identified as a SWMU (SWMU 5) in the Fiero PA/VSI Report (PRC, 1992); therefore, the former Fiero WWTP was considered an AOI.

The former Fiero WWTP operated from 1973 to 1983 (PRC, 1992). The location of the former WWTP was paved over and is currently used as a driveway. The former Fiero WWTP managed wastewater, wastewater treatment sludge, paint sludge, and bonderite sludge.

The Fiero PA/VSI Report (PRC, 1992) stated that there had been no documented releases from the former Fiero WWTP. According to plant personnel, the former Fiero WWTP was

constructed of above-grade steel tanks situated on a concrete pad with secondary containment. Liquids from the plant were decanted to the city of Pontiac POTW. Solids from the plant were removed and placed directly into trucks for off-Site disposal.

There had been no previous investigations or remedial actions associated with the former Fiero WWTP. The CCR (ENCORE, 2001a) recommended NFA for AOI F-5.

3.1.6 WASTE PURGE THINNER UST AND THREE PRODUCT USTs (AOI F-6)

AOI F-6 consists of a waste purge thinner UST (RCRA Interim Status Unit) and three product USTs located north of Plant 17, directly west of the paint mix building. The waste purge thinner was previously identified on the Part A Permit Application (GM, 1985b) and as a SWMU (SWMU 6) in the Fiero PA/VSI Report (PRC, 1992). This area was considered an AOI because affected soils were discovered during UST closure activities in 1989 and because it was identified on the Part A Permit Application and in the Fiero PA/VSI Report (PRC, 1992).

The waste purge thinner UST (RCRA Interim Status Unit) was located in a tank farm north of Plant 17, directly west of the paint mix building. The three product USTs that stored xylenes, purge thinner, and cellosolve acetate were also located within the tank farm. The 12,000-gallon waste purge thinner UST was a single-walled steel tank. The system was located 3 feet below grade and was encased within 15 inches of reinforced concrete. The USTs were in operation from approximately 1969 to May 1989. The waste purge thinner UST received waste purge thinner from the paint mix building and two paint spray booths in the assembly plant. A licensed transporter removed the waste purge thinner from the tank every 60 to 90 days and transported it to an off-Site reclamation center. A spill of 50 to 100 gallons of waste purge thinner occurred in August 1985. The USTs were removed in 1989.

Previous investigations included a RCRA closure investigation conducted during the waste purge thinner UST closure activities. The three product USTs were closed at the same time (but not required to be closed pursuant to RCRA), while the waste purge thinner UST was subject to closure under RCRA. Remedial actions included removal of the four USTs and adjacent soils.

Prior to removal of the USTs, the waste purge thinner and product were removed and hauled to an off-Site licensed waste treatment facility. The four USTs were rinsed out and decontaminated. No holes, pits, or staining were noticed on the USTs after removal. However, during the UST removal process, solvent odors were noticed in the surface soils. Approximately 60 cubic yards (CY) of surface soil were removed and placed in roll-off boxes. The excavated soils were transported off-Site to a licensed hazardous waste disposal facility for disposal. Soil excavation was continued beyond visually affected surficial soils and stockpiled on the pavement near the tank farm. VOCs were not detected above MDNR Type B Cleanup

Criteria Standards in these soils and the soil was disposed of at the city of Pontiac Landfill RUST (1995).

Twenty confirmation soil samples were collected by Techna (1990) from the UST excavation (all four USTs). In addition, four borings were completed north of the tank farm area to determine area-specific background levels of metals in the surrounding soil. Soil underlying the tank farm exceeded typical background levels.

RUST (1995) concluded from the Techna (1990) data that the metals in the soil are typical of Michigan soils. RUST (1995) also concluded that waste purge thinner does not contain metal wastes that could be associated with the elevated levels of metals in the soil; therefore, these metals were not related to the waste purge thinner UST.

RUST (1995) concluded the following from the Techna (1990) data:

- VOCs in the soil did not exceed the MDNR Type B cleanup criteria;
- VOCs were not detected in the soil near the waste purge thinner UST; and
- VOCs were below method detection limits in the approved closure plan.

In January 1995, GM submitted a RCRA Closure Report for the waste purge thinner UST to MDNR RUST (1995). This report summarized the previous investigation conducted at the UST. MDNR sent a letter to GM on March 31, 1995, stating that the agency would begin review of the RCRA Closure Report in early 1996 (MDNR, 1995a). No further communication was noted in the files. GM will pursue final closure certification from the MDEQ. Therefore, the CCR (ENCORE, 2001a) recommended NFA for AOI F-6.

3.1.7 TEMPORARY CONTAINER STORAGE AREA (CSA) (AOI F-9)

AOI F-9 consists of a temporary CSA located east of the powerhouse. This area was identified in the Fiero PA/VSI Report (PRC, 1992) as a SWMU (SWMU 9); therefore, the area was considered an AOI.

The Fiero PA/VSI Report (PRC, 1992) stated that the temporary CSA was located east of the powerhouse. The area was used between August 1985 (when the closed CSA [AOI F-4] became inactive) and July 1986 (when the CSA [AOI F-3] became active). The PA/VSI Report (PRC, 1992) stated that this area was used to store containers of waste gasoline, solvent, and paint wastes. According to Site personnel, the existence of the temporary CSA is questionable because Site records do not indicate operation of this unit.

There have been no documented releases from the temporary CSA and there have been no previous investigations or remedial actions conducted in association with the temporary CSA.

During the VSI, PRC personnel could not inspect this area due to snow cover; however, the Fiero PA/VSI Report (PRC, 1992) states that there was no evidence of any release controls. Based on the location provided in the Fiero PA/VSI Report (PRC, 1992), this area was inspected during an August 2000 Site walk, with no signs of the reported CSA nor any evidence of past releases.

Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI F-9.

3.1.8 HIGH-PRESSURE FLY ASH STORAGE SILO (AOI F-10)

AOI F-10 consists of a high-pressure fly ash storage silo located east of the powerhouse. This area was identified as a SWMU (SWMU 10) in the Fiero PA/VSI Report (PRC, 1992); therefore the area was considered an AOI.

The high-pressure fly ash storage silo has been in operation since 1985. This storage unit consists of a capped concrete cylinder and is used to store nonhazardous high-pressure fly ash. The total capacity of the silo is between 500 and 600 tons. Ash is watered down during the transfer process to reduce dust.

The Fiero PA/VSI Report (PRC, 1992) stated that thirty-seven 55-gallon drums were temporarily stored in this area during the closure of AOI F-4.

There have been no documented releases from the high-pressure fly ash storage silo and there have been no investigations or remedial actions conducted in association with the high-pressure fly ash storage silo. The Fiero PA/VSI Report (PRC, 1992) stated that the silo was in good condition with no evidence of a release. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI F-10.

3.1.9 LOW-PRESSURE FLY ASH STORAGE SILOS (AOI F-11)

AOI F-11 consists of two low-pressure fly ash storage silos located east of the powerhouse. The silos were previously identified as a SWMU (SWMU 11) in the Fiero PA/VSI Report (PRC, 1992); therefore, they were considered an AOI.

The two low-pressure fly ash storage silos have been used to store nonhazardous low-pressure fly ash since the 1940s. Each silo can store approximately 200 to 300 tons of fly ash.

The Fiero PA/VSI Report (PRC, 1992) stated that there had been no documented releases from the low-pressure fly ash storage silos.

No investigations or remedial actions have been conducted in association with the low-pressure fly ash storage silos. The Fiero PA/VSI Report (PRC, 1992) stated that observations made

during the VSI showed that the silos were in good condition with no indication of a release. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI F-11.

3.2 DEMOLITION AREA (DA)

The DA contains four AOIs that had NFA recommended in the CCR (ENCORE, 2001a). These four AOIs are discussed in the following sections.

3.2.1 FORMER HAZARDOUS WASTE STORAGE PAD (AOI W-2)

AOI W-2 consists of a former hazardous waste storage pad located in the western portion of the West Yard, therefore the area was considered an AOI.

In 1982, a hazardous waste storage pad was constructed to store RCRA hazardous waste (RCRA Interim Status Unit). The hazardous waste storage pad is located immediately south of the former Salvage Building and west of the former Compressor Building. The pad is an approximate 27,000-square-foot, 8-inch-thick concrete pad with a 4-inch curb. Activities conducted on the pad included waste storage, drum washing, and empty drum storage. The pad was used for the storage of solid and liquid hazardous and nonhazardous wastes (i.e., paint, paint thinner, gasoline, chlorinated solvents, machine wastes, lead chips, and spent halogenated solvents) prior to July 1, 1988, at which time closure activities were initiated by CPC. As reported in the Certification Regarding Potential Releases from Solid Waste Management Units (GM, 1986c), a waste pile containing WWTP sludge, machine sludges, and paint sludges occupied the storage pad from 1979 to 1981.

Prior to pad construction, TEC conducted a soil/geotechnical investigation. Based on the data, TEC concluded the soil could remain in place to allow for the construction of the Hazardous Waste Storage Pad.

Closure plans were subsequently submitted by GM to MDNR in November 1987 (GM, 1987c), February 1988 (GM, 1988a), and May 1988 (GM, 1988c) to allow for the decommissioning of the pad. The MDNR rejected the first two closure plans, and in June 1988 approved the May 1988 plan (MDNR, 1988b). Closure activities conducted by Dames & Moore commenced in July 1988. As part of the decommissioning activities, Dames & Moore conducted two phases of soil sampling as summarized in the Interim Closure Report - Former Container Storage Area (Dames & Moore, 1989). It was noted in this report that the pad was heavily cracked and that much of the contamination was found in low-lying areas. All soil and groundwater samples were analyzed for lead, benzene, toluene, xylenes, 1,1,1-trichlorethane, methylene chloride, methyl ethyl ketone and 1-butanol.

Dames & Moore reported in the Endangerment Assessment - Former Container Storage Area (Dames & Moore, 1990; draft) that there was a significant risk associated with the carcinogenic contamination. The estimated worst-case current use exposures and associated potential health risks were identified to be within the U.S. EPA target risk range.

Groundwater Technologies, Inc. (GTI) conducted a soil vapor extraction feasibility study that is summarized in both the Subsurface Investigation and Soil Vapor Pilot Test - Feasibility Study (GTI, 1990a) and the Soil Vapor Pilot Test #2 – Feasibility Study (GTI, 1990b). GTI installed several monitoring wells and obtained soil samples. During a subsequent investigation, as reported in the RCRA Pad Review - Hazardous Waste Storage Area (GTI, 1991), it appears that GTI installed two additional monitoring wells, however well logs were not included. In this report, GTI summarizes the ongoing history of the hazardous waste storage pad without making any further discoveries in addition to those outlined previously.

A Parsons (1997b) Site investigation conducted in 1996 and 1997, summarized historical investigations and remedial activities, concluding that it appeared infeasible to remediate to the pad closure criteria the underlying soil and groundwater at the pad, and that compounds in soils and groundwater under the pad most likely did not originate from the activities at the pad, but from historical waste management activities in the West Yard area. GM subsequently agreed to conduct a West Yard area-wide investigation to evaluate the environmental conditions and assess the need for any appropriate corrective actions.

This conclusion is further supported by groundwater sampling and analysis conducted by Parsons in January 1996, which indicated that the LNAPL sampled from different wells originated from different sources and consisted of different concentrations and combinations of constituents (Parsons, 1997b).

GM previously reached an agreement with MDEQ that final closure of the pad would be granted upon implementation of remediation activities pertaining to historical impacts in the West Yard. Recent discussions with MDEQ indicated that a non-clean closure could be provided. GM will pursue non-clean closure of the pad. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for the hazardous waste storage pad.

3.2.2 TRANSFORMER SUBSTATION D-1 (AOI W-4)

AOI W-4 consists of transformer substation D-1, which was previously located in the southeast quadrant of the former Plant 8 prior to its demolition in 1997. This area was considered an AOI because of documented polychlorinated biphenyl (PCB) transformer oil spills within the substation.

As part of the demolition of Plant 8, PCB-containing transformers were removed from substation D-1 located within the plant. Following removal of the transformers, staining observed on the concrete floor was cleaned by the contractor who removed the transformers. Wipe samples taken after the spill cleanup indicated residual PCB contamination. Remedial actions were subsequently undertaken by SUNPRO and summarized in the Final Report- PCB Remediation Substation D-1 (SUNPRO, 1996). SUNPRO removed 2 to 3 inches of concrete from where the transformers were formerly located. Post remedial wipe sampling indicated compliance with the U.S. EPA PCB cleanup requirement of less than 10 ug/100 cm^2. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI W-4.

3.2.3 PLANT 9 TURBO TANK (TANK 9-1) (AOI W-7)

AOI W-7 consists of a turbo tank (Tank 9-1) that was previously located in the area immediately northwest of the former Plant 9. This area was considered an AOI because of the material historically stored in the UST.

Tank 9-1 was a registered UST installed as early as 1983, and was used for storing gasoline. The 550-gallon UST was reportedly removed in June 1991, and was requested to be considered "closed" in an application to the Michigan State Police, Fire Marshal Division, Hazardous Materials Section, in three letters from CPC dated September 11, 1990 (GM, 1990), June 27, 1991 (GM, 1991), and March 6, 1992 (GM, 1992).

TEC's UST Closure Site Assessment report could not be located but was mentioned in a letter from GM dated June 27, 1991 (GM, 1991). The TEC Tank 9-1 site assessment showed no contamination, and was therefore considered closed by CPC Pontiac. The CCR (ENCORE, 2001a) recommended NFA for AOI W-7.

3.2.4 CATALINA SUBSTATION (AOI W-12)

AOI W-12 consists of the Catalina Substation located south of Montcalm Street and east of the SWDF. This area was considered an AOI because there were reported spills of PCB-containing oils with subsequent remedial action implemented.

The substation is owned by GM and leased to Detroit Edison. This power station was used to service the foundry operations.

In response to a release of PCB-containing transformer oils on August 19, 1985, GM initiated a sampling and analysis program for PCB-contaminated soils followed by remedial action (GM, 1986f). These remedial actions involved removal of PCB-contaminated soils and were approved by the MDNR in a letter dated May 27, 1987.

Based on the approved remedial activities, the CCR (ENCORE, 2001a) recommended NFA for AOI W-12.

3.3 METAL FABRICATION DIVISION (MFD)

The CCR (ENCORE, 2001a) concluded that ten of the AOIs contained within MFD required NFA. These ten AOIs are detailed in the following sections.

3.3.1 FORMER TRACK 31 (AOI M-3)

AOI M-3 consists of former Track 31, a railroad spur located west of Plant 14 and northwest of the WWTP. This area was considered an AOI because of a documented historical release of PCB-containing hydrocarbons.

Former Track 31 was used for transporting materials within the facility. The nature of the materials transported on Track 31 is not known at this time. In October 1986, GM personnel reported oil staining on Track 31.

Previous investigations included several soil and groundwater investigations that were conducted between 1986 and 1995. These investigations delineated the nature and extent of PCBs along Track 31. Remedial actions consisted of excavation of PCB-contaminated soil in September and October 1996. Previous investigations and remedial actions are detailed below.

GM submitted a Remedial Action Plan (RAP) for Part 201 industrial/restricted access closure on July 23, 1996 (GM, 1996a). On September 26, 1996, MDEQ (1996) approved the RAP with modifications as an IM.

In September 1996 and October 1996 soils and rail materials were excavated from the Track 31 area. A total of 3,609 tons of debris (soils and rail line) were removed and disposed at the Toxic Substance Control Act (TSCA) permitted Grassy Mountain Facility in Lakepoint, Utah.

The RAP completion report was submitted to the MDEQ in January 1997, O'Brien and Gere (OBG, 1997).

Therefore, the CCR (ENCORE, 2001a) recommended NFA for AOI M-3.

3.3.2 PLANT 5 HYDRAULIC FLUID SPILL (AOI M-6)

AOI M-6 consists of an area adjacent to Plant 5, where PCB-containing fluid was spilled. The area near loading dock 35 was considered to be an AOI because of a spill of PCB-containing hydraulic fluid in September 1992.

Plant 5, built in 1927, was one of the first buildings constructed at the Site. Plant 5 was used for the storage and final shipping of automobiles from 1927 through at least 1950. Plant 5 contained metal working operations from at least the early 1960s through approximately 1985, including the manufacturing of ring and pinions for rear axles. From 1985 through 1990, Plant 5 was used for the storage of automobiles and the long-term storage of miscellaneous equipment. In 1994, a waste accumulation operation was relocated from another part of the Site to the west end of Plant 5.

At the time of the hydraulic fluid spill in September 1995, CPC Headquarters Tooling Procurement leased space from GM to operate an investment recovery operation. This investment recovery operation received shipments of equipment and materials transferred from other GM plants. A spill of PCB-containing hydraulic fluid occurred on September 3, 1992, during unloading of a hydraulic press transferred from another GM plant.

The facility hazardous materials team contained the spill with absorbent and collected a sample of the spilled material. Results of the analysis conducted at the GM on-Site laboratory indicated the presence of Aroclor 1254. Additional samples were collected and sent to National Environmental Testing (NET) for verification. These results also indicated the presence of Aroclor 1254.

Based on the analytical results, GM decided to excavate the spill area plus a 1-foot buffer zone. The excavation was completed on September 18, 1992. No information was available that disclosed the actual size or depth of the excavation. The excavated blacktop, concrete, and soil were subsequently disposed of as nonhazardous/non-TSCA waste, based on toxicity characteristic leaching procedure (TCLP) analysis.

No visible staining was observed in the area during the Site walkthrough associated with the CCR (ENCORE, 2001a). As a result, the CCR (ENCORE, 2001a) recommended NFA for AOI M-6.

3.3.3 PLANT 25 OIL STORAGE AREA (AOI M-8)

AOI M-8 consists of an oil storage building located to the west of Plant 25. Six ASTs are located within the oil storage building. One AST is located outside the oil storage building to the south. This area is considered an AOI because of the various petroleum-based materials stored in the ASTs.

The oil storage building contains five 15,000-gallon ASTs and one 20,000-gallon AST. The 15,000-gallon ASTs are used to store soluble oil (one tank), hydraulic oil (one tank), semi-synthetic grinding oil (one tank), engine oil (one tank), and lubrication oil (one tank). The 20,000-gallon AST is empty. The ASTs do not have individual secondary containment, but the

entire building is surrounded by a diked containment system that drains to the WWTP via the Plant 25 basement sump area.

Plants 25 and 33 housed engine machining and assembly operations. Material storage and shipping associated with these operations were also conducted in these plants. The oil storage building was used to house ASTs containing various types of oil.

A paint booth is located in the building, south of the ASTs. A diesel AST is located just outside the oil storage building on the south end.

There have been no documented releases from either the oil storage ASTs or the diesel AST and there have been no previous investigations or remedial actions associated with the oil storage ASTs or the diesel AST. The concrete containment inside and outside the building appeared to be in good condition with no evidence of releases. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI M-8.

3.3.4 PLANT 23 BASEMENT AST AREA (AOI M-10)

AOI M-10 consists of three ASTs located in the basement of Plant 23. This area was considered an AOI because of the type and quantity of materials (synthetic coolant) stored in the former ASTs.

Pressed metal operations and maintenance activities have historically been conducted in Plants 5 and 23. Three 12,500-gallon ASTs are located in the basement of Plant 23. The ASTs previously contained 593-KC synthetic coolant. Plant personnel confirmed that the ASTs are empty and no longer used. The tanks have a below-grade containment system and sump that discharge to the WWTP. No documented releases have occurred in the Plant 23 basement AST area.

There have been no previous investigations or remedial actions associated with the Plant 23 basement AST Area. During the Site walkthrough for the CCR (ENCORE, 2001a), the ASTs were observed to be intact and no evidence of staining was observed. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI M-10.

3.3.5 AST EAST OF PLANT 49 (AOI M-12)

AOI M-12 consists of an AST located east of Plant 49 at the water storage building. Historically, the AST has contained both fuel oil and diesel fuel. This area was considered an AOI because of the type and quantity of materials (petroleum-based products) stored in the AST.

The 550-gallon AST is currently contained in a secondary containment basin that has a blind sump. There have been no documented releases for this AST and there have been no previous investigations or remedial actions associated with the AST.

During the Site walkthrough for the CCR (ENCORE, 2001a), the concrete containment basin and sump were in good condition and there was no evidence of spills. Based on this information, the CCR (ENCORE, 2001a) recommended NFA AOI M-12.

3.3.6 CURRENT AST AREA EAST OF PLANT 12 (AOI M-14)

AOI M-14 consists of an AST area located east of Plant 12. This area was considered an AOI because of the gasoline and diesel fuel stored in the ASTs.

The AST area contains two 1000-gallon ASTs (one gasoline, one diesel) and associated dispensing equipment that were installed in 1999. The ASTs are constructed of double-lined steel and have secondary containment systems that drain to a closed blind sump. Water in the sump is periodically pumped and hauled off-Site. There have been no documented releases associated with these ASTs.

There have been no previous investigations or remedial actions associated with this AST area.

Both ASTs have secondary containment systems that were observed to be in good condition during the Site walkthrough associated with the CCR (ENCORE, 2001a). Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI M-14.

3.3.7 TRACK 26 (AOI M-15)

AOI M-15 consists of Track 26, a railroad spur that originates from the main railroad line and extends between Plant 2 and Plant 14. Track 26 was considered an AOI due to the types of materials that were potentially transported on the railway and historical investigation showing the possible presence of PCBs. In addition, soil is exposed directly beneath the railway.

Previous investigations of the Track 26 area indicated the potential presence of elevated concentrations of PCBs on concrete and soil (CRA, 1998a). CRA conducted a concrete and soil investigation in March, 1998. PCBs were detected in the one concrete core sample but was below the Michigan NREPA Part 201 Generic Industrial Direct Contact Criteria (IDC) for soil. Only two of 29 soil samples had detections of Aroclor-1260 (9,100 and 2,400 ug/kg). Arsenic and beryllium were the only metals detected above Michigan NREPA Part 201 Generic Residential Drinking Water Protection Criteria (RDWP) for soil, but below the IDC for soil.

During an August 2000 Site walkover, there were no areas of observed staining or other indications of releases.

Based on results of previous investigations, the CCR (ENCORE, 2001a) recommended NFA for AOI M-15.

3.3.8 PLANT 5 WASTE ACCUMULATION AREA (AOI M-18)

AOI M-18 consists of a waste accumulation area located in the west end of Plant 5. This area is considered an AOI because this area is used to accumulate and store various waste materials.

In 1994, a waste accumulation operation was relocated from another part of the Site to the west end of Plant 5. The waste accumulation area occupies approximately 13,000 square feet in the west end of Plant 5, and is separated from the remainder of the building by its location and a small guardrail. The wastes are accumulated from various processes throughout the Site and stored in 55-gallon drums or on pallets, as appropriate. Empty containers are also stored in this area. There is no secondary containment system for the waste accumulation area. Wastes are accumulated in this area and sent off-Site for disposal. Wastes stored and labeled included PCB light ballast, and non-RCRA wastes (labeled). Numerous 55-gallon drums containing various materials were observed in the waste accumulation area during a Site walkthrough associated with the CCR (CRA, 2000c; draft).

There have been no previous investigations or remedial actions associated with the waste accumulation area and no evidence of spills or leaks was observed in the area. Based on this information and the type and quantity of materials stored in this area, the CCR (ENCORE, 2001a) recommended NFA for AOI M-18.

3.3.9 PLANT 23 BASEMENT AREA (AOI M-20)

AOI M-20 consists of the basement area of Plant 23. The Plant 23 basement was considered an AOI because standing liquids and discolored basement walls were observed on the south-central side of the basement during a Site walkthrough associated with the CCR (ENCORE, 2001a).

Plants 5 and 23 contained metal working operations from approximately the early 1960s through 1985, including the manufacturing of rings and pinions for rear axles. Currently, pressed metal operations and maintenance activities are conducted in Plant 23.

There have been no documented releases within the basement area. During a September 2000 Site walkthrough, liquid was observed to be collecting in low-lying areas of the basement. The liquid appeared to be condensate water from a pipe. Discolored basement walls were also observed, along with evidence of groundwater seepage into the basement. Subsequent activities at the Plant revealed this seepage was due to a sanitary sewer break.

There have been no previous investigations or remedial actions associated with the Plant 5 basement area.

Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI M-20.

3.3.10 PLANT 15 - COLUMBIA AVENUE SWITCH HOUSE (AOI M-22)

AOI M-22 consists of the Columbia Avenue Switch House, located on the western side of Plant 15. This area was considered an AOI because transformer oil that potentially contained PCBs was used at the switch house.

The Columbia Avenue switch house has historically handled electrical service for Plant 12 and Plant 15. The switch house is enclosed within a brick building located on the western side of Plant 15, between the plant building and the Site fencing. Access is restricted to the enclosed switch house. During a Site walkthrough associated with the CCR (ENCORE, 2001a), the exterior of the building (excluding the western side) was observed. No staining was observed that may be associated with transformer oil. There have been no documented releases associated with the switch house and there have been no previous investigations or remedial actions associated with the switch house.

Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI M-22.

3.4 POWERTRAIN

The CCR (ENCORE, 2001a) concluded that seven AOIs within Powertrain required NFA. These AOIs are discussed in the following sections.

3.4.1 FORMER POWERTRAIN UST FARM (AOI P-1)

AOI P-1 consists of the former Powertrain gasoline fueling area UST farm previously located adjacent to the south wall of the engine testing laboratory. This area was considered an AOI because of a documented release of gasoline that was discovered in April 1990.

The former UST farm contained seven tanks (PE-A through PE-G) that were used for dispensing fuel. This area is currently paved over as parking spaces.

Three leak detection monitoring wells were installed around the UST farm in 1984. Initial analysis results for gasoline content were non-detect. However, a concentration of 1,500 milligrams per liter (mg/L) was detected in a sample collected from the sump adjacent to the tank vault. Concentrations of BTEX from one of the monitoring wells during the March 1990 leak detection monitoring event were indicative of a possible release near the northwest corner

of the UST farm. Based on these results, a release was reported to the State Fire Marshall on April 12, 1990.

Because of the construction of the new UST farm (AOI P-2), these USTs were already scheduled for removal. UST removal activities are summarized in a UST removal monitoring report (TEC, 1990b). Approximately 1,200 CY of soil surrounding the USTs were removed and disposed off-Site. Perched water that accumulated in the excavation area during removal of the tanks was pumped out each morning and taken to the on-Site WWTP. Analytical results of this perched water indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds.

Confirmation soil samples were collected from the floor of the excavation area on both the north and south ends of each removed tank (16 samples total). Additionally, 12 confirmation soil samples were collected from the side walls of the excavation (two from the east wall, two from the west wall, four from the south wall, and four from the north wall). BTEX compounds were detected above MDNR remediation guidelines, Type B criteria, for soil contamination. The remaining samples exhibited levels below MDNR guidelines. No free product was encountered during excavation activities (TEC, 1990b).

In January 1991, an additional soil investigation was completed adjacent to the former UST area to determine if the surrounding soils had been impacted by the presence of the former USTs. These investigation activities are summarized in the remedial investigation report (TEC, 1991). Sixteen samples were collected from eight soil borings and submitted for analysis of BTEX compounds. No BTEX compounds were detected in these soil borings. No groundwater or free product was encountered during the soil investigation. TEC (1991) concluded that although minor pockets of contamination may remain around the edges of the former UST farm, this contamination was limited in areal and vertical extent and was separated from groundwater by a stiff clay. As a result, TEC (1991) recommended Type B closure for the Site.

In response to MDNR comments (1992), additional soil and groundwater activities were conducted in 1993.

Atwell-Hicks was retained to complete a Closure Investigation. Contamination was defined in both horizontal and vertical directions. BTEX and lead levels were found to be below Michigan Type B Criteria levels (Atwell-Hicks, 1994). Closure was granted in September 1994 (MDNR, 1994).

Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI P-1.

3.4.2 EXISTING POWERTRAIN UST FARM (AOI P-2)

AOI P-2 consists of the current Powertrain UST farm located outside the southwest end of the Powertrain Headquarters Building, just south of a storage building. This area was considered an AOI because of a documented release that was discovered in 1989, during excavation for the current UST farm.

The Powertrain Headquarters building formerly housed a design, engineering, and testing laboratory for automobiles.

The current UST farm consists of six MDEQ-regulated USTs (NL-1 through NL-6) that store gasoline. There are two 12,000-gallon USTs that are subdivided into three 4,000-gallon sections each. There are also three 15,000-gallon USTs and one 2,000-gallon UST. The tanks are double walled steel, unlined tanks and were installed in 1990.

The old dispensing pump was located where the current UST farm is located presently. Gasoline was supplied to the old dispensing pump via a manifold from the former UST farm (AOI P-1), through the building, and finally through the gas line trench.

The current UST farm receives fuel on the east side of the farm. Fuel is piped to the northeast through the gas line trench. Piping enters the building at the west wall and proceeds in an easterly direction to supply the dynamometer rooms (GM, 1992).

During excavation for the current UST farm in August 1989, contaminated soils were encountered near the southeastern corner of the storage building. A release was reported to the State Fire Marshall on August 28, 1989. TEC was contracted to oversee the excavation and identify any areas of contamination. Soils were monitored for the presence of contamination via photoionization detector (PID) headspace readings during the excavation and temporarily stored on Site prior to off-Site disposal. Soil samples were collected from the side walls (five samples) and floor (one sample) of the excavation and analyzed for total petroleum hydrocarbons (TPH). Results indicated the presence of contamination in the east, west, and north walls of the excavation. The area of heaviest contamination was in the northeast corner of the excavation. Approximately 2,800 CY of soil were removed from the excavation. On September 13, 1989, a 6-foot section of abandoned sewer pipe was located which contained approximately 1 gallon of free product. Groundwater was not encountered during excavation activities.

In January 1990, TEC conducted a soil investigation around the excavation for the current UST farm. Nine soil borings were installed around the excavation, concentrated in the northeast corner. Thirteen soil samples were collected and analyzed. Laboratory results indicated non-detectable levels of BTEX compounds. No groundwater was encountered during installation of

these soil borings. These activities were summarized in the Final Site Investigation (TEC, 1990a).

During a subsurface investigation in the vicinity of the UST farm, a low concentration of naphthalene was detected in groundwater. As a result, a suspected release report was submitted to MDEQ on June 29, 2000. Subsequently, GM contracted Oscar W. Larson Company to conduct interstitial testing on each tank. All of the tanks held pressure, and no liquid or odor were detected in the monitoring devices. Laboratory reanalysis of the groundwater sample indicated that naphthalene was not detected in the sample. As a result, GM requested that the MDEQ cancel the suspected release report (GM, 2000).

Although formal closure has not been granted by the MDEQ, the CCR (ENCORE, 2001a) recommended NFA for AOI P-2.

3.4.3 CAR WASH (AOI P-3)

AOI P-3 consists of the car wash area located west of the Powertrain Headquarters building. The car wash was built in 1970 and used to wash plant vehicles. Previously, three USTs were located in this area. The car wash tank farm was considered an AOI because of two previous confirmed releases.

Two 20,000-gallon gasoline USTs were installed in 1972. Site records suggest that one of the USTs may have contained diesel fuel at one time. Releases relating to these USTs were reported in 1985 and in 1990. One 20,000-gallon gasoline UST was installed in 1991 to replace the two USTs which were removed in 1990. This UST was constructed of unlined steel.

In September 1985, a documented release was reported after piping connected to a diesel fuel UST failed a leak test. The pipe was capped and subsequently removed. Upon removal, it was determined that the leak had occurred through a 0.1 inch diameter hole in the pipe. Approximately 5 to 10 gallons of diesel fuel were estimated to have leaked from the piping. An unknown quantity of contaminated soil adjacent to the piping was excavated during removal of the piping (GM, 1985d).

In December 1990, the two 20,000-gallon gasoline USTs were removed and replaced with one new 20,000-gallon gasoline UST. An unknown quantity of soils was also removed to facilitate the installation of the new UST. Upon removal of the USTs, seven confirmation soil samples were collected from the excavation floor (three samples) and side walls (one sample per side). Analytical results indicated the presence of BTEX contamination in the northwest portion of the excavation. Removal of these soils was not practicable because they support a utility conduit containing the electrical supply for two Site plants. Additional soil sampling was conducted in May 1991 to determine the horizontal and vertical extent of contamination in the northwest

portion of the excavation as requested by the MDNR. TEC completed eight soil borings around the former excavation and pump island area. Analytical results indicated the presence of BTEX compounds in only one boring, located in the utility trench. In September 1994, Atwell Hicks submitted a Type C Closure proposal based on industrial land use exposure assumptions (Atwell-Hicks, 1994b). The closure was approved by the MDNR in September 1995 as a Tier II Risk-Based Corrective Action (RBCA) evaluation with the condition that a restrictive covenant be placed on the property and that semi-annual groundwater sampling be conducted for five years (MDNR, 1995b). Initiated by conversations between plant personnel and MDEQ personnel, a Leaking Underground Storage Tank (LUST) Closure Report summarizing previous investigation activities was prepared for the purpose of superceding the previous Tier II Closure and restrictive covenant (Superior, 2000).

In December 1999, one 20,000-gallon gasoline UST was removed. Four confirmation soil samples were collected from the excavation floor (two samples) and the dispenser/pipeline area (two samples) and analyzed for BTEX. Analytical results indicated that no BTEX compounds were detected. On behalf of GM, a closure report for the UST was submitted to the MDEQ in January 2000 (CRA, 2000a). GM received closure from the MDEQ on February 16, 2000 (MDEQ, 2000).

Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI P-3.

3.4.4 POWERTRAIN FORMER USED OIL UST AND UTILITY LINE (AOI P-4)

AOI P-4 consists of a former used oil UST and nearby utility line. The former UST was located west of the Powertrain Headquarters Building. The utility line is located south of the former UST. This area was considered an AOI because a release from the UST was discovered in October 1996.

The former UST was discovered on October 25, 1996, during renovation activities. The used oil UST reportedly stored oil associated with a dynamometer laboratory in the Powertrain Headquarters Building (Remtech Environmental Services, Inc. [Remtech], 1996a).

Previous investigations include an investigation of the soils adjacent to the UST and an investigation of the soils adjacent to the utility line in October 1996. Remedial actions included removal of the UST and excavation of contaminated soils associated with the UST. No remedial actions were conducted related to the utility line.

The former UST was discovered on October 25, 1996, during Site renovation activities. Analysis from a soil sample collected adjacent to the UST indicated that a release had occurred. A confirmed release was documented and submitted to the MDEQ-UST Division on October 28, 1996 (GM, 1996).

On October 30, 1996, the contents of the UST were emptied by Inland Waters for disposal. The UST was subsequently removed. Visual inspection of the UST at the time of removal revealed no visible holes in the UST itself. As a result, the release was determined to have come from the pipe joint that led into the UST (located on the north side of the UST).

Eighty CY of contaminated soil (based on PID measurements) was excavated from the area surrounding the UST and associated vent pipe for disposal. After removal of the UST, confirmation soil samples were collected from the excavation floor and sidewalls and analyzed for BTEX, methyl-tert-butyl-ether (MTBE), halogenated volatile organic compounds (HVOs), polynuclear aromatic hydrocarbons (PNAs), PCBs, cadmium, chromium, and lead in accordance with the MDEQ Verification of Soil Remediation (VSR) guidance document, (April 1994, Revision 1). No groundwater or free product was observed in the excavation. All analytical results were below Part 213 Tier I Residential Criteria. A UST Closure Report was submitted to MDEQ on November 27, 1996 (Remtech, 1996a).

During the Site renovation activities, discolored soils were found adjacent to an excavated utility line located south of the former UST. A sample of the discolored fill material collected adjacent to the utility line was analyzed for BTEX, HVO, and PNA compounds. The laboratory results were all non-detect. A report was submitted to the MDEQ on December 10, 1996 (Remtech, 1996b).

Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI P-4.

3.4.5 POWERTRAIN FORMER STODDARD SOLVENT UST (AOI P-5)

AOI P-5 consists of a former Stoddard solvent UST located outside, near the northwest corner of the Powertrain Headquarters Building. The UST was identified as a SWMU by GM in the Certification of Potential Releases from Solid Waste Management Units (GM, 1986c). The former UST was considered an AOI because a confirmed release was reported to the MDEQ in August 1995 and was previously identified as a SWMU.

The former 550-gallon steel UST was located west of the Powertrain Headquarters building. Previous Site activities indicate that the UST stored Stoddard solvent. The tank was removed in August 1995 by Carlo Environmental Technologies, Inc. (CET) (Atwell-Hicks, 1995).

On August 14, 1995, Atwell-Hicks collected soil samples in the vicinity of the UST and submitted the samples for laboratory analysis, which indicated that a release had occurred. A confirmed release was reported to the MDNR UST division on August 21, 1995, within 24 hours of discovery of the release.

CET removed the UST on August 25, 1995. Visual observation of the UST upon removal indicated the presence of holes and severe pitting. Based on these observations, an unknown volume of contaminated soils adjacent to the UST were also excavated. CET also removed 75 gallons of residual product and perched water from the UST and associated backfill. Confirmation soil samples were collected from the excavation floor and sidewalls and analyzed for BTEX and HVO compounds in accordance with Michigan Environmental Response Act (MERA) guidance and oral communication with the MDNR. No groundwater was identified within 10.5 feet of ground surface in the UST area. The water encountered during tank removal was trapped within the sand fill area by the surrounding native clay unit. Laboratory results for the soil indicated that BTEX and HVO levels were below MDNR Tier 1 criteria. A UST closure report was submitted to the MDEQ (formerly part of the MDNR) on September 8, 1995 (Atwell-Hicks, 1995)

Although no formal letter of approval of the closure report has been received from MDEQ, the Site was considered closed as of March 1996 per Act 451 Section 21315, because the MDEQ did not audit the closure report within 6 months of receipt of the report. As a result, the CCR (ENCORE, 2001a) recommended NFA for AOI P-5.

3.4.6 FORMER PLANT 18 COOLANT AST LOCATION (AOI P-7)

AOI P-7 consists of an 11,000-gallon 38-lb coolant AST with secondary containment formerly located in the basement of Plant 18. The former coolant AST location was considered an AOI because of the materials stored in the AST. There were no documented releases from this former AST. The AST was cleaned and removed in 1998 before Plant 18 demolition activities.

There have been no previous investigations or remedial actions associated with the former Plant 18 coolant AST and there were no documented releases from the AST and the AST had secondary containment. In addition, at the time of removal, the area was reported to be in good condition. Based on this information, the CCR (ENCORE, 2001a) recommended NFA for AOI P-7.

3.4.7 FORMER VACANT LOT UST (AOI P-8)

AOI P-8 consists of a former UST located on a vacant lot directly east of Joslyn Avenue southeast of the Powertrain Headquarters building. The vacant lot was considered an AOI because a release from a previously unknown UST was discovered in 1996.

There are no records indicating Site operations on the vacant lot. The former UST location and construction information are not known.

During Site investigation activities in November 1996, a release was discovered from a previously unknown UST. The release was reported to the MDEQ on November 1, 1996. No free product was observed during the soil investigations at the vacant lot. Soil sample(s) were analyzed for BTEX, PNA, inorganic constituents, 1-methylnaphthalene, and 2-methylnaphthalene. None of the soil samples had concentrations above the Tier I Residential Direct Contact Criteria. An Initial Assessment Report for the release was submitted to MDEQ on January 30, 1997 (Parsons, 1997a), and an incomplete Final Assessment Report was submitted on October 29, 1997 (Parsons, 1997c).

Groundwater investigations were conducted by Conestoga-Rovers and Associates (CRA) in 1998. Groundwater sample(s) were analyzed for BTEX, MTBE, purgable aromatic hydrocarbons (PAHs), PCBs, and select inorganic compounds (cadmium, chromium, and lead). The Leaking Underground Storage Tank Closure Report was submitted to the MDEQ on October 30, 1998 (CRA, 1998b).

Although no formal letter of approval of the UST Closure Report has been received from MDEQ, the vacant lot UST was closed as of April 1999 per Act 451 Section 21315, because the MDEQ did not audit the closure report within 6 months of receipt of the report. As a result, the CCR (ENCORE, 2001a) recommended NFA for AOI P-8.

3.5 SERVICE PARTS OPERATIONS (SPO)

3.5.1 FORMER SPO GASOLINE UST LOCATION (AOI S-1)

AOI S-1 consists of a former SPO Gasoline UST located outside on the southern side of Plant 75, and adjacent to Columbia Avenue. This UST was identified as an AOI because of the gasoline contents of the tank.

A 10,000-gallon gasoline UST was removed from a location on the south side of Plant 75. The tank was installed in 1966 and removed on August 21, 1990 (OBG, 1991a).

OBG submitted a UST Removal Report (OBG, 1991a) and Hydrogeological Investigation Report (OBG, 1991b) to the MDNR.

Dissolved lead was detected at low levels (6 to 17 ug/L) in groundwater, slightly above the generic Part 201 groundwater criteria. Constituents of concern include BTEX, lead, and petroleum hydrocarbons. During the removal of the UST, two soil samples were taken from the excavation and analyzed for BTEX. Xylenes were detected below generic Part 201 criteria.

Based on existing information, which indicates no significant impact to subsurface conditions, the CCR (ENCORE, 2001a) recommended NFA for AOI S-1.

3.5.2 FORMER SPO DIESEL UST LOCATION (AOI S-2)

AOI S-2 consists of a former diesel UST located outside, east of Plant 75 and adjacent to Joslyn Avenue. This UST was identified as an AOI because of the diesel fuel stored in the tank and a reported release from the tank.

A 10,000-gallon gasoline UST was removed from a location on the south side of Plant 75. A 4,000-gallon fiberglass UST used to store diesel fuel was removed January 28, 1992.

OBG submitted a 45-day report describing the removal activities in March 1992 (OBG, 1992). As a result of BTEX and PAH detection in the soil and water samples collected during the removal, GM was required to complete a hydrogeological investigation to define the horizontal and vertical extent of the impacted soil and groundwater.

The 4,000-gallon fiberglass UST used to store diesel fuel was removed January 28, 1992 (OBG, 1992). During the excavation, stained and odorous soil was observed to a depth of 6 feet below ground surface (bgs). No free product was observed during the removal. Five soil samples were collected from the excavation. Additionally, a sample of the standing water in the excavation was collected. The only constituent detected above Part 201 generic criteria was benzo(a)anthracene. No visible evidence of the former UST was observed during a recent Site walkthrough. The UST removal report was submitted to the MDNR in 1992 (OBG, 1992).

Based on existing information, which indicates no significant impact to subsurface conditions, the CCR (ENCORE, 2001a) recommended NFA for AOI S-2.

4.0 EVALUATION OF AREAS OF INTEREST

This section presents a summary of AOIs and the various off-Site areas investigated during the RFI. In addition, this section provides the current status of supplemental investigations currently being conducted at new AOIs that were discovered following completion of the RFI Report (ENCORE, 2002c).

Detailed information, analytical results, and evaluations are presented in the RFI Report (ENCORE, 2002c) and RFI Supplemental Report No. 1 (ENCORE, 2003j).

The identification of a potentially significant release at an area is based on screening of the characterization data collected during investigations with generic risk-based screening criteria (i.e., Natural Resources and Environmental Protection Act (NREPA), Michigan Act 451, Part 201 Generic Cleanup Criteria). The use of the term 'screening criteria' in this Section therefore refers to the corresponding Part 201 Generic Cleanup Criteria. Any concentrations exceeding screening criteria presented in this section are further evaluated in Section 8.0.

4.1 OFF-SITE AREAS SUITABLE FOR RESIDENTIAL LAND USE

Based on the investigation conducted in the RFI, NFA was warranted at four off-Site areas. The following off-Site areas are considered suitable for residential land use: PSB property, Harris Lake, Terry Lake, and Osmun Lake. Sections 4.1.1-4.1.4 detail the RFI evaluation of each of these areas.

4.1.1 PONTIAC SCHOOL BOARD (PSB)

As presented in the CCR Addendum No. 1 (ENCORE, 2002b), a series of drainage ditches historically conveyed stormwater from the Site to Harris Lake by traversing the PSB property, which is located directly south of Montcalm Avenue near the southwest area of the Site. In July 1971, an oily discharge was noted on the PSB property. A visual inspection of the area indicated that oil had run off the Site from the Railroad Marshalling Area (AOI W-10), down the roadway and entered an off-Site lake via the drainage ditches on the PSB property.

4.1.1.1 PSB RFI RESULTS

The scope of the field investigations at the PSB property involved the collection of sediment, soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred. The concentrations of constituents detected in soil and groundwater were compared with the residential screening criteria.

Soil/Sediment Samples

Five sediment samples (MH-492, MH-493, MH-494, MH-494-WEST, and MH-495) were collected from the storm sewer pipe that runs through the property. The samples were collected to determine whether hazardous constituents are contained in the pipe from historic discharge through the pipe. Sediment sample MH-494-WEST was collected from the same manhole as MH-494, however the sediment was collected from a lateral connection that entered the sewer line from the west. The sediment samples were submitted for laboratory analysis for VOCs, semi-volatile organic compounds (SVOCs), inorganics, PCBs, and dioxins, except for the MH-494-WEST sediment sample, which was not analyzed for dioxins. Summaries of the analytical data for the sediment samples are shown in Table 4-1. The concentrations of constituents detected in the pipe sediment samples collected from the PSB property exceeded the residential screening criteria for benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, and lead.

Soil samples were collected from 4 test pits (TPPS-01 through TPPS-04) that were completed to determine the condition of the bedding material surrounding the storm sewer pipe. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and dioxins. Ten additional soil borings (BPS-01 through BPS-10) were completed. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. Summaries of the analytical data for the soil samples are shown in Table 4-2. The concentrations of constituents detected in test pit soil samples at the PSB property exceeded the residential screening criteria for arsenic and lead. The concentrations of constituents detected in soil boring samples at the PSB property exceed the residential screening criteria for benzene and arsenic.

A summary of pipe sediment, test pit and soil boring locations and analytical data is shown on Figure 4-1.

Groundwater Samples

Groundwater samples were collected from monitoring wells MWPS-01 and MWPS-02. The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. Summaries of the analytical data for the groundwater samples are shown in Table 4-3. The concentrations of constituents detected in the groundwater samples collected from the PSB property did not exceed residential screening criteria.

The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The RFI sediment and soils data collected at the PSB property indicate that a release exceeding residential screening criteria has occurred at the PSB property. The PSB was included in a Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and

noncancer risks do not exceed U.S. EPAs acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at the PSB are not necessary. However, IMs were implemented to remove the potential for exposure to sediment contained within the pipe (see Section 5.1).

4.1.2 HARRIS LAKE

Harris Lake is located directly southwest of the Site. Historically, a series of drainage ditches conveyed discharges from the Site to Harris Lake via the PSB property. In 1971, an oily discharge originating from the PNC Site was discovered on the PSB property in the culvert that drains to Harris Lake. A review of historical maps shows that the shape and size of Harris Lake has changed over the years 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 exists along the north shore consisting of foundry sand, wooden floor blocks, and construction and demolition debris [CCR Addendum No. 1 (ENCORE, 2002b)].

4.1.2.1 HARRIS LAKE RFI RESULTS

The scope of the field investigations at Harris Lake involved collection of surface and subsurface soil, surface water and sediment samples along with oil present within the sediment to determine whether a potential release exceeding the residential screening criteria has occurred to the lake.

Soil/Sediment Samples

Fifteen surface soil samples (SSHS-01 through SSHS-15) were collected along the shoreline of Harris Lake. Thirteen soil borings (BHS-01 through BHS-13) were completed (ten soil borings were completed on the north side of Harris Lake and three borings were completed on the south side of Harris Lake). The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics.

Twenty-three surficial sediment samples were collected from 13 locations (SDHS-01 through SDHS-13) within Harris Lake. All samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. At all locations except SDH5-20 and SDH5-26, a clean marl layer was encountered within the upper few feet of sediment, typically at a depth of 1- to 2- feet. Above the marl layer the sediment consists of a dark, oily, highly organic layer that represents the zone of contamination. Thirteen additional locations (SDHS-14 through SDHS-26) were sampled during the follow-up activities of the RFI. The surficial 0- to 2-feet sediment samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide, oil and grease, total organic carbon (TOC), acid volatile sulfide/simultaneously extracted metals (AVS/SEM), total sulfides and dioxins. The deeper sediment samples were analyzed for the

same constituents as the 0- to 2-feet samples with the exception of dioxins. Summaries of the analytical data for the soil and sediment are shown in Tables 4-4 and 4.5.

The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c). The concentrations of constituents detected in surface soil samples collected at Harris Lake exceed residential screening criteria for benzo(a)pyrene, arsenic, lead, and total chromium. The concentrations of constituents detected in soil boring samples collected from Harris Lake exceed residential screening criteria for arsenic. A summary of surface and subsurface soil sampling locations and analytical data is shown on Figure 4-2. Surficial sediment samples were collected from the 0- to 2-inch interval for ecological screening. This section discusses results as compared to residential screening criteria. The Screening Ecological Risk Assessment for Harris Lake [Appendix K of the RFI Report (ENCORE, 2002c)] provides a discussion of results for the samples collected from the 0- to 2-inch interval relative to ecological screening criteria. The concentrations of constituents detected in sediment samples collected from the 0- to 6-inch interval exceed residential screening criteria for benzo(a)pyrene, dibenzo(a,h)anthracene, arsenic, lead and antimony. Deep sediment samples exhibited exceedances of residential screening criteria for antimony, arsenic, lead, and cyanide. A summary of surficial and subsurface sediment sampling locations and analysis is shown on Figure 4-3.

Surface Water Samples

Surface water samples were collected from ten locations (SWHS-01 through SWHS-10). The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and total inorganics. An oil sample was extracted in the field from sediment collected from SDHS-09 location and submitted for laboratory analysis for SVOCs, PCBs, inorganics and dioxins. Individual fish filets and individual species composite samples were submitted for laboratory analysis for inorganics and PCBs. Summaries of the analytical data for the surface water, oil/water mixture, and fish tissue samples are shown in Tables 4-6 through 4-8.

The concentrations of constituents detected in surface water samples collected from Harris Lake exceed residential screening criteria for thallium. A summary of surface water sample locations and analysis is shown on Figure 4-4. SVOCs, PCBs and dioxins were detected in the oil sample extracted from Harris Lake sediment. The fish tissue analytical results are discussed in the Baseline Human Health Risk Assessment for Harris Lake, included as Appendix J to the RFI Report (ENCORE, 2002c), and the Screening Ecological Risk Assessment (ENCORE, 2003c).

The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The RFI sediment (surface and subsurface), soil (surface and subsurface) and surface water data collected from Harris Lake indicate that a release exceeding residential screening criteria has

occurred at Harris Lake. Harris Lake was evaluated in the Baseline Human Health Risk Assessment for Harris Lake (Environ, 2002) which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and HI of 1, respectively. As a result, NFA is recommended for residential use.

The data were further evaluated in the Baseline Human Health Risk Assessment for Harris Lake, included as Appendix J to the RFI Report (ENCORE, 2002c). Based on the ecological risk assessment and the presence of oils in the Lake, GM has completed an IM to remove near shore sediments as discussed in Section 5.2.

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

4.1.3 TERRY LAKE

Terry Lake is located west and downstream of Harris Lake from which it receives surface water. Terry Lake discharges surface water to Osmun Lake.

4.1.3.1 TERRY LAKE RFI RESULTS

The scope of the field investigations at Terry Lake involved collection of sediment samples to determine whether sediment at the Harris Lake outfall to Terry Lake exceeds residential screening criteria.

Surficial sediment samples were collected from three locations (SDTL-01, SDTL-02 and SDTL 03). The samples were collected from the 0- to 6-inch interval. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and cyanide. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in sediment were compared with residential soil screening criteria. This comparison indicates that benzo(a)pyrene was the only constituent exceeding residential screening criteria.

The RFI sediment data from Terry Lake indicates that a release exceeding residential screening criteria has occurred at Terry Lake. Since the ecological-based risks were estimated below the U.S. EPA target levels, NFA is recommended for Terry Lake.

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

4.1.4 OSMUN LAKE

Osmun Lake is located downstream of Terry Lake and receives surface water from Terry Lake along with stormwater from Fiero via permitted Outfall 002.

4.1.4.1 OSMUN LAKE RFI RESULTS

The scope of the field investigations at Osmun Lake involved collection of sediment samples to determine whether a potential release exceeding screening criteria has occurred.

Surficial sediment samples were collected from six locations (SDOL-01 through SDOL-06). The samples were collected from the 0- to 6-inch interval. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and cyanide. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in sediment were compared with the residential soil screening criteria. This comparison indicated that lead is the only constituent to exceed residential screening criteria in Osmun Lake sediments.

The RFI sediment data from Osmun Lake indicate that a release exceeding residential screening criteria has occurred at Osmun Lake. Since the ecological-based risks were estimated below the U.S. EPA target levels, NFA is recommended for Osmun Lake.

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

4.2 AOIs SUITABLE FOR INDUSTRIAL LAND USE WITHOUT FURTHER ACTION

The following section presents a brief overview of the investigations conducted at each AOI that was concluded to be suitable for industrial land use with NFA designations following RFI field activities. Due to the NFA status of these AOIs, the respective investigations are not discussed in detail in this CMP. However, detailed descriptions and discussions of the results of the investigations conducted at each AOI are available in the RFI Report (ENCORE, 2002c) and/or Supplemental RFI Report No. 1 (ENCORE, 2003j).

4.2.1 COAL STORAGE AREA (AOI F-12)

AOI F-12 consists of a coal storage area located southeast of the powerhouse (Figure 1-5). Also located within the northern footprint of the coal storage pile is the 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.

4.2.1.1 AOI F-12 RFI 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 industrial screening criteria has occurred from the coal storage area.

Two monitoring wells (MWF12-01 and MWF12-02) were installed downgradient from the coal storage area. Soil and groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

Concentrations of constituents detected in soil and groundwater do not exceed the industrial screening criteria. NFA or investigation is warranted for this area.

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

4.2.2 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 (Figure 1-5). 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 does any analytical data exist pertaining to the soils below the excavation.

4.2.2.1 AOI F-13 RFI RESULTS

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

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. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the soil boring samples collected from AOI F-13 do not exceed industrial screening criteria. NFA or investigation is warranted for this area.

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

4.2.3 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 (Figure 1-5). 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.

4.2.3.1 AOI F-14 RFI RESULTS

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

Two soil borings (BF14-01 and BF14-02) were completed adjacent to the location of the ASTs. The samples were submitted for laboratory analysis for BTEX, SVOCs, and lead. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the soil boring samples from AOI F-14 do not exceed industrial screening criteria. NFA or investigation is warranted for this area.

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

4.2.4 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 (Figure 1-5). Petroleum-like odors were reported emanating from the catch basin. The oil/solvent catch basin (AOI F-15) was cleaned and inspected during RFI activities. Materials within the catch basin included oil and sludge containing chlorinated solvents. The catch basin showed evidence of pitting and cracking, and was stained throughout.

4.2.4.1 AOI F-15 RFI 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 industrial screening criteria has occurred from the oil/solvent catch basin.

Soil 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. A soil boring associated with the installation of monitoring well (MWP15-01), was completed downgradient of the catch basin. The soil samples were submitted for laboratory analysis for VOCs, SVOCs,

PCBs, and inorganics. The supplemental RFI field investigations at AOI F-15 involved collection of soil samples to determine if VOCs in soil from the oil/solvent catch basin impacted soils to the north, east, and west of the catch basin (ENCORE, 2003j). Three soil borings (BF15-03 through BF15-05) were completed at AOI F-15. The samples were submitted for laboratory analysis for VOCs. The concentrations of constituents detected in the soil borings from AOI F-15 exceed industrial screening criteria for tetrachloroethene (PCE) and 1,1-dichloroethene. The concentrations of constituents detected in the soil boring samples, collected as part of the supplemental RFI field investigations, do not exceed the screening criteria.

Groundwater Samples

One groundwater sample was collected from monitoring well (MWP15-01). The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The concentrations of constituents detected in groundwater samples collected from AOI F-15 do not exceed industrial screening criteria.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil data from AOI F-15 indicate that a release exceeding industrial screening criteria has occurred at AOI F-15. A Site-specific risk evaluation, which shows estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPAs acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at AOI F-15 are not necessary. However, based on comments received from the U.S. EPA, regarding RFI field investigations, the supplemental RFI activities were conducted. The supplemental RFI soil data from AOI F-15 delineates VOC-impacted soils at AOI F-15 to the north, east and west of the catch basin. Concentrations detected in soil do not exceed screening criteria. NFA or investigation is warranted for this area.

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

4.2.5 FORMER PLANT 8 FLAMMABLE LIQUID STORAGE TANK FARM (AOI W-3)

AOI W-3 consists of a former Flammable Liquid Storage Tank Farm near former Plant 8 in the northwestern corner of the DA (Figure 1-5). The tank farm contained nine ASTs historically used to store flammable liquids including diesel fuel, line thinner, gasoline, and solvents. The tank farm consisted of two separate areas, a north area and south area, each contained within a 3-foot-high dike. The former tank farm was decommissioned and demolished prior to RFI on-Site activities although no closure documentation is available.

4.2.5.1 AOI W-3 RFI RESULTS

The scope of the field investigations at AOI W-3 involved collection of soil samples to determine whether a potential release exceeding industrial screening criteria has occurred from the former tank farm.

Five soil borings (BW3-01 through BW3-05) were completed at the approximate locations of borings installed during previous investigations where no laboratory data were available. The samples were submitted for laboratory analysis for VOCs, SVOCs and lead. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the soil samples from AOI W-3 do not exceed industrial screening criteria. . NFA or investigation is warranted for this area.

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

4.2.6 FORMER PLANT 8 FLAMMABLE MATERIALS STORAGE BUILDING (AOI W-6)

AOI W-6 consists of the former Plant 8 Flammable Materials Storage Building located in the northwestern corner of the DA (Figure 1-5). The seventeen ASTs contained in the storage building were historically used to store oils and glycols. The storage building doors were above ground level causing the storage building to act as a diked area. Railroad and truck unloading areas contained catch basins that were connected to the on-Site WWTP via a sump located in the northwest corner of the building. The storage building was decommissioned and demolished prior to RFI activities.

The eight catch basins inspected in the AOI W-6 loading areas contained black sludge with a strong petroleum odor and oily sheen. The catch basins were constructed of concrete and appeared to be in good condition with no sign of deterioration or cracking. The catch basins were cleaned as part of the RFI activities. No further investigation of the catch basins was necessary.

4.2.6.1 AOI W-6 RFI RESULTS

The scope of the field investigations at AOI W-6 involved collection of soil samples to determine whether a potential release in excess of industrial screening criteria has occurred from the former storage building.

Eight soil borings (BW6-01 through BW6-08) were completed to provide areal coverage of the former storage building. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and lead. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the soil boring samples from AOI W-6 do not exceed industrial screening criteria. . NFA or investigation is warranted for this area.

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

4.2.7 SALVAGE YARD SUMP DRAIN (AOI W-11)

AOI W-11 consists of the Salvage Yard Sump Drain. The location of the Sump Drain within the West Yard is unclear. It is believed to be located in the former Salvage Building and to have drained to the WWTP. The Salvage Building was located on the western boundary of the West Yard, north of the Compressor Building, and immediately east of the rail lines. Internal documents indicate that 69 barrels with various liquid contents including nickel were allegedly discharged down the salvage sump during June and July 1985.

4.2.7.1 AOI W-11 RFI RESULTS

The scope of the field investigations at AOI W-11 involved collection of groundwater samples to determine whether a potential release in excess of industrial screening criteria has occurred from the sump drain. Groundwater samples were collected from one monitoring well (MWW1-01) installed near and downgradient of the sump. This well was installed as part of the AOI W-1 investigation. The groundwater results for MWW1-01 are further discussed in Section 4.3.3.

The concentrations of constituents detected in the groundwater samples from AOI W-11 exceed industrial screening criteria for two inorganics (antimony and thallium). The results of the comparisons are further discussed in Section 4.3.3 with the discussion for AOI W-1.

RFI soil data generated from AOI W-11 do not exceed industrial screening criteria. Groundwater data shows exceedances of industrial screening criteria for thallium and vanadium; however, these concentrations are believed to be a result of the analytical method and not indicative of actual groundwater quality. Since the location of the Salvage Yard Sump Drain within the West Yard is unclear and the groundwater results from the suspected area do not confirm a release of nickel from the assumed AOI W-11 location, any further activity required for the sump drain will occur under AOI W-1.

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

4.2.8 MONTCALM SUBSTATION (AOI W-13)

AOI W-13 consists of the Montcalm Substation, located east of Saginaw Street and north of Montcalm Avenue (Figure 1-5). Historically, transformer oil that potentially contained PCBs was used at this substation. The substation remains in service.

4.2.8.1 AOI W-13 RFI RESULTS

The scope of the field investigations at AOI W-13 involved collection of surface soil samples to determine whether a potential release exceeding industrial screening criteria has occurred from the substation. Six surface soil samples (SW13-01 through SW13-06) were collected along the perimeter of the substation. The samples were submitted for laboratory analysis for SVOCs and PCBs. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the surface soil samples collected from AOI W-13 do not exceed industrial screening criteria. NFA or investigation is warranted for this area.

Table 1-1 presents a summary of the data and conclusions at the AOI.

4.2.9 ELPO BUILDING (AOI M-7)

AOI M-7 consists of the ELPO Building. The ELPO operation is located east of Plants 5 and 8 and southwest of Plant 18 (Figure 1-5). The ELPO building is considered an AOI because of poor sump integrity. In addition, numerous spills in the interior of the ELPO process area are evident, and staining was observed on the outside wall of the ELPO Building.

4.2.9.1 AOI M-7 RFI RESULTS

The scope of the field investigations at AOI M-7 involved collection of soil and groundwater samples to determine whether a potential release exceeding industrial screening criteria has occurred from the ELPO building. The supplemental RFI field investigations at AOI M-7 involved collection of a soil sample to investigate soil beneath a four-inch diameter hole that was found in the concrete floor at ELPO Building (ENCORE, 2003j).

Soil Samples

Three soil borings (BM7-01, BM7-02 and BM7-03) were completed to supplement data generated from the well installation program described below. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics.

As part of the supplemental activities conducted at AOI M-7, an investigation was conducted on March 28, 2003, that consisted of a visual inspection of the subsurface conditions beneath the concrete floor at the hole location and collection of a soil sample beneath the hole. A soil (BM7-04) sample was collected immediately beneath the 4-inch diameter hole. The sample was submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The concentrations of constituents detected in the soil samples collected from AOI M-7 do not exceed industrial screening criteria.

Groundwater Samples

Three monitoring wells (MWM7-01, MWM7-02 and MWM7-03) were installed downgradient of the ELPO operational area to assess impacts, if any, to groundwater quality. MWM10 was installed as part of the Site-wide hydrogeologic investigation; however, due to its proximity to AOI M-7, it is included in the AOI M-7 discussion. The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics.

The concentrations of constituents detected in AOI M-7 groundwater samples exceed industrial screening criteria for acetone and thallium. Acetone was detected in the first-round sample and confirmation sample collected from MWM7-03 at concentrations exceeding industrial screening criteria. Interviews with Site personnel indicated that acetone was not used or stored in the ELPO Building. During the second full round of groundwater sampling, the VOC sample collected from MWM7-03 yielded an acetone concentration which does not exceed industrial screening criteria. Thallium was detected at concentrations that exceed the industrial screening criteria in the first round samples submitted from all four wells associated with this AOI. However, during the second round analysis which utilized the revised laboratory methodology, thallium was not detected above industrial screening criteria. The Massachusetts Department of Environmental Protection (DEP) published a memorandum documenting that a specific brand of bentonite pellets commonly used in monitoring well construction contains acetone as a coating agent. These pellets were used in the well construction of MWM7-03. It has been determined that the acetone concentrations exceed the industrial screening criteria are likely a result of the well construction materials and not indicative of a potential groundwater release at AOI M-7. The memorandum published by the MADEP is provided in Appendix G of the RFI Report (ENCORE, 2002c).

The concentrations of acetone and thallium detected at AOI M-7 in the first round groundwater sampling events exceed industrial screening criteria, however, concentrations of both constituents did not exceed industrial screening criteria during the second full round of groundwater sampling and analysis.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI M-7 do not indicate that a release has occurred to soils or groundwater at AOI M-7. NFA or investigation is warranted for this area.

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

4.2.10 PLANT 11 HEAT TREAT OIL STORAGE AREA (AOI M-9)

AOI M-9 consists of four former ASTs located near the eastern wall of Plant 11, which are contained inside a floor pit with a sump that discharges to the WWTP (Figure 1-5). The area is considered an AOI because of the type and quantity of oils and coolant materials historically stored in the ASTs.

During the Site walkthrough completed as part of the CCR (ENCORE, 2001a) preparation, only one AST was in use. The contents were labeled as used oil, non-RCRA regulated. The floor pit and sump contained a moderate amount of oily liquid. The outside of the eastern Plant 11 wall was stained an oily color, suggesting that oil may have seeped out.

In June 2001, the trench surrounding the ASTs was cleaned and inspected. While the trench was being power-sprayed, water was observed to be coming out of the outside east wall where brown staining had originally been observed (and still exists), further suggesting potential leakage from the containment area. Substantial cracking was observed in the concrete trench surrounding the tanks. Cracking was particularly noticeable along floor/wall joints.

4.2.10.1 AOI M-9 RFI RESULTS

The scope of the field investigations at AOI M-9 involved cleaning and inspecting the trench surrounding the ASTs to assess structural integrity. Based on the inspection, soil and groundwater samples were collected to determine whether a potential release exceeding industrial screening criteria has occurred from the Plant 11 heat-treat oil storage area. The ASTs were removed from this AOI in August, 2002 as part of abandonment activities. The sump is scheduled to be abandoned and the area converted to a non-hazardous storage area. Seven pits were discovered beneath the ASTs after they were removed. These pits were inspected on September 6, 2002. The inspection revealed that all the pits were lined with a rubber coating and showed no signs of being compromised.

Soil Samples

One soil boring (BM9-01) was completed downgradient and adjacent to the sump. Soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. The scope of the supplemental RFI field investigations at AOI M-9 involved collection of soil samples to evaluate soil conditions beneath the pit, as presented in Supplemental RFI Report No. 1 (ENCORE, 2003j). One surficial soil sample was collected from the south end of the sump (SM9-01). The sample was submitted for laboratory analysis for VOCs, SVOCs PCBs, and inorganics.

The concentrations of constituents detected in the soil samples collected from AOI M-9 do not exceed industrial screening criteria.

Groundwater Samples

Two monitoring wells (MWM9-01 and MWM9-02) were installed downgradient and adjacent to the sump. Groundwater was not encountered at BM9-01 and MWW9-01 was dry at the time of sampling. The groundwater sample collected from MWM9-02 was submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics.

The scope of the supplemental RFI field investigations at AOI M-9 involved collection of a groundwater sample to fulfill the second round groundwater sampling requirements as presented in Supplemental RFI Report No. 1 (ENCORE, 2003j). One groundwater sample was collected from MWM9-02. The sample was submitted for laboratory analysis for VOCs, SVOC, PCBs, and inorganics. The concentrations of constituents detected in the groundwater sample collected from AOI M-9 do not exceed industrial screening criteria.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI M-9 indicate a release has not occurred at AOI M-9. NFA or investigation is warranted for this area.

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

4.2.11 PLANT 12 FORMER GASOLINE STORAGE AREA (AOI M-11)

AOI M-11 consists of a former outdoor gasoline storage area near the northeast corner of Plant 12 (Figure 1-5). This area is considered an AOI because of the type and quantity of the materials (gasoline) historically stored in the area.

There were no documented releases from the former AST. However, the former location of the AST is not known. According to Site personnel, the AST was emptied and removed from the Site. Cracks were observed in the concrete slab along the north wall of Plant 12 during the Site walkthrough completed as part of the CCR (ENCORE, 2001a) preparation, but no signs of leakage or stains were observed. However, there is no documentation available on the AST closure.

4.2.11.1 AOI M-11 RFI RESULTS

The scope of the field investigations at AOI M-11 involved collection of soil samples to determine whether a potential release above industrial screening criteria has occurred from the Plant 12 Former Gasoline Storage Area.

Three soil borings (BM11-01, BM11-02, and BM11-03) were completed in areas where the former AST may have been located. The samples were submitted for laboratory analysis for BTEX. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the soil samples collected from AOI M-11 do not exceed industrial screening criteria. NFA or investigation is warranted for this area.

Table 1-1 presents a summary of the data and conclusions at the AOI.

4.2.12 AST AREA WEST OF PLANT 14 (AOI M-13)

AOI M-13 consists of three ASTs located west of Plant 14 (Figure 1-5). This area is considered an AOI because of the type and quantity of materials (diesel fuel and gasoline) stored in the ASTs.

There have been no documented releases related to the ASTs in this area. However, secondary containment was not present for two of the ASTs and there is no closure information on the former AST.

4.2.12.1 AOI M-13 RFI RESULTS

The scope of the field investigations at AOI M-13 involved collection of soil samples to determine whether a potential release exceeding industrial screening criteria has occurred from the AST Area West of Plant 14.

Two soil borings (BM13-01 and BM13-02) were completed at the AST locations that did not have secondary containment to provide information on subsurface soil conditions. The samples were submitted for laboratory analysis for BTEX, SVOCs, and lead. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the soil boring samples collected from AOI M-13 do not exceed industrial screening criteria. NFA or investigation is warranted for this area.

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

4.2.13 PLANT 15 SOUTHERN PIPING TRENCH (AOI M-17)

AOI M-17 consists of a piping trench located along the southern wall in the western portion of Plant 15 (Figure 1-5). The piping trench is approximately 10 to 15 feet deep and contains pipes that distribute wastewater to the WWTP. This area is considered an AOI because of the type of material transported in pipes located within this trench and the unknown condition of the trench.

Although there have been no documented releases associated with the piping trench, the interior of the piping trench could not be observed during the initial Site walk completed as part of the CCR (ENCORE, 2001a).

4.2.13.1 AOI M-17 RFI RESULTS

A visual evaluation of the trench was completed as part of the RFI activities. The piping trench was inspected remotely via use of a mobile video camera. The walls and floor appeared to be intact, with no observed staining. Based on the results from the inspection of the trench, NFA or investigation is warranted for this area.

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

4.2.14 PLANT 5 SOUTHERN ACCESS RAILWAY (AOI M-19)

The access railway is located at the southwestern end of Plant 5 (Figure 1-5). The railway is approximately 600 feet long and spans the western half of the building along the southern side. The railway was used to transport materials associated with metalworking and automotive assembly operations into and out of Plant 5. The type and extent of materials transported on the railway is unknown, and soils directly below the railway tracks may have been impacted. Deteriorated asphalt currently covers most of the area directly beneath the tracks.

4.2.14.1 AOI M-19 RFI RESULTS

The scope of the field investigations at AOI M-19 involved collection of surface soil samples to determine whether a potential release exceeding industrial screening criteria has occurred from the railway.

Seven surface soil samples (SM19-01 through SM19-07) were collected along the length of the railroad tracks to determine quality of surface soils in this area. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. Four additional surface soil samples were collected (SM19-08 through SM19-11) at locations SM19-04, SM19-05, SM19-06, SM19-03, respectively, to verify the manganese results derived from the initial surface soil samples collected and to determine chromium species present. These samples were submitted for laboratory analysis for manganese, chromium (total) and hexavalent chromium. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

Concentrations of manganese at three AOI M-19 locations and total chromium at two AOI M-19 locations were detected in the initial soil samples exceeding the industrial screening criteria. Four additional soil samples were collected to verify manganese concentrations, and determine the chromium species present. Chromium and hexavalent chromium were detected at

concentrations that do not exceed industrial screening criteria. Additional samples were also collected because concentrations from the initial samples exceeded the industrial screening criterion based on inhalation of windblown particulates. The additional characterization of manganese covered the area between the existing Plant 5 & 23 building and the former Plant 8 building foundations, which is where the release of manganese was most likely and where the potential for windblown particulates is possible.

The RFI soils data from AOI M-19 do indicate that a release exceeding screening criteria has occurred to soils at AOI M-19. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at AOI M-19 are not necessary.

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

4.2.15 PLANT 14 TRANSFORMER STATION (AOI M-21)

AOI M-21 consists of a transformer station located adjacent to Track 26 between Plant 14 and Plant 2 (Figure 1-5). Approximately 25 transformers are located on an elevated concrete pad with no secondary containment system. The area immediately north of the transformer station (in the vicinity of Track 26) is covered with gravel, leaving the underlying soils potentially exposed. Evidence of oil stains on the north edge of the concrete pad was observed during the Site walk through completed as part of the CCR (ENCORE, 2001a) preparation.

4.2.15.1 AOI M-21 RFI RESULTS

The scope of the field investigations at AOI M-21 involved collection of surface soil samples to determine whether a potential release in exceeding industrial screening criteria has occurred from the substation.

Four surface soil samples (SM21-01 through SM21-04) were collected along the perimeter of the transformer pad with one sample biased to the area previously observed to be oil stained. The samples were submitted for laboratory analysis for SVOCs and PCBs. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the surface soil samples collected from AOI M-21 do not exceed industrial screening criteria. . NFA or investigation is warranted for this area.

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

4.2.16 PLANTS 25, 33, AND 75 SUBSTATION AND POWER BUILDING (AOI M-23)

AOI M-23 consists of a substation and power building located southwest of Plant 25 and north of Columbia Avenue (Figure 1-5). Transformer oil that potentially contained PCBs was used at the substation and power building. The substation and power building remain in service.

4.2.16.1 AOI M-23 RFI RESULTS

The scope of the field investigations at AOI M-23 involved collection of surface soil samples to determine whether a potential release exceeding industrial screening criteria has occurred from the substation and power building.

Four surface soil samples (SM23-01 through SM23-04) were collected along the perimeter of the substation. The samples were submitted for laboratory analysis for SVOCs and PCBs. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The concentrations of constituents detected in the surface soil samples from AOI M-23 do not exceed industrial screening criteria. NFA or investigation is warranted for this area.

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

4.2.17 PLANT 12 TRANSFORMER OIL SPILL (AOI M-24)

AOI M-24 consists of an area adjacent to Plant 12 where PCB-containing fluid was spilled (Figure 1-5). Soil and concrete that may have been affected by the transformer oil spill were removed in May 1994. However, there is no documentation confirming removal activities.

4.2.17.1 AOI M-24 RFI RESULTS

The scope of the field investigations at AOI M-24 involved collecting surface soil samples to determine whether a potential release exceeding industrial screening criteria has occurred from Plant 12. Two surface soil samples (SM24-01 and SM24-02) were collected immediately below the concrete patched areas identified in the CCR (ENCORE, 2001a). The samples were submitted for laboratory analysis for SVOCs and PCBs. The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The laboratory results indicate that SVOCs and PCBs were not detected in the surface soil samples collected at AOI M-24.

The RFI soil data from AOI M-24 do not indicate that a release exceeding industrial screening criteria has occurred to soils at AOI M-24. NFA or investigation is warranted for this area.

Table 1-1 presents a summary of the data and conclusions at the AOI.

4.2.18 PLANT 33 BASEMENT SUMP AREA (AOI M-25)

AOI M-25 consists of the basement area of Plant 33, which contains several floor sumps and process pits (Figure 1-5). This area is considered an AOI because the condition of the floor pits could not be evaluated due to the pits having recently been filled with flowable fill (grout). One sump was inspected in the Plant 33 Basement. Black oily sludge with a strong petroleum odor was present at the bottom of the sump. The sump was cleaned as part of the RFI activities. The concrete walls and floor of the sump appeared to be smooth and no substantial pitting observed.

4.2.18.1 AOI M-25 RFI RESULTS

The scope of the field investigations at AOI M-25 involved collection of soil and groundwater samples to determine whether a potential release in excess of industrial screening criteria has occurred from the sump area.

Soil Samples

A soil boring associated with the installation of monitoring well MWM25-01, was completed downgradient of the Plant 33 Basement. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. The concentrations of constituents detected in the soil boring samples collected from AOI M-25 do not exceed industrial screening criteria.

Groundwater Samples

One monitoring well (MWM25-01) was installed downgradient of the Plant 33 Basement. Natural recharge never occurred at MWM25-01 and a groundwater sample could not be collected. The supplemental RFI field investigations at AOI M-25 involved collection of a groundwater sample, as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j). One additional monitoring well (MWM5-02) was installed and a groundwater sample was collected from MWM25-02 . The sample was submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The concentrations of constituents detected in the groundwater sample collected from AOI M-25 do not exceed the screening criteria.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI M-25 do not indicate that a release has occurred at AOI M-25. The inspection of the one active sump showed it to be structurally sound. NFA or investigation is warranted for this area.

Table 1-1 presents a summary of the data and conclusions at the AOI.

4.3 AOIs SUITABLE FOR INDUSTRIAL LAND USE FOLLOWING IMPLEMENTATION OF CORRECTIVE MEASURES

4.3.1 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 (Figure 1-5). These sumps were identified as a SWMU (SWMU 7) in the Fiero 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 (PRC, 1992) 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 (ENCORE, 2001a), 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. The Site personnel determined that the two sumps associated with the alkali-oily activities will be repaired and will remain in active use.

4.3.1.1 AOI F-7 RFI 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 industrial screening criteria has occurred. The supplemental RFI field investigations at AOI F-7 involved cleaning and repairing the two alkali-oily sumps. Cleaning and repairs to the alkali-oily sumps were completed in August, 2002 and included pressure-washing the sump and coating the sides with polyurethane.

Soil Samples

Two soil borings associated with the installation of monitoring wells MWF7-01 and MWF7-02,

were completed downgradient from the two sumps associated with alkali-oily activities. The supplemental RFI activities included the collection of soil samples, as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j). A soil boring associated with the installation of monitoring well (MWF7-03) was completed upgradient from existing monitoring well MWF7-02. Soil samples were submitted for VOCs, SVOCs, PCBs and inorganics. Concentration of constituents detected in the soil boring samples collected from AOI F-7 during the initial RFI activities exceeded the industrial screening criteria for chromium. The concentration of constituents detected during the supplemental field activities do not exceed screening criteria.

Groundwater Samples

Two groundwater samples were collected from monitoring wells (MWF7-01 and MWF7-02). Groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The supplemental RFI activities included the collection of groundwater samples, as discussed in Supplemental RFI Report No. 1(ENCORE, 2003j). Groundwater samples were collected from the three AOI F-7 monitoring wells (MWF7-01 through MWF7-03) and submitted for laboratory analysis for 1,1-dichloroethene and PCE , as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j).

The concentrations of constituents detected in groundwater samples exceed industrial screening criteria for 1,1-dichloroethene and PCE. Summaries of the analytical data for groundwater at AOI F-7 is presented in Table 4-9. The area where groundwater has been impacted by 1,1-dichloroethene and PCE has been bound, as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j). A summary of groundwater monitoring well locations and analytical results is shown on Figure 4-5.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI F-7 indicate that a release has occurred to soil and groundwater at AOI F-7. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at AOI F-7 are not necessary. Alternatives for addressing the groundwater impacts are reviewed in Section 9.1.

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

4.3.2 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 (Figure 1-5). 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.

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 that 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.

4.3.2.1 AOI F-8 RFI 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 industrial criteria has occurred.

Soil Samples

During original RFI field activities, one soil boring associated with the installation of monitoring well MWF8-01 was completed. The supplemental field investigations at AOI F-8 involved collection of a soil sample from beneath the sump to support decommissioning of the sump. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The RFI soil data does not indicate that a release has occurred at AOI F-8,

Groundwater Samples

One monitoring well, MWF8-01, was installed downgradient from the pad and sump. The groundwater sample was submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Concentrations of constituents detected in groundwater samples detected thallium at a concentration that exceeds the industrial screening criteria. No other constituents were detected at concentrations that exceed industrial screening criteria. The detection of thallium in groundwater was determined to be the result of the analytical methodology and not indicative of actual groundwater quality.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of the Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI F-8 do not indicate that a release has occurred at AOI F-8. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at AOI F-8 are not necessary.

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

4.3.3 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 (Figure 1-5). It is bounded to the south by Montcalm Avenue, to the west by the Grand Trunk Western Railroad, to the east by the former Foundry (Plant 6) and to the north by the former Plant 9 (demolished in 1997). The West Yard area also includes the former A-1 fill area.

The investigation of AOI W-1 comprises various smaller investigations that are being conducted within the West Yard, as well. These include the investigation of the Montcalm Production Well and the seepage face along Montcalm Avenue, as well as a downgradient property boundary groundwater investigation.

The Montcalm Production Well, located in the West Yard is approximately 180 feet deep and was predominantly screened in the sand and gravel zone beneath a basal till layer (approximately 120-180 bgs).

A groundwater seep was present along the southwest corner of the West Yard along Montcalm Avenue. This groundwater seep is due to the ground surface intersecting the top of the water table. The Montcalm Toe Drain, a perforated pipe to intercept groundwater seeping from the bank, was installed, replacing a system that was damaged in the late 1990s. The Toe Drain was replaced in 2002.

Potential impacts, in the vicinity of AOI W-1, were observed during the implementation of a geotechnical borehole investigation conducted by McDowell & Associates. The DA is being evaluated as a potential location for industrial redevelopment. The geotechnical investigation consisted of the completion of 36 soil borings located within the proposed industrial redevelopment location. Odors, stained soil, and/or elevated PID readings were observed in 16 of the 36 soil borings during the investigation.

4.3.3.1 AOI W-1 RFI RESULTS

The scope of the field investigations at AOI W-1 involved installation of soil borings to collect groundwater, seep water, soil, and LNAPL samples to further characterize the previously identified soil and groundwater contamination in this area.

Soil Samples

Soil borings were completed at AOI W-1 to collect data where no historic subsurface information exists, to verify sampling results from previous investigations, to delineate exceedances of screening criteria, and to investigate the presence of LNAPL. Test pits were completed to characterize fill placed in former settling basins. Soil samples analysis varied by location and included VOCs, SVOCs, PCBs, inorganics, cyanide, hexavalent chromium and dioxins.

The scope of the supplemental field investigations at AOI W-1 involved the collection of soil samples to determine if impacts observed during the geotechnical investigation exceed screening criteria. One additional soil boring (BW1-11a) was completed in the vicinity of geotechnical soil boring location B-28 where odors and staining was observed (ENCORE, 2003j). The samples were submitted for analysis for VOCs, SVOCs, PCBs, and inorganics.

Summaries of the analytical data for the soil samples are shown in Table 4-10.

The concentrations of constituents detected in shallow soil samples collected from AOI W-1 as part of the RFI exceed industrial screening criteria for chromium (total), total PCBs, lead, manganese, and dioxins. No VOC or SVOC concentrations exceed industrial screening criteria. In addition, several soil samples were collected from the AOI W-1 area between 1995 and 1999. The concentrations of constituents detected in the historic soil samples from AOI W-1 exceed the industrial screening criteria for butyl benzyl phthalate, chromium (total), total PCBs, antimony, arsenic, lead and manganese. A summary of soil sample locations and analytical results is shown on Figure 4-6.

The concentrations of constituents detected in the deep soil samples collected from AOI W-1 do not exceed industrial screening criteria. The concentrations of constituents detected in the test pit soil samples do not exceed screening criteria, with the exception of manganese at one location.

LNAPL Samples

LNAPL samples were collected from two existing wells MW24-99 and MW36-99. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, total cyanide and dioxins. Summaries of the analytical data for the LNAPL samples are shown on Table 4-11.

The LNAPL present in AOI W-1 has been designated as LNAPL Area No. 1. Further discussions on LNAPL Area No. 1 including delineation of horizontal extent, characterization, and fingerprint analysis are presented in Section 4.6.1

Groundwater Samples

Groundwater samples were collected from monitoring wells installed during the RFI and previously existing downgradient wells (MWW1-01 through MWW1-04, MWW1-06, MW-10, MW-19, MW28-99, MW29-99, MW30-99, MW31-99, MW33-99, MW34-99, MW39-99, MW40-99 and MW42-99). The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide and dioxins.

Monitoring wells DWD10, GWD9, GWD8, IWD7, and MWD6 were installed as part of the Site-wide hydrogeologic investigation and due to their proximity to AOI W-1, are included in this discussion. Groundwater samples were collected from DWD10, GWD9, GWD8, IWD7, and MWD6 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The scope of the supplemental field investigations at AOI W-1 involved the collection of second round groundwater samples to fulfill groundwater sampling requirements, as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j). Groundwater samples were collected from three monitoring wells (DWD13, MWW1-04 and MWW1-05). The samples collected were submitted for laboratory analysis for VOCs, SVOCs, inorganics, and/or PCBs.

Summaries of the analytical data for the shallow groundwater and deep and intermediate groundwater samples are shown in Tables 4-12 and 4-13, respectively.

The concentrations of constituents detected in groundwater samples collected from AOI W-1 and associated Site-wide wells exceed industrial screening criteria for 3 VOCs (acetone, benzene and vinyl chloride), 1 SVOC (bis(2-ethylhexyl)phthalate), 3 inorganics (antimony, barium, and thallium), total PCBs, and dioxins. It should be noted that it is believed that the detected PCB and dioxins are associated with the LNAPL as discussed in Section 5 of the RFI Report (ENCORE, 2002). Figure 4-7 provides a summary of sample locations and analytical results for groundwater.

The laboratory analytical data summaries for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of the Supplemental RFI Report No. 1 (ENCORE, 2003j).

A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. However, the RFI Report (ENCORE, 2002c) also concluded that manganese in soils at AOI W-1 had not been completely delineated. The supplemental field investigations and further evaluation of the data indicates that manganese exceedances in soil have been delineated as shown in Figure 4-6.

The shallow groundwater impacts and LNAPL remediation alternatives are addressed in Sections 9.1 and 9.7 of this CMP, respectively.

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

4.3.4 PLANT 8 BASEMENT AST AREA (AOI W-5)

AOI W-5 consists of seventeen ASTs formerly located in the basement of the former Plant 8 (Figure 1-5). The basement ASTs historically stored weak metallic wastewater, alkali wastewater, and additional unknown materials. Plant 8 has been decommissioned and was demolished in 1997. There is no information available on the closure of the ASTs.

4.3.4.1 AOI W-5 RFI RESULTS

The scope of the field investigations at AOI W-5 involved collection of soil and groundwater samples to determine whether a potential release in excess of screening criteria has occurred from the AST area.

Soil Samples

Three soil borings (BW5-01 through BW5-03) were completed to provide areal coverage of the AOI with some biasing to areas of the basement where tanks had previously been present. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. The concentrations of constituents detected in the soil boring samples from AOI W-5 do not exceed the industrial screening criteria, with the exception of total PCBs for samples.

Groundwater Samples

Groundwater samples were collected from two monitoring wells (MWW5-01 and MWW5-02) installed downgradient of the former AST area. Two wells were installed as part of the Site-wide hydrogeologic investigation (MWD1 and MWD2) and are included in the AOI W-5

evaluation due to their proximity to AOI W-5. The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics.

The concentrations of constituents detected in the groundwater samples from AOI W-5 and various Site-wide wells exceed industrial screening criteria for antimony, thallium, vanadium, and total PCBs. Summaries for the analysis of groundwater samples is presented in Table 4-14. A summary of groundwater sample locations and analysis is shown of Figure 4-8.

The analytical data for all samples are provided in Appendix E of the RFI Report (ENCORE, 2002c).

The RFI soil and groundwater data from AOI W-5 indicate that a release exceeding screening criteria has occurred at AOI W-5. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at AOI W-5 are not necessary. Alternatives for addressing the groundwater impacts area reviewed in Section 9.1.

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

4.3.5 FORMER PLANT 9 BASEMENT AST AREA (AOI W-8)

AOI W-8 consists of 12 ASTs formerly located in the Plant 9 basement (Figure 1-5). Kerosene, coolants, and other unknown materials were historically stored in the ASTs. All tanks have been removed and Plant 9 has been decommissioned and demolished. No documentation on the closure of the ASTs is available. Kerosene-like odors have historically been reported in the storm sewers in this area. AOI W-8 is also part of the current investigation of LNAPL Area No. 3.

4.3.5.1 AOI W-8 RFI RESULTS

The scope of the field investigations at AOI W-8 involved collection of soil, groundwater and LNAPL samples to determine whether a potential release exceeding industrial screening criteria has occurred from the Plant 9 AST area. The scope of the supplemental RFI field investigations at AOI W-8 involved collection of second round groundwater samples to fulfill groundwater sampling requirements and soil samples to investigate field observations made during completion of geotechnical soil borings including an LNAPL investigation [RFI Work Plan Addendum No. 9 (ENCORE, 2003h)]. Additional monitoring wells and soil borings were installed to further evaluate conditions at LNAPL Area No. 3.

Soil Samples

Two soil borings (BW8-01 and BW8-02) were completed to provide areal coverage of the AOI and delineate LNAPL. Soil borings associated with the installation of nine monitoring wells (MWW8-01 through MWW8-05 and MWW8-09 through MWW8-12) were completed. Soils samples were not collected from all locations. Where samples were collected, laboratory analysis was conducted for VOCs, SVOCs, PCBs and inorganics. Eight surface soil samples (SW8-03 through SW8-10) were collected to delineate a shallow manganese concentration and a potential chromium concentration detected in the 0- to 2-foot interval at MWW8-02.

A soil boring was completed in association with the installation of monitoring well MWW8-13, situated adjacent to a geotechnical soil boring location where the potential presence of LNAPL was observed during drilling activities. The location of MWW8-13 is adjacent to a storm sewer line. Four additional soil borings (BW8-03 through BW8-06) were completed and samples collected to further investigate the odor, staining, and/or elevated PID readings observed during the geotechnical investigation. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Eleven additional soil borings were completed along the storm sewers that pass through AOI W-8 to evaluate the condition of the soil, LNAPL conditions, and collect additional information for the determination of corrective measures at LNAPL Area No. 3. Samples were not collected for laboratory analysis from these borings.

The concentrations of constituents detected in the original RFI soil boring samples from AOI W-8 do not exceed industrial screening criteria, except for manganese and chromium. To delineate the extent of manganese in soil, a series of surface samples was collected. While manganese was detected in all eight surface samples collected, only four of the samples contained manganese at concentrations exceeding industrial screening criteria. The sample collected from the 0- to 2-foot interval at MWW8-02 contains a total chromium concentration that exceeds industrial screening criteria for hexavalent chromium. Four surface soil samples were collected to determine the chromium species present. Total chromium and hexavalent chromium were not detected at concentrations exceeding industrial screening criteria.

The concentration of constituents detected in soil boring samples collected during the supplemental RFI activities from AOI W-8 exceed screening criteria for manganese, chromium and lead.

LNAPL Sample

LNAPL was found in five AOI W-8 monitoring wells. One LNAPL sample was collected from MWW8-03 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and dioxins. This area has been designated LNAPL Area No. 3. Summaries of the analysis for the LNAPL sample are shown in Table 4-15. During the supplemental field investigations, no LNAPL was observed in soil samples collected from the west branch of the north/south storm

sewer screened for LNAPL using an ultraviolet light. Further discussion on LNAPL Area No. 3 is presented in Section 4.5.3.

Groundwater Samples

Nine monitoring wells (MWW8-01 through MWW8-13) were installed to provide areal coverage of the AOI and delineate LNAPL. Groundwater samples were not collected from all locations. Where samples were collected, laboratory analysis was conducted for VOCs, SVOCs, PCBs and inorganics. Dioxins were analyzed for in groundwater samples obtained from LNAPL delineation wells MWW8-08 and MWW8-10 through MWW8-12. Groundwater samples were collected during the supplemental RFI activities from one newly installed well and four monitoring wells to fulfill the groundwater sampling requirements (two rounds of sampling) as required by the RFI Work Plan (ENCORE, 2001b). The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

Summaries of the analysis for the groundwater samples are shown in Table 4.16.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of the Supplemental RFI Report No. 1 (ENCORE, 2003j).

The concentrations of constituents detected in the groundwater samples collected from AOI W 8 exceed screening criteria for eight inorganics (manganese, thallium [method 6010], arsenic, antimony, beryllium, lead, chromium, and nickel), two SVOCs (2,4-Dimethylphenol and total methylphenols), PCBs, and dioxins. A summary of groundwater sample locations and analytical results is shown on Figure 4-8.

The RFI soils and groundwater data from AOI W-8 and the presence of LNAPL indicate that a release exceeding industrial criteria has occurred at AOI W-8. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures at AOI W-8 are not necessary.

Groundwater impacts at AOI W-8 are addressed in Section 9.1 of this CMP. Remediation alternatives for LNAPL Area No. 3 are discussed in Section 9.7.

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

4.3.6 FORMER CENTRAL FOUNDRY (PLANT 6) RESIN SPILL AND UST (AOI W-9)

AOI W-9 consists of the Former Central Foundry (Plant 6) previously located in the southeast corner of the DA, which was bordered on the south by Montcalm Avenue, on the west by the West Yard, on the east by Glenwood Avenue, and on the north by Plant 9 (Figure 1-5). The

former Central Foundry Building covered approximately 900,000 square feet. Historically, PCBs were utilized in hydraulic and transformer fluids at the Foundry. A 20,000-gallon UST containing gasoline was also located at the Foundry. The Former Central Foundry (Plant 6) has been decommissioned and demolished. Previous remedial activities addressed the former resin spill and the presence of PCBs. However, documentation does not exist for closure of the 20,000-gallon UST.

4.3.6.1 AOI W-9 RFI RESULTS

The scope of the field investigations at AOI W-9 involved collection of surface soil, subsurface soil boring, and groundwater samples to determine whether a potential release exceeding industrial screening criteria has occurred from the former UST or the demolition of the plant or historic operations.

Soil Samples

Ten surface soil samples (SW9-01 through SW9-10) were collected from the perimeter of the Former Central Foundry building to determine surface soil quality and to evaluate potential impacts, if any, from demolition activities. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. Three additional surface soil samples (SW9-11 through SW9-13) were collected to delineate manganese and chromium concentrations that exceed the industrial screening criteria in the original borings (discussed below). All three samples were submitted for laboratory analysis for manganese. In addition, SW9-11 was sampled for arsenic and SW9-12 was analyzed for total chromium and hexavalent chromium.

Two soil borings (BW9-01 and BW9-02) were completed in the area of the former UST to confirm that closure activities eliminated potential releases. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and total cyanide. Soil borings associated with the installation of three Site-wide monitoring wells (MWD3, MWD4 and MWD5) are shown on Figure 4-9. These borings are included in this discussion because the wells are located immediately downgradient of AOI W-9. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

Based on the results of the PCB analysis for soil samples from borings BW9-02 and SW9-09, additional soil samples were collected to horizontally and vertically delineate PCBs in soil (results discussed below). Soil samples were collected following a 5- to 20-foot horizontal grid pattern at 2-foot intervals from ground surface to the top of the water table. The samples were collected from around borings BW9-02 and SW9-09. The soil samples were field screened with a bioassay field screening kit. Based on the results of the screening analysis, additional borings were completed until the samples collected from the horizontal and vertical extents of the PCB field screening did not exceed the field screening criteria of 20 mg/kg or until obstructions (e.g.,

building foundation and underground utilities) were encountered. The soil samples that were screened on-Site as not exceeding the industrial screening criteria were submitted to the laboratory for verification along with 10 percent of the samples that showed concentrations higher than the field screening criteria of 20 mg/kg.

The supplemental RFI (ENCORE, 2003j) field investigation at AOI W-9 involved collection of soil and groundwater samples to investigate the soil impacts observed during a recent geotechnical investigation. Eighteen soil borings, seven associated with installations of monitoring wells were completed in AOI W-9. Seven of the soil borings (BW9-03 through BW9-06 and BW9-11, and BW9-16) were completed to further investigate the general Site conditions at the geotechnical soil boring locations where odors, stained soils, and/or elevated PID readings were observed. An additional sample was collected form BW9-03 (3 to 5 feet bgs interval) due to staining. These samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

Based on observations of stained soils and the possible presence of free product during the geotechnical investigations two monitoring wells (MWW9-01 and MWW9-02) and four soil borings (BW9-07 through BW9-10) were installed to determine if LNAPL was present near the storm sewer. Soil samples were collected during the installation of MWW9-01 and MWW9-02 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The four soil borings (BW9-07 through BW9-10) installed were not sampled for laboratory analysis. LNAPL was visually observed in the soil boring and a sheen was observed in MWW9-02. To delineate LNAPL impacts in that area four additional monitoring wells (MWW9-03, and MWW9-05 through MWW9-07) and one temporary well (TWW9-01) were installed. No soil samples were collected from these wells.

A summary of the analysis for the soil samples is shown in Table 4.17.

The concentrations of constituents detected in the soil samples from AOI W-9 exceed the industrial screening criteria for manganese, chromium (total), and total PCBs. Concentrations of chromium (total) exceed industrial screening criteria for hexavalent chromium (used because the soil samples were not speciated). Speciation of chromium (total) was not completed at AOI W-9 and the extent of the manganese impacts was not delineated at AOI W-9. Total PCB concentrations exceed criteria at two AOI W-9 locations. Both of these areas were delineated, in both areal and vertical extent. At SW9-09 an estimated area of 1,200 square feet (40 ft by 30 ft) contains soil that exceeds the field screening criteria of 20 mg/kg. At BW9-02 an estimated area of 17,500 square feet (140 ft by 125 ft) contains soil that exceeds the field screening criteria of 20 mg/kg. Figure 4-9 shows the sampling locations, analytical summary and the delineated areal extent of the PCB contamination.

LNAPL Sample

During a groundwater level monitoring event conducted in October 2003 to evaluate groundwater flow conditions along the storm sewer that runs north/south through the DA, LNAPL was detected in MWW9-02. This area is now identified as LNAPL Area No. 6 and is delineated by existing AOI W-9 wells. A sample was collected in November 2003 for fingerprint and chemical (VOCs, SVOCs, PCBs, and inorganics) analysis. LNAPL Area No. 6 is discussed further in Section 4.5.6.

Groundwater Samples

Monitoring wells MWD3, MWD4, MWD5 and GWD11 were installed as part of the Site-wide hydrogeologic investigation immediately downgradient of AOI W-9. Due to their proximity to AOI W-9, they are included in this discussion. Groundwater samples were collected from MWD3, MWD5 and GWD11 and submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. Natural recharge did not occur at MWD4, therefore, no groundwater samples were collected.

The supplemental RFI (ENCORE, 2003j) field activities included the collection of groundwater samples from four monitoring wells (MWW9-01, MWW9-03, MWW9-06, and TWW9-01). A groundwater sample was not collected from MWW9-02 due the presence of an LNAPL sheen, or from MWW9-05 and MWW9-07 because natural recharge at these wells did not occur. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

A summary of the analysis for the shallow groundwater and deep groundwater samples is shown in Tables 4-18 and 4-19, respectively.

Thallium was detected in the first sample collected from shallow well MWD5 at a concentration that exceeds the industrial screening criteria. The second groundwater sample collected from MWD5 shows a detection of thallium at a concentration that does not exceed industrial screening criteria. The supplemental RFI sampling results indicate that the concentration of constituents detected in the groundwater samples collected from MWW9-01 exceeds the screening criteria for lead. A summary of groundwater sample locations and analytical results is shown on Figure 4-8.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The supplemental RFI soil data from AOI W-9 indicate similar impacts as those presented for AOI W-9 in the RFI Report (ENCORE, 2002c). Concentrations of manganese in soil exceed screening criteria. The supplemental RFI groundwater data indicates lead impacts to groundwater, not observed during the original RFI activities. Concentrations of lead in

groundwater samples exceed screening criteria for industrial screening criteria. LNAPL is now present within AOI W-9. Sections 9.1 and 9.2 discuss groundwater and soil remediation alternatives, respectively, for AOI W-9.

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

4.3.7 RAILROAD MARSHALLING AREA DRAINAGE SYSTEM (AOI W-10)

AOI W-10 consists of a Railroad Marshalling Area that extends the entire length of the western boundary of the West Yard (Figure 1-5). Historical operations at the Railroad Marshalling Area included the temporary storage of railcars loaded with scrap metal and grinding waste to be shipped off-Site. Waste from the waste metal chips drained out of the railcars and into the railway ballast/soil immediately beneath the tracks. As a result of the oily discharge, the Railroad Marshalling Area Drainage System was installed in November 1972. The drainage system was designed to collect and convey the oily discharge from the railcars to the WWTP. The Railroad Marshalling Area Drainage System remains at the Site.

Twelve catch basins and a pit/tunnel structure in the Railroad Marshalling Area were cleaned and inspected. A black sludge and/or oily sheen were noted in most of the catch basins. Deterioration ranged from none observed to heavily deteriorated concrete and pipes.

4.3.7.1 AOI W-10 RFI RESULTS

The scope of the field investigations at AOI W-10 involved collection of soil, groundwater and LNAPL samples to determine whether a potential release exceeding screening criteria has occurred.

Soil Samples

Six soil borings (BW10-01 through BW10-06) corresponding to one boring per sump pair (pairs of sumps run along each side of the railway tracks) were completed. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. Three additional soil borings (BW10-07 through BW10-09) were installed to further delineate the extent of inorganics detected at concentrations that exceed industrial screening criteria in soil. The samples were submitted for laboratory analysis for chromium (total), hexavalent chromium, and manganese. The concentrations of constituents detected in the soil samples collected from AOI W-10 exceed industrial screening criteria for total chromium, lead, and manganese.

LNAPL Sample

LNAPL was encountered at AOI W-10 in well MWW10-01. To delineate the LNAPL area, 37 soil samples were collected and evaluated with a fluorescent/ultraviolet light to determine the

presence of LNAPL in the soil column. Four piezometers (PZ-01 through PZ-04) were installed to determine groundwater flow direction. One LNAPL sample was collected from MWW10-01 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and dioxins. Analyses of the LNAPL sample are shown in Table 4-20.

LNAPL was observed in two monitoring wells; MWW10-01 and MWW10-05. An LNAPL sample was collected from MWW10-01 and submitted for laboratory analysis. The LNAPL present in this area has been designated as LNAPL Area No. 2. Further discussion on LNAPL Area No. 2 is present in Section 4.6.

Groundwater Samples

Six monitoring wells were installed to determine LNAPL thickness and impact, if any, on groundwater quality. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

Groundwater samples were collected from five monitoring wells (MWW10-01 through MWW10-04 and MWW10-06). The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics. In addition, dioxin analysis was performed on groundwater samples collected from wells MWW10-02 through MWW10-04 and MWW10 06.

The supplemental field investigation at AOI W-10 involved collection of second round groundwater samples, to fulfill the groundwater sampling requirements as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j). During the supplemental RFI activities, groundwater samples were collected from four monitoring wells (MWW10-02 through MWW10-04 and MWW10-06). Groundwater samples were not collected from MWW10-01 and MWW10-05 due to the presence of LNAPL. The samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

Analyses of the groundwater samples are shown in Table 4-21.

The concentrations of constituents discussed in the RFI Report (ENCORE, 2002c) that were detected in the groundwater samples collected from AOI W 10 exceed the screening criteria for total PCBs, bis-(2-ethylhexyl)phthalate, arsenic and thallium. The results of the supplemental RFI activities indicate that the concentrations of constituents detected in the groundwater samples collected from AOI W-10 do not exceed the screening criteria. A summary of groundwater sample locations and analytical results is shown on Figure 4-7.

The analytical data summaries are provided in Appendix E in the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soils and groundwater data from AOI W-10 indicate that a release exceeding criteria has occurred at AOI W-10. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures for soils at AOI W-10 are not necessary.. Groundwater impacts and remediation alternatives for LNAPL Area No. 2 are addressed in Sections 9.1 and Section 9.7, respectively. Table 1-1 presents a summary of the data, conclusions, and proposed activity at the AOI.

4.3.8 WASTEWATER TREATMENT PLANT (AOI M-1)

AOI M-1 consists of the WWTP located west of Plants 5, 14, 23, and 56 (Figure 1-5). Historically, the WWTP has utilized up to 55 ASTs, which were associated with the industrial wastewater treatment process (including system influent, system effluent, and materials used during treatment). The WWTP and two waste piles located within the WWTP area were identified as SWMUs by GM in the Certification of Potential Releases from Solid Waste Management Units (GM, 1986). This area is considered an AOI because of the type of materials stored and treated (industrial wastes), a history of documented releases, and its previous identification as a SWMU.

4.3.8.1 AOI M-1 RFI RESULTS

The scope of field investigations at AOI M-1 involved the collection of surface soil, soil boring, and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the WWTP.

Soil Samples

Eleven soil borings (BM1-01 through BM1-11) and twelve surface soil samples (SM1-01 through SM1-12). The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide, and hexavalent chromium.

Based on the results of the PCB analysis for soil borings BM1-07 and BM1-08, additional soil samples were collected to horizontally and vertically delineate PCBs in soil. Soil samples were collected at 2-foot intervals from ground surface to the top of the water table and horizontally at 5-foot intervals from the areas surrounding BM1-07 and BM1-08. The soil samples were field screened with a bioassay field screening kit for PCBs. Additional step-out borings were completed until concentrations measured at the horizontal and vertical extents using the PCB field screening kits were less than the field screening criteria 20 mg/kg or obstructions (e.g., tanks, buildings, and underground utilities) were encountered. The soil samples screened on-Site that did not have concentrations that exceed the industrial screening criteria were

submitted to the laboratory for verification along with 10% of the samples that did have concentrations that exceeded the field screening criteria of 20 mg/kg.

The concentrations of constituents detected in the soil samples collected from AOI M-1 do not exceed generic industrial screening criteria with the exception of total PCBs in two locations. A PCB delineation program was implemented at these locations. At BM1-07, an estimated area of 300 square feet (15 feet x 20 feet) contains soil exceeding the field screening criteria of 20 mg/kg. At BM1-08, an estimated area of 625 square feet (25 feet x 25 feet) contains soil exceeding the industrial screening criteria of 20 mg/kg.

Groundwater Samples

Three monitoring wells (MWM1-01 through MWM1-03) were collected to provide areal coverage of the AOI. The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide, and hexavalent chromium.

The supplemental RFI field investigations at AOI M-1 involved the collection of groundwater samples to support, as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j). Groundwater samples were collected from five monitoring wells (MWM1-02 through MWM1-06). Monitoring wells MWM1-04 and MWM1-06 were installed in locations side-gradient from existing monitoring well MWM1-03. Monitoring well MWM1-05 was installed as a downgradient well to MWM1-03. The samples were submitted for laboratory analysis for cyanide. Monitoring well MWM1-01 was dry during the sampling event; therefore, a groundwater sample could not be collected.

Summaries of the analyses for the groundwater samples are shown in Table 4-22.

The concentrations of constituents detected in groundwater samples exceed industrial criteria only for cyanide.

The results from the supplemental field activities (ENCORE, 2003j) indicated that the concentrations of constituents detected in the groundwater samples collected from AOI M-1 exceed the screening criteria for cyanide. Cyanide was detected in MWM1-03 and MWM1-06 at concentrations that exceed the screening criteria. Three new monitoring wells (MWM1-04 through MWM1-06) were installed at AOI M-1 to provide downgradient and side-gradient boundary wells to bound the contaminant plume at AOI M-1, as discussed in Supplemental RFI Report No. 1 (ENCORE, 2003j).

A summary of groundwater monitoring well locations and analytical results is shown on Figure 4-10.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soils and groundwater data from AOI M-1 indicate that a release exceeding screening criteria has occurred at AOI M-1. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures for soil at AOI M-1 are not necessary. Groundwater impacts are addressed in Section 9.1 of this CMP.

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

4.3.9 FORMER PLATING OPERATIONS AREA (AOI M-2)

AOI M-2 consists of a Former Plating Operations Area located in the western portion of Plant 56 (old Plant 2), near Dock 34 (Figure 1-5). This area is considered an AOI because of the type of materials historically used in plating operations (metals, solvents, and acids). In addition, the plating pits showed evidence of corrosion during the Site walkthrough completed as part of the CCR (ENCORE, 2001a) preparation. This area also has six metal-lined mix tanks located below the concrete floor east of the plating pits.

4.3.9.1 AOI M-2 RFI RESULTS

The scope of the field investigations at AOI M-2 involved collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the former plating operations area.

The supplemental field investigations at AOI M-2 involved collection of soil and groundwater samples to assess potential LNAPL source areas, investigate elevated chlorinated organic compounds in groundwater, and fulfill the RFI Work Plan (ENCORE, 2001b) groundwater sampling requirements (second round).

Soil Samples

Eighteen soil borings (BM2-01 through BM2-18) were completed to provide areal coverage of the AOI. The locations were biased to areas of suspected subsurface impacts, such as plating pits and holding tanks. The samples from borings BM2-01 through BM2-13 were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide and hexavalent chromium. Based on analytical results from soil borings BM2-04 and BM2-10, additional borings (BM2-14 through BM2-18) were completed to delineate soil that exceeds the industrial screening criteria. The samples from boring BM2-14 were submitted for laboratory analysis for VOCs only and BM2-15 through BM2-18 were submitted for laboratory analysis for manganese only. The soil samples collected from the installation of eight monitoring wells (MWM2-01 through MWM2-

08) were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide and hexavalent chromium, with the exceptions of MWM2-06 and MWM2-07, which were not analyzed for PCBs, and MWM8, which was not analyzed for cyanide or hexavalent chromium.

The supplemental soil samples were only collected from one of each nested well pair. Five soil samples were collected (MWM2-15 through -17, MWM2-19, and MWM2-22). The samples were submitted for laboratory analysis for VOCs, SVOC, PCBs, and inorganics.

The concentration of constituents detected in soil samples collected from AOI M-2 borings exceed industrial screening criteria for 1,1-dichloroethene and manganese. Both of these areas were delineated by the remaining borings. The supplemental RFI field investigation results indicate that the concentrations of constituents detected in the soil boring samples collected from AOI M-2 do not exceed the screening criteria.

LNAPL Samples

The LNAPL sample collected during the supplemental RFI activities from MWM2-06 was submitted for fingerprint and chemical (VOCs, SVOCs, PCBs, and inorganics) analysis. Further LNAPL discussion including fingerprinting analysis and delineation is presented in Section 4.6.

Groundwater Samples

Groundwater samples were initially collected from four monitoring wells MWM2-01 through MWM2-04. Due to its proximity to AOI M-2, Site-wide well MWM8 is also included in this discussion. Based on VOC concentrations that exceed the screening criteria, four additional wells (MWM1-05 through MWM1-08) were installed to further delineate the VOC plume. The groundwater samples collected from MWM2-01 through MWM2-04 were submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, cyanide, and hexavalent chromium, while the samples collected from MWM2-05 through MWM2-08 were submitted for laboratory analysis for VOCs only. Samples collected from MWM8 were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The supplemental RFI field activities included the collection of fifteen groundwater samples. The second round of groundwater samples, collected during the supplemental field investigation activities, were collected from seven monitoring wells. Samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. The concentration of constituents detected in groundwater samples collected from AOI M-2 exceed the screening criteria for bis(2-ethylhexyl)phthalate, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, methylene chloride, tetrachloroethene, trichloroethene vinyl chloride, acetone, nickel and thallium. A summary of groundwater monitoring well locations and analytical data is shown on Figure 4-10.

Summaries of the analytical data for the groundwater samples are shown in Table 4-23.

The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI M-2 indicate that a release exceeding screening criteria has occurred at M-2. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures for soils at AOI M-2 are not necessary. The supplemental RFI soil data (ENCORE, 2003j) for AOI M-2 confirms the conclusions of the RFI Report (ENCORE, 2002c) that the soils do not pose any unacceptable risks. The supplemental RFI groundwater data from AOI M-2 indicate that a release has occurred to groundwater at AOI M-2, confirming the conclusions of the RFI Report (ENCORE, 2002c). The groundwater impacts and LNAPL remediation alternatives are addressed in Sections 9.1 and 9.7 of this CMP, respectively.

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

4.3.10 PLANT 25 FORMER GASOLINE UST AND CURRENT GASOLINE AST LOCATION (AOI M-4)

AOI M-4 consists of two tanks (one former UST and one existing AST) adjacent to Plant 25 (formerly Plant 51) located in the northwest corner of the MFD portion of the Site (Figure 1-5). This area is considered an AOI because of a prior documented release from the former UST. There have been no documented releases from the existing AST, which is located within a secondary containment system. Remediation of a gasoline spill from the former UST was terminated in August 1987. However, the limited available analyses show that in 1991 benzene still exceeded screening criteria.

4.3.10.1 AOI M-4 RFI RESULTS

The scope of the field investigations at AOI M-4 involved collection of soil and groundwater samples to determine if soil and groundwater quality exceed screening criteria as a result of a historical release. The scope of the supplemental field investigations (ENCORE, 2003j) at AOI M-4 involved collection of soil and groundwater samples to fulfill the second round groundwater sampling requirements, collect groundwater data for remedial design purposes, and for purposes described in RFI Work Plan No. 8 and 8A (ENCORE, 2003g and h).

Soil Samples

One soil boring (BM4-01) was completed at AOI M-4 for areal coverage of the AOI. The soil samples were submitted for laboratory analysis for VOCs and lead.

The supplemental RFI field activities at AOI M-4 included the completion of a soil boring during the installation of MWM4-06 in the basement of Plant 25 [RFI Work Plan Addendum No. 8 (ENCORE, 2003g)]. Soil samples were not collected due to a shallow water table and the lack of staining, odors or elevated PID readings.

During the installation of monitoring well MWM4-07 a soil sample was submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics due the presence of faint petroleum like odors. The well location is within AOI M-16 therefore any soil impacts observed will be addressed and used to delineate AOI M-16, which is still under investigation (Section 4.3.12).

The concentrations of constituents detected in the soil samples collected from AOI M-4 do not exceed industrial screening criteria. The results from the soil sample collected during the installation of MWM4-07 were not validated in time for inclusion in this CMP. Due to the location of MWM4-07, the soil samples will be associated with soil samples collected during the AOI M-16 delineation. AOI M-16 remains under investigation.

Groundwater Samples

Five monitoring wells (MWM4-01 through MWM4-05) were installed for areal coverage of the AOI. The groundwater samples were submitted for laboratory analysis for VOCs and lead.

Supplemental RFI field activities included the installation of two monitoring wells (MWM4-06 and MWM4-07) to provide a downgradient monitoring point. Following installation of MWM4-06, LNAPL was observed in this well, therefore this well could not be used as an appropriate downgradient monitoring point for the AOI M-4 contaminant plume.

To provide an appropriate downgradient monitoring point for AOI M-4, RFI Work Plan Addendum No. 8A (ENCORE, 2003i) proposed the installation of MWM4-07, upgradient to MWM4-06 and downgradient MWM4-04.

A second round of groundwater samples was collected during the supplemental field investigation activities, for remedial design purposes and to fulfill groundwater sampling requirements. Samples were collected from five monitoring wells (MWM4-01 through MWM4-05). The samples were submitted for laboratory analysis for VOCs.

RFI Work Plan Addendum No. 8 (ENCORE, 2003g) proposed the installation of a downgradient monitoring well at AOI M-4. Following the installation of monitoring well MWM4-06, LNAPL was observed in the well, therefore no groundwater sample was collected. Monitoring well MWM4-06 is within the limits of AOI M-16. Due to the additional evidence of LNAPL observed during AOI M-16 investigations, monitoring well MWM4 06 will be further discussed in association with AOI M-16.

RFI Work Plan Addenda No. 8A (ENCORE, 2003i) proposed the installation of monitoring well MWM4-07 as a downgradient well for AOI M-4. Groundwater samples were collected from six monitoring wells (MWM4-01 through MWM4-05, and MWM4 07) to evaluate groundwater quality downgradient from AOI M-4. The samples were submitted for laboratory analysis of BTEX. Well locations are shown on Figure 4-11.

Summaries of the analyses for the groundwater samples are shown in Table 4-24. The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The concentrations of constituents detected during the initial RFI investigations at AOI M-4 indicate that groundwater samples exceed industrial screening criteria for benzene and ethylbenzene. The supplemental RFI groundwater data from AOI M-4 indicate that a release has occurred to groundwater at AOI M-4. Concentrations of benzene and ethylbenzene in groundwater exceed screening criteria. A summary of groundwater monitoring well locations and analytical results is shown on Figure 4-11.

The concentrations of constituents detected in the soil boring samples collected from AOI M-4 do not exceed industrial screening criteria. The RFI Report (ENCORE, 2002c) concluded that NFA or investigation is warranted for soils in this area. The RFI groundwater data from AOI M-4 indicates that a release exceeding screening criteria has occurred at AOI M-4. The supplemental RFI groundwater data from AOI M-4 also indicates that a release has occurred to groundwater at AOI M-4. Alternatives for addressing the groundwater impacts are reviewed in Section 9.3.

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

4.3.11 FORMER A-2 FILL AREA (AOI M-5)

AOI M-5 consists of the former A-2 fill area, which covers approximately 10 acres under Plants 25 and 33 (previously Plants 51 and 55), the east parking lot area in the MFD area, and under the SPO Building (Plant 75). The former landfill was identified as a SWMU by GM in the Certification of Potential Releases from Solid Waste Management Units (GM, 1986). This area is considered an AOI because of previous fill activities.

4.3.11.1 AOI M-5 RFI RESULTS

The scope of the field investigations at AOI M-5 involved collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the A-2 fill area.

Soil Samples

Two soil borings (BM5-01 and BM5-02) were completed to provide supplemental characterization of subsurface soil. The soil samples were submitted for laboratory analysis for VOCs, PCBs, inorganics, and dioxins. Based on the analytical results from soil borings BM5-01 and BM5-02, an additional soil boring (BM5-03) was completed and samples were analyzed for lead only. The concentration of constituents detected in the soil samples collected from AOI M-5 exceeds industrial screening criteria for lead.

Groundwater Samples

One monitoring well (MWM5-01) was installed at AOI M-5 during initial RFI activities. Groundwater samples were collected and submitted for laboratory analysis for PCBs, inorganics, and dioxins from MWM5-01 and existing well MW2 99.

As part of the supplemental RFI activities, three additional monitoring wells were installed at AOI M-5. Groundwater samples were collected from five monitoring wells (MW-2-99, MWM5-01 through MWM5-04). The three new wells (MWM5-02 through MWM5-04) were installed side-gradient and downgradient from existing monitoring wells MW2-99 and MWM5-01. The samples were submitted for laboratory analysis for PCBs and inorganics.

Summaries of the analytical data for the groundwater samples are shown in Table 4-25. The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The concentrations of constituents detected in AOI M-5 groundwater samples exceed industrial screening criteria for barium, manganese, and total PCBs. The supplemental RFI groundwater data indicate that the same constituents exceeding criteria as were reported in the RFI Report (ENCORE, 2002c). Groundwater analytical results for MWM5-02 and MWM2-04 provide side-gradient and downgradient boundaries, as no groundwater screening criteria were exceeded. The PCB screening criteria as MWM5-03 was marginally exceeded. A summary of groundwater sample locations and analytical results is shown on Figure 4.11.

The RFI soil and groundwater data from AOI M-5 indicate that a release exceeding industrial screening criteria has occurred at AOI M-5. A Site-specific risk evaluation, which showed estimates of Site related cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, corrective measures for soils at AOI M-5 are not necessary. The supplemental RFI groundwater data from AOI M-5 indicates the same constituents exceeding screening criteria as were reported in the RFI Report (ENCORE, 2002c). Alternatives for addressing the groundwater impacts are reviewed in Section 9.1. Table 1-1 presents a summary of the data, conclusions, and proposed activity at the AOI.

4.3.12 PLANT 25 BASEMENT SUMP AREA (AOI M-16)

AOI M-16 consists of the basement area of Plant 25, which contains a sludge tank, pumping system, and several floor sumps (Figure 1-5). This area is considered an AOI because oily liquid was observed in several of the floor sumps. Most of the basement sumps have been filled with grout. The two remaining floor sumps were cleaned and inspected as part of the RFI activities. Both sumps contained black oily sludge, topped with alkali-oily liquids. The concrete was intact in both sump pits, although one pit exhibited minor pitting while heavy black staining was observed on the other.

Large metal cutting machinery used to be located in this area of Plant 25. Metal cuttings and oils were collected beneath the equipment by sluiceways and transported to the Plant 25 basement. The area is currently used for storage or is vacant.

4.3.12.1 AOI M-16 RFI RESULTS

The scope of the field investigations at AOI M-16 involved collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the Plant 25 basement sump area.

The supplemental RFI field investigations (ENCORE, 2003j) at AOI M-16 involved the collection of groundwater samples as described in RFI Work Plan Addendum No. 8 (ENCORE, 2003g) and fulfill RFI Work Plan (ENCORE, 2001b) groundwater sampling requirements (second round). Following the discovery of LNAPL, additional activities were initiated to delineate the presence of LNAPL.

Soil Samples

Soils borings associated with the installation of monitoring wells MWM16-01 and MWM16-02 were completed downgradient of AOI M-16. The soil samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics

Following the installation of MWM4-06 and MWM16-03, LNAPL was observed in both wells. Monitoring well MWM4-06 is within the limits of AOI M-16. Due to the additional evidence of LNAPL observed during AOI M-16 investigations, monitoring well MWM4-06 will be associated with AOI M-16.

Soil borings associated with the installation of two additional downgradient AOI M-16 wells were completed as proposed in RFI Work Plan Addendum No. 8 (ENCORE, 2003g). Soil samples were not collected from these wells since odors, staining or elevated PID readings were not encountered.

Following the discovery of LNAPL in the basement of Plant 25 monitoring wells, three additional side-gradient and downgradient wells were installed (MWM16-07 through MWM16-09). A soil sample was collected at MWM16-07 from the 0- to 2-foot interval due to odors. The sample was submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics. During the installation of MWM16-06 LNAPL was observed, therefore, a monitoring well was not installed and a LNAPL delineation program was initiated.

The concentration of constituents detected in the soil boring sample collected from MWM16-07 do not exceed the screening criteria. The results from the soil sample collected during the LNAPL delineation program for AOI M-16 were not validated in time to be included in this Report. The results will be presented and discussed under separate cover following the delineation of LNAPL Area No. 5. This AOI remains under investigation.

The concentrations of constituents detected in the soil samples collected from AOI M-16 do not exceed industrial screening criteria.

Groundwater Samples

Two monitoring wells (MWM16-01 and MWM16-02) were installed downgradient of AOI M-16.The groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics.

One groundwater sample was collected from monitoring well MWM16-02 as part of the scheduled second round sampling activities. The sample was submitted for laboratory analysis of VOCs, SVOCs, PCBs, and inorganics.

Groundwater samples were collected from three monitoring wells (MWM16-01, MWM16-02, MWM16-04). The samples were submitted for laboratory analysis for vinyl chloride. Five monitoring wells were not sampled; LNAPL is present in MWM16-03, natural recharge did not occur at MWM16-05, and MWM16-07 through MWM16-09 will be sampled following installation of additional LNAPL delineation wells. Further LNAPL discussion including fingerprinting analysis and delineation is presented in Section 4.6.5.

Summaries of the analytical data for the groundwater samples are shown in Table 4-26. The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The only constituent detected in groundwater samples collected from AOI M-16 that exceeds industrial screening criteria is vinyl chloride in one well. The downgradient well, sampled during initial RFI activities, did not detect vinyl chloride. The supplemental RFI investigation results indicate that the concentrations of constituents detected in the groundwater samples collected from AOI M-16 exceed the screening criteria for vinyl chloride. Vinyl chloride was

detected in the groundwater at MWM16-01, exceeding industrial screening criteria. The analytical results for vinyl chloride from MWM16-02, MWM16-04, and MWM25-02 (installed just east of MWM16-01) were rejected during data validation. A summary of groundwater monitoring well locations and analytical results is shown on Figure 4-11.

The RFI soils data from AOI M-16 do not indicate that a release has occurred to soils at AOI M-16. Concentrations of constituents detected in soil do not exceed industrial screening criteria. NFA or investigation is required for soils at AOI M-16. The RFI groundwater data from AOI M-16 indicate that a release has occurred to groundwater at AOI M-16. The groundwater impacts and LNAPL remediation alternatives are addressed in Sections 9.1 and 9.7 of this CMP, respectively.

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

4.3.13 EMISSIONS CONTROL BUILDING FORMER UST FARM AND FORMER STODDARD SOLVENT AST (AOI P-6)

AOI P-6 consists of a former UST tank farm and former Stoddard solvent AST located west of the northwest corner of the Emissions Control Building (Figure 1-5). A release from one or more of the USTs was discovered in June 1984 and more recently in January 2001. A concrete paved parking lot is currently at the location of the former UST tank farm and former AST. The former UST tank farm contained seven USTs that were installed in the early- to mid-1970s. The USTs stored several types of materials, including unleaded gasoline, Indolene I clear gas, GM calibration solvent, and water. The USTs were taken out of service in November 1986 and removed in July 1987.

The 950-gallon AST was located on a concrete pad and contained by a concrete dike. The AST was used to store waste Stoddard solvent. The AST was closed in accordance with the closure plan in November 1986, although formal correspondence with MDEQ and/or the U.S. EPA was not necessary.

4.3.13.1 AOI P-6 RFI RESULTS

The scope of the field investigations at AOI P-6 involved collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the former UST tank farm or AST.

The supplemental RFI field investigation (ENCORE, 2003j) at AOI P-6 involved collection of groundwater samples for remedial design purposes, to fulfill groundwater sampling requirements, and to monitor the apparent naturally declining benzene and ethylbenzene concentrations (RFI Work Plan Addendum No. 8 (ENCORE, 2003g).

Soil Samples

Five soil borings (BP6-01 through BP6-05) were installed to provide areal coverage of the former UST tank farm and AST areas. The soil samples collected from the soil borings (BP6-01 through BP6-05) and at monitoring wells MWP6-01 through MWP6-04 and MWP6-07 were submitted for laboratory analysis for VOCs, SVOCs and lead. The soil samples collected from borings completed at monitoring wells MWP6-05, MWP6 06 and MWP6-08 were submitted for laboratory analysis for VOCs.

The concentrations of constituents detected in the soil samples collected from AOI P-6 do not exceed industrial screening criteria.

Groundwater Samples

Eight monitoring wells (MWP6-01 through MWP6-08) were installed at AOI P-6 during original RFI field activities.

Groundwater samples collected from wells MWP6-01 through MWP6-04 were submitted for laboratory analysis for VOCs, SVOCs and lead. The sample from monitoring well MWP6-07 was submitted for laboratory analysis for VOC, SVOCs and inorganics. The RFI Work Plan Addendum No. 3 (ENCORE, 2002a) specified that groundwater samples collected from AOI P-6 be analyzed for lead; however, during the sampling of new well MWP6 07, the groundwater samples were inadvertently shipped to the lab requesting the full inorganic lab analysis. At the time of sampling MWP6-05, MWP6-06 and MWP6-08 were dry and groundwater samples could not be collected from these locations.

Groundwater samples were collected from five monitoring wells (MWP6-01 through MWP6-04 and MWP6-07) during two separate sampling events, for design purposes and for second round sampling event. The samples collected for design purposes were submitted for laboratory analysis for BTEX. The samples collected as part of the second round of sampling were submitted for laboratory analysis for VOCs.

Two AOI P-6 monitoring wells (MWP6-05 and MWP6-08) were properly abandoned prior to construction activities beginning in the AOI P-6 area. These wells will be replaced following the completion of the construction activities.

Summaries of the analytical data for the groundwater samples are shown in Tables 4-27. The analytical data summaries are provided in Appendix E of the RFI Report (ENCORE, 2002c) and Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The concentrations of constituents detected in the groundwater samples collected from AOI P-6 exceed screening criteria for benzene, toluene and ethylbenzene. The results from the

supplemental RFI (ENCORE, 2003j) sampling activities indicate that the groundwater samples collected exceed the screening criteria for benzene and ethylbenzene. During both sampling events at AOI P-6, benzene and ethylbenzene were detected; however, the concentrations are naturally decreasing. A summary of groundwater monitoring well locations and analytical data is shown on Figure 4-12.

The RFI soil data from AOI P-6 indicate that the excavation of contaminated soils as part of the tank removal (completed in between 1984 and 1987 [CCR (ENCORE, 2001a)], eliminated the source area. Concentrations detected in soil do not exceed industrial screening criteria. NFA or investigation is required for soils at AOI P-6. The RFI groundwater data from AOI P-6 indicates residual contamination above industrial screening criteria remains in the groundwater. The supplemental RFI groundwater data from AOI P-6 indicate that although benzene and ethylbenzene concentrations exceed screening criteria they are generally continuing to decrease. Alternatives for addressing the groundwater impacts are reviewed in Section 9.4.

Table 1-1 presents a summary of the data, conclusions, and proposed activities at the AOI.

4.3.14 PIPELINE RELEASE INVESTIGATION (AOI P-9)

A pipeline release occurred since the completion of the RFI Report (ENCORE, 2002c) that may have impacted soil and/or groundwater in the vicinity of the Former Plant 18 (Figure 1-5). As such, AOI P-9 is a new AOI investigated as part of RFI Work Plan Addendum No. 5 (ENCORE, 2003d).

On August 7, 2002, alkali-oily wastewater was reported to be leaking from three areas on a pipeline located in an overhead pipe trestle that runs along the north and east side of the former Plant 18 footprint. The pipeline transports alkali-oily wastewater from the GM Powertrain Engineering building to the Pontiac Metal Center WWTP. The leaking pipe spilled an undetermined amount of wastewater to soil below the trestle. Based on this information and the results of chemical analysis of a sample of the alkali-oily wastewater, an investigative program was developed to address the nature and extent of impacts caused by the release. The alkali-oily liquid was cloudy, white and contained emulsified oils. The release was reported to the U.S. EPA National Response Center (NRC) and the MDEQ. The pipeline was subsequently repaired to stop the leak.

On January 15, 2003, an additional leak was observed approximately 100 feet south of the point at which the utility trestle turns and runs south along the east side of the former Plant 18 footprint. Due to the cold temperature and frozen ground conditions, the wastewater did not infiltrate the ground surface. As such, additional impacts to AOI P-9 were not expected. The leak was subsequently fixed on January 20, 2003.

Plant 18 was demolished in 1998. According to GM personnel the basements were backfilled with demolition debris (concrete, brick, etc). Significant voids may be present in these backfilled areas. RFI Work Plan Addendum No. 5 (ENCORE, 2003d) describes the initial investigation for the immediate area surrounding an overhead trestle pipeline release that occurred at the Site.

4.3.14.1 AOI P-9 RESULTS

The scope of the field investigations at AOI P-9 involved collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the Pipeline Release.

Test Pit Samples

One test pit was completed (TP9-01) to identify the potential presence of LNAPL due to stained soils observed in a soil boring. A sample was collected and submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The concentrations of constituents detected in the test pit soil sample collected from AOI P-9 do not exceed the screening criteria.

Soil Samples

Fourteen soil borings (BP9-01 through BP9-10 and MWP9-01 through MWP9-04) were completed to provide areal coverage of the AOI. Three additional soil borings (BP9-11 through BP9-13) were completed to delineate benzo(a)pyrene detections in the soil. Fourteen additional borings (P18-01 through P18-13 and P18-17) were completed as part of a separate investigation in AOI P-9 to ensure the safety of construction workers installing new parking lots and subsurface utilities in this area. The results of this work were considered pertinent to this AOI P-9 work and as such, are included in this CMP. All samples, excluding the three analyzed for benzo(a)pyrene only, were submitted for laboratory analysis for VOCs, SVOCs, PCBs, and inorganics.

The soil analytical data summaries are presented in Table 4-28.

The concentrations of constituents detected in the soil boring samples collected from AOI P-9 exceed screening criteria for benzo(a)pyrene. Benzo(a)pyrene exceeds the industrial screening criteria at BP9-06, BP9-07 and BP9-08. Due to the lack of soil data north, west and south of BP9-07, three additional soil borings (BP9-11, BP9-12, and BP9-13) were completed to delineate the benzo(a)pyrene exceedances, all concentrations were below screening criteria. Soil boring locations and analytical data are shown on Figure 4-13.

Groundwater Samples

Groundwater samples were collected from three monitoring wells (MWP9-01, MWP9-03, and MWP9-04) downgradient of the release (southwest groundwater flow). A well was not installed at MWW9-02 because a saturated zone was not encountered. One of the monitoring wells (MWP9-03) was installed within the footprint of the northeast basement and was advanced to the former basement floor. MWP9-03 was set as a water table well, with the well screen installed at the basement floor elevation. Two rounds of groundwater samples were collected for the AOI P-9 wells.

The groundwater analytical data summaries are presented in Table 4-29.

The concentrations of constituents detected in the groundwater samples collected from AOI P-9 exceed screening criteria for phenols (2,4-dimethylphenol, and total methylphenols), antimony, nickel, selenium, and vanadium were detected in the groundwater. A summary of groundwater monitoring well locations and analytical data is shown on Figure 4-14.

Analytical reports are provided in Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j).

The RFI soil and groundwater data from AOI P-9 indicate that a release has occurred to soil and groundwater at AOI P-9. Benzo(a)pyrene was detected at concentrations that exceed industrial screening criteria for soil and inorganics, and phenols were detected at concentrations that exceed the residential and industrial screening criteria for groundwater. The soil exceedance of the screening criteria is further evaluated in Section 8.0. Alternatives for addressing the groundwater impacts are reviewed in Section 9.4.

Table 1-1 presents a summary of the data, conclusions, and proposed activities at the AOI.

4.3.15 FORMER PLANT 18 INVESTIGATION (AOI P-10)

Information obtained since the completion of the RFI Report (ENCORE, 2002c) indicates that PCBs are present in sediment and water of the storm sewer system that serviced the west side of Former Plant 18 (Figure 1-5). AOI P-10 is a new AOI investigated as part of RFI Work Plan Addendum No. 6 (ENCORE, 2003e)

On July 19, 1978, oil was reported to be leaking from a transformer on the roof of Plant 18. A portion of the oil had overflowed a concrete dyke around the transformer, subsequently flowing down a roof drain to the storm sewer; and an undetermined amount had seeped through the roof to the floor of Plant 18. Immediately upon discovery of the leak a neoprene plug was put in the roof drain within the substation and "Speedi-Dry" was applied to absorb the oil. Manhole ST321 was promptly sandbagged to prevent discharge to the downstream storm

sewers. The downspouts and laterals from the roof to manhole ST321A and the sewer line from ST321A to ST321 were flushed and vacuumed out.

It was reported that from laboratory results conducted in July 1978, that the PCB containing material was contained on the Site. It should be noted that the available information did not specify whether the collected samples were liquid or sediment. The results of this analysis are included in the RFI Work Plan Addendum No. 6 (ENCORE, 2003e). Upon discovery of the release, federal and state personnel were notified, including the U.S. EPA and the MDNR.

The north-south storm sewer reach from manhole ST321 to manhole ST322, consists of approximately 68 linear feet of 42-inch diameter concrete pipe, which appears to be structurally sound. The storm sewer reach was observed to be leaking, with approximately 6 inches of sediment and debris throughout the invert of the pipe reach.

During a 2002 storm sewer system investigation, PCBs were shown to be present in sewer water and sediment samples collected in the vicinity of Former Plant 18. Concentrations of PCBs and oil and grease were detected in both storm sewer water and sediment in the storm sewer system west of Former Plant 18. Additional samples of the storm sewer water and sediment were collected subsequent to cleaning activities from fifteen manholes and catch basins along the storm sewer lines in the vicinity of Former Plant 18 and were submitted for laboratory analysis of PCBs and oil and grease. Of the 15 manholes and catch basins sampled, 12 had PCBs detected (3 water and 9 sediment) and 11 had oil and grease (2 water and 9 sediment) detected above method detection limits. Summaries of the historical and storm sewer analytical data are summarized on Tables 4-30 and 4-31.

4.3.15.1 AOI P-10 RESULTS

The scope of the field investigation at AOI P-10 involved collection of soil samples to determine whether a potential release exceeding screening criteria has occurred from Former Plant 18 [RFI Work Plan Addendum No. 6 (ENCORE, 2003e)].

Soil Samples

Six soil borings (MWP10-01 through MWP10-06) associated with the installation of monitoring wells proposed in RFI Work Plan Addendum No. 6 (ENCORE, 2003e) were completed in the vicinity of the historical transformer leak and laterals servicing Former Plant 18. Only three of the soil borings installed were completed as monitoring wells (MWP10-01, MWP10-03, and MWP10-05) since the soil at MWP10-02, MWP10-04 and MWP10-06 consisted of dry clay with no observed water bearing zones. The samples were submitted for laboratory analysis for SVOCs and PCBs.

The concentrations of all constituents detected in the soil boring samples collected from AOI P-10 do not exceed the screening criteria.

Groundwater Samples

Three monitoring wells were installed (MWP10-01, MWP10-03, and MWP10-05). No groundwater samples were submitted for laboratory analysis because of an insufficient volume of groundwater in the wells. These three monitoring wells were installed in an area that was observed to consist predominantly of dry clay.

The analytical data summary for AOI P-10 is included in RFI Supplemental Report No. 1 (ENCORE, 2003j).

The RFI soil data from AOI P-10 do not indicate that a release has occurred at AOI P-10. Concentrations detected in soil do not exceed screening criteria. No groundwater was encountered at AOI P-10. NFA or investigation is warranted for this area.

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

4.3.16 TRESTLE PIPELINE RELEASE INVESTIGATION (AOI P-11)

Information obtained since the completion of the RFI Report (ENCORE, 2002c) indicates that a recent overhead pipeline release may have impacted soil and/or groundwater in the vicinity of the former Plant 18 (Figure 1-5).

On March 6, 2003, alkali-oily wastewater was reported to be flowing freely from a broken pipeline in an overhead pipe trestle that runs along the north side of the former Plant 18 (Figure 1-5). The broken pipe was part of a replacement pipeline that conveyed alkali-oily wastewater from Powertrain Engineering to the on-Site Industrial WWTP. The cause of the pipe breach was insufficient structural bracing along the overhead pipeline. The pipe was subsequently repaired on March 7, 2003, and additional bracing was provided along the entire length of the trestle.

The broken pipe spilled approximately 500 gallons of wastewater to the ground surface below the trestle. Once the break in the line was observed, the sump pump was immediately shutdown and MPS Group, Inc. (MPS) began transporting the wastewater that continued to be generated at Powertrain to the WWTP via vacuum truck.

All stained soils in the vicinity of the release were collected by MPS and placed in a roll off box for subsequent disposal characterization. It should be noted that frozen wastewater and stained soils were present beneath the snow from a snowfall event which occurred late on March 4 or early on March 5, 2003, indicating that the release likely occurred prior to March 5, 2003. When the snow cover was removed, it was observed that the liquid had penetrated the ground surface

below the trestle and migrated westerly within the subsurface along the north side of former Plant 18. The wastewater was observed to have seeped out of the bottom of an embankment and pooled on the concrete in the vicinity of the northwest corner of former Plant 18 fence line, and north of the trestle. The embankment results in an elevation change just north of the trestle where the ground surface descends approximately six to eight feet to the north. Asphalt covers the slope along the length of this elevation change from the area of the broken pipe to just east of the area where the wastewater seeped out of the embankment.

Pooled liquid was also observed to be in the immediate area of storm sewer manhole ST321. Manhole ST321 is elevated from the ground surface and there was no evidence of wastewater infiltration. From previous sewer investigations, there is evidence of infiltration in the storm sewer located west of former Plant 18. In addition, pooled liquid was observed on the asphalt surface west of Former Plant 18. The extent of wastewater that accumulated west of former Plant 18 could not be determined due to several storage racks stored in the area.

4.3.16.1 AOI P-11 RESULTS

The scope of the field investigation at AOI P-11 involved collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the trestle pipeline release [RFI Work Plan Addendum No. 7 (ENCORE, 2003f)].

A sewer water sample was not collected as proposed in the RFI Work Plan Addendum No. 7 (ENCORE, 2003f) due to the detection of only one constituent in groundwater exceeding residential screening criteria.

Soil Samples

Ten soil borings were completed at AOI P-10 (BP11-01 through BP11-06 and MWP11-01 through MWP11-04). Three soil borings were completed as monitoring wells (MWP11-01, MWP11-02, and MWP11-04). MWP11-03 was not completed as a monitoring well because a saturated zone was not encountered. The samples were submitted for laboratory analysis of VOCs, SVOCs, PCBs, and inorganics. The soil analytical data summaries are provided in Table 4-32.

The concentrations of constituents detected in the soil boring samples collected from AOI P-11 exceed the screening criteria for manganese. The manganese concentration detected at BP11-06 exceeds industrial screening criteria. Soil boring locations and analytical results are shown on Figure 4-15.

Groundwater Samples

Groundwater samples were collected from two monitoring wells (MWP11-01 and MWP11-04) that were installed downgradient of the release. Natural recharge did not occur at MWP11-02,

therefore a groundwater sample could not be collected. The samples were submitted for laboratory analysis of VOCs, SVOCs, PCBs, and inorganics.

The groundwater analytical data summaries are provided in Table 4-33.

The concentrations of constituents detected in the groundwater samples collected from AOI P-11 exceed the screening criteria for cobalt. Cobalt was detected in MWP11-01 at a concentration exceeding the residential criteria. Monitoring well locations and analytical results are shown on Figure 4-14.

Appendix C of Supplemental RFI Report No. 1 (ENCORE, 2003j) contains the detailed analytical data.

The RFI soil and groundwater data from AOI P-11 indicate that a release has occurred to soil and groundwater at AOI P-11. Manganese was detected in soil at a concentration exceeding industrial screening criteria. Cobalt was detected in groundwater at a concentration that exceeds residential screening criteria. The soil exceedance of the screening criteria is further evaluated in Section 8.0. Alternatives for addressing the groundwater impacts are reviewed in Section 9.4.

Table 1-1 presents a summary of the data, conclusions, and proposed activities at the AOI.

4.4 STORM SEWERS

4.4.1 GENERAL

The majority of Site stormwater runoff is discharged to the City of Pontiac storm sewer system via stormwater outfalls, with the exception of 2 stormwater outfalls that discharge to Harris Lake and one outfall that discharges to the Augusta Drain and Osmun Lake. Figure 4-18 presents the Site storm sewer outfalls and the various plants, buildings, and parking areas within the drainage basin of each outfall. The Site sanitary and treated process water (industrial wastewater) discharge to the City of Pontiac sanitary sewer system via sanitary outfalls.

Historical drawings indicate that a combined sewer system, consisting of planned municipal sewers constructed prior to the land acquisition and development by GM in the 1920s, serviced the oldest portions of the Site. The combined sewer system was characterized by a north south parallel pipe configuration that collected and transported both sanitary wastewater and stormwater runoff. Combined sewers were placed at greater depths than is typical for storm sewers, in order to service basements by gravity flow.

Currently, separate storm sewer systems convey the Site's stormwater runoff to the City of Pontiac storm sewer systems via ten stormwater outfalls. Figure 4-16 presents the Site stormwater outfalls and the various plants, buildings, and parking areas within the drainage basin of each outfall. The Site discharges stormwater from Outfall 001 under NPDES Permit No. MI0056031, issued on December 6, 2002 by the State of Michigan. The Site outfalls excluding Outfall 001 are addressed under General Stormwater Permit No. MID010000.

On the main portion of the Site, the sewer system originally conveyed stormwater from the Central Foundry (Plant 6), West Yard, Plant 2, Plant 8, Plant 14, Plants 5 and 23, the Industrial Wastewater Treatment Plant (IWTP), portions of the Powertrain parking areas, and areas of the Metal Fabrication Division north to Walton Avenue. It should be noted that, in general, plants constructed by GM on the main Site were designed with separate stormwater and sanitary sewer systems, which conveyed stormwater runoff and wastewater to the pre existing combined sewer system. In the 1970s, separation activities at the Site were aimed at reducing or eliminating the combined sewer system. The Stormwater Detention Facility (SWDF), constructed as a treatment facility for oil separation at Outfall 001, became operational in May 1982. Recently, the drainage basin serviced by the SWDF was reduced in areal extent to reduce hydraulic loading to the SWDF, accomplished by conveying stormwater from areas north of Plant 14 to Outfall 002. Laterals from the West Yard, Powertrain parking areas, and other nonessential areas have also been isolated from the Outfall 001 storm sewer system by the use of mechanical plugs and the construction of bulkheads. Figure 4-16 presents a map of the storm sewers servicing the Site, and their respective outfalls.

The Fiero (Plant 17) portion of the Site is serviced by storm and sanitary sewer systems that were constructed and modified as the plant expanded.

4.4.2 DESCRIPTION OF STORMWATER OUTFALLS

Site stormwater is conveyed to the following outfalls (listed with corresponding storm sewer systems):

- Outfall 001 — Montcalm Storm Sewer (84" diameter);
- Outfall 002 — Joslyn Storm Sewer (78" diameter);
- Outfall 010 — Powertrain Headquarters Building Storm Sewer;
- Outfall 011 — Powertrain Engineering Building Storm Sewer;
- Fiero Outfall 001 — Building 17 South Side Storm Sewer; and
- Fiero Outfall 002 — Building 17 North Side Storm Sewer;
- Fiero Outfall 003 — Fiero Southwest Yard Storm Sewer

- Glenwood Avenue Outfall — Powertrain Headquarters Building Parking Storm Sewer
- ELPO Parking Outfall — ELPO Parking Storm Sewer
- Powertrain Engineering Outfall — Powertrain Engineering Storm Sewer

The collection system conveying stormwater to Outfall 001 is located in the oldest portion of the Site. As previously discussed, the stormwater system was constructed in the early 1900s, and originally conveyed stormwater from the Central Foundry (Plant 6), West Yard, Plant 2, Plant 8, Plant 14, Plants 5 and 23, the IWTP, portions of the Powertrain parking areas, and areas of the Metal Fabrication Division north to Walton Avenue.

Stormwater discharges to Outfall 001 are routed through the SWDF for oil separation by inclined Corrugated Plate Interceptors (CPIs), off-line temporary storage (i.e., detention), and filtration by granular activated carbon (GAC) units. The effluent from Outfall 001 is then conveyed to the Joslyn Drain prior to being discharged to the Clinton River. Outfalls 002, 010, and 011 discharge to the Joslyn Drain and ultimately to the Clinton River. Fiero Outfall 001 discharges to the Site's Industrial Wastewater Treatment Plant (IWTP) during dry weather flows, and to Harris Lake during wet weather flows. Fiero Outfall 003 discharges to Harris Lake. Fiero Outfall 002 discharges to the Augusta drain during dry weather flows, and to Osmun Lake during wet weather flows, both of which ultimately discharge to the Clinton River. The Glenwood Avenue Outfall ultimately discharges to the Clinton River. The ELPO Parking Area Outfall and the Powertrain Engineering Outfall discharge to the Glenwood Roadway Extension storm sewer and ultimately the Clinton River.

4.4.3 DIVERTER CHAMBERS NO. 1 AND NO. 2

To reduce the area of the drainage basin and the hydraulic loading contributing to the SWDF, the Site has diverted storm sewer flows from the SWDF by implementing the use of two subsurface structures referred to on historical drawings as Diverter Chambers No. 1 and No. 2, discussed in the Storm Sewer Supplemental IM Report [Appendix M of the RFI Report (ENCORE, 2002c)]. Figure 4-17 illustrates the drainage area contributing to the SWDF and Diverter Chambers No. 1 and No. 2.

4.4.4 STORMWATER DETENTION FACILITY (SWDF)

The SWDF for the Site is located on the south side of Montcalm Avenue. The SWDF became operational in May 1982, intercepting and treating the Site stormwater discharged to Outfall 001.

The SWDF is composed of two elements: a stormwater treatment facility and a 2,000,000 gallon stormwater detention basin. The SWDF was originally designed to eliminate free oil and reduce the amount of solids present in the effluent originating from dry weather flows, and to minimize free oils and solids concentrations in the effluents originating from wet weather flows. In June 1999, the SWDF was retrofitted with GAC units to include a treatment process for the removal of PCBs that may be present in the stormwater.

On June 1, 1999, GM collected a stormwater sample from the effluent discharging from the SWDF. A subsequent analysis of the sample, performed on June 2, 1999, reported that PCBs were present at a concentration of 0.20 ug/L, above the Site NPDES permit limit of 0.1 ug/L. GM immediately responded by notifying the MDEQ and by ceasing all stormwater discharges from the SWDF. On June 4, 1999, after the installation of GAC units at the SWDF, the MDEQ granted GM permission to discharge treated stormwater contingent on the MDEQ's conditions. The MDEQ stipulated that the effluent quality from the GAC system was to be monitored by sampling, and that the resultant discharges were not to contain a detectable level (greater than 0.1 ug/L) of PCBs. GM instituted a stormwater sampling program, and continues to treat the Site stormwater effluents using the GAC units.

During a routine cleaning and inspection of the SWDF completed during September 2002, cracks in the concrete floor were observed as well as missing or degraded sections of rubber seals between the concrete slabs. On the basis of these observations, a subsurface investigation was completed to determine if any potentially impacted storm water from the storm water detention basin was infiltrating into the subsurface, and if so, the possible impacts to soil and/or groundwater.

4.4.4.1 SWDF INVESTIGATION RESULTS

The scope of the field investigation at the SWDF involved the collection of soil and groundwater samples to determine whether a potential release exceeding screening criteria has occurred from the SWDF.

Soil Samples

Eleven soil borings were completed at the SWDF (DP-01 through DP-08 and MWDP-01 through MWDP-03). Borings DP-01 through DP-08 were completed through the bottom of the detention basin, while MWDP-01 through MWDP-03 were installed directly south of the detention basin. The concrete base was repaired after the borings were backfilled. Soil samples were collected from borings DP-03, DP-04, MWDP-01, MWDP-02 and MWDP-03. Soil samples for laboratory analysis were not collected from the remaining borings because saturation was encountered directly beneath the base of the SWDF. The soil samples were submitted for laboratory analysis of VOCs, SVOCs, PCBs, and inorganics.

The concentrations of constituents detected in the soil boring samples collected from the SWDF do not exceed the screening criteria.

Groundwater Samples

Temporary well points were set at each boring within the detention basin (DP-01 through DP-08) to collect groundwater samples. Temporary piezometers were installed in the three borings (MWDP-01, MWDP-02 and MWDP-03) located adjacent to and downgradient of the detention basin. Groundwater samples collected from the temporary well points and temporary piezometers were submitted for laboratory analysis for VOCs, SVOCs, PCBs and inorganics (total and dissolved). A groundwater sample was not collected from DP-04. Groundwater samples collected from temporary piezometers MWDP-02 and MWDP-03 were not analyzed for dissolved inorganics due to insufficient groundwater recharge.

Summaries of the analysis for the groundwater samples are shown in Table 4-34.

The concentrations of constituents detected in the groundwater samples collected from the SWDF exceed the screening criteria for PCBs and five inorganics. Total PCBs were detected at DP-02, DP-03, DP-05, and DP-06 at concentrations exceeding the industrial and residential screening criteria. The following inorganic constituents were detected at concentrations exceeding screening criteria: antimony from DP-02, DP-03 and DP-07; cadmium at MW-02; lead in from DP-03, DP-08, MW-02, and MW-03; manganese from MW-02 and MW-01; and vanadium from MW-03, MW-02, DP-02, DP-03, DP-05, and DP-06. Figure 4-18 provides a summary of sample locations and analytical results for groundwater.

The analytical data summaries are provided in Appendix C of the Supplemental RFI Report No. 1 (ENCORE, 2003j).

The soil analytical data from the SWDF does not indicate a release to soil has occurred from the detention basin. However, the groundwater analytical data indicates that a release to groundwater has occurred at the SWDF. PCBs and five inorganics were detected in groundwater above screening criteria. Groundwater impacts at the SWDF are addressed in Section 9.1.

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

4.4.5 STORM SEWER INVESTIGATION RESULTS

Concurrent with the installation of the GAC treatment system in June 1999, GM initiated a storm sewer inspection with the objective of finding and eliminating the potential source of the PCBs. Preliminary results from the storm sewer inspection indicated that the scope of the inspection would have to be broadened to the status of a full investigation. The objectives of the

investigation included: defining the physical characteristics of the storm sewer system; defining the flow characteristics of the Outfall 001 storm sewer system; and defining the PCB characteristics of the flows conveyed by the storm sewer system. Outfalls 001, 002, 010, 011 and the Glenwood Avenue storm sewer system. Fiero Outfalls 001, 002, and 003 were not investigated at the time as a total of 9 AOIs associated Fiero were concluded to require NFA in the CCR (ENCORE, 2001a). Although the Powertrain Engineering and ELPO Parking Outfalls did not exist at the time of the investigations, as the two outfalls were recently created due to the construction of the Glenwood roadway extension, it should be noted that prior to the road construction, the ELPO Parking and Powertrain Engineering sewer system were serviced by Outfalls 001 and 002, respectively, which were evaluate during the investigations.

In February 2000, stormwater and sediment sampling identified PCB-impacted sewer reaches of the Outfall 001 system. The analytical results of the sampling warranted that the focus of the storm sewer investigation be narrowed to those storm sewers conveying stormwater to Outfall 001. Major storm sewer cleaning activities were performed, including the collection, characterization, and disposal of approximately 200 cy of sediments and debris from approximately 15,000 linear feet of storm sewer reaches. In addition, approximately 250,000 gallons of liquid sludge, containing approximately 300 cy of sediments, were removed from the detention basin and disposed of at an approved facility. Post-cleaning physical inspections of the sewer lines and the detention basin were conducted, with areas of concern identified and noted. Minimal post-cleaning stormwater sampling was also conducted, and it was noted that PCB concentrations in various storm sewer lines remained at detectable concentrations. The storm sewer cleaning activities were substantially completed by October 1, 2000.

During the initial storm sewer investigations, it became apparent that additional information would be required prior to instituting a successful storm sewer rehabilitation effort. The lack of available information was primarily due to the following circumstances: discrepancies in historical information; the lack of analytical information; and incomplete, outdated, or missing information regarding current conditions. The Storm Sewer Supplemental IM Report, incorporated as Appendix M of the RFI Report (ENCORE, 2002c), documented and summarized the following information: a comprehensive mapping of the Site storm sewer system, accomplished through aerial photography, photogrammetric mapping, topographic surveying, manhole/catch basin inspections, videotaped inspections, confined space entry inspections, and dye tracing studies; flow characteristics of the main branches of the storm sewer system conveying stormwater to Outfall 001, accomplished through a 1-month flow monitoring study at five manhole locations; chemical characterization of Outfall 002, 010, 011, and Glenwood Avenue storm sewer system, primarily accomplished through two rounds of water, sediment, and oil and grease sampling events and a 2-week PCB Filtration and Infiltration Study of the Outfall 001 system; an analysis addressing current and historical inputs to the storm sewer system; soil identification with soil sampling and analysis in the proximity of manholes/catch

basins exhibiting detectable levels of PCBs in the sediments associated with those structures; and the results of a numerically modeled response of the storm sewer system, for those branches conveying stormwater runoff to Outfall 001, to a 25-year, 24-hour storm event. Findings included the following: the storm sewer system conveying stormwater to Outfall 001 contains pipe reaches which exhibit conditions ranging from offset and leaky joints to structural failure; AOIs (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) were identified in the MFD, North and South, and in the DA; sporadic detections of PCBs in manhole catch basin sediments and water were detected throughout the Site. PCB-impacted sediments were detected upstream of the DA; while PCB-impacted oils were predominant at downstream locations in the Outfall 001 storm sewer system, indicating a contribution to the system via infiltration/inflow; and the runoff simulation model predicted that a 25-year, 24-hour storm would inundate the current Outfall 001 stormwater system, while rainfall events of 1.2 inches or more were observed to result in untreated overflows at Outfall 001.

Following the preparation of the Storm Sewer Supplemental IM Report (ENCORE, 2002c), a Storm Sewer Feasibility Analysis (Appendix A) was completed to propose alternatives to address a storm sewer system rehabilitation and modification of the GM PNC storm sewers conveying stormwater runoff to Outfall 001. Included in the report were recommendations for diverting stormwater flows to an alternate outfall. The Storm Sewer Feasibility Analysis is discussed further in Section 9.8.

Based on the information compiled in The Storm Sewer Supplemental IM Report (ENCORE, 2002c) and the Storm Sewer Feasibility Analysis, IMs and additional investigations were formulated to address specific areas of the storm sewer system.

The investigations addressed the following conditions that were identified in The Storm Sewer Supplemental IM Report (ENCORE, 2002c) and The Storm Sewer Feasibility Analysis: study of excessive infiltration/inflow issues in the Outfall 001 stormwater system; the remediation of storm sewer AOIs (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) that were identified south of Plant 12, and south and east of Plant 15; the remediation of PCB-impacted sediments that were detected throughout various MFD North, Powertrain, and SPO manholes and catch basins; videotaped and confined space inspections storm sewer reaches recommended as alternate flow pathways for remedial or rehabilitative approaches; remediation of elevated levels of PCB-impacted sediments in exterior electrical Substation O; and the investigation of PCBs on the Plant 14 and ELPO Building rooftops.

Post cleaning confirmatory sampling of the storm sewer system storm sewer AOIs (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) that

were identified south of Plant 12 (Outfall 002), and south and east of Plant 15, and of the PCB-impacted sediments that were detected throughout various MFD North (Outfall 002), Powertrain (Outfalls 010 and 011), and SPO manholes and catch basins, was performed in October 2003. The analytical results indicate that PCB-impacted sediments continue to be detected at manholes and catch basins servicing Outfalls 002, 010, and the SPO Outfall. The PCB-impacted sediments are potentially residuals from the 2002 cleaning events. An investigation, proposed for 2004, will address the potential source of the sediments. A report will be compiled summarizing the results of the investigation.

Investigations performed concurrent with the activities mentioned above resulted in the removal and waste characterization of PCB-impacted oils in a Plant 14 scrap tunnel bilge sump, the removal and waste characterization of PCB-impacted sediments in a storm sewer reach located to the east of Plant 49, and the rerouting of former Plant 18 stormwater runoff to Outfall 001. A report will be compiled summarizing the results of the investigation.

In August 2002, one water and one sediment sample were collected from separate manholes servicing the Fiero Outfall 001 storm sewer system and submitted for the analyses of metals, PCBs, SVOCs, and VOCs. The analytical results confirmed the presence of metals in the water sample, and metals, PCBs, and SVOCs in the sediment samples. Consequently, investigations of the Fiero storm sewer system commenced in late 2002 and are ongoing. The Fiero Storm Sewer Investigations involve the following tasks: surveys and inspections of storm sewer manholes and catch basins; investigation and mapping of rooftop stormwater drainage system; investigation of storm sewer cross connections; a coal pile runoff investigation; sampling and analysis of storm sewer sediment and water; and sampling and analysis of rooftop accumulations potentially impacting stormwater runoff. The sampling events consist of sampling and analyses of rooftop sediments for metals and PCBs, and sampling of storm sewer manhole and catch basin water and sediment for metals, PCBs, and to a limited extent SVOCs and VOCs. Analytical results of the investigation indicate that metals contamination is present in the Fiero storm sewer system. Analytical results of the investigation also indicate that sediments in isolated areas of the Fiero storm sewer system are impacted by VOCs. The source of the metals contamination in the Fiero storm sewers has been identified as the Fiero rooftop. A work plan will be prepared for a focused investigation, proposed for early 2004, which that will address the source of the VOC contamination. A report will be prepared upon completion of the investigations.

4.5 LNAPL DESCRIPTIONS

Six LNAPL areas have been identified at the Site. The respective AOIs associated with each LNAPL area are as follows:

- LNAPL Area No. 1 – AOI W-1;
- LNAPL Area No. 2 – AOI W-10;
- LNAPL Area No. 3 – AOI W-8;
- LNAPL Area No. 4 – AOI M-2;
- LNAPL Area No. 5 – AOIs M-4 and M-16; and
- LNAPL Area No. 6 – AOI W-9.

The locations and extents of LNAPL Areas No. 1, No. 2 and No. 6 are shown on Figure 4-19, while the location and extent of LNAPL Area No. 3 is shown on Figure 4-20. The location and extent of LNAPL Areas No. 4 is shown on Figure 4-21. It should be noted that although LNAPL Areas No. 1 and 2 are being discussed in this section as two separate areas, based on their location within individual AOIs, both areas potentially commingle to create one single LNAPL pool. The specific location where these LNAPL pools mix cannot be determined. It should also be noted that based on varying physical descriptions, fingerprint analytical results and differing magnitudes of chemical constituents of the LNAPL samples collected from Areas No. 1 and 2, it appears that different LNAPL types are present in these areas.

The following sections detail the investigations performed in each LNAPL area, with a discussion of the analytical results for each.

4.5.1 LNAPL AREA NO. 1

LNAPL Area No. 1 occupies approximately one third of the West Yard (AOI W-1, Figure 1-5). Previous LNAPL investigations of this area include a 1997 study by Parsons Engineering Science, Inc (Parsons) and a 2000 CRA LNAPL delineation program. From the previous investigations, it appeared that possibly three different LNAPLs were present in the West Yard (AOI W-1) based on physical properties and chemical composition. Based on the nature of the fill materials in the West Yard area, it was concluded in the previous investigations that the LNAPL had the potential to migrate laterally. This section discusses the scope, results and conclusions of the additional investigations conducted around LNAPL Area No. 1 during the RFI.

4.5.1.1 RFI RESULTS

Twelve soil boring samples (ND01-01 through ND01-12) were collected along the south, east and north borders of LNAPL Area No. 1 and screened for the presence of LNAPL with a fluorescent/ultraviolet light to confirm the horizontal extent of the LNAPL and to assess whether any migration of the LNAPL had occurred. Monitoring well MWW1-05 was installed south of MW39-99 to determine the southern limit of LNAPL in that area. Two LNAPL samples

were collected from AOI W-1 during the RFI field activities. Samples collected from MW24-99 and MW36-99 were submitted for laboratory analysis for fingerprinting, VOCs, SVOCs, PCBs, inorganics, total cyanide and dioxins. The LNAPL fingerprinting report is presented in Appendix H of the RFI Report (ENCORE, 2002c).

LNAPL was not observed during the fluorescent/ultraviolet light screening conducted in soil borings ND01-01 through ND01-12. LNAPL was also not present in the new monitoring well MWW1-05.

During sample collection, the LNAPL collected from MW24-99 and MW36-99 was described as dark brown and weathered. From fingerprinting analysis, LNAPL from MW24-99 and MW36 99 is described as highly degraded No. 6 fuel oil with less amounts of moderately degraded kerosene type fuel for MW36-99 and a highly degraded diesel #2 for MW24-99. The LNAPL fingerprinting results are presented in Appendix H of the RFI Report (ENCORE, 2002c).

The results of chemical analysis of the LNAPL sample collected from MW36-99 indicate that the chemical composition of the LNAPL from this well has lower levels of VOCs than the sample previously collected from MW36-99 during previous investigations. The concentrations of VOCs detected in MW24-99 were similar to those detected in MW36-99. Concentrations of VOCs detected in MW24-99 and MW36-99 ranged from benzene at 0.15 mg/kg to xylenes at 21 mg/kg.

Concentrations of SVOCs detected in MW24-99 and MW36-99 were limited to various PAHs ranging from acenaphthene at 40 mg/kg to pyrene at 300 mg/kg.

Total PCB concentrations ranged from 32 mg/kg at MW36-99 to 1,400 mg/kg at MW24-99. The PCB concentrations detected in MW36-99 were consistent with previous investigations. The PCB concentration detected at MW24-99 was significantly higher than any LNAPL samples previously collected from LNAPL Area No. 1.

The 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ) for LNAPL samples collected from MW24-99 and MW36-99 were 3.13×10^{-3} mg/kg and 4.16×10^{-3} mg/kg, respectively.

The LNAPL analytical results from both historical and RFI sampling are presented in Table 4-11. The chemical analytical results are further evaluated in Section 4.3.3. Several of the chemical constituents detected in LNAPL have also been detected in groundwater from wells downgradient of LNAPL Area No. 1 at a concentration greater than samples collected from upgradient wells indicating the LNAPL is acting as a potential dissolved phase source.

The measured apparent thickness of LNAPL in Area No. 1 appears to vary over time from the various monitoring events conducted during the RFI (Table 4-35). The maximum apparent thickness of LNAPL encountered in the monitoring wells in Area No. 1 was 2.71 feet at MW-6 (March 18, 2002), while the minimum thickness was 0.01 feet at various times in various wells.

The LNAPL collected from MW25-99, MW26-99 and MW-22 had a kinematic viscosity of 29.73, 29.16 and 32.86 centistokes (cSt)(100°F) respectively. The viscosity of the sample collected from MW-6 was 22.34 cSt (100°F). The upper range for product recovery using conventional pumping techniques is approximately 40 cSt. The LNAPL collected from MW-6 and MW-22 had a kinematic viscosity of 38 cSt (77°F) for MW-6 and 66 cSt (77°F) for MW-22.

Figure 4-19 presents the horizontal extent of LNAPL Area No. 1. The Area No. 1 and Area No. 2 LNAPL areas may now constitute a single LNAPL area.

From the additional investigations conducted during the RFI, LNAPL Area No. 1 has not significantly changed in the areal extent compared to the delineation presented in the Draft LNAPL Delineation Report (CRA, 2000b). LNAPL Area No. 1 is further evaluated in Section 9.7.

4.5.2 LNAPL AREA NO. 2

LNAPL Area No. 2 is situated along and covers approximately two-thirds the length of the Railroad Marshalling Area (AOI W-10) and is located directly northwest of LNAPL Area No. 1. LNAPL was discovered in AOI W-10 during development of monitoring well MWW10-01. Additional investigation of LNAPL Area No. 2 was conducted to define the horizontal extent and thickness of LNAPL in this area.

4.5.2.1 RFI RESULTS

Thirty-seven soil boring samples were collected and screened with a fluorescent/ultraviolet light for the presence of LNAPL. Five piezometers (PZ-01 through PZ-04) were installed to assess groundwater flow direction in the area. Based on the results of the ultraviolet screening, five additional monitoring wells (MWW10-02 through MWW10-06) were also installed to determine LNAPL thickness and groundwater impact. One LNAPL sample was collected from MWW10-01 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and dioxins.

The fluorescent/ultraviolet light screening showed positive indicators for LNAPL in 20 of the 37 soil borings. Based on the LNAPL screening, five additional monitoring wells were installed to further characterize and delineate LNAPL in the area. In addition to the LNAPL encountered in MWW10-01, only MWW10-05 had LNAPL present.

The LNAPL sample collected from MWW10-01 was described as thick and dark brown with a diesel odor. From fingerprinting analysis, the LNAPL from MWW10-01 is described as a moderately degraded diesel No. 2 with less amounts of highly degraded No. 6 fuel oil. The LNAPL fingerprinting cover letter is presented in Appendix H of the RFI Report (ENCORE, 2002c).

The results of chemical analysis of LNAPL samples collected from MWW10-01 indicate that VOCs, PAHs, PCBs, and dioxins are present in the LNAPL from Area No. 2. The concentrations of VOCs detected range from chloromethane at 0.23 mg/kg to xylenes at 15 mg/kg. The concentrations of PAHs detected range from biphenyl at 51 mg/kg to phenanthrene at 540 mg/kg. The total PCB concentration was 188.6 mg/kg. The 2,3,7,8-TCDD TEQ concentration for the LNAPL sample collected from MWW10-01 is 5.31×10^{-4} mg/kg. The LNAPL analytical results are presented in Table 4-20.

The apparent thickness of LNAPL in the various monitoring wells in AOI W-10 has varied over time (Table 4-35). The apparent maximum LNAPL thickness has been encountered in MWW10-01 at 10.91 feet, while the minimum apparent thickness was 0.05 at MWM10-06. Results indicated that the viscosity was 17.75 seconds at 43°F.

LNAPL Area No. 2 has been adequately delineated and appears to be localized along the railroad tracks of the former Railroad Marshalling Area. The groundwater flow direction in this area is to the southwest. Although downgradient monitoring wells installed along the property boundary do not have LNAPL present, they do indicate that the LNAPL is acting as a potential source of dissolved phase constituents. Figure 4-19 presents the horizontal extent of LNAPL Area No. 2. LNAPL Area No. 2 is further evaluated in Section 9.7.

4.5.3 LNAPL AREA NO. 3

LNAPL Area No. 3 is located within AOI W-8. LNAPL was discovered in AOI W-8 during low flow development of monitoring well MWW8-03. Additional investigation of LNAPL Area No. 3 was conducted to define the horizontal extent and thickness of LNAPL in this area. There are presently four wells (MWW8-03, MWW8-06, MWW8-07, and MWW8-09) within the delineated LNAPL Area No. 3.

4.5.3.1 RFI RESULTS

Seven additional monitoring wells (MWW8-06 through MWW8-12) and one piezometer (PZW8 01) were installed in the immediate vicinity of MWW8-03 to further delineate the LNAPL. One LNAPL sample was collected from MWW8-03 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics, dioxins and fingerprinting.

Two 6-inch recovery wells (RWW8-01 and RWW8-02) were installed on the west and east sides of the 72-inch storm sewer to allow for a larger reservoir of LNAPL to be used for assessing LNAPL recovery rates. It was noted that groundwater is present in both recovery wells, however, only RWW8-02 currently contains LNAPL. During sample collection, the LNAPL collected from MWW8-03 was described as thick and yellow with a diesel/kerosene odor. Fingerprinting analysis describes the LNAPL as a weathered diesel No. 2 with a small amount of highly degraded No. 6 fuel oil. The LNAPL fingerprinting report is presented in Appendix H of the RFI Report (ENCORE, 2002c).

The results of chemical analysis of LNAPL samples collected from MWW8-03 indicate that VOCs, PAHs, PCBs, and dioxins are present in the LNAPL. The concentrations of VOCs detected range from methyl cyclohexane at 0.62 mg/kg to xylene at 1.3 mg/kg. The concentrations PAHs detected range from 2-methylnapthalene at 120 mg/kg to phenanthrene at 780 mg/kg. The total PCB concentration detected was 2.7 mg/kg. The 2,3,8-TCDD TEQ concentration for the LNAPL sample collected from MWW8^{-03} is 7.38 x 10^{-6} mg/kg.

The LNAPL analytical results are presented in Table 4-15 and are further discussed and evaluated in Section 4.3.5.

The LNAPL collected from MWW8 06 and had a kinematic viscosity of 13.42 seconds at 42°F (measurement taken at -2°F).

To assess LNAPL recovery rates, LNAPL was pumped from MWW8-03, MWW8-06, MWW8-07, and MWW8-09, using a portable skimmer pump to determine the LNAPL thickness, removal volumes, and the recovery rates of the LNAPL.

Results of the activities indicate that all wells in AOI W-8 recover to an appropriate thickness of LNAPL for recovery techniques (i.e. pumping) to be implemented. However, it was noted that recovery from a 2-inch well using the portable skimmer pump resulted in recovery problems once the LNAPL thickness was less than 1.5 feet.

To further evaluate recovery, two 6-inch recovery wells (RWW8-01 and RWW8-02) were subsequently installed to allow additional recovery tests to be completed with a larger volume of LNAPL present in the well. During field activities, it was noted that both wells had LNAPL present.

The additional recovery test on RWW8-02 yielded more reliable recovery data to assess LNAPL removal technologies.

The thickness of LNAPL in the various monitoring wells in AOI W-8 have varied over time (Table 4-35), although it has as much as 6.0 feet in thickness. Figure 4-20 presents the horizontal extent of the current LNAPL Area No. 3 plume.

An existing storm sewer runs through the middle of this area and that a depression in the groundwater table has been observed from the water level data. Recently installed wells adjacent to the sewer in this area indicate that the water level elevations in the immediate vicinity of the sewer are below the sewer invert elevation. The source of the groundwater depression is currently under investigation. LNAPL has not been observed in the sewer, but kerosene odors have been identified within the sewer in this area.

Investigations of LNAPL Area No. 3 are ongoing to further delineate the extent of LNAPL. LNAPL Area No. 3 is further discussed in Sections 5.5 and 9.7.

4.5.4 LNAPL AREA NO. 4

LNAPL Area No. 4 is located within AOI M-2 (Figure 1-5). LNAPL was discovered in AOI M-2 during a Site-wide groundwater level monitoring event Additional investigation was conducted pursuant to RFI Addendum No. 4 (ENCORE, 2003b) to determine the potential source of the LNAPL, delineate the extent of LNAPL, and to investigate the influence of the storm sewer on LNAPL migration.

4.5.4.1 RFI RESULTS

Nine additional monitoring wells were installed to delineate the extent of the LNAPL. One LNAPL sample was collected from MWM2-06 and submitted for laboratory analysis for VOCs, SVOCs, PCBs, inorganics and fingerprinting.

The fingerprint analysis describes the LNAPL as a mixture of mildly weathered No. 2 fuel oil (No. 2 diesel fuel) or highly degraded asphalt . The LNAPL fingerprinting report is presented in Appendix E of RFI Supplemental Report No. 1 (ENCORE, 2003j).

The results of chemical analysis of LNAPL samples collected from MWM2-06 indicate that VOCs, SVOCs, PCBs, and inorganics are present in the LNAPL. The LNAPL analytical results are presented in Table 4.36.

The measured apparent thickness of LNAPL in Area No. 4 appears to vary from the four monitoring events conducted at monitoring well MWM2-06 in June 2003 (see Table 4.35). The maximum apparent thickness of LNAPL encountered was 0.55 feet and the minimum thickness was 0.24 feet. Figure 4-21 presents the horizontal extent of the current LNAPL Area No. 4 plume.

LNAPL Area No. 4 has been adequately delineated and appears to be localized to a small area within AOI M-2. The migration of LNAPL with the overall groundwater flow at the Site has been influenced by the presence of a storm sewer in the area. LNAPL Area No. 4 is further evaluated in Section 9.7.

4.5.5 LNAPL AREA NO. 5

LNAPL Area No. 5 is located within AOI M-4 and AOI M-16. During implementation of RFI Work Plan Addendum No. 8 (ENCORE, 2003g) activities, odors and staining were present within the soil at two monitoring well installation locations. LNAPL was observed at these two monitoring well locations, MWM4-06 and MWM16-03, which are located in the basement of Plant 25 (see Figure 1-5). Approximately 0.5 feet of LNAPL was measured in MWM4-06 and indications of LNAPL (globules on the probe) have been observed at MWM16-03. A LNAPL sample was collected from MWM4-06, and submitted for fingerprinting analysis.

4.5.5.1 RFI RESULTS

The scope of work proposed in LNAPL Area No. 5 involved the installation of monitoring wells in the vicinity of AOIs M-4 and M-16 to delineate the extent of LNAPL in this area (see Figure 4.11).

Fingerprinting analysis, LNAPL from MWM4-06 is described as a likely mixture of a moderately weathered No. 2 fuel oil (or No. 2 diesel fuel) and a highly degraded oil (or asphalt). The LNAPL fingerprinting report is presented in Appendix E of RFI Supplemental Report No. 1 (ENCORE, 2003j).

The results of chemical analysis of LNAPL samples collected from MWM4-06 indicate that VOCs, SVOCs, PCBs, and inorganics are present in the LNAPL (see Table 4.37). LNAPL Area No. 5 is currently undergoing further investigation to fully delineate the extent of LNAPL as detailed in RFI Work Plan Addendum No. 8A (ENCORE, 2003i). Additional wells will be installed to determine the extent of LNAPL in the areas. Monitoring wells will also be installed to determine the apparent thickness of LNAPL. LNAPL Area No. 5 is further evaluated in Section 9.7.

4.5.6 LNAPL AREA NO. 6

LNAPL Area No. 6 is located along the storm sewer line in AOI W-9 (Figure 4-19). The possible presence of LNAPL was detected during a geotechnical investigation completed as part of a re-development proposal for the DA. RFI Work Plan Addendum No. 9 (ENCORE, 2003h) was prepared and implemented to investigate the potential presence of LNAPL in the area.

4.5.6.1 RFI RESULTS

A sheen (less than 0.1 feet) of LNAPL was observed in MWW9-02 for several weeks following installation. During groundwater level monitoring in October 2003, 0.25 feet of LNAPL was detected in MWW9-02.

Delineation has been completed at this LNAPL Area. Monitoring wells (MWW9-03, MWW9-05, MWW9-06, and MWW9-07) bounds the area where LNAPL was observed. Monitoring well MWW9-01 is located along the storm sewer south of MWW9-02 (downgradient to sewer flow) and LNAPL has not been observed in that well. Figure 4-19 presents the horizontal extent of the current LNAPL Area No. 6 plume.

At present an LNAPL sample has not been collected from LNAPL Area No. 6, due to the small volume of LNAPL present in MWW9-02. Corrective measures for LNAPL Area No. 6 are discussed in Section 9.7.

LNAPL Area No. 6 has been adequately delineated and appears to be localized to a small area within AOI W-9. A LNAPL sample will be collected for fingerprint and chemical (VOCs, SVOCs, PCBs, and inorganics) analysis provided sufficient volume is available.

5.0 INTERIM MEASURES (IMS) IMPLEMENTED

IMs have been implemented in several areas at PNC, including the off-Site PSB property, Harris Lake, the Former Central Foundry (AOI W-9), storm sewers, LNAPL Area No. 3, and LNAPL Area No. 6.

5.1 PONTIAC SCHOOL BOARD (PSB)

Based on historical releases from on-Site storm sewers, RFI activities were conducted on the PSB property, involving the collection of sediment samples from within the pipe and soil and groundwater samples outside the pipe to determine whether potential releases exceeding Part 201 generic cleanup criteria may have occurred. Five sediment samples were collected from within the abandoned storm sewer pipe to determine if hazardous constituents are contained in the pipe from historic discharge through the pipe.

Analytical results for five sediment samples collected from inside the sewer pipe during RFI activities indicated that five SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) were detected at concentrations exceeding RDC criteria. Four test pits, ten soil borings, and two monitoring wells were also completed at the PSB property. No SVOCs were detected above screening criteria in soil or groundwater samples collected from these locations outside the sewer pipe.

These results demonstrate that SVOCs present in sediment from inside the sewer pipe are not present in soil or groundwater outside the sewer pipe. In addition, risk-based analysis of the concentrations of constituents detected in soil determined that reasonable maximum exposures are below U.S. EPA-established levels for determining whether corrective measures are warranted (see Section 8.5.1). The PSB property was evaluated and determined to have no significant residential exposures to hazardous constituents in soil based on the results of RFI activities. As such, IMs for the PSB property address sediment impacts within the storm sewer pipe.

An IM has been proposed, approved, and implemented for the PSB property. The storm sewer was in extremely poor condition and could not be cleaned in place. Therefore, the IM for the PSB property consisted of removing approximately 1,000 lineal feet of 24-inch corrugated metal storm sewer pipe and its contents. The removed materials were transported for disposal at an off-Site landfill. Clean overburden material from outside the storm sewer pipe was segregated and staged separately from other materials. The clean overburden and sand backfill was used to backfill and compact the excavation.

This IM is summarized in the document Work Plan for the Storm Sewer Pipe Removal at the PSB property, (ENCORE, 2003a). The U.S. EPA reviewed this work plan and provided

comments. This IM addressed all identified potential impacts to human health at the PSB property. This IM will be performed in December 2003. The former location of the sewer pipe is indicated on Figure 5-1.

5.2 HARRIS LAKE

Additional details are provided in the CCR, Addendum No. 1 for the Site (ENCORE, 2002a). Harris Lake is an 8-acre lake with a small drainage area that also receives storm water input from surrounding areas via several culverts, which convey precipitation and surface runoff. The lake appears to have been used as a fill area, with the fill materials including foundry sand, wooden floor blocks, and construction and demolition debris.

To investigate the potential impacts to the lake from these releases, field investigations were conducted at Harris Lake in September 2001 and January 2002 as part of the RFI activities. In addition, a supplemental sediment investigation was conducted in June 2002. Soil, sediment, and surface water samples were collected during the RFI and analyzed for various chemicals. A release was identified based on the presence of select SVOCs, select inorganics, and cyanide in the sediment, benzo(a)pyrene, lead and chromium in the soil and thallium in the surface water at concentrations higher than the screening criteria. Details of these sampling and analyses are provided in the RFI Report (ECC, 2002). The Baseline Human Health Risk Assessment for Harris Lake (BERA) (RFI Report, Appendix J) demonstrates that potential cumulative cancer and noncancer risks do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively.

A BERA was completed for Harris Lake and submitted to the U.S. on September 30, 2003 (Exponent, 2002). The scope and focus of the BERA are based on the results of a screening ecological risk assessment (SERA) conducted in 2002, that evaluated the potential for ecological risks in and around the lake using conservative, screening-level assumptions. The SERA was presented in the RFI Report (ENCORE, 2002c).

Prior to conducting the BERA and after evaluating the environmental setting in and around Harris Lake and the characteristics of nearshore sediments, ENCORE developed a plan to remove sediment in areas with water depths of 5 feet or less and replace them with imported material to address potential aesthetic impacts to users of the lake. The primary natural limiting factors are the steep bottom slopes found throughout much of the nearshore zone of the lake, the limited bearing capacity of the in-situ sediment and marl, and the hypoxic water-column conditions (i.e., dissolved oxygen concentrations less than 2 mg/L) that prevent the establishment of stable benthic macroinvertebrate communities in the deeper parts of the lake.

The IM for Harris Lake consisted of removal of sediment and soil from the lake and targeted areas on the shoreline and inlet ditch, and replacement of the removed sediment and soil with

clean, imported backfill. Based on consideration of steep bottom slopes found throughout much of the nearshore zone, low dissolved oxygen concentrations in deeper water (greater than 12 feet of water depth), and limited benthic activities in the intermediate zone between 5 and 12 feet water depth, the following activities were conducted.

Nearshore sediments extending from the waterline to less than or equal to 5 feet of water depth were removed and transported off-Site for disposal at a permitted landfill. The near-shore areas were backfilled with clean imported fill material and disturbed support area were restored. These sediments covered approximately 46,000 square feet (SF) of the lake bottom. The removal extended below the soft sediments into the clean native soils to predetermined depths. Approximately 5,400 CY of sediments were removed and disposed off site. Water generated during sediment dewatering was treated and discharged back into the lake.

Sediments in certain areas with water depths greater than 5 feet and less than or equal to 12 feet were covered with clean imported material to provide substrate for benthic macroinvertebrate communities. Fill placement in these areas was limited to where lake bottom slopes are less than or equal to 3 horizontal to 1 vertical (3H:1V) to allow long-term stability of the fill material on these slopes. The coverage area included a 6,000 SF area along the western end and 11,000 SF area along the eastern end of Harris Lake. A minimum of 6 inches of clean imported fill was placed atop these sediments. No activities were performed in areas where the water depth is greater than 12 feet.

An additional quantity of approximately 2,100 CY of sediment/soil was removed from the Harris Lake shoreline and inlet ditch. The inlet ditch area and three specific shoreline areas were excavated to clean native soils and restored to grade with clean imported fill. A geotextile and a layer of rip-rap was placed in the inlet ditch. The Harris Lake Dredging and Backfilling Summary is illustrated on Figure 5-2. The IM was completed in October 2003, and a report documenting activities is currently being prepared for submittal to U.S. EPA.

5.3 FORMER CENTRAL FOUNDRY (AOI W-9)

AOI W-9 is located in the DA, a 48-acre area in the south-central portion of the Site. There are currently no buildings or operations within the DA. The three former main operational buildings (the Foundry [Plant 6], Final Vehicle Assembly [Plant 8], and Engine Construction [Plant 9]) were demolished in the 1990s. Since 1996, the DA has been the subject of on-going soil and groundwater investigations.

Field investigations were completed as part of the RFI at AOI W-9 involved collection of surface soil, soil boring, PCB delineation, and groundwater samples. Soil data indicates a potentially significant release to soil at AOI W-9. Potential exposures to soil at W-9 were evaluated by developing conservative estimates of the average concentrations of the chemicals to provide

representative concentrations to which receptors might be exposed under current and reasonable expected future conditions. The results of this evaluation indicate only the soils impacted with PCBs in the vicinity of BW9-02 pose an unacceptable risk. All other soil results for AOI W-9 lead to estimates of cumulative cancer and non-cancer risks that do not exceed U.S. EPA's acceptable levels of 10^{-4} and a HI of 1, respectively. Therefore, the soils in the vicinity of BW9-02 will be excavated and removed.

The soils are therefore the subject of two IMs. A fence was installed around the PCB-impacted soils to prevent exposure to these soils, and a work plan for PCB-impacted soil removal was also submitted to U.S. EPA for approval in November 2003. The work plan presents a series of tasks to be performed to accomplish the excavation, removal, and off-Site disposal of the soil around RFI sample location BW9-02. The future use of the parcel will be industrial redevelopment, with slab on grade building construction and a paved parking lot over the entire area to be excavated.

A cleanup to 10 mg/kg with a cap over remaining soils containing less than 10 mg/kg PCBs will be conducted as a self-implementing cleanup. A deed restriction will be evaluated. Excavation to a depth of approximately 2 feet will allow removal of soils to this level in most areas, with the exception of soils near BW9-01 requiring excavation to a depth of approximately 10 feet. Soils containing greater than 50 mg/kg PCBs will be disposed at a hazardous waste disposal facility, and soils containing less than 50 mg/kg will be disposed at a nearby municipal landfill. Based on the costs associated with disposal of PCB-impacted soils and the planned future use of the property, the selected IM was determined to be the most practical alternative consistent with the planned future land use compared with the other alternatives of removing soil to a concentration of 1 mg/kg PCB with no future restriction on land use, or removing soil to a concentration of 25 or 50 mg/kg under a risk-based cleanup scenario. This work plan is expected to be implemented in conjunction with redevelopment in 2004. Upon completion of soil removal, the excavated area will be surveyed, and the excavation will be backfilled with clean fill from an approved off-Site source. A report of all IM activities will be prepared for submittal to U.S. EPA. The estimated extent of soil removal is indicated on Figure 5-3.

5.4 STORM SEWERS

IMs have been performed on the Site storm sewer system from 1999 to the present. The IMs implemented for Site storm sewers were completed as part of the Site operation and maintenance activities under the NPDES permit requirements, and not were pursuant to The Agreement. As such, IM work plans were not completed or submitted to U.S. EPA. The IMs consist of the following activities:

- Plugging of nonessential storm sewer branches and laterals of the Outfall 001 system to reduce hydraulic loading to the SWDF;
- Diversion of stormwater flows north of Plant 14 from Outfall 001 to Outfall 002;
- Installation of a GAC unit at Outfall 001 to eliminate PCBs in the effluent;
- Regularly scheduled draining, cleaning, and maintenance of the SWDF basin;
- Alterations to the SWDF basin to increase the storage capacity and to prevent overflows from the detention basin overflow weir;
- Initially cleaning and videotaping of approximately 15,000 linear feet of storm sewer reaches in the DA and MFD North and South, performed to aid in mapping of the system, to identify potential sources of contamination, and to control contaminant transport in the Site storm sewer system;
- Additional cleaning and videotaping of approximately ,000 linear feet of storm sewer areas on interest (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) that were identified in the MFD North and South;
- Remediation of PCB-impacted sediments that were detected throughout various MFD North, Powertrain, and SPO manholes and catch basins;
- Remediation (i.e., removal, waste characterization, and disposal) of elevated levels of PCB-impacted sediments in exterior electrical Substation O;
- Rerouting of Former Plant 18 PCB-impacted stormwater runoff to the SWDF; and
- The remediation (i.e. removal, waste characterization, and planned disposal) of PCB impacted oils in a Plant 14 scrap tunnel bilge sump.

Activities to assess the effectiveness of IMs are ongoing. These activities consist of post-cleaning confirmatory sampling and data analysis of the storm sewer reaches, manholes and catch basins servicing those outfalls other than Outfall 001, as Outfall discharges are treated at the SWDF. Areas requiring additional cleaning and/or further investigation are identified and addressed as required.

As discussed in Section 4.4.5, the source of the metals contamination in the Fiero storm sewer system has been identified through sampling and analysis to be originating from the Fiero rooftop. Planned IMs will consist of roof cleaning and encapsulation, followed by cleaning of the Fiero storm sewer system. The roof cleaning, roof encapsulation, and storm sewer cleaning are anticipated to be effective in the remediation (i.e., removal and disposal) of the metals contamination.

An evaluation of the effectiveness of the storm sewer IMs presented above is ongoing, and is discussed further in Section 9.8.

5.5 LNAPL AREA NO. 3

Corrective measures for LNAPL Area No. 3 will be proposed in an IM Work Plan to be submitted at a later date. The implementation of corrective measures for LNAPL Area No. 3 are required to be initiated prior to construction of a proposed industrial redevelopment in the DA. LNAPL Area No. 3 is situated beneath the proposed footprint of the facility. Investigation in the vicinity of LNAPL Area No. 3 is ongoing to further delineate the extent of LNAPL, and to better determine localized groundwater flow conditions to allow the development of adequate corrective measures. The additional investigation work will be presented to U.S. EPA in a RFI Work Plan Addendum prior to implementation. The additional well investigations further delineate LNAPL, evaluate localized groundwater flow patterns, and evaluate the source of the groundwater flow depression in the area.

5.6 LNAPL AREA NO. 6

Corrective measures for LNAPL Area No. 6 will be proposed in an IM Work Plan to be submitted at a later date. The implementation of corrective measures for LNAPL Area No. 6 are required to be initiated prior to construction of a proposed industrial redevelopment in the DA. LNAPL Area No. 6 is situated beneath the proposed footprint of the facility.

6.0 EVALUATION OF GROUNDWATER AT DOWNGRADIENT PERIMETER

During the implementation of the RFI a series of monitoring wells were installed at the downgradient perimeter of the Site. Monitoring wells were installed in four separate zones: unconfined water table, glaciolacustrine (intermediate), upper sand and gravel outwash, and lower sand and gravel outwash.

The basis for the human health risk evaluation for groundwater is presented in Section 5.0 of the Supplemental RFI Report (ENCORE, 2003J) and Section 8.0 of this report. The risk evaluation in Section 5.0 of the Supplemental RFI Report (ENCORE, 2003J) and the Section 8.0 of this report concluded that there are currently no constituents detected in groundwater that exceed human health risk that is migrated off-Site. This conclusion was based on the fact that there are no residential wells downgradient of the Site. However, concentrations that exceed the MDEQ Part 201 Residential Drinking Water Criteria have been detected at the downgradient property boundary.

The Environmental Indicators (EI) Report (ENVIRON, July 30, 2002) stated that future monitoring would be conducted to confirm that the existing area of contaminated groundwater would remain stabilized. The following monitoring wells were proposed in the EI Report for future monitoring and are currently being monitored on a semi-annual basis:

Shallow Zone	MWD6, MW-40-99, MWW1-04, MWW1-03, MWW1-02, MWW10-03, MWF1, MWF12-01, MWF12-02
Intermediate Zone	IWD7, IWP2, IWP5
Deep Zone(s)	GWD8, GWD9, GWD11, GWP3, GWP6, DWD10, DWD12

The groundwater samples collected from each of the above listed monitoring wells were submitted for laboratory analysis of VOCs, SVOCs, metals, PCBs, and select monitoring wells for dioxin.

Based on the data collected from the RFI and the two semi-annual groundwater sampling events (November 2002 and May 2003), the following groundwater monitoring program is proposed to be implemented on a semi-annual basis beginning with the May 2004 sampling event.

6.1 GROUNDWATER MONITORING IN THE UNCONFINED WATER TABLE ZONE

Groundwater is present in the fill material and unconfined glaciolacustrine deposits at the Site. Site groundwater in this unit is typically encountered at depths ranging from 4 to 35 feet bgs in this zone. In general, the groundwater flow direction follows the topography of the Site, with

the 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 in the unconfined water table zone is 0.0047. However, there are localized groundwater flow variations as shown on Figure 2-6 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 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. The groundwater elevation data 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. A toe drain was installed to divert this to the stormwater detention facility, discussed in Section 4.5.

In addition to the localized groundwater flow on Site, there are also Site areas where groundwater was not present within the interval targeted for well placement. This is due 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 USTs (AOIs M-4 and P-6) have been removed as part of previous remedial actions. These excavations are backfilled with imported sand, which have created a localized mounded and possibly perched groundwater system.

The RFI Report (EEC 2003) concluded that there are currently no constituents detected in off-Site groundwater that exceed the human health determination. However, concentrations that exceed the MDEQ Part 201 Residential Drinking Water Criteria are currently detected at the downgradient property boundary in the unconfined water table zone.

Manganese was detected above the MDEQ Part 201 Residential Drinking Water Criteria and in monitoring wells MWF12-01 and MWF12-02 in both rounds of groundwater samples collected as part of the RFI (September, 2001 and January, 2002) and both semi-annual groundwater sampling events (November, 2002 and May, 2003). Manganese was also detected above MDEQ Part 201 Residential Drinking Water Criteria in monitoring wells and located immediately south of the Storm Water Detention Facility (SWDF). Lead was detected above the MDEQ Part 201 Residential Drinking Water Criteria in monitoring well MWW9-01. Monitoring well MWW9-01 was installed as part of RFI Work Plan Addendum No. 9. Only one groundwater sample has been collected from this monitoring well. The SWDF is located downgradient from this monitoring well and the analytical results for lead from the monitoring wells located at the SWDF are below the MDEQ Part 201 Residential Drinking Water Criteria.

Total PCBs and methylene chloride were detected above the MDEQ Part 201 Residential Drinking Water Criteria at monitoring well MWW1-04, located at the property boundary at the northwest corner of Montcalm Ave. and North Saginaw St. PCBs were detected during groundwater sampling completed as part of the RFI (February 2002) and both semi-annual groundwater sampling events (November 2002 and May 2003). Methylene chloride was not detected during the original groundwater sampling event (February 2002) but was detected in the May 2003 semi-annual groundwater sampling event. Monitoring well MWW1-06 was installed off Site and downgradient of MWW1-04. Total PCBs were not detected from groundwater samples collected at monitoring well MWW1-06. Future monitoring will include both total and dissolved analysis for PCBs to determine if the PCBs that were detected in the groundwater are in aqueous form or adhered to soil particles.

Dioxins are not expected to leach into the groundwater based on their physical properties and are likely associated with LNAPL on-Site. The EI presents that minute quantities of LNAPL were contained in the groundwater samples. While total dioxins were not detected above the MDEQ Part 201 Residential Drinking Water Criteria at the property boundary they were detected in groundwater on-Site. Total dioxins were detected above the screening criteria in monitoring wells MW-28-99 and MW-34-99. These monitoring wells are in close proximity to LNAPL Areas Nos. 1 and 2. Total dioxins were detected downgradient of the LNAPL in monitoring wells MWW1-04, MW-29-99, MW-30-99, and MW-31-99. While analytical results indicate that there are currently no exceedances to screening criteria at or near the property boundary, the concentration at MWW1-04 (property boundary) is increasing in time at the monitoring well MWW1-04. Although Dioxins are not expected to dissolve into the groundwater, future monitoring will include analysis for total dioxins to determine if the dioxins that were detected in the groundwater are in aqueous form or adhered to soil particles and are migrating.

Groundwater samples collected at AOI's M-4 and P-6 for benzene and ethylbenzene exceeded the MDEQ Part 201 Industrial Drinking Water Criteria (IDWC) and Residential Drinking Water Criteria) RDWC at AOI's M-4 and P-6. Both these AOI's were former LUSTs that were removed and the excavation backfilled. The concentrations of constituents detected in the groundwater samples collected from AOI M-4 and AOI P-6 that exceeded the screening criteria originated from monitoring wells installed in the backfill material. The downgradient monitoring wells at each of these AOI's did not have any constituent that exceed the screening criteria. No monitoring wells located at the property boundary exhibited concentrations exceeding the RDWC for VOCs.

No SVOCs were detected above the MDEQ Part 201 RDWC at the property boundary.

6.2 GROUNDWATER MONITORING IN THE GLACIOLACUSTRINE (INTERMEDIATE) ZONE

Intermediate groundwater monitoring wells were installed in the glaciolacustrine deposits as part of the Site-wide 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.

The RFI Report (EEC 2003) concluded that there is currently no constituents detected in groundwater off-Site that exceed the human health determination. Concentrations that exceed the MDEQ Part 201 Residential Drinking Water Criteria were detected at the property boundary in the glaciolacustrine (intermediate) zone. However, the groundwater samples from monitoring wells located along the downgradient Site boundary located in the glaciolacustrine zone are not impacted by on-Site industrial activities.

Acetone was detected above the MDEQ Part 201 Residential Drinking Water Criteria in monitoring wells in this zone (IWF3, IWM2, and IWP5). The RFI Report (ENCORE 2002) (Section 4.1.3.) concluded that the result of the acetone detections was bentonite pellets used in the installation of the monitoring well.

Lead and bis (2-Ethylhexyl) phthalatate exceeded their respective Residential Drinking Water Criteria at monitoring well IWD-7 during the January 9, 2002 sampling event. Two semi-annual groundwater sampling events were conducted after January 9, 2002 (November 2002 and May 2003) in which lead and bis (2-Ethyl hexyl) phthalate were not detected in wells screened in this unit. Based on the data collected, the conclusions in the RFI Report (ENCORE 2002) and the results of both the semi-annual groundwater sampling events (November 2002 and May 2003) no further monitoring of groundwater is proposed in the glaciolacustrine (intermediate) zone.

6.3 GROUNDWATER MONITORING IN THE UPPER AND LOWER SAND AND GRAVEL OUTWASH ZONE

6.3.1 MONITERED ZONES

Upper Sand and Gravel Outwash Zone

Groundwater level measurements were collected periodically throughout the duration of the RFI. A groundwater potentiometric map (Figure 2-6) for February 7 and 8, 2002 was generated for the upper sand and gravel outwash aquifer. 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 in the sand and gravel aquifer is 0.0045. 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

Three groundwater monitoring wells were installed in the lower sand and gravel outwash zone. Based on groundwater elevation data, the groundwater flow direction is similar to the upper sand and gravel zone, being toward the southeast.

Vertical Groundwater Flow

Vertical hydraulic gradients were calculated for each of the clustered 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. 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.

In all instances, the vertical gradient is downward. The vertical 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.

6.3.2 GROUNDWATER QUALITY

The RFI Report (EEC 2003) concluded that there is currently no constituents detected in groundwater that exceed the human health risk that is migrating off-Site. However, concentrations that exceed the MDEQ Part 201 Residential Drinking Water Criteria were detected at the property boundary in the upper and lower sand and gravel zones. However, the groundwater samples from monitoring wells located along the downgradient Site boundary located in the upper and lower sand and gravel zones are not impacted by on-Site industrial activities.

Acetone was detected in monitoring well GWP6 above MDEQ Part 201 Residential Drinking Water Criteria in both the first and second rounds of groundwater sampling associated with the

RFI (September 2001 and January 2002). Acetone was not detected during both the semi-annual groundwater sampling events (November 2002 and May 2003). Acetone was also detected in monitoring well GWD8 above MDEQ Part 201 Residential Drinking Water Criteria in the first round of groundwater sampling associated with the RFI (September 2001). However, it was not detected during both the second round of sampling associated with the RFI and both semi-annual groundwater sampling events (November 2002 and May 2003). The RFI Report (ENCORE 2002) (Section 4.1.3.) concluded that the result of the acetone detections was bentonite pellets used in the installation of the monitoring well.

Based on the data collected and the conclusions in the RFI (ENCORE 2002) and the results of both the semi-annual groundwater-sampling events (November 2002 and May 2003) no further monitoring of groundwater is proposed in the lower sand and gravel outwash zone. This zone is separated from the upper sand and gravel outwash zone by a basal till unit approximately 20 feet thick. Because the vertical gradient demonstrates a downward gradient, groundwater monitoring in the upper sand and gravel zone will continue to be monitored on the southern boundary of the Site to determine if contaminants have migrated.

6.4 GROUNDWATER MONITORING PLAN

The objective of the groundwater monitoring plan is to monitor, on a semi-annual basis, the unconfined water table zone at the downgradient edge of the Site to establish that the contaminant migration has stabilized and no additional contaminants have migrated off-Site. The cleanup goal is to prevent groundwater from migrating off-Site that would pose a potential health risk. Additionally, groundwater samples will be collected in the unconfined water table zone at the northern Site boundary for metals to establish background levels.

Because monitoring wells MWF10-01 and MW12-02, located on the southern property boundary of Fiero had manganese that exceeded the MDEQ Residential Drinking Water criteria groundwater samples will be collected as part of the monitoring plan and analyzed for total and dissolved inorganics. Sample locations are shown on Figure 6-1.

Monitoring wells MW-01 and MW-02, located immediately south of the SWDF, had various inorganics that exceeded the MDEQ Residential Drinking Water Criteria. Groundwater samples will be collected as part of the monitoring plan and analyzed for total and dissolved inorganics. Sample locations are shown on Figure 6-1 and analytical summary presented in Table 6-1.

Since monitoring wells located in AOIs W-1, W-10, and W-9 exhibit elevated levels of various inorganics and VOCs, dioxins, and PCBs, groundwater samples will be collected at select monitoring wells at the property boundary and downgradient of LNAPL Areas as part of the monitoring plan. Groundwater samples will be collected and analyzed for VOCs, total inorganics, and total dioxin at three monitoring wells along the southern property boundary

(MWW1-04, MW-40-99, and MWW1-02) and two monitoring wells downgradient of LNAPL Area No. 2 (MW-29-99 and MW-31-99). Groundwater samples will be collected at monitoring well MWW9-01 for analysis of total inorganics. Groundwater samples will be collected at monitoring wells MWW1-04 (property boundary and MWW1-06 (off-Site) for total PCB analysis. Sample locations are shown on Figure 6-1 and analytical summary presented in Table 6-1.

The supplemental RFI groundwater data from AOIs P-6 and M-4 indicate that although benzene and ethylbenzene concentrations exceed the IDWC and RDWC they are generally continuing to naturally decrease as concluded in the RFI Report (ENCORE, 2002a). Groundwater samples will be collected from downgradient monitoring wells at AOIs M-4 and P-6 for BETX and monitored natural attenuation (MNA) parameters, as indicated in Table 6.1.

Groundwater samples for will be collected for total inorganics at three upgradient monitoring wells (MWM1, MWS1, and MWP3) to evaluate background concentrations in the unconfined water table zone.

As part of the groundwater monitoring plan, groundwater samples will be collected for monitoring wells located in the upper sand and gravel outwash. Groundwater samples will be collected from monitoring wells GWP3, GWP11, and GWP9 and analyzed for VOCs and total inorganics. These monitoring wells are located downgradient (southeast) at the property boundary.

Additional monitoring wells will be installed off-Site to delineate the contaminant plume(s). The RFI work plan addendum for off-Site delineation will be submitted separately. As like, a monitoring plan will be prepared to monitor any off-Site wells and submitted to the U.S. EPA. The groundwater monitoring plan will be re-evaluated on a regular basis.

7.0 HABITAT EVALUATION

7.1 INTRODUCTION

An ecological risk assessment (ERA) was conducted for the Site, as part of the RCRA corrective action process. The first step in conducting an ERA is a habitat characterization. The intent of the habitat characterization is to evaluate all AOIs to determine whether there are complete pathways of exposure for native ecological receptors to Site-related substances. AOIs for which complete pathways do not exist are not considered further in the ERA process because they cannot pose any ecological risk.

The habitat characterization was accomplished by reviewing existing reports, conducting Site visits, and researching the ecology of the on-Site conditions as well as the conditions of the off-Site areas PSB property, Harris Lake, Terry Lake, and Osmun Lake) to evaluate their suitability as wildlife habitat and potential pathways for exposure to adverse levels of Site-related chemicals of potential concern (CoPCs). Observations made during Site visits were also used to identify indigenous wildlife and to assess potential exposure pathways for these receptors to CoPCs that may be present in these areas.

7.2 ON-SITE TERRESTRIAL HABITAT

The Site is situated in an industrial, commercial, and residential area. Almost all of the land within the confines of the plant property has been developed, excavated, graded, filled, or otherwise disturbed as a result of past and current plant operations. No significant portion of the land within the plant property is undeveloped or currently undisturbed. As discussed in Section 1.0 the facility encompasses approximately 595 acres and was divided into five operational areas for the purposes of the RFI. These areas were evaluated with regard to the overall productivity and density of vegetation and the presence of areas that may be used as foraging, cover, or nesting habitat for wildlife species indigenous to the area.

The AOIs within the Site boundaries consist of active industrial areas or disturbed areas that provide few resources for ecological receptors because they constitute only small, discontinuous patches of poor quality habitat. Any vegetation that is present consists primarily of early successional grasses and annual forbs, many of which are currently listed as noxious weeds in the state of Michigan. The remaining vegetation is actively landscaped and is dominated by non-native plant species. Vertebrate fauna is expected to be limited to sparse populations of exotic rodents (e.g., Mus musculus and Rattus norvegicus) and transient avian species common to urban settings. The overall productivity of the Site is not likely sufficient to support a population of upper level carnivores, and predation is therefore likely limited to transient predators such as crows, occasional raccoons, and feral dogs and cats. Therefore, no significant

ecological pathways of exposure exist because the habitat is insufficient to support sustainable wildlife communities.

7.3 ON-SITE AQUATIC HABITAT

Potential aquatic habitat on-Site is limited to the SWDF basin. This basin is not a natural water body, but rather a constructed water holding area. It consists of a concrete-sided structure with vertical walls forming two cells. There is an access ramp on one end of the basin. The basin was designed for a holding capacity of 2 million gallons of water, is 10 feet deep, and covers an area of approximately 0.5 acre. The basin is drained and sediment is removed from the bottom of the basin on an annual or semi-annual basis. An 8-foot high chain link fence surrounds the entire basin and WWTP.

The basin does not provide suitable conditions for the establishment of aquatic communities. No vascular plants were observed during the Site visit and any primary productivity was exclusive to algae. No fish have been observed or reported in the detention basin. No wildlife species were observed, with the exception of overflight by common urban bird species. There were no waterfowl using the basin as a resting area at the time of the Site visit, and it is unlikely that waterfowl would be attracted to this Site feature because of the lack of forage and cover. It would be especially difficult for waterfowl to use the basin during low water periods, which predominate for all but short periods because of the sheer concrete sidings. Fencing surrounding the Site excludes or discourages most terrestrial wildlife species, such as deer, fox, and raccoon. Therefore, no significant ecological pathways of exposure exist because the habitat is insufficient to support sustainable wildlife populations.

7.4 OFF-SITE HABITAT

Four off-Site areas were evaluated as part of the RFI process and are discussed below.

7.4.1 PONTIAC SCHOOL BOARD (PSB) PROPERTY

The area currently owned by the city of PSB is 550 by 700 feet in dimension with one major structure. The open areas consist primarily of pavement, concrete slab, and gravel. Early successional vegetation is present only along the periphery of the property. Habitat within the boundaries of the PSB property is minimal and similar in nature to that within the North Campus Site proper. No aquatic habitat is present. Terrestrial habitat consists of limited grasses and forbs that may potentially support a very small population of exotic rodents. The limited productivity and small size of the site strongly suggest that avian and mammalian predators would be rare and transient. Therefore, no significant ecological pathways of exposure exist because the habitat is insufficient to support sustainable wildlife populations.

7.4.2 HARRIS LAKE

Harris Lake is an 8-acre, glacially formed lake located within the city limits of Pontiac. The lake is relatively deep for its size, with a maximum depth of 39 feet. Harris Lake has two small inlets originating from the GM-PNC Site that carry storm water into the lake: Fiero Outfall 001, located on the northern shoreline, and Fiero Outfall 003, located on the northern shoreline near the inlet on the eastern shoreline. At least four additional inlets convey precipitation and surface runoff to Harris Lake, including the inlet at the eastern shoreline and three culverts originating from the City of Pontiac and neighboring properties.

Submerged aquatic vegetation was observed in small patches on the east end during June 2002 (Exponent, 2002). Emergent pickerel weed (Pontederia cordata) was also present in small patches, mainly restricted to the eastern and southeastern parts of the lake. Artificial habitat is abundant in most sections of Harris Lake in the form of various sizes of anthropogenic debris (e.g., trash, car tires, machinery parts, small motors, and miscellaneous large metal objects). Rip-rap lines a section of the southwestern shoreline of the lake. In September 2001, schools of small sunfishes were observed using the rip-rap as habitat (Exponent, 2002).

Fish species captured during sampling in September 2001 included largemouth bass (Micropterus salmoides), yellow bullhead (Ameiurus natalis), golden shiner (Notemigonus crysoleucas), bluegill (Lepomis macrochirus), and green sunfish (Lepomis cyanellus) and their bluegill hybrids. Crayfish and macroinvertebrates, such as dragonfly (Odonata) and mayfly (Ephemeroptera) larvae, were occasionally observed during fish sampling. Snapping turtles (Chelydra serpentina) and painted turtles (Chrysemys picta) were also observed.

Most of the lakeshore of Harris Lake is undeveloped with a thin strip of mature deciduous woodland, mainly willow (Salix spp.), overhanging in places. The wooded area on the southern shoreline has a relatively dense subcanopy and understory. These wooded areas exist as narrow bands (usually less than 75 feet wide) bordering the lake, except in two areas. Overhanging branches provide perches from which piscivorous birds can hunt, but the narrow littoral area offers little wading habitat for wildlife. The total area of wooded habitat bordering Harris Lake is less than 3 acres. On the northern shoreline of the lake, there are small, periodically managed grassy areas between the wooded area and Montcalm Street East. This mixture of early successional and riparian habitat would be expected to attract wildlife that can tolerate human intrusions such as the raccoon, great blue heron, belted kingfisher, and American robin.

Harris Lake represents adequate habitat for a limited number of wildlife species and, although too small to represent a sustainable habitat in itself, would comprise a portion of the foraging and nesting areas for native wildlife communities. An ERA was performed on the Site in 2003

and it was determined that none of the terrestrial receptors, piscivorous birds, or fish would experience a risk greater at Harris Lake than that incurred under reasonable ambient conditions. It was concluded that there was a potential for sublethal (i.e., reduced growth rate) effects on benthic macroinvertebrates, but that this potential was mitigated by 1) natural conditions of stratification and hypoxia that limit the vertical distribution of benthos, and 2) dredging of sediment at 0 to 5 feet water depths (to eliminate human exposures to oily sediment) and replacement with clean material. These two factors would minimize exposure of benthos to Site-related substances.

7.4.3 TERRY LAKE

Terry Lake is located downstream of and receives surface water from Harris Lake. Terry Lake covers an area of approximately 13 acres with a surrounding riparian and upland area of 21 acres. Most of the lakefront along the north shore consists of single-family dwellings. A park is located at the southeastern corner of the lake and is comprised primarily of maintained lawn space. Wildlife habitat in and around Terry Lake would be expected to be similar to that attributed to Harris Lake. Sediment sampling in Terry Lake in the vicinity of the inflow from Harris Lake did not indicate apparent transport or accumulation of contaminants from Harris Lake to Terry Lake (ENCORE, 2002c) and, therefore, ecological risk to Terry Lake was not assessed.

7.4.4 OSMUN LAKE

Osmun Lake is located downstream of Terry Lake. Osmun Lake receives surface water from Terry Lake along with storm water discharge from the Fiero plant via Outfall 002. The lake covers an area of approximately 15 acres and is 25 feet deep with a surrounding riparian and large upland area of 53 acres. With the exception of the Kiwanis Park on the southeastern shore, and single-family dwellings on the northeastern shore, most of the lakeshore is relatively undisturbed, mature riparian habitat. The surrounding uplands are a mixture of forest and early successional grassland. To the west of the lake is a region about the lake's outfall that shows signs of periodic inundation. Wildlife habitat in and around Osmun Lake would be expected to be larger, but similar in quality to that attributed to Harris Lake. Sediment sampling performed in Osmun Lake at the Fiero discharge did not indicate apparent transport or accumulation of contaminants from the Fiero plant to Osmun Lake (ENCORE, 2002c) and, therefore, ecological risk to Osmun Lake was not assessed.

7.5 CONCLUSION

Evaluation of the AOIs on the GM PNC Site indicates that potential wildlife habitat is too sparse and of too poor a quality to either support a wildlife community or contribute significantly as

habitat to indigenous native wildlife populations. Therefore, no complete exposure pathways exist between ecological receptors and on-Site CoPCs, and hence, there is no significant risk of such CoPCs adversely effecting wildlife. A similar conclusion is reached for the PSB property which is also significantly disturbed and does not provide suitable wildlife habitat. The only productive habitats associated with the facility are the three off-Site lakes: Harris, Terry, and Osmun lakes. These lakes and their associated upland environs do provide foraging and cover habitat for a number of native wildlife species indigenous to Pontiac, Michigan. With the possible exception of benthic macroinvertebrates, an ERA performed at Harris Lake indicated that CoPC concentrations in environmental media and biota do not represent a risk greater than that associated with ambient conditions and hence remediation would not improve the sustainability of wildlife populations. In the case of benthic macroinvertebrates, it was concluded that any uncertainty regarding potential sublethal effects was mitigated by a combination of natural conditions that severely limit the distribution of populations of benthic macroinvertebrates to shallow portions of the lake, and sediment remediation. Sediment sampling in Osmun and Terry lakes did not indicate any transport or accumulation of Site-related contaminants, and therefore, conducting an ERA of these lakes was not warranted.

8.0 EVALUATION OF RISKS TO HUMAN HEALTH

Risks associated with potential exposures to constituents in soil, sediment, surface water, and groundwater at and adjacent to the Site under current and reasonably expected future on-Site land use (i.e., industrial) and off-Site land use (residential) have been evaluated during the RFI. As discussed in Sections 3.0 and 4.0 of this report, the screening criteria for on-Site soils are the Part 201 generic industrial cleanup criteria based on direct contact, inhalation of soil vapor and particulates in ambient air, and inhalation of soil vapor in indoor air. The screening criteria for groundwater are those for residential drinking water (although none of the groundwater zones currently serve as a drinking water supply for the Site or the immediate vicinity), inhalation of groundwater vapor in indoor air, and direct groundwater contact by workers conducting excavations. In cases where some constituent concentrations were higher than the screening criteria, additional risk-based analysis was conducted to evaluate the significance of potential exposure to these concentrations. The additional analysis included estimating cumulative cancer and noncancer risks for reasonable maximum exposures and comparing the estimates with the U.S. EPA-established levels for determining whether corrective measures are warranted. Under U.S. EPA policy, corrective measures are not warranted when the Site-related cumulative cancer risk does not exceed 10^{-4} and the hazard index (HI) does not exceed 1 (61 FR 19432, May 1, 1996; U.S. EPA 1991).

The results of these evaluations showed that certain AOIs have constituent concentrations that correspond to estimates of risk that do not require corrective measures under continued industrial land use, which is the reasonably expected future land use at the Site. These AOIs are summarized in Section 8.1. AOIs that need corrective measures are discussed in Section 8.2. The need for corrective measures at these AOIs is related to the presence of constituents in soil, rather than in groundwater or LNAPLs.

As discussed in Section 4 of the RFI report (ENCORE 2002b) groundwater at the Site is not currently used as a potable water supply and a deed restriction that prohibits such groundwater use at the Site will be evaluated as part of the proposed corrective measures for the Site, as discussed in Section 9.1. Potential exposures to groundwater under this restriction were evaluated during the RFI and the results are summarized in Section 8.3 to provide a basis for not needing other corrective measures for groundwater on-Site. Section 8.4 discusses the risks associated with LNAPL and soil that contain LNAPL. The off-Site areas near the Site have constituent concentrations that are low enough so that the estimates of risk associated with potential exposures under residential land use do not require corrective measures. These areas are summarized in Section 8.5.

8.1 RISKS ASSOCIATED WITH AOIS SUITABLE FOR INDUSTRIAL LAND USE WITHOUT FURTHER ACTION

Among the AOIs evaluated during the RFI, the following were determined to have no significant release of hazardous constituents to soil, based on a conservative approach in which the highest Site-related concentrations of constituents in soil at an AOI were used to estimate upper-bound cumulative cancer and noncancer risks:

AOI F-7 (Wastewater Collection Sumps)

AOI F-8 (Paint Sludge Storage Area)

AOI F-12 (Coal Storage Area)

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

AOI F-14 (Fuel AST Area)

AOI F-15 (Fuel AST Area: Oil/Solvent Catch Basin)

AOI W-3 (Former Plant 8 Flammable Liquid Storage Tank Farm)

AOI W-6 (Former Plant 8 Flammable Materials Storage Building)

AOI W-10 (Railroad Marshalling Area Drainage System)

AOI W-13 (Montcalm Substation)

AOI M-2 (Former Plating Operations Area)

AOI M-4 (Plant 25 Former Gasoline UST & Current Gasoline AST)

AOI M-5 (Former Fill Area A-2)

AOI M-7 (ELPO Building/Flammable Liquids Storage Building)

AOI M-9 (Former Plant 1 Heat Treat Oil Storage Area)

AOI M-11 (Plant 12 Former Gasoline Storage Area)

AOI M-13 (Former AST Location West of Plant 14)

AOI M-16 (Plant 25 Basement Sump Area)

AOI M-21 (Plant 14 Transformer Station)

AOI M-23 (Plants 25, 33, and 75 Substation and Power Building)

AOI M-24 (Former Plant 12 PCB Spill)

AOI M-25 (Plant 25 East Basement Sump Area)

AOI P-6 (Former UST Farm & Stoddard Solvent AST)

AOI P-9 (Pipeline Release)

AOI P-10 (Former Plant 18)

AOI P-11 (Trestle Pipeline Release)

SWDF

Area of Industrial Redevelopment

Table 8.1 summarizes the cumulative cancer risks and noncancer HIs for these AOIs.

Six other AOIs were evaluated further and determined to not warrant corrective measures to address constituents in soil, based on high-end estimates of cumulative cancer and noncancer risks using 95% upper confidence limits (UCLs) on the mean for chemicals with maximum concentrations that significantly contribute to estimates of cumulative risks and the highest Site-related concentrations for other constituents at the AOI:

AOI W-1 (West Yard)

AOI W-5 (Plant 8 Basement)

AOI W-8 (Plant 9 Basement)

AOI M-1 (WWTP)

AOI M-19 (Plant 5 South Access Railway)

Area of Industrial Redevelopment - Routine Worker

Table 8.2 summarizes the cumulative cancer risks and noncancer HIs for these AOIs.

Among the AOIs listed in this subsection, only AOIs F-15 and M-2 have constituents with concentrations that are higher than the Part 201 generic industrial cleanup criteria (screening criteria) based on inhalation of soil vapor in indoor air (i.e., 1,1-dichloroethene and PCE at AOI F-15, and 1,1-dichloroethene at AOI M-2). However, when the screening criteria are adjusted to use occupational air standards (OSHA Permissible Exposure Limits [PELs]), rather than Part 201 generic inhalation toxicity values, the ratio of the estimated indoor air concentrations of 1,1-dichloroethene and PCE to their PELs are at most $3.5E^{-4}$ and $4.4E^{-5}$, respectively. Therefore, soil concentrations at these AOIs do not present unacceptable risk via volatilization to indoor air, and therefore, do not warrant corrective measures.

8.2 RISKS ASSOCIATED WITH AOIS SUITABLE FOR INDUSTRIAL LAND USE AFTER CORRECTIVE MEASURES IMPLEMENTED

AOI W-9 (Former Central Foundry – Plant 8)

AOI W-9 has PCBs in soil around boring BW9-02 at concentrations that would present an unacceptable risk if workers were to have prolonged contact with soil in this area. As an IM the area around this boring has been fenced to prevent unauthorized worker access until soil removal is completed, as discussed in Section 9.2.

Aside from the fenced area around boring BW9-02, AOI W-9 has no other areas of soil that warrant corrective measures, based on high-end estimates of cumulative cancer and noncancer risks using 95% UCLs for benzo(a)pyrene and PCBs and the highest Site-related concentrations for other constituents at this AOI, as shown in Table 8.3

Area of Industrial Redevelopment - Construction Worker

The proposed Area of Industrial Redevelopment encompasses portions of AOIs W-1, W-8, and W-9. As discussed above, the PCBs in soil around boring BW9-02 are present at concentrations that would present an unacceptable risk if workers were to have prolonged contact with soil in this area. As an IM the area around this boring has been fenced to prevent unauthorized worker access until soil removal is completed, as discussed in Section 9.2.

The Area of Industrial Redevelopment has manganese in soil samples BW1-02-S(0-2), BW1-03-S(0-2), BW1-07-S(0-2), BW1-09-S(0-2), BW9-03-S(0-2)072803, BMWW8-02-S(0-2), SBSB5-04.0, SSTT4 (0-6), SSTT5 (0-6), SW8-03-S(0-2), SW8-04-S(0-2), SW8-05-S(0-2), SW8-09-S(0-2), SSTT2 (0-6), and SBTT3-5.0, antimony in soil sample SBSB5-04.0, and naphthalene in soil samples SSTT2 (0-6) and SBTT3-5.0 that would present an unacceptable risk for a larger-scale, short-term construction scenario. Larger-scale, short-term construction in these areas will be restricted in the updated Due Care Plan (to be revised in January 2004) until final redevelopment plans have been finalized. This area will be re-evaluated to determine if corrective measures are warranted, once the final redevelopment plans have been finalized. Any corrective measures identified as necessary for larger-scale, short-term construction will be completed as IMs.

Aside from the fenced area around boring BW9-02 and the few areas noted above, the Area of Industrial Redevelopment has no other areas of soil that warrant corrective measures, based on high-end estimates of cumulative cancer and noncancer risks using 95% UCLs for xylenes, benzo(a)pyrene, 2-methylnaphthalene, naphthalene, PCBs, antimony, arsenic, total chromium, cobalt, copper, iron, manganese, mercury, and thallium and the highest Site-related concentrations for other constituents at this area, as shown in Table 8.3.

8.3 RISKS ASSOCIATED WITH GROUNDWATER

Groundwater quality data were collected from four saturated zones during the RFI, as discussed in Section 2.8. Data from monitoring wells screened in the shallow unconfined water table zone are discussed in Section 8.3.1, data from monitoring wells screened in the glaciolacustrine (intermediate) zone are discussed in Section 8.3.2, and data from monitoring wells screened in the upper and lower sand and gravel outwash zones are discussed in Section 8.3.3. The screening criteria for groundwater include the Part 201 generic cleanup criteria based on residential drinking water use (MDEQ 2002), although none of these saturated zones currently serve as a drinking water supply for the Site or the immediate vicinity.

8.3.1 GROUNDWATER IN THE UNCONFINED WATER TABLE ZONE

Table 8.4 shows the detected constituents in the shallow unconfined water table zone and the ratios of the highest measured concentrations to the screening criteria. 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 2002) were used to identify groundwater in the shallow unconfined water table zone that could pose significant nonpotable exposures. The shallow unconfined water table zone is as shallow as three to four feet below ground surface at some locations at the Site. It should be noted that a deed restriction for potable groundwater use will be evaluated in Section 9.1 as part of the proposed corrective measures at the Site. While the drinking water pathway is not expected currently or in the future, drinking water criteria (MDEQ 2002) were used to identify groundwater in the shallow unconfined water table zone that could present significant potable exposures.

As shown in Table 8.4, organic chemicals with concentrations higher than the screening criteria in the shallow groundwater consist primarily of the following VOCs: benzene, 1,1-dichloroethene, and vinyl chloride. Each of these VOCs is found at concentrations higher than the screening criteria at only one to three AOIs. No VOC has a concentration higher than the criteria based on inhalation of vapors in indoor air or the criteria based on direct contact by excavation workers.

Table 8.4 also shows that the following organic constituents were detected at concentrations that are higher than the screening criteria: bis(2-ethylhexyl)phthalate, 2,4-dimethylphenol, methylphenol (total), pentachlorophenol, PCBs, and 2,3,7,8-TCDD TEQ. These organic constituents have a very small number of concentrations that are higher than the screening criteria. Only two concentrations of bis(2-ethylhexyl)phthalate (at AOIs M-2 and W-10), two concentrations 2,4-dimethylphenol (at AOIs P-9 and W-8), three concentrations of methylphenol (total) (at AOIs P-9 and W-8), and one concentration of pentachlorophenol (at AOI P-9) among

204 to 205 shallow groundwater samples collected across the Site are higher than the screening criteria.

The presence of PCBs and 2,3,7,8-TCDD TEQ in groundwater at concentrations higher than the screening criteria are related to the presence of these chemicals in LNAPLs on the water table at AOIs W-1 and W 8; as these samples most likely consist of a small aqueous component and a much larger LNAPL component. The Part 201 generic groundwater contact criteria were derived based on dermal contact with chemicals in the aqueous-phase. The estimated aqueous-phase concentrations in the groundwater do not pose a significant risk to workers who might contact groundwater while performing occasional excavations. The non-aqueous phase is discussed in Section 8.4.

Several metals are also present in the shallow groundwater at concentrations higher than the screening criteria, as shown in Table 8.4. The most prevalent of these are manganese, thallium, and vanadium. As discussed in Section 3.0 of the RFI Report (ENCORE, 2002c), 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 (ENCORE, 2001b). Based on a review of the thallium results from the initial phase of field work, U.S. EPA 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 thallium concentrations obtained by Method 6020 do not exceed the screening criteria.

Certain constituents in on-Site groundwater in the shallow unconfined water table zone exceed drinking water screening criteria. However, as part of the corrective measures a deed restriction will be evaluated to prevent installation of potable water wells in the shallow unconfined water table zone at the Site. There are no aqueous concentrations in groundwater at the Site that exceed any other Part 201 criteria relevant to nonpotable exposures at the Site, and therefore, no other corrective measures, besides an evaluation of deed restriction on potable groundwater use, are warranted for groundwater in the shallow unconfined water table zone. As discussed in Section 6, off-Site delineation of on-Site monitoring wells that exceed residential criteria will be performed in 2004. This data will be evaluated when delineation is complete.

8.3.2 GROUNDWATER IN THE GLACIOLACUSTRINE (INTERMEDIATE) ZONE

The groundwater data from the intermediate zone have only five chemicals with concentrations higher than the Part 201 residential drinking water criteria (acetone, bis(2-ethylhexyl)phthalate, lead, thallium, vanadium), as shown in Table 8.5. Except for acetone, these chemicals have concentrations higher than the screening criteria in only one monitoring well in the

intermediate zone, and are not believed to be associated with a release from an AOI. As discussed in Section 4.2.9.1, 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 associated with a release from an AOI. Subsequent sampling and analysis during the semi-annual groundwater sampling events (November 2002 and May 2003) showed bis(2-ethylhexyl)phthalate and lead to be non-detect or below the screening criteria at IWD7. Based on recent groundwater results from this well and the frequency of detection, the concentrations of bis(2-ethylhexyl)phthalate and lead in well IDW7 are unlikely to be the result of a release. Therefore, no corrective measures are warranted for groundwater in the intermediate saturated zone.

8.3.3 GROUNDWATER IN THE UPPER AND LOWER SAND AND GRAVEL ZONE

In the deep zones, the only chemicals with concentrations higher than the drinking water criteria are acetone and methylene chloride, as shown on Table 8.5. However, the presence of acetone in the groundwater samples is believed to be unrelated to a release at any AOI. As discussed in Section 4.2.9.1, the presence of acetone in the groundwater samples is likely associated with well construction materials (coated bentonite pellets). Subsequent sampling and analysis during the most recent semi-annual groundwater sampling event (May 2003) showed acetone to be non-detect at GWP6 and GWD8, the two locations where acetone had previously exceeded the screening criteria. The presence of methylene chloride in the groundwater sample at DWD12 does not appear to be due to a release at any AOI, as it is generally considered a common laboratory contaminant (U.S. EPA 1989). During the two previous rounds of groundwater sampling at this location, the methylene chloride results were non-detect. On October 31, 2003, a groundwater sample and field duplicate were collected from this location to confirm the methylene chloride concentration from May 2003. The analytical results from these samples showed that methylene chloride was not detectable. Therefore, groundwater in the upper and lower sand and gravel zones do not warrant corrective measures.

8.4 RISKS ASSOCIATED WITH LNAPL AND SOIL CONTAINING LNAPL

Evaluation of the LNAPL data collected during the RFI determined that occasional intrusive activities at AOI W-1, AOI W-8, AOI W-10, AOI M-2, and AOI M-16 to the depth of LNAPL, that are limited in size and duration, do not present unacceptable risks to workers, as shown in Table 8.6.

The evaluation of vapors emitted from and assumed to migrate into active or proposed buildings at AOI W-8, AOI M-2, and AOI M-16, discussed in detail in Appendix F.3 of the Supplemental RFI Report (ENCORE 2003j), showed that these assumed vapors would not

contribute significantly to indoor air concentrations. The assumed contribution of LNAPL vapors to indoor air concentrations for each AOI is shown in Table 8.7.

However, corrective measures consisting of LNAPL recovery are planned for the LNAPL in these areas, as discussed in Section 9.7.

8.5 RISKS ASSOCIATED WITH NEARBY OFF-SITE AREAS

8.5.1 PSB PROPERTY

Soil, sediment, and groundwater samples were collected from the PSB property during the RFI, as described in Section 4.0.

This area was evaluated and determined to have no significant residential exposures to hazardous constituents in soil; based on high-end estimates of cumulative cancer and noncancer risks using 95% UCLs for benzene, PCBs, barium, cadmium, total chromium, manganese, thallium, and zinc, along with the highest Site-related concentrations for other constituents, as shown on Table 8.8. Basing the evaluation on residential exposure assumptions was not necessary but it was conservative because the PSB property is currently under nonresidential land use and is reasonably expected to remain nonresidential.

The sediment samples collected during the RFI from this property were in and around a former drain pipe. Certain SVOCs and metals from there samples were found to exceed conservative screening criteria, as shown on Table 8.9. As part of the corrective measures the drain pipe and associated sediments will be removed and disposed of December 2003.

The groundwater at the PSB property did not exceed the generic Part 201 criteria for residential drinking water criteria or any other screening criteria, as shown on Table 8.4.

8.5.2 HARRIS LAKE

Soil, sediment, and surface water data were collected at Harris Lake during the RFI. Potential human exposures to soil at Harris Lake under both current and reasonably expected future residential use do not pose unacceptable risk, as summarized on Table 8.10 and discussed in detail in the Baseline Human Health Risk Assessment for Harris Lake (ENVIRON, 2002c).

Potential human exposures to sediment in Harris Lake under both current and reasonably expected future residential use are not expected to pose unacceptable risk, as summarized on Table 8.10 and in the Harris Lake risk assessment report.

As shown in Table 8.11, thallium is the only chemical in the Harris Lake surface water that has concentrations higher than the screening criterion. 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. The data from three surface water samples that were analyzed using Method 6010B and were still available for reanalysis using Method 6020 and confirm that the thallium concentrations obtained using Method 6010B are false detections.

As discussed in Section 5.2, sediment and surface water from Harris Lake were remediated subsequent to the Harris Lake Baseline Risk Assessment (ENVIRON, 2002c). This remedial action was to improve the aesthetic and environmental quality of Harris Lake.

A limited number of sediment samples were also collected from Terry Lake and Osmun Lake, which are downstream of Harris Lake. These samples, collected to determine the sediment quality at Terry and Osmun Lakes relative to Harris Lake, show the sediment quality in these downstream lakes is comparable to or better than that in Harris Lake, as shown on Table 8.9. As such, corrective measures are also not warranted for these lakes.

9.0 EVALUATION OF ALTERNATIVES

This section presents an evaluation of alternatives for corrective measures for each AOI identified in Section 8.0 as presenting a potential risk via soil or groundwater.

9.1 SITEWIDE GROUNDWATER (AOIs W-1, W-5, W-8, W-9, W-10, W-11, M-1, M-2, M-5, M-16, F-7, P-9, AND P-11)

The results of the RFI and human health risk evaluation at AOIs W-1, W-5, W-8, W-9, W-10, W-11, M-1, M-2, M-5, M-16, F-7, P-9, and P-11 resulted in similar conclusions (i.e., exceedances of similar Part 201 criteria), and therefore will be discussed collectively in this section. Soils at these AOIs require NFA, with the exception of AOI W-9 which is addressed in Section 9.2. Corrective measures for groundwater at these AOIs are evaluated in this section. LNAPL detected in these AOIs is addressed in Section 9.7. Off-Site groundwater near the downgradient Site property boundary is also discussed.

The shallow groundwater zone, intermediate saturated zone, and deep saturated zone were investigated as part of the RFI. Several metals, VOCs, PCBs, and dioxins were determined to be present in the shallow saturated zone, however the concentrations present were determined to pose no risk to human health via the volatilization to indoor air or groundwater contact exposure pathways. Similarly, constituents detected in the intermediate saturated zone were determined to pose no risk via the potentially complete exposure pathways evaluated. The one constituent detected in the deep saturated zone was determined to be introduced by groundwater monitoring well installation, not a release from the Site. Therefore, the potential exposure pathway that must be addressed by corrective measures for groundwater at these AOIs is the drinking water pathway in the shallow saturated zone. Figure 9-1 shows the locations of the AOIs addressed in this section.

Semi-annual groundwater monitoring conducted over the past two years indicates constituents detected in the shallow saturated zone are present near the downgradient Site boundary. Results of the RFI also determined that groundwater movement into the storm sewer system is occurring in the vicinity of the West Yard. This water is collected, treated, and discharged from storm water outfalls under an NPDES permit.

On-Site Groundwater

Active remediation of on-Site groundwater by pumping and treating or treating in situ by any of the available remediation technologies would not be more protective of human health than institutional controls and groundwater monitoring, and would incur significant additional cost. Implementation of an active remediation system for on-Site groundwater could potentially reduce constituent concentrations to levels protective for drinking water use, however drinking

water use of the shallow zone is prevented by public health code at a depth of less than 25 feet, and is not expected on this industrial property at any time in the future. Remediation of groundwater to levels protective of drinking water use would not result in an improved or enhanced restoration of the groundwater. Further evaluation of those alternatives was, therefore, not performed for on-Site groundwater.

The shallow saturated zone does not recharge adjacent or underlying aquifers that are used as a drinking water source off-Site. It does, however, discharge to a surface water indirectly through the storm sewers. A downward vertical gradient exists across the Site, and therefore groundwater will be monitored to evaluate the potential for constituents to migrate downward, as discussed in Section 6.0.

Off-Site Groundwater

While the EI Report (ENVIRON, 2002) determined that the migration of contaminated groundwater at the Site is under control and current human exposures to "contamination" at or from the Site are under control, future potential exposure pathways off-Site must be evaluated as part of the corrective measures evaluation. Therefore, the constituents detected near the downgradient property boundary will be further evaluated to determine if they are present off Site, and if so, at what concentrations.

Manganese is present in groundwater samples collected from several monitoring wells upgradient of the Site in the shallow and intermediate zones at concentrations above the aesthetic generic RDWC. Manganese exceeds RDWC at the downgradient boundary of AOI F-12. Manganese is present in shallow groundwater at concentrations exceeding both aesthetic and health-based RDWC criteria. Manganese also exceeds aesthetic RDWC at the downgradient boundary of AOI W-1, and at the SWDF manganese has been detected in groundwater samples at concentrations exceeding aesthetic and health-based RDWC. These results are presented on Figures 4-9 and 4-11 of the RFI Supplemental Report No. 1 (ENCORE 2003j).

The Montcalm Toe Drain is providing control of very shallow groundwater flow (0 to 4 feet deep) north of Montcalm Street in the area indicated on Figure 9-1. The groundwater is collected in the drain and pumped to the SWDF, where it is treated with GAC and discharged to stormwater Outfall 001 under authorization of an NPDES permit. In addition, other IMs and corrective measures being considered for the Site include paving a significant portion of the West Yard as part of Site redevelopment activities (see Figure 9-2) which will result in reducing storm water flow to Outfall 001 and recovering LNAPL near the downgradient perimeter of the Site (see Section 9.7). Actions of this nature, along with IMs already implemented for storm sewers and LNAPL, would help to control/contain impacted groundwater within the Site property boundary.

The Well Construction Code Administrative Rules promulgated under Sections 33 and 63 of Michigan Act 306 and Section 12714 of Michigan Act 368 prohibit installation of wells at depths less than 25 feet below grade. This restriction of the use of off-Site groundwater to depths less than 25 feet may protect against the potential groundwater use of the impacted shallow zone along a portion of the Site downgradient boundary.

The future expected use of the Site is on-going industrial manufacturing operations by GM and industrial redevelopment of an approximate 70-acre parcel of the Site located in the southwest portion of the Site.

Additional delineation of LNAPL No. 3 and groundwater flow is planned for this area, and a recovery system for LNAPL Areas No. 1 and No. 2 will be designed (Section 9.7). These activities may present an opportunity to address off-Site groundwater concurrently, if a determination is made that active remediation is required to address levels of constituents detected in groundwater at the downgradient Site boundary or off Site. Furthermore, the Montcalm Toe Drain and any capping of the southwestern portion of the Site through redevelopment (e.g., construction of buildings and/or paved parking lots) will further aid in controlling/reducing any off-Site migration by reducing surface water infiltration into the shallow saturated zone.

9.1.1 SUMMARY OF ALTERNATIVES - ON-SITE GROUNDWATER

The alternative evaluated to address the on-Site drinking water exposure pathway is Institutional Controls with Groundwater Monitoring. A No Action alternative would not provide Site-specific institutional controls for the drinking water pathway to be carried forward with the deed to the property. The constituents present in groundwater do not pose a current or likely future health risk to human receptors at the Site. The on-Site groundwater is not currently used as a source of drinking water, and it is not expected to be used as a source of drinking water in the future. The installation of drinking water wells in the shallow saturated zone is prohibited under the Well Construction Code Administrative Rules. Therefore, the No Action alternative would likely be protective of potential routes of exposure. Semi-annual groundwater monitoring is currently conducted, and this can easily be integrated into the on-Site groundwater corrective measure and thereby provide a more reliable and effective remedy than institutional controls alone.

9.1.1.1 INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING - ON-SITE GROUNDWATER

Institutional Controls and Groundwater Monitoring for on-Site groundwater would include filing a deed restriction with the county Register of Deeds specifically prohibiting the installation of groundwater drinking water wells on the property, and implementing a

groundwater monitoring program to detect any indication of the potential for off-Site impacts to occur (see Section 6.0). The deed restriction would run with the property in perpetuity, or until groundwater at the Site is remediated to RDWC. Monitoring would be performed as part of this alternative to:

- detect changes in environmental conditions that may affect the implementation of the remedy (e.g., changing groundwater flow directions),
- verify that the plumes are not expanding,
- verify no unacceptable impact to downgradient properties, and

The proposed groundwater monitoring program is presented in Section 6.0. As part of corrective measures for on-Site shallow groundwater, the proposed groundwater monitoring program will be evaluated to assess the need for additional locations and parameters to be monitored to aid in the on-going evaluation of storm sewers and LNAPL areas at the Site. Corrective measures related to LNAPL areas and storm sewers at the Site are discussed in Sections 9.7 and 9.8, respectively.

The proposed groundwater monitoring program would be conducted semi-annually for 5 years, and annually thereafter for 25 years to evaluate concentrations of constituents in groundwater over time. The well locations are indicated on Figure 6-2. An assessment of the monitoring program will be performed upon completion of storm sewer IMs (assumed to be 2 years), and every 5 years thereafter to evaluate the effectiveness of the monitoring, and the need to modify the monitoring program. A review of the monitoring program will also be conducted when significant Site modifications occur due to Site redevelopment, storm sewer IMs/corrective measures, LNAPL IMs/corrective measures, or storm sewer system improvements that may affect groundwater flow at the Site. Installation of additional monitoring wells is anticipated to be required from time to time to evaluate future changes in Site conditions as a result of on-going plant operations and property redevelopment. Maintenance of the monitoring wells will also be required as part of this alternative, which might include periodic repair of well caps and covers, re-development of wells, and abandonment and/or replacement of specific wells if damage occurs at one or more well locations.

In addition evaluating a deed restriction for on-Site groundwater and performing groundwater monitoring, other elements of this corrective measure will include notification(s) to the NPDES permit authority and/or modification(s) of existing storm sewer discharge permits, evaluation of the need for groundwater-surface water interface (GSI) monitoring wells/compliance points, and establishing Site-specific GSI criteria or requesting a mixing zone determination from MDEQ in accordance with Michigan NREPA Part 201 rules. Implementation of corrective measures for on-Site groundwater will be integrated with storm sewer rehabilitation related to

NPDES permit compliance, and will, in part, be dependent upon on-going IMs and final corrective measures implemented for the storm sewers.

9.1.2 EVALUATION OF ALTERNATIVES - ON-SITE GROUNDWATER

9.1.2.1 LONG-TERM RELIABILITY AND EFFECTIVENESS

Institutional Controls and Groundwater Monitoring are highly reliable and effective in the long term. Although it is highly unlikely that the shallow saturated zone would be used as a drinking water supply, evaluation of a deed restriction is more reliable and effective than the existing well construction code to prohibit drinking water well installation, especially if the property or portions of the property are transferred to another owner. Groundwater monitoring and periodic evaluation of monitoring data as the Site is redeveloped, storm sewers are rehabilitated, and LNAPL is recovered will provide data to evaluate the constituent concentrations over time.

9.1.2.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

Institutional Controls and Groundwater Monitoring will not actively reduce the toxicity, mobility, or volume of constituents present in groundwater at the Site. The constituents will not be treated or immobilized by these corrective measures, and the volume of impacted groundwater will not be reduced. The results of the Site-specific risk assessment indicate a reduction of toxicity is not required to protect human health and the environment. The only potential unacceptable exposure pathway is use of groundwater from the shallow saturated zone as a source of drinking water, which is addressed by the proposed corrective measure. It should be noted that some reduction of mobility and volume of constituents may occur through natural attenuation processes.

9.1.2.3 SHORT-TERM EFFECTIVENESS AND RISK

Institutional Controls and Groundwater Monitoring pose a low short-term risk to human health. Personnel performing groundwater monitoring will have received training, health and safety procedures, and equipment required to perform this work safely. The short-term effectiveness of the alternative is high. The key institutional control to prevent groundwater use is already underway. A deed restriction can be filed with the county in a relatively short timeframe, and semi-annual groundwater monitoring is currently being conducted.

9.1.2.4 IMPLEMENTABILITY

Institutional Controls and Groundwater Monitoring are easily implementable. Preparation and filing of a deed restriction is easily implementable with available resources. Groundwater

monitoring wells utilized for the current semi-annual groundwater monitoring are in place at the Site, and are currently in use for monitoring. Installation of new wells, as necessary, and maintenance of the wells are also easily implementable based on the labor, materials, and resources required. Resources required for on-going groundwater monitoring and evaluation of monitoring data are also readily available, and these elements are also highly implementable.

9.1.2.5 COSTS

The estimated costs for the proposed on-Site groundwater corrective measures are presented on Table 9-1. Capital and annual costs are totaled for a period of 30 years, including no discount for present worth.

9.1.2.6 ACCEPTABILITY TO SURROUNDING COMMUNITY

Institutional Controls and Groundwater Monitoring are expected to be acceptable to the surrounding community. This alternative is expected to be acceptable to property owners downgradient of the Site because it provides periodic documentation of the constituent concentrations near the downgradient property line and at off-Site properties downgradient of the Site.

9.1.2.7 ACCEPTABILITY TO STATE OF MICHIGAN

Institutional Controls and Groundwater Monitoring are expected to be acceptable to the State of Michigan based on requirements of NREPA Part 201. The deed restriction provides protection against the use of the groundwater on-Site as a source of drinking water, and groundwater monitoring data will provide on-going verification of the constituent concentrations near the downgradient boundary of the Site. Groundwater-surface water discharge issues will be managed under the existing discharge permits, as appropriate, and a GSI monitoring program will be evaluated as part of the proposed alternative and incorporated into the same semi-annual groundwater monitoring program as appropriate.

9.1.3 PROPOSED ACTION - ON-SITE GROUNDWATER

The proposed action for on-Site groundwater at AOIs W-1, W-5, W-8, W-9, W-10, W-11, M-1, M-2, M-5, M-16, F-7, P-9, and P-11 is Institutional Controls and Groundwater Monitoring. This action is a reliable and effective alternative, and is highly implementable. Provisions for long-term monitoring and evaluation of potential changes in groundwater monitoring requirements allow for potential changes at the Site with respect to storm sewer rehabilitation, LNAPL recovery, and property redevelopment. The cost to implement this alternative is anticipated to be lower than costs for other alternatives that would reduce constituent concentrations below levels protective of drinking water use, which would result in no additional reduction of risk

based on the reasonably expected aquifer use at the Site. This alternative is also believed to be acceptable to the surrounding community and the state of Michigan. Proposed action for off-Site groundwater may be integrated with those for on-Site groundwater, if determined to be appropriate.

9.1.4 PROPOSED ACTION – OFF-SITE GROUNDWATER

No final corrective measures are proposed at this time for off-Site groundwater because the extent of impact to off-Site groundwater is not yet evaluated. Therefore, a work plan for delineating the extent of impact to off-Site groundwater will be submitted to U. S. EPA. Groundwater monitoring wells will be installed on off-Site properties downgradient of on-Site exceedances of RDWC, and samples will be collected from those wells and analyzed to evaluate the constituent concentrations in groundwater downgradient of Fiero, SWDF, and Montcalm Street, and to delineate the extent of any off-Site exceedances of RDWC. In addition, Sitewide groundwater monitoring will continue. The groundwater monitoring plan will be revised periodically as necessary to reflect the results of investigations, and notices of off-Site migration will be filed for constituents likely to be migrating off Site. An evaluation of the extent of capping to be implemented in the West Yard will be conducted as part of redevelopment efforts. Any capping would potentially benefit corrective measures related to Sitewide groundwater, LNAPL Areas, and storm sewers.

Upon completion of these items, a proposal for corrective action for off-Site groundwater will be submitted to U. S. EPA. Proposed action for off-Site groundwater may be integrated with those for on-Site groundwater, if determined to be appropriate. In the meantime, potential exposure to off-Site downgradient receptors is highly unlikely given the availability of the City of Pontiac water distribution system, the cited restriction on wells less than 25 feet deep, and the on-going operation of the Montcalm Toe Drain system.

9.2 AOI W-9 SOILS

Corrective Measures for groundwater at AOI W-9 are discussed under Section 9.1. This section addresses soils at AOI W-9. Based on soil sampling and the PCB delineation program conducted during RFI activities, an estimated area of 17,500 SF (140 feet by 125 feet) contains soil in the 0- to 2-foot interval that exceed Part 201 IDC of 20 mg/kg.

An IM work plan will be submitted to U.S. EPA in December 2003 to remove PCB -impacted soil from the area to address potential risk associated with these soils. This IM is discussed in Section 5.3. Soil removal is expected to be conducted in spring of 2004. The scope of the IM includes additional Site characterization and verification sampling as required under the TSCA rules at 40 CFR 761.61. The extent of soil removed under the IM is designed to meet

requirements for a self-implementing cleanup to 10 mg/kg PCBs under the rules for PCB remediation waste.

The anticipated future land use is redevelopment for construction of a new industrial facility. New building construction will include a concrete floor slab foundation on grade and associated paved parking lot.

Therefore, the evaluation of final corrective measures for soils at AOI W-9 includes alternatives to address risks associated with soils containing up to 10 mg/kg PCBs, and considers the plans for industrial redevelopment in the near future.

9.2.1 SUMMARY OF ALTERNATIVES

Corrective measures evaluated at AOI W-9 consist of no action, excavation of additional PCB-impacted soil, and capping remaining PCB-impacted soil with institutional controls. Requirements for capping PCB-impacted soil are described in 40 CFR 761.61(a)(7). Any alternatives involving the capping of PCB-impacted soil would require a deed restriction for the capped area. The deed restriction would require the Site owner to maintain the cap in perpetuity. The no action alternative could be protective of human health if the fence were maintained and the area were not redeveloped based on a risk evaluation (ENCORE, 2002c) but this alternative is inconsistent with the anticipated future land use. The excavation of additional PCB-impacted soil beyond what is being removed as an IM would allow the area to be operated free of land use restrictions, but would be more costly than other alternatives. It would not result in significant risk reduction over the basic soil removal option, given that a concrete floor slab and/or paved parking area will be constructed over the remaining impacted soils in any case.

The most practical alternative for AOI W-9 soils that is protective of human health, and also consistent with future land use, is capping the soils containing 10 mg/kg PCBs or greater and filing a deed restriction under 40 CFR 761.61. This is, therefore, the only alternative evaluated in detail for AOI W-9 soils.

9.2.1.1 CAP AND INSTITUTIONAL CONTROLS

Under 40 CFR 761.61(a)(4)(i), PCB-impacted soils less than or equal to 10 mg/kg may remain on-Site if the PCB-impacted soils with concentrations between 1 mg/kg and 10 mg/kg are covered with an asphalt, concrete, or soil cap.

Based on the PCB delineation program from the RFI activities, approximately 800 CY of soil that contains greater than 10 mg/kg is being removed and disposed of off-Site as part of an IM, and the remaining PCB – impacted soil will be capped in the area shown on Figure 9-2. Floor slabs

and paved parking areas constructed as part of Site redevelopment will constitute an acceptable cap for this area. The asphalt or concrete will be at least 6 inches thick. A maintenance program and due care documentation will be implemented to assure cap integrity, and a deed restriction will need to be instituted to protect workers and the public from potential exposure to remaining PCB impacted soils by excavating through the soil or disturbing the soil in any way. The area of excavation is shown in Figure 5-3, and the location of the soil cap and institutional controls is shown on Figure 9-2.

9.2.2 EVALUATION OF ALTERNATIVES

9.2.2.1 LONG-TERM RELIABILITY AND EFFECTIVENESS

Capping soils with 1 to 10 mg/kg PCBs is an effective and reliable alternative for the long-term, as long as the cap is maintained and the deed restriction is filed. The potential for direct contact with PCB soils will be removed via the construction and maintenance of a cap for the areas with PCB concentrations of 1 to 10 mg/kg.

9.2.2.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

Capping soils from 1 to 10 mg/kg would not reduce the toxicity or volume of PCB-impacted soil, but would reduce the mobility of the PCB-impacted soil to migrate to locations where there could be potential human receptors.

9.2.2.3 SHORT-TERM EFFECTIVENESS AND RISK

This alternative would be effective in the short term. Short-term risk associated with implementation of this alternative is relatively low. Short-term risk is associated with potential exposure by construction workers to airborne PCB-impacted dust particles during installation of an asphalt and/or concrete cap. The short-term risks associated with this alternative would be addressed by proper training, health and safety procedures, and engineering controls during implementation.

9.2.2.4 IMPLEMENTABILITY

Capping soils and filing a deed restriction would be easily implemented. Capping of the material between 1 and 10 mg/kg can be conducted prior to Site redevelopment, or performed as a part of the redevelopment. This option requires proper training and health and safety procedures for any construction personnel performing below-grade work in the area after the cap has been constructed. Long-term periodic maintenance of the cap will be specified in the deed restriction.

9.2.2.5 COSTS

The estimated cost to implement this alternative is presented in Table 9-2 for a period of 30 years, including no discount for present worth.

9.2.2.6 ACCEPTABILITY TO SURROUNDING COMMUNITY

This alternative is anticipated to be acceptable to the surrounding community. Future property owners or lessees would be aware of the restrictions on the Site through the deed restriction.

9.2.2.7 ACCEPTABILITY TO STATE OF MICHIGAN

This alternative is anticipated to be acceptable to the State of Michigan.

9.2.3 PROPOSED ACTION

The proposed action for AOI W-9 soils is a cap over soils containing from 1 to 10 mg/kg PCBs and institutional controls. This alternative is the lowest cost alternative consistent with anticipated future land use, can be easily implemented, and provides long-term reliability and effectiveness.

9.3 AOI M-4

AOI M-4 consists of two tanks (one former UST and one existing AST) adjacent to Plant 25 (formerly Plant 51) located in the northwest corner of the MFD portion of the Site. This area is considered an AOI because of a documented release from the former UST. Remediation of the documented release from the former UST was terminated in August 1987. During RFI activities, one soil boring and five monitoring wells were completed in the area of the previous remedial program and also downgradient of the former UST to determine groundwater quality conditions.

Soil and groundwater samples were collected during RFI activities for analysis of VOCs and lead. Concentrations of constituents detected in the soil samples collected from AOI M-4 do not exceed screening criteria. Concentrations of constituents detected in the AOI M-4 perched groundwater samples exceed the IDWC for benzene and ethylbenzene. The zone of contamination is estimated to be approximately 50 feet square and 12 feet thick (from 6 to 18 ft bgs).

9.3.1 SUMMARY OF ALTERNATIVES

This section presents the evaluation of alternatives for corrective measures to address exceedances of IDWC in groundwater at AOI M-4. Alternatives evaluated are in-situ biological

degradation, pump and treat with GAC, and institutional controls with groundwater monitoring for natural attenuation. In-situ biological degradation is considered because the BTEX-impacted area is limited, constituent concentrations are within the range that could be successfully degraded, and it would aid in the removal of constituents that may potentially be contributed to the shallow saturated zone.

The pump and treat alternative is evaluated for AOI M-4 because the perched impacted zone is isolated hydraulically from the shallow saturated zone, pump and treat would aid in removal of constituents that may potentially be contributing to the shallow saturated zone, and the hazardous constituents are readily treatable with this technology.

Institutional controls with groundwater monitoring is also evaluated because it is a cost-effective alternative that is consistent with the current and future land use and the proposed corrective measure for on-Site groundwater at other AOIs at the Site. Groundwater at the Site is not currently used as a source of drinking water, and is not anticipated to be as a source of drinking water in the future.

9.3.1.1 ORC® INJECTION

The use of oxygen releasing compound (ORC®) enhances breakdown of gasoline-related contaminants by promoting biological activity and subsequent degradation of organic compounds. An ORC® injection grid would be established at the area shown on Figure 9-3, and would be completed using a direct-push (Geoprobe) drilling rig. The injection grid would consist of 4 rows with 4 borings in each row (16 injection points) completed on approximately 15-foot centers. The ORC® slurry would be injected into the subsurface by drilling into the saturated zone of contamination using a slotted lead drilling rod, and pumping the slurry through the rods once the slotted section has reached the desired depth interval. The slurry would be continuously injected through the rods into the formation as the rods are pulled back out of the borehole to a point at the top of the saturated zone. A total of approximately three pounds (dry weight) of ORC® would be injected per saturated foot of the contamination zone. The remaining annulus from the top of the water table to the ground surface would be backfilled with bentonite pellets, and the paved ground surface would be repaired with concrete.

Following ORC® injection, two rounds of groundwater samples would be collected from monitoring wells associated with AOI M-4 to evaluate the effectiveness of the ORC®. Groundwater samples would be collected 6 months and 12 months following injection of the ORC®, and analyzed for BTEX. Constituent concentrations could likely be reduced to less than IDWC in approximately one year.

9.3.1.2 PUMP AND TREAT WITH GAC

Pump and treat technology would be successful at AOI M-4 because the Site conditions include dissolved constituents only (i.e., soils are not a source of contamination further contributing to the dissolved phase), the area is hydraulically isolated from surrounding soils with lower permeability, and hazardous constituents are easily treatable by GAC at the concentrations detected.

GAC treatment removes gasoline-related contaminants from groundwater through physical and chemical attraction of organic molecules to the carbon as groundwater is pumped through GAC vessels. For this alternative, a 4-inch diameter pumping well would be installed near the center of the zone of contamination. The pumping well would be screened across the entire saturated thickness. A submersible pump would be installed in the well, and groundwater would be pumped through two, disposable GAC vessels operated in series. Water pumped through the vessels would be discharged into a storm sewer line located approximately 40 feet west of the zone of contamination. Electrical power would be required to operate the pump.

This alternative would require authorization under a General National Pollutant Discharge Elimination System (NPDES) permit to discharge treated water into the existing storm sewer. Monthly sampling and reporting would be required to assure compliance with the NPDES permit. In addition, groundwater samples would be collected from the existing monitoring wells at AOI M-4. Groundwater samples would be collected semi-annually, and analyzed for BTEX until groundwater results remained below the IDWC for four consecutive events.

Discontinuing operation during the coldest months of the year would lower costs associated with this alternative. An estimated 12 months of operation would be required to achieve desired cleanup levels.

9.3.1.3 INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

Exceedances of IDWC in groundwater can be addressed through the execution of a deed restriction to restrict the use of groundwater at the Site as a source of drinking water. A deed restriction and monitoring will be evaluated for on-Site groundwater at the AOIs evaluated in Section 9.1. Groundwater monitoring for natural attenuation would occur at AOI M-4 as part of this alternative. Monitoring wells at AOI M-4 would be sampled twice annually for analysis of BTEX.

9.3.2 EVALUATION OF ALTERNATIVES

In this section, the three alternatives for corrective measures to address exceedances of IDWC in groundwater at AOI M-4 are evaluated with respect to reliability, effectiveness, risk,

implementability, acceptability, and cost. Effectiveness refers to the degree to which each alternative is protective of human health and the environment, controls the source of releases, attains media cleanup standards (including the length of time until these standards are achieved), and complies with applicable standards for management of wastes. Implementability refers to the degree to which the alternative is compatible with the existing or planned use of the area, the availability of the technology, and the startup, operation and maintenance, and decommissioning activities required. Cost refers to the total capital, operation, and maintenance costs.

9.3.2.1 LONG-TERM RELIABILITY AND EFFECTIVENESS

ORC® injection would enhance breakdown of benzene and ethylbenzene to below IDWC levels. Semi-annual groundwater monitoring would determine when the constituents at AOI M-4 fall below IDWC levels. Once the media cleanup standards are met, the remediated area would be available for unrestricted use.

Pumping and treatment with GAC would also remove benzene and ethylbenzene from groundwater at AOI M-4 to levels below the IDWC. Semi-annual groundwater monitoring would occur to determine when the constituents at AOI M-4 fall below IDWC levels. Once the media cleanup standards are met, the remediated area would be available for unrestricted use. This alternative would possibly require a longer operation period than ORC® injection to meet the cleanup standards.

A deed restriction would restrict use of groundwater in the affected area, as drinking water wells could not be installed. Upon implementation, the deed restriction would immediately eliminate the exposure route via drinking water for benzene and ethylbenzene at AOI M-4. Semi-annual groundwater monitoring would occur to determine when constituent concentrations at AOI M-4 fall below IDWC levels. The groundwater is not currently used as a source of drinking water, and is not anticipated to be used as a source of drinking water in the future.

9.3.2.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

ORC® injection would reduce the volume of groundwater with exceedances of IDWC for benzene and ethylbenzene. The toxicity and mobility of these constituents would be reduced as biological degradation of the organic compounds occurs.

Pump and treat with GAC would reduce the mobility of groundwater with exceedances of IDWC for benzene and ethylbenzene by pumping impacted groundwater through a GAC system. The volume of groundwater impacted with benzene and ethylbenzene would be reduced with continued operation of the system. The toxicity of these constituents would not

be affected, but would be transferred to the GAC media and ultimately incinerated as part of GAC regeneration.

The institutional controls and groundwater monitoring alternative may reduce the toxicity, mobility, or volume of the hazardous substances present through natural attenuation. The potential exposure to the impacted groundwater at the Site would be eliminated through a deed restriction on the use of groundwater at AOI M-4 as a source of drinking water. This deed restriction could be incorporated into the proposed deed restriction for the AOIs evaluated in Section 9.1 for on-Site groundwater.

9.3.2.3 SHORT-TERM EFFECTIVENESS AND RISK

Short-term risk associated with implementation of any of these alternatives is low. Groundwater is not currently a source of drinking water at the Site and is not expected to be in the future. Short-term risks associated with the alternatives include potential exposure to impacted groundwater by on-Site personnel, installing the ORC® or pump and treat systems. These risks would be addressed by implementation of proper training, health and safety procedures, and engineering controls.

9.3.2.4 IMPLEMENTABILITY

ORC® injection is easily implemented by injecting the ORC® compound into the affected area using a Geoprobe drilling rig. This option requires no long-term use of equipment. Existing monitoring wells can be utilized for groundwater sampling to verify the effectiveness of the corrective measure.

Pumping with GAC treatment would also be easily implemented. This option would require power to operate the pump. Operation and maintenance of the pump and GAC system would be required, although corrective measures would be anticipated to be complete within one year. Existing monitoring wells would be utilized for groundwater sampling to verify the effectiveness of the corrective measure. A discharge permit, monitoring, and reporting would also be required to implement this alternative.

Institutional controls and groundwater monitoring would be easily implemented. An evaluation of deed restriction for groundwater use at AOI M-4 would be investigated in conjunction with the evaluation of a deed restriction for several AOIs evaluated in Section 9.1 for on-Site groundwater. Existing monitoring wells would be utilized for groundwater sampling to monitor groundwater quality at AOI M-4.

9.3.2.5 COSTS

The highest cost alternative evaluated is pumping and treatment with GAC due to the operating costs associated with this alternative. The next highest cost alternative is ORC® injection. The lowest cost alternative evaluated is institutional controls and groundwater monitoring. Tables 9-3, 9-4, and 9-5 present the capital, maintenance, and total costs for these alternatives.

9.3.2.6 ACCEPTABILITY TO SURROUNDING COMMUNITY

The three alternatives evaluated are anticipated to be acceptable to the surrounding community. Future property owners or lessees would be aware of the restrictions on the Site through the deed restriction, and the requirements of any monitoring, operation and maintenance through the deed restriction that would be in place as a result of implementing the institutional controls and groundwater monitoring alternative.

9.3.2.7 ACCEPTABILITY TO STATE OF MICHIGAN

The three alternatives evaluated are anticipated to be acceptable to the State of Michigan.

9.3.3 PROPOSED ACTION

The proposed action for AOI M-4 is institutional controls and groundwater monitoring. This alternative was chosen because it is the lowest cost alternative, can be easily implemented, and provides long-term reliability and effectiveness against potential human health risks. This option requires a deed restriction prohibiting the installation of drinking water wells at the Site. However, a deed restriction will be evaluated for several AOIs, as evaluated in Section 9.1, and AOI M-4 can be included in the Site-wide evaluation. Reducing BTEX concentrations would not restore the shallow saturated zone to improve its use for the community. If BTEX concentrations are reduced below drinking water criteria as a result of natural attenuation, the use of the shallow saturated zone would not change because it will not be used a source of drinking water in the future.

9.4 AOI P-6

AOI P-6 consists of a former UST tank farm and former Stoddard solvent AST located west of the northwest corner of the Emissions Control Building A release from one or more of the USTs was discovered in June 1984 and more recently in January 2001. The former UST tank farm contained seven USTs that stored several types of materials, including unleaded gasoline, Indolene I clear gas, GM calibration solvent, and water. A concrete paved parking lot is

currently at the location of the former UST tank farm and former AST. The USTs were taken out of service in November 1986 and removed in July 1987.

Five soil borings and eight monitoring wells were installed during RFI activities. Soil and groundwater samples were collected for analysis of VOCs, SVOCs, and lead. Concentrations of constituents detected in the soil samples collected from AOI P-6 do not exceed screening criteria. Concentrations of constituents detected in the AOI P-6 perched groundwater samples exceed the IWDC for benzene, ethylbenzene, and toluene. The zone of contamination is calculated to be approximately 25 feet by 100 feet, and 16 feet thick .

9.4.1 SUMMARY OF ALTERNATIVES

This section presents the evaluation of alternatives to address exceedances of IDWC in groundwater samples collected from AOI P-6. Alternatives evaluated are in-situ biological degradation, pump and treat with GAC, and institutional controls with groundwater monitoring for natural attenuation. In-situ biological degradation is considered because the BTEX-impacted area is limited, constituent concentrations are within the range that could be successfully degraded, and it would aid in removal of constituents that may potentially be contributed to the shallow saturated zone.

The pump and treat alternative is evaluated for AOI P-6 because the perched impacted zone is isolated hydraulically from the shallow saturated zone, would aid in removal of constituents that may potentially be contributing to the shallow saturated zone, and the hazardous constituents are readily treatable with this technology.

Institutional controls with groundwater monitoring is also evaluated because it is a cost-effective alternative that is also consistent with the current and future land use and the proposed corrective measure for on-Site groundwater at other AOIs at the Site. Groundwater at the Site is not currently used as a source of drinking water, and is not anticipated to be used as a source of drinking water in the future.

9.4.1.1 IN-SITU ORC® INJECTION

The use of ORC® enhances breakdown of gasoline-related contaminants by promoting biological activity and subsequent degradation of organic compounds. An ORC® injection grid would be established at the area shown on Figure 9-4 and would be completed using a direct-push (Geoprobe) drilling rig. The injection grid would consist of 2 rows with 7 borings in each row (14 injection points) completed on approximately 15-foot centers. The ORC® slurry would be injected into the subsurface by drilling into the saturated zones of contamination using a slotted lead drilling rod, and pumping the slurry through the rods once the slotted section has reached the desired depth interval. The slurry would be continuously injected through the rods

into the formation as the rods are pulled back out of the borehole to a point at the top of the saturated zone. A total of approximately 4.8 pounds (dry weight) of ORC® would be injected per saturated foot of the contamination zone. The remaining annulus from the top of the water table to the ground surface would be backfilled with bentonite pellets, and the paved ground surface would be repaired with concrete.

Following ORC® injection, two rounds of groundwater samples would be collected from monitoring wells associated with AOI P-6 to evaluate the effectiveness of the ORC®. Groundwater samples would be collected 6 months and 12 months following injection of the ORC®, and analyzed for BTEX. Constituent concentrations could likely be reduced to less than IDWC is approximately one year.

9.4.1.2 PUMP AND TREAT WITH GAC

Pump and treat technology would be successful at AOI P-6 because the Site conditions include dissolved constituents only (i.e., soils are not a source of contamination further contributing to the dissolved phase), the area is hydraulically isolated from surrounding soils with lower permeability, and hazardous constituents are easily treatable by GAC at the concentrations detected. GAC treatment removes gasoline-related contaminants from groundwater through physical and chemical attraction of organic molecules to the GAC as groundwater is pumped through GAC vessels. For this alternative, a 4-inch diameter pumping well would be installed near the center of the zone of contamination. The pumping well would be screened across the entire thickness of the zone of contamination. A submersible pump would be installed in the well, and groundwater would be pumped through two, disposable GAC vessels operated in series. Water pumped through the GAC vessels would be discharged into a storm sewer line located approximately 25 feet north of the zone of contamination. Electrical power would be required to operate the pump.

This alternative would require a General NPDES permit to discharge treated water into the existing storm sewer. Monthly sampling and reporting would be required to assure compliance with the NPDES permit. In addition, groundwater samples would be collected from existing monitoring wells at AOI P-6. Groundwater samples would be collected semi-annually and analyzed for BTEX until groundwater results remained below the IDWC for four consecutive events.

Discontinuing operation during the coldest months of the year would lower costs associated with this alternative. An estimated 12 months of operation would be required to achieve desired cleanup levels.

9.4.1.3 INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

Exceedances of IDWC in groundwater can be addressed through the execution of a deed restriction to restrict the use of groundwater at the Site as a source of drinking water. A deed restriction will be evaluated for on-Site groundwater at the AOIs evaluated in Section 9.1. Groundwater monitoring for natural attenuation would occur at AOI P-6 as part of this alternative. Monitoring wells at AOI P-6, would be sampled twice annually for analysis of BTEX.

9.4.2 EVALUATION OF ALTERNATIVES

In this section, the three alternatives for corrective measures to address exceedances of IDWC in groundwater at AOI P-6 are evaluated with respect to reliability, effectiveness, risk, implementability, acceptability, and cost.

9.4.2.1 LONG-TERM RELIABILITY AND EFFECTIVENESS

ORC® injection would enhance breakdown of benzene, ethylbenzene, and toluene to below IDWC levels. Semi-annual groundwater monitoring would occur to determine when all constituents at AOI P-6 fall below IDWC levels. Once the media cleanup standards are met, the remediated area would be available for unrestricted use.

Pumping and treatment with GAC would also remove benzene, ethylbenzene, and toluene from groundwater at AOI P-6 to levels below the IDWC. Semi-annual groundwater monitoring would occur to determine when the constituents at AOI P-6 fall below IDWC levels. Once the media cleanup standards are met, the remediated area would be available for unrestricted use. This alternative would possibly require a longer operation period than ORC® injection to meet the cleanup standards.

A deed restriction would restrict use of groundwater in the affected area, as drinking water wells could not be installed. Upon implementation, the deed restriction would immediately eliminate the exposure route via drinking water for benzene, ethylbenzene, and toluene at AOI P-6. Semi-annual groundwater monitoring would occur to determine when constituent concentrations at AOI P-6 fall below IDWC levels. The groundwater is not currently used as a source of drinking water, and is not anticipated to be used as a source of drinking water in the future.

9.4.2.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

ORC® injection would reduce the volume of groundwater with exceedances of IDWC for benzene, ethylbenzene, and toluene. The toxicity and mobility of these constituents would be reduced as biological degradation of the organic compounds occurs.

Pump and treat with GAC will reduce the mobility of groundwater with exceedances of IDWC for benzene, ethylbenzene, and toluene by pumping impacted groundwater though GAC treatment system. The volume of groundwater impacted with benzene, ethylbenzene, and toluene would be reduced with continued operation of the system. The toxicity of these constituents would not be affected, but would be transferred to the GAC media and ultimately incinerated as part of GAC regeneration.

The institutional controls and groundwater monitoring alternative may reduce the toxicity, mobility, or volume of the hazardous substances present through natural attenuation. The potential exposure to impacted groundwater at the Site would be eliminated through a deed restriction on the use of groundwater at AOI P-6 as a source of drinking water. This deed restriction could be incorporated into the proposed deed restriction for the AOIs evaluated in Section 9.1 for on-Site groundwater.

9.4.2.3 SHORT-TERM EFFECTIVENESS AND RISK

Short-term risk associated with implementation of any of these alternatives is low. Groundwater is not currently a source drinking water at the Site and is not expected to be in the future. Short-term risks associated with the alternatives include potential exposure to impacted groundwater by on-Site personnel installing the ORC or pump and treat systems. These risks would be addressed by implementation of proper training, health and safety procedures, and engineering controls.

9.4.2.4 IMPLEMENTABILITY

ORC® injection is easily implemented by injecting the ORC® compound into the affected area using a Geoprobe drilling rig. This option requires no long-term use of equipment. Existing monitoring wells can be utilized for groundwater sampling to verify the effectiveness of the corrective measure.

Pumping with GAC treatment would also be easily implemented. This option would require power to operate the pump. Operation and maintenance of the pump and GAC system would be required, although corrective measures would be anticipated to be completed within one year. Existing monitoring wells would be utilized for groundwater sampling to verify the

effectiveness of the corrective measure. A discharge permit, monitoring, and reporting would also be required to implement this alternative.

Institutional controls and groundwater monitoring could be easily implemented. A deed restriction for groundwater use at AOI P-6 would be evaluated in conjunction with the an evaluation for a deed restriction for several AOIs evaluated in Section 9.1 for on-Site groundwater. Existing monitoring wells would be utilized for groundwater sampling to monitor groundwater quality at AOI P-6.

9.4.2.5 COSTS

The highest cost alternative evaluated is pumping and GAC treatment due to the operating costs associated with this alternative. The next highest cost alternative is ORC® injection. The lowest cost alternative evaluated is institutional controls and groundwater monitoring. Tables 9-6, 9-7, and 9-8 present the estimated costs for these alternatives.

9.4.2.6 ACCEPTABILITY TO SURROUNDING COMMUNITY

The three alternatives evaluated are anticipated to be acceptable to the surrounding community. Future property owners or lessees would be aware of the restrictions on the Site through the deed restriction, and the requirements of any monitoring, operation, and maintenance through the deed restriction that would be in place as a result of implementing the institutional controls and groundwater monitoring alternative.

9.4.2.7 ACCEPTABILITY TO STATE OF MICHIGAN

The three alternatives evaluated are anticipated to be acceptable to the State of Michigan.

9.4.3 PROPOSED ACTION

The proposed action for AOI P-6 is institutional controls and groundwater monitoring. This alternative was chosen because it is the lowest cost alternative, can be easily implemented, and provides long-term reliability and effectiveness against potential human health risks. This option requires a deed restriction prohibiting the installation of drinking water wells at the Site. However, a deed is being evaluated for several AOIs, as evaluated in Section 9.1, and AOI P-6 can be included in the Site-wide deed restriction evaluation. Reducing BTEX concentrations would not restore the shallow saturated zone to improve its use for the community. If BTEX concentrations are reduced below drinking water criteria as a result of natural attenuation, the use of the shallow saturated zones would not change because it will not be used as a source of drinking water in the future.

9.5 PONTIAC SCHOOL BOARD (PSB) PROPERTY

Analytical results for five sediment samples collected from inside the sewer pipe during RFI activities indicated that five SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) were detected at concentrations exceeding RDC criteria. Four test pits, ten soil borings, and two monitoring wells were also completed at the PSB property. No SVOCs were detected above screening criteria in soil or groundwater samples collected from these locations outside the sewer pipe.

These results demonstrate that SVOCs present in sediment from inside the sewer pipe are not present in soil or groundwater outside the sewer pipe. In addition, risk-based analysis of the concentrations of constituents detected in soil determined that reasonable maximum exposures are below U.S. EPA-established levels for determining whether corrective measures are warranted (see Section 8.5.1). The PSB property was evaluated and determined to have no significant residential exposures to hazardous constituents in soil based on the results of the RFI. As such, corrective measures for the PSB property will address sediments within the storm sewer pipe.

9.5.1 SUMMARY OF IM IMPLEMENTED

As discussed in Section 5.1, an IM has been proposed, approved, and implemented for the PSB property. The storm sewer was in extremely poor condition and could not be cleaned in place. Therefore, the IM for the PSB property consisted of removing approximately 1,000 lineal feet of 24-inch corrugated metal storm sewer pipe and its contents. The removed materials were transported for disposal at an off-Site landfill. Clean overburden material from outside the storm sewer pipe was segregated, staged separately from other materials, and transported for off-Site disposal. The clean overburden and sand backfill was used to backfill and compact the excavation.

This IM is summarized in the document Work Plan for the Storm Sewer Pipe Removal at the PSB property, (ENCORE, March 2003). The U.S. EPA reviewed this work plan and provided comments. This IM addressed identified potential impacts to human health at the PSB property. This IM is expected to be completed by December 2003.

9.5.2 EVALUATION OF ALTERNATIVES

Because implementation of this IM addressed identified potential risks associated with hazardous constituents, further evaluation of additional corrective measures is not required. Documentation of implementation of the IM will be compiled in a report upon the completion of the IM and submitted to U.S. EPA.

9.5.3 PROPOSED ACTION

No corrective action is proposed for the PSB property beyond implementation of the IM already approved by U.S. EPA.

9.6 HARRIS LAKE

Harris Lake is an 8-acre lake with a small drainage area that receives storm water input from surrounding areas via several culverts, which convey precipitation and surface runoff. The lake appears to have been used as a fill area, with the fill materials including foundry sand, wooden floor blocks, and construction and demolition debris. Investigation of Harris Lake identified the presence of oily material in the upper layer of lake sediment. A Baseline Human Health Risk Assessment for Harris Lake (ENCORE, 2002cdetermined that potential human exposures to soil, sediment, and surface water under both current and reasonably expected future use are not expected to pose unacceptable risk. In addition, a BERA (Exponent, 2002) concluded that the IM implemented at Harris Lake will adequately address any potential ecological risks. For aesthetic purposes, the impacted sediment was addressed under an IM.

9.6.1 SUMMARY OF IM IMPLEMENTED

The IM conducted at Harris Lake is summarized in the Nearshore Sediment Removal Program Design Report (ENCORE, September 2002) and Nearshore Sediment Removal Program Bid Documents (ENCORE, April 2003). The U.S. EPA reviewed these documents outlining the IM and provided comments.

The IM for Harris Lake consisted of removal of sediment and soil from Harris Lake and targeted areas on the shoreline and inlet ditch, and replacement of the removed sediment and soil with clean, imported backfill. Based on consideration of steep bottom slopes found throughout much of the nearshore zone, low dissolved oxygen concentrations in deeper water (greater than 12 feet of water depth), and limited benthic activities in the intermediate zone between 5 and 12 feet water depth, the following activities were conducted.

Nearshore sediments extending from the waterline to less than or equal to 5 feet of water depth were removed, dewatered, and transported off-Site for disposal at a permitted landfill. The removed areas were backfilled with clean imported fill material and disturbed support areas were restored. These sediments covered approximately 46,000 SF of the lake bottom. The removal extended below the soft sediments into the clean native soils to predetermined depths. Approximately 5,400 CY of sediments were removed and disposed of off site. Water generated during sediment dewatering was treated and discharged back into the lake.

Sediments in certain areas with water depths greater than 5 feet and less than or equal to 12 feet were covered with clean imported material to provide substrate for benthic macroinvertebrate communities. Fill placement in these areas was limited to where lake bottom slopes are less than or equal to 3 horizontal to 1 vertical (3H:1V) to allow long-term stability of the fill material on these slopes. The coverage area included a 6,000 SF area along the western end and 11,000 SF area along the eastern end of Harris Lake. A minimum of 6 inches of clean imported fill was placed atop these sediments. No activities were performed in areas where the water depth is greater than 12 feet.

An additional quantity of approximately 2,100 CY of sediment/soil was removed from the Harris Lake shoreline and inlet ditch. The inlet ditch area and three specific shoreline areas were excavated to clean native soils and restored to grade with clean imported fill. A geotextile and a layer of rip-rap was placed in the inlet and outlet ditches.

The IM was completed on October 21 2003, and a report documenting activities is currently being prepared for submittal to U.S. EPA.

9.6.2 EVALUATION OF ALTERNATIVES

The IM addressed aesthetic concerns at Harris Lake. Because no potential risks were associated with the oily material, evaluation of additional corrective measures is not necessary.

9.6.3 PROPOSED ACTION

No corrective action is proposed for the Harris Lake property beyond implementation of the IM that was recently completed.

9.7 LNAPL AREAS

Removal of LNAPL in various areas of the Site will be initiated in an effort to reduce LNAPL volumes and mobility. Corrective measures with respect to the LNAPL areas are discussed in terms of the available technologies to recover LNAPL from the affected areas. Six LNAPL areas have been identified at the Site. Descriptions of the LNAPL types in LNAPL Areas Nos. 1 through 5 are as follows:

- LNAPL Area 1: highly degraded No. 6 fuel oil, moderately degraded kerosene, and highly degraded diesel No. 2; PCBs, dioxins, VOCs and PAHs have been detected in samples;
- LNAPL Area 2: moderately degraded diesel No. 2 and highly degraded No. 6 fuel oil; PCBs, dioxins, VOCs and PAHs have been detected in samples;

- LNAPL Area 3: weathered diesel No. 2 and highly degraded No. 6 fuel oil; PCBs, dioxins, VOCs and PAHs have been detected in samples;

- LNAPL Area 4: mildly weathered No. 2 fuel oil and highly degraded asphalt; VOCs, SVOCs, PCBs, and inorganics have been detected in samples; and

- LNAPL Area 5 – moderately weathered No. 2 fuel oil (or No. 2 diesel fuel) and a highly degraded heavy oil (or asphalt); VOCs, SVOCs, PCBs, and inorganics have been detected in samples.

LNAPL Area No. 6 has not yet been sampled. More detailed descriptions of the LNAPL present in each area are provided in Section 4.5.

The RFI Report (ENCORE, 2002c) and RFI Supplemental Report No. 1 (ENCORE, 2003j) have concluded that the presence of LNAPL at the Site does not currently pose an unacceptable risk to human health. Proposed LNAPL recovery techniques take into consideration that the removal of all LNAPL and associated residuals from a given area is not required for the protection of human health. The corrective measures will focus on the removal of as much free product as feasible given Site-specific considerations and limitations. The implementation of polishing technologies for the removal of residual LNAPL is not proposed in this report.

NREPA obligates parties responsible for activities causing a release of hazardous substances to initiate the recovery of such substances that are present as free product. The purpose of this section is to present the options available for the remediation of LNAPL, evaluate the suitability of the applicable technologies for the Site, and propose corrective measures for LNAPL Areas No. 1, No. 2, and No. 4. The investigations of LNAPL Areas No. 3, No. 5, and No. 6 are currently on-going, and any proposed corrective measures will be presented under separate cover.

Selection of an appropriate and effective LNAPL removal technique is dependent upon the type and quantity of LNAPL present and the accessibility to the LNAPL plumes. These factors are considered in the discussion of the LNAPL remedial alternatives. Furthermore, calculations were performed to estimate the volume and areal extent of LNAPL in Areas Nos. 1 through 4, the results of which are presented in Table 9-9. The estimated volumes are utilized to determine estimated disposal costs associated with the proposed remedial alternatives. These calculations are based on assumptions drawn from Site data, and do not differentiate between mobile and immobile, or recoverable and non-recoverable LNAPL due to the unknown partitioning of the LNAPL between mobile and immobile phases.

The following sections discuss various LNAPL remediation technologies. LNAPL remediation alternatives appropriate for the LNAPL areas are evaluated and corrective measures are proposed for LNAPL Areas No. 1, No. 2, and No. 4.

9.7.1 SUMMARY OF ALTERNATIVES

There are various technologies available for the remediation of the LNAPL present at the Site. Three LNAPL remediation strategies are considered for use at the Site:

1. Extraction of mobile LNAPL from the subsurface using an extraction well network or collection trenches;
2. Subsurface containment of the LNAPL plume utilizing a slurry wall and capping containment system; or
3. Excavation of the LNAPL plume with the surrounding soil.

The following sections further discuss the extraction, containment, and excavation remediation strategies and any applicable configuration options available for each strategy.

9.7.1.1 LNAPL EXTRACTION SYSTEMS

The LNAPL extraction options being considered for the Site include an extraction well network and a collection trench system.

9.7.1.1.1 EXTRACTION WELL SYSTEM

An extraction well system would consist of one or more extraction well(s) installed within the LNAPL plume with a well screen(s) straddling the LNAPL layer. Groundwater and LNAPL flow into the extraction well and would be removed through pumping or another method of liquid extraction. Typically, each extraction well would be connected to a piping system that transports the collected liquid for treatment (i.e., oil/water separation). Separated LNAPL would either be disposed of at an appropriately licensed facility or recycled (if possible). Separated groundwater would be further treated as necessary.

Extraction wells can be oriented vertically or horizontally. Vertical wells are most commonly utilized, but horizontal wells have specific applications where they can be effective. Possible disadvantages of horizontal wells include potential for screen smearing, complexity of equipment required for recovery, and potential inability to set the well at the desired pumping depth to facilitate LNAPL recovery. Consequently, the use of horizontal wells at the Site is not recommended.

A passive extraction system allows LNAPL and groundwater to flow into an extraction well without water table depression. Passive systems typically utilize skimmers, canisters, or absorbent filters to collect LNAPL from an extraction well.

Active extraction systems employ consistent pumping of liquid from an extraction well to produce drawdown of the water table and to extract the LNAPL and/or groundwater from the well. Active extraction systems can be designed to collect LNAPL only, groundwater and LNAPL in separate phases, or groundwater and LNAPL in a combined phase. These different LNAPL recovery approaches are summarized as follows:

- Total Fluids Recovery – a single pump is utilized to collect groundwater and LNAPL in a single phase;
- Dual-Pump System - utilizes two pumps in a single well; one pump extracts groundwater to the desired level of drawdown while the other pump recovers free product; and
- Dual-Phase Recovery (Bioslurping) – utilizes vacuum extraction of free product from the wells along with groundwater and vapor extraction to remove VOCs. This method can be configured with a single pump or dual pumps. Single pump systems extract LNAPL, groundwater, and soil vapors under vacuum. A 'slurp' tube is placed down each well to extract free product. Dual-pump systems use soil vapor extraction (SVE) with total fluids recovery. Bioslurping has limited effectiveness at depths greater than 20 feet and with heavier fuel components. Consequently, bioslurping in not considered a viable recovery approach for the Site, and is not considered further in the evaluation of alternatives for the remediation of Site LNAPL areas.

If LNAPL viscosity is high, enhanced recovery techniques can be used to fluidize the LNAPL by injecting steam or hot water through the extraction well system (or utilizing dedicated injection wells) into the LNAPL zone to decrease the viscosity of the LNAPL promoting flow towards the collection points. Subsequent treatment of the injected steam or hot water is typically required with the use of enhanced recovery. Enhanced recovery involves substantial capital costs for the hot water/steam injection equipment and injection wells. The LNAPL at the Site is not of sufficiently high viscosity for enhanced recovery to be warranted. Enhanced recovery will therefore not be considered further in the evaluation of alternatives for the LNAPL areas at the Site.

9.7.1.1.2 COLLECTION TRENCH SYSTEM

LNAPL recovery can also be accomplished by installing a permeable trench oriented to hydraulically contain groundwater flow and contaminant plume migration, in lieu of individual LNAPL extraction wells. The collection trench would consist of either a single horizontal perforated pipe or a horizontal perforated pipe within a granular media that would

be placed below the static LNAPL elevation to collect and convey liquids by gravity flow toward a sump(s) or wet well(s). The sump(s) would be pumped under level control to remove collected LNAPL and depress the groundwater table to induce LNAPL migration toward the recovery trench (total fluids recovery). The collection trench system is useful in applications involving thin LNAPL layers that may otherwise be difficult to recover with extraction wells. The volume of collected LNAPL in the sump(s) would produce an LNAPL layer of sufficient thickness to allow recovery by periodic pumping. Pumping would typically be accomplished using total fluids recovery as discussed in the previous section. Piezometers would be located along the alignment of the collection trench system to enable monitoring of the groundwater and LNAPL elevations to aid in proper operation of the collection system (i.e., LNAPL in contact with the perforated pipe).

9.7.1.2 SLURRY WALL AND CAPPING CONTAINMENT SYSTEM

A slurry wall is a subsurface barrier wall that is installed around or downgradient of a source area to contain contaminated groundwater. A slurry wall can potentially be installed around LNAPL source areas to contain and prevent further migration of the free product. A typical installation would involve excavating a continuous vertical trench down to a low-permeability layer (e.g. clay/till) and backfilling with a soil/bentonite slurry or other suitable low-permeability material. The slurry wall would provide physical containment of horizontal groundwater flow such that the LNAPL plume would be contained. The surface area could also be capped to minimize storm water infiltration. Limited groundwater pumping would be required to prevent groundwater mounding and maintain groundwater levels. This technology can also be implemented in conjunction with other removal and treatment technologies.

9.7.1.3 EXCAVATION OF LNAPL-IMPACTED SOILS

The physical removal of soil and LNAPL would be accomplished through direct excavation. This removal approach would involve characterization, handling, transportation, and disposal of contaminated soils above and within the LNAPL zone, followed by backfilling and grading of the excavated area with clean fill.

Excavation would typically be considered and would be economical for situations where the LNAPL is at a relatively shallow depth and the unsaturated (vadose) zone is generally clean and reusable as fill.

9.7.2 LNAPL AREAS NO. 1 AND NO. 2: EVALUATION OF ALTERNATIVES

LNAPL Areas No. 1 and No. 2 are being treated as a single LNAPL Area in the evaluation of corrective measure alternatives due to their proximity to one another. This approach will provide a more cost efficient means of accomplishing remedial goals in these areas.

Three alternatives are evaluated for LNAPL recovery in LNAPL Areas No. 1 and No. 2. The alternatives include an extraction well network, a collection trench system, and excavation of LNAPL-impacted soils. Capping containment is not evaluated as an alternative for LNAPL Areas No. 1 and No. 2 because capping of portions or all of the area is expected to occur as part of the proposed industrial redevelopment activities in this area. Furthermore, subsurface containment would not be cost-effective based on the large areal extent of LNAPL Areas No. 1 and No. 2.

The extraction well network would consist of a series of extraction wells spaced in a grid format within both LNAPL areas (see Figure 9-5). The number of extraction wells is based on the permeability of the observed geology in LNAPL Areas No. 1 and No. 2. Due to the relatively low permeability of the surrounding formation, passive systems were not considered for LNAPL Areas No. 1 and No. 2 due to expected performance limitations. Using an active recovery system, the maximum estimated radius of influence for each extraction well is expected to be 30 feet, resulting in a maximum well spacing of 60 feet. This well spacing indicates the need for approximately 60 wells to provide full coverage of the area. Well screens would be positioned from above the prevailing LNAPL elevation to below the deepest LNAPL detection within each respective area. The total fluids recovery approach would be employed by utilizing pumps placed in each well to remove accumulated LNAPL and groundwater and depress the local groundwater table to induce additional LNAPL migration from the zone of influence. The system would be designed to minimize the volume of groundwater that would be removed during pumping. Since both groundwater and LNAPL are recovered in a combined phase, processing through an on-Site oil/water separator would be required prior to disposal. Separated LNAPL will be transported off-Site for disposal. Based on the PCB concentrations in both LNAPL areas, the LNAPL would require incineration at an appropriately licensed TSCA disposal facility. Special disposal options are not required for the low-level dioxins observed in the LNAPL. Groundwater would be processed through an on-Site wastewater treatment system (e.g., oil/water separation and GAC) prior to discharge to the storm sewer system or surface water body under an NPDES permit.

The collection trench system alternative would consist of three perforated collection trenches, two running east-west in LNAPL Area No. 1 and one running north-south in LNAPL Area No. 2 (see Figure 9-6). Approximately 2,000 linear feet of collection trenches would be set at an elevation below all detections of LNAPL (up to approximately 20-feet bgs). The depth of the trenches may vary in areas with different localized LNAPL depths. Excavation of the trenches would be accomplished utilizing shoring or trench boxes to minimize the volume of soil that may require disposal. The collection trenches would have up to ten recovery points (i.e. sumps) to facilitate groundwater and LNAPL recovery. A perforated collection pipe would be placed in the center of the trench, surrounded by granular material. The collection trenches would be sloped toward the collection sumps. Each sump would have a submersible pump, an

independent downhole level control, and flow meter. The pump intake would be set below the perforated collection pipe invert to allow drawdown of the water table to insure LNAPL will contact the perforated collection pipe. The system would be designed to minimize the volume of groundwater that would be removed. Collected liquids would flow to one of a series of collection sumps, where they would be extracted by pumping (total fluids) and conveyed for further treatment (i.e., oil/water separation). Separated LNAPL would be transported off-Site for incineration at an appropriately licensed TSCA disposal facility. Groundwater would be processed through an on-Site treatment system prior to discharge to the storm sewer or surface water body under an NPDES permit.

The excavation of LNAPL-impacted soils would consist of the removal of approximately 125,000 CY of impacted soil, which would be transported off-Site for disposal, as necessary. It should be noted that the impacted soils in this area of the Site may contain waste materials such as foundry sand, refuse, and sludge that were historically managed in this area, as identified in the CCR (ENCORE, 2001a). It is anticipated that most of the soil above the water table could be landfilled as non-hazardous waste. It is expected that the LNAPL-saturated soil would require disposal at a TSCA facility (i.e., landfill or incineration). The excavation would be backfilled with clean fill from an off-Site location.

9.7.2.1 LONG-TERM RELIABILITY AND EFFECTIVENESS

Given that the LNAPL in Areas No. 1 and No. 2 does not currently pose a risk to human health, either of these options would remain protective of human health. Neither of these systems is designed to remove residuals that would remain once LNAPL recovery rates decline as the volume of mobile LNAPL is reduced. However, the remaining residuals would not pose an unacceptable risk to human health. Both recovery methods would be effective in reducing the migration of LNAPL in these areas and reducing impacts to groundwater. The long-term reliability and effectiveness of the extraction well system would depend upon significantly more maintenance, equipment replacement and power requirements than the collection trench system due to the number of wells and associated pumping equipment. The collection trench system would require significantly less mechanical equipment, and would therefore require less maintenance.

The extraction well system would allow more long-term operational flexibility based on any changing subsurface conditions (e.g. fluctuating groundwater levels) and would allow pumping at select extraction wells in targeted areas of the plume, as necessary, as the LNAPL mobilization and recovery rates decline after the initial years of operation.

Excavation of LNAPL-impacted soils would provide an effective long-term remedy with a majority of the LNAPL being removed.

9.7.2.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

Each of the three alternatives would provide reduction of toxicity, mobility and volume. The extraction well system and collection trench system would both provide a reduction in LNAPL volume and the concentrations of dissolved phase constituents in the groundwater due to the groundwater and product recovered by the systems. These systems would also provide short-term and long-term reduction of mobility of the LNAPL due to the reduction of the volume of the LNAPL present in the subsurface and the hydraulic containment provided by each system. The extraction well system would allow larger volumes of LNAPL to be collected by focusing LNAPL removal in targeted areas as the initial LNAPL recovery rates decline over time. Excavation of the LNAPL would provide the most effective reduction of mobility and volume, as most of the volume of LNAPL and residuals would be removed.

The results of the Site-specific risk assessment indicate a reduction in toxicity is not required to protect human health.

9.7.2.3 SHORT-TERM EFFECTIVENESS AND RISK

The extraction well and collection trench systems provide good short-term effectiveness for preventing further migration of LNAPL and contaminated groundwater. Each of these alternatives is considered a long-term solution for LNAPL removal. Excavation of LNAPL-impacted soils provides the most effective short-term alternative due to the immediate removal of larger quantities of LNAPL.

Short-term risk associated with the implementation of the extraction well system would be low, as conventional well construction techniques would be used. Short-term risk for the collection trench and excavation alternatives would be higher than the extraction well option due to increased exposure to impacted soil, LNAPL, and groundwater during construction activities. The excavation of LNAPL may result in significant short-term risks due to exposure to a large volume of LNAPL that would be present in the open excavation. The rate of excavation or limitation on the area of excavation that is open at any given time may require restriction to reduce short-term risks. Installation of the collection trenches and perforated collection pipes would require personnel to enter the excavated trench where impacted soils and LNAPL may exist. Proper training, health and safety procedures, and engineering controls during implementation would address the short-term risks.

9.7.2.4 IMPLEMENTABILITY

The extraction well system would be the most easily implemented as conventional well installation techniques would be utilized.

The collection trench system is not as easily implemented as the extraction well system, as open trenching would be required and shoring utilized to allow occupancy by installation crews, and to minimize the volume of soil that may require disposal. The dewatering of the trench would be required, as excavation would extend below the groundwater table. Installation of the perforated pipe would require personnel to wear appropriate personal protective equipment to avoid exposure to LNAPL or impacted soils during installation.

The excavation of LNAPL is easily implemented using conventional excavation techniques. The rate of excavation or size of the excavation would be restricted to manage short-term risks associated with exposure to the LNAPL and impacted soil.

9.7.2.5 COSTS

Implementation of the extraction well network would require a relatively high capital investment due to the number of extraction wells and pumps to be installed, and the extensive piping network and electrical controls required to service the recovery points. Long-term operation and maintenance costs for the extraction well system are the highest of the three alternatives due to the necessity to maintain, operate and eventually replace at least 60 recovery pumps over an extended period of time. Estimated costs for the extraction well system are presented in Table 9-10.

Implementation of the collection trench system would require less capital investment based on the ease of installation of the trenches, and the reduced number of pumps and electrical controls. The excavation of impacted soils and LNAPL raises the capital cost of this alternative. Long-term operation and maintenance costs are considerably lower than the extraction well system since there are only 7 to 10 recovery pumps to operate and maintain. The cost of operation of the treatment system components and LNAPL disposal would approximately be the same for either recovery option. Cost estimates for the collection trench system are presented in Table 9-11.

Based on the assumptions made, costs for the extraction well and collection trench systems are similar. The uncertainty in soil disposal costs and the actual number of extraction wells required would have an effect on actual costs.

Excavation of LNAPL-impacted soils is cost prohibitive to implement due to the large volume of soil to be removed and the associated disposal costs. This alternative would not require any long-term operation and maintenance costs. Costs for this alternative are an order of magnitude higher than either of the other recovery options. Cost estimates for the excavation of LNAPL-impacted soil are presented in Table 9-12.

Based on an evaluation of the capital, operating, and maintenance costs, the collection trench system is the most cost-effective alternative for removal of LNAPL in this area of the site.

9.7.2.6 ACCEPTABILITY TO SURROUNDING COMMUNITY

The three alternatives evaluated are anticipated to be acceptable to the surrounding community. Future property owners or lessees would be aware of the requirements of any monitoring, operation, maintenance, or deed restriction that may be in place as a result of implementing the corrective measures.

9.7.2.7 ACCEPTABILITY TO STATE OF MICHIGAN

The three alternatives evaluated are anticipated to be acceptable to the State of Michigan. The excavation of LNAPL-impacted soils alternative would likely be the most acceptable alternative to the State because the technique removes a large volume of LNAPL from the Site along with impacted soil. The extraction well network total fluids recovery system would likely be least accepted by the State because of the potential for an uneven recovery pattern that a well network could produce, as opposed to the more effective ability of the collection trench system to cut off the LNAPL plumes.

9.7.2.8 PROPOSED ACTION

Both the extraction well and collection trench systems provide an effective LNAPL recovery alternative for the Site. A more detailed comparison of the costs and performance of each system is dependent on further definition of LNAPL characteristics (depth variability), hydraulic properties of the soils, and final proposed Site redevelopment activities. Additional design data would allow better definition of the system configuration and associated components and a better evaluation of the anticipated performance and overall cost. The proposed corrective action for LNAPL Area No. 1 and No. 2 is active removal of LNAPL using either the collection trench or extraction well systems.

Additional evaluation of soil conditions and the existence of any subsurface structures would also allow the assessment of horizontal wells as an extraction well alternative.

The selection between an extraction well system and collection trench system would need to take into consideration the effects on groundwater levels of any capping or paving in the West Yard area associated with proposed industrial redevelopment activities.

9.7.3 LNAPL AREA NO. 3: EVALUATION OF ALTERNATIVES

Further investigation and evaluation of corrective measures for LNAPL Area No. 3 will be conducted following the additional investigations outlined in Section 5.5. The scope of work for the additional investigation will be presented to U.S. EPA in an IM Work Plan. The proposed corrective measures for LNAPL Area No. 3 will remove sufficient LNAPL to allow for future industrial redevelopment in the DA. No additional corrective measures would be expected following completion of the IM.

9.7.4 LNAPL AREA NO. 4: EVALUATION OF ALTERNATIVES

Based on the limited areal extent and thickness of LNAPL Area No. 4 and its proximity to active production in Plants 5 and 23, recovery of the LNAPL manually using a disposable polyethylene bailer or a peristaltic pump with dedicated polyethylene tubing is the only alternative evaluated and proposed for this area. Pumping or other active recovery techniques that require intrusive work for installation are not considered practical given the limited areal extent and thickness of the LNAPL in this area. The LNAPL is present in only one monitoring well (MWM2-06) in AOI M-2. Using a bailer or peristaltic pump, LNAPL will be removed while minimizing the volume of groundwater to be treated and/or disposed. The LNAPL will be manually removed on a regular basis, with the length of time for effective removal of the LNAPL being dependent on how quickly LNAPL recovers in the well following each manual removal event. From time to time, the groundwater in the monitoring well may need to be pumped or drawn down to promote migration of LNAPL to the well. Collected LNAPL would be transferred to a 55-gallon drum for disposal.

9.7.4.1 LONG-TERM RELIABILITY AND EFFECTIVENESS

Using a bailer or peristaltic pump will immediately recover LNAPL from the plume. Given the limited volume and areal extent of the LNAPL, it is expected that the removal of the LNAPL using a bailer or peristaltic pump will be effective in significantly reducing the mobile LNAPL from LNAPL Area No. 4.

9.7.4.2 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

LNAPL recovery using the bailer or peristaltic pump will immediately reduce the volume of LNAPL in the monitoring well upon implementation. The mobility of the LNAPL will be minimized as the volume of LNAPL in the area is reduced. This method will remove a majority of the LNAPL, thus reducing toxicity associated with the LNAPL. This method will not eliminate residual LNAPL remaining in the pore space of the soil. However, as discussed in the RFI Supplemental Report No. 1 (ENCORE, 2003j), the LNAPL or any remaining residuals do not pose an unacceptable risk or hazard to human health.

9.7.4.3 SHORT-TERM EFFECTIVENESS AND RISK

The use of a bailer or peristaltic pump does not result in any significant short-term risk. Short-term risks associated with this method include potential exposure to impacted groundwater or LNAPL by on-Site field personnel conducting the removal activities. These risks would be addressed by implementation of proper equipment training and health and safety procedures.

9.7.4.4 IMPLEMENTABILITY

This method is easily and cost effectively implemented since it does not require construction or installation of electrical or mechanical removal equipment. In addition, the recovery does not require extensive or costly operation, maintenance, or repairs to operating equipment. Existing monitoring wells can be utilized for LNAPL recovery and monitoring, as necessary, to verify the effectiveness of the corrective measure.

9.7.4.5 COSTS

Table 9-13 presents the estimated cost for this alternative.

9.7.4.6 ACCEPTABILITY TO SURROUNDING COMMUNITY

The alternative evaluated is anticipated to be acceptable to the surrounding community. Future property owners or lessees would be aware of the requirements of any monitoring, operation, or maintenance that may be in place as a result of implementing the corrective measure.

9.7.4.7 ACCEPTABILITY TO STATE OF MICHIGAN

The alternative evaluated is anticipated to be acceptable to the State of Michigan.

9.7.4.8 PROPOSED ACTION

The proposed action for LNAPL Area No. 4 is to employ manual removal of the LNAPL using a bailer or peristaltic pump. Occasional drawdown of the groundwater table in MWM2-06 may be necessary to promote migration of the LNAPL to the well. The effectiveness of this corrective measure can be easily monitored utilizing existing monitoring wells. This alternative was chosen because of the relatively small size of the LNAPL plume, the location of the plume (under an active portion of Plant 56), the ease of implementation, and the low cost associated with the recovery.

9.7.5 LNAPL AREA NO. 5: EVALUATION OF ALTERNATIVES

Investigation of AOI M-16 is currently ongoing which includes the delineation of LNAPL Area No. 5. Consequently, an evaluation of alternatives for LNAPL recovery in this area is not currently available, and will be presented under separate cover. A supplement to this CMP will evaluate alternatives once delineation is complete.

9.7.6 LNAPL AREA NO. 6: EVALUATION OF ALTERNATIVES

The objective of the proposed corrective measures for LNAPL Area No. 6 will remove sufficient LNAPL to allow for future industrial redevelopment in the DA. The corrective measures for LNAPL Area No. 6 will be presented to U.S. EPA in an IM Work Plan. It is not expected that additional corrective measures would be required following completion of the IM.

9.8 STORM SEWERS

The following sections predominantly detail the options for corrective measures associated with the portion of the Site storm sewer system discharging to Outfall 001. Corrective measures associated with outfalls other than Outfall 001 are either yet to be determined or finalized due to ongoing investigations, as discussed below. Corrective measures for the portions of the Site sewer system discharging to outfalls other than Outfall 001 are not addressed in detail by this CMP, but will be further addressed in subsequent documents, as necessary.

Sampling and analyses for PCBs was conducted on the storm sewer systems servicing Outfall 001, 002, 010, 011, and the Glenwood Avenue and SPO Outfall storm sewer systems concurrently with the RFI (ENCORE, 2002c). Fiero Outfalls 001, 002, and 003 were not investigated at the time as a total of nine AOIs associated with Fiero were concluded to require NFA in the CCR (ENCORE, 2001a). The Powertrain Engineering and ELPO Parking Outfalls did not exist at the time of the RFI investigations, as the two outfalls were created as part of the Glenwood roadway extension. It should be noted that prior to the road construction, the ELPO Parking and Powertrain Engineering sewer systems were serviced by Outfalls 001 and 002, respectively, which were evaluated during the RFI investigations. Subsequent investigations of the Fiero Outfall 001, 002, and 003 storm sewer systems were conducted in late 2002 and 2003, and are ongoing.

During the Storm Sewer Supplemental IM investigations, performed concurrent with the RFI (ENCORE, 2003c), storm sewer areas of interest (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) were identified. The storm sewer areas of interest consisted of the following:

- Main storm sewer reaches south of Plant 12 (Outfall 002),

- Main storm sewer reaches south and east of Plant 15 (Outfall 002), and
- Various manholes and catch basins situated in the MFD North (Outfall 002), Powertrain (Outfalls 010 and 011), and SPO (SPO Outfall) areas.

The storm sewer areas of interest were cleaned in September to October 2002. Post cleaning confirmatory sampling of the storm sewer reaches, manholes, and catch basins was performed in October 2003, allowing a sufficient time interval for sedimentation to occur in the storm sewers. The analytical results indicate that PCB impacted sediments continue to be detected at manholes and catch basins servicing Outfalls 002, 010, and the SPO Outfall. The PCB impacted sediments are potentially residuals from the 2002 cleaning events. An investigation, proposed for 2004, will address the potential source of the sediments. A report will be compiled summarizing the results of the investigation.

The objective of the proposed corrective measures for Outfall 001 is to decrease the hydraulic loading to the SWDF as well as ensure compliance with the Site NPDES permit. The Storm Sewer Feasibility Analysis presents options for the physical rehabilitation of the Site storm sewer system and subsequent environmental remedial measures. The Storm Sewer Feasibility Analysis is presented as Appendix A. The corrective measures proposed in the following sections are included in this CMP to provide a complete accounting of Site conditions affecting proposed RCRA corrective measures at specific AOIs. However, corrective measures for storm sewers will continue to be managed under the NPDES regulatory framework, with notifications, periodic reporting, and approvals obtained from the MDEQ and/or U.S. EPA as applicable.

The following discussion is related to the effectiveness of the IMs implemented to date with respect to Outfalls 001, 002, 010, 011, and the Glenwood Avenue Outfall, as well as evaluations of proposed options for both physical rehabilitation of Site storm sewer reaches discharging to Outfall 001 and potential subsequent remedial measures.

9.8.1 SUMMARY OF INTERIM MEASURES IMPLEMENTED

IMs implemented to date have been summarized in Section 5.4. The effectiveness of each IM is presented below.

9.8.1.1 PLUGGING OF NONESSENTIAL STORM SEWER BRANCHES AND LATERALS

The plugging of nonessential storm sewer branches and laterals of the Outfall 001 storm sewer system (DA, West Yard, and in the vicinity of the WWTP) has been effective in reducing hydraulic loading to the SWDF, decreasing the potential for direct overflows from the SWDF during long duration or intense rain events, as confirmed by the Site Utility Manager

9.8.1.2 DIVERSION OF STORMWATER FLOWS NORTH OF PLANT 14 FROM OUTFALL 001 TO OUTFALL 002

The diversion of stormwater flows north of Plant 14 from Outfall 001 to Outfall 002 has been effective in reducing hydraulic loading to the SWDF, decreasing the frequency of direct overflows from the SWDF during long duration or intense rain events.

9.8.1.3 INSTALLATION OF A GAC UNIT AT OUTFALL 001

The installation of a granular activated carbon unit at Outfall 001 has eliminated PCBs in the effluent during dry weather flows and during rain events that do not exceed the capacity limitations of the SWDF detention basin or screw pumps.

9.8.1.4 ANNUAL MAINTENANCE OF THE SWDF

Annual draining, cleaning, and maintenance of the SWDF basin and equipment servicing Outfall 001 has been occurring since 1999 following the detection of PCBs in the effluent. The draining and cleaning has been effective in the following manners: preventing sedimentation from reducing the storage volume of the detention basin; allowing a detailed visual inspection of treatment equipment; allowing an inspection of structural conditions of the detention basin; and reducing suspended solids from the stored stormwater prior to treatment through the GAC units.

9.8.1.5 ALTERATIONS TO THE SWDF

Modifications to the SWDF basin servicing, completed in 2002, servicing Outfall 001 to increase the storage capacity consist of reconstructing a sump for the GAC units at a greater depth and the resetting of screw pump controls. The alterations have been effective in increasing the effective storage capacity of the SWDF by approximately 200,000 gallons, by allowing an increase in the basin drawdown, and decreasing the potential for overflows from the detention basin overflow weir.

9.8.1.6 INITIAL CLEANING AND VIDEOTAPING OF STORM SEWER REACHES

The initial cleaning and videotaping of approximately 15,000 linear feet of storm sewer reaches in the DA (Outfall 001) and Metal Fabrication Division (MFD) South and North (Outfalls 001 and 002, respectively) has been performed to aid in mapping of the system, to identify potential sources of contamination, and to control contaminant transport in the Site storm sewer system.

9.8.1.7 ADDITIONAL CLEANING AND VIDEOTAPING OF STORM SEWER REACHES

The additional cleaning and videotaping of approximately 5,000 linear feet of storm sewer areas of interest (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs), that were identified in the Metal Fabrication Division (MFD) North and South (Outfall 002), has been an effective IM in controlling contaminant transport in the Site storm sewer system. Random visual observations have not noted the recurrence of significant sedimentation, and confirmatory sampling has been completed to quantify the recurrence of PCBs in the storm sewer reaches.

9.8.1.8 REMEDIATION OF PCB IMPACTED SEDIMENTS

The removal of PCB-impacted sediments that were detected throughout various MFD North (Outfall 002), Powertrain (Outfalls 010, 011, and the Glenwood Avenue Outfall), and SPO manholes and catch basins has been an effective IM in controlling contaminant transport in the Site storm sewer system. Visual observations have not noted the recurrence of significant sedimentation.

9.8.1.9 REMEDIATION OF PCBS IN ELECTRICAL SUBSTATION 'O'

The remediation of elevated levels of PCB impacted sediments in exterior electrical Substation 'O' (Outfall 001) has been effective in eliminating the potential for PCB impacted stormwater runoff to be conveyed to the Site stormwater system.

9.8.1.10 REROUTING OF FORMER PLANT 18 STORMWATER RUNOFF

The rerouting of Former Plant 18 (Outfall 002) PCB impacted stormwater runoff to the SWDF (Outfall 001) has been effective in preventing the conveyance of stormwater runoff to Site sewer systems not serviced by GAC units for PCB removal.

9.8.1.11 REMEDIATION OF PLANT 14 BILGE SUMP

The remediation of PCB impacted oils in a Plant 14 scrap tunnel bilge sump (Outfall 001) has reduced the potential for the PCB impacted oils to reach the Site storm sewers via infiltration.

9.8.2 CONCLUSIONS OF INTERIM MEASURES IMPLEMENTED

The IMs discussed in Sections 5.4 and 9.8.1 represent the extent of IMs that are feasible given the current known conditions, physical condition, and configuration of the sewers, as discussed below.

9.8.2.1 OUTFALL 001 SYSTEM

The limitations of the IMs applied to the Outfall 001 storm sewer system are dictated by the current physical condition and configuration of the system. The north-south 36-inch to 42-inch Outfall 001 storm sewer reach located in the DA from manhole ST11A to manhole ST6 has been assessed by a videotaped inspection review to be in poor condition and structurally deficient. Sections of the storm sewer reach have been observed to be missing, allowing sewer bedding material, backfill material, and groundwater infiltration with its associated constituents to impact the system. The north-south 66-inch to 84-inch Outfall 001 storm sewer in the DA is aligned through LNAPL Area No. 3, and a noted depression in the groundwater contour map suggests that the sewer may have some influence on the LNAPL plume. LNAPL Area No. 3 is being addressed through a separate IM. Presently, the IMs performed to date and the treatment provided by the SWDF are actively alleviating the environmental issues affecting the Outfall 001 system, although further remediation is required to reduce the potential for overflows from the SWDF.

9.8.3 EVALUATION OF ALTERNATIVES

The Storm Sewer Feasibility Analysis (Appendix A) is an evaluation of various alternatives for implementing corrective measures to reduce hydraulic loading of PCB impacted stormwater to the SWDF, which services Outfall 001 of the Site storm sewer system. The objective of the Storm Sewer Feasibility Analysis (Appendix A) is to provide a comparative analysis of corrective measures with a recommended approach to attain the Storm Sewer Supplemental IM (ENCORE, 2002c) objectives. The corrective measures can be separated into the following three constructs: reduction of the hydraulic loading to the SWDF by diverting stormwater runoff not impacted by PCBs to outfalls other than Outfall 001 (i.e., Outfall 002, Michigan Department of Transportation [MDOT] storm sewer) or, alternatively, either collecting and treating a substantially greater volume of stormwater at the SWDF, or continuing to route flows to Outfall 001 and bypassing those portions of the stormwater runoff deemed to be not impacted by PCBs around the SWDF while collecting and treating those portions deemed to be contaminated by PCBs. See Appendix A for detailed discussions of rehabilitation options and corrective measures for Outfall 001 of the Site storm sewer system including associated figures and cost analyses.

9.8.4 PROPOSED ACTIONS

9.8.4.1 OUTFALL 001

Proposed actions for the Site storm sewer system, prior to the implementation of final corrective measures, consist of continued monitoring and assessment of the IMs performed to date.

Continued monitoring and assessment should be accomplished by confirmatory sampling, periodic documented observations and inspections, and continued annual O&M of the SWDF.

The proposed final corrective measures for the Outfall 001 storm sewer system consists of diverting the stormwater runoff from the Plant 14, Plant 14 5 Truck Dock, and the Plant 49 rooftops to an outfall other than Outfall 001, thereby reducing hydraulic loading to the SWDF and decreasing the potential for overflows. Additionally, those areas of the West Yard and DA not addressed by future development plans should be capped by pavement to prevent infiltration, in conjunction with the proper abandonment (i.e., flow filling) of the storm sewers located in the subsurface of those areas.

In the DA, the Outfall 001 storm sewer system should be monitored as part of on-going monitoring programs associated with the Site-wide groundwater corrective measures and LNAPL Area No. 3 corrective measures. In addition to evaluating filing a deed restriction and performing groundwater monitoring, other elements of this corrective measure should include the following: notification(s) to the NPDES permit authority and/or modification(s) of existing storm sewer discharge permits; identification of groundwater-surface water interface (GSI) monitoring wells/compliance points; establishing Site-specific GSI criteria or requesting a mixing zone determination from MDEQ in accordance w/Michigan NREAP Part 201; and periodic evaluation of groundwater monitoring data. Implementation of corrective measures for Site-wide groundwater will be integrated with storm sewer rehabilitation related to NPDES permit compliance, and will, in part, be dependent upon on-going IMs and final corrective measures implemented for the storm sewers.

Proposed final corrective measures for the Outfall 001 storm sewer system are dependent upon factors including the future use of existing buildings and future land development in the DA. Therefore, the proposed final corrective measures are at least partially dependent on future land use decisions.

9.8.4.2 OUTFALLS EXCLUDING OUTFALL 001

Any final corrective measures that may be required for the portions of the Site storm sewer system discharging to outfalls other than Outfall 001 are to be determined pending the results of ongoing investigations. Outfalls other than Outfall 001 proposed for further action consist of Outfalls 002, 010, 011, Fiero Outfalls 001, 002, and 003, and the SPO Outfall. No further action is proposed for the Glenwood Avenue Outfall. Proposed final corrective measures for the outfalls requiring further action will be addressed and presented under separate cover.

Proposed measures for those outfalls excluding Outfall 001 consist of the completion of, and continued monitoring and assessment of the IMs performed to date. Continued monitoring and assessment should be accomplished by regularly scheduled confirmatory sampling and

periodic documented observations and inspections. Additional cleaning and/or investigations should be performed on those areas where contaminants continue to be detected. The storm sewer systems should also be monitored as part of on-going monitoring programs associated with the Site-wide groundwater corrective measures.

9.8.4.2.1 OUTFALL 002

Approximately 5,000 linear feet of main storm sewer reaches servicing Plants 12, 15, and 18 were cleaned in 2002 and 2003 to remove PCB impacted sediments from the sewers. In addition, PCB sampling of various MFD North (Outfall 002) manholes and catch basins was performed to evaluate the effectiveness of cleaning activities performed in late 2002. Confirmatory sampling and analyses performed in October 2003 indicate that PCB impacted sediments continue to be present in the storm sewers. Additional sampling and investigations, proposed for 2004, are proposed to determine whether the contaminated sediments are residuals from the cleaning operations, or if source area exists.

9.8.4.2.2 OUTFALLS 010, 011, AND GLENWOOD AVENUE OUTFALL

Post cleaning confirmatory sampling of the storm sewer system storm sewer areas of interest (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) that were identified throughout various Powertrain (Outfalls 010, 011, and Glenwood Avenue Outfall) and SPO manholes and catch basins, was performed in October 2003. The analytical results indicate that PCB impacted sediments continue to be detected at manholes and catch basins servicing Outfalls 010 and the SPO Outfall. The PCB impacted sediments are potentially residuals from the 2002 cleaning events. An investigation, proposed for 2004, will address the potential source of the sediments.

9.8.4.2.3 FIERO OUTFALLS 001, 002, AND 003

Water and sediment sampling and analyses from the Fiero Outfalls 001, 002, and 003 storm sewer systems identified metals contamination in the sewers. Sampling and analyses of sediments from the Fiero rooftop has identified the rooftop as a source of the metals contamination. Cleaning and encapsulation of the Fiero rooftop and cleaning of the Fiero storm sewer reaches is proposed as a corrective measure for the Fiero storm sewer system.

10.0 FINAL CORRECTIVE MEASURES PROPOSED

The Site AOIs that are designated NFA in the CCR (ENCORE, 2001a), the RFI Report (ENCORE, 2002c), and Supplemental RFI Report No. 1 (ENCORE, 2003j) are summarized in Table 10-1. Results of RFI activities and the associated human health and ecology-based risk assessments have determined that corrective measures are not required at these 52 AOIs and 2 off-Site areas.

The areas that currently have IMs on-going or proposed include the following:

- AOI W-9 – Former Central Foundry PCB soil removal;
- LNAPL Area No. 3 (AOI W-8);
- LNAPL Area No. 6 (AOI W-9);
- Site Storm Sewers;
- PSB; and
- Harris Lake.

Details of the IMs associated with these areas are discussed in Section 5.0. The status of these areas are summarized in Table 10-1. Proposed corrective measures for LNAPL Areas No. 3 and No. 6 will be submitted to the U.S. EPA in an IM Work Plan(s).

Corrective measures are proposed in this CMP for the following AOIs:

- W-1, W-5, W-8, W-9, W-10, W-11, M-1, M-2, M-5, M-16, F-7, P-9 and P-11 (included in proposed corrected measures for Site-wide groundwater);
- M-4 for localized groundwater;
- P-6 for localized groundwater;
- LNAPL Area No. 1 (AOIs W-1 and W-10) for LNAPL;
- LNAPL Area No. 2 (AOI W-10) for LNAPL; and
- LNAPL Area No. 4 (AOI M-2) for LNAPL.

The proposed corrective measures for each of these areas are detailed in Section 9.0, and summarized in Table 10-1. Additionally, completed and proposed IMs for Site storm sewers are further evaluated in Section 9.0 and the Storm Sewer Feasibility Analysis (Appendix A).

Corrective measures remain to be proposed for the following areas:

- LNAPL Area No. 5 (AOIs M-2 and M-16); and

- Off-Site Property.

The status of these areas is summarized in Table 10-1. Corrective measures for LNAPL Area No. 5 will be evaluated following the completion of LNAPL delineation in the area. Further evaluation and delineation of constituents in off-Site groundwater will be conducted, and proposed corrective measures will be submitted to the U.S. EPA under separate cover if necessary.

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Tables

ENCORE
Environmental Corporate Remediation

TABLE 1-1
Status of AOIs and Off-Site Areas
Pontiac North Campus
Pontiac, Michigan

AOI #	AOI Description	Further Investigation	CCR No Further Action	RFI No Further Action (4)	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Part 201 Industrial Criteria[2]		Risk Evaluation					Proposed Activity		
								Soil	Groundwater	Soil	Sediment	Groundwater	Surface Water	LNAPL	Soil	Groundwater	LNAPL
Study Area 1 - Fiero																	
F-1	Satellite Accumulation Area - Located in the Powerhouse - Consists of 2 areas: SAA1 (1 55-gal drum) and SAA2 (15 55-gal drums) - SAA1 identified as a SWMU 1		X		- Storage of waste paint thinner and waste oils	- Aug 2000 Site visit, both SAAs in good condition (no cracks in concrete or no extensive staining observed) - No documented releases				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-2	Waste Gasoline Accumulation Area - Located in the maintenance area of Plant 17 - Consists of 1 55-gal drum placed on a concrete floor		X		- Storage of waste gasoline	- Aug 2000 Site visit, no evidence of waste accumulation - No documented releases				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-3	Container Storage Area - Located outside on the south side of the storage dock of the assembly plant - Consisted of a concrete pad (65 by 90 ft, 8" thickness) - Max capacity 380 55-gal drums and 2 ASTs - Closure activities completed in 1989		X		- Ignitable waste - Chlorinated solvents - Paint waste	- No documented releases - Submitted RCRA Closure report to MDNR in 1995				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-4	Closed Container Storage Area - Located outside Plant 17 in the southwest driveway - Max capacity 370 55-gal drums and 2 ASTs - Operated from 1977 to 1985		X		- Scraped sealers - Adhesives - Paint thinners - Waste solvents	- No documented releases - Clean closure certified from MDNR in 1988				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-5	Former Wastewater Treatment Plant - Located on Portland St., 100 yds north of Owen St. - Former WWTP was paved over and is used as a driveway - Constructed of above-grade steel tanks on a concrete pad with secondary containment - Liquids from plant were decanted to the City of Pontiac POTW - Operated from 1973 to 1983		X		- Wastewater - Wastewater treatment sludge - Paint sludge - Bonderite sludge	- No former investigations or remedial actions - No documented releases				NE	NA	NE	NA	NA	No further Action	No Further Action	NA
F-6	Waste Purge Thinner UST - Located north of Plant 17, west of paint mix building - Affected soils discovered during UST closure activities in 1989 - 12,000-gal single-walled steel tank		X		- Waste purge thinner	- Approx 60 cubic yards of surface soil removed - RCRA Closure Report submitted in 1995 to MDNR				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-7	Wastewater Collection Sumps - Located in the basement of the Powerhouse	X			- Industrial wastewater	- Cleaned and inspected sumps - Installed 3 groundwater monitoring wells - Sump pits repaired - Collected 1 soil sample - Collected 3 groundwater samples	- VOCs - SVOCs - PCBs - Inorganics	Total Chromium (335 mg/kg)	1,1-DCE (0.02 mg/L) TCE (0.0063 mg/L)	Exceeds IPSIC Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC and RDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
F-8	Paint Sludge Storage Area - Located north of Building 17 - The concrete pad is 12 by 24 ft and is unbermed - It is covered with a corrugated roof	X			- Storage of nonhazardous paint sludge and sludge from filtering waste bonderite	- Road salt removed and concrete pad, trench, and sump were inspected for integrity of concrete - Installed 1 groundwater monitoring well - Trench and sump properly abandoned - Collected 1 subsurface soil sample	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	Thallium (0.0054 mg/L)	Concentrations below generic Industrial criteria	NA	Exceeds IDWC	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
F-9	Temporary Container Storage Area - Located east of the Powerhouse - Site records do not indicate operation of this unit - Aug 2000 Site walk, no signs of the CSA nor any evidence of past releases		X		- Store containers of waste gasoline, solvent, and paint wastes	- No documented releases - No previous investigation or remedial actions				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-10	High Pressure Fly Ash Storage Silo - Located east of the Powerhouse - Capped concrete cylinder, total capacity 500 to 600 tons - Ash is watered down during transfer process to reduce dust		X		- Store non-hazardous high-pressure fly ash	- No documented releases - No previous investigation or remedial actions - Silo in good condition				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-11	Low Pressure Fly Ash Storage Silo - Consists of 2 silos located east of the Powerhouse - Each silo stores approx. 200 to 300 tons of fly ash		X		- Store non-hazardous low-pressure fly ash	- No documented releases - No previous investigation or remedial actions - Silo in good condition				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
F-12	Coal Storage Area - Located southeast of the Powerhouse - This area is used for stockpiling coal for the Powerhouse - Reported solvents added to coal to increase BTU			X	- Coal	- Installed 2 groundwater monitoring wells	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	No exceedances	Concentrations below generic Industrial criteria	NA	Concentrations below generic Industrial criteria	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
F-13	Oily Pea Gravel, Concrete, and Debris Area - Located at the northeast corner of Plant 17 - The oily material was removed in February 1996			X	- Oily pea gravel, concrete, and debris	- Completed 3 soil borings	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
F-14	Fuel AST Area - Located west of the low-pressure fly ash storage silos - The area includes 3 ASTs: 1,000-gal diesel tank (relocated), 300-gal diesel tank (removed), and a 560-gal gasoline tank (removed) - Current 1,000-gal diesel tank has a secondary containment - Former location no containment			X	- Diesel fuel and gasoline	- Completed 2 soil borings	- BTEX - SVOCs - Lead	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
F-15	Fuel AST Area: Oil/Solvent Catch Basin - Located in the Fiero Loading dock - Contents of catch basin was an oil sludge - Catch basin cleaned and inspected			X	- Unknown	- Completed 5 soil borings - Installed 1 groundwater monitoring well - Catch basin properly abandoned	- VOCs - SVOCs - PCBs - Inorganics	PCE (81 mg/kg) 1,1-DCE (2.2 mg/kg)	No exceedances	Exceeds ISVIC Cumulative Industrial Risks at or below EPA target levels	NA	Concentrations below generic Industrial criteria	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA

Note: Shaded columns represent information from Current Conditions Report for AOI not in RFI Report

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Pontiac, Michigan

AOI #	AOI Description	Further Investigation	CCR No Further Action	RFI No Further Action (4)	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Part 201 Industrial Criteria[2]		Risk Evaluation					Proposed Activity		
								Soil	Groundwater	Soil	Sediment	Groundwater	Surface Water	LNAPL	Soil	Groundwater	LNAPL
Study Area 2 - Demolition Area																	
W-1	West Yard - Approximately 20 acres in size - Entire yard was historically used for materials management activities, including: - Disposal of foundry sand, refuse, sludge and trash; - The storage of hazardous waste (former hazardous waste storage pad); - Former railroad marshalling area; and - a backfilled settling basin	X			- Impacted soils, Groundwater, and LNAPL containing VOCs, SVOCs, metals, PCB and dioxins	- Completed 13 soil borings - Installed 4 groundwater monitoring wells - Completed 3 test pits - Installed 1 LNAPL deli+M77neation monitoring well - Installed 5 site-wide hydrogeologic monitoring wells (1 shallow, 1 intermediate, 2 upper sand and gravel) - Groundwater samples were collected at selected, previously installed, downgradient wells (MW-10, MW-19, MW28-99, MW29-99, MW30-99, MW31-99, MW33-99, MW34-99, MW39-99, MW40-99, MW42-99, DWD-13, MWW1-04, MWW1-05)) - Collected LNAPL samples from MW36-99 and MW24-99 - Toe Drain has been installed to divert the Seep Water to the sanitary sewer system	- VOCs - SVOCs - PCBs - Inorganics - Dioxins/Furans - Cyanide	**SHALLOW BORINGS** Arsenic (9 mg/kg) Lead (3,950 mg/kg) Manganese (7,260 mg/kg) Total PCB (54 mg/kg) Chromium (total) (1,520 mg/kg) Dioxins (1.89 x 10 -3 mg/kg) **DEEP BORINGS** No exceedances **HISTORIC RESULTS** Antimony Arsenic Butyl benzylphthalate Chromium (total) Total PCB Lead Manganese	**SHALLOW WELLS** Acetone (12 mg/L) Benzene (0.091 mg/L) Methylene Chloride (0.3 mg/L) Vinyl Chloride (0.018 mg/L) Antimony (0.0079 mg/L) Barium (4.07 mg/L) Manganese (1.2 mg/L) Thallium (0.0091 mg/L) Vanadium (0.0484 mg/L) Total PCB (0.0033 mg/L) Dioxins (1 x 10-5 mg/L) **UPPER SAND AND GRAVEL WELLS** Acetone (3.1 mg/L) **LOWER SAND AND GRAVEL WELLS** bis(2-ethylhexyl)phthalate (0.0088 mg/L)	Exceeds IDC all noted except: - Manganese and Total chromium IPSIC Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC and RDWC all noted except: - Vanadium exceeds RDWC - 2,3,7,8-TCDD TEQ exceeds GCC - Dioxin and PCB associated LNAPL	NA	Construction Worker Risks at or below EPA targets. Presently contains dioxins, PCBs	No Further Action (Industrial)[1]	Perform CMP	Perform CMP (LNAPL No. 1)
W-2	Former Hazardous Waste Storage Pad - Located in west portion of West Yard - Approx. 27,000 sq ft, 8 inch concrete pad with 4 inch curb - Waste storage, drum washing and empty drum storage - Unknown extent of contamination		X		- Solid and liquid hazardous and non-hazardous wastes (paint, paint thinner, gasoline, chlorinated solvents, machine wastes, lead chips, and spent halogenated solvents)	- MDNR (1991) former pad did not meet "clean closure criteria" - GM will pursue final approval of the pad closure				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
W-3	Former Plant 8 Flammable Liquid StorageTank Farm - total of 9 ASTs - 5 ASTs in the north area and 4 in the south area contained within a 3-ft high dike - 13,000 to 26,000 gal - Excess product in fill hoses was routinely emptied inside the diked area surrounding the ASTs			X	- Flammable liquids - Diesel Fuel - Line thinner - Gasoline - Solvents	- Completed 5 soil borings	- VOCs - SVOCs - Lead	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
W-4	Plant 8-Substation "D-1" - Located in the southeast quadrant of the former Plant 8 - Documented PCB transformer oil spills - Decommissioned and demolished 1996		X		- PCBs	- Cleanup activities completed in 1996 and met USEPA requirements				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
W-5	Plant 8-Basement - 17 ASTs ranging in size from 680 gal to 11,300 gal - 3 tanks were located at column L-67 within the basement - All other tanks are suspected to have been located at the west end of the basement	X			- Weak metallic wastewater - Alkali/oily wastewater	- Completed 3 soil borings - Installed 2 groundwater monitoring wells - Installed 2 shallow sitewide hydrogeologic monitoring wells	- VOCs - SVOCs - PCBs - Inorganics	Total PCBs (24 mg/kg)	Antimony (0.0098mg/L) Thallium (0.009 mg/L) Vanadium (0.0732 mg/L) PCBs (0.0017 mg/L)	Exceeds IDWC Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
W-6	Former Plant 8 Flammable Materials Storage Building - 17 tanks ranging in size from 15,000 gal to 22,000 gal - Doors of the building were above ground level causing the storage building to act as a diked area - The railroad and truck unloading areas contained catch basins that were connected to the WWTP			X	- Oils	- Completed 8 soil borings	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
W-7	Plant 9 Turbo Tank Closure (Tank 9-1) - Located northwest of former Plant 9 - 550-gal removed in 1991 and is considered closed by CPC Pontiac		X		- Gasoline	- Tank closed				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
W-8	Plant 9-Basement - 12 ASTs ranging in size from 2,000 gal to 14,000 gal - The tanks were located along the north side of Plant 9 basement - Kerosene-like odors noticed in storm sewer in this area	X			- Kerosene - Coolant (141-KC)	- Completed 8 surface soil samples - Completed 7 soil borings - Installed 8 groundwater monitoring wells - Installed 7 monitoring wells for NAPL delineation - Installed 1 shallow Site-wide hydrogeologic monitoring well - Collected NAPL sample from monitoring well MWW8-03 - Evaluated 11 soil borings for the presence of LNAPL - Installed 2 recovery wells	- VOCs - SVOCs - PCBs - Inorganics - Dioxins - Chromium VI - Methylene Chloride (Nov. 2003 sample only)	**SURFACE SOIL** Manganese (2,780 mg/kg) Total Chromium (847 mg/kg) **SOIL BORINGS** Arsenic (54 mg/kg) Manganese (1,990 mg/kg) Total Chromium (363 mg/kg) Lead (8,440 mg/kg)	Arsenic (0.0849 mg/L) Antimony (0.008 mg/L) Beryllium (0.0054 mg/L) Total Chromium (0.294 mg/L) Cobalt (0.0879 mg/L) Lead (0.122 mg/L) Manganese (5.41 mg/L) Nickel (0.307 mg/L) Total PCB (0.0013 mg/L) Thallium (0.0074 mg/L) Vanadium (0.239 mg/L) Dioxins (1 x 10-8 mg/L) 2-4-Dimethylphenol (2.5 mg/L) Total methylphenols (4.6 mg/L)	Exceeds IPSIC (manganese, total chromium) IDC (Arsenic, lead) Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC and RDWC all noted except: - Cobalt exceeds RDWC - 2,3,7,8-TCDD TBQ exceeds GCC - Dioxins associated with LNAPL	NA	Construction Worker Risks at or below EPA targets.	No Further Action (Industrial)[1]	Perform CMP	Perform CMP (LNAPL No. 3)
W-9	Former Central Foundry (Plant 6) - Formerly located east of the West Yard - Produced gray iron from metallic ore to be casted into automotive parts - Operations ceased in 1987 and the plant was demolished in 1995 - 20,000 gallon UST	X			- Gasoline - Metals - PCBs - Arsenic - Resin	- Completed 13 surface soil samples - Completed 11 soil borings - Completed PCB soil delineation at 2 locations - Installed 4 Site-wide hydrogeologic monitoring wells (2 shallow, 1 upper sand and gravel, 1 lower sand and gravel) - Installed 2 groundwater monitoring wells - Evaluated 9 soil borings for the presence of LNAPL - Collected 1 LNAPL sample	- UST BORINGS - BTEX - Surface Samples - VOCs - SVOCs - PCBs - Inorganics - Chromium VI - Dioxins/Furans	**SOIL BORINGS** Total PCBs (47 mg/kg) Manganese (3,680 mg/kg) **SURFACE SOILS** Total PCBs (29 mg/kg) Manganese (2,650 mg/kg) Chromium (total) (523 mg/kg)	Thallium (0.0053 mg/L) Lead (0.0391 mg/L)	Exceeds IDC (total PCBs), IPSIC (manganese), Cumulative Industrial Risks at or below EPA target levels. Does not include PCB concentrations around BW9-02 as this area will be remediated as part of the CMP.	NA	Exceeds IDWC	NA	NA	Perform CMP	Perform CMP	Perform CMP (LNAPL No. 6)
W-10	Railroad Marshalling Area Drainage System - Extends the entire length of the west boundary of the West Yard - Used for the temporary storage of railcars loaded with scrap metal and grinding waste to be shipped off-site - A drainage system was installed in 1972 to collect the waste draining out of the railcars - The marshalling area is no longer used for the storage of railcars, although the drainage system remains in place	X			- Waste from the metal chips - Oils - PCBs	- Inspected sumps - Completed 9 soil borings - Installed 3 downgradient groundwater monitoring wells - Installed 3 monitoring wells for NAPL delineation - Collected NAPL sample from monitoring well MWW10-01	- VOCs - SVOCs - PCBs - Inorganics - Dioxins/Furans	**SURFACE SOILS** Manganese (10,000 mg/kg) Total Chromium (596 mg/kg) **SOIL BORINGS** Lead (4,020 mg/kg)	Total PCB (0.0007 mg/L) bis(2-ethylhexyl)phthalate (0.15 mg/L) Arsenic (0.0591 mg/L) Thallium (0.0055 mg/L)	Exceeds IDC (lead), IPSIC (hexavalent chromium) Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC	NA	Construction Worker Risks at or below EPA targets.	No Further Action (Industrial)[1]	Perform CMP	Perform CMP (LNAPL No. 1,2)

Note: Shaded columns represent information from Current Conditions Report for AOI not in RFI Report

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								Soil	Groundwater	Soil	Sediment	Groundwater	Surface Water	LNAPL	Soil	Groundwater	LNAPL
W-11	Salvage Yard - Sump Drain - 69 barrels of unknown liquid were dumped down the Salvage Yard sump drain over an eight day period in 1985 - The location of the Salvage Yard sump drain is unclear - 2 possible sump locations			X	- Barrel contents unknown - WWTP influent and effluent analyzed for : Total Kjeldahl nitrogen, chloride, nickel, zinc, phosphorus, oil and grease on the days the dumping occurred	- Installed 1 downgradient monitoring well (installed as part of AOI W-1 investigation)	- VOCs - SVOCs - PCBs - Inorganics	Soils not analyzed	Antimony (0.0069 mg/L) Thallium (0.0054 mg/L)	NE	NA	NE RFI concluded IDWC exceedances were due to laboratory analytical method, and not an indication of groundwater quality	NA	NA	No Further Action	No Further Action RFI concluded IDWC exceedances were due to laboratory analytical method, and not an indication of groundwater quality.	NA
W-12	Catalina Substation - Consists of the Catalina Substation south of Montcalm St. and east of the storm-water retention pond - Reported spills of PCB containing oils with previous remedial action implemented - Substation owner by GM and leased to Detroit Edison		X		- PCBs containing transformer oils	- Access to substation was restricted during recent Site visit - Remedial efforts approved by MDNR 1987				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
W-13	Montcalm Substation - Located east of Saginaw St. and north of Montcalm Ave. - Transformer oil that potentially contained PCBs was used at this location			X	- PCBs - Oils	- Completed 6 surface soil samples	- PCBs - SVOCs	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
Study Area 3 - Metal Fabrication Division																	
M-1	Wastewater Treatment Plant (WWTP) - Located west of Plants 5/23 and Plant 14 - Included up to 55 ASTs historically utilized for the WWTP - Ground cover includes pavement, gravel, and grass - Known releases included alkali/oily water, cyanide plating solution, acidic alkali water, lime slurry, reclaimed oil, storing metallic water, chrome solution, and cyanide solution. - History of exceedances of lead, phenol, and Chromium VI at sanitary sewer outfall 003	x			- Treated metals (including chromium VI) - Treated alkali/oily wastes - Oil - Sludge - Sulfuric Acid - Lime, Alum, Polymer, Caustic - Pickle Liquid	- Completed 12 surface soil samples - Completed 11 soil borings - Installed 6 groundwater monitoring wells - Completed PCB soil delineation at 2 locations. EPA requested PCB analysis in pavement confirmed - Investigation on-going (CA750)	- VOCs - SVOCs - PCBs - Inorganics - Dioxins - Cyanide	PCBs (46 mg/kg)	Cyanide (1.3 mg/L)	Exceeds IDC Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
M-2	Former Plating Operations Area - Western portion of Plant 2 - Types of plating included meatier (copper coating) and utility (nickel and chrome plating) - Plating pits showed evidence of corrosion during Site visit	X			- Metals (including copper, nickel, and chromium VI) - Chlorinated solvents	- Completed 23 soil borings - Installed 17 groundwater monitoring wells - Installed 1 shallow Sitewide hydrogeologic monitoring well - LNAPL delineation - Collected 1 LNAPL sample for chemical analysis and fingerprinting	- VOCs - SVOCs - PCBs - Inorganics - Dioxins - Cyanide	Manganese (2,220 mg/kg) 1,1-DCE (1.8 mg/kg)	Acetone (3.4 mg/L) 1,1,1-TCA (0.555 mg/L) 1,1,2-TCA (0.02 mg/L) 1,1-DCE (0.091 mg/L) 1,1-DCA (1.9 mg/L) 1,2-DCA (0.01 mg/L) PCE (0.0075 mg/L) TCE (0.056 mg/L) cis-1,2-DCE (0.09 mg/L) bis(2-ethylphthalate) (0.024 mg/L) Methylene Chloride (0.024 mg/L) Vinyl Chloride (0.0033 mg/L) Cyanide (0.55 mg/L) Nickel (10.4 mg/L) Thallium (0.0056 mg/L) Vanadium (0.0054 mg/L)	Exceeds ISVIC (1,1-DCE), IPSIC (manganese), Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC and RDWC all noted except: - Vanadium and 1,1-DCA exceed RDWC only	NA	Construction Worker Risks at or below EPA targets.	No Further Action (Industrial)[1]	Perform CMP	Perform CMP (LNAPL No. 4)
M-3	Former Track 31 - Consists of a railroad spur located west of Plant 14 and northwest of the WWTP - Used for transporting materials within the facility - Reported oil staining on Track 31 - Currently covered with soil		X		- Not known - Documented historical release of PCB-containing hydrocarbons	- Area excavated in 1996 - RAP to MDEQ approved and completed				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-4	Plant 25 Former Gasoline UST & Current Gasoline AST - Prior documented release (gasoline) from former UST (1,000 gal)	X			- Gasoline (leaded and unleaded)	- Completed 2 soil boring - Installed 7 groundwater monitoring wells - LNAPL delineation - Collected 1 LNAPL sample for chemical analysis and fingerprinting	- VOCs - SVOCs - PCBs - Inorganics - Lead	No exceedances (Waiting for validated result from MWM4-07)	Benzene (0.98 mg/L) Ethylbenzene (1.5 mg/L)	Concentrations below generic Industrial criteria	NA	Exceeds IDWC and RDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
M-5	Former Fill Area A-2 - Used for disposal of plant refuse and industrial waste including partially burned materials	x			- Wastewater sludge - PCBs - Partially burned waste	- Completed 3 soil borings - Installed 4 groundwater monitoring well - Groundwater samples were collected from previously installed MW-2-99	- VOCs - PCBs - Inorganics - Dioxins - Barium - Manganese	Lead (1,560 mg/kg)	Barium (4.72 mg/L) Manganese (3.57 mg/L) PCBs (0.0015mg/L)	Exceeds IDC Cumulative Industrial Risks at or below EPA target levels	NA	Exceeds IDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP *RFI risk assessment concluded building floors/pavement would prevent exposure to workers/trespassers.	NA
M-6	Plant 5 Hydraulic Fluid Spill - Spill area near loading dock 35, Sept 1992 - Various operations at Plant 5		X		- PCB-containing hydraulic fluid	- Excavated spill area, excavated material identified as non-hazardous waste - No staining observed during Site walkthrough				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-7	ELPO Building/Flammable Liquids Storage Building - Includes ELPO Operations Building and Flammable Liquids Storage Building - Series of concrete trenches and sumps which convey wastewater containing metals			X	- Solvents - Alkali Cleaners - Phosphoric Acid - Chromic Acid - PCBs - Metals	- Completed 4 soil borings - Installed 3 groundwater monitoring wells - Installed 1 shallow site-wide hydrogeologic monitoring well - Visual inspection of subsurface conditions	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	Acetone (42 mg/L) Thallium (0.0141 mg/L)	Concentrations below generic Industrial criteria	NA	Exceeds IDWC	NA	NA	No Further Action (Industrial)[1]	No Further Action *RFI concluded acetone results are from well materials and were not an indication of groundwater quality. Follow-up thallium samples using a revised analytical method did not show results exceeding IDWC.	NA
M-8	Plant 25 Oil Storage Building - Located to the west of Plant 25 - 6 ASTs located within the building (1 outside to the south): 5 15,000-gal ASTs and 1 20,000-gal AST (empty) - No secondary containment, building is surrounded by a diked containment system that drains to the WWTP via Plant 25 sump area - Paint booth located in the building, south of the ASTs - Diesel AST located just outside the storage building to the south		X		- Various petroleum-based products: soluble oil, hydraulic oil, semi-synthetic grinding oil, engine oil, and lubrication oil	- No previous investigations or remedial actions - Site visit, concrete containment in good condition - No documented releases				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-9	Former Plant 1 Heat Treat Oil Storage Area - 4 ASTs near the eastern wall of Plant 11 - ASTs contained inside a floor pit with sump that discharges to WWTP			X	- Dirty heat treat quench oil - LC-7 coolant - Acidic material	- Cleaned and evaluated structural integrity of containment pit and sump - Completed 1 soil boring - Installed 2 groundwater monitoring wells - 1 surficial soil sample collected	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	No exceedances	Concentrations below generic Industrial criteria	NA	Concentrations below generic Industrial criteria	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA

Note: Shaded columns represent information from Current Conditions Report for AOI not in RFI Report

TABLE 1-1
Status of AOIs and Off-Site Areas
Pontiac North Campus
Pontiac, Michigan

AOI #	AOI Description	Further Investigation	CCR No Further Action	RFI No Further Action (4)	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Part 201 Industrial Criteria[2]		Risk Evaluation					Proposed Activity		
								Soil	Groundwater	Soil	Sediment	Groundwater	Surface Water	LNAPL	Soil	Groundwater	LNAPL
M-10	Plant 23 Basement Former AST Area - Consists of 3 ASTs located in the basement of Plant 23 - 3 12,500-gal ASTs now empty and no longer used - Below-grade containment system and a sump that discharges to the WWTP		X		- Synthetic coolant (593-KC)	- No previous investigations or remedial actions - Site visit, ASTs intact and no evidence of staining - No documented released				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-11	Plant 12 Former Gasoline Storage Area - Former 480-gallon unleaded gasoline AST located north of Plant 12 - Exact location unknown - No information available on removal of AST			X	- Gasoline (unleaded)		- BTEX	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
M-12	Former AST Location East of Plant 14 - Plant 49 houses metal operations and used for storage and shipping activities - 550-gal AST contained in a secondary containment basin that has a blind sump		X		- Fuel oil - Diesel fuel	- No documented releases - No previous investigations or remedial actions - Site visit, concrete containment basin and sump in good condition, no evidence of spills				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-13	Former AST Location West of Plant 14 - 3 ASTs, 1 AST with secondary containment, other 2 had no containment			X	- Gasoline - Diesel fuel	- Completed 2 soil borings	- BTEX - SVOCs - Lead	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
M-14	Current AST Location East of Plant 12 - Use of Plant 12 changed over the years - Currently vacant and scheduled for demolition - 2 1000-gal ASTs, both double lined steel and have secondary containment that drain to a closed blind-sump		X		- Gasoline - Diesel	- No documented releases - No previous investigations or remedial actions - Site visit, containment systems in good condition				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-15	Track 26 - Consists of a railroad spur that originates from the main railroad line and extends between Plant 2 and 14 - Used to transport materials for operations in Plant 14 (pressed metal), Plant 49 (storage, shipping, and pressed metal), Plant 2 (metal plating), and Plant 11 (heat treating)		X		- PCB-containing materials	- Aug. 2000 Site visit no areas of observed staining or other indications of releases				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-16	Plant 25 Basement Sump Area - Sludge tank, pumping system, and several floor sumps - Area currently flooded - Several of the sumps and pits filled with grout, unable to ascertain condition - Evidence of water on foundation walls	x			- Sludges - Oils	- Cleaned and evaluated structural integrity of floor sumps - Installed 8 groundwater monitoring wells - Investigation ongoing (CA750) - LNAPL discovered 07/03 - 1 soil boring completed from monitoring well installation MWM16-07 - Completed 18 soil borings, sampled 4 (waiting for validated analytical results)	- VOCs - SVOCs - PCBs - Inorganics - Cyanide	No exceedances Validated analytical data not available for 4 sampled soil borings.	Vinyl Chloride (0.023 mg/L)	Concentrations below generic Industrial criteria	NA	Exceeds IDWC	NA	LNAPL discovered 07/03, Additional evaluation required	No Further Action (Industrial)[1]	Perform CMP	Perform CMP (LNAPL No. 5)
M-17	Plant 15 Southern Piping Trench - Located along the southern wall in the western portion of Plant 15 - Contains pipes that distribute wastewater below grade to the WWTP			X	- Metals - Alkali/Oily	- Visually inspected piping trench	None	Soil not analyzed	Groundwater not analyzed	NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-18	Plant 5 Waste Accumulation Area - Located in the west end of Plant 5 - Latest use was waste accumulation operations - Waste stored in 55-gal drums or on pallets - No secondary containment system for area - Material stored in area are non-hazardous		X		- Waste includes: PCB light ballast, non-RCRA wastes and RCRA hazardous wastes	- No previous investigations or remedial actions - During Site visit no evidence of spills or leaks				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-19	Plant 5 South Access Railway - Southwestern end of Plant 5 - soil exposed at ground surface			X	- Unknown	- Completed 11 surface soil samples	- VOCs - SVOCs - Inorganics - Chromium VI	Manganese (12,60 mg/kg) Total Chromium (668 mg/kg)	Groundwater not analyzed	Exceeds IPSIC Cumulative Industrial Risks at or below EPA target levels	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
M-20	Plant 23 Basement Area - Metal working operations from early 1960's to 1985		X		- Standing liquids in basement	- Aug 2000 Site visit, liquid is condensate water from a pipe, discolored walls, and evidence of groundwater seepage into basement				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-21	Plant 14 Transformer Station - Located between Plant 2 and Plant 14, adjacent to Track 26 - Oil-stained concrete observed during Site walk			X	- PCBs	- Completed 4 surface soil samples	- SVOCs - PCBs	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
M-22	Plant Columbia Avenue Switch House - Located on the western side of Plant 15 - Handled electrical service for Plant 12 and 15		X		- Transformer oil (PCB containing)	- Site visit no staining observed - No documented releases - No previous investigations or remedial actions				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
M-23	Plants 25, 33, and 75 Substation and Power Building - Southwest of Plant 25 and north of Columbia Avenue - Transformer oil that potentially contained PCBs was used at the Substation and Power Building			X	- PCBs	- Completed 4 surface soil samples	- SVOCs - PCBs	No exceedances	Groundwater not analyzed	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
M-24	Former Plant 12 PCB Spill - Consists of an area adjacent to Plant 12 where an unknown quantity PCB-containing fluid was spilled in 1994 - Currently vacant and scheduled for demolition			X	- PCB-containing transformer oil	- No soil or groundwater investigations - Remedial action consisted of removal of soil and concrete potentially impacted by spill				Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
M-25	Plant 25 East Basement Sump Area - Plants 25 and 33 housed engine machining and assembly operations, material storage and shipping - Basement sump area is located along the east wall of Plant 33 , the floor sump discharges to Plant 25 which discharges to the WWTP - Plant 25 and 33 under extensive renovation			X	- Framing system wax	- Installed 2 groundwater wells - 1 soil boring completed - Site visit, condition of floor pits could not be evaluated	- VOCs - SVOCs - PCBs - Inorganics	No exceedances	No exceedances	Concentrations below generic Industrial criteria	NA	NE	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
Study Area 4 - Powertrain																	
P-1	Powertrain Former UST Farm - Located adjacent to the south wall of the engine testing lab - 7 tanks used for dispensing fuel, all removed in 1990 - Area is now paved over as parking spaces - Closure granted in Sept. 1994		X		- Gasoline	- Previous investigations included sampling, activities for the removal of the UST				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA

Note: Shaded columns represent information from Current Conditions Report for AOI not in RFI Report

TABLE 1-1
Status of AOIs and Off-Site Areas
Pontiac North Campus
Pontiac, Michigan

AOI #	AOI Description	Further Investigation	CCR No Further Action	RFI No Further Action (4)	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Part 201 Industrial Criteria[2]		Risk Evaluation					Proposed Activity		
								Soil	Groundwater	Soil	Sediment	Groundwater	Surface Water	LNAPL	Soil	Groundwater	LNAPL
P-2	Powertrain Current UST Farm - Located outside the southwest end of the Powertrain HQ, just south of a storage building - Consists of 6 MDEQ-regulated USTs that store gasoline - During excavation for the current UST, contaminated solid were encountered near SE corner of storage bldg		X		- Gasoline	- Remedial actions include removal of contaminated soils (1989) - No confirmed releases with current USTs - Formal closure by MDEQ has not been granted				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
P-3	Car Wash Former USTs - Located west of the Powertrain HQ - Previously 3 USTs were located in this area -2 20,000-gal gasoline USTs, removed in 1990 - 1 20,000-gal UST installed in 1991, constructed of unlined steel, removed in 1999		X		- Gasoline - Diesel fuel	- Remedial actions relating to the 2 earlier USTs, soil excavation, and leaking pipe removal - GM received residential closure for the third UST from the MDEQ (Feb 2000)				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
P-4	Powertrain Former Used Oil UST & Utility Line - The former UST is located west of the Powertrain HQ, the utility line is south of the former UST - Former UST discovered Oct 1996 during Site renovations and soon after removed		X		- Oil	- Documented releases from the UST in Oct. 1996 - Remedial actions included excavation of contaminated soil - No impact on Utility Line				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
P-5	Powertrain Former Stoddard Solvent UST - Located outside, near the NW corner of the Powertrain HQ - 550-gal UST removed in Aug. 1995		X		- Stoddard Solvent	- Remedial actions included excavation of contaminated soil				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
P-6	Former UST Farm & Stoddard Solvent AST - West of the northwest corner of the Emissions Control building - Release from UST(s) was discovered in 1984 - Remediation performed in 1984 and tanks removed in 1987 - Documentation of previous investigations and remediation does not exist - Recent (Jan 2001) construction activities indicate subsurface contamination exceeds criteria for BTEX compounds	X			- Gasoline - Indolene I clear gas - GM calibration solvent - Stoddard solvent	- Completed 10 soil borings - Installed 8 groundwater monitoring wells - Abandoned 2 monitoring wells (MWP6-05 and MWP6-08)	- VOCs - SVOCs - Lead - Inorganics - BTEX	No exceedances.	Benzene (1.2 mg/L) Toluene (5.4 mg/L) Ethylbenzene (1.6 mg/L)	Concentrations below generic Industrial criteria	NA	Exceeds IDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
P-7	Former Plant 18 Coolant AST (Former Plant 71) - 11,000-gal coolant AST located in the basement - AST has a secondary containment - Cleaned and removed in 1998 before Plant 18 demolished		X		- 38LB Coolant	- No documented releases - No previous investigations or remedial actions - No closure documents available				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
P-8	Powertrain Vacant Lot UST Across Joslyn Avenue - Vacant lot SE of the Powertrain HQ - Former UST location and construction information are not known - Release from previous unknown UST discovered in 1996		X			- Soil and groundwater investigations in 1996-1998 - Vacant lot closed in 1999, no formal letter of UST Closure Report from MDEQ				NE	NA	NE	NA	NA	No Further Action	No Further Action	NA
P-9	Former Plant 18 Trestle Spill - Located along north and east side of former Plant 18 - Leak from overhead wastewater trestle	X			- Alkali-oily wastewater	- Installed 3 groundwater monitoring wells - Completed and sampled one test pit - Completed 31 soil borings (14 for areal coverage, 3 to investigate for benzo(a)pyrene, 14 for safety of workers)	- VOCs - SVOCs - PCBs - Inorganics - Benzo(a)pyrene (BP9-11 to BP9-13)	Benzo(a)pyrene (12mg/kg)	2,4-dimethylphenol (0.6 mg/L) Total methylphenols (1.28 mg/L) Antimony (0.0131 mg/L) Nickel (0.128 mg/l) Selenium (0.0607 mg/L) Vanadium (0.578 mg/L)	Exceeds IDC		Exceeds IDWC and RDWC all noted except: - 2,4-Dimethylphenol exceeds RDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
P-10	Former Plant 18 - Former release from PCB transformer - Potential PCBs in storm sewers from unplugged laterals	X			-PCBs	- Completed 6 soil borings - Installed 3 monitoring wells	- SVOCs - PCBs	No exceedances.	Groundwater not encountered	NE	NA	NA	NA	NA	No Further Action (Industrial)[1]	No Further Action	NA
P-11	Former Plant 18 Trestle Break - Located along north side of former Plant 18 - Release of significant volume of alkali-oil wastewater from overhead pipeline break	X			-Alkali-oil wastewater	- Completed 10 soil borings - Installed 3 monitoring wells	-VOCs - SVOCs - PCBs - Inorganics	Manganese (3,260 mg/kg)	Cobalt (0.0535 mg/L)	Exceeds IPSIC	NA	Exceeds RDWC	NA	NA	No Further Action (Industrial)[1]	Perform CMP	NA
Study Area 5 - Service Parts Operations																	
S-1	Former SPO Gasoline UST Location - Located outside of the southern side of Plant 75 - Plant 75 used entirely for warehousing - 10,000-gal gasoline UST removed from south side of Plant 75, 1990		X		- Gasoline	- Tank removal and excavation of surrounding soil - No significant impact to subsurface conditions				NE	NA	NE	NA	NA	No Further Action	No Further Action	
S-2	Former SPO Diesel UST Location - Located outside, east of Plant 75, adjacent to Joslyn Ave. - Plant 75 used entirely for warehousing - 10,000-gal gasoline UST removed from south side of Plant 75, 1990 - 4,000-gal fiberglass UST, for diesel storage removed 1992		X		- Diesel fuel	- No significant impact to subsurface conditions				NE	NA	NE	NA	NA	No Further Action	No Further Action	
M-5	Former Fill Area A-2 - See AOI M-5		X							NE	NA	NE	NA	NA	No Further Action	No Further Action	
Off Site																	
PSB	Pontiac School Board - The area that is currently owned by the City of Pontiac School Board was formerly a wetland area. Historically, Howard Lake, the first of a chain of 4 lakes, is believed to have taken up part of the southwest corner of the property. A series of open ditches traversed the PSB from the Site to Harris Lake and it is believed that these ditches historically conveyed storm water from the Site to the lakes.	X			- Surface water drainage - Storm water	- Completed 10 soil borings - Installed 2 groundwater monitoring wells - Completed 5 sediment samples from storm sewer pipe - Completed 4 test pits	- VOCs - SVOCs - PCBs - Inorganics - Dioxins	**BORINGS** [3] Arsenic (14.1 mg/kg) Benzene (4.2 mg/kg) **TEST PITS** [3] Arsenic (13.8 mg/kg) Lead (429 mg/kg) **PIPE SEDIMENT** Benzo(a)anthracene (53 mg/kg) Benzo(a)pyrene (50 mg/kg) Benzo(b)fluoranthene (69 mg/kg) Dibenz(a,h)anthracene (7.6 mg/kg) Indeno(1,2,3-cd)pyrene (28mg/kg) Arsenic (27.2 mg/kg) Lead (659 mg/kg)	No exceedances	Exceeds RDC all noted except: - RSVIC (benzene) Cumulative Residential Risks at or below EPA target levels. Benzene to be addressed by other, off-Site source	Exceeds RDC but incomplete exposure pathway	Concentrations below generic Residential Criteria	NA	NA	No Further Action	No Further Action (residential)	NA

Note: Shaded columns represent information from Current Conditions Report for AOI not in RFI Report

TABLE 1-1
Status of AOIs and Off-Site Areas
Pontiac North Campus
Pontiac, Michigan

AOI #	AOI Description	Further Investigation	CCR No Further Action	RFI No Further Action (4)	Summary of Primary Materials Managed	RFI Activities	Laboratory Analysis Performed	Analytical Results That Exceed Part 201 Industrial Criteria[2]		Risk Evaluation					Proposed Activity		
								Soil	Groundwater	Soil	Sediment	Groundwater	Surface Water	LNAPL	Soil	Groundwater	LNAPL
HL	Harris Lake - A review of historical maps shows that the shape and size of Harris Lake 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 the previous on-shore activities. A fill area along the north shore consisted of foundry sand, wooded floor blocks, and construction and demolition debris. It is believed that Harris Lake received surface water and storm water run off from the Site via a series of ditches and culverts.	X				- Completed 15 surface soil samples - Completed 13 soil borings - Collected 68 sediment samples - Collected 10 surface water samples - Collected 18 fish fillet and fish composite samples - Collected oil phase sample from sediment	- VOCs - SVOCs - PCBs - Inorganics - Dioxins	**SEDIMENT (<2ft)[3]** Benzo(a)pyrene (12 mg/kg) Dibenz(a,h)anthracene (3.7 mg/kg) Antimony (228 mg/kg) Arsenic (83.8 mg/kg) Lead (6,330 mg/kg) Cyanide(total) (42.2 mg/kg) Total Chromium (576 mg/kg) **SEDIMENT (>2ft)[3]** Antimony (379 mg/kg) Arsenic (80.2 mg/kg) Lead (11,300 mg/kg) Cyanide(total) (12.4 mg/kg) **SUBSURFACE SOIL[3]** Benzo(a)pyrene (3.6 mg/kg) Arsenic (24 mg/kg) Lead (751 mg/kg) **SOIL BORINGS[3]** Arsenic (13.6 mg/kg)	**SURFACE WATER** Thallium (0.0118 mg/L)	Exceeds RDC Cumulative Residential Risks at or below EPA target levels (see Harris Lake Risk Assessment)	Exceeds RDC all noted except: - RPSIC (hexavalent chromium) Cumulative Residential Risks at or below EPA target levels, failed ecological risk (see Harris Lake Risk Assessment)	NE	Cumulative Residential Risks at or below EPA target levels (see Harris Lake Risk Assessment)	NA	No Further Action	No Further Action	NA
TL	Terry Lake - Terry Lake is located downstream of Harris Lake. Terry Lake receives surface water from Harris Lake.		X			- Collected 3 sediment samples	- VOCs - SVOCs - PCBs - Inorganics	Benzo(a)pyrene (3.5 mg/kg)	Groundwater not analyzed	NE	Residential Risks estimated to be lower than EPA target levels for residential land use	NE	Residential Risks estimated to be lower than EPA target levels for residential land use	NA	No Further Action	No Further Action	NA
OL	Osmun Lake - Osmun Lake is located downstream of Terry Lake. - Osmun Lake receives surface water from Terry Lake along with storm water discharge from Fiero via Outfall 002.		X			- Collected 6 sediment samples	- VOCs - SVOCs - PCBs - Inorganics	Lead (592 mg/kg)	Groundwater not analyzed	NE	Residential Risks estimated to be lower than EPA target levels for residential land use	NE	Residential Risks estimated to be lower than EPA target levels for residential land use	NA	No Further Action	No Further Action	NA
Other Areas																	
	Storm Water Detention Facility (SWDF) - Located on the south side of Montcalm Avenue - Operational in May 1982, intercepting and treating the Site storm water discharged to Outfall 001 - During routine cleaning/inspection (Sept./02) cracks in the concrete floor and degraded sections of rubber seals observed - Subsurface investigation to determine if impacted storm water from pond was infiltrating into the subsurface	X			- Storm water	- Repair to concrete and rubber seals - 5 soil samples collected, temporary well installed at each boring location - 3 temporary piezometers installed in 3 boring locations - 5 soil samples collected - 6 groundwater samples collected	- VOCs - SVOCs - PCBs - Inorganics	Arsenic (9.3 mg/kg)	Antimony (total)(0.0129 mg/L) Cadmium (total)(0.0067 mg/L) Lead (total)(0.164 mg/L) Manganese(total) (1.64 mg/L) Vanadium(total) (0.087 mg/L) Antimony(dissolved) (0.0223 mg/L) Manganese(dissolved) (1.02 mg/L) Vanadium(dissolved) (0.0116 mg/L) PCBs (0.0017 mg/L)	Exceeds RDC		Exceeds IDWC and RDWC all noted except: - Manganese exceeds RDWC			No Further Action	Perform CMP	NA

[1] No Further Action - determination made based on being below Cumulative Industrial Risks at or below EPA target levels
[2] LNAPL not included - Part 201 criteria are not applicable to LNAPL
[3] Results compared to generic residential criteria
[4] No further action as identified in July 2002 RFI Report

NOTES:
NA = Not Applicable
NE = Not Evaluated
IDWC = Part 201 Generic Industrial Drinking Water Criteria (Groundwater)
IPSIC = Part 201 Generic Industrial Particulate Soil Inhalation Criteria (Soil)
ISVIC = Part 201 Generic Industrial Soil Vapor Inhalation Criteria (Soil)
IDC = Part 201 Generic Industrial Direct Contact Criteria (Soil)
RDC = Part 201 Generic Residential Direct Contact Criteria (Soil)
RPSIC = Part 201 Generic Residential Particulate Soil Inhalation Criteria (Soil)
RDWC = Part 201 Generic Residential Drinking Water Criteria (Groundwater)

Note: Shaded columns represent information from Current Conditions Report for AOI not in RFI Report

TABLE 2-1
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

HISTORICAL AND CURRENT SITE BUILDINGS

Current Building Number or Name	Current Activity	Historic Building Number(s) or Name(s)	Original Year Built	Historic Activity
Fiero				
Plant 17	Non-production storage, prototyping	Plant 17, Fiero Assemebly Fiero Body Plant	1925	automotive assembly, metal fabrication, body shop, chassis, painting, trim
Powerhouse	Idle but operational power plant	Powerhouse		Power plant
Demolition Area (DA)				
Vacant Lot	Demolished	Plant 8	1927	automotive assembly
Vacant Lot	Demolished	Plant 9	1927	engine assembly
Vacant Lot	Demolished	Plant 6	1925	foundry
Vacant Lot	Demolished	Salvage Building	1945	Incineration, scrap/refuse separation
Vacant Lot	Demolished	Compressor Building		electrical transformers, air compressors
Metal Fabrication Division (MFD)				
Plant 25	engine assembly and future engine assembly	Plant 25	1967	engine assembly
		Plant 51	1967	chassis parts, machining
Plant 33	engine assembly	Plant 55	1981	engine assembly
Plant 15	pressed metal	Plant 15	1952	pressed metal
Plant 12	Vacant building scheduled for demolition	Plant 12	1950	car finishing, sales garage, equipment storage & shipping, miscellaneous non-production activities
Vacant Lot	Demolished (majority of facility)	Plant 16	1954	pressed parts, car finishing, storage
Plant 14	pressed metal	Plant 14	1951	pressed metal
Plant 49 *	pressed metal	Plant 49	1965	storage & shipping, pressed metal
Plant 11 *	Repair work and maintenance activities.	Plant 1	1945	heat treating
Plant 56 *	Western portion vacated.	Plant 2	1945	plating, pressed metal, maintenance, shipping & receiving
Plants 5 and 23 *	Western portion consists of storage and shipping & receiving.	Plant 5	1927	shipping and receiving, axle / differential
	Eastern portion is pressed metal and axle/differential operations, maintenance activities	Plant 23	1945	axle / differential, pressed metal
WWTP	wastewater treatment	WWTP	1957	wastewater treatment
ELPO	Phosphating, painting, flammable liquids storage, chemical storage	Frame Storage Building and Apprentice School	1927	Phosphating, painting, flammable liquids storage, chemical storage

TABLE 2-2
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

HYDRAULIC CONDUCTIVITY VALUES

Well ID	Calculated[4]	Slug Test Data[5]			
		Test 1	Test 2	Test 3	AVG.
SITEWIDE					
MWF1	5.58E-02	NA	NA	NA	--
MWF2	3.79E-02	NA	NA	NA	--
IWF3	2.52E-04	NA	NA	NA	--
GWF4	1.78E-02	NA	NA	NA	--
MWP1	1.24E-04	NA	NA	NA	--
IWP2 (1)	NA	NA	NA	NA	--
GWP3	8.03E-04	NA	NA	NA	--
MWP4	3.51E-05	NA	NA	NA	--
IWP5 (2)	NA	NA	NA	NA	--
GWP6	4.35E-01	NA	NA	NA	--
MWD1	4.54E-04	NA	NA	NA	--
MWD2	8.81E-04	NA	NA	NA	--
MWD3	1.89E-03	NA	NA	NA	--
MWD4 (2)	NA	NA	NA	NA	--
MWD5	7.53E-01	6.71E-02	NA	NA	6.71E-02
MWD6 (2)	NA	9.80E-03	NA	NA	9.80E-03
IWD7 (2)	NA	NA	NA	NA	--
GWD8	3.56E-03	1.21E-02	NA	NA	1.21E-02
MWM1	1.90E-02	5.97E-03	NA	NA	5.97E-03
IWM2	3.75E-05	5.89E-05	NA	NA	5.89E-05
GWM3 (2)	NA	9.86E-03	9.84E-03	NA	9.85E-03
MWM4	1.69E-02	NA	NA	NA	--
MWM5	5.97E-03	NA	NA	NA	--
MWM6	2.10E-03	NA	NA	NA	--
MWM7	5.42E-02	NA	NA	NA	--
MWM8	9.10E-04	NA	NA	NA	--
MWM9	1.38E-03	NA	NA	NA	--
MWM10	1.01E-03	NA	NA	NA	--
MWS1	3.11E-03	NA	NA	NA	--
GWS2	3.23E-03	NA	NA	NA	--
GWD9	2.15E-03	NA	NA	NA	--
DWD10	3.88E-03	NA	NA	NA	--
GWD11	1.15E-04	1.28E-04	NA	NA	--
DWD12	1.59E-03	NA	NA	NA	--
DWD13	5.90E-03	NA	NA	NA	--
FIERO					
F-12					
MWF12-01	1.60E-02	1.83E-01	1.78E-01	NA	1.80E-01
MWF12-02	1.50E+00	1.36E-01	NA	NA	1.36E-01
F-7					
MWF7-01	1.99E-02	NA	NA	NA	--
MWF7-02	1.59E-02	NA	NA	NA	--
F-8					
MWF8-01	2.74E-02	NA	NA	NA	--
F-15					
MWF15-01	3.40E-02	NA	NA	NA	--

TABLE 2-2
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

HYDRAULIC CONDUCTIVITY VALUES

Well ID	Calculated[4]	Slug Test Data[5]			
		Test 1	Test 2	Test 3	AVG.
POWERTRAIN					
P-6					
MWP6-01	1.33E-03	2.62E-04	NA	NA	2.62E-04
MWP6-02	2.45E-05	NA	NA	NA	--
MWP6-03	NA	2.42E-02	NA	NA	2.42E-02
MWP6-04	8.60E-05	NA	NA	NA	--
MWP6-05 (1)	NA	NA	NA	NA	--
MWP6-06 (1)	NA	NA	NA	NA	--
MWP6-07	3.60E-04	7.54E-04	NA	NA	7.54E-04
MWP6-08 (1)	NA	NA	NA	NA	--
DEMOLITION AREA					
W-1					
MWW1-01	8.15E-04	NA	NA	NA	--
MWW1-02	1.65E-03	7.28E-04	NA	NA	7.28E-04
MWW1-03	6.22E-03	1.98E-03	NA	NA	1.98E-03
MWW1-04	1.37E-01	8.69E-02	NA	NA	8.69E-02
MWW1-05 (2)	NA	NA	NA	NA	--
MW28-99	1.29E-02	NA	NA	NA	--
MW29-99	3.65E-02	NA	NA	NA	--
MW30-99	6.40E-03	NA	NA	NA	--
MW31-99	1.20E-02	NA	NA	NA	--
MW33-99 (2)	NA	8.67E-03	NA	NA	8.67E-03
MW34-99	2.88E-03	NA	NA	NA	--
MW42-99	1.29E-02	NA	NA	NA	--
W-5					
MWW5-01	2.98E-05	NA	NA	NA	--
MWW5-02	5.95E-04	NA	NA	NA	--
W-8					
MWW8-01	4.53E-03	NA	NA	NA	--
MWW8-02	2.17E-03	NA	NA	NA	--
MWW8-03	9.53E-04	NA	NA	NA	--
MWW8-04	2.34E-05	NA	NA	NA	--
MWW8-05 (2)	NA	NA	NA	NA	--
MWW8-06 (3)	NA	NA	NA	NA	--
MWW8-07 (3)	NA	NA	NA	NA	--
MWW8-08 (2)	NA	NA	NA	NA	--
MWW8-09 (3)	NA	NA	NA	NA	--
MWW8-10	8.09E-04	2.63E-04	3.80E-04	NA	3.22E-04
MWW8-11 (2)	NA	3.32E-04	1.80E-04	1.09E-04	2.07E-04
MWW8-12 (2)	NA	NA	NA	NA	--
W-10					
MWW10-01 (3)	NA	NA	NA	NA	--
MWW10-02	2.01E-03	3.31E-03	1.59E-02	NA	9.58E-03
MWW10-03	3.81E-02	NA	NA	NA	--
MWW10-04	1.44E-03	NA	NA	NA	--
MWW10-05 (3)	NA	NA	NA	NA	--
MWW10-06 (2)	NA	NA	NA	NA	--

TABLE 2-2
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

HYDRAULIC CONDUCTIVITY VALUES

Well ID	Calculated[4]	Slug Test Data[5]			
		Test 1	Test 2	Test 3	AVG.
MFD					
M-1					
MWM1-01	1.50E-03	6.88E-03	NA	NA	6.88E-03
MWM1-02	5.32E-01	NA	NA	NA	--
MWM1-03	4.90E-02	NA	NA	NA	--
M-2					
MWM2-01	NA	4.54E-02	NA	NA	4.54E-02
MWM2-02	5.42E-02	NA	NA	NA	--
MWM2-03	5.91E-03	NA	NA	NA	--
MWM2-04	1.68E-02	NA	NA	NA	--
MWM2-05	1.57E-02	3.39E-02	NA	NA	3.39E-02
MWM2-06	1.02E-01	NA	NA	NA	--
MWM2-07	1.94E-02	NA	NA	NA	--
MWM2-08	7.52E-03	NA	NA	NA	--
M-4					
MWM4-01	1.32E-02	NA	NA	NA	--
MWM4-02	1.10E+00	2.22E-02	9.09E-03	NA	1.57E-02
MWM4-03	1.70E-02	NA	NA	NA	--
MWM4-04	4.25E-04	NA	NA	NA	--
MWM4-05	3.40E-03	NA	NA	NA	--
M-5					
MW-2-99	2.23E-03	NA	NA	NA	--
MWM5-01	5.41E-05	NA	NA	NA	--
M-7					
MWM7-01	1.36E-04	NA	NA	NA	--
MWM7-02	3.89E-03	NA	NA	NA	--
MWM7-03 (3)	NA	NA	NA	NA	--
M-9					
MWM9-01 (1)	NA	NA	NA	NA	--
MWM9-02	NA	NA	NA	NA	--
M-16					
MWM16-01	7.21E-01	7.00E-02	NA	NA	7.00E-02
MWM16-02	9.46E-03	1.00E-02	NA	NA	1.00E-02
M-25					
MWM25-01 (1)	NA	NA	NA	NA	--
PONTIAC SCHOOL BOARD					
MWPS-02	9.94E-03	NA	NA	NA	--
MWPS-01	NA	3.67E-02	NA	NA	3.67E-02

Notes:

1. Monitoring well was dry
2. Hydraulic conductivity could not be calculated due to no drawdown during low flow sampling or well was purged dry during low flow sampling.
3. Hydraulic conductivity was not determined because monitoring well contains LNAPL.
4. Hydraulic conductivity was estimated using information obtained from low flow sampling (pump rate, drawdown, and purge volume.
5. Hydraulic conductivity determined from slug test (rising head).
6. NA - Hydraulic conductivity not determined.

Table 2-3: Metal Concentrations in Background Soil from 0 to 2 ft bgs
GM Pontiac North Campus, Pontiac, Michigan

	Sb		As		Ba		Be		Cd		Cr		Co		Cu		Pb		Mn		Hg		Ni		Se		Th		V		Zn	
Sample ID	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
SB-01-S(0-2)	1.09	U	3.86		36.6		0.15		0.273	U	11.5		4.9		11.7		7.7		272		0.018	U	14		0.273	U	1.78		14.3		32.7	
SB-03-S(0-2) *	1.07	U	13.2		22.3		0.116		0.267	U	11.2		3.51		10.8		16.75		223		0.012	J	10.8		0.267	U	1.46		12.6		189	
GWM3-5(0-2)062701	0.264	U	3.88		26.1		0.126		0.023	U	10.3		3.3		10.6		15.5		216		0.029	J	9.49		0.167	U	0.269	U	11.9		29.4	
GWP6-S(0-2)-061301 #	0.28	U	4.3	J	54		0.408		0.61		10.6		5.16		14.8		20.4		259		0.079		12.6		0.547	J	0.737	J	18.1		45.9	
MWF2-S(0-2)062201	0.278	U	3.15		6.12		0.026	U	0.118	J	5.08		2.38		5.48		2.8		149		0.005	U	5.01		0.176	U	0.592	J	6.81		18.3	
MWP1-S(0-2)062801	0.273	U	4.74		42.9		0.178		0.091	J	11.1		5.21		13.3		26.4		271		0.057		12.1		0.173	U	0.278	U	14.5		52.7	
Count	**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**		**6**	
Detected	**0**		**6**		**6**		**5**		**3**		**6**		**6**		**6**		**6**		**6**		**4**		**6**		**1**		**4**		**6**		**6**	
Minimum	0.3		3.2		6		0.03		0.02		5.1		2.4		5.5		2.8		149		0.00		5.0		0.17		0.3		7		18	
Median	0.3		4.1		31		0.14		0.19		10.9		4.2		11.3		16.1		241		0.02		11.5		0.22		0.7		13		39	
Maximum	1.1		13.2		54		0.41		0.61		11.5		5.2		14.8		26.4		272		0.08		14.0		0.55		1.8		18		189	
IQR	0.6		0.8		18		0.05		0.17		0.8		1.7		2.3		9.8		50		0.04		2.7		0.10		0.9		2		21	
Mean	0.5		5.5		31		0.17		0.23		10.0		4.1		11.1		14.9		232		0.03		10.7		0.27		0.9		13		61	
SD	0.4		3.8		17		0.13		0.21		2.4		1.2		3.2		8.5		47		0.03		3.2		0.15		0.6		4		64	
RSD	77%		69%		54%		77%		92%		24%		29%		29%		57%		20%		87%		30%		54%		74%		29%		104%	
0.99 Bootstrap UPL			**101.7**		**110**		**1.53**				**49.2**		**17.4**		**17.4**		**49.2**		**510**				**30.1**						**33**		**1202**	
MDEQ Background	**NA**		**5.8**		**75**		**NA**		**1.20**		**18.0**		**6.8**		**32.0**		**21.0**		**440**		**0.13**		**20.0**		**0.41**		**NA**		**NA**		**47**	
Background			***13.2***		**110**		**1.53**		**1.20**		**49.2**		**17.4**		**32.0**		**49.2**		**510**		**0.13**		**30.1**		**0.41**		**1.8**		**33**		***189***	

Notes:

1. Concentrations for Sample IDs with * represent average of duplicate samples.
2. Concentrations for nondetects (U-qualified data) are 0.5 the quantitation limits.
3. Sample SB-02-S(0-2) from Location SB-02 was excluded from the calculations because the concentrations of several metals appear unusually high
4. # The original arsenic concentration of 134 mg/kg is replaced with the average of the five verification samples.
5. The calculated UPL for arsenic is unreasonably high for background; the higher of the maximum detected concentration or MDEQ background is used.
6. The calculated UPL for zinc is unreasonably high for background; the higher of the maximum detected concentration or MDEQ background is used.

TABLE 4-1

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR PONTIAC SCHOOL BOARD (SEDIMENT)

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 Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	5	5	8.80E-03	3.73E-02	1.00E-01				1.10E+05	9E-07	2.30E+04	4E-06
VOC	Benzene	71-43-2	A	5					7.50E-04	2.50E-03		4.00E+02	0E+00	1.80E+02	0E+00
VOC	Bromodichloromethane	75-27-4	B2	5					1.40E-03	4.50E-03		7.50E+02	0E+00	1.10E+02	0E+00
VOC	Bromoform	75-25-2	B2	5					1.90E-03	6.10E-03		8.70E+02	0E+00	8.20E+02	0E+00
VOC	Bromomethane	74-83-9	D	5					2.10E-03	6.80E-03		1.60E+03	0E+00	3.20E+02	0E+00
VOC	2-Butanone	78-93-3	D	5	2	1.20E-02	1.65E-02	2.10E-02	3.10E-03	4.30E-03		2.70E+04	8E-07	2.70E+04	8E-07
VOC	Carbon Disulfide	75-15-0		5					9.10E-04	3.00E-03		2.80E+02	0E+00	2.80E+02	0E+00
VOC	Carbon Tetrachloride	56-23-5	B2	5					1.20E-03	3.80E-03		3.90E+02	0E+00	9.60E+01	0E+00
VOC	Chlorobenzene	108-90-7	D	5					6.00E-04	2.00E-03		2.60E+02	0E+00	2.60E+02	0E+00
VOC	Chloroethane	75-00-3		5					2.60E-03	8.30E-03		9.50E+02	0E+00	9.50E+02	0E+00
VOC	Chloroform	67-66-3	B2	5					9.50E-04	3.10E-03		1.50E+03	0E+00	1.20E+03	0E+00
VOC	Chloromethane	74-87-3	D	5					1.50E-03	4.90E-03		1.10E+03	0E+00	1.10E+03	0E+00
VOC	Cumene	98-82-8	D	5	2	1.00E-02	1.40E-02	1.80E-02	8.10E-04	1.10E-03		3.90E+02	5E-05	3.90E+02	5E-05
VOC	Cyclohexane	110-82-7		5	2	2.50E-02	2.65E-02	2.80E-02	1.20E-03	1.60E-03			0E+00		0E+00
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	5					1.90E-03	6.10E-03		1.20E+00	0E+00	1.20E+00	0E+00
VOC	Dibromochloromethane	124-48-1	C	5					1.30E-03	4.20E-03		6.10E+02	0E+00	1.10E+02	0E+00
VOC	1,2-Dibromoethane	106-93-4	B2	5					1.40E-03	4.50E-03		6.60E-01	0E+00	9.20E-02	0E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	5					8.20E-04	2.70E-03		2.10E+02	0E+00	2.10E+02	0E+00
VOC	1,3-Dichlorobenzene	541-73-1	D	5					9.30E-04	3.00E-03		1.70E+02	0E+00	1.70E+02	0E+00
VOC	1,4-Dichlorobenzene	106-46-7	C	5					7.80E-04	2.50E-03		2.90E+03	0E+00	4.00E+02	0E+00
VOC	Dichlorodifluoromethane	75-71-8		5					1.30E-03	4.20E-03		1.00E+03	0E+00	1.00E+03	0E+00
VOC	1,1-Dichloroethane	75-34-3	C	5					6.70E-04	2.20E-03		8.90E+02	0E+00	8.90E+02	0E+00
VOC	1,2-Dichloroethane	107-06-2	B2	5					8.50E-04	2.80E-03		6.40E+02	0E+00	9.10E+01	0E+00
VOC	1,1-Dichloroethene	75-35-4	C	5					1.40E-03	4.50E-03		5.70E+02	0E+00	2.00E+02	0E+00
VOC	cis-1,2-Dichloroethene	156-59-2	D	5					9.70E-04	3.20E-03		6.40E+02	0E+00	6.40E+02	0E+00
VOC	trans-1,2-Dichloroethene	156-60-5		5					8.50E-04	2.80E-03		1.40E+03	0E+00	1.40E+03	0E+00
VOC	1,2-Dichloropropane	78-87-5	B2	5					8.70E-04	2.80E-03		5.50E+02	0E+00	1.40E+02	0E+00
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	5					1.00E-03	3.30E-03		6.20E+02	0E+00	1.30E+02	0E+00
VOC	Ethyl Benzene	100-41-4	D	5	2	7.20E-03	1.06E-02	1.40E-02	6.80E-04	9.50E-04		1.40E+02	1E-04	1.40E+02	1E-04
VOC	2-Hexanone	591-78-6		5					2.00E-03	6.40E-03		2.50E+03	0E+00	2.50E+03	0E+00
VOC	Methyl Acetate	79-20-9		5					1.30E-03	4.20E-03			0E+00		0E+00
VOC	Methyl tert-butyl ether	1634-04-4		5					9.70E-04	3.20E-03		5.90E+03	0E+00	1.80E+03	0E+00
VOC	4-Methyl-2-pentanone	108-10-1		5					2.20E-03	7.20E-03		2.70E+03	0E+00	2.70E+03	0E+00
VOC	Methylcyclohexane	108-87-2		5	2	2.00E-02	2.00E-02	2.00E-02	6.80E-04	9.50E-04			0E+00		0E+00
VOC	Methylene Chloride	75-09-2	B2	5					1.50E-03	4.90E-03		2.30E+03	0E+00	1.30E+03	0E+00
VOC	Styrene	100-42-5		5					5.80E-04	1.90E-03		5.20E+02	0E+00	4.00E+02	0E+00
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	5					2.10E-03	6.80E-03		3.70E+02	0E+00	5.30E+01	0E+00
VOC	Tetrachloroethene	127-18-4	C-B2	5					1.40E-03	4.50E-03		8.80E+01	0E+00	8.80E+01	0E+00
VOC	Toluene	108-88-3	D	5	1	2.10E-03	2.10E-03	2.10E-03	6.20E-04	2.00E-03		2.50E+02	8E-06	2.50E+02	8E-06
VOC	1,2,4-Trichlorobenzene	120-82-1	D	5					1.00E-03	3.40E-03		1.10E+03	0E+00	9.90E+02	0E+00
VOC	1,1,1-Trichloroethane	71-55-6	D	5					1.10E-03	3.50E-03		4.60E+02	0E+00	4.60E+02	0E+00
VOC	1,1,2-Trichloroethane	79-00-5	C	5					1.40E-03	4.50E-03		9.20E+02	0E+00	1.80E+02	0E+00
VOC	Trichloroethene	79-01-6	C-B2	5					8.80E-04	2.90E-03		5.00E+02	0E+00	5.00E+02	0E+00
VOC	Trichlorofluoromethane	75-69-4		5	1	1.45E-03	1.45E-03	1.45E-03	1.30E-03	4.20E-03		5.60E+02	3E-06	5.60E+02	3E-06
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		5					1.10E-03	3.50E-03		5.50E+02	0E+00	5.50E+02	0E+00
VOC	Vinyl Chloride	75-01-4	A	5					1.60E-03	5.30E-03		2.90E+01	0E+00	4.00E+00	0E+00
VOC	Xylenes (total)	1330-20-7	D	5	2	4.30E-02	6.90E-02	9.50E-02	2.20E-03	3.00E-03		1.50E+02	6E-04	1.50E+02	6E-04
SVOC	Acenaphthene	83-32-9		5	4	3.71E-01	3.58E+00	6.70E+00	5.90E-01	5.90E-01		2.00E+05	3E-05	4.10E+04	2E-04

TABLE 4-1

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR PONTIAC SCHOOL BOARD (SEDIMENT)

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 Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	Acenaphthylene	208-96-8	D	5					3.07E-01	3.20E+00		8.00E+03	0E+00	1.60E+03	0E+00
SVOC	Acetophenone	98-86-2	D	5					3.24E-01	3.40E+00		1.10E+03	0E+00	1.10E+03	0E+00
SVOC	Anthracene	120-12-7	D	5	5	6.60E-01	4.55E+00	1.00E+01				1.00E+06	1E-05	2.30E+05	4E-05
SVOC	Atrazine	1912-24-9		5					9.50E-01	1.00E+01		5.00E+02	0E+00	7.10E+01	0E+00
SVOC	Benzaldehyde	100-52-7		5					1.12E+00	1.20E+01			0E+00		0E+00
SVOC	Benzo(a)anthracene	56-55-3	B2	5	5	1.40E+00	2.19E+01	5.30E+01				1.00E+02	5E-01	2.00E+01	**3E+00**
SVOC	Benzo(a)pyrene	50-32-8	B2	5	5	1.30E+00	2.07E+01	5.00E+01				1.00E+01	**5E+00**	2.00E+00	**3E+01**
SVOC	Benzo(b)fluoranthene	205-99-2	B2	5	5	2.00E+00	2.81E+01	6.90E+01				1.00E+02	7E-01	2.00E+01	**3E+00**
SVOC	Benzo(g,h,i)perylene	191-24-2	D	5	5	1.10E+00	1.32E+01	3.10E+01				9.10E+03	3E-03	2.50E+03	1E-02
SVOC	Benzo(k)fluoranthene	207-08-9	B2	5	5	1.10E+00	1.20E+01	3.20E+01				1.00E+03	3E-02	2.00E+02	2E-01
SVOC	Biphenyl	92-52-4		5					8.95E-01	9.50E+00			0E+00		0E+00
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	5					3.07E-01	3.20E+00			0E+00		0E+00
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	5					3.29E-01	3.50E+00		8.90E+01	0E+00	1.30E+01	0E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	5	5	1.30E+00	3.48E+00	5.80E+00				1.00E+04	6E-04	2.80E+03	2E-03
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	5					3.96E-01	4.20E+00			0E+00		0E+00
SVOC	Butylbenzylphthalate	85-68-7	C	5	3	6.95E-01	4.40E+00	1.10E+01	2.30E+00	3.50E+00		3.10E+02	4E-02	3.10E+02	4E-02
SVOC	Caprolactam	105-60-2		5					1.17E+00	1.20E+01		4.50E+05	0E+00	5.30E+04	0E+00
SVOC	Carbazole	86-74-8	B2	5	3	6.50E-01	3.58E+00	5.50E+00	6.00E-01	6.50E-01		3.70E+03	1E-03	5.30E+02	1E-02
SVOC	4-Chloro-3-methylphenol	59-50-7		5					3.29E-01	3.50E+00		2.20E+04	0E+00	4.50E+03	0E+00
SVOC	4-Chloroaniline	106-47-8		5					3.29E-01	3.50E+00			0E+00		0E+00
SVOC	2-Chloronaphthalene	91-58-7		5					3.12E-01	3.30E+00		2.80E+05	0E+00	5.60E+04	0E+00
SVOC	2-Chlorophenol	95-57-8		5					3.35E-01	3.50E+00		6.90E+03	0E+00	1.40E+03	0E+00
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		5					3.35E-01	3.50E+00			0E+00		0E+00
SVOC	Chrysene	218-01-9	B2	5	5	2.10E+00	2.97E+01	7.10E+01				1.00E+04	7E-03	2.00E+03	4E-02
SVOC	Di-n-butylphthalate	84-74-2	D	5					9.50E-01	1.00E+01		7.60E+02	0E+00	7.60E+02	0E+00
SVOC	Di-n-octylphthalate	117-84-0		5					3.51E-01	3.70E+00		2.80E+04	0E+00	6.90E+03	0E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	5	4	5.75E-01	4.02E+00	7.60E+00	5.90E-01	5.90E-01		1.00E+01	8E-01	2.00E+00	**4E+00**
SVOC	Dibenzofuran	132-64-9	D	5	2	3.12E-01	1.41E+00	2.50E+00	5.80E-01	3.40E+00			0E+00		0E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	5					2.51E-01	2.70E+00		4.70E+01	0E+00	6.60E+00	0E+00
SVOC	2,4-Dichlorophenol	120-83-2		5					3.24E-01	3.40E+00		1.80E+03	0E+00	6.60E+02	0E+00
SVOC	Diethylphthalate	84-66-2	D	5					9.50E-01	1.00E+01		7.40E+02	0E+00	7.40E+02	0E+00
SVOC	2,4-Dimethylphenol	105-67-9		5					5.20E-01	5.40E+00		5.60E+04	0E+00	1.10E+04	0E+00
SVOC	Dimethylphthalate	131-11-3	D	5					1.06E+00	1.10E+01		7.90E+02	0E+00	7.90E+02	0E+00
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		5					1.06E+00	1.10E+01		3.90E+02	0E+00	7.90E+01	0E+00
SVOC	2,4-Dinitrophenol	51-28-5		5					7.25E-01	7.50E+00			0E+00		0E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	5					2.96E-01	3.10E+00		3.40E+02	0E+00	4.80E+01	0E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	5					3.12E-01	3.30E+00			0E+00		0E+00
SVOC	Fluoranthene	206-44-0	D	5	5	4.00E+00	5.60E+01	1.30E+02				1.80E+05	7E-04	4.60E+04	3E-03
SVOC	Fluorene	86-73-7	D	5	5	5.66E-01	2.63E+00	5.70E+00				1.30E+05	4E-05	2.70E+04	2E-04
SVOC	Hexachlorobenzene	118-74-1	B2	5					3.63E-01	3.80E+00		5.10E+01	0E+00	8.90E+00	0E+00
SVOC	Hexachlorobutadiene	87-68-3	C	5					2.90E-01	3.10E+00		3.50E+02	0E+00	1.00E+02	0E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	5					3.91E-01	4.10E+00		7.20E+02	0E+00	7.20E+02	0E+00
SVOC	Hexachloroethane	67-72-1	C	5					3.12E-01	3.30E+00		1.10E+03	0E+00	2.30E+02	0E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	5	5	8.70E-01	1.17E+01	2.80E+01				1.00E+02	3E-01	2.00E+01	**1E+00**
SVOC	Isophorone	78-59-1	C	5					2.85E-01	3.00E+00		2.40E+03	0E+00	2.40E+03	0E+00
SVOC	2-Methylnaphthalene	91-57-6		5	3	4.46E-01	1.58E+00	3.20E+00	6.00E-01	2.20E+00		4.00E+04	8E-05	8.10E+03	4E-04
SVOC	Methylphenol (summed)	1319-77-3		5					3.07E-01	3.20E+00		5.60E+04	0E+00	1.10E+04	0E+00
SVOC	Naphthalene	91-20-3	C	5	2	3.72E-01	5.76E-01	7.80E-01	6.10E-01	3.30E+00		8.00E+04	1E-05	1.60E+04	5E-05

TABLE 4-1

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR PONTIAC SCHOOL BOARD (SEDIMENT)

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 Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	2-Nitroaniline	88-74-4		5					2.96E-01	3.10E+00			0E+00		0E+00
SVOC	3-Nitroaniline	99-09-2	C	5					8.95E-01	9.50E+00			0E+00		0E+00
SVOC	4-Nitroaniline	100-01-6	C	5					4.41E-01	4.60E+00			0E+00		0E+00
SVOC	Nitrobenzene	98-95-3	D	5					2.96E-01	3.10E+00		4.90E+02	0E+00	1.00E+02	0E+00
SVOC	2-Nitrophenol	88-75-5		5					2.96E-01	3.10E+00		3.10E+03	0E+00	6.30E+02	0E+00
SVOC	4-Nitrophenol	100-02-7		5					1.23E+00	1.30E+01			0E+00		0E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	5					3.18E-01	3.30E+00		1.20E+04	0E+00	1.70E+03	0E+00
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	5					2.85E-01	3.00E+00		8.30E+00	0E+00	1.20E+00	0E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	5					3.35E-01	3.50E+00			0E+00		0E+00
SVOC	Pentachlorophenol	87-86-5	B2	5					7.80E-01	8.20E+00		3.90E+02	0E+00	9.00E+01	0E+00
SVOC	Phenanthrene	85-01-8	D	5	5	2.80E+00	2.42E+01	5.60E+01				8.00E+03	7E-03	1.60E+03	4E-02
SVOC	Phenol	108-95-2	D	5					3.18E-01	3.30E+00		1.20E+04	0E+00	1.20E+04	0E+00
SVOC	Pyrene	129-00-0	D	5	5	3.30E+00	5.06E+01	1.20E+02				1.10E+05	1E-03	2.90E+04	4E-03
SVOC	2,4,5-Trichlorophenol	95-95-4		5					3.57E-01	3.70E+00		1.10E+05	0E+00	2.30E+04	0E+00
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	5					4.08E-01	4.30E+00		5.00E+03	0E+00	7.10E+02	0E+00
P/PCB	PCBs (summed)	1336-36-3	B2	5	5	1.02E-01	2.79E-01	3.87E-01				2.00E+01	2E-02	4.00E+00	1E-01
INORG	Antimony	7440-36-0		5	4	1.52E+00	3.05E+00	5.18E+00	1.11E+00	1.11E+00		1.20E+03	4E-03	1.80E+02	3E-02
INORG	Arsenic	7440-38-2	A	5	5	4.86E+00	1.37E+01	2.30E+01			1.32E+01	6.10E+01	2E-01	7.60E+00	**1E+00**
INORG	Barium	7440-39-3	D	5	5	6.79E+01	1.24E+02	2.27E+02			1.10E+02	2.50E+05	5E-04	3.70E+04	3E-03
INORG	Beryllium	7440-41-7	B1	5	5	6.28E-01	9.86E-01	1.67E+00			1.53E+00	3.10E+03	5E-05	4.10E+02	3E-04
INORG	Cadmium	7440-43-9	B1	5	5	6.03E-01	3.60E+00	7.43E+00			1.20E+00	4.10E+03	2E-03	5.50E+02	1E-02
INORG	Chromium (total)	7440-47-3		5	5	2.46E+01	6.77E+01	1.28E+02			4.92E+01	1.70E+04	5E-03	2.50E+03	3E-02
INORG	Cobalt	7440-48-4		5	5	2.41E+00	4.97E+00	6.73E+00			1.74E+01	1.80E+04	0E+00	2.60E+03	0E+00
INORG	Copper	7440-50-8	D	5	5	6.24E+01	1.29E+02	2.30E+02			3.20E+01	1.40E+05	1E-03	2.00E+04	1E-02
INORG	Lead	7439-92-1	B2	5	5	1.75E+02	4.35E+02	6.59E+02			4.92E+01	9.00E+02	7E-01	4.00E+02	**2E+00**
INORG	Manganese	7439-96-5	D	5	5	6.31E+02	1.37E+03	2.01E+03			5.10E+02	1.70E+05	9E-03	2.50E+04	6E-02
INORG	Mercury	7439-97-6	D	5	5	3.42E-02	1.37E-01	3.35E-01			1.30E-01	1.10E+03	2E-04	1.60E+02	1E-03
INORG	Nickel	7440-02-0	A	5	5	1.22E+01	2.97E+01	4.54E+01			3.01E+01	2.70E+05	6E-05	4.00E+04	4E-04
INORG	Selenium	7782-49-2	D	5					3.87E-01	7.03E-01	4.10E-01	1.80E+04	0E+00	2.60E+03	0E+00
INORG	Silver	7440-22-4	D	5	3	6.45E-01	9.73E-01	1.46E+00	1.87E-01	3.40E-01		1.70E+04	9E-05	2.50E+03	6E-04
INORG	Thallium	7440-28-0		5	4	8.28E-01	1.04E+00	1.39E+00	6.24E-01	6.24E-01		2.40E+02	6E-03	3.50E+01	4E-02
INORG	Vanadium	7440-62-2		5	5	9.09E+00	1.55E+01	2.55E+01			3.28E+01	1.00E+04	0E+00	7.50E+02	0E+00
INORG	Zinc	7440-66-6	D	5	5	4.04E+02	8.59E+02	1.52E+03			4.70E+01	1.00E+06	1E-03	1.70E+05	9E-03
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	2	2	8.25E-06	8.54E-06	8.84E-06				9.90E-04	9E-03	9.00E-05	1E-01

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.
12. The concentrations for the Target Dioxin congeners were used to calculate an 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

TABLE 4-2

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR PONTIAC SCHOOL BOARD (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	31	22	3.10E-03	1.69E-02	8.40E-02	1.80E-03	2.20E-02		1.10E+05	8E-07	1.60E+05	5E-07	1.70E+08	5E-10	1.10E+05	8E-07	1.10E+05	8E-07	1.30E+05	6E-07	3.90E+08	2E-10	2.30E+04	4E-06
VOC	Benzene	71-43-2	A	31	2	1.70E-03	2.10E+00	4.20E+00	5.50E-04	6.30E-03		8.40E+00	5E-01	4.50E+01	9E-02	4.70E+05	9E-06	4.00E+02	1E-02	1.60E+00	**3E+00**	1.30E+01	3E-01	3.80E+05	1E-05	1.80E+02	2E-02
VOC	Bromodichloromethane	75-27-4	B2	31					1.00E-03	2.70E-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	31					1.40E-03	2.70E-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	31					1.50E-03	5.40E-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	31	14	2.00E-03	5.55E-03	1.30E-02	2.30E-03	1.10E+00		2.70E+04	5E-07	3.50E+04	4E-07	2.90E+07	4E-10	2.70E+04	5E-07	2.70E+04	5E-07	2.90E+04	4E-07	6.70E+07	2E-10	2.70E+04	5E-07
VOC	Carbon Disulfide	75-15-0		31	3	1.50E-03	2.03E-03	3.00E-03	6.70E-04	2.70E-01		1.40E+02	2E-05	1.60E+03	2E-06	2.10E+07	1E-10	2.80E+02	1E-05	7.60E+01	4E-05	1.30E+03	2E-06	4.70E+07	6E-11	2.80E+02	1E-05
VOC	Carbon Tetrachloride	56-23-5	B2	31					8.50E-04	2.70E-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	31					4.40E-04	2.70E-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		31					1.90E-03	5.40E-01		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	31					7.00E-04	2.70E-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	31					1.10E-03	5.40E-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	31	1	1.40E-01	1.40E-01	1.40E-01	6.00E-04	6.30E-03		3.90E+02	4E-04	2.00E+03	7E-05	2.60E+06	5E-08	3.90E+02	4E-04	3.90E+02	4E-04	1.70E+03	8E-05	5.80E+06	2E-08	3.90E+02	4E-04
VOC	Cyclohexane	110-82-7		31	3	1.05E-03	2.05E-01	6.10E-01	8.50E-04	1.30E-02																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	31					1.40E-03	5.40E-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	31					9.40E-04	2.70E-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	31					1.00E-03	2.70E-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	31	1	1.20E-03	1.20E-03	1.20E-03	6.10E-04	2.70E-01		2.10E+02	6E-06	4.60E+04	3E-08	4.40E+07	3E-11	2.10E+02	6E-06	2.10E+02	6E-06	3.90E+04	3E-08	1.00E+08	1E-11	2.10E+02	6E-06
VOC	1,3-Dichlorobenzene	541-73-1	D	31					6.80E-04	2.70E-01								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	31					5.70E-04	2.70E-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		31					9.40E-04	5.40E-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	31					4.90E-04	2.70E-01		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	31					6.20E-04	2.70E-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	31					1.00E-03	2.70E-01		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	31					7.20E-04	2.70E-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		31					6.20E-04	2.70E-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	31					6.40E-04	2.70E-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	31					7.30E-04	2.70E-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	31	1	2.20E+00	2.20E+00	2.20E+00	5.00E-04	6.30E-03		1.40E+02	2E-02	1.10E+04	2E-04	2.90E+07	8E-08	1.40E+02	2E-02	1.40E+02	2E-02	9.50E+03	2E-04	6.70E+07	3E-08	1.40E+02	2E-02
VOC	2-Hexanone	591-78-6		31					1.40E-03	1.10E+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		31	5	9.70E-04	2.96E-02	1.40E-01	9.40E-04	1.30E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		31	1	4.70E-01	4.70E-01	4.70E-01	7.20E-04	2.50E-02		5.90E+03	8E-05	3.00E+04	2E-05	8.80E+07	5E-09	5.90E+03	8E-05	5.90E+03	8E-05	2.50E+04	2E-05	2.00E+08	2E-09	1.80E+03	3E-04
VOC	4-Methyl-2-pentanone	108-10-1		31					1.60E-03	1.10E+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		31	5	6.00E-04	5.88E-02	2.90E-01	5.00E-04	1.30E-02																	
VOC	Methylene Chloride	75-09-2	B2	31	5	1.30E-03	1.56E-03	1.90E-03	1.10E-03	2.70E-01		2.40E+02	8E-06	7.00E+02	3E-06	8.30E+06	2E-10	2.30E+03	8E-07	4.50E+01	4E-05	2.10E+02	9E-06	6.60E+06	3E-10	1.30E+03	1E-06
VOC	Styrene	100-42-5		31					4.30E-04	2.70E-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	31					1.50E-03	2.70E-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	31					1.00E-03	2.70E-01		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	31	22	5.50E-04	8.51E-03	1.60E-01	5.30E-04	6.30E-03		2.50E+02	6E-04	3.30E+03	5E-05	1.20E+07	1E-08	2.50E+02	6E-04	2.50E+02	6E-04	2.80E+03	6E-05	2.70E+07	6E-09	2.50E+02	6E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	31					7.60E-04	2.70E-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	31					7.80E-04	2.70E-01		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	31					1.00E-03	2.70E-01		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	31					6.50E-04	2.70E-01		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		31					9.40E-04	5.40E-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		31					7.90E-04	2.70E-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	31					1.20E-03	5.40E-01		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	31	1	8.10E+00	8.10E+00	8.10E+00	1.60E-03	1.30E-02		1.50E+02	5E-02	5.40E+04	2E-04	1.30E+08	6E-08	1.50E+02	5E-02	1.50E+02	5E-02	4.60E+04	2E-04	2.90E+08	3E-08	1.50E+02	5E-02
SVOC	Acenaphthene	83-32-9		31	5	7.00E-02	1.40E-01	1.90E-01	5.50E-02	2.10E+00		3.50E+05	5E-07	9.70E+04	2E-06	6.20E+06	3E-08	2.00E+05	1E-06	1.90E+05	1E-06	8.10E+04	2E-06	1.40E+07	1E-08	4.10E+04	5E-06
SVOC	Acenaphthylene	208-96-8	D	31					5.10E-02	2.10E+00		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	31	1	7.70E-02	7.70E-02	7.70E-02	5.40E-02	2.10E+00		1.10E+03	7E-05	5.20E+04	1E-06	1.40E+07	6E-09	1.10E+03	7E-05	1.10E+03	7E-05	4.40E+04	2E-06	3.30E+07	2E-09	1.10E+03	7E-05
SVOC	Anthracene	120-12-7	D	31	6	5.40E-02	1.41E-01	2.70E-01	5.30E-02	2.10E+00		1.00E+06	3E-07	1.60E+06	2E-07	2.90E+07	9E-09	1.00E+06	3E-07	1.00E+06	3E-07	1.40E+06	2E-07	6.70E+07	4E-09	2.30E+05	1E-06
SVOC	Atrazine	1912-24-9		31					1.60E-01	2.10E+00								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		31					1.80E-01	2.10E+00																	
SVOC	Benzo(a)anthracene	56-55-3	B2	31	14	7.20E-02	3.96E-01	1.70E+00	5.90E-02	2.10E+00								1.00E+02	2E-02							2.00E+01	9E-02
SVOC	Benzo(a)pyrene	50-32-8	B2	31	12	8.60E-02	4.18E-01	1.60E+00	6.50E-02	2.10E+00						1.90E+03	8E-04	1.00E+01	2E-01					1.50E+03	1E-03	2.00E+00	8E-01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	31	16	7.00E-02	5.63E-01	2.90E+00	6.50E-02	2.10E+00								1.00E+02	3E-02							2.00E+01	1E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	31	9	6.50E-02	3.54E-01	1.20E+00	5.90E-02	2.10E+00						3.50E+05	3E-06	9.10E+03	1E-04					8.00E+05	2E-06	2.50E+03	5E-04
SVOC	Benzo(k)fluoranthene	207-08-9	B2	31	7	5.60E-02	3.61E-01	1.00E+00	5.70E-02	2.10E+00								1.00E+03	1E-03							2.00E+02	5E-03
SVOC	Biphenyl	92-52-4		31					1.50E-01	2.10E+00																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	31					5.10E-02	2.10E+00																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	31					5.50E-02	2.10E+00		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	31	5	7.50E-02	1.14E-01	1.90E-01	5.80E-02	2.10E+00						8.90E+05	2E-07	1.00E+04	2E-05					7.00E+05	3E-07	2.80E+03	7E-05
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	31					6.60E-02	2.10E+00																	
SVOC	Butylbenzylphthalate	85-68-7	C	31	5	7.20E-02	1.72E-01	2.70E-01	5.50E-02	2.10E+00						2.10E+07	1E-08	3.10E+02	9E-04					4.70E+07	6E-09	3.10E+02	9E-04
SVOC	Caprolactam	105-60-2		31	2	2.85E-01	8.43E-01	1.40E+00	1.90E-01	2.10E+00						2.90E+05	5E-06	4.50E+05	3E-06					6.70E+05	2E-06	5.30E+04	3E-05
SVOC	Carbazole	86-74-8	B2	31	3	8.40E-02	1.48E-01	1.80E-01	5.60E-02	2.10E+00								3.70E+03	5E-05							5.30E+02	3E-04
SVOC	4-Chloro-3-methylphenol	59-50-7		31					5.50E-02	2.10E+00								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		31					5.50E-02	8.20E+00																	
SVOC	2-Chloronaphthalene	91-58-7		31					5.20E-02	2.10E+00								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		31					5.60E-02	2.10E+00								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		31					5.60E-02	2.10E+00																	
SVOC	Chrysene	218-01-9	B2	31	17	4.63E-02	3.86E-01	1.90E+00	5.00E-02	2.10E+00								1.00E+04	2E-04							2.00E+03	1E-03
SVOC	Di-n-butylphthalate	84-74-2	D	31	2	2.10E-01	2.10E-01	2.10E-01	1.60E-01	2.10E+00						1.50E+06	1E-07	7.60E+02	3E-04					3.30E+06	6E-08	7.60E+02	3E-04
SVOC	Di-n-octylphthalate	117-84-0		31					5.80E-02	2.10E+00								2.80E+04								6.90E+03	

TABLE 4-2

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR PONTIAC SCHOOL BOARD (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	Dibenz(a,h)anthracene	53-70-3	B2	31	2	1.20E-01	1.50E-01	1.80E-01	5.50E-02	2.10E+00								1.00E+01	2E-02							2.00E+00	9E-02
SVOC	Dibenzofuran	132-64-9	D	31					5.40E-02	2.10E+00																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	31					4.20E-02	1.30E+01						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		31					5.40E-02	2.10E+00						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	31					1.60E-01	2.10E+00						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		31					8.60E-02	2.10E+00						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	31					1.70E-01	2.10E+00						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		31					1.70E-01	1.10E+01								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		31					1.20E-01	1.10E+01																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	31					5.00E-02	2.10E+00						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	31					5.20E-02	2.10E+00																	
SVOC	Fluoranthene	206-44-0	D	31	21	6.43E-02	5.92E-01	3.80E+00	6.30E-02	2.10E+00		1.00E+06	4E-06	8.90E+05	4E-06	4.10E+06	9E-07	1.80E+05	2E-05	1.00E+06	4E-06	7.40E+05	5E-06	9.30E+06	4E-07	4.60E+04	8E-05
SVOC	Fluorene	86-73-7	D	31	5	9.80E-02	1.32E-01	2.30E-01	5.20E-02	2.10E+00		1.00E+06	2E-07	1.50E+05	2E-06	4.10E+06	6E-08	1.30E+05	2E-06	5.80E+05	4E-07	1.30E+05	2E-06	9.30E+06	2E-08	2.70E+04	9E-06
SVOC	Hexachlorobenzene	118-74-1	B2	31					6.00E-02	2.10E+00		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	31					4.90E-02	2.10E+00		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	31					6.50E-02	2.10E+00								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	31					5.20E-02	6.30E-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	31	7	9.25E-02	3.95E-01	1.10E+00	7.60E-02	2.10E+00								1.00E+02	1E-02							2.00E+01	6E-02
SVOC	Isophorone	78-59-1	C	31					4.80E-02	2.10E+00						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		31	8	7.20E-02	3.73E-01	1.30E+00	5.20E-02	2.10E+00								4.00E+04	3E-05							8.10E+03	2E-04
SVOC	Methylphenol (summed)	1319-77-3		31					5.10E-02	2.10E+00						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	31	4	5.25E-02	7.71E-02	1.20E-01	5.30E-02	2.10E+00		4.70E+02	3E-04	3.50E+02	3E-04	8.80E+04	1E-06	8.00E+04	2E-06	2.50E+02	5E-04	3.00E+02	4E-04	2.00E+05	6E-07	1.60E+04	8E-06
SVOC	2-Nitroaniline	88-74-4		31					5.00E-02	1.10E+01																	
SVOC	3-Nitroaniline	99-09-2	C	31					1.50E-01	1.10E+01																	
SVOC	4-Nitroaniline	100-01-6	C	31					7.30E-02	1.10E+01																	
SVOC	Nitrobenzene	98-95-3	D	31					5.00E-02	2.10E+00		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		31					5.00E-02	2.10E+00								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		31					2.10E-01	1.10E+01																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	31					5.30E-02	2.10E+00								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	31					4.80E-02	2.10E+00						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	31					5.60E-02	2.10E+00																	
SVOC	Pentachlorophenol	87-86-5	B2	31					1.30E-01	2.10E+01						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	31	21	4.65E-02	3.74E-01	1.30E+00	5.60E-02	2.10E+00		5.10E+03	3E-04	1.90E+02	7E-03	2.90E+03	4E-04	8.00E+03	2E-04	2.80E+03	5E-04	1.60E+02	8E-03	6.70E+03	2E-04	1.60E+03	8E-04
SVOC	Phenol	108-95-2	D	31					5.30E-02	2.10E+00						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	31	24	6.03E-02	4.46E-01	3.00E+00	5.70E-02	2.10E+00		1.00E+06	3E-06	7.80E+05	4E-06	2.90E+06	1E-06	1.10E+05	3E-05	1.00E+06	3E-06	6.50E+05	5E-06	6.70E+06	4E-07	2.90E+04	1E-04
SVOC	2,4,5-Trichlorophenol	95-95-4		31					5.90E-02	2.10E+00						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	31					6.80E-02	2.10E+00						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	31	8	3.28E-02	1.31E-01	5.87E-01	2.10E-02	3.50E-01		1.60E+04	4E-05	8.10E+02	7E-04	6.50E+03	9E-05	2.00E+01	3E-02	3.00E+03	2E-04	2.40E+02	2E-03	5.20E+03	1E-04	4.00E+00	1E-01
INORG	Antimony	7440-36-0		31	7	2.28E-01	1.25E+00	2.90E+00	5.18E-01	2.64E+00						5.90E+03	5E-04	1.20E+03	2E-03					1.30E+04	2E-04	1.80E+02	2E-02
INORG	Arsenic	7440-38-2	A	31	31	1.64E+00	6.77E+00	1.41E+01			1.32E+01					9.10E+02	1E-03	6.10E+01	1E-02					7.20E+02	1E-03	7.60E+00	1E-01
INORG	Barium	7440-39-3	D	31	31	8.93E+00	1.16E+02	9.77E+02			1.10E+02					1.50E+05	6E-03	2.50E+05	3E-03					3.30E+05	3E-03	3.70E+04	2E-02
INORG	Beryllium	7440-41-7	B1	31	31	4.44E-02	3.68E-01	1.28E+00			1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	31	31	1.92E-01	1.10E+00	5.88E+00			1.20E+00					2.20E+03	2E-03	4.10E+03	1E-03					1.70E+03	3E-03	5.50E+02	9E-03
INORG	Chromium (total)	7440-47-3		31	31	4.69E+00	2.62E+01	1.67E+02			4.92E+01					2.40E+02	5E-01	1.70E+04	7E-03					2.60E+02	5E-01	2.50E+03	5E-02
INORG	Cobalt	7440-48-4		31	31	1.49E+00	4.24E+00	7.28E+00			1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	31	31	8.11E+00	4.77E+01	3.18E+02			3.20E+01					5.90E+04	5E-03	1.40E+05	2E-03					1.30E+05	2E-03	2.00E+04	1E-02
INORG	Lead	7439-92-1	B2	31	31	5.95E+00	7.77E+01	4.29E+02			4.92E+01					4.40E+04	9E-03	9.00E+02	4E-01					1.00E+05	4E-03	4.00E+02	9E-01
INORG	Manganese	7439-96-5	D	31	31	1.27E+02	4.55E+02	1.16E+03			5.10E+02					1.50E+03	4E-01	1.70E+05	4E-03					3.30E+03	2E-01	2.50E+04	3E-02
INORG	Mercury	7439-97-6	D	31	21	1.41E-02	8.90E-02	4.26E-01	8.90E-03	3.80E-02	1.30E-01							1.10E+03	3E-04							1.60E+02	2E-03
INORG	Nickel	7440-02-0	A	31	31	5.83E+00	2.37E+01	1.54E+02			3.01E+01					1.60E+04	8E-03	2.70E+05	5E-04					1.30E+04	1E-02	4.00E+04	3E-03
INORG	Selenium	7782-49-2	D	31	6	5.29E-01	9.60E-01	2.23E+00	1.84E-01	6.29E-01	4.10E-01					5.90E+04	3E-05	1.80E+04	1E-04					1.30E+05	1E-05	2.60E+03	7E-04
INORG	Silver	7440-22-4	D	31	5	1.85E-01	3.56E-01	5.11E-01	8.90E-02	7.13E-01						2.90E+03	2E-04	1.70E+04	3E-05					6.70E+03	8E-05	2.50E+03	2E-04
INORG	Thallium	7440-28-0		31	1	7.31E-01	7.31E-01	7.31E-01	2.97E-01	1.43E+00								2.40E+02	3E-03							3.50E+01	2E-02
INORG	Vanadium	7440-62-2		31	31	3.94E+00	1.35E+01	2.50E+01			3.28E+01							1.00E+04								7.50E+02	
INORG	Zinc	7440-66-6	D	31	31	2.90E+01	2.95E+02	5.20E+03			4.70E+01							1.00E+06	5E-03							1.70E+05	3E-02
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	6	6	6.91E-07	5.64E-06	1.49E-05								8.90E-02	2E-04	9.90E-04	2E-02					7.10E-02	2E-04	9.00E-05	2E-01

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. Screening Criteria is from Michigan DEQ Part 201.
7. The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
8. The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
9. The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.
10. The concentrations for all PCB isomers were summed before comparing to the Screening Levels.
11. The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.
12. The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.
13. The concentrations for the Target Dioxin congeners were used to calculate an 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

Table 4-3: Data Summary for AOI PSB (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	4				5.10E-04	1.00E-03	1.0E+06		3.1E+04		7.3E-01	
Shallow	VOC	Benzene	71-43-2	T	A	4	2	1.20E-03	1.40E-03	1.60E-04	1.60E-04	3.5E+01	4.0E-05	1.1E+01	1.3E-04	5.0E-03	2.8E-01
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	4				1.70E-04	3.40E-04	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	3.60E-04	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	4				2.00E-04	4.00E-04	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	4	1	4.00E-03	4.00E-03	4.10E-04	8.20E-04	2.4E+05	1.7E-08	2.4E+05	1.7E-08	1.3E+01	3.1E-04
Shallow	VOC	Carbon Disulfide	75-15-0	T		4	1	8.30E-04	8.30E-04	2.00E-04	4.00E-04	5.5E+02	1.5E-06	1.2E+03	6.9E-07	8.0E-01	1.0E-03
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	2.40E-04	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	2.80E-04	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		4				2.60E-04	5.20E-04	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	4				1.40E-04	2.80E-04	1.8E+02		1.5E+02		1.0E-01	
Shallow	VOC	Chloromethane	74-87-3	T	D	4				1.30E-04	2.60E-04	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	4	3	1.70E-04	3.20E-04	1.20E-04	1.20E-04	5.6E+01	5.7E-06	5.6E+01	5.7E-06	8.0E-01	4.0E-04
Shallow	VOC	Cyclohexane	110-82-7	T	ID	4	4	2.00E-04	4.40E-04								
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	1.20E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	5.20E-04	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	4.40E-04	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	2.20E-04	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	3.00E-04			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	3.40E-04	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	5.20E-04	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	4				1.60E-04	3.20E-04	2.3E+03		2.4E+03		8.8E-01	
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	4.20E-04	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	4				2.40E-04	4.80E-04	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.20E-04	4.40E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	3.00E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	3.40E-04	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	5.40E-04	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	4	2	5.70E-04	7.40E-04	1.20E-04	1.20E-04	1.7E+02	4.4E-06	1.7E+02	4.4E-06	7.0E-01	1.1E-03
Shallow	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	9.20E-04	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	8.20E-04						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		4				1.30E-04	2.60E-04	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	4				2.30E-04	4.60E-04	2.0E+04		1.3E+04		1.8E+00	
Shallow	VOC	Methylcyclohexane	108-87-2	T		4	4	1.60E-04	4.70E-04								
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	4				3.40E-04	6.80E-04	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		4				1.50E-04	3.00E-04	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	5.00E-04	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	4				2.30E-04	4.60E-04	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	4	2	1.20E-03	2.40E-03	1.80E-04	1.80E-04	5.3E+02	4.5E-06	5.3E+02	4.5E-06	1.0E+00	2.4E-03
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	3.40E-04	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4				1.50E-04	3.00E-04	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	6.00E-04	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	4				1.40E-04	2.80E-04	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	5.60E-04	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	6.40E-04	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	4				1.50E-04	3.00E-04	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	4	3	4.90E-04	9.50E-03	3.30E-04	3.30E-04	1.9E+02	5.0E-05	1.9E+02	5.0E-05	1.0E+01	9.5E-04
Shallow	SVOC	Acenaphthene	83-32-9	T		4	1	1.50E-03	1.50E-03	8.00E-04	8.00E-04	4.2E+00	3.6E-04	4.2E+00	3.6E-04	1.3E+00	1.2E-03
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	7.10E-04	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	2.60E-03	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	6.80E-04	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	2.50E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	2.80E-03						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	7.00E-04			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	7.30E-04			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	9.40E-04			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	8.50E-04			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	8.40E-04			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	2.60E-03						
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	8.70E-04						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	9.70E-04	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4				2.70E-03	2.70E-03			3.2E-01		6.0E-03	

Table 4-3: Data Summary for AOI PSB (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	8.80E-04						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	8.80E-04			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		4				2.50E-03	2.50E-03			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	4	2	1.10E-03	1.40E-03	8.20E-04	8.20E-04			7.4E+00	1.9E-04	8.5E-02	1.6E-02
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	9.90E-04			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		2				6.10E-04	6.10E-04						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	8.50E-04			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	1.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	7.90E-04						
Shallow	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	7.50E-04			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	7.90E-04			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	1.10E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	9.30E-04			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	8.50E-04			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	6.50E-04			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	8.50E-04			5.2E+02		3.7E-01	
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	7.60E-04			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	6.70E-04			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	1.30E-03			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	3.00E-03						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	7.90E-04			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.70E-04						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	1.10E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	8.10E-04	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	1.00E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	7.40E-04	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	7.30E-04	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	1.10E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	7.40E-04	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	6.30E-04			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	6.30E-04			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4	1	8.90E-04	8.90E-04	6.40E-04	6.40E-04			2.5E+01	3.6E-05	2.6E-01	3.4E-03
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		4	2	3.75E-03	4.55E-03	1.30E-03	1.30E-03			8.1E+02	5.6E-06	3.7E-01	1.2E-02
Shallow	SVOC	Naphthalene	91-20-3	T	C	4	2	5.30E-03	6.80E-03	7.50E-04	7.50E-04	3.1E+01	2.2E-04	3.1E+01	2.2E-04	5.2E-01	1.3E-02
Shallow	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	7.00E-04						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	7.10E-04						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	1.30E-03						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	8.10E-04	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	2.10E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	1.90E-03						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	1.40E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	6.70E-04			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	7.80E-04						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	2.40E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	4	1	1.10E-03	1.10E-03	8.20E-04	8.20E-04	1.0E+00	1.1E-03	1.0E+00	1.1E-03	5.2E-02	2.1E-02
Shallow	SVOC	Phenol	108-95-2	T	ID	4	2	6.10E-02	6.70E-02	2.60E-03	2.60E-03			2.9E+04	2.3E-06	4.4E+00	1.5E-02
Shallow	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	1.10E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	1.20E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	1.70E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	2				8.20E-05	8.20E-05	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	8.20E-05	4.5E-02		3.3E-03		5.0E-04	
Shallow	INORG	Antimony	7440-36-0	D		4	1	2.70E-03	2.70E-03	2.20E-03	2.20E-03			6.8E+01	4.0E-05	6.0E-03	4.5E-01
Shallow	INORG	Antimony	7440-36-0	T		4				2.20E-03	2.20E-03			6.8E+01		6.0E-03	
Shallow	INORG	Arsenic	7440-38-2	D	A	4	4	4.50E-03	1.51E-02					4.3E+00	3.5E-03	5.0E-02	3.0E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	4	3	6.00E-03	1.42E-02	3.90E-03	3.90E-03			4.3E+00	3.3E-03	5.0E-02	2.8E-01
Shallow	INORG	Barium	7440-39-3	D	D	4	4	5.55E-01	9.09E-01					1.4E+04	6.5E-05	2.0E+00	4.5E-01
Shallow	INORG	Barium	7440-39-3	T	D	4	4	5.66E-01	8.79E-01					1.4E+04	6.3E-05	2.0E+00	4.4E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	4				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	4				2.80E-04	2.80E-04			1.9E+02		5.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	4				2.80E-04	2.80E-04			1.9E+02		5.0E-03	
Shallow	INORG	Chromium (total)	7440-47-3	D		4				1.40E-03	1.40E-03			4.6E+02		1.0E-01	

Table 4-3: Data Summary for AOI PSB (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Chromium (total)	7440-47-3	T		4				1.40E-03	1.40E-03			4.6E+02		1.0E-01	
Shallow	INORG	Cobalt	7440-48-4	D	B1	4				1.30E-03	1.30E-03			2.4E+03		4.0E-02	
Shallow	INORG	Cobalt	7440-48-4	T	B1	4				1.30E-03	1.30E-03			2.4E+03		4.0E-02	
Shallow	INORG	Copper	7440-50-8	D	D	4				4.20E-03	4.20E-03			7.4E+03		1.4E+00	
Shallow	INORG	Copper	7440-50-8	T	D	4				4.20E-03	4.20E-03			7.4E+03		1.4E+00	
Shallow	INORG	Lead	7439-92-1	D	B2	4				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	4				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	D	D	4	2	3.43E-01	4.14E-01	9.00E-04	9.00E-04			9.1E+03	4.5E-05	8.6E-01	4.8E-01
Shallow	INORG	Manganese	7439-96-5	T	D	4	4	4.50E-03	3.97E-01					9.1E+03	4.4E-05	8.6E-01	4.6E-01
Shallow	INORG	Mercury	7439-97-6	D	D	4	1	2.50E-04	2.50E-04	6.90E-05	6.90E-05	5.6E-02	4.5E-03	5.6E-02	4.5E-03	2.0E-03	1.3E-01
Shallow	INORG	Mercury	7439-97-6	T	D	4	2	9.20E-05	1.10E-04	6.90E-05	6.90E-05	5.6E-02	2.0E-03	5.6E-02	2.0E-03	2.0E-03	5.5E-02
Shallow	INORG	Nickel	7440-02-0	D	A	4	2	4.30E-03	1.56E-02	2.20E-03	2.20E-03			7.4E+04	2.1E-07	1.0E-01	1.6E-01
Shallow	INORG	Nickel	7440-02-0	T	A	4	2	3.90E-03	1.55E-02	2.20E-03	2.20E-03			7.4E+04	2.1E-07	1.0E-01	1.6E-01
Shallow	INORG	Selenium	7782-49-2	D	D	4				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	4				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	4				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		4				1.80E-05	5.00E-03			1.3E+01		2.0E-03	
Shallow	INORG	Thallium	7440-28-0	T		4				1.80E-05	5.00E-03			1.3E+01		2.0E-03	
Shallow	INORG	Vanadium	7440-62-2	D		4	1	2.50E-03	2.50E-03	8.20E-04	8.20E-04			9.7E+02	2.6E-06	4.5E-03	5.6E-01
Shallow	INORG	Vanadium	7440-62-2	T		4	1	2.40E-03	2.40E-03	8.20E-04	8.20E-04			9.7E+02	2.5E-06	4.5E-03	5.3E-01
Shallow	INORG	Zinc	7440-66-6	D	D	4				1.20E-02	1.20E-02			1.1E+05		2.4E+00	
Shallow	INORG	Zinc	7440-66-6	T	D	4	3	1.33E-02	1.97E-02	1.20E-02	1.20E-02			1.1E+05	1.8E-07	2.4E+00	8.2E-03

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 4-4

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR HARRIS LAKE (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	40	13	3.40E-03	1.15E-01	4.60E-01	2.20E-03	2.90E-02		1.10E+05	4E-06	1.60E+05	3E-06	1.70E+08	3E-09	1.10E+05	4E-06	1.10E+05	4E-06	1.30E+05	4E-06	3.90E+08	1E-09	2.30E+04	2E-05
VOC	Benzene	71-43-2	A	40					6.70E-04	7.20E-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	40					1.20E-03	7.20E-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	40					1.60E-03	8.60E-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	40					1.80E-03	1.40E-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	40	6	6.95E-03	2.73E-02	4.60E-02	2.80E-03	2.90E-02		2.70E+04	2E-06	3.50E+04	1E-06	2.90E+07	2E-09	2.70E+04	2E-06	2.70E+04	2E-06	2.90E+04	2E-06	6.70E+07	7E-10	2.70E+04	2E-06
VOC	Carbon Disulfide	75-15-0		40	1	4.00E-03	4.00E-03	4.00E-03	8.00E-04	7.20E-03		1.40E+02	3E-05	1.60E+03	3E-06	2.10E+07	2E-10	2.80E+02	1E-05	7.60E+01	5E-05	1.30E+03	3E-06	4.70E+07	9E-11	2.80E+02	1E-05
VOC	Carbon Tetrachloride	56-23-5	B2	40					1.00E-03	7.20E-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	40					5.30E-04	7.20E-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		40					2.30E-03	1.40E-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	40					8.40E-04	7.20E-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	40					1.30E-03	1.40E-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	40					7.20E-04	7.20E-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		40					1.00E-03	1.40E-02																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	40					1.60E-03	1.40E-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	40					1.10E-03	7.20E-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	40					1.20E-03	7.20E-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	40					7.30E-04	7.20E-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	40					8.20E-04	7.20E-03								1.70E+02								1.70E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	40	2	9.90E-04	1.25E-03	1.50E-03	6.90E-04	6.90E-03		1.00E+02	2E-05	2.60E+02	6E-06	5.70E+05	3E-09	2.90E+03	5E-07	1.90E+01	8E-05	7.70E+01	2E-05	4.50E+05	3E-09	4.00E+02	4E-06
VOC	Dichlorodifluoromethane	75-71-8		40					1.10E-03	1.40E-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	40					5.90E-04	7.20E-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	40					7.50E-04	7.20E-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	40					1.20E-03	7.20E-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	40					8.60E-04	7.20E-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		40					7.50E-04	7.20E-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	40					7.70E-04	7.20E-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	40					8.80E-04	7.20E-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	40					6.10E-04	7.20E-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		40					1.70E-03	2.90E-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		40	18	1.83E-03	1.79E-02	6.65E-02	1.10E-03	1.40E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		40	1	3.30E-01	3.30E-01	3.30E-01	8.60E-04	2.90E-02		5.90E+03	6E-05	3.00E+04	1E-05	8.80E+07	4E-09	5.90E+03	6E-05	5.90E+03	6E-05	2.50E+04	1E-05	2.00E+08	2E-09	1.80E+03	2E-04
VOC	4-Methyl-2-pentanone	108-10-1		40					1.90E-03	2.90E-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		40	1	1.30E-03	1.30E-03	1.30E-03	6.10E-04	1.40E-02																	
VOC	Methylene Chloride	75-09-2	B2	40	2	1.70E-03	3.31E-03	4.93E-03	1.30E-03	7.20E-03		2.40E+02	2E-05	7.00E+02	7E-06	8.30E+06	6E-10	2.30E+03	2E-06	4.50E+01	1E-04	2.10E+02	2E-05	6.60E+06	7E-10	1.30E+03	4E-06
VOC	Styrene	100-42-5		40					5.10E-04	7.20E-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	40					1.80E-03	9.60E-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	40					1.20E-03	7.20E-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	40	36	5.28E-04	2.31E-03	1.20E-02	5.40E-04	5.20E-03		2.50E+02	5E-05	3.30E+03	4E-06	1.20E+07	1E-09	2.50E+02	5E-05	2.50E+02	5E-05	2.80E+03	4E-06	2.70E+07	4E-10	2.50E+02	5E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	D	40					9.10E-04	7.20E-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	40					9.40E-04	7.20E-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	40					1.20E-03	7.20E-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	40					7.80E-04	7.20E-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		40					1.10E-03	1.40E-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		40					9.50E-04	7.20E-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	40					1.40E-03	1.40E-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	40					1.90E-03	1.40E-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		40	5	8.90E-02	2.74E-01	8.10E-01	5.45E-02	1.20E+00		3.50E+05	2E-06	9.70E+04	8E-06	6.20E+06	1E-07	2.00E+05	4E-06	1.90E+05	4E-06	8.10E+04	1E-05	1.40E+07	6E-08	4.10E+04	2E-05
SVOC	Acenaphthylene	208-96-8	D	40					5.00E-02	1.10E+00		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	40					5.35E-02	1.10E+00		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	40	11	4.63E-02	2.97E-01	8.60E-01	5.25E-02	1.10E+00		1.00E+06	9E-07	1.60E+06	5E-07	2.90E+07	3E-08	1.00E+06	9E-07	1.00E+06	9E-07	1.40E+06	6E-07	6.70E+07	1E-08	2.30E+05	4E-06
SVOC	Atrazine	1912-24-9		40					1.60E-01	3.40E+00								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		40					1.80E-01	3.80E+00																	
SVOC	Benzo(a)anthracene	56-55-3	B2	38	15	1.30E-01	7.45E-01	2.40E+00	5.85E-02	1.20E+00								1.00E+02	2E-02							2.00E+01	1E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	40	13	1.20E-01	9.09E-01	3.60E+00	6.40E-02	1.40E+00								1.00E+01	4E-01							2.00E+00	**2E+00**
SVOC	Benzo(b)fluoranthene	205-99-2	B2	40	14	8.70E-02	9.38E-01	3.80E+00	6.20E-02	1.30E+00								1.00E+02	4E-02							2.00E+01	2E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	40	12	7.25E-02	7.54E-01	1.70E+00	5.85E-02	1.20E+00								1.00E+03	2E-03							2.00E+02	1E-02
SVOC	Benzo(k)fluoranthene	207-08-9	B2	40	12	6.30E-02	5.57E-01	2.00E+00	5.65E-02	1.20E+00																	
SVOC	Biphenyl	92-52-4		40					1.50E-01	3.20E+00																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	40					5.00E-02	1.10E+00																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	40					5.45E-02	1.20E+00		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	40	12	6.30E-02	6.27E-01	5.50E+00	5.80E-02	1.20E+00						8.90E+05	6E-06	1.00E+04	6E-04					7.00E+05	8E-06	2.80E+03	2E-03
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	40					6.50E-02	1.40E+00																	
SVOC	Butylbenzylphthalate	85-68-7	C	40	9	6.20E-02	9.93E-01	5.30E+00	5.45E-02	1.20E+00						2.10E+07	3E-07	3.10E+02	2E-02					4.70E+07	1E-07	3.10E+02	2E-02
SVOC	Caprolactam	105-60-2		40					1.90E-01	4.10E+00						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	40	6	1.10E-01	2.42E-01	5.30E-01	5.55E-02	1.20E+00								3.70E+03	1E-04							5.30E+02	1E-03
SVOC	4-Chloro-3-methylphenol	59-50-7		40					5.45E-02	1.20E+00								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		40					5.45E-02	2.90E+00																	
SVOC	2-Chloronaphthalene	91-58-7		40					5.10E-02	1.10E+00								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		40					5.55E-02	1.20E+00								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		40					5.55E-02	1.20E+00																	
SVOC	Chrysene	218-01-9	B2	40	16	8.00E-02	8.73E-01	2.60E+00	4.90E-02	1.00E+00								1.00E+04	3E-04							2.00E+03	1E-03

TABLE 4-4

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR HARRIS LAKE (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	Di-n-butylphthalate	84-74-2	D	40	1	1.70E-01	1.70E-01	1.70E-01	1.60E-01	3.40E+00						1.50E+06	1E-07	7.60E+02	2E-04					3.30E+06	5E-08	7.60E+02	2E-04
SVOC	Di-n-octylphthalate	117-84-0		40	1	1.20E+00	1.20E+00	1.20E+00	5.75E-02	1.20E+00								2.80E+04	4E-05							6.90E+03	2E-04
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	40	7	7.90E-02	1.93E-01	4.70E-01	5.45E-02	1.20E+00								1.00E+01	5E-02							2.00E+00	2E-01
SVOC	Dibenzofuran	132-64-9	D	40	7	6.00E-02	1.74E-01	4.30E-01	5.35E-02	1.10E+00																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	40					4.15E-02	4.50E+00						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		40					5.35E-02	1.10E+00						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	Diethylphthalate	84-66-2	D	40					1.60E-01	3.40E+00						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	2,4-Dimethylphenol	105-67-9		40					8.55E-02	1.80E+00						2.10E+06		5.60E+04						4.70E+06		1.10E+04	
SVOC	Dimethylphthalate	131-11-3	D	40					1.70E-01	3.60E+00						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		40					1.70E-01	3.80E+00								3.90E+02								7.90E+01	
SVOC	2,4-Dinitrophenol	51-28-5		40					1.20E-01	3.80E+00																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	40					4.90E-02	1.00E+00						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	40					5.10E-02	1.10E+00																	
SVOC	Fluoranthene	206-44-0	D	40	17	8.30E-02	1.58E+00	5.30E+00	5.95E-02	1.30E+00		1.00E+06	5E-06	8.90E+05	6E-06	4.10E+06	1E-06	1.80E+05	3E-05	1.00E+06	5E-06	7.40E+05	7E-06	9.30E+06	6E-07	4.60E+04	1E-04
SVOC	Fluorene	86-73-7	D	40	6	8.60E-02	2.59E-01	6.80E-01	5.10E-02	1.10E+00		1.00E+06	7E-07	1.50E+05	5E-06	4.10E+06	2E-07	1.30E+05	5E-06	5.80E+05	1E-06	1.30E+05	5E-06	9.30E+06	7E-08	2.70E+04	3E-05
SVOC	Hexachlorobenzene	118-74-1	B2	40					5.95E-02	1.30E+00		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	40					4.80E-02	1.00E+00		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	40					6.40E-02	1.40E+00								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	40					5.10E-02	1.10E+00		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	40	10	8.25E-02	5.64E-01	1.40E+00	7.45E-02	1.60E+00								1.00E+02	1E-02							2.00E+01	7E-02
SVOC	Isophorone	78-59-1	C	40					4.70E-02	9.90E-01						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	2-Methylnaphthalene	91-57-6		40	8	4.20E-02	3.47E-01	1.40E+00	5.10E-02	1.10E+00								4.00E+04	4E-05							8.10E+03	2E-04
SVOC	Methylphenol (summed)	1319-77-3		40					5.00E-02	1.10E+00						2.90E+06		5.60E+04						6.70E+06		1.10E+04	
SVOC	Naphthalene	91-20-3	C	40	8	4.28E-02	2.39E-01	5.70E-01	5.25E-02	1.10E+00		4.70E+02	1E-03	3.50E+02	2E-03	8.80E+04	6E-06	8.00E+04	7E-06	2.50E+02	2E-03	3.00E+02	2E-03	2.00E+05	3E-06	1.60E+04	4E-05
SVOC	2-Nitroaniline	88-74-4		40					4.90E-02	3.80E+00																	
SVOC	3-Nitroaniline	99-09-2	C	40					1.50E-01	3.80E+00																	
SVOC	4-Nitroaniline	100-01-6	C	40					7.25E-02	3.80E+00																	
SVOC	Nitrobenzene	98-95-3	D	40					4.90E-02	1.00E+00		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		40					4.90E-02	1.00E+00								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		40					2.00E-01	4.30E+00																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	40					5.25E-02	1.10E+00								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	40					4.70E-02	9.90E-01						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	40					5.55E-02	1.20E+00																	
SVOC	Pentachlorophenol	87-86-5	B2	40					1.30E-01	7.60E+00						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenanthrene	85-01-8	D	40	19	7.10E-02	1.01E+00	6.90E+00	5.55E-02	1.20E+00		5.10E+03	1E-03	1.90E+02	4E-02	2.90E+03	2E-03	8.00E+03	9E-04	2.80E+03	2E-03	1.60E+02	4E-02	6.70E+03	1E-03	1.60E+03	4E-03
SVOC	Phenol	108-95-2	D	40					5.25E-02	1.10E+00						1.80E+07		1.20E+04						4.00E+07		1.20E+04	
SVOC	Pyrene	129-00-0	D	40	16	7.80E-02	1.41E+00	4.70E+00	5.45E-02	1.20E+00		1.00E+06	5E-06	7.80E+05	6E-06	2.90E+06	2E-06	1.10E+05	4E-05	1.00E+06	5E-06	6.50E+05	7E-06	6.70E+06	7E-07	2.90E+04	2E-04
SVOC	2,4,5-Trichlorophenol	95-95-4		40					5.85E-02	1.20E+00						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	40					6.75E-02	1.40E+00						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
P/PCB	PCBs (summed)	1336-36-3	B2	40	13	3.62E-02	1.33E-01	5.06E-01	2.10E-02	4.50E-02		1.60E+04	3E-05	8.10E+02	6E-04	6.50E+03	8E-05	2.00E+01	3E-02	3.00E+03	2E-04	2.40E+02	2E-03	5.20E+03	1E-04	4.00E+00	1E-01
INORG	Antimony	7440-36-0		40	25	3.12E-01	1.43E+00	7.51E+00	2.62E-01	2.75E+00						5.90E+03	1E-03	1.20E+03	6E-03					1.30E+04	6E-04	1.80E+02	4E-02
INORG	Arsenic	7440-38-2	A	40	40	1.26E+00	6.34E+00	2.84E+01			1.32E+01					9.10E+02	2E-02	6.10E+01	2E-01					7.20E+02	2E-02	7.60E+00	**2E+00**
INORG	Barium	7440-39-3	D	40	40	4.02E+00	8.95E+01	1.19E+03			1.10E+02					1.50E+05	7E-03	2.50E+05	4E-03					3.30E+05	3E-03	3.70E+04	3E-02
INORG	Beryllium	7440-41-7	B1	40	24	3.23E-02	2.61E-01	1.35E+00	2.45E-02	1.37E-01	1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	40	40	6.85E-02	1.30E+00	1.45E+01			1.20E+00					2.20E+03	6E-03	4.10E+03	3E-03					1.70E+03	8E-03	5.50E+02	2E-02
INORG	Chromium (total)	7440-47-3		40	40	4.03E+00	7.37E+01	6.53E+02			4.92E+01					2.40E+02	**3E+00**	1.70E+04	4E-02					2.60E+02	**2E+00**	2.50E+03	2E-01
INORG	Cobalt	7440-48-4		40	40	1.03E+00	3.70E+00	1.05E+01			1.74E+01					5.90E+03		1.80E+04						1.30E+04		2.60E+03	
INORG	Copper	7440-50-8	D	40	40	3.00E+00	1.66E+02	1.82E+03			3.20E+01					5.90E+04	3E-02	1.40E+05	1E-02					1.30E+05	1E-02	2.00E+04	9E-02
INORG	Lead	7439-92-1	B2	40	40	3.28E+00	9.86E+01	7.51E+02			4.92E+01					4.40E+04	2E-02	9.00E+02	8E-01					1.00E+05	7E-03	4.00E+02	**2E+00**
INORG	Manganese	7439-96-5	D	40	40	5.38E+01	4.88E+02	2.33E+03			5.10E+02					1.50E+03	**1E+00**	1.70E+05	1E-02					3.30E+03	6E-01	2.50E+04	7E-02
INORG	Mercury	7439-97-6	D	40	29	9.65E-03	1.24E-01	5.68E-01	9.10E-03	3.70E-02	1.30E-01							1.10E+03	4E-04							1.60E+02	3E-03
INORG	Nickel	7440-02-0	A	40	40	3.65E+00	6.05E+01	6.31E+02			3.01E+01					1.60E+04	4E-02	2.70E+05	2E-03					1.30E+04	5E-02	4.00E+04	2E-02
INORG	Selenium	7782-49-2	D	40	22	1.84E-01	1.14E+00	5.96E+00	1.66E-01	1.14E+00	4.10E-01					5.90E+04	9E-05	1.80E+04	3E-04					1.30E+05	4E-05	2.60E+03	2E-03
INORG	Silver	7440-22-4	D	40	1	1.85E-01	1.85E-01	1.85E-01	8.00E-02	1.14E+00						2.90E+03	6E-05	1.70E+04	1E-05					6.70E+03	3E-05	2.50E+03	7E-05
INORG	Thallium	7440-28-0		40	19	2.18E-01	6.69E-01	2.11E+00	2.69E-01	2.28E+00								2.40E+02	9E-03							3.50E+01	6E-02
INORG	Vanadium	7440-62-2		40	40	6.18E+00	1.26E+01	5.29E+01			3.28E+01							1.00E+04	2E-03							7.50E+02	3E-02
INORG	Zinc	7440-66-6	D	40	39	1.15E+01	1.10E+02	1.13E+03	1.07E+00	1.07E+00	4.70E+01							1.00E+06	1E-03							1.70E+05	6E-03

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 4-5
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
HARRIS LAKE (SEDIMENT)

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 Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
VOC	Acetone	67-64-1	D	68	67	3.20E-03	1.78E+00	1.90E+01	4.00E-02	4.00E-02		1.10E+05	2E-04	2.30E+04	8E-04
VOC	Benzene	71-43-2	A	68	7	1.38E-03	1.04E-02	2.10E-02	8.80E-04	5.40E-01		4.00E+02	5E-05	1.80E+02	1E-04
VOC	Bromodichloromethane	75-27-4	B2	68					1.60E-03	3.20E-01		7.50E+02	0E+00	1.10E+02	0E+00
VOC	Bromoform	75-25-2	B2	68					2.20E-03	5.30E-01		8.70E+02	0E+00	8.20E+02	0E+00
VOC	Bromomethane	74-83-9	D	68					2.40E-03	8.20E-01		1.60E+03	0E+00	3.20E+02	0E+00
VOC	2-Butanone	78-93-3	D	68	43	7.10E-03	4.02E-02	1.90E-01	3.70E-03	2.60E+00		2.70E+04	7E-06	2.70E+04	7E-06
VOC	Carbon Disulfide	75-15-0		68	24	1.50E-03	1.22E-02	3.80E-02	1.10E-03	1.10E+00		2.80E+02	1E-04	2.80E+02	1E-04
VOC	Carbon Tetrachloride	56-23-5	B2	68					1.40E-03	3.20E-01		3.90E+02	0E+00	9.60E+01	0E+00
VOC	Chlorobenzene	108-90-7	D	68	1	1.80E-03	1.80E-03	1.80E-03	7.10E-04	2.60E-01		2.60E+02	7E-06	2.60E+02	7E-06
VOC	Chloroethane	75-00-3		68					3.00E-03	1.20E+00		9.50E+02	0E+00	9.50E+02	0E+00
VOC	Chloroform	67-66-3	B2	68					1.10E-03	3.20E-01		1.50E+03	0E+00	1.20E+03	0E+00
VOC	Chloromethane	74-87-3	D	68					1.80E-03	4.90E-01		1.10E+03	0E+00	1.10E+03	0E+00
VOC	Cumene	98-82-8	D	68	5	4.10E-03	4.67E-02	1.00E-01	9.50E-04	2.60E-01		3.90E+02	3E-04	3.90E+02	3E-04
VOC	Cyclohexane	110-82-7		68	12	1.90E-03	5.06E-02	2.30E-01	1.40E-03	2.70E-01			0E+00		0E+00
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	68					2.20E-03	2.60E+00		1.20E+00	0E+00	1.20E+00	0E+00
VOC	Dibromochloromethane	124-48-1	C	68					1.50E-03	4.00E-01		6.10E+02	0E+00	1.10E+02	0E+00
VOC	1,2-Dibromoethane	106-93-4	B2	68					1.60E-03	6.30E-01		6.60E-01	0E+00	9.20E-02	0E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	68					9.60E-04	5.00E-01		2.10E+02	0E+00	2.10E+02	0E+00
VOC	1,3-Dichlorobenzene	541-73-1	D	68					1.10E-03	3.10E-01		1.70E+02	0E+00	1.70E+02	0E+00
VOC	1,4-Dichlorobenzene	106-46-7	C	68					9.10E-04	5.30E-01		2.90E+03	0E+00	4.00E+02	0E+00
VOC	Dichlorodifluoromethane	75-71-8		68					1.50E-03	1.20E+00		1.00E+03	0E+00	1.00E+03	0E+00
VOC	1,1-Dichloroethane	75-34-3	C	68					7.90E-04	4.40E-01		8.90E+02	0E+00	8.90E+02	0E+00
VOC	1,2-Dichloroethane	107-06-2	B2	68					9.90E-04	3.50E-01		6.40E+02	0E+00	9.10E+01	0E+00
VOC	1,1-Dichloroethene	75-35-4	C	68					1.60E-03	5.30E-01		5.70E+02	0E+00	2.00E+02	0E+00
VOC	cis-1,2-Dichloroethene	156-59-2	D	68					1.10E-03	5.10E-01		6.40E+02	0E+00	6.40E+02	0E+00
VOC	trans-1,2-Dichloroethene	156-60-5		68	1	6.00E-03	6.00E-03	6.00E-03	9.90E-04	5.80E-01		1.40E+03	4E-06	1.40E+03	4E-06
VOC	1,2-Dichloropropane	78-87-5	B2	68					1.00E-03	3.00E-01		5.50E+02	0E+00	1.40E+02	0E+00
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	68					1.20E-03	3.70E-01		6.20E+02	0E+00	1.30E+02	0E+00
VOC	Ethyl Benzene	100-41-4	D	68	5	1.70E-03	8.18E-03	1.90E-02	8.00E-04	4.60E-01		1.40E+02	1E-04	1.40E+02	1E-04
VOC	2-Hexanone	591-78-6		68					2.30E-03	9.80E-01		2.50E+03	0E+00	2.50E+03	0E+00
VOC	Methyl Acetate	79-20-9		68	19	2.73E-03	1.36E-01	2.00E+00	1.50E-03	8.70E-02			0E+00		0E+00
VOC	Methyl tert-butyl ether	1634-04-4		68	1	6.40E-03	6.40E-03	6.40E-03	1.10E-03	3.60E-01		5.90E+03	1E-06	1.80E+03	4E-06
VOC	4-Methyl-2-pentanone	108-10-1		68					2.60E-03	9.40E-01		2.70E+03	0E+00	2.70E+03	0E+00
VOC	Methylcyclohexane	108-87-2		68	26	1.53E-03	1.24E-01	1.50E+00	8.00E-04	1.30E-01			0E+00		0E+00
VOC	Methylene Chloride	75-09-2	B2	68	33	3.50E-03	4.01E-01	2.40E+00	1.80E-03	1.30E+00		2.30E+03	1E-03	1.30E+03	2E-03
VOC	Styrene	100-42-5		68	2	3.60E-03	8.30E-03	1.30E-02	6.80E-04	5.40E-01		5.20E+02	3E-05	4.00E+02	3E-05
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	68					2.40E-03	3.50E-01		3.70E+02	0E+00	5.30E+01	0E+00
VOC	Tetrachloroethene	127-18-4	C-B2	68					1.60E-03	4.80E-01		8.80E+01	0E+00	8.80E+01	0E+00
VOC	Toluene	108-88-3	D	68	19	9.10E-04	1.55E-02	1.30E-01	7.20E-04	3.20E-01		2.50E+02	5E-04	2.50E+02	5E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	68					1.20E-03	3.60E-01		1.10E+03	0E+00	9.90E+02	0E+00
VOC	1,1,1-Trichloroethane	71-55-6	D	68					1.20E-03	3.20E-01		4.60E+02	0E+00	4.60E+02	0E+00
VOC	1,1,2-Trichloroethane	79-00-5	C	68					1.60E-03	5.30E-01		9.20E+02	0E+00	1.80E+02	0E+00
VOC	Trichloroethene	79-01-6	C-B2	68					1.00E-03	5.50E-01		5.00E+02	0E+00	5.00E+02	0E+00
VOC	Trichlorofluoromethane	75-69-4		68					1.50E-03	6.20E-01		5.60E+02	0E+00	5.60E+02	0E+00
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		68					1.30E-03	1.20E+00		5.50E+02	0E+00	5.50E+02	0E+00
VOC	Vinyl Chloride	75-01-4	A	68					1.90E-03	3.50E-01		2.90E+01	0E+00	4.00E+00	0E+00
VOC	Xylenes (total)	1330-20-7	D	68	11	2.70E-03	1.48E-02	5.30E-02	3.20E-03	6.30E-01		1.50E+02	4E-04	1.50E+02	4E-04
SVOC	Acenaphthene	83-32-9		68	16	6.90E-02	1.20E+00	6.90E+00	1.10E-01	5.70E+00		2.00E+05	3E-05	4.10E+04	2E-04

TABLE 4-5
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
HARRIS LAKE (SEDIMENT)

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 Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	Acenaphthylene	208-96-8	D	68					5.80E-02	5.30E+00		8.00E+03	0E+00	1.60E+03	0E+00
SVOC	Acetophenone	98-86-2	D	68					6.20E-02	5.60E+00		1.10E+03	0E+00	1.10E+03	0E+00
SVOC	Anthracene	120-12-7	D	68	21	1.80E-01	1.82E+00	9.80E+00	1.10E-01	5.50E+00		1.00E+06	1E-05	2.30E+05	4E-05
SVOC	Atrazine	1912-24-9		68					1.90E-01	1.70E+01		5.00E+02	0E+00	7.10E+01	0E+00
SVOC	Benzaldehyde	100-52-7		68					2.10E-01	1.90E+01			0E+00		0E+00
SVOC	Benzo(a)anthracene	56-55-3	B2	68	30	2.30E-01	3.55E+00	1.30E+01	1.20E-01	6.20E+00		1.00E+02	1E-01	2.00E+01	7E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	68	27	2.90E-01	3.80E+00	1.20E+01	1.30E-01	6.80E+00		1.00E+01	**1E+00**	2.00E+00	**6E+00**
SVOC	Benzo(b)fluoranthene	205-99-2	B2	68	30	4.80E-01	4.48E+00	1.40E+01	1.30E-01	6.50E+00		1.00E+02	1E-01	2.00E+01	7E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	68	25	2.20E-01	2.63E+00	1.00E+01	1.20E-01	6.20E+00		9.10E+03	1E-03	2.50E+03	4E-03
SVOC	Benzo(k)fluoranthene	207-08-9	B2	68	25	2.40E-01	2.08E+00	5.60E+00	1.20E-01	6.00E+00		1.00E+03	6E-03	2.00E+02	3E-02
SVOC	Biphenyl	92-52-4		68					1.70E-01	1.60E+01			0E+00		0E+00
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	68					5.80E-02	5.30E+00			0E+00		0E+00
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	68					6.30E-02	5.70E+00		8.90E+01	0E+00	1.30E+01	0E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	68	38	1.90E-01	2.33E+00	8.50E+00	1.20E-01	6.10E+00		1.00E+04	9E-04	2.80E+03	3E-03
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	68					7.60E-02	6.90E+00			0E+00		0E+00
SVOC	Butylbenzylphthalate	85-68-7	C	68	22	7.70E-02	2.26E+00	7.10E+00	1.10E-01	5.70E+00		3.10E+02	2E-02	3.10E+02	2E-02
SVOC	Caprolactam	105-60-2		68	1	1.40E+01	1.40E+01	1.40E+01	2.20E-01	2.00E+01		4.50E+05	3E-05	5.30E+04	3E-04
SVOC	Carbazole	86-74-8	B2	68	15	9.55E-02	7.84E-01	4.10E+00	1.20E-01	5.90E+00		3.70E+03	1E-03	5.30E+02	8E-03
SVOC	4-Chloro-3-methylphenol	59-50-7		68					6.30E-02	5.70E+00		2.20E+04	0E+00	4.50E+03	0E+00
SVOC	4-Chloroaniline	106-47-8		68					6.30E-02	5.70E+00			0E+00		0E+00
SVOC	2-Chloronaphthalene	91-58-7		68					6.00E-02	5.40E+00		2.80E+05	0E+00	5.60E+04	0E+00
SVOC	2-Chlorophenol	95-57-8		68					6.50E-02	5.90E+00		6.90E+03	0E+00	1.40E+03	0E+00
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		68					6.50E-02	5.90E+00			0E+00		0E+00
SVOC	Chrysene	218-01-9	B2	68	33	1.80E-01	4.11E+00	1.40E+01	1.00E-01	5.20E+00		1.00E+04	1E-03	2.00E+03	7E-03
SVOC	Di-n-butylphthalate	84-74-2	D	68					1.90E-01	1.70E+01		7.60E+02	0E+00	7.60E+02	0E+00
SVOC	Di-n-octylphthalate	117-84-0		68					6.70E-02	6.10E+00		2.80E+04	0E+00	6.90E+03	0E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	68	13	6.60E-02	1.04E+00	3.70E+00	8.50E-02	5.70E+00		1.00E+01	4E-01	2.00E+00	**2E+00**
SVOC	Dibenzofuran	132-64-9	D	68	11	1.00E-01	7.22E-01	2.80E+00	6.30E-02	5.60E+00			0E+00		0E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	68					4.80E-02	4.40E+00		4.70E+01	0E+00	6.60E+00	0E+00
SVOC	2,4-Dichlorophenol	120-83-2		68					6.20E-02	5.60E+00		1.80E+03	0E+00	6.60E+02	0E+00
SVOC	Diethylphthalate	84-66-2	D	68					1.90E-01	1.70E+01		7.40E+02	0E+00	7.40E+02	0E+00
SVOC	2,4-Dimethylphenol	105-67-9		68					9.90E-02	9.00E+00		5.60E+04	0E+00	1.10E+04	0E+00
SVOC	Dimethylphthalate	131-11-3	D	68					2.00E-01	1.80E+01		7.90E+02	0E+00	7.90E+02	0E+00
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		68					2.00E-01	1.80E+01		3.90E+02	0E+00	7.90E+01	0E+00
SVOC	2,4-Dinitrophenol	51-28-5		68					1.40E-01	1.20E+01			0E+00		0E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	68					5.70E-02	5.20E+00		3.40E+02	0E+00	4.80E+01	0E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	68					6.00E-02	5.40E+00			0E+00		0E+00
SVOC	Fluoranthene	206-44-0	D	68	36	2.80E-01	7.95E+00	4.80E+01	1.30E-01	6.30E+00		1.80E+05	3E-04	4.60E+04	1E-03
SVOC	Fluorene	86-73-7	D	68	19	1.10E-01	1.32E+00	8.80E+00	1.10E-01	5.40E+00		1.30E+05	7E-05	2.70E+04	3E-04
SVOC	Hexachlorobenzene	118-74-1	B2	68					7.00E-02	6.30E+00		5.10E+01	0E+00	8.90E+00	0E+00
SVOC	Hexachlorobutadiene	87-68-3	C	68					5.60E-02	5.10E+00		3.50E+02	0E+00	1.00E+02	0E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	68					7.40E-02	6.80E+00		7.20E+02	0E+00	7.20E+02	0E+00
SVOC	Hexachloroethane	67-72-1	C	68					6.00E-02	5.40E+00		1.10E+03	0E+00	2.30E+02	0E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	68	24	2.00E-01	2.54E+00	9.60E+00	1.60E-01	7.90E+00		1.00E+02	1E-01	2.00E+01	5E-01
SVOC	Isophorone	78-59-1	C	68					5.50E-02	5.00E+00		2.40E+03	0E+00	2.40E+03	0E+00
SVOC	2-Methylnaphthalene	91-57-6		68	13	1.50E-01	1.02E+00	4.10E+00	6.00E-02	5.40E+00		4.00E+04	1E-04	8.10E+03	5E-04
SVOC	Methylphenol (summed)	1319-77-3		68	5	1.69E-01	4.62E-01	6.60E-01	5.80E-02	5.30E+00		5.60E+04	1E-05	1.10E+04	6E-05
SVOC	Naphthalene	91-20-3	C	68	10	1.20E-01	5.81E-01	1.00E+00	6.10E-02	5.50E+00		8.00E+04	1E-05	1.60E+04	6E-05

TABLE 4-5
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
HARRIS LAKE (SEDIMENT)

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 Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
SVOC	2-Nitroaniline	88-74-4		68					5.70E-02	5.20E+00			0E+00		0E+00
SVOC	3-Nitroaniline	99-09-2	C	68					1.70E-01	1.60E+01			0E+00		0E+00
SVOC	4-Nitroaniline	100-01-6	C	68					8.40E-02	7.70E+00			0E+00		0E+00
SVOC	Nitrobenzene	98-95-3	D	68					5.70E-02	5.20E+00		4.90E+02	0E+00	1.00E+02	0E+00
SVOC	2-Nitrophenol	88-75-5		68					5.70E-02	5.20E+00		3.10E+03	0E+00	6.30E+02	0E+00
SVOC	4-Nitrophenol	100-02-7		68					2.40E-01	2.10E+01			0E+00		0E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	68					6.10E-02	5.50E+00		1.20E+04	0E+00	1.70E+03	0E+00
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	68					5.50E-02	5.00E+00		8.30E+00	0E+00	1.20E+00	0E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	68					6.50E-02	5.90E+00			0E+00		0E+00
SVOC	Pentachlorophenol	87-86-5	B2	68					1.50E-01	1.40E+01		3.90E+02	0E+00	9.00E+01	0E+00
SVOC	Phenanthrene	85-01-8	D	68	33	3.00E-01	6.09E+00	4.90E+01	1.20E-01	5.90E+00		8.00E+03	6E-03	1.60E+03	3E-02
SVOC	Phenol	108-95-2	D	68					6.10E-02	5.50E+00		1.20E+04	0E+00	1.20E+04	0E+00
SVOC	Pyrene	129-00-0	D	68	36	2.30E-01	6.14E+00	2.50E+01	1.10E-01	5.70E+00		1.10E+05	2E-04	2.90E+04	9E-04
SVOC	2,4,5-Trichlorophenol	95-95-4		68					6.80E-02	6.20E+00		1.10E+05	0E+00	2.30E+04	0E+00
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	68					7.80E-02	7.10E+00		5.00E+03	0E+00	7.10E+02	0E+00
P/PCB	PCBs (summed)	1336-36-3	B2	68	37	2.62E-02	3.82E-01	2.97E+00	3.30E-02	2.20E-01		2.00E+01	1E-01	4.00E+00	7E-01
INORG	Antimony	7440-36-0		68	37	4.42E-01	2.95E+01	3.79E+02	5.48E-01	5.44E+00		1.20E+03	3E-01	1.80E+02	**2E+00**
INORG	Arsenic	7440-38-2	A	68	60	4.64E-01	1.30E+01	9.05E+01	3.36E-01	5.74E-01	1.32E+01	6.10E+01	**1E+00**	7.60E+00	**1E+01**
INORG	Barium	7440-39-3	D	68	68	2.92E+01	1.99E+02	1.06E+03			1.10E+02	2.50E+05	4E-03	3.70E+04	3E-02
INORG	Beryllium	7440-41-7	B1	68	35	8.56E-02	4.60E-01	1.34E+00	5.15E-02	5.11E-01	1.53E+00	3.10E+03	0E+00	4.10E+02	0E+00
INORG	Cadmium	7440-43-9	B1	68	46	6.53E-02	3.64E+00	2.54E+01	4.81E-02	1.08E-01	1.20E+00	4.10E+03	6E-03	5.50E+02	4E-02
INORG	Chromium (total)	7440-47-3		68	64	6.81E-01	2.10E+02	2.47E+03	4.42E-01	6.01E-01	4.92E+01	1.70E+04	1E-01	2.50E+03	1E+00
INORG	Cobalt	7440-48-4		68	63	2.19E-01	4.21E+00	1.96E+01	1.74E-01	2.54E-01	1.74E+01	1.80E+04	1E-04	2.60E+03	9E-04
INORG	Copper	7440-50-8	D	68	68	5.17E-01	2.02E+02	2.53E+03			3.20E+01	1.40E+05	2E-02	2.00E+04	1E-01
INORG	Cyanide (total)	57-12-5	D	62	30	2.73E-01	4.49E+00	4.52E+01	2.15E-01	1.03E+00		2.50E+02	2E-01	1.20E+01	**4E+00**
INORG	Lead	7439-92-1	B2	68	50	4.55E-01	8.75E+02	1.13E+04	2.68E-01	4.59E-01	4.92E+01	9.00E+02	**1E+01**	4.00E+02	**3E+01**
INORG	Manganese	7439-96-5	D	68	68	3.89E+01	5.28E+02	3.97E+03			5.10E+02	1.70E+05	2E-02	2.50E+04	1E-01
INORG	Mercury	7439-97-6	D	68	45	2.72E-02	2.12E-01	8.48E-01	1.88E-02	3.21E-02	1.30E-01	1.10E+03	7E-04	1.60E+02	4E-03
INORG	Nickel	7440-02-0	A	68	68	9.65E-01	9.39E+01	1.01E+03			3.01E+01	2.70E+05	4E-03	4.00E+04	2E-02
INORG	Selenium	7782-49-2	D	68	40	5.07E-01	2.05E+00	6.78E+00	1.96E-01	3.44E+00	4.10E-01	1.80E+04	4E-04	2.60E+03	2E-03
INORG	Silver	7440-22-4	D	68	8	1.66E-01	7.00E-01	1.45E+00	9.50E-02	1.66E+00		1.70E+04	9E-05	2.50E+03	6E-04
INORG	Thallium	7440-28-0		68	22	5.97E-01	1.59E+00	4.84E+00	5.59E-01	5.55E+00		2.40E+02	2E-02	3.50E+01	1E-01
INORG	Vanadium	7440-62-2		68	68	3.26E-01	9.01E+00	2.96E+01			3.28E+01	1.00E+04	0E+00	7.50E+02	0E+00
INORG	Zinc	7440-66-6	D	68	68	1.66E+00	2.97E+02	1.67E+03			4.70E+01	1.00E+06	2E-03	1.70E+05	1E-02
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	14	14	6.47E-06	4.22E-05	2.19E-04				9.90E-04	2E-01	9.00E-05	**2E+00**

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.
12. The concentrations for the Target Dioxin congeners were used to calculate an 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

TABLE 4-6
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL
DATA SUMMARY FOR
HARRIS LAKE
(SURFACE WATER)

Chem Group	Chemical Name	CASRN	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)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria
VOC	Acetone	67-64-1	D	10	3	7.60E-04	8.57E-04	9.50E-04	5.10E-04	1.00E-02	7.30E-01	1E-03	3.10E+04	3E-08
VOC	Benzene	71-43-2	A	10	4	1.90E-04	2.38E-04	3.40E-04	1.60E-04	1.00E-03	5.00E-03	7E-02	1.10E+01	3E-05
VOC	Bromodichloromethane	75-27-4	B2	10					1.70E-04	1.00E-03	1.00E-01	0E+00	1.40E+01	0E+00
VOC	Bromoform	75-25-2	B2	10					1.80E-04	1.00E-03	1.00E-01	0E+00	1.40E+02	0E+00
VOC	Bromomethane	74-83-9	D	10					2.00E-04	1.00E-03	1.00E-02	0E+00	7.00E+01	0E+00
VOC	2-Butanone	78-93-3	D	10	1	7.20E-04	7.20E-04	7.20E-04	4.10E-04	1.00E-02	1.30E+01	6E-05	2.40E+05	3E-09
VOC	Carbon Disulfide	75-15-0		10					2.00E-04	1.00E-03	8.00E-01	0E+00	1.20E+03	0E+00
VOC	Carbon Tetrachloride	56-23-5	B2	10					1.20E-04	1.00E-03	5.00E-03	0E+00	4.60E+00	0E+00
VOC	Chlorobenzene	108-90-7	D	10					1.40E-04	1.00E-03	1.00E-01	0E+00	8.60E+01	0E+00
VOC	Chloroethane	75-00-3		10					2.60E-04	1.00E-03	4.30E-01	0E+00	4.40E+02	0E+00
VOC	Chloroform	67-66-3	B2	10					1.40E-04	1.00E-03	1.00E-01	0E+00	1.50E+02	0E+00
VOC	Chloromethane	74-87-3	D	10					1.30E-04	1.00E-03	2.60E-01	0E+00	4.90E+02	0E+00
VOC	Cumene	98-82-8	D	10					1.20E-04	1.00E-03	8.00E-01	0E+00	5.60E+01	0E+00
VOC	Cyclohexane	110-82-7		10					1.30E-04	1.00E-03		0E+00		0E+00
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	10					6.20E-04	2.00E-03	2.00E-04	0E+00	3.90E-01	0E+00
VOC	Dibromochloromethane	124-48-1	C	10					2.60E-04	1.00E-03	1.00E-01	0E+00	1.80E+01	0E+00
VOC	1,2-Dibromoethane	106-93-4	B2	10					2.20E-04	1.00E-03	1.00E-03	0E+00	2.50E-02	0E+00
VOC	1,2-Dichlorobenzene	95-50-1	D	10					1.10E-04	1.00E-03	6.00E-01	0E+00	1.60E+02	0E+00
VOC	1,3-Dichlorobenzene	541-73-1	D	10					1.50E-04	1.00E-03	6.60E-03	0E+00	2.00E+00	0E+00
VOC	1,4-Dichlorobenzene	106-46-7	C	10					1.70E-04	1.00E-03	7.50E-02	0E+00	6.40E+00	0E+00
VOC	Dichlorodifluoromethane	75-71-8		10					2.60E-04	2.00E-03	1.70E+00	0E+00	3.00E+02	0E+00
VOC	1,1-Dichloroethane	75-34-3	C	10					1.60E-04	1.00E-03	8.80E-01	0E+00	2.40E+03	0E+00
VOC	1,2-Dichloroethane	107-06-2	B2	10					2.10E-04	1.00E-03	5.00E-03	0E+00	1.90E+01	0E+00
VOC	1,1-Dichloroethene	75-35-4	C	10					2.40E-04	1.00E-03	7.00E-03	0E+00	1.10E+01	0E+00
VOC	cis-1,2-Dichloroethene	156-59-2	D	10					2.20E-04	5.00E-04	7.00E-02	0E+00	2.00E+02	0E+00
VOC	trans-1,2-Dichloroethene	156-60-5		10					1.50E-04	5.00E-04	1.00E-01	0E+00	2.20E+02	0E+00
VOC	1,2-Dichloropropane	78-87-5	B2	10					1.70E-04	1.00E-03	5.00E-03	0E+00	1.60E+01	0E+00
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	10					2.70E-04	1.00E-03	2.10E-02	0E+00	1.30E+01	0E+00
VOC	Ethyl Benzene	100-41-4	D	10	2	1.20E-04	1.45E-04	1.70E-04	1.20E-04	1.00E-03	7.00E-01	2E-04	1.70E+02	1E-06
VOC	2-Hexanone	591-78-6		10					4.60E-04	1.00E-02	1.00E+00	0E+00	5.20E+03	0E+00
VOC	Methyl Acetate	79-20-9		10					4.10E-04	1.00E-02		0E+00		0E+00
VOC	Methyl tert-butyl ether	1634-04-4		10	1	1.10E-03	1.10E-03	1.10E-03	1.30E-04	5.00E-03	2.40E-01	5E-03	6.90E+02	2E-06
VOC	4-Methyl-2-pentanone	108-10-1		10	1	1.70E-03	1.70E-03	1.70E-03	2.30E-04	1.00E-02	1.80E+00	9E-04	1.30E+04	1E-07
VOC	Methylcyclohexane	108-87-2		10					1.50E-04	1.00E-03		0E+00		0E+00
VOC	Methylene Chloride	75-09-2	B2	10					3.40E-04	1.00E-03	5.00E-03	0E+00	2.20E+02	0E+00
VOC	Styrene	100-42-5		10					1.50E-04	1.00E-03	1.00E-01	0E+00	9.70E+00	0E+00
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	10					2.50E-04	1.00E-03	8.50E-03	0E+00	4.70E+00	0E+00
VOC	Tetrachloroethene	127-18-4	C-B2	10					2.30E-04	1.00E-03	5.00E-03	0E+00	1.20E+01	0E+00
VOC	Toluene	108-88-3	D	10	9	2.20E-04	4.96E-04	1.10E-03	1.00E-03	1.00E-03	1.00E+00	1E-03	5.30E+02	2E-06
VOC	1,2,4-Trichlorobenzene	120-82-1	D	10					1.70E-04	1.00E-03	7.00E-02	0E+00	1.90E+01	0E+00
VOC	1,1,1-Trichloroethane	71-55-6	D	10					1.50E-04	1.00E-03	2.00E-01	0E+00	1.30E+03	0E+00
VOC	1,1,2-Trichloroethane	79-00-5	C	10					3.00E-04	1.00E-03	5.00E-03	0E+00	2.10E+01	0E+00
VOC	Trichloroethene	79-01-6	C-B2	10					1.40E-04	1.00E-03	5.00E-03	0E+00	3.70E+01	0E+00
VOC	Trichlorofluoromethane	75-69-4		10					2.80E-04	1.00E-03	2.60E+00	0E+00	1.10E+03	0E+00
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		10					3.20E-04	1.00E-03	1.70E+02	0E+00	1.70E+02	0E+00
VOC	Vinyl Chloride	75-01-4	A	10					1.50E-04	1.00E-03	2.00E-03	0E+00	5.70E-01	0E+00
VOC	Xylenes (total)	1330-20-7	D	10	3	5.50E-04	8.25E-04	1.00E-03	3.30E-04	1.00E-03	1.00E+01	1E-04	1.90E+02	5E-06
SVOC	Acenaphthene	83-32-9		10					8.00E-04	5.00E-03	1.30E+00	0E+00	4.20E+00	0E+00

TABLE 4-6
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL
DATA SUMMARY FOR
HARRIS LAKE
(SURFACE WATER)

Chem Group	Chemical Name	CASRN	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)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria
SVOC	Acenaphthylene	208-96-8	D	10					7.10E-04	5.00E-03	5.20E-02	0E+00	3.90E+00	0E+00
SVOC	Acetophenone	98-86-2	D	10					2.60E-03	1.00E-02	1.50E+00	0E+00	6.10E+03	0E+00
SVOC	Anthracene	120-12-7	D	10					6.80E-04	5.00E-03	4.30E-02	0E+00	4.30E-02	0E+00
SVOC	Atrazine	1912-24-9		10					2.50E-03	5.00E-03	3.00E-03	0E+00	5.40E+00	0E+00
SVOC	Benzaldehyde	100-52-7		10					2.80E-03	1.00E-02		0E+00		0E+00
SVOC	Benzo(a)anthracene	56-55-3	B2	10					7.00E-04	5.00E-03	2.10E-03	0E+00	9.40E-03	0E+00
SVOC	Benzo(a)pyrene	50-32-8	B2	10					7.30E-04	5.00E-03	5.00E-03	0E+00	5.00E-03	0E+00
SVOC	Benzo(b)fluoranthene	205-99-2	B2	10					9.40E-04	5.00E-03	2.00E-03	0E+00	2.00E-03	0E+00
SVOC	Benzo(g,h,i)perylene	191-24-2	D	10					8.50E-04	5.00E-03	5.00E-03	0E+00	5.00E-03	0E+00
SVOC	Benzo(k)fluoranthene	207-08-9	B2	10					8.40E-04	5.00E-03	5.00E-03	0E+00	5.00E-03	0E+00
SVOC	Biphenyl	92-52-4		10					2.60E-03	1.00E-02		0E+00		0E+00
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	10					8.70E-04	5.00E-03		0E+00		0E+00
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	10					9.70E-04	5.00E-03	2.00E-03	0E+00	5.70E+00	0E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	10					2.70E-03	5.00E-03	6.00E-03	0E+00	3.20E-01	0E+00
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	10					8.80E-04	5.00E-03		0E+00		0E+00
SVOC	Butylbenzylphthalate	85-68-7	C	10					8.80E-04	5.00E-03	1.20E+00	0E+00	2.70E+00	0E+00
SVOC	Caprolactam	105-60-2		10					2.50E-03	1.00E-02	5.80E+00	0E+00	3.90E+05	0E+00
SVOC	Carbazole	86-74-8	B2	10					8.20E-04	1.00E-02	8.50E-02	0E+00	7.40E+00	0E+00
SVOC	4-Chloro-3-methylphenol	59-50-7		10					9.90E-04	5.00E-03	1.50E-01	0E+00	7.90E+01	0E+00
SVOC	4-Chloroaniline	106-47-8		10					6.10E-04	1.00E-02		0E+00		0E+00
SVOC	2-Chloronaphthalene	91-58-7		10					8.50E-04	5.00E-03	1.80E+00	0E+00	6.70E+00	0E+00
SVOC	2-Chlorophenol	95-57-8		10					1.00E-03	5.00E-03	4.50E-02	0E+00	9.40E+01	0E+00
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		10					7.90E-04	5.00E-03		0E+00		0E+00
SVOC	Chrysene	218-01-9	B2	10					7.50E-04	5.00E-03	5.00E-03	0E+00	5.00E-03	0E+00
SVOC	Di-n-butylphthalate	84-74-2	D	10					6.70E-04	5.00E-03	8.80E-01	0E+00	1.10E+01	0E+00
SVOC	Di-n-octylphthalate	117-84-0		10					1.10E-03	5.00E-03	1.30E-01	0E+00	4.00E-01	0E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	10					7.90E-04	5.00E-03	5.00E-03	0E+00	5.00E-03	0E+00
SVOC	Dibenzofuran	132-64-9	D	10					1.10E-03	5.00E-03		0E+00		0E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	10					9.30E-04	2.00E-02	1.10E-03	0E+00	1.80E-01	0E+00
SVOC	2,4-Dichlorophenol	120-83-2		10					8.50E-04	1.00E-02	7.30E-02	0E+00	4.80E+01	0E+00
SVOC	Diethylphthalate	84-66-2	D	10					6.50E-04	5.00E-03	5.50E+00	0E+00	1.10E+03	0E+00
SVOC	2,4-Dimethylphenol	105-67-9		10					8.50E-04	5.00E-03	3.70E-01	0E+00	5.20E+02	0E+00
SVOC	Dimethylphthalate	131-11-3	D	10					7.60E-04	5.00E-03	7.30E+01	0E+00	4.20E+03	0E+00
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		10					1.30E-03	2.00E-02	2.00E-02	0E+00	9.50E+00	0E+00
SVOC	2,4-Dinitrophenol	51-28-5		10					3.00E-03	2.00E-02		0E+00		0E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	10					7.90E-04	5.00E-03	7.70E-03	0E+00	8.60E+00	0E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	10					5.70E-04	5.00E-03		0E+00		0E+00
SVOC	Fluoranthene	206-44-0	D	10					8.10E-04	5.00E-03	2.10E-01	0E+00	2.10E-01	0E+00
SVOC	Fluorene	86-73-7	D	10					1.00E-03	5.00E-03	8.80E-01	0E+00	2.00E+00	0E+00
SVOC	Hexachlorobenzene	118-74-1	B2	10					7.40E-04	5.00E-03	1.00E-03	0E+00	4.60E-03	0E+00
SVOC	Hexachlorobutadiene	87-68-3	C	10					7.30E-04	5.00E-03	1.50E-02	0E+00	4.00E-01	0E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	10					1.10E-03	5.00E-03	5.00E-02	0E+00	1.80E+00	0E+00
SVOC	Hexachloroethane	67-72-1	C	10					7.40E-04	5.00E-03	7.30E-03	0E+00	1.90E+00	0E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	10					6.30E-04	5.00E-03	5.00E-03	0E+00	5.00E-03	0E+00
SVOC	Isophorone	78-59-1	C	10					6.30E-04	5.00E-03	7.70E-01	0E+00	9.90E+02	0E+00
SVOC	2-Methylnaphthalene	91-57-6		10	1	1.01E-03	1.01E-03	1.01E-03	6.40E-04	5.00E-03	2.60E-01	4E-03	2.50E+01	4E-05
SVOC	Methylphenol (summed)	1319-77-3		10					1.30E-03	5.00E-03	3.70E-01	0E+00	8.10E+02	0E+00
SVOC	Naphthalene	91-20-3	C	10	1	1.19E-03	1.19E-03	1.19E-03	7.50E-04	5.00E-03	5.20E-01	2E-03	3.10E+01	4E-05

TABLE 4-6
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL
DATA SUMMARY FOR
HARRIS LAKE
(SURFACE WATER)

Chem Group	Chemical Name	CASRN	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)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detect to Groundwater Contact Criteria
SVOC	2-Nitroaniline	88-74-4		10					7.00E-04	2.00E-02		0E+00		0E+00
SVOC	3-Nitroaniline	99-09-2	C	10					7.10E-04	2.00E-02		0E+00		0E+00
SVOC	4-Nitroaniline	100-01-6	C	10					1.30E-03	2.00E-02		0E+00		0E+00
SVOC	Nitrobenzene	98-95-3	D	10					8.10E-04	5.00E-03	3.40E-03	0E+00	1.10E+01	0E+00
SVOC	2-Nitrophenol	88-75-5		10					2.10E-03	5.00E-03	2.00E-02	0E+00	7.90E+01	0E+00
SVOC	4-Nitrophenol	100-02-7		10					1.90E-03	2.00E-02		0E+00		0E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	10					1.40E-03	5.00E-03	2.70E-01	0E+00	3.50E+01	0E+00
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	10					6.70E-04	5.00E-03	5.00E-03	0E+00	3.60E-01	0E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	10					7.80E-04	5.00E-03		0E+00		0E+00
SVOC	Pentachlorophenol	87-86-5	B2	10					2.40E-03	5.00E-03	1.00E-03	0E+00	2.00E-01	0E+00
SVOC	Phenanthrene	85-01-8	D	10					8.20E-04	5.00E-03	5.20E-02	0E+00	1.00E+00	0E+00
SVOC	Phenol	108-95-2	D	10					2.60E-03	5.00E-03	4.40E+00	0E+00	2.90E+04	0E+00
SVOC	Pyrene	129-00-0	D	10					1.10E-03	5.00E-03	1.40E-01	0E+00	1.40E-01	0E+00
SVOC	2,4,5-Trichlorophenol	95-95-4		10					1.20E-03	5.00E-03	7.30E-01	0E+00	1.70E+02	0E+00
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	10					1.70E-03	5.00E-03	1.20E-01	0E+00	1.00E+01	0E+00
P/PCB	PCBs (summed)	1336-36-3	B2	10					8.20E-05	2.00E-04	5.00E-04	0E+00	3.30E-03	0E+00
INORG	Antimony	7440-36-0		10	2	3.00E-03	3.40E-03	3.80E-03	2.20E-03	2.50E-02	6.00E-03	6E-01	6.80E+01	6E-05
INORG	Arsenic	7440-38-2	A	10	5	4.10E-03	4.93E-03	6.70E-03	3.90E-03	1.00E-02	5.00E-02	1E-01	4.30E+00	2E-03
INORG	Barium	7440-39-3	D	10	10	2.14E-01	3.41E-01	1.32E+00			2.00E+00	7E-01	1.40E+04	9E-05
INORG	Beryllium	7440-41-7	B1	10					5.40E-04	1.00E-03	4.00E-03	0E+00	2.90E+02	0E+00
INORG	Cadmium	7440-43-9	B1	10	7	2.80E-04	3.21E-04	3.80E-04	2.80E-04	5.00E-03	5.00E-03	8E-02	1.90E+02	2E-06
INORG	Chromium (total)	7440-47-3		10	2	1.15E-03	1.78E-03	2.40E-03	1.40E-03	1.00E-02	1.00E-01	2E-02	4.60E+02	5E-06
INORG	Cobalt	7440-48-4		10					1.30E-03	2.00E-02	4.00E-02	0E+00	2.40E+03	0E+00
INORG	Copper	7440-50-8	D	10	7	4.20E-03	5.65E-03	8.00E-03	5.00E-03	5.00E-03	1.40E+00	6E-03	7.40E+03	1E-06
INORG	Lead	7439-92-1	B2	10					2.50E-03	3.00E-03	4.00E-03	0E+00		0E+00
INORG	Manganese	7439-96-5	D	10	10	2.49E-02	5.89E-02	2.95E-01			8.60E-01	3E-01	9.10E+03	3E-05
INORG	Mercury	7439-97-6	D	10					6.90E-05	2.00E-04	2.00E-03	0E+00	5.60E-02	0E+00
INORG	Nickel	7440-02-0	A	10	10	3.00E-03	5.05E-03	6.40E-03			1.00E-01	6E-02	7.40E+04	9E-08
INORG	Selenium	7782-49-2	D	10					4.50E-03	5.00E-03	5.00E-02	0E+00	9.70E+02	0E+00
INORG	Silver	7440-22-4	D	10					1.50E-03	5.00E-03	3.40E-02	0E+00	1.50E+03	0E+00
INORG	Thallium	7440-28-0		10	4	6.60E-03	8.33E-03	1.18E-02	1.80E-05	5.00E-03	2.00E-03	**6E+00**	1.30E+01	9E-04
INORG	Vanadium	7440-62-2		10	1	9.70E-04	9.70E-04	9.70E-04	8.20E-04	1.00E-02	4.50E-03	2E-01	9.70E+02	1E-06
INORG	Zinc	7440-66-6	D	10	4	1.29E-02	1.64E-02	1.87E-02	1.20E-02	2.00E-02	2.40E+00	8E-03	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 4-7

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
HARRIS LAKE
(OIL/WATER MIXTURE)

Chem Group	Chemical	CASRN	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)
VOC	Acetone	67-64-1	D	3	3	4.80E-02	9.13E-02	1.60E-01		
VOC	Benzene	71-43-2	A	3					6.50E-04	6.50E-04
VOC	Bromodichloromethane	75-27-4	B2	3					1.20E-03	1.20E-03
VOC	Bromoform	75-25-2	B2	3					1.60E-03	1.60E-03
VOC	Bromomethane	74-83-9	D	3					1.80E-03	1.80E-03
VOC	2-Butanone	78-93-3	D	3	2	2.80E-03	4.00E-03	5.20E-03	2.70E-03	2.70E-03
VOC	Carbon Disulfide	75-15-0		3					7.80E-04	7.80E-04
VOC	Carbon Tetrachloride	56-23-5	B2	3					1.00E-03	1.00E-03
VOC	Chlorobenzene	108-90-7	D	3					5.20E-04	5.20E-04
VOC	Chloroethane	75-00-3		3					2.20E-03	2.20E-03
VOC	Chloroform	67-66-3	B2	3					8.20E-04	8.20E-04
VOC	Chloromethane	74-87-3	D	3					1.30E-03	1.30E-03
VOC	Cumene	98-82-8	D	3					7.00E-04	7.00E-04
VOC	Cyclohexane	110-82-7		3					1.00E-03	1.00E-03
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	3					1.60E-03	1.60E-03
VOC	Dibromochloromethane	124-48-1	C	3					1.10E-03	1.10E-03
VOC	1,2-Dibromoethane	106-93-4	B2	3					1.20E-03	1.20E-03
VOC	1,2-Dichlorobenzene	95-50-1	D	3					7.10E-04	7.10E-04
VOC	1,3-Dichlorobenzene	541-73-1	D	3					8.00E-04	8.00E-04
VOC	1,4-Dichlorobenzene	106-46-7	C	3					6.70E-04	6.70E-04
VOC	Dichlorodifluoromethane	75-71-8		3					1.10E-03	1.10E-03
VOC	1,1-Dichloroethane	75-34-3	C	3					5.80E-04	5.80E-04
VOC	1,2-Dichloroethane	107-06-2	B2	3					7.30E-04	7.30E-04
VOC	1,1-Dichloroethene	75-35-4	C	3					1.20E-03	1.20E-03
VOC	cis-1,2-Dichloroethene	156-59-2	D	3					8.40E-04	8.40E-04
VOC	trans-1,2-Dichloroethene	156-60-5		3					7.30E-04	7.30E-04
VOC	1,2-Dichloropropane	78-87-5	B2	3					7.50E-04	7.50E-04
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	3					8.60E-04	8.60E-04
VOC	Ethyl Benzene	100-41-4	D	3					5.90E-04	5.90E-04
VOC	2-Hexanone	591-78-6		3					1.70E-03	1.70E-03
VOC	Methyl Acetate	79-20-9		3					1.10E-03	1.10E-03
VOC	Methyl tert-butyl ether	1634-04-4		3					8.40E-04	8.40E-04
VOC	4-Methyl-2-pentanone	108-10-1		3					1.90E-03	1.90E-03
VOC	Methylcyclohexane	108-87-2		3	1	1.60E-03	1.60E-03	1.60E-03	5.90E-04	5.90E-04
VOC	Methylene Chloride	75-09-2	B2	3	1	5.30E-02	5.30E-02	5.30E-02	1.30E-03	1.30E-03
VOC	Styrene	100-42-5		3					5.00E-04	5.00E-04
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	3					1.80E-03	1.80E-03
VOC	Tetrachloroethene	127-18-4	C-B2	3					1.20E-03	1.20E-03
VOC	Toluene	108-88-3	D	3					5.30E-04	5.30E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	3					8.90E-04	8.90E-04
VOC	1,1,1-Trichloroethane	71-55-6	D	3					9.20E-04	9.20E-04
VOC	1,1,2-Trichloroethane	79-00-5	C	3					1.20E-03	1.20E-03
VOC	Trichloroethene	79-01-6	C-B2	3					7.60E-04	7.60E-04
VOC	Trichlorofluoromethane	75-69-4		3					1.10E-03	1.10E-03

TABLE 4-7

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
HARRIS LAKE
(OIL/WATER MIXTURE)

Chem Group	Chemical	CASRN	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)
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		3					9.30E-04	9.30E-04
VOC	Vinyl Chloride	75-01-4	A	3					1.40E-03	1.40E-03
VOC	Xylenes (total)	1330-20-7	D	3					1.90E-03	1.90E-03
SVOC	Acenaphthene	83-32-9		3					8.00E-03	1.60E-02
SVOC	Acenaphthylene	208-96-8	D	3					7.10E-03	1.40E-02
SVOC	Acetophenone	98-86-2	D	3					2.60E-02	5.20E-02
SVOC	Anthracene	120-12-7	D	3					6.80E-03	1.40E-02
SVOC	Atrazine	1912-24-9		3					2.50E-02	5.00E-02
SVOC	Benzaldehyde	100-52-7		3					2.80E-02	5.60E-02
SVOC	Benzo(a)anthracene	56-55-3	B2	3					7.00E-03	1.40E-02
SVOC	Benzo(a)pyrene	50-32-8	B2	3					7.30E-03	1.50E-02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	3					9.40E-03	1.90E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	3					8.50E-03	1.70E-02
SVOC	Benzo(k)fluoranthene	207-08-9	B2	3					8.40E-03	1.70E-02
SVOC	Biphenyl	92-52-4		3					2.60E-02	5.20E-02
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3					8.70E-03	1.70E-02
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3					9.70E-03	1.90E-02
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	3					2.70E-02	5.40E-02
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	3					8.80E-03	1.80E-02
SVOC	Butylbenzylphthalate	85-68-7	C	3					8.80E-03	1.80E-02
SVOC	Caprolactam	105-60-2		3					2.50E-02	5.00E-02
SVOC	Carbazole	86-74-8	B2	3					8.20E-03	1.60E-02
SVOC	4-Chloro-3-methylphenol	59-50-7		3					9.90E-03	2.00E-02
SVOC	4-Chloroaniline	106-47-8		3					6.10E-03	1.20E-02
SVOC	2-Chloronaphthalene	91-58-7		3					8.50E-03	1.70E-02
SVOC	2-Chlorophenol	95-57-8		3					1.00E-02	2.00E-02
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		3					7.90E-03	1.60E-02
SVOC	Chrysene	218-01-9	B2	3					7.50E-03	1.50E-02
SVOC	Di-n-butylphthalate	84-74-2	D	3					6.70E-03	1.30E-02
SVOC	Di-n-octylphthalate	117-84-0		3					1.10E-02	2.20E-02
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	3					7.90E-03	1.60E-02
SVOC	Dibenzofuran	132-64-9	D	3					1.10E-02	2.20E-02
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	3					9.30E-03	1.90E-02
SVOC	2,4-Dichlorophenol	120-83-2		3					8.50E-03	1.70E-02
SVOC	Diethylphthalate	84-66-2	D	3					6.50E-03	1.30E-02
SVOC	2,4-Dimethylphenol	105-67-9		3					8.50E-03	1.70E-02
SVOC	Dimethylphthalate	131-11-3	D	3					7.60E-03	1.50E-02
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		3					1.30E-02	2.60E-02
SVOC	2,4-Dinitrophenol	51-28-5		3					3.00E-02	6.00E-02
SVOC	2,4-Dinitrotoluene	121-14-2	B2	3					7.90E-03	1.60E-02
SVOC	2,6-Dinitrotoluene	606-20-2	B2	3					5.70E-03	1.10E-02
SVOC	Fluoranthene	206-44-0	D	3					8.10E-03	1.60E-02
SVOC	Fluorene	86-73-7	D	3					1.00E-02	2.00E-02
SVOC	Hexachlorobenzene	118-74-1	B2	3					7.40E-03	1.50E-02

TABLE 4-7

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
HARRIS LAKE
(OIL/WATER MIXTURE)

Chem Group	Chemical	CASRN	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)
SVOC	Hexachlorobutadiene	87-68-3	C	3					7.30E-03	1.50E-02
SVOC	Hexachloroethane	67-72-1	C	3					7.40E-03	1.50E-02
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3					6.30E-03	1.30E-02
SVOC	Isophorone	78-59-1	C	3					6.30E-03	1.30E-02
SVOC	2-Methylnaphthalene	91-57-6		3	1	9.10E-03	9.10E-03	9.10E-03	6.40E-03	1.30E-02
SVOC	Methylphenol (summed)	1319-77-3		3					1.30E-02	2.60E-02
SVOC	Naphthalene	91-20-3	C	3					7.50E-03	1.50E-02
SVOC	2-Nitroaniline	88-74-4		3					7.00E-03	1.40E-02
SVOC	3-Nitroaniline	99-09-2	C	3					7.10E-03	1.40E-02
SVOC	4-Nitroaniline	100-01-6	C	3					1.30E-02	2.60E-02
SVOC	Nitrobenzene	98-95-3	D	3					8.10E-03	1.60E-02
SVOC	2-Nitrophenol	88-75-5		3					2.10E-02	4.20E-02
SVOC	4-Nitrophenol	100-02-7		3					1.90E-02	3.80E-02
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	3					1.40E-02	2.80E-02
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3					6.70E-03	1.30E-02
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3					7.80E-03	1.60E-02
SVOC	Pentachlorophenol	87-86-5	B2	3					2.40E-02	4.80E-02
SVOC	Phenanthrene	85-01-8	D	3					8.20E-03	1.60E-02
SVOC	Phenol	108-95-2	D	3					2.60E-02	5.20E-02
SVOC	Pyrene	129-00-0	D	3					1.10E-02	2.20E-02
SVOC	2,4,5-Trichlorophenol	95-95-4		3					1.20E-02	2.40E-02
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3					1.70E-02	3.40E-02
P/PCB	PCBs (summed)	1336-36-3	B2	3	3	6.93E-04	1.40E-03	2.67E-03		
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	3	3	6.10E-07	9.26E-07	1.32E-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

TABLE 4-8

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL
DATA SUMMARY FOR
HARRIS LAKE
(FISH TISSUE)

Portion	Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min Detected	Mean Detected	Max Detected	Min QL	Max QL	Units
Whole Fish	P/PCB	PCBs (summed)	1336-36-3	B2	15	15	3.45E-02	6.57E-02	1.42E-01			MG/KG
Whole Fish	INORG	Antimony	7440-36-0		15					2.00E+00	2.00E+00	MG/KG
Whole Fish	INORG	Arsenic	7440-38-2	A	15					5.00E-01	5.00E-01	MG/KG
Whole Fish	INORG	Barium	7440-39-3	D	15	15	6.32E-01	2.10E+00	4.30E+00			MG/KG
Whole Fish	INORG	Beryllium	7440-41-7	B1	15	1	5.93E-02	5.93E-02	5.93E-02	1.00E-01	1.00E-01	MG/KG
Whole Fish	INORG	Cadmium	7440-43-9	B1	15	2	1.11E-01	1.24E-01	1.36E-01	5.00E-01	5.00E-01	MG/KG
Whole Fish	INORG	Chromium (total)	7440-47-3		15	11	3.91E-01	4.48E-01	5.38E-01	1.00E+00	1.00E+00	MG/KG
Whole Fish	INORG	Cobalt	7440-48-4		15					1.00E+00	1.00E+00	MG/KG
Whole Fish	INORG	Copper	7440-50-8	D	15	10	3.07E-01	7.47E-01	1.93E+00	5.00E-01	5.00E-01	MG/KG
Whole Fish	INORG	Lead	7439-92-1	B2	15	3	2.53E-01	3.39E-01	4.44E-01	3.00E-01	3.00E-01	MG/KG
Whole Fish	INORG	Manganese	7439-96-5	D	15	15	6.43E-01	1.68E+00	3.14E+00			MG/KG
Whole Fish	INORG	Mercury	7439-97-6	D	15	15	1.96E-02	5.25E-02	9.14E-02			MG/KG
Whole Fish	INORG	Nickel	7440-02-0	A	15					2.00E+00	2.00E+00	MG/KG
Whole Fish	INORG	Selenium	7782-49-2	D	15	15	8.10E-01	1.05E+00	1.26E+00			MG/KG
Whole Fish	INORG	Silver	7440-22-4	D	15					5.00E-01	5.00E-01	MG/KG
Whole Fish	INORG	Thallium	7440-28-0		15	2	5.34E-01	5.84E-01	6.33E-01	1.00E+00	1.00E+00	MG/KG
Whole Fish	INORG	Vanadium	7440-62-2		15					1.00E+00	1.00E+00	MG/KG
Whole Fish	INORG	Zinc	7440-66-6	D	15	15	8.91E+00	2.27E+01	3.96E+01			MG/KG
Whole Fish	AT	Lipids	LIPIDS		15	15	3.00E-01	1.43E+00	4.80E+00			PERCENT
Whole Fish	AT	Solids (Residue,Total)	RS		15	15	1.80E+01	2.51E+01	3.30E+01			PERCENT
Fillet	P/PCB	PCBs (summed)	1336-36-3	B2	3	2	2.57E-02	3.39E-02	4.20E-02	1.70E-02	1.70E-02	MG/KG
Fillet	INORG	Antimony	7440-36-0		3					2.00E+00	2.00E+00	MG/KG
Fillet	INORG	Arsenic	7440-38-2	A	3					5.00E-01	5.00E-01	MG/KG
Fillet	INORG	Barium	7440-39-3	D	3	3	2.31E-01	3.08E-01	4.53E-01			MG/KG
Fillet	INORG	Beryllium	7440-41-7	B1	3					1.00E-01	1.00E-01	MG/KG
Fillet	INORG	Cadmium	7440-43-9	B1	3					5.00E-01	5.00E-01	MG/KG
Fillet	INORG	Chromium (total)	7440-47-3		3					1.00E+00	1.00E+00	MG/KG
Fillet	INORG	Cobalt	7440-48-4		3					1.00E+00	1.00E+00	MG/KG
Fillet	INORG	Copper	7440-50-8	D	3					5.00E-01	5.00E-01	MG/KG
Fillet	INORG	Lead	7439-92-1	B2	3					3.00E-01	3.00E-01	MG/KG
Fillet	INORG	Manganese	7439-96-5	D	3	3	2.50E-01	3.40E-01	4.82E-01			MG/KG
Fillet	INORG	Mercury	7439-97-6	D	3	3	5.70E-02	6.56E-02	8.02E-02			MG/KG
Fillet	INORG	Nickel	7440-02-0	A	3					2.00E+00	2.00E+00	MG/KG
Fillet	INORG	Selenium	7782-49-2	D	3	3	6.79E-01	8.27E-01	9.41E-01			MG/KG
Fillet	INORG	Silver	7440-22-4	D	3					5.00E-01	5.00E-01	MG/KG
Fillet	INORG	Thallium	7440-28-0		3					1.00E+00	1.00E+00	MG/KG
Fillet	INORG	Vanadium	7440-62-2		3					1.00E+00	1.00E+00	MG/KG
Fillet	INORG	Zinc	7440-66-6	D	3	3	4.89E+00	6.18E+00	7.77E+00			MG/KG
Fillet	AT	Lipids	LIPIDS		3	3	3.00E-01	3.33E-01	4.00E-01			PERCENT
Fillet	AT	Solids (Residue,Total)	RS		3	3	1.80E+01	2.07E+01	2.40E+01			PERCENT

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

Table 4-9: Data Summary for AOI F-07 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	4				5.10E-04	1.00E-02	1.0E+06		3.1E+04		7.3E-01	
Shallow	VOC	Benzene	71-43-2	T	A	4				1.60E-04	1.00E-03	3.5E+01		1.1E+01		5.0E-03	
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	4	2	2.00E-03	2.20E-03	1.70E-04	1.00E-03	3.7E+01	5.9E-05	1.4E+01	1.6E-04	1.0E-01	2.2E-02
Shallow	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	1.00E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	4				2.00E-04	1.00E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	4				4.10E-04	1.00E-02	2.4E+05		2.4E+05		1.3E+01	
Shallow	VOC	Carbon Disulfide	75-15-0	T		4	1	4.70E-04	4.70E-04	2.00E-04	1.00E-03	5.5E+02	8.5E-07	1.2E+03	3.9E-07	8.0E-01	5.9E-04
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	1.00E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	1.00E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		4	2	3.30E-03	4.70E-03	2.60E-04	1.00E-03	5.7E+03	8.2E-07	4.4E+02	1.1E-05	4.3E-01	1.1E-02
Shallow	VOC	Chloroform	67-66-3	T	B2	4	3	2.90E-04	9.50E-03	1.40E-04	1.40E-04	1.8E+02	5.3E-05	1.5E+02	6.3E-05	1.0E-01	9.5E-02
Shallow	VOC	Chloromethane	74-87-3	T	D	4	1	2.80E-04	2.80E-04	1.30E-04	1.00E-03	4.5E+01	6.2E-06	4.9E+02	5.7E-07	2.6E-01	1.1E-03
Shallow	VOC	Cumene	98-82-8	T	D	4				1.20E-04	1.00E-03	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	4				1.30E-04	1.00E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	2.00E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	1.00E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	1.00E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	1.00E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	1.00E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	1.00E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	2.00E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	4	4	6.00E-03	2.30E-02			2.3E+03	1.0E-05	2.4E+03	9.6E-06	8.8E-01	2.6E-02
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	1.00E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	7	6	1.10E-03	2.00E-02	2.20E-04	2.20E-04	1.3E+00	1.5E-02	1.1E+01	1.8E-03	7.0E-03	**2.9E+00**
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4	4	2.30E-04	5.60E-04			2.1E+02	2.7E-06	2.0E+02	2.8E-06	7.0E-02	8.0E-03
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	5.00E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	1.00E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	1.00E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	1.00E-03	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	1.00E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	1.00E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		4				1.30E-04	5.00E-03	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	4				2.30E-04	1.00E-02	2.0E+04		1.3E+04		1.8E+00	
Shallow	VOC	Methylcyclohexane	108-87-2	T		4				1.50E-04	1.00E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	4				3.40E-04	1.00E-03	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		4				1.50E-04	1.00E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	1.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	7	6	5.60E-04	6.30E-03	1.20E-04	1.20E-04	1.7E+02	3.7E-05	1.2E+01	5.3E-04	5.0E-03	**1.3E+00**
Shallow	VOC	Toluene	108-88-3	T	D	4	3	2.00E-04	2.60E-04	1.80E-04	1.80E-04	5.3E+02	4.9E-07	5.3E+02	4.9E-07	1.0E+00	2.6E-04
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	1.00E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4	4	6.30E-03	1.00E-02			1.3E+03	7.7E-06	1.3E+03	7.7E-06	2.0E-01	5.0E-02
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	1.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	4	2	3.90E-04	4.20E-04	1.40E-04	1.00E-03	9.7E+01	4.3E-06	2.2E+01	1.9E-05	5.0E-03	8.4E-02
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	1.00E-03	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	4				1.50E-04	1.00E-03	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	4				3.30E-04	1.00E-03	1.9E+02		1.9E+02		1.0E+01	
Shallow	SVOC	Acenaphthene	83-32-9	T		4				8.00E-04	5.00E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	5.00E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	1.00E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	5.00E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	1.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	5.00E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	5.00E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	1.00E-02						

Table 4-9: Data Summary for AOI F-07 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	5.00E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	5.00E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4				2.70E-03	5.00E-03			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	5.00E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	5.00E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		4	1	4.10E-03	4.10E-03	2.50E-03	1.00E-02			3.9E+05	1.1E-08	5.8E+00	7.1E-04
Shallow	SVOC	Carbazole	86-74-8	T	B2	4				8.20E-04	1.00E-02			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	5.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		4				6.10E-04	1.00E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	5.00E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	5.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	5.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	5.00E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	2.00E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	1.00E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	5.00E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	5.00E-03			5.2E+02		3.7E-01	
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	5.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	5.00E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	2.00E-02			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	2.00E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	5.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.00E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	5.00E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	5.00E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	5.00E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	5.00E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	5.00E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	5.00E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	5.00E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4				6.40E-04	5.00E-03			2.5E+01		2.6E-01	
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		4				1.30E-03	5.00E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	4				7.50E-04	5.00E-03	3.1E+01		3.1E+01		5.2E-01	
Shallow	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	2.00E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	2.00E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	2.00E-02						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	5.00E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	5.00E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	2.00E-02						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	5.00E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	5.00E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	5.00E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	5.00E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	4				8.20E-04	5.00E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	4				2.60E-03	5.00E-03			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	5.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	5.00E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	2				4.00E-04	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	INORG	Antimony	7440-36-0	D		4	1	3.00E-03	3.00E-03	2.20E-03	2.50E-02			6.8E+01	4.4E-05	6.0E-03	5.0E-01
Shallow	INORG	Antimony	7440-36-0	T		4				2.20E-03	2.50E-02			6.8E+01		6.0E-03	
Shallow	INORG	Arsenic	7440-38-2	D	A	4	2	1.24E-02	4.16E-02	3.90E-03	1.00E-02			4.3E+00	9.7E-03	5.0E-02	8.3E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	4	2	2.36E-02	3.00E-02	3.90E-03	1.00E-02			4.3E+00	7.0E-03	5.0E-02	6.0E-01
Shallow	INORG	Barium	7440-39-3	D	D	4	4	1.85E-02	6.46E-02					1.4E+04	4.6E-06	2.0E+00	3.2E-02

Table 4-9: Data Summary for AOI F-07 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	4	4	1.73E-02	5.72E-02					1.4E+04	4.1E-06	2.0E+00	2.9E-02
Shallow	INORG	Beryllium	7440-41-7	D	B1	4				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	4				2.80E-04	5.00E-03			1.9E+02		5.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	4	1	3.80E-04	3.80E-04	2.80E-04	5.00E-03			1.9E+02	2.0E-06	5.0E-03	7.6E-02
Shallow	INORG	Chromium (total)	7440-47-3	D		4				1.40E-03	1.00E-02			4.6E+02		1.0E-01	
Shallow	INORG	Chromium (total)	7440-47-3	T		4	2	1.50E-03	2.90E-03	1.40E-03	1.00E-02			4.6E+02	6.3E-06	1.0E-01	2.9E-02
Shallow	INORG	Cobalt	7440-48-4	D	B1	4				1.30E-03	2.00E-02			2.4E+03		4.0E-02	
Shallow	INORG	Cobalt	7440-48-4	T	B1	4				1.30E-03	2.00E-02			2.4E+03		4.0E-02	
Shallow	INORG	Copper	7440-50-8	D	D	4	1	1.54E-02	1.54E-02	4.20E-03	5.00E-03			7.4E+03	2.1E-06	1.4E+00	1.1E-02
Shallow	INORG	Copper	7440-50-8	T	D	4	1	1.79E-02	1.79E-02	4.20E-03	5.00E-03			7.4E+03	2.4E-06	1.4E+00	1.3E-02
Shallow	INORG	Lead	7439-92-1	D	B2	4				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	4	1	3.00E-03	3.00E-03	2.50E-03	3.00E-03					4.0E-03	7.5E-01
Shallow	INORG	Manganese	7439-96-5	D	D	4	4	1.10E-03	2.69E-01					9.1E+03	3.0E-05	8.6E-01	3.1E-01
Shallow	INORG	Manganese	7439-96-5	T	D	4	4	1.50E-03	2.34E-01					9.1E+03	2.6E-05	8.6E-01	2.7E-01
Shallow	INORG	Mercury	7439-97-6	D	D	4				6.90E-05	2.00E-04	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	4	1	1.70E-04	1.70E-04	6.90E-05	2.00E-04	5.6E-02	3.0E-03	5.6E-02	3.0E-03	2.0E-03	8.5E-02
Shallow	INORG	Nickel	7440-02-0	D	A	4	2	2.70E-03	3.60E-03	2.20E-03	2.00E-02			7.4E+04	4.9E-08	1.0E-01	3.6E-02
Shallow	INORG	Nickel	7440-02-0	T	A	4	2	4.10E-03	4.90E-03	2.20E-03	2.00E-02			7.4E+04	6.6E-08	1.0E-01	4.9E-02
Shallow	INORG	Selenium	7782-49-2	D	D	4				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	4				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	4				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		4	1	2.50E-05	2.50E-05	1.80E-05	1.00E-02			1.3E+01	1.9E-06	2.0E-03	1.3E-02
Shallow	INORG	Thallium	7440-28-0	T		4	1	2.50E-05	2.50E-05	1.80E-05	1.00E-02			1.3E+01	1.9E-06	2.0E-03	1.3E-02
Shallow	INORG	Vanadium	7440-62-2	D		4	3	8.40E-04	2.47E-02	8.20E-04	8.20E-04			9.7E+02	2.5E-05	4.5E-03	**5.5E+00**
Shallow	INORG	Vanadium	7440-62-2	T		4	2	7.80E-03	1.71E-02	8.20E-04	1.00E-02			9.7E+02	1.8E-05	4.5E-03	**3.8E+00**
Shallow	INORG	Zinc	7440-66-6	D	D	4	2	1.58E-02	2.08E-02	1.20E-02	2.00E-02			1.1E+05	1.9E-07	2.4E+00	8.7E-03
Shallow	INORG	Zinc	7440-66-6	T	D	4	3	1.24E-02	1.69E-01	2.00E-02	2.00E-02			1.1E+05	1.5E-06	2.4E+00	7.0E-02

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR AOI W-1 (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	90	51	2.50E-03	1.36E-01	2.20E+00	1.80E-03	5.70E+01		1.10E+05	2E-05	1.60E+05	1E-05	1.70E+08	1E-08	1.10E+05	2E-05	1.10E+05	2E-05	1.30E+05	2E-05	3.90E+08	6E-09	2.30E+04	1E-04
VOC	Acetonitrile	75-05-8	D	10					5.30E-02	1.40E+01		8.80E+03		1.90E+03		1.80E+06		2.10E+04		4.80E+03		1.60E+03		4.00E+06		4.30E+03	
VOC	Acrolein	107-02-8	C	10					5.30E-02	1.40E+01		7.60E-01		3.70E-01		5.90E+02		1.80E+04		4.10E-01		3.10E-01		1.30E+03		3.60E+03	
VOC	Acrylonitrile	107-13-1	B1	10					5.30E-02	1.40E+01		3.50E+01		1.70E+01		5.80E+04		1.10E+02		6.60E+00		5.00E+00		4.60E+04		1.60E+01	
VOC	Benzene	71-43-2	A	90	12	8.50E-04	1.53E-01	7.20E-01	6.10E-04	5.70E+00		8.40E+00	9E-02	4.50E+01	2E-02	4.70E+05	2E-06	4.00E+02	2E-03	1.60E+00	5E-01	1.30E+01	6E-02	3.80E+05	2E-06	1.80E+02	4E-03
VOC	Bromodichloromethane	75-27-4	B2	90					6.70E-04	5.70E+00		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	90					5.10E-04	5.70E+00		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	90					1.20E-03	5.70E+00		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	90	35	2.20E-03	1.51E-01	2.30E+00	2.50E-03	5.70E+01		2.70E+04	9E-05	3.50E+04	7E-05	2.90E+07	8E-08	2.70E+04	9E-05	2.70E+04	9E-05	2.90E+04	8E-05	6.70E+07	3E-08	2.70E+04	9E-05
VOC	Carbon Disulfide	75-15-0		90	4	2.20E-03	4.58E-03	9.60E-03	7.00E-04	5.70E+01		1.40E+02	7E-05	1.60E+03	6E-06	2.10E+07	5E-10	2.80E+02	3E-05	7.60E+01	1E-04	1.30E+03	7E-06	4.70E+07	2E-10	2.80E+02	3E-05
VOC	Carbon Tetrachloride	56-23-5	B2	90					6.40E-04	5.70E+00		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	2-Chloro-1,3-butadiene	126-99-8		10					5.30E-03	1.40E+00																	
VOC	3-Chloro-1-propene	107-05-1		10					1.10E-02	2.90E+00																	
VOC	Chlorobenzene	108-90-7	D	90	1	1.10E-01	1.10E-01	1.10E-01	4.70E-04	5.70E+00		2.20E+02	5E-04	9.20E+02	1E-04	2.10E+06	5E-08	2.60E+02	4E-04	1.20E+02	9E-04	7.70E+02	1E-04	4.70E+06	2E-08	2.60E+02	4E-04
VOC	Chloroethane	75-00-3		90	3	2.20E-03	3.77E-03	5.20E-03	9.40E-04	5.70E+00		9.50E+02	5E-06	3.60E+04	1E-07	2.90E+08	2E-11	9.50E+02	5E-06	9.50E+02	5E-06	3.00E+04	2E-07	6.70E+08	8E-12	9.50E+02	5E-06
VOC	Chloroform	67-66-3	B2	90					7.30E-04	5.70E+00		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	90					7.50E-04	5.70E+00		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	34	9	2.50E-03	2.61E-01	1.10E+00	6.60E-04	2.40E-01		3.90E+02	3E-03	2.00E+03	6E-04	2.60E+06	4E-07	3.90E+02	3E-03	3.90E+02	3E-03	1.70E+03	6E-04	5.80E+06	2E-07	3.90E+02	3E-03
VOC	Cyclohexane	110-82-7		34	8	2.20E-03	1.47E-01	3.00E-01	9.40E-04	5.00E-01																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	44					1.40E-03	2.90E+00		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	90					5.90E-04	5.70E+00		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	44					6.50E-04	1.40E+00		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	Dibromomethane	74-95-3		10					5.30E-03	1.40E+00								2.00E+03								2.00E+03	
VOC	trans-1,4-Dichloro-2-butene	110-57-6		10					5.30E-03	1.40E+00																	
VOC	1,2-Dichlorobenzene	95-50-1	D	83	1	3.40E-03	3.40E-03	3.40E-03	6.40E-04	5.70E+00		2.10E+02	2E-05	4.60E+04	7E-08	4.40E+07	8E-11	2.10E+02	2E-05	2.10E+02	2E-05	3.90E+04	9E-08	1.00E+08	3E-11	2.10E+02	2E-05
VOC	1,3-Dichlorobenzene	541-73-1	D	83	1	1.10E-01	1.10E-01	1.10E-01	7.20E-04	5.70E+00								1.70E+02	6E-04							1.70E+02	6E-04
VOC	1,4-Dichlorobenzene	106-46-7	C	83	1	2.60E-03	2.60E-03	2.60E-03	6.00E-04	5.70E+00		1.00E+02	3E-05	2.60E+02	1E-05	5.70E+05	5E-09	2.90E+03	9E-07	1.90E+01	1E-04	7.70E+01	3E-05	4.50E+05	6E-09	4.00E+02	7E-06
VOC	Dichlorodifluoromethane	75-71-8		44	1	1.40E-03	1.40E-03	1.40E-03	9.00E-04	1.40E+00		1.00E+03	1E-06	6.30E+04	2E-08	1.50E+09	9E-13	1.00E+03	1E-06	9.00E+02	2E-06	5.30E+04	3E-08	3.30E+09	4E-13	1.00E+03	1E-06
VOC	1,1-Dichloroethane	75-34-3	C	90	4	1.85E-02	6.11E-02	1.70E-01	5.20E-04	5.70E+00		4.30E+02	4E-04	2.50E+03	7E-05	1.50E+07	1E-08	8.90E+02	2E-04	2.30E+02	7E-04	2.10E+03	8E-05	3.30E+07	5E-09	8.90E+02	2E-04
VOC	1,2-Dichloroethane	107-06-2	B2	90					5.90E-04	5.70E+00		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	90					6.90E-04	5.70E+00		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	90	4	1.23E-02	4.38E-01	1.40E+00	2.80E-04	5.70E+00		4.20E+01	3E-02	2.10E+02	7E-03	1.00E+06	1E-06	6.40E+02	2E-03	2.30E+01	6E-02	1.80E+02	8E-03	2.30E+06	6E-07	6.40E+02	2E-03
VOC	trans-1,2-Dichloroethene	156-60-5		90	1	1.80E-01	1.80E-01	1.80E-01	6.60E-04	5.70E+00		4.30E+01	4E-03	3.30E+02	5E-04	2.10E+06	9E-08	1.40E+03	1E-04	2.30E+01	8E-03	2.80E+02	6E-04	4.70E+06	4E-08	1.40E+03	1E-04
VOC	1,2-Dichloropropane	78-87-5	B2	90					6.70E-04	5.70E+00		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	90					6.30E-04	5.70E+00		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	1,4-Dioxane	123-91-1	B2	10					5.30E-01	1.40E+02						7.10E+05		3.70E+03						5.70E+05		5.30E+02	
VOC	Ethyl Benzene	100-41-4	D	90	21	2.10E-03	3.03E+00	2.50E+01	5.50E-04	2.40E-01		1.40E+02	2E-01	1.10E+04	2E-03	2.90E+07	9E-07	1.40E+02	2E-01	1.40E+02	2E-01	9.50E+03	3E-03	6.70E+07	4E-07	1.40E+02	2E-01
VOC	Ethyl Methacrylate	97-63-2		4					5.65E-03	1.30E-02																	
VOC	2-Hexanone	591-78-6		90	3	2.50E-03	7.45E-03	1.58E-02	1.20E-03	5.70E+01		1.80E+03	9E-06	1.30E+03	1E-05	1.20E+06	1E-08	2.50E+03	6E-06	9.90E+02	2E-05	1.10E+03	1E-05	2.70E+06	6E-09	2.50E+03	6E-06
VOC	Iodomethane	74-88-4		10					5.30E-03	1.40E+00																	
VOC	Isobutyl Alcohol	78-83-1		10					2.30E+00	6.30E+02		8.90E+03		9.50E+04		4.40E+07		8.90E+03		8.90E+03		7.90E+04		1.00E+08		8.90E+03	
VOC	Methacrylonitrile	126-98-7		10					2.10E-02	5.70E+00																	
VOC	Methyl Acetate	79-20-9		34	7	1.40E-01	5.17E+00	3.40E+01	9.90E-04	5.00E-01																	
VOC	Methyl tert-butyl ether	1634-04-4		34					4.50E-04	1.30E+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		90	8	3.00E-03	1.16E-01	6.80E-01	1.70E-03	5.70E+01		2.70E+03	3E-04	5.30E+04	1E-05	6.00E+07	1E-08	2.70E+03	3E-04	2.70E+03	3E-04	4.50E+04	2E-05	1.40E+08	5E-09	2.70E+03	3E-04
VOC	Methylcyclohexane	108-87-2		34	12	8.50E-04	3.78E-01	1.40E+00	5.50E-04	4.90E-01																	
VOC	Methylene Chloride	75-09-2	B2	90	11	2.40E-03	2.40E+00	2.50E+01	1.20E-03	1.40E+00		2.40E+02	1E-01	7.00E+02	4E-02	8.30E+06	3E-06	2.30E+03	1E-02	4.50E+01	6E-01	2.10E+02	1E-01	6.60E+06	4E-06	1.30E+03	2E-02
VOC	Methylmethacrylate	80-62-6	E	10					5.30E-03	1.40E+00																	
VOC	Pentachloroethane	76-01-7		10	1	9.90E-02	9.90E-02	9.90E-02	1.70E-01	3.00E+01																	
VOC	Propionitrile	107-12-0		10					2.10E-02	5.70E+00																	
VOC	Styrene	100-42-5		90					4.50E-04	5.70E+00		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	1,1,1,2-Tetrachloroethane	630-20-6		10					5.30E-03	1.40E+00		3.30E+01		1.20E+02		5.30E+05		4.40E+02		6.20E+00		3.60E+01		4.20E+05		4.40E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	90					7.20E-04	5.70E+00		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	90	12	2.30E-03	1.13E+00	5.60E+00	7.60E-04	5.70E+00		6.00E+01	9E-02	6.00E+02	9E-03	6.80E+06	8E-07	8.80E+01	6E-02	1.10E+01	5E-01	1.80E+02	3E-02	5.40E+06	1E-06	8.80E+01	6E-02
VOC	Toluene	108-88-3	D	90	36	5.60E-04	2.39E+00	4.20E+01	6.60E-04	2.50E-01		2.50E+02	2E-01	3.30E+03	1E-02	1.20E+07	4E-06	2.50E+02	2E-01	2.50E+02	2E-01	2.80E+03	2E-02	2.70E+07	2E-06	2.50E+02	2E-01
VOC	1,2,4-Trichlorobenzene	120-82-1	D	65					8.00E-04	1.10E+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	90	2	2.60E-03	3.25E-03	3.90E-03	7.30E-04	5.70E+00		4.60E+02	8E-06	4.50E+03	9E-07	2.90E+07	1E-10	4.60E+02	8E-06	2.50E+02	2E-05	3.80E+03	1E-06	6.70E+07	6E-11	4.60E+02	8E-06
VOC	1,1,2-Trichloroethane	79-00-5	C	90					5.50E-04	5.70E+00		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	90	5	4.90E-02	5.65E-01	2.30E+00	6.90E-04	5.70E+00		3.70E+01	6E-02	2.60E+02	9E-03	2.30E+06	1E-06	5.00E+02	5E-03	7.10E+00	3E-01	7.80E+01	3E-02	1.80E+06	1E-06	5.00E+02	5E-03
VOC	Trichlorofluoromethane	75-69-4		44	2	1.40E-03	1.45E-03	1.50E-03	9.90E-04	1.40E+00		5.60E+02	3E-06	1.10E+05	1E-08	1.70E+09	9E-13	5.60E+02	3E-06	5.60E+02	3E-06	9.20E+04	2E-08	3.80E+09	4E-13	5.60E+02	3E-06
VOC	1,2,3-Trichloropropane	96-18-4		12					5.30E-03	1.40E+00								8.30E+02								8.30E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		34	3	5.50E-03	7.67E-03	8.90E-03	8.40E-04	3.20E-01		5.50E+02	2E-05	2.10E+05	4E-08	2.30E+09	4E-12	5.50E+02	2E-05	5.50E+02	2E-05	1.80E+05	5E-08	5.10E+09	2E-12	5.50E+02	2E-05
VOC	Vinyl Acetate	108-05-4		10					5.30E-02	1.40E+01		1.50E+03		2.00E+03		5.90E+06		2.40E+03		7.90E+02		1.70E+03		1.30E+07		2.40E+03	
VOC	Vinyl Chloride	75-01-4	A	90	1	9.50E-03	9.50E-03	9.50E-03	6.80E-04	5.70E+00		1.50E-01	6E-02	1.50E+00	6E-03	4.70E+04	2E-07	2.90E+01	3E-04	2.80E-02	3E-01	4.40E-01	2E-02	3.70E+04	3E-07	4.00E+00	2E-03
VOC	Xylenes (total)	1330-20-7	D	90	25	4.85E-03	1.28E+01	1.50E+02	1.80E-03	8.80E-02		1.50E+02	1E+00	5.40E+04	3E-03	1.30E+08	1E-06	1.50E+02	1E+00	1.50E+02	1E+00	4.60E+04	3E-03	2.90E+08	5E-07	1.50E+02	1E+00

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR AOI W-1 (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	Acenaphthene	83-32-9		66	16	2.40E-02	4.31E+00	3.60E+01	5.30E-02	3.50E+01		3.50E+05	1E-04	9.70E+04	4E-04	6.20E+06	6E-06	2.00E+05	2E-04	1.90E+05	2E-04	8.10E+04	4E-04	1.40E+07	3E-06	4.10E+04	9E-04
SVOC	Acenaphthylene	208-96-8	D	66	1	2.00E+00	2.00E+00	2.00E+00	4.90E-02	1.10E+02		3.00E+03	7E-04	2.70E+03	7E-04	1.00E+06	2E-06	8.00E+03	3E-04	1.60E+03	1E-03	2.20E+03	9E-04	2.30E+06	9E-07	1.60E+03	1E-03
SVOC	Acetophenone	98-86-2	D	44					5.20E-02	3.00E+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	2-Acetylaminofluorene	53-96-3		10					1.70E+00	3.00E+02																	
SVOC	4-Aminobiphenyl	92-67-1		10					9.00E-01	1.60E+02																	
SVOC	Aniline	62-53-3	B2	10					9.00E-01	6.10E+01						2.90E+04		2.30E+03						6.70E+04		3.30E+02	
SVOC	Anthracene	120-12-7	D	66	19	2.00E-02	2.67E+00	2.10E+01	5.10E-02	3.00E+01		1.00E+06	2E-05	1.60E+06	1E-05	2.90E+07	7E-07	1.00E+06	2E-05	1.00E+06	2E-05	1.40E+06	2E-05	6.70E+07	3E-07	2.30E+05	9E-05
SVOC	Atrazine	1912-24-9		34					1.60E-01	1.90E+01								5.00E+02								7.10E+01	
SVOC	Benzaldehyde	100-52-7		34					1.80E-01	1.90E+01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	66	21	4.20E-02	2.38E+00	1.50E+01	5.80E-02	1.10E+02								1.00E+02	2E-01							2.00E+01	8E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	66	15	2.50E-02	1.36E+00	8.60E+00	6.30E-02	1.10E+02						1.90E+03	5E-03	1.00E+01	9E-01					1.50E+03	6E-03	2.00E+00	**4E+00**
SVOC	Benzo(b)fluoranthene	205-99-2	B2	66	22	2.80E-02	1.62E+00	1.10E+01	6.10E-02	1.10E+02								1.00E+02	1E-01							2.00E+01	6E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	66	18	2.10E-02	1.09E+00	4.50E+00	5.80E-02	1.10E+02						3.50E+05	1E-05	9.10E+03	5E-04					8.00E+05	6E-06	2.50E+03	2E-03
SVOC	Benzo(k)fluoranthene	207-08-9	B2	66	11	3.60E-02	1.11E+00	5.30E+00	5.50E-02	1.10E+02								1.00E+03	5E-03							2.00E+02	3E-02
SVOC	Benzyl Alcohol	100-51-6		10					6.90E-01	6.10E+01						1.50E+08		5.80E+03						3.30E+08		5.80E+03	
SVOC	Biphenyl	92-52-4		34	1	3.40E+00	3.40E+00	3.40E+00	1.50E-01	1.90E+01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	66					4.90E-02	1.10E+02																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	66					5.30E-02	1.10E+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	66	19	2.40E-02	7.16E+00	7.60E+01	5.70E-02	3.50E+01						8.90E+05	9E-05	1.00E+04	8E-03					7.00E+05	1E-04	2.80E+03	3E-02
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	66					6.40E-02	1.10E+02																	
SVOC	2,sec-Butyl-4,6-dinitrophenol	88-85-7		10					1.10E-02	5.70E-02								1.40E+02								6.60E+01	
SVOC	Butylbenzylphthalate	85-68-7	C	66	23	9.40E-02	6.16E+01	1.10E+03	5.30E-02	3.50E+01						2.10E+07	5E-05	3.10E+02	**4E+00**					4.70E+07	2E-05	3.10E+02	**4E+00**
SVOC	Caprolactam	105-60-2		34					1.90E-01	1.90E+01						2.90E+05		4.50E+05						6.70E+05		5.30E+04	
SVOC	Carbazole	86-74-8	B2	65	8	2.10E-02	1.88E+00	1.10E+01	5.40E-02	1.10E+02								3.70E+03	3E-03							5.30E+02	2E-02
SVOC	4-Chloro-3-methylphenol	59-50-7		66					5.30E-02	1.10E+02								2.20E+04								4.50E+03	
SVOC	4-Chloroaniline	106-47-8		66					5.30E-02	1.10E+02																	
SVOC	p-Chlorobenzilate	510-15-6		10					1.70E-01	3.00E+01																	
SVOC	2-Chloronaphthalene	91-58-7		66					5.00E-02	1.10E+02								2.80E+05								5.60E+04	
SVOC	2-Chlorophenol	95-57-8		66					5.40E-02	1.10E+02								6.90E+03								1.40E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		66					5.40E-02	1.10E+02																	
SVOC	Chrysene	218-01-9	B2	66	26	4.70E-02	2.78E+00	1.60E+01	4.80E-02	1.10E+02								1.00E+04	2E-03							2.00E+03	8E-03
SVOC	Di-n-butylphthalate	84-74-2	D	66	3	5.70E+00	1.67E+02	4.80E+02	1.60E-01	1.10E+02						1.50E+06	3E-04	7.60E+02	6E-01					3.30E+06	1E-04	7.60E+02	6E-01
SVOC	Di-n-octylphthalate	117-84-0		66	1	3.70E+01	3.70E+01	3.70E+01	5.70E-02	3.50E+01								2.80E+04	1E-03							6.90E+03	5E-03
SVOC	Diallate (total)	2303-16-4		10					3.50E-01	6.10E+01																	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	66	6	1.80E-02	2.47E-01	6.70E-01	5.30E-02	1.10E+02								1.00E+01	7E-02							2.00E+00	3E-01
SVOC	Dibenzofuran	132-64-9	D	66	14	2.20E-02	4.23E+00	2.70E+01	5.20E-02	3.50E+01																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	66					4.10E-02	6.50E+02						8.20E+03		4.70E+01						6.50E+03		6.60E+00	
SVOC	2,4-Dichlorophenol	120-83-2		66					5.20E-02	1.10E+02						2.30E+06		1.80E+03						5.10E+06		6.60E+02	
SVOC	2,6-Dichlorophenol	87-65-0		13					1.70E-01	3.00E+01																	
SVOC	Diethylphthalate	84-66-2	D	66					1.60E-01	1.10E+02						1.50E+06		7.40E+02						3.30E+06		7.40E+02	
SVOC	Dimethoate	60-51-5		10					3.90E-02	2.30E+01																	
SVOC	p-(Dimethylamino)azobenzene	60-11-7		10					3.50E-01	6.10E+01																	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6		10					3.50E-01	6.10E+01																	
SVOC	3,3'-Dimethylbenzidine	119-93-7		10					1.70E-01	3.00E+01																	
SVOC	a,a-Dimethylphenethylamine	122-09-8		10					9.00E-01	1.60E+02																	
SVOC	2,4-Dimethylphenol	105-67-9		66	8	2.40E-02	9.40E+00	7.20E+01	8.40E-02	3.50E+01						2.10E+06	3E-05	5.60E+04	1E-03					4.70E+06	2E-05	1.10E+04	7E-03
SVOC	Dimethylphthalate	131-11-3	D	66					1.70E-01	1.10E+02						1.50E+06		7.90E+02						3.30E+06		7.90E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		66					1.70E-01	5.60E+02								3.90E+02								7.90E+01	
SVOC	1,3-Dinitrobenzene	99-65-0		10					1.70E-01	3.00E+01																	
SVOC	2,4-Dinitrophenol	51-28-5		66					1.20E-01	5.60E+02																	
SVOC	2,4-Dinitrotoluene	121-14-2	B2	66					4.80E-02	1.10E+02						2.00E+04		3.40E+02						1.60E+04		4.80E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	66					5.00E-02	1.10E+02																	
SVOC	Diphenylamine	122-39-4		10					1.70E-01	3.00E+01																	
SVOC	Disulfoton	298-04-4		10					3.90E-02	2.30E+01																	
SVOC	Ethylmethanesulfonate	62-50-0		10					1.70E-01	3.00E+01																	
SVOC	Famphur	52-85-7		10					3.90E-02	2.30E+01																	
SVOC	Fluoranthene	206-44-0	D	66	30	4.60E-02	6.93E+00	8.20E+01	5.90E-02	3.00E+01		1.00E+06	8E-05	8.90E+05	9E-05	4.10E+06	2E-05	1.80E+05	5E-04	1.00E+06	8E-05	7.40E+05	1E-04	9.30E+06	9E-06	4.60E+04	2E-03
SVOC	Fluorene	86-73-7	D	66	22	4.00E-02	5.47E+00	3.60E+01	5.00E-02	3.00E+01		1.00E+06	4E-05	1.50E+05	2E-04	4.10E+06	9E-06	1.30E+05	3E-04	5.80E+05	6E-05	1.30E+05	3E-04	9.30E+06	4E-06	2.70E+04	1E-03
SVOC	Hexachlorobenzene	118-74-1	B2	66					5.90E-02	1.10E+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	66					4.70E-02	1.10E+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	63					6.30E-02	1.10E+02								7.20E+02								7.20E+02	
SVOC	Hexachloroethane	67-72-1	C	65					5.00E-02	1.10E+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	Hexachlorophene	70-30-4		2					1.80E-01	1.80E-01																	
SVOC	Hexachloropropene	1888-71-7		10					1.70E+00	3.00E+02																	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	65	13	2.70E-02	9.96E-01	3.70E+00	7.30E-02	1.10E+02								1.00E+02	4E-02							2.00E+01	2E-01

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR AOI W-1 (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	Isodrin	465-73-6		10					3.50E-03	1.90E-01																	
SVOC	Isophorone	78-59-1	C	65					4.60E-02	1.10E+02						8.20E+06		2.40E+03						1.20E+07		2.40E+03	
SVOC	Isosafrole (total)	120-58-1		10					3.50E-01	6.10E+01																	
SVOC	Kepone	143-50-0		10					3.50E-02	3.10E+00																	
SVOC	Methapyrilene	91-80-5		10					9.00E-01	1.60E+02																	
SVOC	Methyl parathion	298-00-0		10					3.90E-02	2.30E+01								2.80E+02								5.60E+01	
SVOC	3-Methylcholanthrene	56-49-5		10					3.50E-01	6.10E+01																	
SVOC	Methylmethanesulfonate	66-27-3		10					1.70E-01	3.00E+01																	
SVOC	2-Methylnaphthalene	91-57-6		65	35	2.40E-02	1.58E+01	1.50E+02	5.00E-02	2.10E+01								4.00E+04	4E-03						8.10E+03	2E-02
SVOC	Methylphenol (summed)	1319-77-3		65	12	8.60E-02	1.18E+01	1.25E+02	4.90E-02	3.50E+01						2.90E+06	4E-05	5.60E+04	2E-03					6.70E+06	2E-05	1.10E+04	1E-02
SVOC	N-Nitrosomorpholine	59-89-2		10					1.70E-01	3.00E+01																	
SVOC	Naphthalene	91-20-3	C	65	27	2.20E-02	1.01E+01	9.70E+01	5.10E-02	2.10E+01		4.70E+02	2E-01	3.50E+02	3E-01	8.80E+04	1E-03	8.00E+04	1E-03	2.50E+02	4E-01	3.00E+02	3E-01	2.00E+05	5E-04	1.60E+04	6E-03
SVOC	1,4-Naphthoquinone	130-15-4		10					9.00E-01	1.60E+02																	
SVOC	1-Naphthylamine	134-32-7		10					1.70E-01	3.00E+01																	
SVOC	2-Naphthylamine	91-59-8		10					1.70E-01	3.00E+01																	
SVOC	5-Nitro-o-toluidine	99-55-8		10					3.50E-01	6.10E+01																	
SVOC	2-Nitroaniline	88-74-4		65					4.80E-02	5.60E+02																	
SVOC	3-Nitroaniline	99-09-2	C	65					1.50E-01	5.60E+02																	
SVOC	4-Nitroaniline	100-01-6	C	65					7.10E-02	5.60E+02																	
SVOC	Nitrobenzene	98-95-3	D	65					4.80E-02	1.10E+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		65					4.80E-02	1.10E+02								3.10E+03								6.30E+02	
SVOC	4-Nitrophenol	100-02-7		65					2.00E-01	5.60E+02																	
SVOC	4-Nitroquinoline-1-oxide	56-57-5		10					1.70E+00	3.00E+02																	
SVOC	N-Nitrosodi-n-butylamine	924-16-3		10					1.70E-01	3.00E+01																	
SVOC	N-Nitrosodiethylamine	55-18-5		10					1.70E-01	3.00E+01																	
SVOC	N-Nitrosodimethylamine	62-75-9		10					1.70E-01	3.00E+01																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	65					5.10E-02	1.10E+02								1.20E+04								1.70E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	66					4.60E-02	1.10E+02						2.00E+03		8.30E+00						1.60E+03		1.20E+00	
SVOC	N-Nitrosomethylethylamine	10595-95-6		10					1.70E-01	3.00E+01																	
SVOC	N-Nitrosopiperidine	100-75-4		10					1.70E-01	3.00E+01																	
SVOC	N-Nitrosopyrrolidine	930-55-2		10					1.70E-01	3.00E+01																	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	65					5.40E-02	1.10E+02																	
SVOC	Parathion	56-38-2		10					3.90E-02	2.30E+01																	
SVOC	Pentachlorobenzene	608-93-5		10					1.70E-01	3.00E+01								1.90E+02								1.90E+02	
SVOC	Pentachloronitrobenzene	82-68-8		10					9.00E-01	1.60E+02		2.20E+02		2.80E+02		1.50E+05		8.40E+03		1.20E+02		2.30E+02		3.30E+05		1.70E+03	
SVOC	Pentachlorophenol	87-86-5	B2	65					1.30E-01	1.00E+03						1.30E+05		3.90E+02						1.00E+05		9.00E+01	
SVOC	Phenacetin	62-44-2		10					3.50E-01	6.10E+01																	
SVOC	Phenanthrene	85-01-8	D	65	42	2.30E-02	8.92E+00	1.10E+02	5.40E-02	3.70E-01		5.10E+03	2E-02	1.90E+02	6E-01	2.90E+03	4E-02	8.00E+03	1E-02	2.80E+03	4E-02	1.60E+02	7E-01	6.70E+03	2E-02	1.60E+03	7E-02
SVOC	Phenol	108-95-2	D	65	8	5.90E-02	1.86E+01	1.40E+02	5.10E-02	3.50E+01						1.80E+07	8E-06	1.20E+04	1E-02					4.00E+07	4E-06	1.20E+04	1E-02
SVOC	p-Phenylene diamine	106-50-3		10					1.70E+00	3.00E+02																	
SVOC	Phorate	298-02-2		10					3.90E-02	2.30E+01																	
SVOC	2-Picoline	109-06-8		10					3.50E-01	6.10E+01																	
SVOC	Pronamide	23950-58-5		10					3.50E-01	6.10E+01																	
SVOC	Pyrene	129-00-0	D	65	33	3.20E-02	4.99E+00	5.00E+01	5.30E-02	3.00E+01		1.00E+06	5E-05	7.80E+05	6E-05	2.90E+06	2E-05	1.10E+05	5E-04	1.00E+06	5E-05	6.50E+05	8E-05	6.70E+06	7E-06	2.90E+04	2E-03
SVOC	Pyridine	110-86-1		10					3.50E-01	6.10E+01		2.00E+00		9.80E+00		1.00E+05		3.70E+01		1.10E+00		8.20E+00		2.30E+05		3.70E+01	
SVOC	Safrole (total)	94-59-7		10					3.50E-01	6.10E+01																	
SVOC	Sulfotepp	3689-24-5		10					3.90E-02	2.30E+01																	
SVOC	1,2,4,5-Tetrachlorobenzene	95-94-3		10					1.70E-01	3.00E+01								3.80E+05								7.70E+04	
SVOC	2,3,4,6-Tetrachlorophenol	58-90-2		10					9.00E-01	1.60E+02																	
SVOC	Thionazin	297-97-2		10					3.90E-02	2.30E+01																	
SVOC	o-Toluidine	95-53-4		10					3.50E-01	6.10E+01																	
SVOC	2,4,5-Trichlorophenol	95-95-4		65					5.80E-02	2.20E+02						1.00E+07		1.10E+05						2.30E+07		2.30E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	65					6.60E-02	1.10E+02						1.30E+06		5.00E+03						1.00E+06		7.10E+02	
SVOC	O,O,O-Triethyl phosphorothioate	126-68-1		10					3.90E-02	2.30E+01																	
SVOC	1,3,5-Trinitrobenzene	99-35-4		10					9.00E-01	1.60E+02																	
P/PCB	PCBs (summed)	1336-36-3	B2	72	32	5.86E-02	9.69E+00	8.93E+01	1.00E-02	3.80E+00		1.60E+04	6E-03	8.10E+02	1E-01	6.50E+03	1E-02	2.00E+01	**4E+00**	3.00E+03	3E-02	2.40E+02	4E-01	5.20E+03	2E-02	4.00E+00	**2E+01**
P/PCB	Aldrin	309-00-2	B2	30					1.10E-02	3.85E-01		7.10E+03		2.00E+02		8.00E+02		5.90E+00		1.30E+03		5.80E+01		6.40E+02		1.00E+00	
P/PCB	alpha-BHC	319-84-6	B2	30					1.10E-02	3.85E-01		1.60E+02		4.10E+01		2.10E+03		1.90E+01		3.00E+01		1.20E+01		1.70E+03		2.60E+00	
P/PCB	beta-BHC	319-85-7	C	30					1.10E-02	3.85E-01						7.40E+03		3.80E+01						5.90E+03		5.40E+00	
P/PCB	delta-BHC	319-86-8	D	30					1.10E-02	3.85E-01																	
P/PCB	gamma-BHC	58-89-9	B2-C	30					1.10E-02	3.85E-01								7.30E+01								8.30E+00	
P/PCB	Chlordane (summed)	57-74-9	B2	23					5.30E-03	3.85E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	Chlordane (summed)	57-74-9	B2	23					1.40E-02	2.00E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	Chlordane	57-74-9	B2	7					5.30E-03	3.85E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	Chlordane	57-74-9	B2	7					1.40E-02	2.00E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	

TABLE 4-10

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR AOI W-1 (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
P/PCB	Chlordane	57-74-9	B2	7					5.30E-03	3.85E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	Chlordane	57-74-9	B2	7					1.40E-02	2.00E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	Chlordane (summed)	57-74-9	B2	23					1.40E-02	2.00E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	Chlordane (summed)	57-74-9	B2	23					5.30E-03	3.85E-01		5.90E+04		4.20E+03		2.10E+04		2.40E+02		1.10E+04		1.20E+03		3.10E+04		3.10E+01	
P/PCB	4,4'-DDD	72-54-8	B2	30					1.10E-02	7.70E-01						5.60E+04		5.40E+02						4.40E+04		9.50E+01	
P/PCB	4,4'-DDE	72-55-9	B2	30					1.10E-02	7.70E-01						4.00E+04		2.60E+02						3.20E+04		4.50E+01	
P/PCB	4,4'-DDT	50-29-3	B2	30					1.10E-02	7.70E-01						4.00E+04		4.60E+02						3.20E+04		5.70E+01	
P/PCB	Dieldrin	60-57-1	B2	30					1.10E-02	7.70E-01		7.20E+02		6.40E+01		8.50E+02		6.40E+00		1.40E+02		1.90E+01		6.80E+02		1.10E+00	
P/PCB	Endosulfan I	959-98-8		30					1.10E-02	3.85E-01								6.70E+03								1.40E+03	
P/PCB	Endosulfan II	33213-65-9		30					1.10E-02	7.70E-01								6.70E+03								1.40E+03	
P/PCB	Endosulfan sulfate	1031-07-8		30					1.10E-02	7.70E-01								6.70E+03								1.40E+03	
P/PCB	Endrin	72-20-8	D	30					1.10E-02	7.70E-01								2.60E+02								6.50E+01	
P/PCB	Endrin aldehyde	7421-93-4		30					1.10E-02	7.70E-01								2.60E+02								6.50E+01	
P/PCB	Endrin ketone	53494-70-5		27					1.10E-02	7.70E-01								2.60E+02								6.50E+01	
P/PCB	Heptachlor	76-44-8	B2	30					1.10E-02	3.85E-01		1.90E+03		2.10E+02		3.00E+03		3.20E+01		3.50E+02		6.20E+01		2.40E+03		5.60E+00	
P/PCB	Heptachlor epoxide	1024-57-3	B2	30					1.10E-02	3.85E-01						1.50E+03		1.30E+01						1.20E+03		3.10E+00	
P/PCB	Methoxychlor	72-43-5	D	30					2.70E-02	3.85E+00								7.70E+03								1.90E+03	
P/PCB	Toxaphene	8001-35-2	B2	30					9.00E-02	1.95E+01						1.20E+04		1.20E+02						9.70E+03		2.00E+01	
INORG	Aluminum	7429-90-5	D	31	31	4.38E+02	3.12E+03	1.08E+04										6.60E+05	2E-02							5.00E+04	2E-01
INORG	Antimony	7440-36-0		65	33	3.24E-01	6.07E+01	1.74E+03	2.28E-01	2.08E+01						5.90E+03	3E-01	1.20E+03	**1E+00**					1.30E+04	1E-01	1.80E+02	**1E+01**
INORG	Arsenic	7440-38-2	A	65	65	6.03E-01	6.43E+00	4.43E+01			1.32E+01					9.10E+02	3E-02	6.10E+01	5E-01					7.20E+02	4E-02	7.60E+00	**4E+00**
INORG	Barium	7440-39-3	D	65	65	4.66E+00	2.58E+02	5.72E+03			1.10E+02					1.50E+05	4E-02	2.50E+05	2E-02					3.30E+05	2E-02	3.70E+04	2E-01
INORG	Beryllium	7440-41-7	B1	65	27	2.50E-02	3.66E-01	1.32E+00	2.41E-02	1.72E+00	1.53E+00					5.90E+02		3.10E+03						1.30E+03		4.10E+02	
INORG	Cadmium	7440-43-9	B1	65	55	3.68E-02	1.24E+00	1.56E+01	2.99E-02	5.89E-01	1.20E+00					2.20E+03	7E-03	4.10E+03	4E-03					1.70E+03	8E-03	5.50E+02	3E-02
INORG	Chromium (total)	7440-47-3		65	65	1.69E+00	1.22E+02	1.66E+03			4.92E+01					2.40E+02	**7E+00**	1.70E+04	9E-02					2.60E+02	**6E+00**	2.50E+03	6E-01
INORG	Chromium III	16065-83-1	D	12	12	1.35E+01	1.07E+02	3.77E+02								1.50E+05	3E-03	1.00E+06	4E-04					3.30E+05	1E-03	7.90E+05	5E-04
INORG	Chromium VI	18540-29-9	A	12					3.80E-01	4.46E-01						2.40E+02		1.70E+04						2.60E+02		2.50E+03	
INORG	Cobalt	7440-48-4		65	49	9.70E-01	8.87E+00	6.44E+01	2.65E+00	4.50E+00	1.74E+01					5.90E+03	8E-03	1.80E+04	3E-03					1.30E+04	4E-03	2.60E+03	2E-02
INORG	Copper	7440-50-8	D	65	65	2.79E+00	2.25E+02	4.70E+03			3.20E+01					5.90E+04	8E-02	1.40E+05	3E-02					1.30E+05	4E-02	2.00E+04	2E-01
INORG	Cyanide (total)	57-12-5	D	56	29	2.32E-01	1.27E+00	4.10E+00	1.78E-01	5.89E-01						2.50E+02	2E-02	2.50E+02	2E-02					2.50E+02	2E-02	1.20E+01	3E-01
INORG	Iron	7439-89-6	D	31	31	2.06E+03	3.28E+04	3.76E+05										1.00E+06	4E-01							1.60E+05	**2E+00**
INORG	Lead	7439-92-1	B2	65	64	7.11E-01	1.53E+02	3.95E+03	9.00E-01	9.00E-01	4.92E+01					4.40E+04	9E-02	9.00E+02	**4E+00**					1.00E+05	4E-02	4.00E+02	**1E+01**
INORG	Manganese	7439-96-5	D	77	77	3.24E+01	1.06E+03	7.04E+03			5.10E+02					1.50E+03	**4E+00**	1.70E+05	4E-02					3.30E+03	**2E+00**	2.50E+04	3E-01
INORG	Mercury	7439-97-6	D	65	30	1.19E-02	4.46E-01	4.65E+00	8.80E-03	9.00E-02	1.30E-01							1.10E+03	4E-03							1.60E+02	3E-02
INORG	Nickel	7440-02-0	A	65	65	3.06E+00	6.10E+01	6.01E+02			3.01E+01					1.60E+04	4E-02	2.70E+05	2E-03					1.30E+04	4E-02	4.00E+04	1E-02
INORG	Selenium	7782-49-2	D	65	13	2.22E-01	1.26E+00	7.67E+00	1.62E-01	1.14E+01	4.10E-01					5.90E+04	1E-04	1.80E+04	4E-04					1.30E+05	6E-05	2.60E+03	3E-03
INORG	Silver	7440-22-4	D	65	12	2.75E-01	6.48E+00	6.96E+01	7.85E-02	5.20E+00						2.90E+03	2E-02	1.70E+04	4E-03					6.70E+03	1E-02	2.50E+03	3E-02
INORG	Thallium	7440-28-0		65	21	2.72E-01	1.26E+00	7.72E+00	2.61E-01	2.28E+01								2.40E+02	3E-02							3.50E+01	2E-01
INORG	Tin	7440-31-5		9	4	2.70E+01	5.41E+01	8.40E+01	1.14E+01	1.20E+01																	
INORG	Vanadium	7440-62-2		65	64	4.23E+00	1.26E+01	6.14E+01	1.80E+00	1.80E+00	3.28E+01							1.00E+04	3E-03							7.50E+02	4E-02
INORG	Zinc	7440-66-6	D	65	65	3.96E+00	3.84E+02	7.40E+03			4.70E+01							1.00E+06	7E-03							1.70E+05	4E-02
HERB	2,4-D	94-75-7		10					1.10E-01	1.70E-01						2.90E+06		1.50E+04						6.70E+06		2.50E+03	
HERB	2,4,5-T	93-76-5		10					2.70E-02	2.70E-01																	
HERB	2,4,5-TP	93-72-1		10					2.70E-02	3.00E-02								8.40E+03								1.70E+03	
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	27	26	2.57E-07	1.19E-04	1.89E-03	8.32E-07	8.32E-07						8.90E-02	2E-02	9.90E-04	**2E+00**					7.10E-02	3E-02	9.00E-05	**2E+01**

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.
12. The concentrations for the Chlordane isomers (alpha and beta) were summed before comparing to the Screening Criteria.
13. The concentrations for the Target Dioxin congeners were used to calculate an 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

TABLE 4-11

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-1/LNAPL AREA NO. 1

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)
VOC	Acetone	67-64-1	D	6					2.70E-01	5.00E+00
VOC	Benzene	71-43-2	A	6	2	1.50E-01	1.90E-01	2.30E-01	2.50E-01	2.50E-01
VOC	Bromodichloromethane	75-27-4	B2	6					3.60E-02	2.50E-01
VOC	Bromoform	75-25-2	B2	6					5.90E-02	5.00E-01
VOC	Bromomethane	74-83-9	D	6					9.20E-02	1.20E+00
VOC	2-Butanone	78-93-3	D	6	1	3.40E-01	3.40E-01	3.40E-01	9.00E-01	5.00E+00
VOC	Carbon Disulfide	75-15-0		6					1.20E-01	1.20E+00
VOC	Carbon Tetrachloride	56-23-5	B2	6					3.60E-02	2.50E-01
VOC	Chlorobenzene	108-90-7	D	10	1	6.60E-01	6.60E-01	6.60E-01	2.90E-02	2.50E-01
VOC	Chloroethane	75-00-3		6					1.30E-01	1.20E+00
VOC	Chloroform	67-66-3	B2	6					3.60E-02	2.50E-01
VOC	Chloromethane	74-87-3	D	6					5.40E-02	1.20E+00
VOC	Cumene	98-82-8	D	2	2	9.20E-01	1.21E+00	1.50E+00		
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	2					2.90E-01	9.00E-01
VOC	Dibromochloromethane	124-48-1	C	6					4.40E-02	5.00E-01
VOC	1,2-Dibromoethane	106-93-4	B2	2					7.00E-02	2.20E-01
VOC	1,2-Dichlorobenzene	95-50-1	D	6	2	8.00E-01	1.54E+01	3.00E+01	1.80E-01	1.80E-01
VOC	1,3-Dichlorobenzene	541-73-1	D	6	1	5.60E-01	5.60E-01	5.60E-01	3.40E-02	1.10E-01
VOC	1,4-Dichlorobenzene	106-46-7	C	6	1	1.20E+00	1.20E+00	1.20E+00	5.90E-02	1.80E-01
VOC	Dichlorodifluoromethane	75-71-8		2					1.40E-01	4.30E-01
VOC	1,1-Dichloroethane	75-34-3	C	6					4.90E-02	2.50E-01
VOC	1,2-Dichloroethane	107-06-2	B2	6					3.90E-02	2.50E-01
VOC	1,1-Dichloroethene	75-35-4	C	10	1	1.70E+01	1.70E+01	1.70E+01	5.90E-02	2.50E-01
VOC	cis-1,2-Dichloroethene	156-59-2	D	6	1	8.00E-02	8.00E-02	8.00E-02	1.80E-01	2.50E-01
VOC	trans-1,2-Dichloroethene	156-60-5		6					6.40E-02	2.50E-01
VOC	1,2-Dichloropropane	78-87-5	B2	6					3.30E-02	2.50E-01
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	6					4.10E-02	2.50E-01
VOC	Ethyl Benzene	100-41-4	D	10	6	1.30E+00	4.39E+01	9.70E+01	2.50E-01	2.50E-01
VOC	2-Hexanone	591-78-6		6					1.10E-01	5.00E+00
VOC	Methyl Acetate	79-20-9		2					1.70E+00	5.40E+00
VOC	Methyl tert-butyl ether	1634-04-4		2					4.00E-02	1.30E-01
VOC	4-Methyl-2-pentanone	108-10-1		6					1.00E-01	5.00E+00
VOC	Methylcyclohexane	108-87-2		2	2	8.90E-01	5.95E+00	1.10E+01		
VOC	Methylene Chloride	75-09-2	B2	6	1	5.20E-01	5.20E-01	5.20E-01	1.40E-01	3.80E+00
VOC	Styrene	100-42-5		6					6.00E-02	2.50E-01
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	6					3.90E-02	5.00E-01
VOC	Tetrachloroethene	127-18-4	C-B2	10	4	6.90E-01	2.51E+00	6.50E+00	1.70E-01	2.50E-01
VOC	Toluene	108-88-3	D	10	4	1.40E+01	2.40E+01	3.40E+01	3.60E-02	2.50E-01
VOC	1,2,4-Trichlorobenzene	120-82-1	D	2					4.00E-02	1.30E-01
VOC	1,1,1-Trichloroethane	71-55-6	D	6					3.60E-02	2.50E-01
VOC	1,1,2-Trichloroethane	79-00-5	C	6					5.90E-02	2.50E-01
VOC	Trichloroethene	79-01-6	C-B2	6					6.10E-02	2.50E-01
VOC	Trichlorofluoromethane	75-69-4		2					6.90E-02	2.20E-01
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2					3.60E+00	1.10E+01
VOC	Vinyl Chloride	75-01-4	A	6					3.90E-02	5.00E-01
VOC	Xylenes (total)	1330-20-7	D	10	8	1.80E+00	1.05E+02	2.60E+02		

TABLE 4-11

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-1/LNAPL AREA NO. 1

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)
SVOC	Acenaphthene	83-32-9		2	1	4.00E+01	4.00E+01	4.00E+01	1.00E+00	1.00E+00
SVOC	Acenaphthylene	208-96-8	D	2					9.40E-01	9.40E-01
SVOC	Acetophenone	98-86-2	D	2					1.00E+00	1.00E+00
SVOC	Anthracene	120-12-7	D	2	1	4.30E+01	4.30E+01	4.30E+01	9.80E-01	9.80E-01
SVOC	Atrazine	1912-24-9		2					3.00E+00	3.00E+00
SVOC	Benzaldehyde	100-52-7		2					3.40E+00	3.40E+00
SVOC	Benzo(a)anthracene	56-55-3	B2	2	1	7.00E+01	7.00E+01	7.00E+01	1.10E+00	1.10E+00
SVOC	Benzo(a)pyrene	50-32-8	B2	2	1	5.40E+01	5.40E+01	5.40E+01	1.20E+00	1.20E+00
SVOC	Benzo(b)fluoranthene	205-99-2	B2	2	1	7.50E+01	7.50E+01	7.50E+01	1.20E+00	1.20E+00
SVOC	Benzo(g,h,i)perylene	191-24-2	D	2					1.10E+00	1.10E+00
SVOC	Benzo(k)fluoranthene	207-08-9	B2	2					1.10E+00	1.10E+00
SVOC	Biphenyl	92-52-4		2					2.80E+00	2.80E+00
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	2					9.40E-01	9.40E-01
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	2					1.00E+00	1.00E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	2	1	1.10E+02	1.10E+02	1.10E+02	1.10E+00	1.10E+00
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	2					1.20E+00	1.20E+00
SVOC	Butylbenzylphthalate	85-68-7	C	2					1.00E+00	1.00E+00
SVOC	Caprolactam	105-60-2		2					3.60E+00	3.60E+00
SVOC	Carbazole	86-74-8	B2	2					1.00E+00	1.00E+00
SVOC	4-Chloro-3-methylphenol	59-50-7		2					1.00E+00	1.00E+00
SVOC	4-Chloroaniline	106-47-8		2					1.00E+00	1.00E+00
SVOC	2-Chloronaphthalene	91-58-7		2					9.60E-01	9.60E-01
SVOC	2-Chlorophenol	95-57-8		2					1.00E+00	1.00E+00
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		2					1.00E+00	1.00E+00
SVOC	Chrysene	218-01-9	B2	2	1	9.40E+01	9.40E+01	9.40E+01	9.20E-01	9.20E-01
SVOC	Di-n-butylphthalate	84-74-2	D	2	1	1.30E+02	1.30E+02	1.30E+02	3.00E+00	3.00E+00
SVOC	Di-n-octylphthalate	117-84-0		2					1.10E+00	1.10E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	2					1.00E+00	1.00E+00
SVOC	Dibenzofuran	132-64-9	D	2					1.00E+00	1.00E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	2					7.80E-01	7.80E-01
SVOC	2,4-Dichlorophenol	120-83-2		2					1.00E+00	1.00E+00
SVOC	Diethylphthalate	84-66-2	D	2					3.00E+00	3.00E+00
SVOC	2,4-Dimethylphenol	105-67-9		2					1.60E+00	1.60E+00
SVOC	Dimethylphthalate	131-11-3	D	2					3.20E+00	3.20E+00
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		2					3.20E+00	3.20E+00
SVOC	2,4-Dinitrophenol	51-28-5		2					2.20E+00	2.20E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	2					9.20E-01	9.20E-01
SVOC	2,6-Dinitrotoluene	606-20-2	B2	2					9.60E-01	9.60E-01
SVOC	Fluoranthene	206-44-0	D	2	2	5.20E+01	1.31E+02	2.10E+02		
SVOC	Fluorene	86-73-7	D	2	1	5.40E+01	5.40E+01	5.40E+01	9.60E-01	9.60E-01
SVOC	Hexachlorobenzene	118-74-1	B2	2					1.10E+00	1.10E+00
SVOC	Hexachlorobutadiene	87-68-3	C	2					9.00E-01	9.00E-01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	2					1.20E+00	1.20E+00
SVOC	Hexachloroethane	67-72-1	C	2					9.60E-01	9.60E-01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	2					1.40E+00	1.40E+00
SVOC	Isophorone	78-59-1	C	2					8.80E-01	8.80E-01

TABLE 4-11

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-1/LNAPL AREA NO. 1

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)
SVOC	2-Methylnaphthalene	91-57-6		2	2	4.40E+01	4.60E+01	4.80E+01		
SVOC	Methylphenol (summed)	1319-77-3		2					9.40E-01	9.40E-01
SVOC	Naphthalene	91-20-3	C	2					9.80E-01	9.80E-01
SVOC	2-Nitroaniline	88-74-4		2					9.20E-01	9.20E-01
SVOC	3-Nitroaniline	99-09-2	C	2					2.80E+00	2.80E+00
SVOC	4-Nitroaniline	100-01-6	C	2					1.40E+00	1.40E+00
SVOC	Nitrobenzene	98-95-3	D	2					9.20E-01	9.20E-01
SVOC	2-Nitrophenol	88-75-5		2					9.20E-01	9.20E-01
SVOC	4-Nitrophenol	100-02-7		2					3.80E+00	3.80E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	2					9.80E-01	9.80E-01
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	2					8.80E-01	8.80E-01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	2					1.00E+00	1.00E+00
SVOC	Pentachlorophenol	87-86-5	B2	2					2.40E+00	2.40E+00
SVOC	Phenanthrene	85-01-8	D	2	2	8.40E+01	1.47E+02	2.10E+02		
SVOC	Phenol	108-95-2	D	2					9.80E-01	9.80E-01
SVOC	Pyrene	129-00-0	D	2	1	3.00E+02	3.00E+02	3.00E+02	1.00E+00	1.00E+00
SVOC	2,4,5-Trichlorophenol	95-95-4		2					1.10E+00	1.10E+00
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2					1.30E+00	1.30E+00
P/PCB	PCBs (summed)	1336-36-3	B2	10	10	2.30E+01	2.14E+02	1.40E+03		
INORG	Aluminum	7429-90-5	D	2	2	3.24E+01	1.12E+02	1.91E+02		
INORG	Antimony	7440-36-0		2	1	5.20E-01	5.20E-01	5.20E-01	4.90E-01	4.90E-01
INORG	Arsenic	7440-38-2	A	2	2	9.50E-01	1.53E+00	2.10E+00		
INORG	Barium	7440-39-3	D	2	2	2.23E+01	2.52E+01	2.81E+01		
INORG	Beryllium	7440-41-7	B1	2	1	5.00E-02	5.00E-02	5.00E-02	4.60E-02	4.60E-02
INORG	Cadmium	7440-43-9	B1	2	2	9.10E-02	1.31E-01	1.70E-01		
INORG	Chromium (total)	7440-47-3		2	2	3.26E+01	6.39E+01	9.51E+01		
INORG	Cobalt	7440-48-4		2	1	2.50E-01	2.50E-01	2.50E-01	1.50E-01	1.50E-01
INORG	Copper	7440-50-8	D	2	2	4.60E+00	2.05E+01	3.63E+01		
INORG	Cyanide (total)	57-12-5	D	2	2	2.50E-01	3.20E-01	3.90E-01		
INORG	Iron	7439-89-6	D	2	2	3.72E+02	3.99E+02	4.26E+02		
INORG	Lead	7439-92-1	B2	2	2	1.40E+00	5.00E+00	8.60E+00		
INORG	Manganese	7439-96-5	D	2	2	7.00E+00	1.26E+01	1.82E+01		
INORG	Mercury	7439-97-6	D	2	2	7.00E-02	8.00E-02	9.00E-02		
INORG	Nickel	7440-02-0	A	2	2	1.10E+00	6.40E+00	1.17E+01		
INORG	Selenium	7782-49-2	D	2	2	3.40E-01	4.75E-01	6.10E-01		
INORG	Silver	7440-22-4	D	2					1.50E-01	1.50E-01
INORG	Thallium	7440-28-0		2					5.00E-01	5.00E-01
INORG	Vanadium	7440-62-2		2	2	4.70E-01	1.39E+00	2.30E+00		
INORG	Zinc	7440-66-6	D	2	2	3.50E+00	6.20E+00	8.90E+00		
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	2	2	3.13E-03	3.64E-03	4.16E-03		

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

Table 4-12: Data Summary for AOI W-01 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	38	10	6.80E-04	3.30E-02	5.10E-04	1.00E-02	1.0E+06	3.3E-08	3.1E+04	1.1E-06	7.3E-01	4.5E-02
Shallow	VOC	Benzene	71-43-2	T	A	38	17	1.60E-04	9.10E-02	1.60E-04	1.00E-03	3.5E+01	2.6E-03	1.1E+01	8.3E-03	5.0E-03	**1.8E+01**
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	38				1.70E-04	1.00E-03	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	38				1.80E-04	1.00E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	37				2.00E-04	1.00E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	38	16	4.30E-04	7.30E-03	4.10E-04	1.00E-02	2.4E+05	3.0E-08	2.4E+05	3.0E-08	1.3E+01	5.6E-04
Shallow	VOC	Carbon Disulfide	75-15-0	T		38	1	1.30E-03	1.30E-03	2.00E-04	1.00E-03	5.5E+02	2.4E-06	1.2E+03	1.1E-06	8.0E-01	1.6E-03
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	38				1.20E-04	1.00E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	38				1.40E-04	1.00E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		38	11	5.30E-04	4.50E-02	2.60E-04	1.00E-03	5.7E+03	7.9E-06	4.4E+02	1.0E-04	4.3E-01	1.0E-01
Shallow	VOC	Chloroform	67-66-3	T	B2	38	1	8.10E-04	8.10E-04	1.40E-04	1.00E-03	1.8E+02	4.5E-06	1.5E+02	5.4E-06	1.0E-01	8.1E-03
Shallow	VOC	Chloromethane	74-87-3	T	D	38	4	1.30E-04	1.70E-04	1.30E-04	1.00E-03	4.5E+01	3.8E-06	4.9E+02	3.5E-07	2.6E-01	6.5E-04
Shallow	VOC	Cumene	98-82-8	T	D	38	12	1.70E-04	8.60E-03	1.20E-04	1.00E-03	5.6E+01	1.5E-04	5.6E+01	1.5E-04	8.0E-01	1.1E-02
Shallow	VOC	Cyclohexane	110-82-7	T	ID	38	11	1.70E-04	1.90E-02	1.30E-04	1.00E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	38				6.20E-04	2.10E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	38				2.60E-04	1.00E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	38				2.20E-04	1.00E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	38	4	4.80E-04	2.00E-03	1.10E-04	1.00E-03	1.6E+02	1.3E-05	1.6E+02	1.3E-05	6.0E-01	3.3E-03
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	38				1.50E-04	1.00E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	38				1.70E-04	1.00E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		38				2.60E-04	2.00E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	38	11	1.60E-04	2.30E-02	1.60E-04	1.00E-03	2.3E+03	1.0E-05	2.4E+03	9.6E-06	8.8E-01	2.6E-02
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	38	1	4.50E-04	4.50E-04	2.10E-04	1.00E-03	5.9E+01	7.6E-06	1.9E+01	2.4E-05	5.0E-03	9.0E-02
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	38				2.40E-04	1.00E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	38	7	4.50E-04	3.90E-03	2.20E-04	5.00E-04	2.1E+02	1.9E-05	2.0E+02	2.0E-05	7.0E-02	5.6E-02
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		38	3	1.80E-04	2.10E-03	1.50E-04	5.00E-04	2.0E+02	1.1E-05	2.2E+02	9.5E-06	1.0E-01	2.1E-02
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	38				1.70E-04	1.00E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	38				2.70E-04	1.00E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	38	8	2.40E-04	1.90E-02	1.20E-04	1.00E-03	1.7E+02	1.1E-04	1.7E+02	1.1E-04	7.0E-01	2.7E-02
Shallow	VOC	2-Hexanone	591-78-6	T		38				4.60E-04	1.00E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		38				4.10E-04	1.00E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		38	3	8.40E-04	7.10E-03	1.30E-04	5.00E-03	4.7E+04	1.5E-07	6.1E+02	1.2E-05	2.4E-01	3.0E-02
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	37	4	2.88E-04	1.60E-03	2.30E-04	1.00E-02	2.0E+04	8.0E-08	1.3E+04	1.2E-07	1.8E+00	8.9E-04
Shallow	VOC	Methylcyclohexane	108-87-2	T		38	11	3.30E-04	7.60E-03	1.50E-04	1.00E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	38	5	5.00E-04	7.00E-03	2.90E-04	1.00E-03	1.4E+03	5.0E-06	2.2E+02	3.2E-05	5.0E-03	**1.4E+00**
Shallow	VOC	Styrene	100-42-5	T		38				1.50E-04	1.00E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	38				2.50E-04	1.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	37	3	4.30E-04	2.60E-03	2.30E-04	1.00E-03	1.7E+02	1.5E-05	1.2E+01	2.2E-04	5.0E-03	5.2E-01
Shallow	VOC	Toluene	108-88-3	T	D	38	14	2.50E-04	1.50E-02	1.80E-04	1.00E-03	5.3E+02	2.8E-05	5.3E+02	2.8E-05	1.0E+00	1.5E-02
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	38	1	9.20E-04	9.20E-04	1.70E-04	1.00E-03	3.0E+02	3.1E-06	1.9E+01	4.8E-05	7.0E-02	1.3E-02
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	38				1.50E-04	1.00E-03	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	38				3.00E-04	1.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	38	6	2.40E-04	1.40E-03	1.40E-04	1.00E-03	9.7E+01	1.4E-05	2.2E+01	6.4E-05	5.0E-03	2.8E-01
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		38	1	6.60E-04	6.60E-04	2.80E-04	1.00E-03	1.1E+03	6.0E-07	1.1E+03	6.0E-07	2.6E+00	2.5E-04
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		38				3.20E-04	1.10E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	38	9	1.80E-04	1.80E-02	1.50E-04	1.00E-03	1.3E+01	1.4E-03	1.0E+00	1.8E-02	2.0E-03	**9.0E+00**
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	38	10	6.90E-04	2.00E-01	3.30E-04	1.00E-03	1.9E+02	1.1E-03	1.9E+02	1.1E-03	1.0E+01	2.0E-02
Shallow	SVOC	Acenaphthene	83-32-9	T		38	1	2.40E-03	2.40E-03	8.00E-04	2.50E-02	4.2E+00	5.7E-04	4.2E+00	5.7E-04	1.3E+00	1.8E-03
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	38				7.10E-04	2.50E-02	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	38	1	2.70E-03	2.70E-03	2.60E-03	5.00E-02	6.1E+03	4.4E-07	6.1E+03	4.4E-07	1.5E+00	1.8E-03
Shallow	SVOC	Anthracene	120-12-7	T	D	38				6.80E-04	2.50E-02	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		38				2.50E-03	2.50E-02			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		38				2.80E-03	5.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	38				7.00E-04	2.50E-02			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	38				7.30E-04	2.50E-02			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	38				9.40E-04	2.50E-02			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	38				8.50E-04	2.50E-02			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	38				8.40E-04	2.50E-02			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	38				2.60E-03	5.00E-02						

Table 4-12: Data Summary for AOI W-01 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	38				8.70E-04	2.50E-02						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	36				9.70E-04	2.50E-02	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	38	2	2.70E-03	4.10E-03	2.70E-03	2.50E-02			3.2E-01	1.3E-02	6.0E-03	6.8E-01
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	38				8.80E-04	2.50E-02						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	38				8.80E-04	2.50E-02			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		38				2.50E-03	5.00E-02			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	38	2	1.50E-03	2.80E-03	8.20E-04	5.00E-02			7.4E+00	3.8E-04	8.5E-02	3.3E-02
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		37				9.90E-04	2.50E-02			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		37				6.10E-04	5.00E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		38				8.50E-04	2.50E-02			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		38				1.00E-03	2.50E-02			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		38				7.90E-04	2.50E-02						
Shallow	SVOC	Chrysene	218-01-9	T	B2	38				7.50E-04	2.50E-02			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	38				7.90E-04	2.50E-02			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	38	1	1.80E-03	1.80E-03	1.10E-03	2.50E-02						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	36				9.30E-04	1.00E-01			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		38				8.50E-04	5.00E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	38				6.50E-04	2.50E-02			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		37	3	1.90E-03	1.10E-02	8.50E-04	2.50E-02			5.2E+02	2.1E-05	3.7E-01	3.0E-02
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	38				7.60E-04	2.50E-02			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	38	3	1.35E-03	2.30E-03	6.70E-04	2.50E-02			1.1E+01	2.1E-04	8.8E-01	2.6E-03
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		38				1.30E-03	1.00E-01			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		38				3.00E-03	1.00E-01						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	38				7.90E-04	2.50E-02			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	38				5.70E-04	2.50E-02						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		38				1.10E-03	2.50E-02			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	38	1	9.90E-04	9.90E-04	8.10E-04	2.50E-02	2.1E-01	4.7E-03	2.1E-01	4.7E-03	2.1E-01	4.7E-03
Shallow	SVOC	Fluorene	86-73-7	T	D	38	1	2.20E-03	2.20E-03	1.00E-03	2.50E-02	2.0E+00	1.1E-03	2.0E+00	1.1E-03	8.8E-01	2.5E-03
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	38				7.40E-04	2.50E-02	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	36				7.30E-04	2.50E-02	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	35				1.10E-03	2.50E-02	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	38				7.40E-04	2.50E-02	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	38				6.30E-04	2.50E-02			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	38				6.30E-04	2.50E-02			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	38	6	8.50E-04	6.10E-03	6.40E-04	2.50E-02			2.5E+01	2.4E-04	2.6E-01	2.3E-02
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		38	1	2.16E-02	2.16E-02	1.30E-03	2.50E-02			8.1E+02	2.7E-05	3.7E-01	5.8E-02
Shallow	SVOC	Naphthalene	91-20-3	T	C	37	4	6.20E-03	1.30E-02	7.50E-04	2.50E-02	3.1E+01	4.2E-04	3.1E+01	4.2E-04	5.2E-01	2.5E-02
Shallow	SVOC	2-Nitroaniline	88-74-4	T		38				7.00E-04	1.00E-01						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	37				7.10E-04	1.00E-01						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	37				1.30E-03	1.00E-01						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	38				8.10E-04	2.50E-02	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		38				2.10E-03	2.50E-02			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		38				1.90E-03	1.00E-01						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	38				1.40E-03	2.50E-02			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	38				6.70E-04	2.50E-02			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	38				7.80E-04	2.50E-02						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	38				2.40E-03	2.50E-02			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	38				8.20E-04	2.50E-02	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	38	1	1.90E-02	1.90E-02	2.60E-03	2.50E-02			2.9E+04	6.6E-07	4.4E+00	4.3E-03
Shallow	SVOC	Pyrene	129-00-0	T	D	38				1.10E-03	2.50E-02	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		38				1.20E-03	2.50E-02			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	37				1.70E-03	2.50E-02			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	12	1	5.22E-04	5.22E-04	8.20E-05	4.00E-04	4.5E-02	1.2E-02	3.3E-03	1.6E-01	5.0E-04	1.0E+00
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	41	8	3.67E-04	4.59E-03	8.20E-05	4.00E-04	4.5E-02	1.0E-01	3.3E-03	**1.4E+00**	5.0E-04	**9.2E+00**
Shallow	INORG	Antimony	7440-36-0	D		28	4	5.80E-03	7.90E-03	2.20E-03	2.50E-02			6.8E+01	1.2E-04	6.0E-03	**1.3E+00**
Shallow	INORG	Antimony	7440-36-0	T		38	5	2.60E-03	8.60E-03	2.20E-03	2.50E-02			6.8E+01	1.3E-04	6.0E-03	**1.4E+00**
Shallow	INORG	Arsenic	7440-38-2	D	A	28	19	4.00E-03	2.69E-02	3.90E-03	1.00E-02			4.3E+00	6.3E-03	5.0E-02	5.4E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	38	26	2.10E-03	2.64E-02	2.10E-03	1.00E-02			4.3E+00	6.1E-03	5.0E-02	5.3E-01
Shallow	INORG	Barium	7440-39-3	D	D	28	28	5.63E-02	4.07E+00					1.4E+04	2.9E-04	2.0E+00	**2.0E+00**

Table 4-12: Data Summary for AOI W-01 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	38	38	3.50E-02	4.57E+00					1.4E+04	3.3E-04	2.0E+00	**2.3E+00**
Shallow	INORG	Beryllium	7440-41-7	D	B1	28	1	7.50E-04	7.50E-04	5.40E-04	1.00E-03			2.9E+02	2.6E-06	4.0E-03	1.9E-01
Shallow	INORG	Beryllium	7440-41-7	T	B1	38				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	28	4	3.00E-04	6.90E-04	2.80E-04	5.00E-03			1.9E+02	3.6E-06	5.0E-03	1.4E-01
Shallow	INORG	Cadmium	7440-43-9	T	B1	38	7	2.20E-04	1.10E-03	2.80E-04	5.00E-03			1.9E+02	5.8E-06	5.0E-03	2.2E-01
Shallow	INORG	Chromium (total)	7440-47-3	D		28	3	1.80E-03	8.50E-03	1.40E-03	1.00E-02			4.6E+02	1.8E-05	1.0E-01	8.5E-02
Shallow	INORG	Chromium (total)	7440-47-3	T		38	5	1.40E-03	3.05E-02	1.40E-03	1.00E-02			4.6E+02	6.6E-05	1.0E-01	3.1E-01
Shallow	INORG	Cobalt	7440-48-4	D	B1	28	9	1.30E-03	3.50E-03	1.30E-03	2.00E-02			2.4E+03	1.5E-06	4.0E-02	8.8E-02
Shallow	INORG	Cobalt	7440-48-4	T	B1	38	13	7.60E-04	6.60E-03	7.40E-04	2.00E-02			2.4E+03	2.8E-06	4.0E-02	1.7E-01
Shallow	INORG	Copper	7440-50-8	D	D	28	2	4.50E-03	5.60E-03	4.20E-03	5.00E-03			7.4E+03	7.6E-07	1.4E+00	4.0E-03
Shallow	INORG	Copper	7440-50-8	T	D	38	7	2.30E-03	2.22E-02	1.70E-03	5.00E-03			7.4E+03	3.0E-06	1.4E+00	1.6E-02
Shallow	INORG	Cyanide (total)	57-12-5	T	D	33	22	2.00E-03	1.75E-02	1.70E-03	1.00E-02			5.7E+01	3.1E-04	2.0E-01	8.8E-02
Shallow	INORG	Lead	7439-92-1	D	B2	28				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	38	7	1.80E-03	2.71E-02	1.60E-03	3.00E-03					4.0E-03	**6.8E+00**
Shallow	INORG	Manganese	7439-96-5	D	D	28	27	4.72E-02	9.52E-01	9.00E-04	9.00E-04			9.1E+03	1.0E-04	8.6E-01	**1.1E+00**
Shallow	INORG	Manganese	7439-96-5	T	D	38	38	1.30E-03	1.22E+00					9.1E+03	1.3E-04	8.6E-01	**1.4E+00**
Shallow	INORG	Mercury	7439-97-6	D	D	28	6	8.00E-05	1.30E-04	6.90E-05	2.00E-04	5.6E-02	2.3E-03	5.6E-02	2.3E-03	2.0E-03	6.5E-02
Shallow	INORG	Mercury	7439-97-6	T	D	38	6	6.73E-05	1.20E-04	6.90E-05	2.00E-04	5.6E-02	2.1E-03	5.6E-02	2.1E-03	2.0E-03	6.0E-02
Shallow	INORG	Nickel	7440-02-0	D	A	28	19	2.40E-03	1.59E-02	2.20E-03	2.00E-02			7.4E+04	2.1E-07	1.0E-01	1.6E-01
Shallow	INORG	Nickel	7440-02-0	T	A	38	21	2.60E-03	1.94E-02	2.20E-03	2.00E-02			7.4E+04	2.6E-07	1.0E-01	1.9E-01
Shallow	INORG	Selenium	7782-49-2	D	D	28				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	38	1	4.90E-03	4.90E-03	4.50E-03	5.00E-03			9.7E+02	5.1E-06	5.0E-02	9.8E-02
Shallow	INORG	Silver	7440-22-4	D	D	28				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	38	1	1.50E-03	1.50E-03	9.80E-04	5.00E-03			1.5E+03	1.0E-06	3.4E-02	4.4E-02
Shallow	INORG	Thallium	7440-28-0	D		28	6	4.30E-05	9.10E-03	1.80E-05	1.00E-02			1.3E+01	7.0E-04	2.0E-03	**4.6E+00**
Shallow	INORG	Thallium	7440-28-0	T		38	4	1.80E-05	1.02E-02	1.80E-05	1.00E-02			1.3E+01	7.8E-04	2.0E-03	**5.1E+00**
Shallow	INORG	Vanadium	7440-62-2	D		28	4	1.00E-03	2.45E-02	8.20E-04	1.00E-02			9.7E+02	2.5E-05	4.5E-03	**5.4E+00**
Shallow	INORG	Vanadium	7440-62-2	T		38	8	8.40E-04	4.84E-02	6.70E-04	1.00E-02			9.7E+02	5.0E-05	4.5E-03	**1.1E+01**
Shallow	INORG	Zinc	7440-66-6	D	D	28	2	1.56E-02	2.09E-02	1.20E-02	2.00E-02			1.1E+05	1.9E-07	2.4E+00	8.7E-03
Shallow	INORG	Zinc	7440-66-6	T	D	38	6	1.85E-02	3.82E-02	1.20E-02	2.00E-02			1.1E+05	3.5E-07	2.4E+00	1.6E-02
Shallow	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	D	B2	4	3	1.99E-09	3.03E-09	4.57E-09	4.57E-09			1.0E-08	3.0E-01	3.0E-08	1.0E-01
Shallow	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	31	15	1.63E-09	2.16E-08	2.34E-09	3.99E-08			1.0E-08	**2.2E+00**	3.0E-08	7.2E-01

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

The concentrations for the Target Dioxin congeners were used to calculate a 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-13: Data Summary for AOI W-01 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Deep	VOC	Acetone	67-64-1	T	ID	11	5	4.50E-02	3.10E+00	5.10E-04	3.70E-01	2.1E+00	**1.5E+00**	7.3E-01	**4.2E+00**
Deep	VOC	Benzene	71-43-2	T	A	11	2	5.60E-04	4.50E-03	1.60E-04	1.20E-01	5.0E-03	9.0E-01	5.0E-03	9.0E-01
Deep	VOC	Bromodichloromethane	75-27-4	T	B2	10				1.70E-04	4.00E-02	1.0E-01		1.0E-01	
Deep	VOC	Bromoform	75-25-2	T	B2	11				1.80E-04	1.20E-01	1.0E-01		1.0E-01	
Deep	VOC	Bromomethane	74-83-9	T	D	10				2.00E-04	1.00E-01	2.9E-02		1.0E-02	
Deep	VOC	2-Butanone	78-93-3	T	ID	11	1	9.60E-04	9.60E-04	4.10E-04	4.00E-01	3.8E+01	2.5E-05	1.3E+01	7.4E-05
Deep	VOC	Carbon Disulfide	75-15-0	T		11	1	9.40E-03	9.40E-03	2.00E-04	8.00E-02	2.3E+00	4.1E-03	8.0E-01	1.2E-02
Deep	VOC	Carbon Tetrachloride	56-23-5	T	B2	11				1.20E-04	1.20E-01	5.0E-03		5.0E-03	
Deep	VOC	Chlorobenzene	108-90-7	T	D	11				1.40E-04	1.30E-01	1.0E-01		1.0E-01	
Deep	VOC	Chloroethane	75-00-3	T		11				2.60E-04	9.70E-02	1.7E+00		4.3E-01	
Deep	VOC	Chloroform	67-66-3	T	B2	11	1	1.60E-04	1.60E-04	3.50E-04	1.20E-01	1.0E-01	1.6E-03	1.0E-01	1.6E-03
Deep	VOC	Chloromethane	74-87-3	T	D	11				1.30E-04	1.60E-01	1.1E+00		2.6E-01	
Deep	VOC	Cumene	98-82-8	T	D	11				1.20E-04	1.30E-01	2.3E+00		8.0E-01	
Deep	VOC	Cyclohexane	110-82-7	T	ID	11				1.30E-04	1.10E-01				
Deep	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	11				6.20E-04	2.70E-01	2.0E-04		2.0E-04	
Deep	VOC	Dibromochloromethane	124-48-1	T	C	11				2.60E-04	1.20E-01	1.0E-01		1.0E-01	
Deep	VOC	1,2-Dibromoethane	106-93-4	T	B2	11				2.20E-04	1.10E-01	1.0E-03		1.0E-03	
Deep	VOC	1,2-Dichlorobenzene	95-50-1	T	D	11				1.10E-04	1.30E-01	6.0E-01		6.0E-01	
Deep	VOC	1,3-Dichlorobenzene	541-73-1	T	D	11				1.50E-04	1.30E-01	1.9E-02		6.6E-03	
Deep	VOC	1,4-Dichlorobenzene	106-46-7	T	C	11				1.70E-04	1.30E-01	7.5E-02		7.5E-02	
Deep	VOC	Dichlorodifluoromethane	75-71-8	T		11				2.60E-04	1.60E-01	4.8E+00		1.7E+00	
Deep	VOC	1,1-Dichloroethane	75-34-3	T	C	11				1.60E-04	1.00E-01	2.5E+00		8.8E-01	
Deep	VOC	1,2-Dichloroethane	107-06-2	T	B2	11				2.10E-04	9.30E-02	5.0E-03		5.0E-03	
Deep	VOC	1,1-Dichloroethene	75-35-4	T	C	10				2.40E-04	4.00E-02	7.0E-03		7.0E-03	
Deep	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	10				2.20E-04	2.00E-02	7.0E-02		7.0E-02	
Deep	VOC	trans-1,2-Dichloroethene	156-60-5	T		11				1.50E-04	1.10E-01	1.0E-01		1.0E-01	
Deep	VOC	1,2-Dichloropropane	78-87-5	T	B2	11				1.70E-04	1.40E-01	5.0E-03		5.0E-03	
Deep	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	10				3.50E-04	1.20E-01	3.5E-02		8.5E-03	
Deep	VOC	Ethyl Benzene	100-41-4	T	D	10				1.20E-04	1.40E-01	7.0E-01		7.0E-01	
Deep	VOC	2-Hexanone	591-78-6	T		11				4.60E-04	4.00E-01	2.9E+00		1.0E+00	
Deep	VOC	Methyl Acetate	79-20-9	T		11				4.10E-04	4.00E-01				
Deep	VOC	Methyl tert-butyl ether	1634-04-4	T		11				1.30E-04	2.00E-01	6.9E-01		2.4E-01	
Deep	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	8	1	3.20E-04	3.20E-04	2.60E-04	4.00E-01	5.2E+00	6.2E-05	1.8E+00	1.8E-04
Deep	VOC	Methylcyclohexane	108-87-2	T		11				1.50E-04	1.40E-01				
Deep	VOC	Methylene Chloride	75-09-2	T	B2	11	1	1.60E-03	1.60E-03	2.90E-04	9.70E-02	5.0E-03	3.2E-01	5.0E-03	3.2E-01
Deep	VOC	Styrene	100-42-5	T		11				1.50E-04	1.20E-01	1.0E-01		1.0E-01	
Deep	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	11				2.50E-04	1.20E-01	3.5E-02		8.5E-03	
Deep	VOC	Tetrachloroethene	127-18-4	T	C-B2	10				4.20E-04	1.40E-01	5.0E-03		5.0E-03	
Deep	VOC	Toluene	108-88-3	T	D	11				1.80E-04	1.30E-01	1.0E+00		1.0E+00	
Deep	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	11				1.70E-04	1.30E-01	7.0E-02		7.0E-02	
Deep	VOC	1,1,1-Trichloroethane	71-55-6	T	D	11				1.50E-04	1.30E-01	2.0E-01		2.0E-01	
Deep	VOC	1,1,2-Trichloroethane	79-00-5	T	C	11				3.00E-04	1.20E-01	5.0E-03		5.0E-03	
Deep	VOC	Trichloroethene	79-01-6	T	C-B2	11				1.40E-04	1.40E-01	5.0E-03		5.0E-03	
Deep	VOC	Trichlorofluoromethane	75-69-4	T		11				2.80E-04	1.80E-01	7.3E+00		2.6E+00	
Deep	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		11				3.20E-04	1.10E-01	1.7E+02		1.7E+02	
Deep	VOC	Vinyl Chloride	75-01-4	T	A	11				1.50E-04	1.20E-01	2.0E-03		2.0E-03	
Deep	VOC	Xylenes (total)	1330-20-7	T	ID	11				3.30E-04	1.50E-01	1.0E+01		1.0E+01	
Deep	SVOC	Acenaphthene	83-32-9	T		11				8.00E-04	5.00E-03	3.8E+00		1.3E+00	
Deep	SVOC	Acenaphthylene	208-96-8	T	D	11				7.10E-04	5.00E-03	1.5E-01		5.2E-02	
Deep	SVOC	Acetophenone	98-86-2	T	D	11				2.60E-03	1.00E-02	4.4E+00		1.5E+00	
Deep	SVOC	Anthracene	120-12-7	T	D	11				6.80E-04	5.00E-03	4.3E-02		4.3E-02	
Deep	SVOC	Atrazine	1912-24-9	T		11				2.50E-03	5.00E-03	3.0E-03		3.0E-03	
Deep	SVOC	Benzaldehyde	100-52-7	T		11				2.80E-03	1.00E-02				
Deep	SVOC	Benzo(a)anthracene	56-55-3	T	B2	11				7.00E-04	5.00E-03	8.5E-03		2.1E-03	
Deep	SVOC	Benzo(a)pyrene	50-32-8	T	B2	11				7.30E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	11				9.40E-04	5.00E-03	2.0E-03		2.0E-03	
Deep	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	11				8.50E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	11				8.40E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	SVOC	Biphenyl	92-52-4	T	D	11				2.60E-03	1.00E-02				
Deep	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	11				8.70E-04	5.00E-03				
Deep	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	11				9.70E-04	5.00E-03	8.3E-03		2.0E-03	
Deep	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	11	1	2.90E-03	2.90E-03	2.70E-03	5.00E-03	6.0E-03	4.8E-01	6.0E-03	4.8E-01

Table 4-13: Data Summary for AOI W-01 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Deep	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	11				8.80E-04	5.00E-03				
Deep	SVOC	Butylbenzylphthalate	85-68-7	T	C	11				8.80E-04	5.00E-03	2.7E+00		1.2E+00	
Deep	SVOC	Caprolactam	105-60-2	T		11				2.50E-03	1.00E-02	1.7E+01		5.8E+00	
Deep	SVOC	Carbazole	86-74-8	T	B2	11				8.20E-04	1.00E-02	3.5E-01		8.5E-02	
Deep	SVOC	4-Chloro-3-methylphenol	59-50-7	T		11				9.90E-04	5.00E-03	4.2E-01		1.5E-01	
Deep	SVOC	4-Chloroaniline	106-47-8	T		11				6.10E-04	1.00E-02				
Deep	SVOC	2-Chloronaphthalene	91-58-7	T		11				8.50E-04	5.00E-03	5.2E+00		1.8E+00	
Deep	SVOC	2-Chlorophenol	95-57-8	T		11				1.00E-03	5.00E-03	1.3E-01		4.5E-02	
Deep	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		11				7.90E-04	5.00E-03				
Deep	SVOC	Chrysene	218-01-9	T	B2	11				7.50E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	11				7.90E-04	5.00E-03	2.0E-03		2.0E-03	
Deep	SVOC	Dibenzofuran	132-64-9	T	D	11				1.10E-03	5.00E-03				
Deep	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	2.00E-02	4.3E-03		1.1E-03	
Deep	SVOC	2,4-Dichlorophenol	120-83-2	T		11				8.50E-04	1.00E-02	2.1E-01		7.3E-02	
Deep	SVOC	Diethylphthalate	84-66-2	T	D	11	1	7.10E-04	7.10E-04	6.50E-04	5.00E-03	1.6E+01	4.4E-05	5.5E+00	1.3E-04
Deep	SVOC	2,4-Dimethylphenol	105-67-9	T		11				8.50E-04	5.00E-03	1.0E+00		3.7E-01	
Deep	SVOC	Dimethylphthalate	131-11-3	T	D	11				7.60E-04	5.00E-03	2.1E+02		7.3E+01	
Deep	SVOC	Di-n-butylphthalate	84-74-2	T	D	11				6.70E-04	5.00E-03	2.5E+00		8.8E-01	
Deep	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		11				1.30E-03	2.00E-02	2.0E-02		2.0E-02	
Deep	SVOC	2,4-Dinitrophenol	51-28-5	T		11				3.00E-03	2.00E-02				
Deep	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	11				7.90E-04	5.00E-03	3.2E-02		7.7E-03	
Deep	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	11				5.70E-04	5.00E-03				
Deep	SVOC	Di-n-octylphthalate	117-84-0	T		11				1.10E-03	5.00E-03	3.8E-01		1.3E-01	
Deep	SVOC	Fluoranthene	206-44-0	T	D	11				8.10E-04	5.00E-03	2.1E-01		2.1E-01	
Deep	SVOC	Fluorene	86-73-7	T	D	11				1.00E-03	5.00E-03	2.0E+00		8.8E-01	
Deep	SVOC	Hexachlorobenzene	118-74-1	T	B2	11				7.40E-04	5.00E-03	1.0E-03		1.0E-03	
Deep	SVOC	Hexachlorobutadiene	87-68-3	T	C	11				7.30E-04	5.00E-03	4.2E-02		1.5E-02	
Deep	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	10				1.10E-03	5.00E-03	5.0E-02		5.0E-02	
Deep	SVOC	Hexachloroethane	67-72-1	T	C	11				7.40E-04	5.00E-03	2.1E-02		7.3E-03	
Deep	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	11				6.30E-04	5.00E-03	2.0E-03		2.0E-03	
Deep	SVOC	Isophorone	78-59-1	T	C	11				6.30E-04	5.00E-03	3.1E+00		7.7E-01	
Deep	SVOC	2-Methylnaphthalene	91-57-6	T	ID	11				6.40E-04	5.00E-03	7.5E-01		2.6E-01	
Deep	SVOC	Methylphenol (total)	1319-77-3	T		11				1.30E-03	5.00E-03	1.0E+00		3.7E-01	
Deep	SVOC	Naphthalene	91-20-3	T	C	11				7.50E-04	5.00E-03	1.5E+00		5.2E-01	
Deep	SVOC	2-Nitroaniline	88-74-4	T		11				7.00E-04	2.00E-02				
Deep	SVOC	3-Nitroaniline	99-09-2	T	C	11				7.10E-04	2.00E-02				
Deep	SVOC	4-Nitroaniline	100-01-6	T	C	11				1.30E-03	2.00E-02				
Deep	SVOC	Nitrobenzene	98-95-3	T	D	11				8.10E-04	5.00E-03	9.6E-03		3.4E-03	
Deep	SVOC	2-Nitrophenol	88-75-5	T		11				2.10E-03	5.00E-03	5.8E-02		2.0E-02	
Deep	SVOC	4-Nitrophenol	100-02-7	T		11				1.90E-03	2.00E-02				
Deep	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	11				1.40E-03	5.00E-03	1.1E+00		2.7E-01	
Deep	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	11				6.70E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	11				7.80E-04	5.00E-03				
Deep	SVOC	Pentachlorophenol	87-86-5	T	B2	11				2.40E-03	5.00E-03	1.0E-03		1.0E-03	
Deep	SVOC	Phenanthrene	85-01-8	T	D	11				8.20E-04	5.00E-03	1.5E-01		5.2E-02	
Deep	SVOC	Phenol	108-95-2	T	ID	11	4	5.20E-03	8.80E-03	2.60E-03	5.00E-03	1.3E+01	6.8E-04	4.4E+00	2.0E-03
Deep	SVOC	Pyrene	129-00-0	T	D	11				1.10E-03	5.00E-03	1.4E-01		1.4E-01	
Deep	SVOC	2,4,5-Trichlorophenol	95-95-4	T		11				1.20E-03	5.00E-03	2.1E+00		7.3E-01	
Deep	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	11				1.70E-03	5.00E-03	4.7E-01		1.2E-01	
Deep	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	5.0E-04		5.0E-04	
Deep	P/PCB	PCBs (total)	1336-36-3	T	B2	11				8.20E-05	4.00E-04	5.0E-04		5.0E-04	
Deep	INORG	Antimony	7440-36-0	D		5	1	2.30E-03	2.30E-03	2.20E-03	2.50E-02	6.0E-03	3.8E-01	6.0E-03	3.8E-01
Deep	INORG	Antimony	7440-36-0	T		11				2.20E-03	2.50E-02	6.0E-03		6.0E-03	
Deep	INORG	Arsenic	7440-38-2	D	A	5	2	4.40E-03	7.10E-03	3.90E-03	1.00E-02	5.0E-02	1.4E-01	5.0E-02	1.4E-01
Deep	INORG	Arsenic	7440-38-2	T	A	11	7	4.40E-03	1.45E-02	3.90E-03	1.00E-02	5.0E-02	2.9E-01	5.0E-02	2.9E-01
Deep	INORG	Barium	7440-39-3	D	D	5	5	1.15E-01	3.73E-01			2.0E+00	1.9E-01	2.0E+00	1.9E-01
Deep	INORG	Barium	7440-39-3	T	D	11	11	1.26E-01	4.58E-01			2.0E+00	2.3E-01	2.0E+00	2.3E-01
Deep	INORG	Beryllium	7440-41-7	D	B1	5				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
Deep	INORG	Beryllium	7440-41-7	T	B1	11				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
Deep	INORG	Cadmium	7440-43-9	D	B1	5				2.80E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	INORG	Cadmium	7440-43-9	T	B1	11				2.80E-04	5.00E-03	5.0E-03		5.0E-03	
Deep	INORG	Chromium (total)	7440-47-3	D		5	1	2.30E-03	2.30E-03	1.40E-03	1.00E-02	1.0E-01	2.3E-02	1.0E-01	2.3E-02

Table 4-13: Data Summary for AOI W-01 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Deep	INORG	Chromium (total)	7440-47-3	T		11	8	2.30E-03	9.10E-03	1.40E-03	1.00E-02	1.0E-01	9.1E-02	1.0E-01	9.1E-02
Deep	INORG	Cobalt	7440-48-4	D	B1	5	1	2.40E-03	2.40E-03	1.30E-03	2.00E-02	1.0E-01	2.4E-02	4.0E-02	6.0E-02
Deep	INORG	Cobalt	7440-48-4	T	B1	11	5	7.60E-04	2.20E-03	7.40E-04	2.00E-02	1.0E-01	2.2E-02	4.0E-02	5.5E-02
Deep	INORG	Copper	7440-50-8	D	D	5				4.20E-03	5.00E-03	4.0E+00		1.4E+00	
Deep	INORG	Copper	7440-50-8	T	D	11				1.70E-03	5.00E-03	4.0E+00		1.4E+00	
Deep	INORG	Lead	7439-92-1	D	B2	5				2.50E-03	3.00E-03	4.0E-03		4.0E-03	
Deep	INORG	Lead	7439-92-1	T	B2	11	1	1.60E-03	1.60E-03	1.60E-03	3.00E-03	4.0E-03	4.0E-01	4.0E-03	4.0E-01
Deep	INORG	Manganese	7439-96-5	D	D	5	4	3.45E-02	7.03E-02	9.00E-04	9.00E-04	2.5E+00	2.8E-02	8.6E-01	8.2E-02
Deep	INORG	Manganese	7439-96-5	T	D	11	8	2.81E-02	7.12E-02	6.80E-04	9.00E-04	2.5E+00	2.8E-02	8.6E-01	8.3E-02
Deep	INORG	Mercury	7439-97-6	D	D	5	1	7.20E-05	7.20E-05	6.90E-05	6.90E-05	2.0E-03	3.6E-02	2.0E-03	3.6E-02
Deep	INORG	Mercury	7439-97-6	T	D	11				6.90E-05	2.00E-04	2.0E-03		2.0E-03	
Deep	INORG	Nickel	7440-02-0	D	A	5	1	6.40E-03	6.40E-03	2.20E-03	2.00E-02	1.0E-01	6.4E-02	1.0E-01	6.4E-02
Deep	INORG	Nickel	7440-02-0	T	A	11	7	3.00E-03	9.90E-03	2.20E-03	2.00E-02	1.0E-01	9.9E-02	1.0E-01	9.9E-02
Deep	INORG	Selenium	7782-49-2	D	D	5				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
Deep	INORG	Selenium	7782-49-2	T	D	11				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
Deep	INORG	Silver	7440-22-4	D	D	5				1.50E-03	5.00E-03	9.8E-02		3.4E-02	
Deep	INORG	Silver	7440-22-4	T	D	11				9.80E-04	5.00E-03	9.8E-02		3.4E-02	
Deep	INORG	Thallium	7440-28-0	D		5				1.80E-05	1.00E-02	2.0E-03		2.0E-03	
Deep	INORG	Thallium	7440-28-0	T		11				1.80E-05	1.00E-02	2.0E-03		2.0E-03	
Deep	INORG	Vanadium	7440-62-2	D		5				8.20E-04	1.00E-02	6.2E-02		4.5E-03	
Deep	INORG	Vanadium	7440-62-2	T		11				6.70E-04	1.00E-02	6.2E-02		4.5E-03	
Deep	INORG	Zinc	7440-66-6	D	D	5	1	2.36E-02	2.36E-02	1.20E-02	2.00E-02	5.0E+00	4.7E-03	2.4E+00	9.8E-03
Deep	INORG	Zinc	7440-66-6	T	D	11	1	1.65E-02	1.65E-02	1.20E-02	2.00E-02	5.0E+00	3.3E-03	2.4E+00	6.9E-03
Intermediate	VOC	Acetone	67-64-1	T	ID	4	1	3.80E-02	3.80E-02	5.10E-04	7.30E-03	2.1E+00	1.8E-02	7.3E-01	5.2E-02
Intermediate	VOC	Benzene	71-43-2	T	A	4				1.60E-04	2.30E-03	5.0E-03		5.0E-03	
Intermediate	VOC	Bromodichloromethane	75-27-4	T	B2	4				1.70E-04	2.40E-03	1.0E-01		1.0E-01	
Intermediate	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	2.60E-03	1.0E-01		1.0E-01	
Intermediate	VOC	Bromomethane	74-83-9	T	D	3				2.00E-04	2.90E-03	2.9E-02		1.0E-02	
Intermediate	VOC	2-Butanone	78-93-3	T	ID	4				4.10E-04	5.90E-03	3.8E+01		1.3E+01	
Intermediate	VOC	Carbon Disulfide	75-15-0	T		4				2.00E-04	2.90E-03	2.3E+00		8.0E-01	
Intermediate	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	1.70E-03	5.0E-03		5.0E-03	
Intermediate	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	2.00E-03	1.0E-01		1.0E-01	
Intermediate	VOC	Chloroethane	75-00-3	T		4				2.60E-04	3.70E-03	1.7E+00		4.3E-01	
Intermediate	VOC	Chloroform	67-66-3	T	B2	4	1	1.70E-04	1.70E-04	3.50E-04	2.00E-03	1.0E-01	1.7E-03	1.0E-01	1.7E-03
Intermediate	VOC	Chloromethane	74-87-3	T	D	4	1	2.10E-04	2.10E-04	4.90E-04	1.90E-03	1.1E+00	1.9E-04	2.6E-01	8.1E-04
Intermediate	VOC	Cumene	98-82-8	T	D	4				1.20E-04	1.70E-03	2.3E+00		8.0E-01	
Intermediate	VOC	Cyclohexane	110-82-7	T	ID	4				1.30E-04	1.90E-03				
Intermediate	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	8.90E-03	2.0E-04		2.0E-04	
Intermediate	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	3.70E-03	1.0E-01		1.0E-01	
Intermediate	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	3.10E-03	1.0E-03		1.0E-03	
Intermediate	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	1.60E-03	6.0E-01		6.0E-01	
Intermediate	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	2.10E-03	1.9E-02		6.6E-03	
Intermediate	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	2.40E-03	7.5E-02		7.5E-02	
Intermediate	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	3.70E-03	4.8E+00		1.7E+00	
Intermediate	VOC	1,1-Dichloroethane	75-34-3	T	C	4				1.60E-04	2.30E-03	2.5E+00		8.8E-01	
Intermediate	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	3.00E-03	5.0E-03		5.0E-03	
Intermediate	VOC	1,1-Dichloroethene	75-35-4	T	C	4				2.40E-04	3.40E-03	7.0E-03		7.0E-03	
Intermediate	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.20E-04	3.10E-03	7.0E-02		7.0E-02	
Intermediate	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	2.10E-03	1.0E-01		1.0E-01	
Intermediate	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	2.40E-03	5.0E-03		5.0E-03	
Intermediate	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	3.90E-03	3.5E-02		8.5E-03	
Intermediate	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	1.70E-03	7.0E-01		7.0E-01	
Intermediate	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	6.60E-03	2.9E+00		1.0E+00	
Intermediate	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	5.90E-03				
Intermediate	VOC	Methyl tert-butyl ether	1634-04-4	T		4				1.30E-04	1.90E-03	6.9E-01		2.4E-01	
Intermediate	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	3				2.30E-04	3.30E-03	5.2E+00		1.8E+00	
Intermediate	VOC	Methylcyclohexane	108-87-2	T		4				1.50E-04	2.10E-03				
Intermediate	VOC	Methylene Chloride	75-09-2	T	B2	3				2.90E-04	4.90E-03	5.0E-03		5.0E-03	
Intermediate	VOC	Styrene	100-42-5	T		4				1.50E-04	2.10E-03	1.0E-01		1.0E-01	
Intermediate	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	3.60E-03	3.5E-02		8.5E-03	
Intermediate	VOC	Tetrachloroethene	127-18-4	T	C-B2	4				2.30E-04	3.30E-03	5.0E-03		5.0E-03	
Intermediate	VOC	Toluene	108-88-3	T	D	4				1.80E-04	2.60E-03	1.0E+00		1.0E+00	

Table 4-13: Data Summary for AOI W-01 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Intermediate	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	2.40E-03	7.0E-02		7.0E-02	
Intermediate	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4				1.50E-04	2.10E-03	2.0E-01		2.0E-01	
Intermediate	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	4.30E-03	5.0E-03		5.0E-03	
Intermediate	VOC	Trichloroethene	79-01-6	T	C-B2	4				1.40E-04	2.00E-03	5.0E-03		5.0E-03	
Intermediate	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	4.00E-03	7.3E+00		2.6E+00	
Intermediate	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	4.60E-03	1.7E+02		1.7E+02	
Intermediate	VOC	Vinyl Chloride	75-01-4	T	A	4				1.50E-04	2.10E-03	2.0E-03		2.0E-03	
Intermediate	VOC	Xylenes (total)	1330-20-7	T	ID	4				3.30E-04	4.70E-03	1.0E+01		1.0E+01	
Intermediate	SVOC	Acenaphthene	83-32-9	T		4				8.00E-04	8.00E-04	3.8E+00		1.3E+00	
Intermediate	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	7.10E-04	1.5E-01		5.2E-02	
Intermediate	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	2.60E-03	4.4E+00		1.5E+00	
Intermediate	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	6.80E-04	4.3E-02		4.3E-02	
Intermediate	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	2.50E-03	3.0E-03		3.0E-03	
Intermediate	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	2.80E-03				
Intermediate	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	7.00E-04	8.5E-03		2.1E-03	
Intermediate	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	7.30E-04	5.0E-03		5.0E-03	
Intermediate	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	9.40E-04	2.0E-03		2.0E-03	
Intermediate	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	8.50E-04	5.0E-03		5.0E-03	
Intermediate	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	8.40E-04	5.0E-03		5.0E-03	
Intermediate	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	2.60E-03				
Intermediate	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	8.70E-04				
Intermediate	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	9.70E-04	8.3E-03		2.0E-03	
Intermediate	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4	1	8.80E-03	8.80E-03	2.70E-03	2.70E-03	6.0E-03	**1.5E+00**	6.0E-03	**1.5E+00**
Intermediate	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	8.80E-04				
Intermediate	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	8.80E-04	2.7E+00		1.2E+00	
Intermediate	SVOC	Caprolactam	105-60-2	T		4	3	6.70E-03	3.90E-02	2.50E-03	2.50E-03	1.7E+01	2.3E-03	5.8E+00	6.7E-03
Intermediate	SVOC	Carbazole	86-74-8	T	B2	4				8.20E-04	8.20E-04	3.5E-01		8.5E-02	
Intermediate	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	9.90E-04	4.2E-01		1.5E-01	
Intermediate	SVOC	4-Chloroaniline	106-47-8	T		4				6.10E-04	6.10E-04				
Intermediate	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	8.50E-04	5.2E+00		1.8E+00	
Intermediate	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	1.00E-03	1.3E-01		4.5E-02	
Intermediate	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	7.90E-04				
Intermediate	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	7.50E-04	5.0E-03		5.0E-03	
Intermediate	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	7.90E-04	2.0E-03		2.0E-03	
Intermediate	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	1.10E-03				
Intermediate	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	9.30E-04	4.3E-03		1.1E-03	
Intermediate	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	8.50E-04	2.1E-01		7.3E-02	
Intermediate	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	6.50E-04	1.6E+01		5.5E+00	
Intermediate	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	8.50E-04	1.0E+00		3.7E-01	
Intermediate	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	7.60E-04	2.1E+02		7.3E+01	
Intermediate	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	6.70E-04	2.5E+00		8.8E-01	
Intermediate	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	1.30E-03	2.0E-02		2.0E-02	
Intermediate	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	3.00E-03				
Intermediate	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	7.90E-04	3.2E-02		7.7E-03	
Intermediate	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.70E-04				
Intermediate	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	1.10E-03	3.8E-01		1.3E-01	
Intermediate	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	8.10E-04	2.1E-01		2.1E-01	
Intermediate	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	1.00E-03	2.0E+00		8.8E-01	
Intermediate	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	7.40E-04	1.0E-03		1.0E-03	
Intermediate	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	7.30E-04	4.2E-02		1.5E-02	
Intermediate	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	1.10E-03	5.0E-02		5.0E-02	
Intermediate	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	7.40E-04	2.1E-02		7.3E-03	
Intermediate	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	6.30E-04	2.0E-03		2.0E-03	
Intermediate	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	6.30E-04	3.1E+00		7.7E-01	
Intermediate	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4				6.40E-04	6.40E-04	7.5E-01		2.6E-01	
Intermediate	SVOC	Methylphenol (total)	1319-77-3	T		4	1	2.65E-03	2.65E-03	1.30E-03	1.30E-03	1.0E+00	2.7E-03	3.7E-01	7.2E-03
Intermediate	SVOC	Naphthalene	91-20-3	T	C	4				7.50E-04	7.50E-04	1.5E+00		5.2E-01	
Intermediate	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	7.00E-04				
Intermediate	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	7.10E-04				
Intermediate	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	1.30E-03				
Intermediate	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	8.10E-04	9.6E-03		3.4E-03	
Intermediate	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	2.10E-03	5.8E-02		2.0E-02	

Table 4-13: Data Summary for AOI W-01 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Intermediate	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	1.90E-03				
Intermediate	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	1.40E-03	1.1E+00		2.7E-01	
Intermediate	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	6.70E-04	5.0E-03		5.0E-03	
Intermediate	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	7.80E-04				
Intermediate	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	2.40E-03	1.0E-03		1.0E-03	
Intermediate	SVOC	Phenanthrene	85-01-8	T	D	4				8.20E-04	8.20E-04	1.5E-01		5.2E-02	
Intermediate	SVOC	Phenol	108-95-2	T	ID	4	1	7.00E-03	7.00E-03	2.60E-03	2.60E-03	1.3E+01	5.4E-04	4.4E+00	1.6E-03
Intermediate	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	1.10E-03	1.4E-01		1.4E-01	
Intermediate	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	1.20E-03	2.1E+00		7.3E-01	
Intermediate	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	1.70E-03	4.7E-01		1.2E-01	
Intermediate	P/PCB	PCBs (total)	1336-36-3	D	B2	1				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
Intermediate	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
Intermediate	INORG	Antimony	7440-36-0	D		2				2.20E-03	2.20E-03	6.0E-03		6.0E-03	
Intermediate	INORG	Antimony	7440-36-0	T		4				2.20E-03	3.40E-03	6.0E-03		6.0E-03	
Intermediate	INORG	Arsenic	7440-38-2	D	A	2	1	6.20E-03	6.20E-03	3.90E-03	3.90E-03	5.0E-02	1.2E-01	5.0E-02	1.2E-01
Intermediate	INORG	Arsenic	7440-38-2	T	A	4	3	2.70E-03	5.20E-03	2.10E-03	2.10E-03	5.0E-02	1.0E-01	5.0E-02	1.0E-01
Intermediate	INORG	Barium	7440-39-3	D	D	2	2	4.00E-02	4.04E-01			2.0E+00	2.0E-01	2.0E+00	2.0E-01
Intermediate	INORG	Barium	7440-39-3	T	D	4	4	6.77E-02	4.32E-01			2.0E+00	2.2E-01	2.0E+00	2.2E-01
Intermediate	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	5.40E-04	4.0E-03		4.0E-03	
Intermediate	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	6.00E-04	4.0E-03		4.0E-03	
Intermediate	INORG	Cadmium	7440-43-9	D	B1	2	1	2.80E-04	2.80E-04	2.80E-04	2.80E-04	5.0E-03	5.6E-02	5.0E-03	5.6E-02
Intermediate	INORG	Cadmium	7440-43-9	T	B1	4	2	2.80E-04	5.70E-04	2.80E-04	2.80E-04	5.0E-03	1.1E-01	5.0E-03	1.1E-01
Intermediate	INORG	Chromium (total)	7440-47-3	D		2				1.40E-03	1.40E-03	1.0E-01		1.0E-01	
Intermediate	INORG	Chromium (total)	7440-47-3	T		4	1	6.80E-03	6.80E-03	1.40E-03	1.50E-03	1.0E-01	6.8E-02	1.0E-01	6.8E-02
Intermediate	INORG	Cobalt	7440-48-4	D	B1	2				1.30E-03	1.30E-03	1.0E-01		4.0E-02	
Intermediate	INORG	Cobalt	7440-48-4	T	B1	4	1	1.40E-03	1.40E-03	7.40E-04	1.30E-03	1.0E-01	1.4E-02	4.0E-02	3.5E-02
Intermediate	INORG	Copper	7440-50-8	D	D	2				4.20E-03	4.20E-03	4.0E+00		1.4E+00	
Intermediate	INORG	Copper	7440-50-8	T	D	4				1.70E-03	4.20E-03	4.0E+00		1.4E+00	
Intermediate	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	2.50E-03	4.0E-03		4.0E-03	
Intermediate	INORG	Lead	7439-92-1	T	B2	4	1	1.35E-02	1.35E-02	1.60E-03	2.50E-03	4.0E-03	**3.4E+00**	4.0E-03	**3.4E+00**
Intermediate	INORG	Manganese	7439-96-5	D	D	2	2	2.80E-03	1.59E-01			2.5E+00	6.4E-02	8.6E-01	1.8E-01
Intermediate	INORG	Manganese	7439-96-5	T	D	4	4	6.31E-02	1.77E-01			2.5E+00	7.1E-02	8.6E-01	2.1E-01
Intermediate	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	6.90E-05	2.0E-03		2.0E-03	
Intermediate	INORG	Mercury	7439-97-6	T	D	4				6.90E-05	8.70E-05	2.0E-03		2.0E-03	
Intermediate	INORG	Nickel	7440-02-0	D	A	2				2.20E-03	2.20E-03	1.0E-01		1.0E-01	
Intermediate	INORG	Nickel	7440-02-0	T	A	4	1	5.70E-03	5.70E-03	2.20E-03	2.90E-03	1.0E-01	5.7E-02	1.0E-01	5.7E-02
Intermediate	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	4.50E-03	5.0E-02		5.0E-02	
Intermediate	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	4.70E-03	5.0E-02		5.0E-02	
Intermediate	INORG	Silver	7440-22-4	D	D	2				1.50E-03	1.50E-03	9.8E-02		3.4E-02	
Intermediate	INORG	Silver	7440-22-4	T	D	4				9.80E-04	1.50E-03	9.8E-02		3.4E-02	
Intermediate	INORG	Thallium	7440-28-0	D		2				1.80E-05	5.00E-03	2.0E-03		2.0E-03	
Intermediate	INORG	Thallium	7440-28-0	T		4	1	4.40E-05	4.40E-05	3.30E-05	5.00E-03	2.0E-03	2.2E-02	2.0E-03	2.2E-02
Intermediate	INORG	Vanadium	7440-62-2	D		2	1	2.50E-03	2.50E-03	8.20E-04	8.20E-04	6.2E-02	4.0E-02	4.5E-03	5.6E-01
Intermediate	INORG	Vanadium	7440-62-2	T		4	1	4.90E-03	4.90E-03	6.70E-04	8.20E-04	6.2E-02	7.9E-02	4.5E-03	**1.1E+00**
Intermediate	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	1.20E-02	5.0E+00		2.4E+00	
Intermediate	INORG	Zinc	7440-66-6	T	D	4	1	5.92E-01	5.92E-01	1.20E-02	1.40E-02	5.0E+00	1.2E-01	2.4E+00	2.5E-01

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 4-14

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-5 (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	8					5.10E-04	2.00E-02	1.00E+06		3.10E+04		1.00E+06	
VOC	Benzene	71-43-2	T	A	8	2	3.50E-04	4.20E-04	4.90E-04	1.60E-04	2.00E-03	3.60E+01	1E-05	1.10E+01	4E-05	5.60E+00	9E-05
VOC	Bromodichloromethane	75-27-4	T	B2	8	1	4.60E-04	4.60E-04	4.60E-04	1.70E-04	2.00E-03	3.80E+01	1E-05	1.40E+01	3E-05	4.80E+00	1E-04
VOC	Bromoform	75-25-2	T	B2	8					1.80E-04	2.00E-03	3.10E+03		1.40E+02		4.80E+02	
VOC	Bromomethane	74-83-9	T	D	8					2.00E-04	2.00E-03	9.00E+00		7.00E+01		4.00E+00	
VOC	2-Butanone	78-93-3	T	D	8	2	1.78E-03	3.34E-03	4.90E-03	4.10E-04	2.00E-02	2.40E+05	2E-08	2.40E+05	2E-08	2.40E+05	2E-08
VOC	Carbon Disulfide	75-15-0	T		8					2.00E-04	2.00E-03	5.50E+02		1.20E+03		2.50E+02	
VOC	Carbon Tetrachloride	56-23-5	T	B2	8					1.20E-04	2.00E-03	2.40E+00		4.60E+00		3.70E-01	
VOC	Chlorobenzene	108-90-7	T	D	8					1.40E-04	2.00E-03	4.70E+02		8.60E+01		2.10E+02	
VOC	Chloroethane	75-00-3	T		8	2	3.60E-02	4.30E-02	5.00E-02	2.60E-04	1.43E-03	5.70E+03	9E-06	4.40E+02	1E-04	5.70E+03	9E-06
VOC	Chloroform	67-66-3	T	B2	8	4	5.50E-04	1.61E-03	2.10E-03	1.40E-04	7.70E-04	1.80E+02	1E-05	1.50E+02	1E-05	2.80E+01	8E-05
VOC	Chloromethane	74-87-3	T	D	8	2	3.00E-04	3.88E-04	4.75E-04	1.30E-04	2.00E-03	5.20E+01	9E-06	4.90E+02	1E-06	8.60E+00	6E-05
VOC	Cumene	98-82-8	T	D	8					1.20E-04	2.00E-03	5.60E+01		5.60E+01		5.60E+01	
VOC	Cyclohexane	110-82-7	T		8					1.30E-04	2.00E-03						
VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	8					6.20E-04	4.00E-03	1.20E+00		3.90E-01		1.20E+00	
VOC	Dibromochloromethane	124-48-1	T	C	8					2.60E-04	2.00E-03	1.10E+02		1.80E+01		1.50E+01	
VOC	1,2-Dibromoethane	106-93-4	T	B2	8					2.20E-04	2.00E-03	1.50E+01		2.50E-02		2.40E+00	
VOC	1,2-Dichlorobenzene	95-50-1	T	D	8					1.10E-04	2.00E-03	1.60E+02		1.60E+02		1.60E+02	
VOC	1,3-Dichlorobenzene	541-73-1	T	D	8					1.50E-04	2.00E-03			2.00E+00			
VOC	1,4-Dichlorobenzene	106-46-7	T	C	8					1.70E-04	2.00E-03	7.40E+01		6.40E+00		1.60E+01	
VOC	Dichlorodifluoromethane	75-71-8	T		8					2.60E-04	4.00E-03	3.00E+02		3.00E+02		2.20E+02	
VOC	1,1-Dichloroethane	75-34-3	T	C	8	2	2.00E-02	2.50E-02	3.00E-02	1.60E-04	1.00E-03	2.30E+03	1E-05	2.40E+03	1E-05	1.00E+03	3E-05
VOC	1,2-Dichloroethane	107-06-2	T	B2	8					2.10E-04	2.00E-03	5.90E+01		1.90E+01		9.60E+00	
VOC	1,1-Dichloroethene	75-35-4	T	C	8	1	7.80E-04	7.80E-04	7.80E-04	2.40E-04	1.32E-03	1.30E+00	6E-04	1.10E+01	7E-05	2.00E-01	4E-03
VOC	cis-1,2-Dichloroethene	156-59-2	T	D	8	3	3.20E-04	6.03E-04	1.10E-03	2.20E-04	1.21E-03	2.20E+02	5E-06	2.00E+02	6E-06	9.60E+01	1E-05
VOC	trans-1,2-Dichloroethene	156-60-5	T		8					1.50E-04	1.00E-03	2.00E+02		2.20E+02		8.50E+01	
VOC	1,2-Dichloropropane	78-87-5	T	B2	8					1.70E-04	2.00E-03	3.60E+01		1.60E+01		1.60E+01	
VOC	1,3-Dichloropropene (summed)	542-75-6	T	B2	8					2.70E-04	2.00E-03	1.30E-02		1.30E+01		2.00E-03	
VOC	Ethyl Benzene	100-41-4	T	D	8					1.20E-04	2.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	2-Hexanone	591-78-6	T		8					4.60E-04	2.00E-02	8.80E+03		5.20E+03		4.20E+03	
VOC	Methyl Acetate	79-20-9	T		8					4.10E-04	2.00E-02						
VOC	Methyl tert-butyl ether	1634-04-4	T		8					1.30E-04	1.00E-02	4.70E+04		6.90E+02		4.70E+04	
VOC	4-Methyl-2-pentanone	108-10-1	T		8	3	5.00E-04	1.05E-03	1.60E-03	2.30E-04	2.00E-02	2.00E+04	8E-08	1.30E+04	1E-07	2.00E+04	8E-08
VOC	Methylcyclohexane	108-87-2	T		8					1.50E-04	2.00E-03						
VOC	Methylene Chloride	75-09-2	T	B2	8	1	7.70E-04	7.70E-04	7.70E-04	3.40E-04	1.87E-03	1.40E+03	6E-07	2.20E+02	4E-06	2.20E+02	4E-06
VOC	Styrene	100-42-5	T		8					1.50E-04	2.00E-03	3.10E+02		9.70E+00		1.70E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	8					2.50E-04	2.00E-03	7.70E+01		4.70E+00		1.20E+01	
VOC	Tetrachloroethene	127-18-4	T	C-B2	8					2.30E-04	2.00E-03	1.70E+02		1.20E+01		2.50E+01	
VOC	Toluene	108-88-3	T	D	8	3	2.60E-04	4.82E-04	6.05E-04	1.80E-04	1.00E-03	5.30E+02	1E-06	5.30E+02	1E-06	5.30E+02	1E-06
VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	8					1.70E-04	2.00E-03	3.00E+02		1.90E+01		3.00E+02	
VOC	1,1,1-Trichloroethane	71-55-6	T	D	8	1	5.65E-04	5.65E-04	5.65E-04	1.50E-04	2.00E-03	1.30E+03	4E-07	1.30E+03	4E-07	6.60E+02	9E-07
VOC	1,1,2-Trichloroethane	79-00-5	T	C	8					3.00E-04	2.00E-03	1.10E+02		2.10E+01		1.70E+01	
VOC	Trichloroethene	79-01-6	T	C-B2	8					1.40E-04	2.00E-03	9.70E+01		3.70E+01		1.50E+01	
VOC	Trichlorofluoromethane	75-69-4	T		8					2.80E-04	2.00E-03	1.10E+03		1.10E+03		1.10E+03	

TABLE 4-14

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-5 (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-Trichloro-1,2,2-trifluoroethane	76-13-1	T		8					3.20E-04	2.00E-03	1.70E+02		1.70E+02		1.70E+02	
VOC	Vinyl Chloride	75-01-4	T	A	8	2	2.20E-04	2.45E-04	2.70E-04	1.50E-04	2.00E-03	6.90E-01	4E-04	5.70E-01	5E-04	1.10E-01	2E-03
VOC	Xylenes (total)	1330-20-7	T	D	8	1	4.30E-04	4.30E-04	4.30E-04	3.30E-04	2.00E-03	1.90E+02	2E-06	1.90E+02	2E-06	1.90E+02	2E-06
SVOC	Acenaphthene	83-32-9	T		8					8.00E-04	5.00E-03	4.20E+00		4.20E+00		4.20E+00	
SVOC	Acenaphthylene	208-96-8	T	D	8					7.10E-04	5.00E-03	3.90E+00		3.90E+00		3.90E+00	
SVOC	Acetophenone	98-86-2	T	D	8					2.60E-03	1.00E-02	6.10E+03		6.10E+03		6.10E+03	
SVOC	Anthracene	120-12-7	T	D	8	2	1.15E-03	1.18E-03	1.20E-03	6.80E-04	5.00E-03	4.30E-02	3E-02	4.30E-02	3E-02	4.30E-02	3E-02
SVOC	Atrazine	1912-24-9	T		8					2.50E-03	6.20E-03			5.40E+00			
SVOC	Benzaldehyde	100-52-7	T		8					2.80E-03	1.00E-02						
SVOC	Benzo(a)anthracene	56-55-3	T	B2	8					7.00E-04	5.00E-03			9.40E-03			
SVOC	Benzo(a)pyrene	50-32-8	T	B2	8					7.30E-04	5.00E-03			5.00E-03			
SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	8					9.40E-04	5.00E-03			2.00E-03			
SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	8					8.50E-04	5.00E-03			5.00E-03			
SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	8					8.40E-04	5.00E-03			5.00E-03			
SVOC	Biphenyl	92-52-4	T		8					2.60E-03	1.00E-02						
SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	8					8.70E-04	5.00E-03						
SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	8					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	8					2.70E-03	6.80E-03			3.20E-01			
SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	8					8.80E-04	5.00E-03						
SVOC	Butylbenzylphthalate	85-68-7	T	C	8					8.80E-04	5.00E-03			2.70E+00			
SVOC	Caprolactam	105-60-2	T		8					2.50E-03	1.00E-02			3.90E+05			
SVOC	Carbazole	86-74-8	T	B2	8	2	1.30E-03	1.43E-03	1.55E-03	8.20E-04	1.00E-02			7.40E+00	2E-04		
SVOC	4-Chloro-3-methylphenol	59-50-7	T		8					9.90E-04	5.00E-03			7.90E+01			
SVOC	4-Chloroaniline	106-47-8	T		8					6.10E-04	1.00E-02						
SVOC	2-Chloronaphthalene	91-58-7	T		8					8.50E-04	5.00E-03			6.70E+00			
SVOC	2-Chlorophenol	95-57-8	T		8					1.00E-03	5.00E-03			9.40E+01			
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		8					7.90E-04	5.00E-03						
SVOC	Chrysene	218-01-9	T	B2	8					7.50E-04	5.00E-03			5.00E-03			
SVOC	Di-n-butylphthalate	84-74-2	T	D	8					6.70E-04	5.00E-03			1.10E+01			
SVOC	Di-n-octylphthalate	117-84-0	T		8					1.10E-03	5.00E-03			4.00E-01			
SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	8					7.90E-04	5.00E-03			5.00E-03			
SVOC	Dibenzofuran	132-64-9	T	D	8					1.10E-03	5.00E-03						
SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	8					9.30E-04	2.00E-02			1.80E-01			
SVOC	2,4-Dichlorophenol	120-83-2	T		8					8.50E-04	1.00E-02			4.80E+01			
SVOC	Diethylphthalate	84-66-2	T	D	8					6.50E-04	5.00E-03			1.10E+03			
SVOC	2,4-Dimethylphenol	105-67-9	T		8					8.50E-04	5.00E-03			5.20E+02			
SVOC	Dimethylphthalate	131-11-3	T	D	8					7.60E-04	5.00E-03			4.20E+03			
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		8					1.30E-03	2.00E-02			9.50E+00			
SVOC	2,4-Dinitrophenol	51-28-5	T		8					3.00E-03	2.00E-02						
SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	8					7.90E-04	5.00E-03			8.60E+00			
SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	8					5.70E-04	5.00E-03						
SVOC	Fluoranthene	206-44-0	T	D	8					8.10E-04	5.00E-03	2.10E-01		2.10E-01		2.10E-01	
SVOC	Fluorene	86-73-7	T	D	8	2	2.80E-03	4.80E-03	6.80E-03	1.00E-03	5.00E-03	2.00E+00	3E-03	2.00E+00	3E-03	2.00E+00	3E-03
SVOC	Hexachlorobenzene	118-74-1	T	B2	8					7.40E-04	5.00E-03	3.00E+00		4.60E-03		4.40E-01	

TABLE 4-14

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-5 (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	Hexachlorobutadiene	87-68-3	T	C	8					7.30E-04	5.00E-03	3.20E+00		4.00E-01		1.60E+00	
SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	8					1.10E-03	5.00E-03			1.80E+00			
SVOC	Hexachloroethane	67-72-1	T	C	8					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	8					6.30E-04	5.00E-03			5.00E-03			
SVOC	Isophorone	78-59-1	T	C	8					6.30E-04	5.00E-03			9.90E+02			
SVOC	2-Methylnaphthalene	91-57-6	T		8					6.40E-04	5.00E-03			2.50E+01			
SVOC	Methylphenol (summed)	1319-77-3	T		8					1.30E-03	5.00E-03			8.10E+02			
SVOC	Naphthalene	91-20-3	T	C	8	1	2.50E-03	2.50E-03	2.50E-03	7.50E-04	5.00E-03	3.10E+01	8E-05	3.10E+01	8E-05	3.10E+01	8E-05
SVOC	2-Nitroaniline	88-74-4	T		8					7.00E-04	2.00E-02						
SVOC	3-Nitroaniline	99-09-2	T	C	8					7.10E-04	2.00E-02						
SVOC	4-Nitroaniline	100-01-6	T	C	8					1.30E-03	2.00E-02						
SVOC	Nitrobenzene	98-95-3	T	D	8					8.10E-04	5.00E-03	2.10E+03		1.10E+01		2.10E+03	
SVOC	2-Nitrophenol	88-75-5	T		8					2.10E-03	5.20E-03			7.90E+01			
SVOC	4-Nitrophenol	100-02-7	T		8					1.90E-03	2.00E-02						
SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	8					1.40E-03	5.00E-03			3.50E+01			
SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	8					6.70E-04	5.00E-03			3.60E-01			
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	8					7.80E-04	5.00E-03						
SVOC	Pentachlorophenol	87-86-5	T	B2	8					2.40E-03	6.00E-03			2.00E-01			
SVOC	Phenanthrene	85-01-8	T	D	8	1	2.30E-03	2.30E-03	2.30E-03	8.20E-04	5.00E-03	1.00E+00	2E-03	1.00E+00	2E-03	1.00E+00	2E-03
SVOC	Phenol	108-95-2	T	D	8					2.60E-03	6.50E-03			2.90E+04			
SVOC	Pyrene	129-00-0	T	D	8					1.10E-03	5.00E-03	1.40E-01		1.40E-01		1.40E-01	
SVOC	2,4,5-Trichlorophenol	95-95-4	T		8					1.20E-03	5.00E-03			1.70E+02			
SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	8					1.70E-03	5.00E-03			1.00E+01			
P/PCB	PCBs (summed)	1336-36-3	D	B2	4					8.20E-05	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
P/PCB	PCBs (summed)	1336-36-3	T	B2	8					8.20E-05	2.00E-04	4.50E-02		3.30E-03		4.50E-02	
INORG	Antimony	7440-36-0	D		8	2	8.30E-03	9.05E-03	9.80E-03	2.20E-03	2.50E-02			6.80E+01	1E-04		
INORG	Antimony	7440-36-0	T		8	2	9.25E-03	9.98E-03	1.07E-02	2.20E-03	2.50E-02			6.80E+01	2E-04		
INORG	Arsenic	7440-38-2	D	A	8	4	5.10E-03	1.71E-02	4.73E-02	3.90E-03	1.00E-02			4.30E+00	1E-02		
INORG	Arsenic	7440-38-2	T	A	8	4	5.70E-03	1.95E-02	5.85E-02	3.90E-03	1.00E-02			4.30E+00	1E-02		
INORG	Barium	7440-39-3	D	D	8	8	3.06E-02	1.26E-01	3.00E-01					1.40E+04	2E-05		
INORG	Barium	7440-39-3	T	D	8	8	3.25E-02	1.22E-01	2.85E-01					1.40E+04	2E-05		
INORG	Beryllium	7440-41-7	D	B1	8					5.40E-04	1.00E-03			2.90E+02			
INORG	Beryllium	7440-41-7	T	B1	8	1	5.60E-04	5.60E-04	5.60E-04	5.40E-04	1.00E-03			2.90E+02	2E-06		
INORG	Cadmium	7440-43-9	D	B1	8	3	2.20E-04	3.23E-04	3.90E-04	2.80E-04	5.00E-03			1.90E+02	2E-06		
INORG	Cadmium	7440-43-9	T	B1	8	3	2.90E-04	3.67E-04	4.70E-04	2.80E-04	5.00E-03			1.90E+02	2E-06		
INORG	Chromium (total)	7440-47-3	D		8	2	9.60E-03	1.34E-02	1.72E-02	1.40E-03	1.00E-02			4.60E+02	4E-05		
INORG	Chromium (total)	7440-47-3	T		8	2	1.04E-02	1.38E-02	1.72E-02	1.40E-03	1.00E-02			4.60E+02	4E-05		
INORG	Cobalt	7440-48-4	D		8	4	3.00E-03	4.00E-03	5.80E-03	1.30E-03	2.00E-02			2.40E+03	2E-06		
INORG	Cobalt	7440-48-4	T		8	4	1.70E-03	3.63E-03	5.50E-03	1.30E-03	2.00E-02			2.40E+03	2E-06		
INORG	Copper	7440-50-8	D	D	8	2	1.05E-02	2.65E-02	4.26E-02	4.20E-03	5.00E-03			7.40E+03	6E-06		
INORG	Copper	7440-50-8	T	D	8	2	1.37E-02	3.06E-02	4.74E-02	4.20E-03	5.00E-03			7.40E+03	6E-06		
INORG	Lead	7439-92-1	D	B2	8					2.50E-03	3.00E-03						
INORG	Lead	7439-92-1	T	B2	8					2.50E-03	3.00E-03						
INORG	Manganese	7439-96-5	D	D	8	8	1.38E-03	2.73E-01	8.15E-01					9.10E+03	9E-05		

TABLE 4-14

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-5 (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	Manganese	7439-96-5	T	D	8	8	2.48E-03	2.66E-01	7.66E-01					9.10E+03	8E-05		
INORG	Mercury	7439-97-6	D	D	8	2	8.20E-05	1.51E-04	2.20E-04	6.90E-05	2.00E-04			5.60E-02	4E-03		
INORG	Mercury	7439-97-6	T	D	8	1	3.00E-04	3.00E-04	3.00E-04	6.90E-05	2.00E-04			5.60E-02	5E-03		
INORG	Nickel	7440-02-0	D	A	8	6	2.70E-03	9.88E-03	1.63E-02	2.20E-03	2.00E-02			7.40E+04	2E-07		
INORG	Nickel	7440-02-0	T	A	8	6	2.90E-03	9.91E-03	1.62E-02	2.20E-03	2.00E-02			7.40E+04	2E-07		
INORG	Selenium	7782-49-2	D	D	8	2	2.78E-02	3.78E-02	4.78E-02	4.50E-03	5.00E-03			9.70E+02	5E-05		
INORG	Selenium	7782-49-2	T	D	8	2	2.88E-02	3.88E-02	4.89E-02	4.50E-03	5.00E-03			9.70E+02	5E-05		
INORG	Silver	7440-22-4	D	D	8					1.50E-03	5.00E-03			1.50E+03			
INORG	Silver	7440-22-4	T	D	8					1.50E-03	5.00E-03			1.50E+03			
INORG	Thallium	7440-28-0	D		8	5	3.25E-05	3.88E-03	9.00E-03	1.80E-05	5.00E-03			1.30E+01	7E-04		
INORG	Thallium	7440-28-0	T		8	3	3.60E-05	2.39E-03	7.10E-03	1.80E-05	1.00E-02			1.30E+01	5E-04		
INORG	Vanadium	7440-62-2	D		8	3	1.00E-03	3.99E-02	7.32E-02	8.20E-04	1.00E-02			9.70E+02	8E-05		
INORG	Vanadium	7440-62-2	T		8	4	8.30E-04	3.21E-02	7.66E-02	8.20E-04	1.00E-02			9.70E+02	8E-05		
INORG	Zinc	7440-66-6	D	D	8	1	1.28E-02	1.28E-02	1.28E-02	1.20E-02	2.00E-02			1.10E+05	1E-07		
INORG	Zinc	7440-66-6	T	D	8	2	1.33E-02	1.59E-02	1.85E-02	1.20E-02	2.00E-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 4-15

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-8/ LNAPL AREA NO. 3

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)
VOC	Acetone	67-64-1	D	1					2.20E+00	2.20E+00
VOC	Benzene	71-43-2	A	1					5.00E-01	5.00E-01
VOC	Bromodichloromethane	75-27-4	B2	1					3.00E-01	3.00E-01
VOC	Bromoform	75-25-2	B2	1					4.90E-01	4.90E-01
VOC	Bromomethane	74-83-9	D	1					7.60E-01	7.60E-01
VOC	2-Butanone	78-93-3	D	1					2.40E+00	2.40E+00
VOC	Carbon Disulfide	75-15-0		1					1.00E+00	1.00E+00
VOC	Carbon Tetrachloride	56-23-5	B2	1					3.00E-01	3.00E-01
VOC	Chlorobenzene	108-90-7	D	1					2.40E-01	2.40E-01
VOC	Chloroethane	75-00-3		1					1.10E+00	1.10E+00
VOC	Chloroform	67-66-3	B2	1					3.00E-01	3.00E-01
VOC	Chloromethane	74-87-3	D	1					4.50E-01	4.50E-01
VOC	Cumene	98-82-8	D	1	1	8.00E-01	8.00E-01	8.00E-01		
VOC	Cyclohexane	110-82-7		1					3.00E+01	3.00E+01
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	1					2.40E+00	2.40E+00
VOC	Dibromochloromethane	124-48-1	C	1					3.70E-01	3.70E-01
VOC	1,2-Dibromoethane	106-93-4	B2	1					5.80E-01	5.80E-01
VOC	1,2-Dichlorobenzene	95-50-1	D	1					4.60E-01	4.60E-01
VOC	1,3-Dichlorobenzene	541-73-1	D	1					2.80E-01	2.80E-01
VOC	1,4-Dichlorobenzene	106-46-7	C	1					4.90E-01	4.90E-01
VOC	Dichlorodifluoromethane	75-71-8		1					1.10E+00	1.10E+00
VOC	1,1-Dichloroethane	75-34-3	C	1					4.00E-01	4.00E-01
VOC	1,2-Dichloroethane	107-06-2	B2	1					3.20E-01	3.20E-01
VOC	1,1-Dichloroethene	75-35-4	C	1					4.90E-01	4.90E-01
VOC	cis-1,2-Dichloroethene	156-59-2	D	1					4.70E-01	4.70E-01
VOC	trans-1,2-Dichloroethene	156-60-5		1					5.30E-01	5.30E-01
VOC	1,2-Dichloropropane	78-87-5	B2	1					2.70E-01	2.70E-01
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	1					3.40E-01	3.40E-01
VOC	Ethyl Benzene	100-41-4	D	1	1	1.20E+00	1.20E+00	1.20E+00		
VOC	2-Hexanone	591-78-6		1					9.00E-01	9.00E-01
VOC	Methyl Acetate	79-20-9		1					1.40E+01	1.40E+01
VOC	Methyl tert-butyl ether	1634-04-4		1					3.30E-01	3.30E-01
VOC	4-Methyl-2-pentanone	108-10-1		1					8.60E-01	8.60E-01
VOC	Methylcyclohexane	108-87-2		1	1	6.20E-01	6.20E-01	6.20E-01		
VOC	Methylene Chloride	75-09-2	B2	1					1.20E+00	1.20E+00
VOC	Styrene	100-42-5		1					5.00E-01	5.00E-01
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1					3.20E-01	3.20E-01
VOC	Tetrachloroethene	127-18-4	C-B2	1					4.40E-01	4.40E-01
VOC	Toluene	108-88-3	D	1					3.00E-01	3.00E-01
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1					3.30E-01	3.30E-01
VOC	1,1,1-Trichloroethane	71-55-6	D	1					3.00E-01	3.00E-01
VOC	1,1,2-Trichloroethane	79-00-5	C	1					4.90E-01	4.90E-01
VOC	Trichloroethene	79-01-6	C-B2	1					5.10E-01	5.10E-01
VOC	Trichlorofluoromethane	75-69-4		1					5.70E-01	5.70E-01

TABLE 4-15

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-8/ LNAPL AREA NO. 3

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)
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1					3.00E+01	3.00E+01
VOC	Vinyl Chloride	75-01-4	A	1					3.20E-01	3.20E-01
VOC	Xylenes (total)	1330-20-7	D	1	1	1.30E+00	1.30E+00	1.30E+00		
SVOC	Acenaphthene	83-32-9		1					2.60E+00	2.60E+00
SVOC	Acenaphthylene	208-96-8	D	1					2.40E+00	2.40E+00
SVOC	Acetophenone	98-86-2	D	1					2.50E+00	2.50E+00
SVOC	Anthracene	120-12-7	D	1					2.40E+00	2.40E+00
SVOC	Atrazine	1912-24-9		1					7.50E+00	7.50E+00
SVOC	Benzaldehyde	100-52-7		1					8.50E+00	8.50E+00
SVOC	Benzo(a)anthracene	56-55-3	B2	1					2.80E+00	2.80E+00
SVOC	Benzo(a)pyrene	50-32-8	B2	1					3.00E+00	3.00E+00
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1					2.90E+00	2.90E+00
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1					2.80E+00	2.80E+00
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1					2.60E+00	2.60E+00
SVOC	Biphenyl	92-52-4		1	1	1.60E+02	1.60E+02	1.60E+02		
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1					2.40E+00	2.40E+00
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1					2.60E+00	2.60E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1					2.70E+00	2.70E+00
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1					3.00E+00	3.00E+00
SVOC	Butylbenzylphthalate	85-68-7	C	1					2.60E+00	2.60E+00
SVOC	Caprolactam	105-60-2		1					9.00E+00	9.00E+00
SVOC	Carbazole	86-74-8	B2	1					2.60E+00	2.60E+00
SVOC	4-Chloro-3-methylphenol	59-50-7		1					2.60E+00	2.60E+00
SVOC	4-Chloroaniline	106-47-8		1					2.60E+00	2.60E+00
SVOC	2-Chloronaphthalene	91-58-7		1					2.40E+00	2.40E+00
SVOC	2-Chlorophenol	95-57-8		1					2.60E+00	2.60E+00
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		1					2.60E+00	2.60E+00
SVOC	Chrysene	218-01-9	B2	1					2.30E+00	2.30E+00
SVOC	Di-n-butylphthalate	84-74-2	D	1					7.50E+00	7.50E+00
SVOC	Di-n-octylphthalate	117-84-0		1					2.70E+00	2.70E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1					2.60E+00	2.60E+00
SVOC	Dibenzofuran	132-64-9	D	1					2.50E+00	2.50E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1					2.00E+00	2.00E+00
SVOC	2,4-Dichlorophenol	120-83-2		1					2.50E+00	2.50E+00
SVOC	Diethylphthalate	84-66-2	D	1					7.50E+00	7.50E+00
SVOC	2,4-Dimethylphenol	105-67-9		1					4.00E+00	4.00E+00
SVOC	Dimethylphthalate	131-11-3	D	1					8.00E+00	8.00E+00
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1					8.00E+00	8.00E+00
SVOC	2,4-Dinitrophenol	51-28-5		1					5.50E+00	5.50E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1					2.30E+00	2.30E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1					2.40E+00	2.40E+00
SVOC	Fluoranthene	206-44-0	D	1					2.80E+00	2.80E+00
SVOC	Fluorene	86-73-7	D	1	1	1.90E+02	1.90E+02	1.90E+02		
SVOC	Hexachlorobenzene	118-74-1	B2	1					2.80E+00	2.80E+00
SVOC	Hexachlorobutadiene	87-68-3	C	1					2.20E+00	2.20E+00

TABLE 4-15

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-8/ LNAPL AREA NO. 3

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)
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1					3.00E+00	3.00E+00
SVOC	Hexachloroethane	67-72-1	C	1					2.40E+00	2.40E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1					3.50E+00	3.50E+00
SVOC	Isophorone	78-59-1	C	1					2.20E+00	2.20E+00
SVOC	2-Methylnaphthalene	91-57-6		1	1	1.20E+02	1.20E+02	1.20E+02		
SVOC	Methylphenol (summed)	1319-77-3		1					2.40E+00	2.40E+00
SVOC	Naphthalene	91-20-3	C	1					2.40E+00	2.40E+00
SVOC	2-Nitroaniline	88-74-4		1					2.30E+00	2.30E+00
SVOC	3-Nitroaniline	99-09-2	C	1					7.00E+00	7.00E+00
SVOC	4-Nitroaniline	100-01-6	C	1					3.40E+00	3.40E+00
SVOC	Nitrobenzene	98-95-3	D	1					2.30E+00	2.30E+00
SVOC	2-Nitrophenol	88-75-5		1					2.30E+00	2.30E+00
SVOC	4-Nitrophenol	100-02-7		1					9.50E+00	9.50E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1					2.40E+00	2.40E+00
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1					2.20E+00	2.20E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1					2.60E+00	2.60E+00
SVOC	Pentachlorophenol	87-86-5	B2	1					6.00E+00	6.00E+00
SVOC	Phenanthrene	85-01-8	D	1	1	7.80E+02	7.80E+02	7.80E+02		
SVOC	Phenol	108-95-2	D	1					2.40E+00	2.40E+00
SVOC	Pyrene	129-00-0	D	1					2.60E+00	2.60E+00
SVOC	2,4,5-Trichlorophenol	95-95-4		1					2.80E+00	2.80E+00
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1					3.20E+00	3.20E+00
P/PCB	PCBs (summed)	1336-36-3	B2	1	1	2.71E+00	2.71E+00	2.71E+00		
INORG	Antimony	7440-36-0		1					4.90E-01	4.90E-01
INORG	Arsenic	7440-38-2	A	1					3.00E-01	3.00E-01
INORG	Barium	7440-39-3	D	1					1.30E-01	1.30E-01
INORG	Beryllium	7440-41-7	B1	1					4.60E-02	4.60E-02
INORG	Cadmium	7440-43-9	B1	1					4.30E-02	4.30E-02
INORG	Chromium (total)	7440-47-3		1					3.80E-01	3.80E-01
INORG	Cobalt	7440-48-4		1					1.50E-01	1.50E-01
INORG	Copper	7440-50-8	D	1	1	2.90E-01	2.90E-01	2.90E-01		
INORG	Lead	7439-92-1	B2	1					2.40E-01	2.40E-01
INORG	Manganese	7439-96-5	D	1					1.50E-01	1.50E-01
INORG	Mercury	7439-97-6	D	1					4.70E-03	4.70E-03
INORG	Nickel	7440-02-0	A	1					2.70E-01	2.70E-01
INORG	Selenium	7782-49-2	D	1					3.10E-01	3.10E-01
INORG	Silver	7440-22-4	D	1					1.50E-01	1.50E-01
INORG	Thallium	7440-28-0		1					5.00E-01	5.00E-01
INORG	Vanadium	7440-62-2		1					1.30E-01	1.30E-01
INORG	Zinc	7440-66-6	D	1					1.20E+00	1.20E+00
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	1	1	7.38E-06	7.38E-06	7.38E-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

Table 4-16: Data Summary for AOI W-08 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	19	6	1.63E-03	1.60E-01	5.10E-04	1.10E-03	1.0E+06	1.6E-07	3.1E+04	5.2E-06	7.3E-01	2.2E-01
Shallow	VOC	Benzene	71-43-2	T	A	19	7	1.80E-04	6.25E-04	1.60E-04	4.00E-03	3.5E+01	1.8E-05	1.1E+01	5.7E-05	5.0E-03	1.3E-01
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	19				1.70E-04	4.00E-03	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	19				1.80E-04	4.00E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	16				1.60E-04	4.00E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	19	3	5.40E-04	4.40E-03	3.60E-04	4.00E-02	2.4E+05	1.8E-08	2.4E+05	1.8E-08	1.3E+01	3.4E-04
Shallow	VOC	Carbon Disulfide	75-15-0	T		19	8	2.40E-04	1.10E-03	2.00E-04	4.00E-03	5.5E+02	2.0E-06	1.2E+03	9.2E-07	8.0E-01	1.4E-03
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	19				1.20E-04	4.00E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	19				1.40E-04	4.00E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		19				2.20E-04	4.00E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	19	4	1.40E-04	2.40E-04	1.40E-04	4.00E-03	1.8E+02	1.3E-06	1.5E+02	1.6E-06	1.0E-01	2.4E-03
Shallow	VOC	Chloromethane	74-87-3	T	D	19	1	2.60E-04	2.60E-04	1.30E-04	4.00E-03	4.5E+01	5.8E-06	4.9E+02	5.3E-07	2.6E-01	1.0E-03
Shallow	VOC	Cumene	98-82-8	T	D	19	6	1.80E-04	1.70E-03	1.20E-04	4.00E-03	5.6E+01	3.0E-05	5.6E+01	3.0E-05	8.0E-01	2.1E-03
Shallow	VOC	Cyclohexane	110-82-7	T	ID	19	1	2.20E-04	2.20E-04	1.30E-04	4.00E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	19				5.30E-04	8.00E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	19				2.50E-04	4.00E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	19				2.20E-04	4.00E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	19				1.10E-04	4.00E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	19				1.50E-04	4.00E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	19				1.60E-04	4.00E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		19				2.30E-04	8.00E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	19	6	1.90E-04	3.00E-03	1.60E-04	4.00E-03	2.3E+03	1.3E-06	2.4E+03	1.3E-06	8.8E-01	3.4E-03
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	19				2.10E-04	4.00E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	19				2.20E-04	4.00E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	19	2	3.00E-04	2.30E-03	2.20E-04	2.00E-03	2.1E+02	1.1E-05	2.0E+02	1.2E-05	7.0E-02	3.3E-02
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		19	1	6.30E-04	6.30E-04	1.50E-04	2.00E-03	2.0E+02	3.2E-06	2.2E+02	2.9E-06	1.0E-01	6.3E-03
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	19				1.70E-04	4.00E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	19				1.50E-04	4.00E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	19	8	1.50E-04	7.00E-04	1.20E-04	4.00E-03	1.7E+02	4.1E-06	1.7E+02	4.1E-06	7.0E-01	1.0E-03
Shallow	VOC	2-Hexanone	591-78-6	T		19				3.10E-04	4.00E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		19				4.10E-04	4.00E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		19				1.30E-04	2.00E-02	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	18	8	4.30E-04	4.90E-03	2.30E-04	4.00E-02	2.0E+04	2.5E-07	1.3E+04	3.8E-07	1.8E+00	2.7E-03
Shallow	VOC	Methylcyclohexane	108-87-2	T		19	1	1.90E-04	1.90E-04	1.50E-04	4.00E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	18	1	5.00E-04	5.00E-04	2.80E-04	4.00E-03	1.4E+03	3.6E-07	2.2E+02	2.3E-06	5.0E-03	1.0E-01
Shallow	VOC	Styrene	100-42-5	T		19				1.50E-04	4.00E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	19				2.30E-04	4.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	19	1	8.90E-04	8.90E-04	1.20E-04	4.00E-03	1.7E+02	5.2E-06	1.2E+01	7.4E-05	5.0E-03	1.8E-01
Shallow	VOC	Toluene	108-88-3	T	D	19	9	2.00E-04	2.00E-03	1.80E-04	4.00E-03	5.3E+02	3.8E-06	5.3E+02	3.8E-06	1.0E+00	2.0E-03
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	19				1.50E-04	4.00E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	19				1.50E-04	4.00E-03	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	19				2.10E-04	4.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	19	2	2.00E-04	2.60E-03	1.40E-04	4.00E-03	9.7E+01	2.7E-05	2.2E+01	1.2E-04	5.0E-03	5.2E-01
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		19				2.50E-04	4.00E-03	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		19				2.30E-04	4.00E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	19	1	3.10E-04	3.10E-04	1.50E-04	4.00E-03	1.3E+01	2.4E-05	1.0E+00	3.1E-04	2.0E-03	1.6E-01
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	19	9	5.10E-04	2.80E-03	3.30E-04	4.00E-03	1.9E+02	1.5E-05	1.9E+02	1.5E-05	1.0E+01	2.8E-04
Shallow	SVOC	Acenaphthene	83-32-9	T		19	2	2.20E-03	3.10E-03	8.00E-04	1.40E-01	4.2E+00	7.4E-04	4.2E+00	7.4E-04	1.3E+00	2.4E-03
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	19				7.10E-04	8.20E-02	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	19				2.60E-03	1.30E-01	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	19	2	7.30E-04	7.90E-04	6.80E-04	1.20E-01	4.3E-02	1.8E-02	4.3E-02	1.8E-02	4.3E-02	1.8E-02
Shallow	SVOC	Atrazine	1912-24-9	T		19				2.50E-03	7.00E-02			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		19				2.80E-03	1.20E-01						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	19				7.00E-04	1.40E-01			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	19				7.30E-04	1.10E-01			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	19				9.40E-04	1.40E-01			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	19				8.50E-04	1.40E-01			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	19				8.40E-04	1.30E-01			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	19				2.60E-03	1.30E-01						

Table 4-16: Data Summary for AOI W-08 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	19				8.70E-04	2.00E-01						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	19				9.70E-04	3.40E-01	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	19				2.70E-03	5.40E-02			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	19				8.80E-04	1.60E-01						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	19				8.80E-04	4.60E-02			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		19	1	5.50E+00	5.50E+00	2.50E-03	9.00E-02			3.9E+05	1.4E-05	5.8E+00	9.5E-01
Shallow	SVOC	Carbazole	86-74-8	T	B2	19				8.20E-04	1.20E-01			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		19				9.90E-04	1.10E-01			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		18				6.10E-04	1.80E-01						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		19				8.50E-04	1.50E-01			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		19				1.00E-03	2.60E-01			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		19				7.90E-04	1.30E-01						
Shallow	SVOC	Chrysene	218-01-9	T	B2	19				7.50E-04	1.30E-01			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	19				7.90E-04	1.40E-01			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	19				1.10E-03	1.30E-01						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	17				9.30E-04	9.40E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		19				8.50E-04	1.40E-01			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	19				6.50E-04	5.00E-02			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		19	1	2.50E+00	2.50E+00	8.50E-04	1.70E-02			5.2E+02	4.8E-03	3.7E-01	**6.8E+00**
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	19				7.60E-04	4.00E-02			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	19				6.70E-04	7.40E-02			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		19				1.30E-03	4.20E-01			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		19				3.00E-03	6.60E-01						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	19				7.90E-04	9.20E-02			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	19				5.70E-04	1.40E-01						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		19				1.10E-03	1.40E-01			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	19				8.10E-04	1.40E-01	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	19	8	1.50E-03	2.10E-02	1.00E-03	1.50E-01	2.0E+00	1.1E-02	2.0E+00	1.1E-02	8.8E-01	2.4E-02
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	19				7.40E-04	1.50E-01	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	19				7.30E-04	3.00E-01	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	17				1.10E-03	2.20E-01	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	19				7.40E-04	3.20E-01	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	19				6.30E-04	1.40E-01			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	19				6.30E-04	1.70E-01			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	19	4	6.50E-04	5.10E-03	6.40E-04	1.90E-01			2.5E+01	2.0E-04	2.6E-01	2.0E-02
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		19	1	4.69E+00	4.69E+00	1.30E-03	2.60E-02			8.1E+02	5.8E-03	3.7E-01	**1.3E+01**
Shallow	SVOC	Naphthalene	91-20-3	T	C	19	4	1.70E-03	2.60E-03	7.50E-04	2.60E-01	3.1E+01	8.4E-05	3.1E+01	8.4E-05	5.2E-01	5.0E-03
Shallow	SVOC	2-Nitroaniline	88-74-4	T		19				7.00E-04	9.80E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	18				7.10E-04	9.60E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	19				1.30E-03	1.20E-01						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	19				8.10E-04	2.60E-01	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		19				2.10E-03	1.90E-01			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		19				1.90E-03	7.00E-01						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	19				1.40E-03	1.30E-01			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	19				6.70E-04	2.20E-01			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	19				7.80E-04	3.60E-01						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	19				2.40E-03	5.20E-01			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	19	9	1.00E-03	2.80E-02	8.20E-04	1.40E-01	1.0E+00	2.8E-02	1.0E+00	2.8E-02	5.2E-02	5.4E-01
Shallow	SVOC	Phenol	108-95-2	T	ID	19	2	4.60E-02	1.20E+00	2.60E-03	5.20E-02			2.9E+04	4.1E-05	4.4E+00	2.7E-01
Shallow	SVOC	Pyrene	129-00-0	T	D	19				1.10E-03	1.30E-01	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		19				1.20E-03	1.70E-01			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	19				1.70E-03	1.40E-01			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	5				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	19	1	7.36E-04	7.36E-04	8.20E-05	4.00E-04	4.5E-02	1.6E-02	3.3E-03	2.2E-01	5.0E-04	**1.5E+00**
Shallow	INORG	Antimony	7440-36-0	D		14	3	2.50E-03	8.00E-03	2.20E-03	2.20E-03			6.8E+01	1.2E-04	6.0E-03	**1.3E+00**
Shallow	INORG	Antimony	7440-36-0	T		19	3	2.80E-03	7.90E-03	2.20E-03	3.40E-03			6.8E+01	1.2E-04	6.0E-03	**1.3E+00**
Shallow	INORG	Arsenic	7440-38-2	D	A	14	10	4.10E-03	3.41E-02	3.90E-03	1.00E-02			4.3E+00	7.9E-03	5.0E-02	6.8E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	19	15	4.10E-03	8.49E-02	3.90E-03	1.00E-02			4.3E+00	2.0E-02	5.0E-02	**1.7E+00**
Shallow	INORG	Barium	7440-39-3	D	D	14	14	2.60E-02	3.01E-01					1.4E+04	2.2E-05	2.0E+00	1.5E-01

Table 4-16: Data Summary for AOI W-08 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	19	18	2.65E-02	1.03E+00	8.20E-04	8.20E-04			1.4E+04	7.4E-05	2.0E+00	5.2E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	14				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	19	2	6.20E-04	5.40E-03	4.70E-04	1.00E-03			2.9E+02	1.9E-05	4.0E-03	**1.4E+00**
Shallow	INORG	Cadmium	7440-43-9	D	B1	14	3	2.80E-04	5.50E-04	2.80E-04	2.80E-04			1.9E+02	2.9E-06	5.0E-03	1.1E-01
Shallow	INORG	Cadmium	7440-43-9	T	B1	19	7	2.90E-04	3.90E-03	2.80E-04	3.60E-04			1.9E+02	2.1E-05	5.0E-03	7.8E-01
Shallow	INORG	Chromium (total)	7440-47-3	D		14	2	5.00E-03	4.76E-02	1.40E-03	1.00E-02			4.6E+02	1.0E-04	1.0E-01	4.8E-01
Shallow	INORG	Chromium (total)	7440-47-3	T		19	6	1.15E-03	2.95E-01	1.00E-03	1.00E-02			4.6E+02	6.4E-04	1.0E-01	**3.0E+00**
Shallow	INORG	Cobalt	7440-48-4	D	B1	14	5	1.40E-03	9.30E-03	1.30E-03	2.00E-02			2.4E+03	3.9E-06	4.0E-02	2.3E-01
Shallow	INORG	Cobalt	7440-48-4	T	B1	19	6	1.90E-03	8.79E-02	7.40E-04	2.00E-02			2.4E+03	3.7E-05	4.0E-02	**2.2E+00**
Shallow	INORG	Copper	7440-50-8	D	D	14	2	4.40E-03	5.20E-03	4.20E-03	5.00E-03			7.4E+03	7.0E-07	1.4E+00	3.7E-03
Shallow	INORG	Copper	7440-50-8	T	D	19	3	6.60E-03	2.14E-01	1.70E-03	5.00E-03			7.4E+03	2.9E-05	1.4E+00	1.5E-01
Shallow	INORG	Lead	7439-92-1	D	B2	14				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	19	3	5.70E-03	1.22E-01	1.60E-03	3.00E-03					4.0E-03	**3.1E+01**
Shallow	INORG	Manganese	7439-96-5	D	D	14	14	2.10E-03	3.24E+00					9.1E+03	3.6E-04	8.6E-01	**3.8E+00**
Shallow	INORG	Manganese	7439-96-5	T	D	19	19	3.50E-03	5.41E+00					9.1E+03	5.9E-04	8.6E-01	**6.3E+00**
Shallow	INORG	Mercury	7439-97-6	D	D	14	2	1.10E-04	1.90E-04	6.90E-05	2.00E-04	5.6E-02	3.4E-03	5.6E-02	3.4E-03	2.0E-03	9.5E-02
Shallow	INORG	Mercury	7439-97-6	T	D	19	5	7.00E-05	2.60E-04	6.90E-05	2.00E-04	5.6E-02	4.6E-03	5.6E-02	4.6E-03	2.0E-03	1.3E-01
Shallow	INORG	Nickel	7440-02-0	D	A	14	11	2.30E-03	1.56E-02	2.20E-03	2.20E-03			7.4E+04	2.1E-07	1.0E-01	1.6E-01
Shallow	INORG	Nickel	7440-02-0	T	A	19	14	3.40E-03	3.07E-01	2.20E-03	2.00E-02			7.4E+04	4.1E-06	1.0E-01	**3.1E+00**
Shallow	INORG	Selenium	7782-49-2	D	D	14				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	19				3.90E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	14				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	19				9.80E-04	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		14	3	2.10E-05	7.40E-03	1.80E-05	5.00E-03			1.3E+01	5.7E-04	2.0E-03	**3.7E+00**
Shallow	INORG	Thallium	7440-28-0	T		19	3	1.00E-03	6.10E-03	1.50E-05	1.00E-02			1.3E+01	4.7E-04	2.0E-03	**3.1E+00**
Shallow	INORG	Vanadium	7440-62-2	D		14	4	6.40E-04	3.80E-03	8.20E-04	1.00E-02			9.7E+02	3.9E-06	4.5E-03	8.4E-01
Shallow	INORG	Vanadium	7440-62-2	T		19	8	6.70E-04	2.39E-01	6.70E-04	1.00E-02			9.7E+02	2.5E-04	4.5E-03	**5.3E+01**
Shallow	INORG	Zinc	7440-66-6	D	D	14	2	2.25E-02	3.21E-02	1.20E-02	2.00E-02			1.1E+05	2.9E-07	2.4E+00	1.3E-02
Shallow	INORG	Zinc	7440-66-6	T	D	19	3	3.38E-02	6.31E-01	1.20E-02	2.00E-02			1.1E+05	5.7E-06	2.4E+00	2.6E-01
Shallow	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	4	4	1.95E-09	1.97E-08					1.0E-08	**2.0E+00**	3.0E-08	6.6E-01

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

The concentrations for the Target Dioxin congeners were used to calculate a 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-17: Data Summary – AOI W-9 – Soil
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min 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 Detect 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 Detect 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	ID	43	7	3.20E-03	3.10E-01	1.80E-03	2.90E-02		1.1E+05	2.8E-06	1.6E+05	1.9E-06	1.7E+08	1.8E-09	7.3E+04	4.2E-06	1.1E+05	2.8E-06	1.3E+05	2.4E-06	3.9E+08	7.9E-10	2.3E+04	1.3E-05
VOC	Benzene	71-43-2	A	43	4	3.70E-04	8.00E-04	3.00E-04	2.60E-02		8.4E+00	9.5E-05	4.5E+01	1.8E-05	4.7E+05	1.7E-09	4.0E+02	2.0E-06	1.6E+00	5.0E-04	1.3E+01	6.2E-05	3.8E+05	2.1E-09	1.8E+02	4.4E-06
VOC	Bromodichloromethane	75-27-4	B2	43				3.50E-04	1.50E-02		6.4E+00		3.1E+01		1.1E+05		4.9E+02		1.2E+00		9.1E+00		8.4E+04		1.1E+02	
VOC	Bromoform	75-25-2	B2	43				4.60E-04	2.40E-02		7.7E+02		3.1E+03		3.6E+06		8.7E+02		1.5E+02		9.0E+02		2.8E+06		8.2E+02	
VOC	Bromomethane	74-83-9	D	43				9.50E-04	4.00E-02		1.6E+00		1.3E+01		1.5E+05		1.0E+03		8.6E-01		1.1E+01		3.3E+05		3.2E+02	
VOC	2-Butanone	78-93-3	ID	43	4	2.30E-03	7.80E-03	1.30E-03	1.20E-01		2.7E+04	2.9E-07	3.5E+04	2.2E-07	2.9E+07	2.7E-10	2.7E+04	2.9E-07	2.7E+04	2.9E-07	2.9E+04	2.7E-07	6.7E+07	1.2E-10	2.7E+04	2.9E-07
VOC	Carbon Disulfide	75-15-0		43	4	3.10E-04	1.20E-03	2.50E-04	5.30E-02		1.4E+02	8.6E-06	1.6E+03	7.5E-07	2.1E+07	5.7E-11	2.8E+02	4.3E-06	7.6E+01	1.6E-05	1.3E+03	9.2E-07	4.7E+07	2.6E-11	2.8E+02	4.3E-06
VOC	Carbon Tetrachloride	56-23-5	B2	43				4.20E-04	1.50E-02		9.9E-01		1.2E+01		1.7E+05		3.9E+02		1.9E-01		3.5E+00		1.3E+05		9.6E+01	
VOC	Chlorobenzene	108-90-7	D	43				3.40E-04	1.20E-02		2.2E+02		9.2E+02		2.1E+06		2.6E+02		1.2E+02		7.7E+02		4.7E+06		2.6E+02	
VOC	Chloroethane	75-00-3		43				8.20E-04	5.70E-02		9.5E+02		3.6E+04		2.9E+08		9.5E+02		9.5E+02		3.0E+04		6.7E+08		9.5E+02	
VOC	Chloroform	67-66-3	B2	43				3.70E-04	1.50E-02		3.8E+01		1.5E+02		1.6E+06		1.5E+03		7.2E+00		4.5E+01		1.3E+06		1.2E+03	
VOC	Chloromethane	74-87-3	D	43				4.10E-04	2.30E-02		1.0E+01		1.2E+02		2.6E+06		1.1E+03		2.3E+00		4.0E+01		4.9E+06		1.1E+03	
VOC	Cumene	98-82-8	D	43	2	5.30E-04	3.11E-03	3.70E-04	1.20E-02		3.9E+02	8.0E-06	2.0E+03	1.6E-06	2.6E+06	1.2E-09	3.9E+02	8.0E-06	3.9E+02	8.0E-06	1.7E+03	1.8E-06	5.8E+06	5.4E-10	3.9E+02	8.0E-06
VOC	Cyclohexane	110-82-7	ID	43	3	8.30E-04	2.90E-02	4.10E-04	1.50E-02																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	43				9.90E-04	1.20E-01		1.2E+00		1.5E+01		5.9E+03		1.2E+00		1.2E+00		1.3E+01		1.3E+04		1.2E+00	
VOC	Dibromochloromethane	124-48-1	C	43				4.60E-04	2.00E-02		2.1E+01		8.0E+01		1.6E+05		5.0E+02		3.9E+00		2.4E+01		1.3E+05		1.1E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	43				3.20E-04	2.90E-02		3.6E+00		5.8E+00		1.8E+04		4.3E-01		6.7E-01		1.7E+00		1.4E+04		2.5E-01	
VOC	1,2-Dichlorobenzene	95-50-1	D	43				3.90E-04	2.40E-02		2.1E+02		4.6E+04		4.4E+07		2.1E+02		2.1E+02		3.9E+04		1.0E+08		2.1E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	43				3.90E-04	1.50E-02								1.7E+02								1.7E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	43				3.50E-04	2.40E-02		1.0E+02		2.6E+02		5.7E+05		1.9E+03		1.9E+01		7.7E+01		4.5E+05		4.0E+02	
VOC	Dichlorodifluoromethane	75-71-8		43				5.00E-04	5.80E-02		1.7E+03		6.3E+04		1.5E+09		1.0E+03		9.0E+02		5.3E+04		3.3E+09		1.0E+03	
VOC	1,1-Dichloroethane	75-34-3	C	43	2	4.18E-04	1.20E-03	2.70E-04	2.10E-02		4.3E+02	2.8E-06	2.5E+03	4.8E-07	1.5E+07	8.0E-11	8.9E+02	1.3E-06	2.3E+02	5.2E-06	2.1E+03	5.7E-07	3.3E+07	3.6E-11	8.9E+02	1.3E-06
VOC	1,2-Dichloroethane	107-06-2	B2	43				3.80E-04	1.70E-02		1.1E+01		2.1E+01		1.5E+05		4.2E+02		2.1E+00		6.2E+00		1.2E+05		9.1E+01	
VOC	1,1-Dichloroethene	75-35-4	C	43	1	5.55E-04	5.55E-04	4.70E-04	2.60E-02		3.3E-01	1.7E-03	3.7E+00	1.5E-04	7.8E+04	7.1E-09	5.7E+02	9.7E-07	6.2E-02	9.0E-03	1.1E+00	5.0E-04	6.2E+04	9.0E-09	2.0E+02	2.8E-06
VOC	cis-1,2-Dichloroethene	156-59-2	D	43				3.00E-04	2.40E-02		4.1E+01		2.1E+02		1.0E+06		6.4E+02		2.2E+01		1.8E+02		2.3E+06		6.4E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		43				3.40E-04	2.70E-02		4.3E+01		3.3E+02		2.1E+06		1.4E+03		2.3E+01		2.8E+02		4.7E+06		1.4E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	43				3.00E-04	1.40E-02		7.4E+00		3.0E+01		1.2E+05		5.5E+02		4.0E+00		2.5E+01		2.7E+05		1.4E+02	
VOC	1,3-Dichloropropene (total)	542-75-6	B2	43				3.90E-04	1.80E-02		5.4E+00		6.0E+01		5.9E+05		2.4E+02		1.0E+00		1.8E+01		7.8E+05		1.0E+01	
VOC	Ethyl Benzene	100-41-4	D	43				3.70E-04	2.10E-02		1.4E+02		2.4E+03		1.3E+07		1.4E+02		8.7E+01		7.2E+02		1.0E+07		1.4E+02	
VOC	2-Hexanone	591-78-6		43				1.00E-03	4.60E-02		1.8E+03		1.3E+03		1.2E+06		2.5E+03		9.9E+02		1.1E+03		2.7E+06		2.5E+03	
VOC	Methyl Acetate	79-20-9		43	1	2.60E+00	2.60E+00	9.20E-04	1.50E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		43				2.70E-04	2.90E-02		5.9E+03		3.0E+04		8.8E+07		5.9E+03		5.9E+03		2.5E+04		2.0E+08		1.5E+03	
VOC	4-Methyl-2-pentanone	108-10-1	ID	43	1	9.50E-04	9.50E-04	8.00E-04	4.40E-02		2.7E+03	3.5E-07	5.3E+04	1.8E-08	6.0E+07	1.6E-11	2.7E+03	3.5E-07	2.7E+03	3.5E-07	4.5E+04	2.1E-08	1.4E+08	6.8E-12	2.7E+03	3.5E-07
VOC	Methylcyclohexane	108-87-2		43	4	5.50E-04	5.60E-02	3.90E-04	1.50E-02																	
VOC	Methylene Chloride	75-09-2	B2	43	9	1.70E-03	1.30E-01	1.10E-03	7.30E-03		2.4E+02	5.4E-04	7.0E+02	1.9E-04	8.3E+06	1.6E-08	2.3E+03	5.7E-05	4.5E+01	2.9E-03	2.1E+02	6.2E-04	6.6E+06	2.0E-08	1.3E+03	1.0E-04
VOC	Styrene	100-42-5		43				2.90E-04	2.60E-02		5.2E+02		3.3E+03		6.9E+06		5.2E+02		2.5E+02		9.7E+02		5.5E+06		4.0E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	43				3.70E-04	1.70E-02		2.3E+01		3.4E+01		6.8E+04		2.4E+02		4.3E+00		1.0E+01		5.4E+04		5.3E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	43				4.60E-04	2.30E-02		6.0E+01		6.0E+02		6.8E+06		8.8E+01		1.1E+01		1.8E+02		5.4E+06		8.8E+01	
VOC	Toluene	108-88-3	D	43	9	4.50E-04	3.70E-02	3.20E-04	7.30E-03		2.5E+02	1.5E-04	3.3E+03	1.1E-05	1.2E+07	3.1E-09	2.5E+02	1.5E-04	2.5E+02	1.5E-04	2.8E+03	1.3E-05	2.7E+07	1.4E-09	2.5E+02	1.5E-04
VOC	1,2,4-Trichlorobenzene	120-82-1	D	43				3.60E-04	1.70E-02		1.1E+03		3.4E+04		1.1E+07		1.1E+03		1.1E+03		2.8E+04		2.5E+07		9.9E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	43	2	6.20E-04	1.50E-03	3.70E-04	1.50E-02		4.6E+02	3.3E-06	4.5E+03	3.3E-07	2.9E+07	5.2E-11	4.6E+02	3.3E-06	2.5E+02	6.0E-06	3.8E+03	3.9E-07	6.7E+07	2.2E-11	4.6E+02	3.3E-06
VOC	1,1,2-Trichloroethane	79-00-5	C	43				3.20E-04	2.40E-02		2.4E+01		5.7E+01		2.5E+05		8.4E+02		4.6E+00		1.7E+01		1.9E+05		1.8E+02	
VOC	Trichloroethene	79-01-6	C-B2	43	1	4.08E-03	4.08E-03	4.70E-04	2.60E-02		3.7E+01	1.1E-04	2.6E+02	1.6E-05	2.3E+06	1.8E-09	5.0E+02	8.2E-06	7.1E+00	5.7E-04	7.8E+01	5.2E-05	1.8E+06	2.3E-09	5.0E+02	8.2E-06
VOC	Trichlorofluoromethane	75-69-4		43	1	8.40E-04	8.40E-04	3.40E-04	2.90E-02		5.6E+02	1.5E-06	1.1E+05	7.6E-09	1.7E+09	4.9E-13	5.6E+02	1.5E-06	5.6E+02	1.5E-06	9.2E+04	9.1E-09	3.8E+09	2.2E-13	5.6E+02	1.5E-06
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		43	2	6.90E-03	8.20E-03	6.80E-04	5.70E-02		5.5E+02	1.5E-05	2.1E+05	3.9E-08	2.3E+09	3.6E-12	5.5E+02	1.5E-05	5.5E+02	1.5E-05	1.8E+05	4.6E-08	5.1E+09	1.6E-12	5.5E+02	1.5E-05
VOC	Vinyl Chloride	75-01-4	A	43				4.10E-04	1.70E-02		2.8E+00		2.9E+01		8.9E+05		3.4E+01		2.7E-01		4.2E+00		3.5E+05		3.8E+00	
VOC	Xylenes (total)	1330-20-7	ID	43	1	6.30E-02	6.30E-02	1.10E-03	1.50E-02		1.5E+02	4.2E-04	5.4E+04	1.2E-06	1.3E+08	4.8E-10	1.5E+02	4.2E-04	1.5E+02	4.2E-04	4.6E+04	1.4E-06	2.9E+08	2.2E-10	1.5E+02	4.2E-04
SVOC	Acenaphthene	83-32-9		43	7	3.10E-02	2.20E+00	1.90E-02	1.10E+00		3.5E+05	6.3E-06	9.7E+04	2.3E-05	6.2E+06	3.5E-07	1.3E+05	1.7E-05	1.9E+05	1.2E-05	8.1E+04	2.7E-05	1.4E+07	1.6E-07	4.1E+04	5.4E-05
SVOC	Acenaphthylene	208-96-8	D	42				1.90E-02	4.10E+00		3.0E+03		2.7E+03		1.0E+06		5.2E+03		1.6E+03		2.2E+03		2.3E+06		1.6E+03	
SVOC	Acetophenone	98-86-2	D	43				1.80E-02	4.10E+00		1.1E+03		5.2E+04		1.4E+07		1.1E+03		1.1E+03		4.4E+04		3.3E+07		1.1E+03	
SVOC	Anthracene	120-12-7	D	43	13	2.10E-02	3.40E+00	1.80E-02	1.00E+00		1.0E+06	3.4E-06	1.6E+06	2.1E-06	2.9E+07	1.2E-07	7.3E+05	4.7E-06	1.0E+06	3.4E-06	1.4E+06	2.4E-06	6.7E+07	5.1E-08	2.3E+05	1.5E-05
SVOC	Atrazine	1912-24-9		43				1.80E-02	4.10E+00								3.3E+02								7.1E+01	
SVOC	Benzaldehyde	100-52-7		43				2.20E-02	4.10E+00																	
SVOC	Benzo(a)anthracene	56-55-3	B2	43	21	1.80E-02	1.20E+01	1.70E-02	1.20E+00								8.0E+01	1.5E-01							2.0E+01	6.0E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	43	19	2.70E-02	8.80E+00	1.80E-02	1.30E+00						1.9E+03	4.6E-03	8.0E+00	**1.1E+00**					1.5E+03	5.9E-03	2.0E+00	**4.4E+00**
SVOC	Benzo(b)fluoranthene	205-99-2	B2	43	22	4.00E-02	1.00E+01	2.10E-02	1.20E+00								8.0E+01	1.3E-01							2.0E+01	5.0E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	43	19	2.40E-02	4.80E+00	2.30E-02	1.20E+00						3.5E+05	1.4E-05	7.0E+03	6.9E-04					8.0E+05	6.0E-06	2.5E+03	1.9E-03
SVOC	Benzo(k)fluoranthene	207-08-9	B2	43	16	2.00E-02	4.50E+00	1.80E-02	1.10E+00								8.0E+02	5.6E-03							2.0E+02	2.3E-02
SVOC	Biphenyl	92-52-4	D	43	5	6.80E-02	3.00E-01	2.20E-02	4.10E+00																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	43				1.70E-02	4.10E+00																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	43				1.80E-02	4.10E+00		4.4E+01		1.3E+01		1.2E+04		5.8E+01		8.3E+00		3.8E+00		9.4E+03		1.3E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	43	13	9.20E-02	5.30E+01	2.30E-02	4.10E+00						8.9E+05	6.0E-05	1.0E+04	5.3E-03					7.0E+05	7.6E-05	2.8E+03	1.9E-02
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	43				1.90E-02	4.10E+00																	
SVOC	Butylbenzylphthalate	85-68-7	C	43	8	3.60E-02	2.80E+01	1.70E-02	4.10E+00						2.1E+07	1.3E-06	3.1E+02	9.0E-02					4.7E+07	6.0E-07	3.1E+02	9.0E-02
SVOC	Caprolactam	105-60-2		43				2.20E-02	4.10E+00						2.9E+05		3.1E+05						6.7E+05		5.3E+04	
SVOC	Carbazole	86-74-8	B2	43	7	5.40E-02	1.40E+00	2.30E-02	1.10E+00								2.4E+03	5.8E-04							5.3E+02	2.6E-03
SVOC	4-Chloro-3-methylphenol	59-50-7		43				1.80E-02	4.10E+00								1.5E+04								4.5E+03	
SVOC	4-Chloroaniline	106-47-8		43				6.30E-03	1.60E+01																	
SVOC	2-Chloronaphthalene	91-58-7		43				1.90E-02	4.10E+00								1.8E+05								5.6E+04	
SVOC	2-Chlorophenol	95-57-8		43				1.80E-02	4.10E+00								4.5E+03								1.4E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		42				1.90E-02	4.10E+00																	
SVOC	Chrysene	218-01-9	B2	43	21	3.10E-02	1.40E+01	1.70E-02	9.80E-01								8.0E+03	1.8E-03							2.0E+03	7.0E-03
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	43	9	6.40E-02	1.40E+00	2.20E-02	1.10E+00								8.0E+00	1.8E-01							2.0E+00	7.0E-01
SVOC	Dibenzofuran	132-64-9	D	43	13	2.00E-02	1.00E+00	1.90E-02	1.10E+00																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	43				9.50E-03	2.50E+01						8.2E+03		3.0E+01						6.5E+03		6.6E+00	
SVOC	2,4-Dichlorophenol	120-83-2		43				1.60E-02	4.10E+00						2.3E+06		1.8E+03						5.1E+06		6.6E+02	

Table 4-17: Data Summary – AOI W-9 – Soil
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min 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 Detect 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 Detect 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	Diethylphthalate	84-66-2	D	43				2.10E-02	4.10E+00						1.5E+06		7.4E+02							3.3E+06		7.4E+02	
SVOC	2,4-Dimethylphenol	105-67-9		43	1	6.20E-02	6.20E-02	3.30E-02	4.10E+00						2.1E+06	3.0E-08	3.6E+04	1.7E-06						4.7E+06	1.3E-08	1.1E+04	5.6E-06
SVOC	Dimethylphthalate	131-11-3	D	43				1.90E-02	4.10E+00						1.5E+06		7.9E+02							3.3E+06		7.9E+02	
SVOC	Di-n-butylphthalate	84-74-2	D	43				2.40E-02	4.10E+00						1.5E+06		7.6E+02							3.3E+06		7.6E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		42				7.50E-02	2.10E+01								2.6E+02									7.9E+01	
SVOC	2,4-Dinitrophenol	51-28-5		42				1.00E-01	2.10E+01																		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	43				1.80E-02	4.10E+00						2.0E+04		2.2E+02							1.6E+04		4.8E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	42				1.80E-02	4.10E+00																		
SVOC	Di-n-octylphthalate	117-84-0		43	1	2.90E+00	2.90E+00	1.80E-02	4.10E+00								2.0E+04	1.5E-04								6.9E+03	4.2E-04
SVOC	Fluoranthene	206-44-0	D	43	22	2.80E-02	2.80E+01	2.40E-02	1.20E+00		1.0E+06	2.8E-05	8.9E+05	3.1E-05	4.1E+06	6.8E-06	1.3E+05	2.2E-04	1.0E+06	2.8E-05	7.4E+05	3.8E-05	9.3E+06	3.0E-06	4.6E+04	6.1E-04
SVOC	Fluorene	86-73-7	D	42	6	7.30E-02	1.50E+00	2.10E-02	1.00E+00		1.0E+06	1.5E-06	1.5E+05	1.0E-05	4.1E+06	3.7E-07	8.7E+04	1.7E-05	5.8E+05	2.6E-06	1.3E+05	1.2E-05	9.3E+06	1.6E-07	2.7E+04	5.6E-05
SVOC	Hexachlorobenzene	118-74-1	B2	43				1.80E-02	4.10E+00		2.2E+02		5.6E+01		8.5E+03		3.7E+01		4.1E+01		1.7E+01		6.8E+03		8.9E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	43				1.70E-02	4.10E+00		3.5E+02		4.6E+02		1.8E+05		3.5E+02		1.3E+02		1.3E+02		1.4E+05		1.0E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	43				1.50E-02	4.10E+00		5.6E+01		6.0E+01		5.9E+03		7.2E+02		3.0E+01		5.0E+01		1.3E+04		7.2E+02	
SVOC	Hexachloroethane	67-72-1	C	43				1.80E-02	1.20E+00		7.9E+01		6.6E+02		1.0E+05		7.3E+02		4.0E+01		5.5E+02		2.3E+05		2.3E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	43	15	2.40E-02	4.50E+00	2.30E-02	1.50E+00								8.0E+01	5.6E-02							2.0E+01	2.3E-01
SVOC	Isophorone	78-59-1	C	43				1.90E-02	4.10E+00						8.2E+06		2.4E+03							1.2E+07		2.4E+03	
SVOC	2-Methylnaphthalene	91-57-6	ID	42	17	2.70E-02	8.70E-01	1.80E-02	1.00E+00								2.6E+04	3.3E-05							8.1E+03	1.1E-04
SVOC	Methylphenol (total)	1319-77-3		43	1	1.11E-01	1.11E-01	1.50E-02	4.10E+00						2.9E+06	3.8E-08	3.6E+04	3.1E-06					6.7E+06	1.7E-08	1.1E+04	1.0E-05
SVOC	Naphthalene	91-20-3	C	42	15	2.70E-02	7.90E-01	1.90E-02	1.00E+00		4.7E+02	1.7E-03	3.5E+02	2.3E-03	8.8E+04	9.0E-06	5.2E+04	1.5E-05	2.5E+02	3.2E-03	3.0E+02	2.6E-03	2.0E+05	4.0E-06	1.6E+04	4.9E-05
SVOC	2-Nitroaniline	88-74-4		43				1.90E-02	2.10E+01																		
SVOC	3-Nitroaniline	99-09-2	C	43				1.20E-02	2.10E+01																		
SVOC	4-Nitroaniline	100-01-6	C	43				1.80E-02	2.10E+01																		
SVOC	Nitrobenzene	98-95-3	D	43				1.80E-02	4.10E+00		1.7E+02		6.4E+01		2.1E+04		3.4E+02		9.1E+01		5.4E+01		4.7E+04		1.0E+02	
SVOC	2-Nitrophenol	88-75-5		43				1.60E-02	4.10E+00								2.0E+03								6.3E+02	
SVOC	4-Nitrophenol	100-02-7		43				1.10E-01	2.10E+01																		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	43				2.10E-02	4.10E+00								7.8E+03								1.7E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	43				1.90E-02	4.10E+00						2.0E+03		5.4E+00							1.6E+03		1.2E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	43				1.90E-02	4.10E+00																		
SVOC	Pentachlorophenol	87-86-5	B2	34				8.90E-02	4.20E+01						1.3E+05		3.2E+02							1.0E+05		9.0E+01	
SVOC	Phenanthrene	85-01-8	D	43	22	3.50E-02	1.60E+01	2.10E-02	1.10E+00		5.1E+03	3.1E-03	1.9E+02	8.4E-02	2.9E+03	5.5E-03	5.2E+03	3.1E-03	2.8E+03	5.7E-03	1.6E+02	1.0E-01	6.7E+03	2.4E-03	1.6E+03	1.0E-02
SVOC	Phenol	108-95-2	ID	43	4	6.10E-02	1.13E+00	1.80E-02	4.10E+00						1.8E+07	6.3E-08	1.2E+04	9.4E-05					4.0E+07	2.8E-08	1.2E+04	9.4E-05
SVOC	Pyrene	129-00-0	D	43	24	2.00E-02	2.80E+01	1.70E-02	1.10E+00		1.0E+06	2.8E-05	7.8E+05	3.6E-05	2.9E+06	9.7E-06	8.4E+04	3.3E-04	1.0E+06	2.8E-05	6.5E+05	4.3E-05	6.7E+06	4.2E-06	2.9E+04	9.7E-04
SVOC	2,4,5-Trichlorophenol	95-95-4		43				2.20E-02	4.10E+00						1.0E+07		7.3E+04						2.3E+07		2.3E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	43				1.70E-02	4.10E+00						1.3E+06		3.3E+03						1.0E+06		7.1E+02	
P/PCB	PCBs (total)	1336-36-3	B2	387	255	1.08E-02	3.95E+02	3.00E-03	4.10E-02		1.6E+04	2.5E-02	8.1E+02	4.9E-01	6.5E+03	6.1E-02	1.6E+01	**2.5E+01**	3.0E+03	1.3E-01	2.4E+02	**1.6E+00**	5.2E+03	7.6E-02	4.0E+00	**9.9E+01**
INORG	Antimony	7440-36-0		43	32	1.27E-01	6.26E+00	5.12E-01	2.54E+00						5.9E+03	1.1E-03	6.7E+02	9.3E-03					1.3E+04	4.8E-04	1.8E+02	3.5E-02
INORG	Arsenic	7440-38-2	A	44	44	1.01E+00	1.92E+01			1.3E+01					9.1E+02	6.6E-03	3.7E+01	1.6E-01					7.2E+02	8.3E-03	7.6E+00	7.9E-01
INORG	Barium	7440-39-3	D	43	43	3.74E+00	3.78E+02			1.1E+02					1.5E+05	1.8E-03	1.3E+05	2.1E-03					3.3E+05	8.1E-04	3.7E+04	7.2E-03
INORG	Beryllium	7440-41-7	B1	43	23	5.15E-02	5.90E-01	3.49E-02	1.24E-01	1.5E+00					5.9E+02		1.6E+03						1.3E+03		4.1E+02	
INORG	Cadmium	7440-43-9	B1	43	32	2.44E-02	5.86E+00	8.40E-03	4.86E-02	1.2E+00					2.2E+03	2.1E-03	2.1E+03	2.2E-03					1.7E+03	2.7E-03	5.5E+02	8.5E-03
INORG	Chromium (total)	7440-47-3		44	44	2.89E+00	5.23E+02			4.9E+01					2.4E+02	**2.0E+00**	9.2E+03	5.1E-02					2.6E+02	**1.8E+00**	2.5E+03	1.9E-01
INORG	Chromium III	16065-83-1	D	1	1	1.94E+02	1.94E+02								1.5E+05	1.3E-03	1.0E+06	1.9E-04					3.3E+05	5.9E-04	7.9E+05	2.5E-04
INORG	Chromium VI	18540-29-9	A	1	1	6.38E-01	6.38E-01								2.4E+02	2.7E-03	9.2E+03	6.9E-05					2.6E+02	2.5E-03	2.5E+03	2.6E-04
INORG	Cobalt	7440-48-4	B1	43	43	7.76E-01	1.41E+01			1.7E+01					5.9E+03		9.0E+03						1.3E+04		2.6E+03	
INORG	Copper	7440-50-8	D	43	43	2.31E+00	4.60E+02			3.2E+01					5.9E+04	7.3E-03	7.3E+04	5.9E-03					1.3E+05	3.3E-03	2.0E+04	2.1E-02
INORG	Cyanide (total)	57-12-5	D	4	2	2.60E-01	6.12E-01	1.80E-01	1.87E-01						2.5E+02	2.4E-03	2.5E+02	2.4E-03					2.5E+02	2.4E-03	1.2E+01	5.1E-02
INORG	Lead	7439-92-1	B2	43	43	3.16E+00	4.29E+02			4.9E+01					4.4E+04	8.6E-03	9.0E+02	4.2E-01					1.0E+05	3.8E-03	4.0E+02	9.5E-01
INORG	Manganese	7439-96-5	D	46	46	1.09E+02	4.82E+03			5.1E+02					1.5E+03	**2.9E+00**	9.0E+04	4.8E-02					3.3E+03	**1.3E+00**	2.5E+04	1.7E-01
INORG	Mercury	7439-97-6	D	43	30	1.07E-02	3.28E-01	8.80E-03	1.88E-02	1.3E-01	8.9E+01	2.2E-03	6.2E+01	3.2E-03	8.8E+03	2.3E-05	5.8E+02	3.4E-04	4.8E+01	4.1E-03	5.2E+01	3.8E-03	2.0E+04	9.9E-06	1.6E+02	1.2E-03
INORG	Nickel	7440-02-0	A	43	43	2.08E+00	1.54E+02			3.0E+01					1.6E+04	7.7E-03	1.5E+05	8.3E-04					1.3E+04	9.5E-03	4.0E+04	3.1E-03
INORG	Selenium	7782-49-2	D	43	4	2.56E-01	1.71E+00	2.21E-01	6.18E+00	4.1E-01					5.9E+04	2.2E-05	9.6E+03	1.4E-04					1.3E+05	1.0E-05	2.6E+03	5.0E-04
INORG	Silver	7440-22-4	D	43	9	2.29E-01	6.53E-01	4.24E-02	6.14E-01						2.9E+03	2.3E-04	9.0E+03	7.3E-05					6.7E+03	9.7E-05	2.5E+03	2.6E-04
INORG	Thallium	7440-28-0		43	15	3.88E-01	3.32E+00	2.31E-01	1.24E+01								1.3E+02	2.6E-02							3.5E+01	9.5E-02
INORG	Vanadium	7440-62-2		43	43	4.48E+00	2.32E+01			3.3E+01							5.5E+03								7.5E+02	
INORG	Zinc	7440-66-6	D	43	43	5.19E+00	2.34E+03			1.9E+02							6.3E+05	3.4E-03							1.7E+05	1.3E-02

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-18: Data Summary for AOI W-09 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	6	2	1.50E-02	3.50E-02	5.10E-04	6.60E-04	1.0E+06	3.5E-08	3.1E+04	1.1E-06	7.3E-01	4.8E-02
Shallow	VOC	Benzene	71-43-2	T	A	6	1	2.85E-04	2.85E-04	1.60E-04	1.00E-03	3.5E+01	8.1E-06	1.1E+01	2.6E-05	5.0E-03	5.7E-02
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	6				1.70E-04	1.00E-03	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	6				1.80E-04	1.00E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	6				1.60E-04	1.00E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	6	1	2.05E-03	2.05E-03	3.60E-04	1.00E-02	2.4E+05	8.5E-09	2.4E+05	8.5E-09	1.3E+01	1.6E-04
Shallow	VOC	Carbon Disulfide	75-15-0	T		6	1	1.40E-03	1.40E-03	2.00E-04	1.00E-03	5.5E+02	2.5E-06	1.2E+03	1.2E-06	8.0E-01	1.8E-03
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.20E-04	1.00E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	6				1.40E-04	1.00E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		6				2.20E-04	1.00E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	6				1.40E-04	1.00E-03	1.8E+02		1.5E+02		1.0E-01	
Shallow	VOC	Chloromethane	74-87-3	T	D	6				1.30E-04	1.00E-03	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	6	1	2.55E-04	2.55E-04	1.20E-04	1.00E-03	5.6E+01	4.6E-06	5.6E+01	4.6E-06	8.0E-01	3.2E-04
Shallow	VOC	Cyclohexane	110-82-7	T	ID	6	1	7.90E-04	7.90E-04	1.30E-04	1.00E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				5.30E-04	2.00E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	6				2.50E-04	1.00E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	1.00E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.10E-04	1.00E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				1.50E-04	1.00E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.60E-04	1.00E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		6				2.30E-04	2.00E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	6				1.60E-04	1.00E-03	2.3E+03		2.4E+03		8.8E-01	
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.10E-04	1.00E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.20E-04	1.00E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	6				2.20E-04	5.00E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				1.50E-04	5.00E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.70E-04	1.00E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				1.50E-04	1.00E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	6				1.20E-04	1.00E-03	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		6				3.10E-04	1.00E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		6				4.10E-04	1.00E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		6				1.30E-04	5.00E-03	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	4	1	2.55E-03	2.55E-03	2.30E-04	1.00E-02	2.0E+04	1.3E-07	1.3E+04	2.0E-07	1.8E+00	1.4E-03
Shallow	VOC	Methylcyclohexane	108-87-2	T		6	1	8.55E-04	8.55E-04	1.50E-04	1.00E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	6				2.80E-04	1.00E-03	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		6				1.50E-04	1.00E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.30E-04	1.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	6				1.20E-04	1.00E-03	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	6	1	2.75E-04	2.75E-04	1.70E-04	1.00E-03	5.3E+02	5.2E-07	5.3E+02	5.2E-07	1.0E+00	2.8E-04
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.50E-04	1.00E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6	1	2.50E-04	2.50E-04	1.80E-04	1.00E-03	1.3E+03	1.9E-07	1.3E+03	1.9E-07	2.0E-01	1.3E-03
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				2.10E-04	1.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	6				1.40E-04	1.00E-03	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		6	2	9.50E-04	2.20E-03	2.50E-04	2.50E-04	1.1E+03	2.0E-06	1.1E+03	2.0E-06	2.6E+00	8.5E-04
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				2.30E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	6				1.50E-04	1.00E-03	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	6	1	1.25E-03	1.25E-03	3.30E-04	1.00E-03	1.9E+02	6.6E-06	1.9E+02	6.6E-06	1.0E+01	1.3E-04
Shallow	SVOC	Acenaphthene	83-32-9	T		6				6.90E-04	5.00E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	6				4.10E-04	5.00E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	6				6.50E-04	1.00E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	6				5.90E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		6				3.50E-04	5.00E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		6				5.90E-04	1.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				6.80E-04	5.00E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				5.30E-04	5.00E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				7.00E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				7.00E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				6.40E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	6				6.50E-04	1.00E-02						

Table 4-18: Data Summary for AOI W-09 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				8.70E-04	5.00E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	6				9.70E-04	8.50E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6	1	5.80E-04	5.80E-04	2.00E-04	5.00E-03			3.2E-01	1.8E-03	6.0E-03	9.7E-02
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				7.80E-04	5.00E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				2.30E-04	5.00E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		6				4.50E-04	1.00E-02			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	6				6.10E-04	1.00E-02			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				5.50E-04	5.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		5				9.00E-04	1.00E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		6				7.30E-04	5.00E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		6				1.00E-03	6.50E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				6.60E-04	5.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	6				6.70E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				6.80E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	6				6.60E-04	5.00E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	5				4.70E-04	2.00E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		6				7.00E-04	1.00E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	6				2.50E-04	5.00E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		6	1	1.04E-02	1.04E-02	8.50E-04	5.00E-03			5.2E+02	2.0E-05	3.7E-01	2.8E-02
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	6				2.00E-04	5.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				3.70E-04	5.00E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				1.30E-03	2.00E-02			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.00E-03	2.00E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				4.60E-04	5.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				5.70E-04	5.00E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		6				6.90E-04	5.00E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	6				7.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	6				7.50E-04	5.00E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.40E-04	5.00E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	6				7.30E-04	7.50E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	6				1.10E-03	5.50E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	6				7.40E-04	8.00E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.30E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	6				6.30E-04	5.00E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	6				6.40E-04	5.00E-03			2.5E+01		2.6E-01	
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		6				9.00E-04	5.00E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	6				7.50E-04	6.50E-03	3.1E+01		3.1E+01		5.2E-01	
Shallow	SVOC	2-Nitroaniline	88-74-4	T		6				4.90E-04	2.00E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	5				4.80E-04	2.00E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	6				5.90E-04	2.00E-02						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	6				8.10E-04	6.50E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		6				9.50E-04	5.00E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		6				1.90E-03	2.00E-02						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				6.40E-04	5.00E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				6.70E-04	5.50E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				7.80E-04	9.00E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	6				2.40E-03	1.30E-02			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	6				6.80E-04	5.00E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	6				1.30E-03	6.50E-03			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	6				6.30E-04	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				8.60E-04	5.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				7.10E-04	5.00E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	6				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	INORG	Antimony	7440-36-0	D		2				2.20E-03	2.50E-02			6.8E+01		6.0E-03	
Shallow	INORG	Antimony	7440-36-0	T		6				2.20E-03	2.50E-02			6.8E+01		6.0E-03	
Shallow	INORG	Arsenic	7440-38-2	D	A	2				3.90E-03	1.00E-02			4.3E+00		5.0E-02	
Shallow	INORG	Arsenic	7440-38-2	T	A	6	3	3.70E-03	1.54E-02	2.90E-03	1.00E-02			4.3E+00	3.6E-03	5.0E-02	3.1E-01
Shallow	INORG	Barium	7440-39-3	D	D	2	2	5.40E-02	1.47E-01					1.4E+04	1.1E-05	2.0E+00	7.4E-02

Table 4-18: Data Summary for AOI W-09 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	6	6	1.73E-02	4.20E-01					1.4E+04	3.0E-05	2.0E+00	2.1E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	6				4.70E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	2				2.80E-04	5.00E-03			1.9E+02		5.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	6				2.80E-04	5.00E-03			1.9E+02		5.0E-03	
Shallow	INORG	Chromium (total)	7440-47-3	D		2	1	1.04E-02	1.04E-02	1.00E-02	1.00E-02			4.6E+02	2.3E-05	1.0E-01	1.0E-01
Shallow	INORG	Chromium (total)	7440-47-3	T		6	2	1.12E-02	5.68E-02	1.00E-03	1.00E-02			4.6E+02	1.2E-04	1.0E-01	5.7E-01
Shallow	INORG	Cobalt	7440-48-4	D	B1	2	1	1.40E-03	1.40E-03	1.30E-03	1.30E-03			2.4E+03	5.8E-07	4.0E-02	3.5E-02
Shallow	INORG	Cobalt	7440-48-4	T	B1	6	3	2.35E-03	2.90E-03	1.10E-03	1.30E-03			2.4E+03	1.2E-06	4.0E-02	7.3E-02
Shallow	INORG	Copper	7440-50-8	D	D	2				4.20E-03	5.00E-03			7.4E+03		1.4E+00	
Shallow	INORG	Copper	7440-50-8	T	D	6	1	2.80E-03	2.80E-03	1.80E-03	5.00E-03			7.4E+03	3.8E-07	1.4E+00	2.0E-03
Shallow	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	6	1	3.91E-02	3.91E-02	2.30E-03	3.00E-03					4.0E-03	**9.8E+00**
Shallow	INORG	Manganese	7439-96-5	D	D	2	2	1.98E-02	2.42E-01					9.1E+03	2.7E-05	8.6E-01	2.8E-01
Shallow	INORG	Manganese	7439-96-5	T	D	6	6	1.65E-02	6.70E-01					9.1E+03	7.4E-05	8.6E-01	7.8E-01
Shallow	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	2.00E-04	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	6	1	8.60E-05	8.60E-05	6.70E-05	2.00E-04	5.6E-02	1.5E-03	5.6E-02	1.5E-03	2.0E-03	4.3E-02
Shallow	INORG	Nickel	7440-02-0	D	A	2	1	2.20E-03	2.20E-03	2.20E-03	2.20E-03			7.4E+04	3.0E-08	1.0E-01	2.2E-02
Shallow	INORG	Nickel	7440-02-0	T	A	6	3	3.80E-03	3.85E-02	2.10E-03	2.20E-03			7.4E+04	5.2E-07	1.0E-01	3.9E-01
Shallow	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	6				3.90E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	2				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	6				1.10E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		2	2	3.80E-05	5.30E-03					1.3E+01	4.1E-04	2.0E-03	**2.7E+00**
Shallow	INORG	Thallium	7440-28-0	T		6	1	1.24E-02	1.24E-02	1.50E-05	1.80E-05			1.3E+01	9.5E-04	2.0E-03	**6.2E+00**
Shallow	INORG	Vanadium	7440-62-2	D		2				8.20E-04	1.00E-02			9.7E+02		4.5E-03	
Shallow	INORG	Vanadium	7440-62-2	T		6	2	1.90E-03	4.50E-03	8.20E-04	1.00E-02			9.7E+02	4.6E-06	4.5E-03	1.0E+00
Shallow	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	2.00E-02			1.1E+05		2.4E+00	
Shallow	INORG	Zinc	7440-66-6	T	D	6	1	5.44E-02	5.44E-02	1.20E-02	2.00E-02			1.1E+05	4.9E-07	2.4E+00	2.3E-02

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-19: Data Summary for AOI W-09 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Deep	VOC	Acetone	67-64-1	T	ID	6	2	6.60E-04	1.60E-03	1.10E-03	1.10E-03	2.1E+00	7.6E-04	7.3E-01	2.2E-03
Deep	VOC	Benzene	71-43-2	T	A	6				1.60E-04	3.70E-04	5.0E-03		5.0E-03	
Deep	VOC	Bromodichloromethane	75-27-4	T	B2	6				1.70E-04	3.20E-04	1.0E-01		1.0E-01	
Deep	VOC	Bromoform	75-25-2	T	B2	6				1.80E-04	3.70E-04	1.0E-01		1.0E-01	
Deep	VOC	Bromomethane	74-83-9	T	D	6				2.00E-04	3.00E-04	2.9E-02		1.0E-02	
Deep	VOC	2-Butanone	78-93-3	T	ID	6				4.10E-04	5.90E-04	3.8E+01		1.3E+01	
Deep	VOC	Carbon Disulfide	75-15-0	T		6	3	2.40E-04	9.30E-04	2.00E-04	2.40E-04	2.3E+00	4.0E-04	8.0E-01	1.2E-03
Deep	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.20E-04	3.70E-04	5.0E-03		5.0E-03	
Deep	VOC	Chlorobenzene	108-90-7	T	D	6				1.40E-04	3.80E-04	1.0E-01		1.0E-01	
Deep	VOC	Chloroethane	75-00-3	T		6				2.60E-04	2.90E-04	1.7E+00		4.3E-01	
Deep	VOC	Chloroform	67-66-3	T	B2	6	1	2.80E-04	2.80E-04	1.40E-04	3.50E-04	1.0E-01	2.8E-03	1.0E-01	2.8E-03
Deep	VOC	Chloromethane	74-87-3	T	D	6				1.30E-04	4.90E-04	1.1E+00		2.6E-01	
Deep	VOC	Cumene	98-82-8	T	D	6				1.20E-04	3.90E-04	2.3E+00		8.0E-01	
Deep	VOC	Cyclohexane	110-82-7	T	ID	6				1.30E-04	3.30E-04				
Deep	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				6.20E-04	8.20E-04	2.0E-04		2.0E-04	
Deep	VOC	Dibromochloromethane	124-48-1	T	C	6				2.60E-04	3.70E-04	1.0E-01		1.0E-01	
Deep	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	3.40E-04	1.0E-03		1.0E-03	
Deep	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.10E-04	3.80E-04	6.0E-01		6.0E-01	
Deep	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				1.50E-04	3.80E-04	1.9E-02		6.6E-03	
Deep	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.70E-04	3.80E-04	7.5E-02		7.5E-02	
Deep	VOC	Dichlorodifluoromethane	75-71-8	T		6				2.60E-04	4.90E-04	4.8E+00		1.7E+00	
Deep	VOC	1,1-Dichloroethane	75-34-3	T	C	6				1.60E-04	3.00E-04	2.5E+00		8.8E-01	
Deep	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.10E-04	2.80E-04	5.0E-03		5.0E-03	
Deep	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.40E-04	3.10E-04	7.0E-03		7.0E-03	
Deep	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	6				2.20E-04	3.50E-04	7.0E-02		7.0E-02	
Deep	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				1.50E-04	3.30E-04	1.0E-01		1.0E-01	
Deep	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.70E-04	4.10E-04	5.0E-03		5.0E-03	
Deep	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				2.70E-04	3.50E-04	3.5E-02		8.5E-03	
Deep	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	4.10E-04	7.0E-01		7.0E-01	
Deep	VOC	2-Hexanone	591-78-6	T		6				4.60E-04	5.80E-04	2.9E+00		1.0E+00	
Deep	VOC	Methyl Acetate	79-20-9	T		6				4.10E-04	5.40E-04				
Deep	VOC	Methyl tert-butyl ether	1634-04-4	T		6	4	2.40E-04	5.20E-03	2.70E-04	2.70E-04	6.9E-01	7.5E-03	2.4E-01	2.2E-02
Deep	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6				2.30E-04	2.60E-04	5.2E+00		1.8E+00	
Deep	VOC	Methylcyclohexane	108-87-2	T		6				1.50E-04	4.20E-04				
Deep	VOC	Methylene Chloride	75-09-2	T	B2	7	1	1.80E-02	1.80E-02	2.80E-04	3.40E-04	5.0E-03	**3.6E+00**	5.0E-03	**3.6E+00**
Deep	VOC	Styrene	100-42-5	T		6				1.50E-04	3.50E-04	1.0E-01		1.0E-01	
Deep	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.50E-04	3.60E-04	3.5E-02		8.5E-03	
Deep	VOC	Tetrachloroethene	127-18-4	T	C-B2	6				2.30E-04	4.20E-04	5.0E-03		5.0E-03	
Deep	VOC	Toluene	108-88-3	T	D	6				1.80E-04	3.90E-04	1.0E+00		1.0E+00	
Deep	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.70E-04	4.00E-04	7.0E-02		7.0E-02	
Deep	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6				1.50E-04	3.90E-04	2.0E-01		2.0E-01	
Deep	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				3.00E-04	3.60E-04	5.0E-03		5.0E-03	
Deep	VOC	Trichloroethene	79-01-6	T	C-B2	6				1.40E-04	4.20E-04	5.0E-03		5.0E-03	
Deep	VOC	Trichlorofluoromethane	75-69-4	T		6				2.80E-04	5.40E-04	7.3E+00		2.6E+00	
Deep	VOC	1,1,2-Trichloro-1,2,2-trifluoroe	76-13-1	T		6				3.20E-04	3.20E-04	1.7E+02		1.7E+02	
Deep	VOC	Vinyl Chloride	75-01-4	T	A	6				1.50E-04	3.60E-04	2.0E-03		2.0E-03	
Deep	VOC	Xylenes (total)	1330-20-7	T	ID	6				3.30E-04	4.40E-04	1.0E+01		1.0E+01	
Deep	SVOC	Acenaphthene	83-32-9	T		6				8.00E-04	8.00E-04	3.8E+00		1.3E+00	
Deep	SVOC	Acenaphthylene	208-96-8	T	D	6				7.10E-04	7.10E-04	1.5E-01		5.2E-02	
Deep	SVOC	Acetophenone	98-86-2	T	D	6				2.60E-03	2.60E-03	4.4E+00		1.5E+00	
Deep	SVOC	Anthracene	120-12-7	T	D	6				6.80E-04	6.80E-04	4.3E-02		4.3E-02	
Deep	SVOC	Atrazine	1912-24-9	T		6				2.50E-03	2.50E-03	3.0E-03		3.0E-03	
Deep	SVOC	Benzaldehyde	100-52-7	T		6				2.80E-03	2.80E-03				
Deep	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				7.00E-04	7.00E-04	8.5E-03		2.1E-03	
Deep	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				7.30E-04	7.30E-04	5.0E-03		5.0E-03	
Deep	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				9.40E-04	9.40E-04	2.0E-03		2.0E-03	
Deep	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				8.50E-04	8.50E-04	5.0E-03		5.0E-03	
Deep	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				8.40E-04	8.40E-04	5.0E-03		5.0E-03	
Deep	SVOC	Biphenyl	92-52-4	T	D	6				2.60E-03	2.60E-03				

Table 4-19: Data Summary for AOI W-09 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Deep	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				8.70E-04	8.70E-04				
Deep	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	5				9.70E-04	9.70E-04	8.3E-03		2.0E-03	
Deep	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6				2.70E-03	2.70E-03	6.0E-03		6.0E-03	
Deep	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				8.80E-04	8.80E-04				
Deep	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				8.80E-04	8.80E-04	2.7E+00		1.2E+00	
Deep	SVOC	Caprolactam	105-60-2	T		6	1	3.10E-03	3.10E-03	2.50E-03	2.50E-03	1.7E+01	1.8E-04	5.8E+00	5.3E-04
Deep	SVOC	Carbazole	86-74-8	T	B2	6				8.20E-04	8.20E-04	3.5E-01		8.5E-02	
Deep	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				9.90E-04	9.90E-04	4.2E-01		1.5E-01	
Deep	SVOC	4-Chloroaniline	106-47-8	T		6				6.10E-04	6.10E-04				
Deep	SVOC	2-Chloronaphthalene	91-58-7	T		6				8.50E-04	8.50E-04	5.2E+00		1.8E+00	
Deep	SVOC	2-Chlorophenol	95-57-8	T		6				1.00E-03	1.00E-03	1.3E-01		4.5E-02	
Deep	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				7.90E-04	7.90E-04				
Deep	SVOC	Chrysene	218-01-9	T	B2	6				7.50E-04	7.50E-04	5.0E-03		5.0E-03	
Deep	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				7.90E-04	7.90E-04	2.0E-03		2.0E-03	
Deep	SVOC	Dibenzofuran	132-64-9	T	D	6				1.10E-03	1.10E-03				
Deep	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	6				9.30E-04	9.30E-04	4.3E-03		1.1E-03	
Deep	SVOC	2,4-Dichlorophenol	120-83-2	T		6				8.50E-04	8.50E-04	2.1E-01		7.3E-02	
Deep	SVOC	Diethylphthalate	84-66-2	T	D	6				6.50E-04	6.50E-04	1.6E+01		5.5E+00	
Deep	SVOC	2,4-Dimethylphenol	105-67-9	T		6				8.50E-04	8.50E-04	1.0E+00		3.7E-01	
Deep	SVOC	Dimethylphthalate	131-11-3	T	D	6				7.60E-04	7.60E-04	2.1E+02		7.3E+01	
Deep	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				6.70E-04	6.70E-04	2.5E+00		8.8E-01	
Deep	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				1.30E-03	1.30E-03	2.0E-02		2.0E-02	
Deep	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.00E-03	3.00E-03				
Deep	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				7.90E-04	7.90E-04	3.2E-02		7.7E-03	
Deep	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				5.70E-04	5.70E-04				
Deep	SVOC	Di-n-octylphthalate	117-84-0	T		6				1.10E-03	1.10E-03	3.8E-01		1.3E-01	
Deep	SVOC	Fluoranthene	206-44-0	T	D	6				8.10E-04	8.10E-04	2.1E-01		2.1E-01	
Deep	SVOC	Fluorene	86-73-7	T	D	6				1.00E-03	1.00E-03	2.0E+00		8.8E-01	
Deep	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.40E-04	7.40E-04	1.0E-03		1.0E-03	
Deep	SVOC	Hexachlorobutadiene	87-68-3	T	C	5				7.30E-04	7.30E-04	4.2E-02		1.5E-02	
Deep	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	5				1.10E-03	1.10E-03	5.0E-02		5.0E-02	
Deep	SVOC	Hexachloroethane	67-72-1	T	C	6				7.40E-04	7.40E-04	2.1E-02		7.3E-03	
Deep	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.30E-04	6.30E-04	2.0E-03		2.0E-03	
Deep	SVOC	Isophorone	78-59-1	T	C	6				6.30E-04	6.30E-04	3.1E+00		7.7E-01	
Deep	SVOC	2-Methylnaphthalene	91-57-6	T	ID	5				6.40E-04	6.40E-04	7.5E-01		2.6E-01	
Deep	SVOC	Methylphenol (total)	1319-77-3	T		6				1.30E-03	1.30E-03	1.0E+00		3.7E-01	
Deep	SVOC	Naphthalene	91-20-3	T	C	5				7.50E-04	7.50E-04	1.5E+00		5.2E-01	
Deep	SVOC	2-Nitroaniline	88-74-4	T		6				7.00E-04	7.00E-04				
Deep	SVOC	3-Nitroaniline	99-09-2	T	C	6				7.10E-04	7.10E-04				
Deep	SVOC	4-Nitroaniline	100-01-6	T	C	6				1.30E-03	1.30E-03				
Deep	SVOC	Nitrobenzene	98-95-3	T	D	6				8.10E-04	8.10E-04	9.6E-03		3.4E-03	
Deep	SVOC	2-Nitrophenol	88-75-5	T		6				2.10E-03	2.10E-03	5.8E-02		2.0E-02	
Deep	SVOC	4-Nitrophenol	100-02-7	T		6				1.90E-03	1.90E-03				
Deep	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				1.40E-03	1.40E-03	1.1E+00		2.7E-01	
Deep	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				6.70E-04	6.70E-04	5.0E-03		5.0E-03	
Deep	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				7.80E-04	7.80E-04				
Deep	SVOC	Pentachlorophenol	87-86-5	T	B2	6				2.40E-03	2.40E-03	1.0E-03		1.0E-03	
Deep	SVOC	Phenanthrene	85-01-8	T	D	6				8.20E-04	8.20E-04	1.5E-01		5.2E-02	
Deep	SVOC	Phenol	108-95-2	T	ID	6				2.60E-03	2.60E-03	1.3E+01		4.4E+00	
Deep	SVOC	Pyrene	129-00-0	T	D	6				1.10E-03	1.10E-03	1.4E-01		1.4E-01	
Deep	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				1.20E-03	1.20E-03	2.1E+00		7.3E-01	
Deep	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				1.70E-03	1.70E-03	4.7E-01		1.2E-01	
Deep	P/PCB	PCBs (total)	1336-36-3	T	B2	6				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
Deep	INORG	Antimony	7440-36-0	D		2	1	2.70E-03	2.70E-03	2.20E-03	2.20E-03	6.0E-03	4.5E-01	6.0E-03	4.5E-01
Deep	INORG	Antimony	7440-36-0	T		6	1	4.90E-03	4.90E-03	2.20E-03	3.40E-03	6.0E-03	8.2E-01	6.0E-03	8.2E-01
Deep	INORG	Arsenic	7440-38-2	D	A	2	2	5.20E-03	2.59E-02			5.0E-02	5.2E-01	5.0E-02	5.2E-01
Deep	INORG	Arsenic	7440-38-2	T	A	6	5	3.10E-03	3.95E-02	2.10E-03	2.10E-03	5.0E-02	7.9E-01	5.0E-02	7.9E-01
Deep	INORG	Barium	7440-39-3	D	D	2	2	9.89E-02	2.02E-01			2.0E+00	1.0E-01	2.0E+00	1.0E-01
Deep	INORG	Barium	7440-39-3	T	D	6	6	3.60E-02	5.85E-01			2.0E+00	2.9E-01	2.0E+00	2.9E-01

Table 4-19: Data Summary for AOI W-09 (Deep and Intermediate Groundwater)
Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detect to Industrial Drinking Water Criteria	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria
Deep	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	5.40E-04	4.0E-03		4.0E-03	
Deep	INORG	Beryllium	7440-41-7	T	B1	6				5.40E-04	6.00E-04	4.0E-03		4.0E-03	
Deep	INORG	Cadmium	7440-43-9	D	B1	2				2.80E-04	2.80E-04	5.0E-03		5.0E-03	
Deep	INORG	Cadmium	7440-43-9	T	B1	6	1	3.00E-04	3.00E-04	2.80E-04	2.80E-04	5.0E-03	6.0E-02	5.0E-03	6.0E-02
Deep	INORG	Chromium (total)	7440-47-3	D		2				1.40E-03	1.40E-03	1.0E-01		1.0E-01	
Deep	INORG	Chromium (total)	7440-47-3	T		6	5	2.80E-03	8.40E-03	1.40E-03	1.40E-03	1.0E-01	8.4E-02	1.0E-01	8.4E-02
Deep	INORG	Cobalt	7440-48-4	D	B1	2				1.30E-03	1.30E-03	1.0E-01		4.0E-02	
Deep	INORG	Cobalt	7440-48-4	T	B1	6	3	7.60E-04	8.40E-03	7.40E-04	1.30E-03	1.0E-01	8.4E-02	4.0E-02	2.1E-01
Deep	INORG	Copper	7440-50-8	D	D	2				4.20E-03	4.20E-03	4.0E+00		1.4E+00	
Deep	INORG	Copper	7440-50-8	T	D	6				1.70E-03	4.20E-03	4.0E+00		1.4E+00	
Deep	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	2.50E-03	4.0E-03		4.0E-03	
Deep	INORG	Lead	7439-92-1	T	B2	6				1.60E-03	2.50E-03	4.0E-03		4.0E-03	
Deep	INORG	Manganese	7439-96-5	D	D	2	1	6.18E-02	6.18E-02	9.00E-04	9.00E-04	2.5E+00	2.5E-02	8.6E-01	7.2E-02
Deep	INORG	Manganese	7439-96-5	T	D	6	5	4.61E-02	2.55E-01	9.00E-04	9.00E-04	2.5E+00	1.0E-01	8.6E-01	3.0E-01
Deep	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	6.90E-05	2.0E-03		2.0E-03	
Deep	INORG	Mercury	7439-97-6	T	D	6				6.90E-05	8.70E-05	2.0E-03		2.0E-03	
Deep	INORG	Nickel	7440-02-0	D	A	2				2.20E-03	2.20E-03	1.0E-01		1.0E-01	
Deep	INORG	Nickel	7440-02-0	T	A	6	4	3.10E-03	9.30E-03	2.20E-03	2.90E-03	1.0E-01	9.3E-02	1.0E-01	9.3E-02
Deep	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	4.50E-03	5.0E-02		5.0E-02	
Deep	INORG	Selenium	7782-49-2	T	D	6				4.50E-03	4.70E-03	5.0E-02		5.0E-02	
Deep	INORG	Silver	7440-22-4	D	D	2				1.50E-03	1.50E-03	9.8E-02		3.4E-02	
Deep	INORG	Silver	7440-22-4	T	D	6	1	1.30E-03	1.30E-03	9.80E-04	1.50E-03	9.8E-02	1.3E-02	3.4E-02	3.8E-02
Deep	INORG	Thallium	7440-28-0	D		2				1.80E-05	1.80E-05	2.0E-03		2.0E-03	
Deep	INORG	Thallium	7440-28-0	T		6				1.80E-05	3.30E-05	2.0E-03		2.0E-03	
Deep	INORG	Vanadium	7440-62-2	D		2				8.20E-04	8.20E-04	6.2E-02		4.5E-03	
Deep	INORG	Vanadium	7440-62-2	T		6				6.70E-04	8.20E-04	6.2E-02		4.5E-03	
Deep	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	1.20E-02	5.0E+00		2.4E+00	
Deep	INORG	Zinc	7440-66-6	T	D	6				1.20E-02	1.40E-02	5.0E+00		2.4E+00	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 4-20

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-10/LNAPL AREA NO. 2

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)
VOC	Acetone	67-64-1	D	1					2.20E-01	2.20E-01
VOC	Benzene	71-43-2	A	1					4.80E-02	4.80E-02
VOC	Bromodichloromethane	75-27-4	B2	1					2.90E-02	2.90E-02
VOC	Bromoform	75-25-2	B2	1					4.70E-02	4.70E-02
VOC	Bromomethane	74-83-9	D	1					7.40E-02	7.40E-02
VOC	2-Butanone	78-93-3	D	1	1	6.20E-01	6.20E-01	6.20E-01		
VOC	Carbon Disulfide	75-15-0		1					9.90E-02	9.90E-02
VOC	Carbon Tetrachloride	56-23-5	B2	1					2.90E-02	2.90E-02
VOC	Chlorobenzene	108-90-7	D	1					2.30E-02	2.30E-02
VOC	Chloroethane	75-00-3		1					1.10E-01	1.10E-01
VOC	Chloroform	67-66-3	B2	1					2.90E-02	2.90E-02
VOC	Chloromethane	74-87-3	D	1	1	2.30E-01	2.30E-01	2.30E-01		
VOC	Cumene	98-82-8	D	1	1	2.10E+00	2.10E+00	2.10E+00		
VOC	Cyclohexane	110-82-7		1	1	2.60E-01	2.60E-01	2.60E-01		
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	1					2.30E-01	2.30E-01
VOC	Dibromochloromethane	124-48-1	C	1					3.60E-02	3.60E-02
VOC	1,2-Dibromoethane	106-93-4	B2	1					5.60E-02	5.60E-02
VOC	1,2-Dichlorobenzene	95-50-1	D	1					4.50E-02	4.50E-02
VOC	1,3-Dichlorobenzene	541-73-1	D	1					2.80E-02	2.80E-02
VOC	1,4-Dichlorobenzene	106-46-7	C	1					4.70E-02	4.70E-02
VOC	Dichlorodifluoromethane	75-71-8		1					1.10E-01	1.10E-01
VOC	1,1-Dichloroethane	75-34-3	C	1					3.90E-02	3.90E-02
VOC	1,2-Dichloroethane	107-06-2	B2	1					3.10E-02	3.10E-02
VOC	1,1-Dichloroethene	75-35-4	C	1					4.70E-02	4.70E-02
VOC	cis-1,2-Dichloroethene	156-59-2	D	1					4.60E-02	4.60E-02
VOC	trans-1,2-Dichloroethene	156-60-5		1					5.20E-02	5.20E-02
VOC	1,2-Dichloropropane	78-87-5	B2	1					2.60E-02	2.60E-02
VOC	1,3-Dichloropropene (summed)	542-75-6	B2	1					3.30E-02	3.30E-02
VOC	Ethyl Benzene	100-41-4	D	1	1	2.10E+00	2.10E+00	2.10E+00		
VOC	2-Hexanone	591-78-6		1					8.70E-02	8.70E-02
VOC	Methyl Acetate	79-20-9		1					1.40E+00	1.40E+00
VOC	Methyl tert-butyl ether	1634-04-4		1					3.20E-02	3.20E-02
VOC	4-Methyl-2-pentanone	108-10-1		1					8.40E-02	8.40E-02
VOC	Methylcyclohexane	108-87-2		1	1	1.70E+00	1.70E+00	1.70E+00		
VOC	Methylene Chloride	75-09-2	B2	1					1.20E-01	1.20E-01
VOC	Styrene	100-42-5		1					4.80E-02	4.80E-02
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1					3.10E-02	3.10E-02
VOC	Tetrachloroethene	127-18-4	C-B2	1					4.30E-02	4.30E-02
VOC	Toluene	108-88-3	D	1	1	1.40E+00	1.40E+00	1.40E+00		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1					3.20E-02	3.20E-02
VOC	1,1,1-Trichloroethane	71-55-6	D	1					2.90E-02	2.90E-02
VOC	1,1,2-Trichloroethane	79-00-5	C	1					4.70E-02	4.70E-02
VOC	Trichloroethene	79-01-6	C-B2	1					4.90E-02	4.90E-02
VOC	Trichlorofluoromethane	75-69-4		1					5.50E-02	5.50E-02
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		1					2.90E+00	2.90E+00
VOC	Vinyl Chloride	75-01-4	A	1					3.10E-02	3.10E-02
VOC	Xylenes (total)	1330-20-7	D	1	1	1.50E+01	1.50E+01	1.50E+01		
SVOC	Acenaphthene	83-32-9		1					1.30E+00	1.30E+00
SVOC	Acenaphthylene	208-96-8	D	1					1.20E+00	1.20E+00
SVOC	Acetophenone	98-86-2	D	1					1.20E+00	1.20E+00
SVOC	Anthracene	120-12-7	D	1	1	6.40E+01	6.40E+01	6.40E+01		

TABLE 4-20

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-10/LNAPL AREA NO. 2

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)
SVOC	Atrazine	1912-24-9		1					3.80E+00	3.80E+00
SVOC	Benzaldehyde	100-52-7		1					4.20E+00	4.20E+00
SVOC	Benzo(a)anthracene	56-55-3	B2	1					1.40E+00	1.40E+00
SVOC	Benzo(a)pyrene	50-32-8	B2	1					1.50E+00	1.50E+00
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1					1.40E+00	1.40E+00
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1					1.40E+00	1.40E+00
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1					1.30E+00	1.30E+00
SVOC	Biphenyl	92-52-4		1	1	5.10E+01	5.10E+01	5.10E+01		
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1					1.20E+00	1.20E+00
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1					1.30E+00	1.30E+00
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1					1.40E+00	1.40E+00
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1					1.50E+00	1.50E+00
SVOC	Butylbenzylphthalate	85-68-7	C	1					1.30E+00	1.30E+00
SVOC	Caprolactam	105-60-2		1					4.50E+00	4.50E+00
SVOC	Carbazole	86-74-8	B2	1					1.30E+00	1.30E+00
SVOC	4-Chloro-3-methylphenol	59-50-7		1					1.30E+00	1.30E+00
SVOC	4-Chloroaniline	106-47-8		1					1.30E+00	1.30E+00
SVOC	2-Chloronaphthalene	91-58-7		1					1.20E+00	1.20E+00
SVOC	2-Chlorophenol	95-57-8		1					1.30E+00	1.30E+00
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		1					1.30E+00	1.30E+00
SVOC	Chrysene	218-01-9	B2	1					1.20E+00	1.20E+00
SVOC	Di-n-butylphthalate	84-74-2	D	1					3.80E+00	3.80E+00
SVOC	Di-n-octylphthalate	117-84-0		1					1.40E+00	1.40E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1					1.30E+00	1.30E+00
SVOC	Dibenzofuran	132-64-9	D	1					1.20E+00	1.20E+00
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1					9.80E-01	9.80E-01
SVOC	2,4-Dichlorophenol	120-83-2		1					1.20E+00	1.20E+00
SVOC	Diethylphthalate	84-66-2	D	1					3.80E+00	3.80E+00
SVOC	2,4-Dimethylphenol	105-67-9		1					2.00E+00	2.00E+00
SVOC	Dimethylphthalate	131-11-3	D	1					4.00E+00	4.00E+00
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1					4.00E+00	4.00E+00
SVOC	2,4-Dinitrophenol	51-28-5		1					2.80E+00	2.80E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1					1.20E+00	1.20E+00
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1					1.20E+00	1.20E+00
SVOC	Fluoranthene	206-44-0	D	1	1	9.00E+01	9.00E+01	9.00E+01		
SVOC	Fluorene	86-73-7	D	1	1	1.30E+02	1.30E+02	1.30E+02		
SVOC	Hexachlorobenzene	118-74-1	B2	1					1.40E+00	1.40E+00
SVOC	Hexachlorobutadiene	87-68-3	C	1					1.10E+00	1.10E+00
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1					1.50E+00	1.50E+00
SVOC	Hexachloroethane	67-72-1	C	1					1.20E+00	1.20E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1					1.80E+00	1.80E+00
SVOC	Isophorone	78-59-1	C	1					1.10E+00	1.10E+00
SVOC	2-Methylnaphthalene	91-57-6		1	1	1.70E+02	1.70E+02	1.70E+02		
SVOC	Methylphenol (summed)	1319-77-3		1					1.20E+00	1.20E+00
SVOC	Naphthalene	91-20-3	C	1					1.20E+00	1.20E+00
SVOC	2-Nitroaniline	88-74-4		1					1.20E+00	1.20E+00

TABLE 4-20

GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

CORRECTIVE MEASURES PROPOSAL

DATA SUMMARY FOR
AOI W-10/LNAPL AREA NO. 2

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)
SVOC	3-Nitroaniline	99-09-2	C	1					3.50E+00	3.50E+00
SVOC	4-Nitroaniline	100-01-6	C	1					1.70E+00	1.70E+00
SVOC	Nitrobenzene	98-95-3	D	1					1.20E+00	1.20E+00
SVOC	2-Nitrophenol	88-75-5		1					1.20E+00	1.20E+00
SVOC	4-Nitrophenol	100-02-7		1					4.80E+00	4.80E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1					1.20E+00	1.20E+00
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1					1.10E+00	1.10E+00
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1					1.30E+00	1.30E+00
SVOC	Pentachlorophenol	87-86-5	B2	1					3.00E+00	3.00E+00
SVOC	Phenanthrene	85-01-8	D	1	1	5.40E+02	5.40E+02	5.40E+02		
SVOC	Phenol	108-95-2	D	1					1.20E+00	1.20E+00
SVOC	Pyrene	129-00-0	D	1	1	1.10E+02	1.10E+02	1.10E+02		
SVOC	2,4,5-Trichlorophenol	95-95-4		1					1.40E+00	1.40E+00
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1					1.60E+00	1.60E+00
P/PCB	PCBs (summed)	1336-36-3	B2	1	1	1.89E+02	1.89E+02	1.89E+02		
INORG	Antimony	7440-36-0		1					4.90E-01	4.90E-01
INORG	Arsenic	7440-38-2	A	1	1	7.20E+00	7.20E+00	7.20E+00		
INORG	Barium	7440-39-3	D	1	1	2.20E+00	2.20E+00	2.20E+00		
INORG	Beryllium	7440-41-7	B1	1					4.60E-02	4.60E-02
INORG	Cadmium	7440-43-9	B1	1					4.30E-02	4.30E-02
INORG	Chromium (total)	7440-47-3		1	1	2.50E+00	2.50E+00	2.50E+00		
INORG	Cobalt	7440-48-4		1					1.50E-01	1.50E-01
INORG	Copper	7440-50-8	D	1	1	6.20E-01	6.20E-01	6.20E-01		
INORG	Lead	7439-92-1	B2	1	1	6.80E-01	6.80E-01	6.80E-01		
INORG	Manganese	7439-96-5	D	1	1	2.20E-01	2.20E-01	2.20E-01		
INORG	Mercury	7439-97-6	D	1					4.70E-03	4.70E-03
INORG	Nickel	7440-02-0	A	1	1	1.60E+00	1.60E+00	1.60E+00		
INORG	Selenium	7782-49-2	D	1	1	8.30E-01	8.30E-01	8.30E-01		
INORG	Silver	7440-22-4	D	1					1.50E-01	1.50E-01
INORG	Thallium	7440-28-0		1					5.00E-01	5.00E-01
INORG	Vanadium	7440-62-2		1	1	2.50E+00	2.50E+00	2.50E+00		
INORG	Zinc	7440-66-6	D	1					1.20E+00	1.20E+00
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	1	1	5.31E-04	5.31E-04	5.31E-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

Table 4-21: Data Summary for AOI W-10 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	10	1	3.10E-03	3.10E-03	5.10E-04	1.10E-03	1.0E+06	3.1E-09	3.1E+04	1.0E-07	7.3E-01	4.2E-03
Shallow	VOC	Benzene	71-43-2	T	A	10	3	1.90E-04	5.80E-04	1.60E-04	3.70E-04	3.5E+01	1.7E-05	1.1E+01	5.3E-05	5.0E-03	1.2E-01
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	10	1	3.00E-04	3.00E-04	1.70E-04	3.20E-04	3.7E+01	8.1E-06	1.4E+01	2.1E-05	1.0E-01	3.0E-03
Shallow	VOC	Bromoform	75-25-2	T	B2	10				1.80E-04	3.70E-04	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	10				2.00E-04	3.00E-04	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	10	1	1.00E-03	1.00E-03	4.10E-04	5.90E-04	2.4E+05	4.2E-09	2.4E+05	4.2E-09	1.3E+01	7.7E-05
Shallow	VOC	Carbon Disulfide	75-15-0	T		10	1	2.00E-04	2.00E-04	2.00E-04	2.40E-04	5.5E+02	3.6E-07	1.2E+03	1.7E-07	8.0E-01	2.5E-04
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	10				1.20E-04	3.70E-04	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	10				1.40E-04	3.80E-04	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		10				2.60E-04	2.90E-04	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	10	3	2.00E-04	5.70E-04	1.40E-04	3.50E-04	1.8E+02	3.2E-06	1.5E+02	3.8E-06	1.0E-01	5.7E-03
Shallow	VOC	Chloromethane	74-87-3	T	D	10				1.30E-04	4.90E-04	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	10	1	3.00E-04	3.00E-04	1.20E-04	3.90E-04	5.6E+01	5.4E-06	5.6E+01	5.4E-06	8.0E-01	3.8E-04
Shallow	VOC	Cyclohexane	110-82-7	T	ID	10				1.30E-04	3.30E-04						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	10				6.20E-04	8.20E-04	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	10				2.60E-04	3.70E-04	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	10				2.20E-04	3.40E-04	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	10				1.10E-04	3.80E-04	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	10				1.50E-04	3.80E-04			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	10				1.70E-04	3.80E-04	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		10				2.60E-04	4.90E-04	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	10	3	7.30E-04	1.20E-03	1.60E-04	3.00E-04	2.3E+03	5.2E-07	2.4E+03	5.0E-07	8.8E-01	1.4E-03
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	10				2.10E-04	2.80E-04	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	10				2.40E-04	3.10E-04	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	10				2.20E-04	3.50E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		10				1.50E-04	3.30E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	10				1.70E-04	4.10E-04	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	10				2.70E-04	3.50E-04	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	10	4	1.50E-04	1.00E-03	1.20E-04	4.10E-04	1.7E+02	5.9E-06	1.7E+02	5.9E-06	7.0E-01	1.4E-03
Shallow	VOC	2-Hexanone	591-78-6	T		10				4.60E-04	5.80E-04	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		10				4.10E-04	5.40E-04						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		10	4	6.70E-04	2.00E-02	1.30E-04	2.70E-04	4.7E+04	4.3E-07	6.1E+02	3.3E-05	2.4E-01	8.3E-02
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	10	1	2.40E-04	2.40E-04	2.30E-04	2.60E-04	2.0E+04	1.2E-08	1.3E+04	1.8E-08	1.8E+00	1.3E-04
Shallow	VOC	Methylcyclohexane	108-87-2	T		10				1.50E-04	4.20E-04						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	6				2.90E-04	3.40E-04	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		10				1.50E-04	3.50E-04	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	10				2.50E-04	3.60E-04	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	10				2.30E-04	4.20E-04	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	10	4	5.90E-04	1.90E-03	1.80E-04	3.90E-04	5.3E+02	3.6E-06	5.3E+02	3.6E-06	1.0E+00	1.9E-03
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	10				1.70E-04	4.00E-04	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	10	2	4.10E-04	6.20E-04	1.50E-04	3.90E-04	1.3E+03	4.8E-07	1.3E+03	4.8E-07	2.0E-01	3.1E-03
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	10				3.00E-04	3.60E-04	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	10				1.40E-04	4.20E-04	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		10				2.80E-04	5.40E-04	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		10				3.20E-04	3.20E-04	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	10				1.50E-04	3.60E-04	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	10	4	5.80E-04	7.80E-03	3.30E-04	4.40E-04	1.9E+02	4.1E-05	1.9E+02	4.1E-05	1.0E+01	7.8E-04
Shallow	SVOC	Acenaphthene	83-32-9	T		10				8.00E-04	3.20E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	10				7.10E-04	2.80E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	10				2.60E-03	1.00E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	10				6.80E-04	2.70E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		10				2.50E-03	1.00E-02			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		10				2.80E-03	1.10E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	10				7.00E-04	2.80E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	10				7.30E-04	2.90E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	10				9.40E-04	3.80E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	10				8.50E-04	3.40E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	10				8.40E-04	3.40E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	10				2.60E-03	1.00E-02						

Table 4-21: Data Summary for AOI W-10 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	10				8.70E-04	3.50E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	10				9.70E-04	3.90E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	10	1	1.50E-01	1.50E-01	2.70E-03	1.10E-02			3.2E-01	4.7E-01	6.0E-03	**2.5E+01**
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	10				8.80E-04	3.50E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	10				8.80E-04	3.50E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		10				2.50E-03	1.00E-02			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	10				8.20E-04	3.30E-03			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		10				9.90E-04	4.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		10				6.10E-04	2.40E-03						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		10				8.50E-04	3.40E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		10				1.00E-03	4.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		10				7.90E-04	3.20E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	10				7.50E-04	3.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	10				7.90E-04	3.20E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	10				1.10E-03	4.40E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	3.70E-03			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		10				8.50E-04	3.40E-03			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	10				6.50E-04	2.60E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		10				8.50E-04	3.40E-03			5.2E+02		3.7E-01	
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	10				7.60E-04	3.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	10				6.70E-04	2.70E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		10				1.30E-03	5.20E-03			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		10				3.00E-03	1.20E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	10				7.90E-04	3.20E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	10				5.70E-04	2.30E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		10				1.10E-03	4.40E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	10	1	8.20E-04	8.20E-04	8.10E-04	3.20E-03	2.1E-01	3.9E-03	2.1E-01	3.9E-03	2.1E-01	3.9E-03
Shallow	SVOC	Fluorene	86-73-7	T	D	10	1	1.90E-03	1.90E-03	1.00E-03	4.00E-03	2.0E+00	9.5E-04	2.0E+00	9.5E-04	8.8E-01	2.2E-03
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	10				7.40E-04	3.00E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	10				7.30E-04	2.90E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	6				1.10E-03	4.40E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	10				7.40E-04	3.00E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	10				6.30E-04	2.50E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	10				6.30E-04	2.50E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	10	1	7.50E-03	7.50E-03	6.40E-04	6.40E-04			2.5E+01	3.0E-04	2.6E-01	2.9E-02
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		10				1.30E-03	5.20E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	10	1	6.90E-03	6.90E-03	7.50E-04	7.50E-04	3.1E+01	2.2E-04	3.1E+01	2.2E-04	5.2E-01	1.3E-02
Shallow	SVOC	2-Nitroaniline	88-74-4	T		10				7.00E-04	2.80E-03						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	10				7.10E-04	2.80E-03						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	10				1.30E-03	5.20E-03						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	10				8.10E-04	3.20E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		10				2.10E-03	8.40E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		10				1.90E-03	7.60E-03						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	10				1.40E-03	5.60E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	10				6.70E-04	2.70E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	10				7.80E-04	3.10E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	10				2.40E-03	9.60E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	10				8.20E-04	3.30E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	10				2.60E-03	1.00E-02			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	10				1.10E-03	4.40E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		10				1.20E-03	4.80E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	10				1.70E-03	6.80E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	1				8.20E-05	8.20E-05	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	10	2	4.09E-04	8.31E-04	8.20E-05	8.20E-05	4.5E-02	1.8E-02	3.3E-03	2.5E-01	5.0E-04	**1.7E+00**
Shallow	INORG	Antimony	7440-36-0	D		5				2.20E-03	2.20E-03			6.8E+01		6.0E-03	
Shallow	INORG	Antimony	7440-36-0	T		10	1	2.30E-03	2.30E-03	2.20E-03	3.40E-03			6.8E+01	3.4E-05	6.0E-03	3.8E-01
Shallow	INORG	Arsenic	7440-38-2	D	A	5	2	5.00E-03	5.91E-02	3.90E-03	3.90E-03			4.3E+00	1.4E-02	5.0E-02	**1.2E+00**
Shallow	INORG	Arsenic	7440-38-2	T	A	10	4	4.90E-03	6.33E-02	2.10E-03	3.90E-03			4.3E+00	1.5E-02	5.0E-02	**1.3E+00**
Shallow	INORG	Barium	7440-39-3	D	D	5	5	1.05E-02	1.09E-01					1.4E+04	7.8E-06	2.0E+00	5.5E-02

Table 4-21: Data Summary for AOI W-10 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	10	10	1.16E-02	2.19E-01					1.4E+04	1.6E-05	2.0E+00	1.1E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	5				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	10				5.40E-04	6.00E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	5				2.80E-04	2.80E-04			1.9E+02		5.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	10				2.80E-04	2.80E-04			1.9E+02		5.0E-03	
Shallow	INORG	Chromium (total)	7440-47-3	D		5	2	5.30E-03	6.50E-03	1.40E-03	1.40E-03			4.6E+02	1.4E-05	1.0E-01	6.5E-02
Shallow	INORG	Chromium (total)	7440-47-3	T		10	3	5.60E-03	1.84E-02	1.40E-03	1.50E-03			4.6E+02	4.0E-05	1.0E-01	1.8E-01
Shallow	INORG	Cobalt	7440-48-4	D	B1	5	2	2.50E-03	1.11E-02	1.30E-03	1.30E-03			2.4E+03	4.6E-06	4.0E-02	2.8E-01
Shallow	INORG	Cobalt	7440-48-4	T	B1	10	4	1.30E-03	1.14E-02	7.40E-04	1.30E-03			2.4E+03	4.8E-06	4.0E-02	2.9E-01
Shallow	INORG	Copper	7440-50-8	D	D	5	1	4.60E-03	4.60E-03	4.20E-03	4.20E-03			7.4E+03	6.2E-07	1.4E+00	3.3E-03
Shallow	INORG	Copper	7440-50-8	T	D	10	1	4.30E-03	4.30E-03	1.70E-03	4.20E-03			7.4E+03	5.8E-07	1.4E+00	3.1E-03
Shallow	INORG	Lead	7439-92-1	D	B2	5				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	10				1.60E-03	2.50E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	D	D	5	5	1.09E-02	4.83E-01					9.1E+03	5.3E-05	8.6E-01	5.6E-01
Shallow	INORG	Manganese	7439-96-5	T	D	10	10	9.90E-03	5.11E-01					9.1E+03	5.6E-05	8.6E-01	5.9E-01
Shallow	INORG	Mercury	7439-97-6	D	D	5				6.90E-05	6.90E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	10	2	7.50E-05	9.10E-05	6.90E-05	8.70E-05	5.6E-02	1.6E-03	5.6E-02	1.6E-03	2.0E-03	4.6E-02
Shallow	INORG	Nickel	7440-02-0	D	A	5	3	3.10E-03	2.42E-02	2.20E-03	2.20E-03			7.4E+04	3.3E-07	1.0E-01	2.4E-01
Shallow	INORG	Nickel	7440-02-0	T	A	10	5	3.50E-03	2.47E-02	2.20E-03	2.90E-03			7.4E+04	3.3E-07	1.0E-01	2.5E-01
Shallow	INORG	Selenium	7782-49-2	D	D	5				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	10	1	4.90E-03	4.90E-03	4.50E-03	4.70E-03			9.7E+02	5.1E-06	5.0E-02	9.8E-02
Shallow	INORG	Silver	7440-22-4	D	D	5				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	10				9.80E-04	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		5	2	2.80E-05	5.50E-03	1.80E-05	1.80E-05			1.3E+01	4.2E-04	2.0E-03	**2.8E+00**
Shallow	INORG	Thallium	7440-28-0	T		10	1	6.80E-03	6.80E-03	1.80E-05	3.30E-05			1.3E+01	5.2E-04	2.0E-03	**3.4E+00**
Shallow	INORG	Vanadium	7440-62-2	D		5	2	1.70E-03	2.40E-03	8.20E-04	8.20E-04			9.7E+02	2.5E-06	4.5E-03	5.3E-01
Shallow	INORG	Vanadium	7440-62-2	T		10	3	1.20E-03	3.00E-03	6.70E-04	8.20E-04			9.7E+02	3.1E-06	4.5E-03	6.7E-01
Shallow	INORG	Zinc	7440-66-6	D	D	5				1.20E-02	1.20E-02			1.1E+05		2.4E+00	
Shallow	INORG	Zinc	7440-66-6	T	D	10	1	1.46E-02	1.46E-02	1.20E-02	1.40E-02			1.1E+05	1.3E-07	2.4E+00	6.1E-03
Shallow	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	9	3	1.74E-09	4.88E-09	2.71E-09	3.99E-08			1.0E-08	4.9E-01	3.0E-08	1.6E-01

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

The concentrations for the Target Dioxin congeners were used to calculate a 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-22: Data Summary for AOI M-01 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	6				5.10E-04	1.00E-02	1.0E+06		3.1E+04		7.3E-01	
Shallow	VOC	Benzene	71-43-2	T	A	6				1.60E-04	1.00E-03	3.5E+01		1.1E+01		5.0E-03	
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	6	1	1.90E-04	1.90E-04	1.70E-04	1.00E-03	3.7E+01	5.1E-06	1.4E+01	1.4E-05	1.0E-01	1.9E-03
Shallow	VOC	Bromoform	75-25-2	T	B2	6				1.80E-04	1.00E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	6				2.00E-04	1.00E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	6				4.10E-04	1.00E-02	2.4E+05		2.4E+05		1.3E+01	
Shallow	VOC	Carbon Disulfide	75-15-0	T		6				2.00E-04	1.00E-03	5.5E+02		1.2E+03		8.0E-01	
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.20E-04	1.00E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	6				1.40E-04	1.00E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		6				2.60E-04	1.00E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	6	3	4.20E-04	6.70E-04	1.40E-04	1.40E-04	1.8E+02	3.7E-06	1.5E+02	4.5E-06	1.0E-01	6.7E-03
Shallow	VOC	Chloromethane	74-87-3	T	D	6				1.30E-04	1.00E-03	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	6				1.20E-04	1.00E-03	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	6				1.30E-04	1.00E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				6.20E-04	2.00E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	6				2.60E-04	1.00E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	1.00E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.10E-04	1.00E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				1.50E-04	1.00E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.70E-04	1.00E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		6	4	6.70E-04	2.40E-02	2.60E-04	2.60E-04	3.0E+02	8.0E-05	3.0E+02	8.0E-05	1.7E+00	1.4E-02
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	6				1.60E-04	1.00E-03	2.3E+03		2.4E+03		8.8E-01	
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.10E-04	1.00E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.40E-04	1.00E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	6				2.20E-04	5.00E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				1.50E-04	5.00E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.70E-04	1.00E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				2.70E-04	1.00E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	6				1.20E-04	1.00E-03	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		6				4.60E-04	1.00E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		6				4.10E-04	1.00E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		6				1.30E-04	5.00E-03	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6				2.30E-04	1.00E-02	2.0E+04		1.3E+04		1.8E+00	
Shallow	VOC	Methylcyclohexane	108-87-2	T		6				1.50E-04	1.00E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	6				3.40E-04	1.00E-03	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		6				1.50E-04	1.00E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.50E-04	1.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	6	2	3.80E-04	4.10E-04	2.30E-04	1.00E-03	1.7E+02	2.4E-06	1.2E+01	3.4E-05	5.0E-03	8.2E-02
Shallow	VOC	Toluene	108-88-3	T	D	6	1	4.40E-04	4.40E-04	1.80E-04	1.00E-03	5.3E+02	8.3E-07	5.3E+02	8.3E-07	1.0E+00	4.4E-04
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.70E-04	1.00E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6	3	5.30E-04	1.00E-03	1.50E-04	1.00E-03	1.3E+03	7.7E-07	1.3E+03	7.7E-07	2.0E-01	5.0E-03
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				3.00E-04	1.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	6				1.40E-04	1.00E-03	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		6				2.80E-04	1.00E-03	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	6				1.50E-04	1.00E-03	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	6	1	3.70E-04	3.70E-04	3.30E-04	1.00E-03	1.9E+02	1.9E-06	1.9E+02	1.9E-06	1.0E+01	3.7E-05
Shallow	SVOC	Acenaphthene	83-32-9	T		6				8.00E-04	5.00E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	6				7.10E-04	5.00E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	6				2.60E-03	1.00E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	6				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		6				2.50E-03	5.00E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		6				2.80E-03	1.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				7.00E-04	5.00E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				7.30E-04	5.00E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				9.40E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				8.50E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				8.40E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	6				2.60E-03	1.00E-02						

Table 4-22: Data Summary for AOI M-01 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				8.70E-04	5.00E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	6				9.70E-04	5.00E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6				2.70E-03	5.00E-03			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				8.80E-04	5.00E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				8.80E-04	5.00E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		6				2.50E-03	1.00E-02			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	6				8.20E-04	1.00E-02			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				9.90E-04	5.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		3				6.10E-04	1.00E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		6				8.50E-04	5.00E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		6				1.00E-03	5.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				7.90E-04	5.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	6				7.50E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				7.90E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	6				1.10E-03	5.00E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	3				9.30E-04	2.00E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		6				8.50E-04	1.00E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	6				6.50E-04	5.00E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		6				8.50E-04	5.00E-03			5.2E+02		3.7E-01	
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	6				7.60E-04	5.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				6.70E-04	5.00E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				1.30E-03	2.00E-02			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.00E-03	2.00E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				7.90E-04	5.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				5.70E-04	5.00E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		6				1.10E-03	5.00E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	6				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	6				1.00E-03	5.00E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.40E-04	5.00E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	6				7.30E-04	5.00E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	6				1.10E-03	5.00E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	6				7.40E-04	5.00E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.30E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	6				6.30E-04	5.00E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	6				6.40E-04	5.00E-03			2.5E+01		2.6E-01	
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		6				1.30E-03	5.00E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	6				7.50E-04	5.00E-03	3.1E+01		3.1E+01		5.2E-01	
Shallow	SVOC	2-Nitroaniline	88-74-4	T		6				7.00E-04	2.00E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	3				7.10E-04	2.00E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	6				1.30E-03	2.00E-02						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	6				8.10E-04	5.00E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		6				2.10E-03	5.00E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		6				1.90E-03	2.00E-02						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				1.40E-03	5.00E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				6.70E-04	5.00E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				7.80E-04	5.00E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	6				2.40E-03	5.00E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	6				8.20E-04	5.00E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	6				2.60E-03	5.00E-03			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	6				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				1.20E-03	5.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				1.70E-03	5.00E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	3				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	6				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	INORG	Antimony	7440-36-0	D		6	2	4.20E-03	6.00E-03	2.20E-03	2.50E-02			6.8E+01	8.8E-05	6.0E-03	1.0E+00
Shallow	INORG	Antimony	7440-36-0	T		6	2	5.00E-03	7.70E-03	2.20E-03	2.50E-02			6.8E+01	1.1E-04	6.0E-03	**1.3E+00**
Shallow	INORG	Arsenic	7440-38-2	D	A	6	3	4.20E-03	6.40E-03	3.90E-03	1.00E-02			4.3E+00	1.5E-03	5.0E-02	1.3E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	6	5	4.70E-03	7.00E-03	1.00E-02	1.00E-02			4.3E+00	1.6E-03	5.0E-02	1.4E-01
Shallow	INORG	Barium	7440-39-3	D	D	6	6	1.41E-02	1.77E-01					1.4E+04	1.3E-05	2.0E+00	8.9E-02

Table 4-22: Data Summary for AOI M-01 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	6	6	1.36E-02	1.72E-01					1.4E+04	1.2E-05	2.0E+00	8.6E-02
Shallow	INORG	Beryllium	7440-41-7	D	B1	6				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	6				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	6				2.80E-04	5.00E-03			1.9E+02		5.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	6	1	3.80E-04	3.80E-04	2.80E-04	5.00E-03			1.9E+02	2.0E-06	5.0E-03	7.6E-02
Shallow	INORG	Chromium (total)	7440-47-3	D		4	1	3.64E-02	3.64E-02	1.40E-03	1.00E-02			4.6E+02	7.9E-05	1.0E-01	3.6E-01
Shallow	INORG	Chromium III	16065-83-1	D	D	2	1	3.87E-02	3.87E-02	1.40E-03	1.40E-03			2.9E+05	1.3E-07	3.8E+01	1.0E-03
Shallow	INORG	Chromium III	16065-83-1	T	D	6	2		4.85E-02	1.40E-03	1.00E-02			2.9E+05	1.7E-07	3.8E+01	1.3E-03
Shallow	INORG	Chromium VI	18540-29-9	D	A	2				6.90E-03	6.90E-03			4.6E+02		1.0E-01	
Shallow	INORG	Chromium VI	18540-29-9	T	A	6	1	3.38E-02	3.38E-02	6.90E-03	2.00E-02			4.6E+02	7.3E-05	1.0E-01	3.4E-01
Shallow	INORG	Cobalt	7440-48-4	D	B1	6	4	2.20E-03	2.90E-03	1.30E-03	1.30E-03			2.4E+03	1.2E-06	4.0E-02	7.3E-02
Shallow	INORG	Cobalt	7440-48-4	T	B1	6	4	2.20E-03	2.80E-03	1.30E-03	1.30E-03			2.4E+03	1.2E-06	4.0E-02	7.0E-02
Shallow	INORG	Copper	7440-50-8	D	D	6				4.20E-03	5.00E-03			7.4E+03		1.4E+00	
Shallow	INORG	Copper	7440-50-8	T	D	6				4.20E-03	5.00E-03			7.4E+03		1.4E+00	
Shallow	INORG	Cyanide (total)	57-12-5	T	D	11	7	5.50E-03	1.30E+00	1.70E-03	1.80E-03			5.7E+01	2.3E-02	2.0E-01	**6.5E+00**
Shallow	INORG	Lead	7439-92-1	D	B2	6				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	6				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	D	D	6	5	9.40E-04	5.46E-01	9.00E-04	9.00E-04			9.1E+03	6.0E-05	8.6E-01	6.3E-01
Shallow	INORG	Manganese	7439-96-5	T	D	6	5	2.63E-02	5.48E-01	9.00E-04	9.00E-04			9.1E+03	6.0E-05	8.6E-01	6.4E-01
Shallow	INORG	Mercury	7439-97-6	D	D	6				6.90E-05	2.00E-04	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	6				6.90E-05	2.00E-04	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Nickel	7440-02-0	D	A	6	2	2.40E-03	3.00E-03	2.20E-03	2.20E-03			7.4E+04	4.1E-08	1.0E-01	3.0E-02
Shallow	INORG	Nickel	7440-02-0	T	A	6	1	3.70E-03	3.70E-03	2.20E-03	2.00E-02			7.4E+04	5.0E-08	1.0E-01	3.7E-02
Shallow	INORG	Selenium	7782-49-2	D	D	6	2	5.00E-03	5.60E-03	4.50E-03	5.00E-03			9.7E+02	5.8E-06	5.0E-02	1.1E-01
Shallow	INORG	Selenium	7782-49-2	T	D	6	2	4.50E-03	6.50E-03	4.50E-03	5.00E-03			9.7E+02	6.7E-06	5.0E-02	1.3E-01
Shallow	INORG	Silver	7440-22-4	D	D	6				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	6				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		6	3	2.60E-05	5.40E-05	5.00E-03	1.00E-02			1.3E+01	4.2E-06	2.0E-03	2.7E-02
Shallow	INORG	Thallium	7440-28-0	T		6	1	4.50E-05	4.50E-05	1.80E-05	1.00E-02			1.3E+01	3.5E-06	2.0E-03	2.3E-02
Shallow	INORG	Vanadium	7440-62-2	D		6	2	1.00E-03	1.70E-03	8.20E-04	1.00E-02			9.7E+02	1.8E-06	4.5E-03	3.8E-01
Shallow	INORG	Vanadium	7440-62-2	T		6	1	2.80E-03	2.80E-03	8.20E-04	1.00E-02			9.7E+02	2.9E-06	4.5E-03	6.2E-01
Shallow	INORG	Zinc	7440-66-6	D	D	6	1	1.89E-02	1.89E-02	1.20E-02	2.00E-02			1.1E+05	1.7E-07	2.4E+00	7.9E-03
Shallow	INORG	Zinc	7440-66-6	T	D	6				1.20E-02	2.00E-02			1.1E+05		2.4E+00	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

The MDEQ Drinking Water Criteria for Chromium III was calculated by ENVIRON to account for valence specific toxicity.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-23: Data Summary for AOI M-02 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	36	16	8.25E-04	3.40E+00	5.10E-04	6.90E-02	1.0E+06	3.4E-06	3.1E+04	1.1E-04	7.3E-01	**4.7E+00**
Shallow	VOC	Benzene	71-43-2	T	A	36				1.60E-04	2.50E-02	3.5E+01		1.1E+01		5.0E-03	
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	36	2	4.80E-04	7.20E-04	1.70E-04	2.50E-02	3.7E+01	1.9E-05	1.4E+01	5.1E-05	1.0E-01	7.2E-03
Shallow	VOC	Bromoform	75-25-2	T	B2	36				1.80E-04	2.50E-02	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	36				2.00E-04	2.50E-02	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	36				4.10E-04	2.50E-01	2.4E+05		2.4E+05		1.3E+01	
Shallow	VOC	Carbon Disulfide	75-15-0	T		36				2.00E-04	2.50E-02	5.5E+02		1.2E+03		8.0E-01	
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	36				1.20E-04	2.50E-02	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	36				1.40E-04	2.50E-02	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		36	7	2.70E-03	5.80E-02	2.60E-04	1.80E-02	5.7E+03	1.0E-05	4.4E+02	1.3E-04	4.3E-01	1.3E-01
Shallow	VOC	Chloroform	67-66-3	T	B2	36	11	2.00E-04	5.80E-03	1.40E-04	2.20E-02	1.8E+02	3.2E-05	1.5E+02	3.9E-05	1.0E-01	5.8E-02
Shallow	VOC	Chloromethane	74-87-3	T	D	36	1	1.60E-04	1.60E-04	1.30E-04	3.10E-02	4.5E+01	3.6E-06	4.9E+02	3.3E-07	2.6E-01	6.2E-04
Shallow	VOC	Cumene	98-82-8	T	D	36				1.20E-04	2.50E-02	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	36				1.30E-04	2.50E-02						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	36				6.20E-04	5.10E-02	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	36				2.60E-04	2.50E-02	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	36				2.20E-04	2.50E-02	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	36				1.10E-04	2.50E-02	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	36				1.50E-04	2.50E-02			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	36				1.70E-04	2.50E-02	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		36				2.60E-04	5.00E-02	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	36	34	4.80E-04	1.90E+00	3.20E-03	1.10E-02	2.3E+03	8.3E-04	2.4E+03	7.9E-04	8.8E-01	**2.2E+00**
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	36	6	6.20E-04	1.00E-02	2.10E-04	2.50E-02	5.9E+01	1.7E-04	1.9E+01	5.3E-04	5.0E-03	**2.0E+00**
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	36	25	3.30E-04	9.10E-02	2.40E-04	1.60E-02	1.3E+00	7.0E-02	1.1E+01	8.3E-03	7.0E-03	**1.3E+01**
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	36	9	5.80E-04	7.15E-02	2.20E-04	2.20E-02	2.1E+02	3.4E-04	2.0E+02	3.6E-04	7.0E-02	1.0E+00
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		36	3	5.45E-04	3.20E-03	1.50E-04	2.10E-02	2.0E+02	1.6E-05	2.2E+02	1.5E-05	1.0E-01	3.2E-02
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	36				1.70E-04	2.60E-02	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	36				2.70E-04	2.50E-02	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	29				1.20E-04	2.50E-02	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		36				4.60E-04	2.50E-01	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		36				4.10E-04	2.50E-01						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		36				1.30E-04	1.20E-01	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	36	3	1.00E-03	3.20E-02	2.30E-04	2.50E-01	2.0E+04	1.6E-06	1.3E+04	2.5E-06	1.8E+00	1.8E-02
Shallow	VOC	Methylcyclohexane	108-87-2	T		36				1.50E-04	2.60E-02						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	36	10	3.75E-04	2.40E-02	2.90E-04	2.50E-02	1.4E+03	1.7E-05	2.2E+02	1.1E-04	5.0E-03	**4.8E+00**
Shallow	VOC	Styrene	100-42-5	T		36				1.50E-04	2.50E-02	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	36				2.50E-04	2.50E-02	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	36	6	7.20E-04	7.50E-03	2.30E-04	2.60E-02	1.7E+02	4.4E-05	1.2E+01	6.3E-04	5.0E-03	**1.5E+00**
Shallow	VOC	Toluene	108-88-3	T	D	36	1	2.00E-03	2.00E-03	1.80E-04	2.50E-02	5.3E+02	3.8E-06	5.3E+02	3.8E-06	1.0E+00	2.0E-03
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	36				1.70E-04	2.50E-02	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	36	27	4.50E-04	6.00E-01	1.50E-04	1.00E-02	1.3E+03	4.6E-04	1.3E+03	4.6E-04	2.0E-01	**3.0E+00**
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	36	3	1.00E-02	2.00E-02	3.00E-04	2.20E-02	1.1E+02	1.8E-04	2.1E+01	9.5E-04	5.0E-03	**4.0E+00**
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	36	10	1.40E-03	5.60E-02	1.40E-04	2.60E-02	9.7E+01	5.8E-04	2.2E+01	2.5E-03	5.0E-03	**1.1E+01**
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		36				2.80E-04	3.40E-02	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		36	1	6.30E-04	6.30E-04	3.20E-04	2.50E-02	1.7E+02	3.7E-06	1.7E+02	3.7E-06	1.7E+02	3.7E-06
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	36	8	3.80E-04	2.10E-02	1.50E-04	2.50E-02	1.3E+01	1.6E-03	1.0E+00	2.1E-02	2.0E-03	**1.1E+01**
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	36				3.30E-04	2.80E-02	1.9E+02		1.9E+02		1.0E+01	
Shallow	SVOC	Acenaphthene	83-32-9	T		32	1	8.40E-04	8.40E-04	6.90E-04	5.00E-03	4.2E+00	2.0E-04	4.2E+00	2.0E-04	1.3E+00	6.5E-04
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	32				4.10E-04	5.00E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	32				6.50E-04	1.00E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	32	1	7.80E-04	7.80E-04	5.90E-04	5.00E-03	4.3E-02	1.8E-02	4.3E-02	1.8E-02	4.3E-02	1.8E-02
Shallow	SVOC	Atrazine	1912-24-9	T		32				3.50E-04	5.00E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		32				5.90E-04	1.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	32				6.80E-04	5.00E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	32				5.30E-04	5.00E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	32				7.10E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	32				7.00E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	32				6.40E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	32				6.50E-04	1.00E-02						

Table 4-23: Data Summary for AOI M-02 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	32				8.70E-04	5.00E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	32				9.70E-04	5.00E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	32	5	1.10E-03	2.40E-02	2.00E-04	5.00E-03			3.2E-01	7.5E-02	6.0E-03	**4.0E+00**
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	32				7.80E-04	5.00E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	32				2.30E-04	5.00E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		32	1	4.90E-04	4.90E-04	4.50E-04	1.00E-02			3.9E+05	1.3E-09	5.8E+00	8.4E-05
Shallow	SVOC	Carbazole	86-74-8	T	B2	32				6.10E-04	1.00E-02			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		32				5.50E-04	5.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		30				6.10E-04	1.00E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		32				7.30E-04	5.00E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		32				1.00E-03	5.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		32				6.60E-04	5.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	32				6.70E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	32				6.80E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	32				6.60E-04	5.00E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	29				4.70E-04	2.00E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		32				7.00E-04	1.00E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	32	3	5.50E-04	2.40E-03	2.50E-04	5.00E-03			1.1E+03	2.2E-06	5.5E+00	4.4E-04
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		32	3	1.00E-03	1.30E-03	8.50E-04	5.00E-03			5.2E+02	2.5E-06	3.7E-01	3.5E-03
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	32				2.00E-04	5.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	32	5	4.40E-04	1.10E-03	3.70E-04	5.00E-03			1.1E+01	1.0E-04	8.8E-01	1.3E-03
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		32				1.30E-03	2.00E-02			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		32				3.00E-03	2.00E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	32				4.60E-04	5.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	32				5.70E-04	5.00E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		32				6.90E-04	5.00E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	32				7.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	32	6	1.20E-03	4.40E-03	7.50E-04	5.00E-03	2.0E+00	2.2E-03	2.0E+00	2.2E-03	8.8E-01	5.0E-03
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	32				7.40E-04	5.00E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	32				7.30E-04	5.00E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	32				1.10E-03	5.00E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	32				7.40E-04	5.00E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	32				6.30E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	32				6.30E-04	5.00E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	32	4	1.10E-03	2.10E-03	6.40E-04	5.00E-03			2.5E+01	8.4E-05	2.6E-01	8.1E-03
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		32				9.00E-04	5.00E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	32	4	1.30E-03	1.60E-03	7.50E-04	5.00E-03	3.1E+01	5.2E-05	3.1E+01	5.2E-05	5.2E-01	3.1E-03
Shallow	SVOC	2-Nitroaniline	88-74-4	T		32				4.90E-04	2.00E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	29				4.80E-04	2.00E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	31				5.90E-04	2.00E-02						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	32				8.10E-04	5.00E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		32				9.50E-04	5.00E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		32				1.90E-03	2.00E-02						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	32				6.40E-04	5.00E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	32				6.70E-04	5.00E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	32				7.80E-04	5.00E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	32				2.40E-03	5.00E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	32	7	9.10E-04	7.50E-03	6.80E-04	5.00E-03	1.0E+00	7.5E-03	1.0E+00	7.5E-03	5.2E-02	1.4E-01
Shallow	SVOC	Phenol	108-95-2	T	ID	32				1.30E-03	5.00E-03			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	32				6.30E-04	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		32				8.60E-04	5.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	32				7.10E-04	5.00E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	5				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	32	1	4.12E-04	4.12E-04	8.20E-05	4.00E-04	4.5E-02	9.1E-03	3.3E-03	1.2E-01	5.0E-04	8.2E-01
Shallow	INORG	Antimony	7440-36-0	D		10	2	3.40E-03	3.90E-03	2.20E-03	2.20E-03			6.8E+01	5.7E-05	6.0E-03	6.5E-01
Shallow	INORG	Antimony	7440-36-0	T		32	2	2.30E-03	2.50E-03	2.20E-03	3.40E-03			6.8E+01	3.7E-05	6.0E-03	4.2E-01
Shallow	INORG	Arsenic	7440-38-2	D	A	10	2	1.27E-02	3.07E-02	3.90E-03	3.90E-03			4.3E+00	7.1E-03	5.0E-02	6.1E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	32	17	1.83E-03	3.81E-02	2.10E-03	3.90E-03			4.3E+00	8.9E-03	5.0E-02	7.6E-01
Shallow	INORG	Barium	7440-39-3	D	D	10	10	2.05E-02	2.09E-01					1.4E+04	1.5E-05	2.0E+00	1.0E-01

Table 4-23: Data Summary for AOI M-02 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	32	32	1.62E-02	2.58E-01					1.4E+04	1.8E-05	2.0E+00	1.3E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	10				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	32				5.40E-04	6.00E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	10	2	2.20E-04	3.30E-04	2.80E-04	2.80E-04			1.9E+02	1.7E-06	5.0E-03	6.6E-02
Shallow	INORG	Cadmium	7440-43-9	T	B1	32	8	2.80E-04	3.80E-04	2.80E-04	2.80E-04			1.9E+02	2.0E-06	5.0E-03	7.6E-02
Shallow	INORG	Chromium (total)	7440-47-3	D		6				1.40E-03	1.40E-03			4.6E+02		1.0E-01	
Shallow	INORG	Chromium (total)	7440-47-3	T		24	6	1.28E-03	3.20E-03	1.50E-03	1.50E-03			4.6E+02	7.0E-06	1.0E-01	3.2E-02
Shallow	INORG	Chromium III	16065-83-1	D	D	4	1	3.45E-03	3.45E-03	1.40E-03	1.40E-03			2.9E+05	1.2E-08	3.8E+01	9.1E-05
Shallow	INORG	Chromium III	16065-83-1	T	D	8				1.40E-03	1.40E-03			2.9E+05		3.8E+01	
Shallow	INORG	Chromium VI	18540-29-9	D	A	4	1	7.90E-03	7.90E-03	6.90E-03	6.90E-03			4.6E+02	1.7E-05	1.0E-01	7.9E-02
Shallow	INORG	Chromium VI	18540-29-9	T	A	8				6.90E-03	6.90E-03			4.6E+02		1.0E-01	
Shallow	INORG	Cobalt	7440-48-4	D	B1	10	7	1.50E-03	1.87E-02	1.30E-03	1.30E-03			2.4E+03	7.8E-06	4.0E-02	4.7E-01
Shallow	INORG	Cobalt	7440-48-4	T	B1	32	27	8.00E-04	3.05E-02	7.40E-04	1.30E-03			2.4E+03	1.3E-05	4.0E-02	7.6E-01
Shallow	INORG	Copper	7440-50-8	D	D	10	5	4.80E-03	1.68E-02	4.20E-03	4.20E-03			7.4E+03	2.3E-06	1.4E+00	1.2E-02
Shallow	INORG	Copper	7440-50-8	T	D	32	5	4.60E-03	2.51E-01	1.70E-03	4.20E-03			7.4E+03	3.4E-05	1.4E+00	1.8E-01
Shallow	INORG	Cyanide (total)	57-12-5	T	D	11	7	3.18E-03	5.50E-01	1.70E-03	1.70E-03			5.7E+01	9.6E-03	2.0E-01	**2.8E+00**
Shallow	INORG	Lead	7439-92-1	D	B2	10				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	32	1	2.20E-02	2.20E-02	1.60E-03	2.50E-03					4.0E-03	**5.5E+00**
Shallow	INORG	Manganese	7439-96-5	D	D	10	10	3.70E-03	1.17E+00					9.1E+03	1.3E-04	8.6E-01	**1.4E+00**
Shallow	INORG	Manganese	7439-96-5	T	D	32	31	3.60E-03	1.21E+00	6.80E-04	6.80E-04			9.1E+03	1.3E-04	8.6E-01	**1.4E+00**
Shallow	INORG	Mercury	7439-97-6	D	D	10	1	7.70E-05	7.70E-05	6.90E-05	2.00E-04	5.6E-02	1.4E-03	5.6E-02	1.4E-03	2.0E-03	3.9E-02
Shallow	INORG	Mercury	7439-97-6	T	D	32	2	7.70E-05	1.00E-04	6.90E-05	2.00E-04	5.6E-02	1.8E-03	5.6E-02	1.8E-03	2.0E-03	5.0E-02
Shallow	INORG	Nickel	7440-02-0	D	A	10	10	2.70E-03	1.68E-01					7.4E+04	2.3E-06	1.0E-01	**1.7E+00**
Shallow	INORG	Nickel	7440-02-0	T	A	32	31	3.20E-03	1.06E+01	2.90E-03	2.90E-03			7.4E+04	1.4E-04	1.0E-01	**1.1E+02**
Shallow	INORG	Selenium	7782-49-2	D	D	10	1	5.70E-03	5.70E-03	4.50E-03	4.50E-03			9.7E+02	5.9E-06	5.0E-02	1.1E-01
Shallow	INORG	Selenium	7782-49-2	T	D	32	2	5.00E-03	5.40E-03	4.50E-03	4.70E-03			9.7E+02	5.6E-06	5.0E-02	1.1E-01
Shallow	INORG	Silver	7440-22-4	D	D	10				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	32	2	7.95E-04	1.00E-03	9.80E-04	1.50E-03			1.5E+03	6.7E-07	3.4E-02	2.9E-02
Shallow	INORG	Thallium	7440-28-0	D		10	4	4.80E-05	5.60E-03	1.80E-05	5.00E-03			1.3E+01	4.3E-04	2.0E-03	**2.8E+00**
Shallow	INORG	Thallium	7440-28-0	T		32	4	2.00E-05	5.50E-03	1.80E-05	5.00E-03			1.3E+01	4.2E-04	2.0E-03	**2.8E+00**
Shallow	INORG	Vanadium	7440-62-2	D		10	4	1.90E-03	5.80E-03	8.20E-04	8.20E-04			9.7E+02	6.0E-06	4.5E-03	**1.3E+00**
Shallow	INORG	Vanadium	7440-62-2	T		32	9	1.00E-03	1.16E-02	6.70E-04	8.20E-04			9.7E+02	1.2E-05	4.5E-03	**2.6E+00**
Shallow	INORG	Zinc	7440-66-6	D	D	10	3	1.51E-02	8.48E-02	1.20E-02	1.20E-02			1.1E+05	7.7E-07	2.4E+00	3.5E-02
Shallow	INORG	Zinc	7440-66-6	T	D	32	4	1.52E-02	5.54E-01	1.20E-02	1.40E-02			1.1E+05	5.0E-06	2.4E+00	2.3E-01

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

The MDEQ Drinking Water Criteria for Chromium III was calculated by ENVIRON to account for valence specific toxicity.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-24: Data Summary for AOI M-04 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	13	3	2.10E-03	1.70E-01	5.10E-04	3.70E-02	1.0E+06	1.7E-07	3.1E+04	5.5E-06	7.3E-01	2.3E-01
Shallow	VOC	Benzene	71-43-2	T	A	19	6	3.30E-04	9.80E-01	1.60E-04	4.00E-04	3.5E+01	2.8E-02	1.1E+01	8.9E-02	5.0E-03	**2.0E+02**
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	13	1	3.00E-04	3.00E-04	1.70E-04	1.10E-02	3.7E+01	8.1E-06	1.4E+01	2.1E-05	1.0E-01	3.0E-03
Shallow	VOC	Bromoform	75-25-2	T	B2	13				1.80E-04	1.20E-02	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	13				2.00E-04	1.00E-02	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	13				4.10E-04	2.00E-02	2.4E+05		2.4E+05		1.3E+01	
Shallow	VOC	Carbon Disulfide	75-15-0	T		13	1	2.10E-03	2.10E-03	2.00E-04	8.00E-03	5.5E+02	3.8E-06	1.2E+03	1.8E-06	8.0E-01	2.6E-03
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	13				1.20E-04	1.20E-02	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	13				1.40E-04	1.30E-02	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		13				2.60E-04	9.70E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	13	3	8.90E-04	1.30E-03	1.40E-04	1.20E-02	1.8E+02	7.2E-06	1.5E+02	8.7E-06	1.0E-01	1.3E-02
Shallow	VOC	Chloromethane	74-87-3	T	D	13				1.30E-04	1.60E-02	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	13	4	2.70E-04	1.90E-02	1.20E-04	1.30E-02	5.6E+01	3.4E-04	5.6E+01	3.4E-04	8.0E-01	2.4E-02
Shallow	VOC	Cyclohexane	110-82-7	T	ID	13	3	1.30E-01	3.00E-01	1.30E-04	3.30E-04						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	13				6.20E-04	2.70E-02	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	13				2.60E-04	1.20E-02	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	13				2.20E-04	1.10E-02	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	13	1	2.10E-04	2.10E-04	1.10E-04	1.30E-02	1.6E+02	1.3E-06	1.6E+02	1.3E-06	6.0E-01	3.5E-04
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	13				1.50E-04	1.30E-02			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	13	1	1.90E-04	1.90E-04	1.70E-04	1.30E-02	7.4E+01	2.6E-06	6.4E+00	3.0E-05	7.5E-02	2.5E-03
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		13				2.60E-04	1.60E-02	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	13				1.60E-04	1.00E-02	2.3E+03		2.4E+03		8.8E-01	
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	13				2.10E-04	9.30E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	13				2.40E-04	1.00E-02	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	13				2.20E-04	1.20E-02	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		13				1.50E-04	1.10E-02	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	13				1.70E-04	1.40E-02	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	13				2.70E-04	1.20E-02	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	19	7	2.70E-04	1.50E+00	1.20E-04	4.10E-04	1.7E+02	8.8E-03	1.7E+02	8.8E-03	7.0E-01	**2.1E+00**
Shallow	VOC	2-Hexanone	591-78-6	T		13				4.60E-04	1.90E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		13				4.10E-04	1.80E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		13	1	1.20E-03	1.20E-03	1.30E-04	9.00E-03	4.7E+04	2.6E-08	6.1E+02	2.0E-06	2.4E-01	5.0E-03
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	13				2.30E-04	8.70E-03	2.0E+04		1.3E+04		1.8E+00	
Shallow	VOC	Methylcyclohexane	108-87-2	T		13	3	1.80E-02	6.30E-02	1.50E-04	4.20E-04						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	8	2	3.50E-04	1.40E-03	3.40E-04	1.10E-02	1.4E+03	1.0E-06	2.2E+02	6.4E-06	5.0E-03	2.8E-01
Shallow	VOC	Styrene	100-42-5	T		13				1.50E-04	1.20E-02	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	13				2.50E-04	1.20E-02	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	13				2.30E-04	1.40E-02	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	19	6	3.10E-04	5.70E-02	1.70E-04	4.50E-04	5.3E+02	1.1E-04	5.3E+02	1.1E-04	1.0E+00	5.7E-02
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	13	1	2.40E-04	2.40E-04	1.70E-04	1.30E-02	3.0E+02	8.0E-07	1.9E+01	1.3E-05	7.0E-02	3.4E-03
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	13				1.50E-04	1.30E-02	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	13				3.00E-04	1.20E-02	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	13				1.40E-04	1.40E-02	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		13				2.80E-04	1.80E-02	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		13				3.20E-04	1.10E-02	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	13				1.50E-04	1.20E-02	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	19	4	3.00E-01	1.40E+00	3.30E-04	8.20E-04	1.9E+02	7.4E-03	1.9E+02	7.4E-03	1.0E+01	1.4E-01
Shallow	INORG	Lead	7439-92-1	D	B2	8				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	10				1.60E-03	2.50E-03					4.0E-03	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-25: Data Summary for AOI M-05 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	2				8.20E-05	8.20E-05	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	9	4	4.19E-04	1.64E-03	8.20E-05	8.20E-05	4.5E-02	3.6E-02	3.3E-03	5.0E-01	5.0E-04	**3.3E+00**
Shallow	INORG	Antimony	7440-36-0	D		4	1	4.30E-03	4.30E-03	2.20E-03	2.20E-03			6.8E+01	6.3E-05	6.0E-03	7.2E-01
Shallow	INORG	Antimony	7440-36-0	T		4	1	3.50E-03	3.50E-03	2.20E-03	2.20E-03			6.8E+01	5.1E-05	6.0E-03	5.8E-01
Shallow	INORG	Arsenic	7440-38-2	D	A	4	2	2.49E-02	2.67E-02	3.90E-03	3.90E-03			4.3E+00	6.2E-03	5.0E-02	5.3E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	4	3	4.10E-03	2.73E-02	3.90E-03	3.90E-03			4.3E+00	6.3E-03	5.0E-02	5.5E-01
Shallow	INORG	Barium	7440-39-3	D	D	4	4	1.28E+00	4.72E+00					1.4E+04	3.4E-04	2.0E+00	**2.4E+00**
Shallow	INORG	Barium	7440-39-3	T	D	9	9	2.05E-01	4.80E+00					1.4E+04	3.4E-04	2.0E+00	**2.4E+00**
Shallow	INORG	Beryllium	7440-41-7	D	B1	4				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	4	3	3.00E-04	6.60E-04	2.80E-04	2.80E-04			1.9E+02	3.5E-06	5.0E-03	1.3E-01
Shallow	INORG	Cadmium	7440-43-9	T	B1	4	3	3.60E-04	7.10E-04	2.80E-04	2.80E-04			1.9E+02	3.7E-06	5.0E-03	1.4E-01
Shallow	INORG	Chromium (total)	7440-47-3	D		4	3	1.80E-03	2.20E-03	1.40E-03	1.40E-03			4.6E+02	4.8E-06	1.0E-01	2.2E-02
Shallow	INORG	Chromium (total)	7440-47-3	T		4	3	2.50E-03	2.05E-02	1.40E-03	1.40E-03			4.6E+02	4.5E-05	1.0E-01	2.1E-01
Shallow	INORG	Cobalt	7440-48-4	D	B1	4	1	8.00E-03	8.00E-03	1.30E-03	1.30E-03			2.4E+03	3.3E-06	4.0E-02	2.0E-01
Shallow	INORG	Cobalt	7440-48-4	T	B1	4	1	7.90E-03	7.90E-03	1.30E-03	1.30E-03			2.4E+03	3.3E-06	4.0E-02	2.0E-01
Shallow	INORG	Copper	7440-50-8	D	D	4				4.20E-03	4.20E-03			7.4E+03		1.4E+00	
Shallow	INORG	Copper	7440-50-8	T	D	4	1	5.20E-03	5.20E-03	4.20E-03	4.20E-03			7.4E+03	7.0E-07	1.4E+00	3.7E-03
Shallow	INORG	Lead	7439-92-1	D	B2	4				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	4				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	D	D	4	4	9.53E-01	3.57E+00					9.1E+03	3.9E-04	8.6E-01	**4.2E+00**
Shallow	INORG	Manganese	7439-96-5	T	D	9	9	1.25E-01	3.63E+00					9.1E+03	4.0E-04	8.6E-01	**4.2E+00**
Shallow	INORG	Mercury	7439-97-6	D	D	4				6.90E-05	6.90E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	4				6.90E-05	6.90E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Nickel	7440-02-0	D	A	4	2	1.06E-02	1.60E-02	2.20E-03	2.20E-03			7.4E+04	2.2E-07	1.0E-01	1.6E-01
Shallow	INORG	Nickel	7440-02-0	T	A	4	2	1.69E-02	1.75E-02	2.20E-03	2.20E-03			7.4E+04	2.4E-07	1.0E-01	1.8E-01
Shallow	INORG	Selenium	7782-49-2	D	D	4				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	4				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	4				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		4	2	5.00E-03	5.90E-03	1.80E-05	1.80E-05			1.3E+01	4.5E-04	2.0E-03	**3.0E+00**
Shallow	INORG	Thallium	7440-28-0	T		4	1	3.00E-05	3.00E-05	1.80E-05	5.00E-03			1.3E+01	2.3E-06	2.0E-03	1.5E-02
Shallow	INORG	Vanadium	7440-62-2	D		4	2	8.00E-03	1.00E-02	8.20E-04	8.20E-04			9.7E+02	1.0E-05	4.5E-03	**2.2E+00**
Shallow	INORG	Vanadium	7440-62-2	T		4	2	7.80E-03	1.04E-02	8.20E-04	8.20E-04			9.7E+02	1.1E-05	4.5E-03	**2.3E+00**
Shallow	INORG	Zinc	7440-66-6	D	D	4	1	1.33E-02	1.33E-02	1.20E-02	1.20E-02			1.1E+05	1.2E-07	2.4E+00	5.5E-03
Shallow	INORG	Zinc	7440-66-6	T	D	4				1.20E-02	1.20E-02			1.1E+05		2.4E+00	
Shallow	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	D	B2	2				5.02E-09	6.62E-09			1.0E-08		3.0E-08	
Shallow	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	2				5.85E-09	9.14E-09			1.0E-08		3.0E-08	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Target Dioxin congeners were used to calculate a 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs, before comparing to the Screening Levels for 2,3,7,8-TCDD.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-26: Data Summary for AOI M-16 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	4	1	6.95E-03	6.95E-03	5.10E-04	1.00E-02	1.0E+06	7.0E-09	3.1E+04	2.2E-07	7.3E-01	9.5E-03
Shallow	VOC	Benzene	71-43-2	T	A	4				1.60E-04	1.00E-03	3.5E+01		1.1E+01		5.0E-03	
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	4	1	2.15E-04	2.15E-04	1.70E-04	1.00E-03	3.7E+01	5.8E-06	1.4E+01	1.5E-05	1.0E-01	2.2E-03
Shallow	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	1.00E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	3				2.00E-04	1.00E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	4				4.10E-04	1.00E-02	2.4E+05		2.4E+05		1.3E+01	
Shallow	VOC	Carbon Disulfide	75-15-0	T		4				2.00E-04	1.00E-03	5.5E+02		1.2E+03		8.0E-01	
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	1.00E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	1.00E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		4				2.60E-04	1.00E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	4	2	2.00E-04	6.55E-04	1.40E-04	3.50E-04	1.8E+02	3.6E-06	1.5E+02	4.4E-06	1.0E-01	6.6E-03
Shallow	VOC	Chloromethane	74-87-3	T	D	4				1.30E-04	1.00E-03	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	4				1.20E-04	1.00E-03	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	4				1.30E-04	1.00E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	2.00E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	1.00E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	1.00E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	1.00E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	1.00E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	1.00E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	2.00E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	4				1.60E-04	1.00E-03	2.3E+03		2.4E+03		8.8E-01	
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	1.00E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	4				2.40E-04	1.00E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.20E-04	5.00E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	5.00E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	1.00E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	1.00E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	1.00E-03	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	1.00E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	1.00E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		4	1	7.15E-03	7.15E-03	1.30E-04	5.00E-03	4.7E+04	1.5E-07	6.1E+02	1.2E-05	2.4E-01	3.0E-02
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	3				2.30E-04	1.00E-02	2.0E+04		1.3E+04		1.8E+00	
Shallow	VOC	Methylcyclohexane	108-87-2	T		4				1.50E-04	1.00E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	4				2.90E-04	1.00E-03	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		4				1.50E-04	1.00E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	1.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	4				2.30E-04	1.00E-03	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	4	1	1.90E-04	1.90E-04	1.80E-04	1.00E-03	5.3E+02	3.6E-07	5.3E+02	3.6E-07	1.0E+00	1.9E-04
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	1.00E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4	2	2.90E-03	3.00E-03	1.50E-04	1.00E-03	1.3E+03	2.3E-06	1.3E+03	2.3E-06	2.0E-01	1.5E-02
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	1.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	4				1.40E-04	1.00E-03	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	1.00E-03	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	5	3	1.40E-02	2.30E-02	1.50E-04	3.60E-04	1.3E+01	1.8E-03	1.0E+00	2.3E-02	2.0E-03	**1.2E+01**
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	4				3.30E-04	1.00E-03	1.9E+02		1.9E+02		1.0E+01	
Shallow	SVOC	Acenaphthene	83-32-9	T		4				8.00E-04	5.00E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	5.00E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	1.00E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	5.00E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	1.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	5.00E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	5.00E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	1.00E-02						

Table 4-26: Data Summary for AOI M-16 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	5.00E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	5.00E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4	3	2.03E-03	5.50E-03	2.70E-03	2.70E-03			3.2E-01	1.7E-02	6.0E-03	9.2E-01
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	5.00E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	5.00E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		4				2.50E-03	1.00E-02			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	4				8.20E-04	1.00E-02			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	5.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		4				6.10E-04	1.00E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	5.00E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	5.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	5.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	5.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	5.00E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	2.00E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	1.00E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	5.00E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	5.00E-03			5.2E+02		3.7E-01	
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	5.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	5.00E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	2.00E-02			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	2.00E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	5.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.00E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	5.00E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	5.00E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	5.00E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	5.00E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	5.00E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	5.00E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	5.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	5.00E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4				6.40E-04	5.00E-03			2.5E+01		2.6E-01	
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		4				1.30E-03	5.00E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	4				7.50E-04	5.00E-03	3.1E+01		3.1E+01		5.2E-01	
Shallow	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	2.00E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	2.00E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	2.00E-02						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	5.00E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	5.00E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	2.00E-02						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	5.00E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	5.00E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	5.00E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	5.00E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	4				8.20E-04	5.00E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	4				2.60E-03	5.00E-03			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	5.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	5.00E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	4.00E-04	4.5E-02		3.3E-03		5.0E-04	
Shallow	INORG	Antimony	7440-36-0	D		3				2.20E-03	2.50E-02			6.8E+01		6.0E-03	
Shallow	INORG	Antimony	7440-36-0	T		4				2.20E-03	2.50E-02			6.8E+01		6.0E-03	
Shallow	INORG	Arsenic	7440-38-2	D	A	3	1	8.30E-03	8.30E-03	3.90E-03	1.00E-02			4.3E+00	1.9E-03	5.0E-02	1.7E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	4	1	8.80E-03	8.80E-03	2.10E-03	1.00E-02			4.3E+00	2.0E-03	5.0E-02	1.8E-01
Shallow	INORG	Barium	7440-39-3	D	D	3	3	4.58E-02	2.12E-01					1.4E+04	1.5E-05	2.0E+00	1.1E-01

Table 4-26: Data Summary for AOI M-16 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Barium	7440-39-3	T	D	4	4	3.60E-02	2.15E-01					1.4E+04	1.5E-05	2.0E+00	1.1E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	3				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	1.00E-03			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	3				2.80E-04	5.00E-03			1.9E+02		5.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	4				2.80E-04	5.00E-03			1.9E+02		5.0E-03	
Shallow	INORG	Chromium (total)	7440-47-3	D		3				1.40E-03	1.00E-02			4.6E+02		1.0E-01	
Shallow	INORG	Chromium (total)	7440-47-3	T		4	2	1.40E-03	1.60E-03	1.40E-03	1.00E-02			4.6E+02	3.5E-06	1.0E-01	1.6E-02
Shallow	INORG	Cobalt	7440-48-4	D	B1	3	1	2.60E-03	2.60E-03	1.30E-03	2.00E-02			2.4E+03	1.1E-06	4.0E-02	6.5E-02
Shallow	INORG	Cobalt	7440-48-4	T	B1	4	2	9.75E-04	2.65E-03	7.40E-04	2.00E-02			2.4E+03	1.1E-06	4.0E-02	6.6E-02
Shallow	INORG	Copper	7440-50-8	D	D	3				4.20E-03	5.00E-03			7.4E+03		1.4E+00	
Shallow	INORG	Copper	7440-50-8	T	D	4				1.70E-03	5.00E-03			7.4E+03		1.4E+00	
Shallow	INORG	Lead	7439-92-1	D	B2	3				2.50E-03	3.00E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	4				1.60E-03	3.00E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	D	D	3	3	9.66E-02	1.05E+00					9.1E+03	1.2E-04	8.6E-01	**1.2E+00**
Shallow	INORG	Manganese	7439-96-5	T	D	4	3	9.65E-02	1.09E+00	6.80E-04	6.80E-04			9.1E+03	1.2E-04	8.6E-01	**1.3E+00**
Shallow	INORG	Mercury	7439-97-6	D	D	3				6.90E-05	2.00E-04	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	4				6.90E-05	2.00E-04	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Nickel	7440-02-0	D	A	3	1	3.10E-03	3.10E-03	2.20E-03	2.00E-02			7.4E+04	4.2E-08	1.0E-01	3.1E-02
Shallow	INORG	Nickel	7440-02-0	T	A	4	1	4.70E-03	4.70E-03	2.20E-03	2.00E-02			7.4E+04	6.4E-08	1.0E-01	4.7E-02
Shallow	INORG	Selenium	7782-49-2	D	D	3				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	5.00E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	3				1.50E-03	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	4				9.80E-04	5.00E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		3				1.80E-05	1.00E-02			1.3E+01		2.0E-03	
Shallow	INORG	Thallium	7440-28-0	T		4				1.80E-05	1.00E-02			1.3E+01		2.0E-03	
Shallow	INORG	Vanadium	7440-62-2	D		3				8.20E-04	1.00E-02			9.7E+02		4.5E-03	
Shallow	INORG	Vanadium	7440-62-2	T		4				6.70E-04	1.00E-02			9.7E+02		4.5E-03	
Shallow	INORG	Zinc	7440-66-6	D	D	3	2	1.04E-02	1.56E-02	2.00E-02	2.00E-02			1.1E+05	1.4E-07	2.4E+00	6.5E-03
Shallow	INORG	Zinc	7440-66-6	T	D	4	1	1.35E-02	1.35E-02	1.20E-02	2.00E-02			1.1E+05	1.2E-07	2.4E+00	5.6E-03

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-27: Data Summary for AOI P-06 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	14	2	1.20E-02	2.10E-02	5.10E-04	8.50E-02	1.0E+06	2.1E-08	3.1E+04	6.8E-07	7.3E-01	2.9E-02
Shallow	VOC	Benzene	71-43-2	T	A	19	14	3.10E-04	1.20E+00	1.60E-04	3.70E-04	3.5E+01	3.4E-02	1.1E+01	1.1E-01	5.0E-03	**2.4E+02**
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	14	1	3.40E-04	3.40E-04	1.70E-04	2.80E-02	3.7E+01	9.2E-06	1.4E+01	2.4E-05	1.0E-01	3.4E-03
Shallow	VOC	Bromoform	75-25-2	T	B2	14				1.80E-04	3.00E-02	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	10				2.00E-04	3.30E-02	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	14	2	5.90E-04	2.00E-03	4.10E-04	6.80E-02	2.4E+05	8.3E-09	2.4E+05	8.3E-09	1.3E+01	1.5E-04
Shallow	VOC	Carbon Disulfide	75-15-0	T		14				2.00E-04	3.30E-02	5.5E+02		1.2E+03		8.0E-01	
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	14				1.20E-04	2.30E-02	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	14				1.40E-04	2.40E-02	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		14				2.60E-04	4.30E-02	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	14	4	6.50E-04	1.50E-03	1.40E-04	2.30E-02	1.8E+02	8.3E-06	1.5E+02	1.0E-05	1.0E-01	1.5E-02
Shallow	VOC	Chloromethane	74-87-3	T	D	14	1	1.80E-04	1.80E-04	1.30E-04	3.10E-02	4.5E+01	4.0E-06	4.9E+02	3.7E-07	2.6E-01	6.9E-04
Shallow	VOC	Cumene	98-82-8	T	D	14	2	3.30E-02	3.90E-02	1.20E-04	2.00E-02	5.6E+01	7.0E-04	5.6E+01	7.0E-04	8.0E-01	4.9E-02
Shallow	VOC	Cyclohexane	110-82-7	T	ID	14	5	4.20E-04	1.10E-01	1.30E-04	3.30E-04						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	14				6.20E-04	1.00E-01	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	14				2.60E-04	4.30E-02	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	14				2.20E-04	3.70E-02	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	14				1.10E-04	2.40E-02	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	14				1.50E-04	2.50E-02			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	14				1.70E-04	2.80E-02	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		14				2.60E-04	4.30E-02	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	14	1	5.10E-04	5.10E-04	1.60E-04	2.70E-02	2.3E+03	2.2E-07	2.4E+03	2.1E-07	8.8E-01	5.8E-04
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	14				2.10E-04	3.50E-02	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	14				2.40E-04	4.00E-02	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	14				2.20E-04	3.70E-02	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		14				1.50E-04	2.50E-02	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	14				1.70E-04	2.80E-02	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	14				2.70E-04	4.50E-02	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	19	10	1.50E-04	1.60E+00	1.20E-04	4.10E-04	1.7E+02	9.4E-03	1.7E+02	9.4E-03	7.0E-01	**2.3E+00**
Shallow	VOC	2-Hexanone	591-78-6	T		14				4.60E-04	7.70E-02	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		14				4.10E-04	6.80E-02						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		14	2	5.40E-04	2.10E-03	1.30E-04	2.20E-02	4.7E+04	4.5E-08	6.1E+02	3.4E-06	2.4E-01	8.8E-03
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	9	1	7.90E-04	7.90E-04	2.30E-04	3.80E-02	2.0E+04	4.0E-08	1.3E+04	6.1E-08	1.8E+00	4.4E-04
Shallow	VOC	Methylcyclohexane	108-87-2	T		14	2	4.90E-02	7.80E-02	1.50E-04	2.50E-02						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	13				2.90E-04	5.70E-02	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		14				1.50E-04	2.50E-02	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	14				2.50E-04	4.20E-02	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	14				2.30E-04	3.80E-02	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	19	10	1.90E-04	5.40E+00	1.80E-04	3.90E-04	5.3E+02	1.0E-02	5.3E+02	1.0E-02	1.0E+00	**5.4E+00**
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	14				1.70E-04	2.80E-02	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	14				1.50E-04	2.50E-02	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	14				3.00E-04	5.00E-02	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	14				1.40E-04	2.60E-02	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		14				2.80E-04	4.70E-02	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		14				3.20E-04	5.30E-02	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	14				1.50E-04	2.50E-02	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	19	6	3.70E-04	4.20E+00	3.30E-04	1.30E-03	1.9E+02	2.2E-02	1.9E+02	2.2E-02	1.0E+01	4.2E-01
Shallow	SVOC	Acenaphthene	83-32-9	T		10				8.00E-04	4.00E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	10				7.10E-04	3.60E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	10				2.60E-03	1.30E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	10				6.80E-04	3.40E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		10				2.50E-03	1.20E-02			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		10				2.80E-03	1.40E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	10				7.00E-04	3.50E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	10				7.30E-04	3.60E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	10				9.40E-04	4.70E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	10				8.50E-04	4.20E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	10				8.40E-04	4.20E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	10				2.60E-03	1.30E-02						

Table 4-27: Data Summary for AOI P-06 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	10				8.70E-04	4.40E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	10				9.70E-04	4.80E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	10				2.70E-03	1.40E-02			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	10				8.80E-04	4.40E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	10				8.80E-04	4.40E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		10	1	1.20E-02	1.20E-02	2.50E-03	1.20E-02			3.9E+05	3.1E-08	5.8E+00	2.1E-03
Shallow	SVOC	Carbazole	86-74-8	T	B2	10				8.20E-04	4.10E-03			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		10				9.90E-04	5.00E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		10				6.10E-04	3.00E-03						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		10				8.50E-04	4.20E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		10				1.00E-03	5.00E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		10				7.90E-04	4.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	10				7.50E-04	3.80E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	10				7.90E-04	4.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	10				1.10E-03	5.50E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	4.60E-03			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		10				8.50E-04	4.20E-03			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	10				6.50E-04	3.20E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		10	2	3.50E-03	2.80E-02	8.50E-04	8.50E-04			5.2E+02	5.4E-05	3.7E-01	7.6E-02
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	10				7.60E-04	3.80E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	10				6.70E-04	3.40E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		10				1.30E-03	6.50E-03			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		10				3.00E-03	1.50E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	10				7.90E-04	4.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	10				5.70E-04	2.80E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		10				1.10E-03	5.50E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	10				8.10E-04	4.00E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	10				1.00E-03	5.00E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	10				7.40E-04	3.70E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	10				7.30E-04	3.60E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	9				1.10E-03	5.50E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	10				7.40E-04	3.70E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	10				6.30E-04	3.20E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	10				6.30E-04	3.20E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	10	2	9.90E-03	1.60E-02	6.40E-04	6.40E-04			2.5E+01	6.4E-04	2.6E-01	6.2E-02
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		10	1	2.95E-01	2.95E-01	1.30E-03	3.20E-03			8.1E+02	3.6E-04	3.7E-01	8.0E-01
Shallow	SVOC	Naphthalene	91-20-3	T	C	10	2	8.60E-02	9.30E-02	7.50E-04	7.50E-04	3.1E+01	3.0E-03	3.1E+01	3.0E-03	5.2E-01	1.8E-01
Shallow	SVOC	2-Nitroaniline	88-74-4	T		10				7.00E-04	3.50E-03						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	10				7.10E-04	3.60E-03						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	10				1.30E-03	6.50E-03						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	10				8.10E-04	4.00E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		10				2.10E-03	1.00E-02			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		10				1.90E-03	9.50E-03						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	10				1.40E-03	7.00E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	10				6.70E-04	3.40E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	10				7.80E-04	3.90E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	10				2.40E-03	1.20E-02			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	10				8.20E-04	4.10E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	10	1	3.60E-02	3.60E-02	2.60E-03	6.50E-03			2.9E+04	1.2E-06	4.4E+00	8.2E-03
Shallow	SVOC	Pyrene	129-00-0	T	D	10				1.10E-03	5.50E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		10				1.20E-03	6.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	10				1.70E-03	8.50E-03			1.0E+01		1.2E-01	
Shallow	INORG	Antimony	7440-36-0	D		1				2.20E-03	2.20E-03			6.8E+01		6.0E-03	
Shallow	INORG	Antimony	7440-36-0	T		1				2.20E-03	2.20E-03			6.8E+01		6.0E-03	
Shallow	INORG	Arsenic	7440-38-2	D	A	1				3.90E-03	3.90E-03			4.3E+00		5.0E-02	
Shallow	INORG	Arsenic	7440-38-2	T	A	1				3.90E-03	3.90E-03			4.3E+00		5.0E-02	
Shallow	INORG	Barium	7440-39-3	D	D	1	1	9.78E-01	9.78E-01					1.4E+04	7.0E-05	2.0E+00	4.9E-01
Shallow	INORG	Barium	7440-39-3	T	D	1	1	9.94E-01	9.94E-01					1.4E+04	7.1E-05	2.0E+00	5.0E-01
Shallow	INORG	Beryllium	7440-41-7	D	B1	1				5.40E-04	5.40E-04			2.9E+02		4.0E-03	

Table 4-27: Data Summary for AOI P-06 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Beryllium	7440-41-7	T	B1	1				5.40E-04	5.40E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	D	B1	1	1	3.80E-04	3.80E-04					1.9E+02	2.0E-06	5.0E-03	7.6E-02
Shallow	INORG	Cadmium	7440-43-9	T	B1	1	1	3.80E-04	3.80E-04					1.9E+02	2.0E-06	5.0E-03	7.6E-02
Shallow	INORG	Chromium (total)	7440-47-3	D		1				1.40E-03	1.40E-03			4.6E+02		1.0E-01	
Shallow	INORG	Chromium (total)	7440-47-3	T		1				1.40E-03	1.40E-03			4.6E+02		1.0E-01	
Shallow	INORG	Cobalt	7440-48-4	D	B1	1	1	8.30E-03	8.30E-03					2.4E+03	3.5E-06	4.0E-02	2.1E-01
Shallow	INORG	Cobalt	7440-48-4	T	B1	1	1	8.00E-03	8.00E-03					2.4E+03	3.3E-06	4.0E-02	2.0E-01
Shallow	INORG	Copper	7440-50-8	D	D	1				4.20E-03	4.20E-03			7.4E+03		1.4E+00	
Shallow	INORG	Copper	7440-50-8	T	D	1				4.20E-03	4.20E-03			7.4E+03		1.4E+00	
Shallow	INORG	Lead	7439-92-1	D	B2	9				2.50E-03	2.50E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	10				1.60E-03	2.50E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	D	D	1	1	7.22E-01	7.22E-01					9.1E+03	7.9E-05	8.6E-01	8.4E-01
Shallow	INORG	Manganese	7439-96-5	T	D	1	1	7.41E-01	7.41E-01					9.1E+03	8.1E-05	8.6E-01	8.6E-01
Shallow	INORG	Mercury	7439-97-6	D	D	1				6.90E-05	6.90E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	1				6.90E-05	6.90E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Nickel	7440-02-0	D	A	1	1	1.30E-02	1.30E-02					7.4E+04	1.8E-07	1.0E-01	1.3E-01
Shallow	INORG	Nickel	7440-02-0	T	A	1	1	1.32E-02	1.32E-02					7.4E+04	1.8E-07	1.0E-01	1.3E-01
Shallow	INORG	Selenium	7782-49-2	D	D	1				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	1				4.50E-03	4.50E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	1				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	1				1.50E-03	1.50E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		1	1	1.50E-04	1.50E-04					1.3E+01	1.2E-05	2.0E-03	7.5E-02
Shallow	INORG	Thallium	7440-28-0	T		1	1	1.70E-04	1.70E-04					1.3E+01	1.3E-05	2.0E-03	8.5E-02
Shallow	INORG	Vanadium	7440-62-2	D		1				8.20E-04	8.20E-04			9.7E+02		4.5E-03	
Shallow	INORG	Vanadium	7440-62-2	T		1				8.20E-04	8.20E-04			9.7E+02		4.5E-03	
Shallow	INORG	Zinc	7440-66-6	D	D	1	1	1.25E-02	1.25E-02					1.1E+05	1.1E-07	2.4E+00	5.2E-03
Shallow	INORG	Zinc	7440-66-6	T	D	1				1.20E-02	1.20E-02			1.1E+05		2.4E+00	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-28: Data Summary – AOI P-09 – Soil
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min 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 Detect 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 Detect 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	ID	61	21	2.90E-03	3.70E-02	2.60E-03	1.50E-01		1.1E+05	3.4E-07	1.6E+05	2.3E-07	1.7E+08	2.2E-10	7.3E+04	5.1E-07	1.1E+05	3.4E-07	1.3E+05	2.8E-07	3.9E+08	9.5E-11	2.3E+04	1.6E-06
VOC	Benzene	71-43-2	A	61	1	4.10E-04	4.10E-04	2.60E-04	1.40E-02		8.4E+00	4.9E-05	4.5E+01	9.1E-06	4.7E+05	8.7E-10	4.0E+02	1.0E-06	1.6E+00	2.6E-04	1.3E+01	3.2E-05	3.8E+05	1.1E-09	1.8E+02	2.3E-06
VOC	Bromodichloromethane	75-27-4	B2	61				2.50E-04	1.30E-02		6.4E+00		3.1E+01		1.1E+05		4.9E+02		1.2E+00		9.1E+00		8.4E+04		1.1E+02	
VOC	Bromoform	75-25-2	B2	61				3.40E-04	1.20E-02		7.7E+02		3.1E+03		3.6E+06		8.7E+02		1.5E+02		9.0E+02		2.8E+06		8.2E+02	
VOC	Bromomethane	74-83-9	D	61				6.90E-04	4.20E-02		1.6E+00		1.3E+01		1.5E+05		1.0E+03		8.6E-01		1.1E+01		3.3E+05		3.2E+02	
VOC	2-Butanone	78-93-3	ID	61	13	1.50E-03	8.90E-03	1.00E-03	9.50E-02		2.7E+04	3.3E-07	3.5E+04	2.5E-07	2.9E+07	3.1E-10	2.7E+04	3.3E-07	2.7E+04	3.3E-07	2.9E+04	3.1E-07	6.7E+07	1.3E-10	2.7E+04	3.3E-07
VOC	Carbon Disulfide	75-15-0		61	2	3.20E-03	1.10E-02	2.10E-04	1.70E-02		1.4E+02	7.9E-05	1.6E+03	6.9E-06	2.1E+07	5.2E-10	2.8E+02	3.9E-05	7.6E+01	1.4E-04	1.3E+03	8.5E-06	4.7E+07	2.3E-10	2.8E+02	3.9E-05
VOC	Carbon Tetrachloride	56-23-5	B2	61				3.70E-04	1.80E-02		9.9E-01		1.2E+01		1.7E+05		3.9E+02		1.9E-01		3.5E+00		1.3E+05		9.6E+01	
VOC	Chlorobenzene	108-90-7	D	61				2.50E-04	1.30E-02		2.2E+02		9.2E+02		2.1E+06		2.6E+02		1.2E+02		7.7E+02		4.7E+06		2.6E+02	
VOC	Chloroethane	75-00-3		61				7.10E-04	3.80E-02		9.5E+02		3.6E+04		2.9E+08		9.5E+02		9.5E+02		3.0E+04		6.7E+08		9.5E+02	
VOC	Chloroform	67-66-3	B2	61				2.70E-04	1.30E-02		3.8E+01		1.5E+02		1.6E+06		1.5E+03		7.2E+00		4.5E+01		1.3E+06		1.2E+03	
VOC	Chloromethane	74-87-3	D	61				3.60E-04	2.80E-02		1.0E+01		1.2E+02		2.6E+06		1.1E+03		2.3E+00		4.0E+01		4.9E+06		1.1E+03	
VOC	Cumene	98-82-8	D	61	4	3.10E-04	1.40E-03	2.70E-04	1.80E-02		3.9E+02	3.6E-06	2.0E+03	7.0E-07	2.6E+06	5.4E-10	3.9E+02	3.6E-06	3.9E+02	3.6E-06	1.7E+03	8.2E-07	5.8E+06	2.4E-10	3.9E+02	3.6E-06
VOC	Cyclohexane	110-82-7	ID	61	3	7.00E-04	8.40E-04	3.50E-04	2.00E-02																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	61				8.50E-04	2.60E-02		1.2E+00		1.5E+01		5.9E+03		1.2E+00		1.2E+00		1.3E+01		1.3E+04		1.2E+00	
VOC	Dibromochloromethane	124-48-1	C	61				3.40E-04	9.10E-03		2.1E+01		8.0E+01		1.6E+05		5.0E+02		3.9E+00		2.4E+01		1.3E+05		1.1E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	61				2.70E-04	1.50E-02		3.6E+00		5.8E+00		1.8E+04		4.3E-01		6.7E-01		1.7E+00		1.4E+04		2.5E-01	
VOC	1,2-Dichlorobenzene	95-50-1	D	61	1	4.80E-04	4.80E-04	3.00E-04	1.30E-02		2.1E+02	2.3E-06	4.6E+04	1.0E-08	4.4E+07	1.1E-11	2.1E+02	2.3E-06	2.1E+02	2.3E-06	3.9E+04	1.2E-08	1.0E+08	4.8E-12	2.1E+02	2.3E-06
VOC	1,3-Dichlorobenzene	541-73-1	D	61	1	6.00E-04	6.00E-04	2.80E-04	1.30E-02								1.7E+02	3.5E-06							1.7E+02	3.5E-06
VOC	1,4-Dichlorobenzene	106-46-7	C	61				2.50E-04	1.30E-02		1.0E+02		2.6E+02		5.7E+05		1.9E+03		1.9E+01		7.7E+01		4.5E+05		4.0E+02	
VOC	Dichlorodifluoromethane	75-71-8		61				3.70E-04	3.30E-02		1.7E+03		6.3E+04		1.5E+09		1.0E+03		9.0E+02		5.3E+04		3.3E+09		1.0E+03	
VOC	1,1-Dichloroethane	75-34-3	C	61	5	5.30E-04	1.80E-02	2.30E-04	1.60E-02		4.3E+02	4.2E-05	2.5E+03	7.2E-06	1.5E+07	1.2E-09	8.9E+02	2.0E-05	2.3E+02	7.8E-05	2.1E+03	8.6E-06	3.3E+07	5.5E-10	8.9E+02	2.0E-05
VOC	1,2-Dichloroethane	107-06-2	B2	61				3.30E-04	9.50E-03		1.1E+01		2.1E+01		1.5E+05		4.2E+02		2.1E+00		6.2E+00		1.2E+05		9.1E+01	
VOC	1,1-Dichloroethene	75-35-4	C	61	1	1.00E-03	1.00E-03	4.00E-04	2.30E-02		3.3E-01	3.0E-03	3.7E+00	2.7E-04	7.8E+04	1.3E-08	5.7E+02	1.8E-06	6.2E-02	1.6E-02	1.1E+00	9.1E-04	6.2E+04	1.6E-08	2.0E+02	5.0E-06
VOC	cis-1,2-Dichloroethene	156-59-2	D	61	8	2.10E-03	2.10E-01	2.60E-04	7.30E-04		4.1E+01	5.1E-03	2.1E+02	1.0E-03	1.0E+06	2.1E-07	6.4E+02	3.3E-04	2.2E+01	9.5E-03	1.8E+02	1.2E-03	2.3E+06	9.1E-08	6.4E+02	3.3E-04
VOC	trans-1,2-Dichloroethene	156-60-5		61				3.00E-04	2.40E-02		4.3E+01		3.3E+02		2.1E+06		1.4E+03		2.3E+01		2.8E+02		4.7E+06		1.4E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	61				2.60E-04	1.40E-02		7.4E+00		3.0E+01		1.2E+05		5.5E+02		4.0E+00		2.5E+01		2.7E+05		1.4E+02	
VOC	1,3-Dichloropropene (total)	542-75-6	B2	61				2.80E-04	1.20E-02		5.4E+00		6.0E+01		5.9E+05		2.4E+02		1.0E+00		1.8E+01		7.8E+05		1.0E+01	
VOC	Ethyl Benzene	100-41-4	D	61	4	3.50E-04	2.60E-03	2.70E-04	1.20E-02		1.4E+02	1.9E-05	2.4E+03	1.1E-06	1.3E+07	2.0E-10	1.4E+02	1.9E-05	8.7E+01	3.0E-05	7.2E+02	3.6E-06	1.0E+07	2.6E-10	1.4E+02	1.9E-05
VOC	2-Hexanone	591-78-6		61				7.50E-04	7.00E-02		1.8E+03		1.3E+03		1.2E+06		2.5E+03		9.9E+02		1.1E+03		2.7E+06		2.5E+03	
VOC	Methyl Acetate	79-20-9		61				8.20E-04	5.60E-02																	
VOC	Methyl tert-butyl ether	1634-04-4		61				2.30E-04	1.60E-02		5.9E+03		3.0E+04		8.8E+07		5.9E+03		5.9E+03		2.5E+04		2.0E+08		1.5E+03	
VOC	4-Methyl-2-pentanone	108-10-1	ID	61	2	9.00E-04	2.00E-03	6.90E-04	4.70E-02		2.7E+03	7.4E-07	5.3E+04	3.8E-08	6.0E+07	3.3E-11	2.7E+03	7.4E-07	2.7E+03	7.4E-07	4.5E+04	4.4E-08	1.4E+08	1.4E-11	2.7E+03	7.4E-07
VOC	Methylcyclohexane	108-87-2		61	4	6.20E-04	1.20E-03	2.80E-04	2.20E-02																	
VOC	Methylene Chloride	75-09-2	B2	61	17	2.30E-03	1.40E-02	8.20E-04	5.10E-02		2.4E+02	5.8E-05	7.0E+02	2.0E-05	8.3E+06	1.7E-09	2.3E+03	6.1E-06	4.5E+01	3.1E-04	2.1E+02	6.7E-05	6.6E+06	2.1E-09	1.3E+03	1.1E-05
VOC	Styrene	100-42-5		60				2.40E-04	1.20E-02		5.2E+02		3.3E+03		6.9E+06		5.2E+02		2.5E+02		9.7E+02		5.5E+06		4.0E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	61				3.20E-04	1.30E-02		2.3E+01		3.4E+01		6.8E+04		2.4E+02		4.3E+00		1.0E+01		5.4E+04		5.3E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	61	5	4.90E-04	1.90E-03	3.40E-04	1.40E-02		6.0E+01	3.2E-05	6.0E+02	3.2E-06	6.8E+06	2.8E-10	8.8E+01	2.2E-05	1.1E+01	1.7E-04	1.8E+02	1.1E-05	5.4E+06	3.5E-10	8.8E+01	2.2E-05
VOC	Toluene	108-88-3	D	61	28	3.40E-04	5.60E-03	2.90E-04	1.10E-02		2.5E+02	2.2E-05	3.3E+03	1.7E-06	1.2E+07	4.7E-10	2.5E+02	2.2E-05	2.5E+02	2.2E-05	2.8E+03	2.0E-06	2.7E+07	2.1E-10	2.5E+02	2.2E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	D	61				2.60E-04	1.80E-02		1.1E+03		3.4E+04		1.1E+07		1.1E+03		1.1E+03		2.8E+04		2.5E+07		9.9E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	61	2	3.60E-03	1.70E-02	3.20E-04	1.40E-02		4.6E+02	3.7E-05	4.5E+03	3.8E-06	2.9E+07	5.9E-10	4.6E+02	3.7E-05	2.5E+02	6.8E-05	3.8E+03	4.5E-06	6.7E+07	2.5E-10	4.6E+02	3.7E-05
VOC	1,1,2-Trichloroethane	79-00-5	C	61				2.70E-04	1.90E-02		2.4E+01		5.7E+01		2.5E+05		8.4E+02		4.6E+00		1.7E+01		1.9E+05		1.8E+02	
VOC	Trichloroethene	79-01-6	C-B2	61	11	5.50E-04	4.40E+00	3.40E-04	6.45E-04		3.7E+01	1.2E-01	2.6E+02	1.7E-02	2.3E+06	1.9E-06	5.0E+02	8.8E-03	7.1E+00	6.2E-01	7.8E+01	5.6E-02	1.8E+06	2.4E-06	5.0E+02	8.8E-03
VOC	Trichlorofluoromethane	75-69-4		61				3.00E-04	2.80E-02		5.6E+02		1.1E+05		1.7E+09		5.6E+02		5.6E+02		9.2E+04		3.8E+09		5.6E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		61				4.90E-04	4.60E-02		5.5E+02		2.1E+05		2.3E+09		5.5E+02		5.5E+02		1.8E+05		5.1E+09		5.5E+02	
VOC	Vinyl Chloride	75-01-4	A	61	2	1.70E-03	1.80E-03	3.50E-04	3.00E-02		2.8E+00	6.4E-04	2.9E+01	6.2E-05	8.9E+05	2.0E-09	3.4E+01	5.3E-05	2.7E-01	6.7E-03	4.2E+00	4.3E-04	3.5E+05	5.1E-09	3.8E+00	4.7E-04
VOC	Xylenes (total)	1330-20-7	ID	61	5	1.30E-03	1.20E-02	8.20E-04	4.00E-02		1.5E+02	8.0E-05	5.4E+04	2.2E-07	1.3E+08	9.2E-11	1.5E+02	8.0E-05	1.5E+02	8.0E-05	4.6E+04	2.6E-07	2.9E+08	4.1E-11	1.5E+02	8.0E-05
SVOC	Acenaphthene	83-32-9		61	14	3.40E-02	8.00E+00	1.50E-02	1.10E+00		3.5E+05	2.3E-05	9.7E+04	8.2E-05	6.2E+06	1.3E-06	1.3E+05	6.2E-05	1.9E+05	4.2E-05	8.1E+04	9.9E-05	1.4E+07	5.7E-07	4.1E+04	2.0E-04
SVOC	Acenaphthylene	208-96-8	D	61				2.00E-02	1.10E+00		3.0E+03		2.7E+03		1.0E+06		5.2E+03		1.6E+03		2.2E+03		2.3E+06		1.6E+03	
SVOC	Acetophenone	98-86-2	D	61				1.90E-02	1.10E+00		1.1E+03		5.2E+04		1.4E+07		1.1E+03		1.1E+03		4.4E+04		3.3E+07		1.1E+03	
SVOC	Anthracene	120-12-7	D	61	25	3.30E-02	7.70E+00	1.90E-02	1.00E+00		1.0E+06	7.7E-06	1.6E+06	4.8E-06	2.9E+07	2.7E-07	7.3E+05	1.1E-05	1.0E+06	7.7E-06	1.4E+06	5.5E-06	6.7E+07	1.1E-07	2.3E+05	3.3E-05
SVOC	Atrazine	1912-24-9		61				1.90E-02	1.20E+00								3.3E+02								7.1E+01	
SVOC	Benzaldehyde	100-52-7		61				1.50E-02	1.20E+00																	
SVOC	Benzo(a)anthracene	56-55-3	B2	61	21	1.90E-02	1.50E+01	1.90E-02	9.80E-01								8.0E+01	1.9E-01							2.0E+01	7.5E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	67	23	1.80E-02	1.20E+01	1.70E-02	1.00E+00						1.9E+03	6.3E-03	8.0E+00	**1.5E+00**					1.5E+03	8.0E-03	2.0E+00	**6.0E+00**
SVOC	Benzo(b)fluoranthene	205-99-2	B2	61	20	2.20E-02	1.70E+01	2.20E-02	1.20E+00								8.0E+01	2.1E-01							2.0E+01	8.5E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	61	20	1.90E-02	7.70E+00	1.80E-02	1.30E+00						3.5E+05	2.2E-05	7.0E+03	1.1E-03					8.0E+05	9.6E-06	2.5E+03	3.1E-03
SVOC	Benzo(k)fluoranthene	207-08-9	B2	61	16	2.30E-02	1.10E+01	1.80E-02	1.00E+00								8.0E+02	1.4E-02							2.0E+02	5.5E-02
SVOC	Biphenyl	92-52-4	D	61	4	7.90E-02	9.20E-01	2.00E-02	1.20E+00																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	47				1.80E-02	1.40E+00																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	59				1.90E-02	1.00E+00		4.4E+01		1.3E+01		1.2E+04		5.8E+01		8.3E+00		3.8E+00		9.4E+03		1.3E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	61	14	2.30E-02	9.60E-01	1.40E-02	1.30E+00						8.9E+05	1.1E-06	1.0E+04	9.6E-05					7.0E+05	1.4E-06	2.8E+03	3.4E-04
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	61				1.70E-02	1.10E+00																	
SVOC	Butylbenzylphthalate	85-68-7	C	51	8	3.05E-02	2.60E+00	1.90E-02	1.20E+00						2.1E+07	1.2E-07	3.1E+02	8.4E-03					4.7E+07	5.5E-08	3.1E+02	8.4E-03
SVOC	Caprolactam	105-60-2		61				2.20E-02	1.50E+00						2.9E+05		3.1E+05						6.7E+05		5.3E+04	
SVOC	Carbazole	86-74-8	B2	61	12	4.60E-02	1.90E+00	2.10E-02	1.30E+00								2.4E+03	7.9E-04							5.3E+02	3.6E-03
SVOC	4-Chloro-3-methylphenol	59-50-7		61				1.90E-02	1.10E+00								1.5E+04								4.5E+03	
SVOC	4-Chloroaniline	106-47-8		61				6.50E-03	1.10E+00																	
SVOC	2-Chloronaphthalene	91-58-7		61				1.90E-02	1.10E+00								1.8E+05								5.6E+04	
SVOC	2-Chlorophenol	95-57-8		61				1.90E-02	1.00E+00								4.5E+03								1.4E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		61				1.90E-02	1.10E+00																	
SVOC	Chrysene	218-01-9	B2	61	22	2.10E-02	1.60E+01	1.90E-02	9.80E-01								8.0E+03	2.0E-03							2.0E+03	8.0E-03
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	61	11	4.10E-02	2.50E+00	2.00E-02	1.20E+00								8.0E+00	3.1E-01							2.0E+00	**1.3E+00**

Table 4-28: Data Summary – AOI P-09 – Soil
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min 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 Detect 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 Detect 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	Dibenzofuran	132-64-9	D	61	9	2.00E-02	9.40E+00	1.90E-02	1.10E+00																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	61				9.90E-03	1.00E+00						8.2E+03		3.0E+01							6.5E+03		6.6E+00	
SVOC	2,4-Dichlorophenol	120-83-2		47				1.70E-02	9.20E-01						2.3E+06		1.8E+03							5.1E+06		6.6E+02	
SVOC	Diethylphthalate	84-66-2	D	61				2.10E-02	1.20E+00						1.5E+06		7.4E+02							3.3E+06		7.4E+02	
SVOC	2,4-Dimethylphenol	105-67-9		61	1	1.40E-01	1.40E-01	2.00E-02	1.80E+00						2.1E+06	6.7E-08	3.6E+04	3.9E-06						4.7E+06	3.0E-08	1.1E+04	1.3E-05
SVOC	Dimethylphthalate	131-11-3	D	61				1.90E-02	1.10E+00						1.5E+06		7.9E+02							3.3E+06		7.9E+02	
SVOC	Di-n-butylphthalate	84-74-2	D	61				2.40E-02	1.30E+00						1.5E+06		7.6E+02							3.3E+06		7.6E+02	
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		61				5.30E-02	4.20E+00								2.6E+02									7.9E+01	
SVOC	2,4-Dinitrophenol	51-28-5		61				5.20E-02	5.80E+00																		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	61				1.90E-02	1.20E+00						2.0E+04		2.2E+02							1.6E+04		4.8E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	61				1.70E-02	1.00E+00																		
SVOC	Di-n-octylphthalate	117-84-0		61				1.90E-02	3.50E+00								2.0E+04									6.9E+03	
SVOC	Fluoranthene	206-44-0	D	61	35	2.20E-02	4.60E+01	1.80E-02	1.30E+00		1.0E+06	4.6E-05	8.9E+05	5.2E-05	4.1E+06	1.1E-05	1.3E+05	3.5E-04	1.0E+06	4.6E-05	7.4E+05	6.2E-05	9.3E+06	4.9E-06	4.6E+04	1.0E-03
SVOC	Fluorene	86-73-7	D	61	24	3.60E-02	5.50E+00	1.70E-02	1.20E+00		1.0E+06	5.5E-06	1.5E+05	3.7E-05	4.1E+06	1.3E-06	8.7E+04	6.3E-05	5.8E+05	9.5E-06	1.3E+05	4.2E-05	9.3E+06	5.9E-07	2.7E+04	2.0E-04
SVOC	Hexachlorobenzene	118-74-1	B2	61				1.90E-02	1.20E+00		2.2E+02		5.6E+01		8.5E+03		3.7E+01		4.1E+01		1.7E+01		6.8E+03		8.9E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	59				1.80E-02	9.80E-01		3.5E+02		4.6E+02		1.8E+05		3.5E+02		1.3E+02		1.3E+02		1.4E+05		1.0E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	61				1.10E-02	8.70E-01		5.6E+01		6.0E+01		5.9E+03		7.2E+02		3.0E+01		5.0E+01		1.3E+04		7.2E+02	
SVOC	Hexachloroethane	67-72-1	C	59				1.90E-02	1.00E+00		7.9E+01		6.6E+02		1.0E+05		7.3E+02		4.0E+01		5.5E+02		2.3E+05		2.3E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	61	18	2.40E-02	7.50E+00	2.10E-02	1.30E+00								8.0E+01	9.4E-02							2.0E+01	3.8E-01
SVOC	Isophorone	78-59-1	C	61				2.00E-02	1.20E+00						8.2E+06		2.4E+03							1.2E+07		2.4E+03	
SVOC	2-Methylnaphthalene	91-57-6	ID	60	11	2.60E-02	1.10E+00	1.90E-02	1.00E+00								2.6E+04	4.2E-05							8.1E+03	1.4E-04
SVOC	Methylphenol (total)	1319-77-3		61	1	2.32E-01	2.32E-01	1.60E-02	1.20E+00						2.9E+06	8.0E-08	3.6E+04	6.4E-06						6.7E+06	3.5E-08	1.1E+04	2.1E-05
SVOC	Naphthalene	91-20-3	C	50	8	2.50E-02	2.60E+00	1.90E-02	1.10E+00		4.7E+02	5.5E-03	3.5E+02	7.4E-03	8.8E+04	3.0E-05	5.2E+04	5.0E-05	2.5E+02	1.0E-02	3.0E+02	8.7E-03	2.0E+05	1.3E-05	1.6E+04	1.6E-04
SVOC	2-Nitroaniline	88-74-4		61				1.40E-02	1.10E+00																	
SVOC	3-Nitroaniline	99-09-2	C	61				1.30E-02	1.20E+00																	
SVOC	4-Nitroaniline	100-01-6	C	61				1.90E-02	1.00E+00																	
SVOC	Nitrobenzene	98-95-3	D	48				1.90E-02	1.30E+00		1.7E+02		6.4E+01		2.1E+04		3.4E+02		9.1E+01		5.4E+01		4.7E+04		1.0E+02	
SVOC	2-Nitrophenol	88-75-5		60				1.70E-02	1.20E+00								2.0E+03								6.3E+02	
SVOC	4-Nitrophenol	100-02-7		61				5.90E-02	6.40E+00																	
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	61				2.10E-02	1.20E+00								7.8E+03								1.7E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	61				1.70E-02	1.10E+00						2.0E+03		5.4E+00							1.6E+03		1.2E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	61				2.00E-02	1.50E+00																	
SVOC	Pentachlorophenol	87-86-5	B2	61				6.60E-02	5.00E+00						1.3E+05		3.2E+02							1.0E+05		9.0E+01	
SVOC	Phenanthrene	85-01-8	D	61	36	2.40E-02	6.40E+01	2.20E-02	4.70E-01		5.1E+03	1.3E-02	1.9E+02	3.4E-01	2.9E+03	2.2E-02	5.2E+03	1.2E-02	2.8E+03	2.3E-02	1.6E+02	4.0E-01	6.7E+03	9.6E-03	1.6E+03	4.0E-02
SVOC	Phenol	108-95-2	ID	61				1.90E-02	1.00E+00						1.8E+07		1.2E+04							4.0E+07		1.2E+04	
SVOC	Pyrene	129-00-0	D	61	39	2.30E-02	3.40E+01	1.90E-02	9.70E-01		1.0E+06	3.4E-05	7.8E+05	4.4E-05	2.9E+06	1.2E-05	8.4E+04	4.0E-04	1.0E+06	3.4E-05	6.5E+05	5.2E-05	6.7E+06	5.1E-06	2.9E+04	1.2E-03
SVOC	2,4,5-Trichlorophenol	95-95-4		61				1.70E-02	1.20E+00						1.0E+07		7.3E+04							2.3E+07		2.3E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	61				1.80E-02	1.10E+00						1.3E+06		3.3E+03							1.0E+06		7.1E+02	
P/PCB	PCBs (total)	1336-36-3	B2	62	25	1.52E-02	1.47E+01	3.10E-03	3.40E-02		1.6E+04	9.2E-04	8.1E+02	1.8E-02	6.5E+03	2.3E-03	1.6E+01	9.2E-01	3.0E+03	4.9E-03	2.4E+02	6.1E-02	5.2E+03	2.8E-03	4.0E+00	**3.7E+00**
INORG	Antimony	7440-36-0		49	46	1.47E-01	1.17E+00	1.27E-01	1.31E-01						5.9E+03	2.0E-04	6.7E+02	1.7E-03						1.3E+04	9.0E-05	1.8E+02	6.5E-03
INORG	Arsenic	7440-38-2	A	61	61	2.13E+00	7.67E+00			1.3E+01					9.1E+02		3.7E+01							7.2E+02		7.6E+00	
INORG	Barium	7440-39-3	D	61	61	9.31E+00	1.96E+02			1.1E+02					1.5E+05	5.7E-04	1.3E+05	6.6E-04						3.3E+05	2.6E-04	3.7E+04	2.3E-03
INORG	Beryllium	7440-41-7	B1	61	47	5.25E-02	5.76E-01	3.61E-02	3.94E-02	1.5E+00					5.9E+02		1.6E+03							1.3E+03		4.1E+02	
INORG	Cadmium	7440-43-9	B1	61	54	5.26E-02	6.26E-01	8.90E-03	9.10E-03	1.2E+00					2.2E+03		2.1E+03							1.7E+03		5.5E+02	
INORG	Chromium (total)	7440-47-3		61	61	4.98E+00	4.86E+01			4.9E+01					2.4E+02		9.2E+03							2.6E+02		2.5E+03	
INORG	Cobalt	7440-48-4	B1	61	61	1.82E+00	8.64E+00			1.7E+01					5.9E+03		9.0E+03							1.3E+04		2.6E+03	
INORG	Copper	7440-50-8	D	61	61	5.63E+00	1.40E+02			3.2E+01					5.9E+04	1.8E-03	7.3E+04	1.5E-03						1.3E+05	8.3E-04	2.0E+04	5.4E-03
INORG	Lead	7439-92-1	B2	61	61	3.40E+00	4.49E+01			4.9E+01					4.4E+04		9.0E+02							1.0E+05		4.0E+02	
INORG	Manganese	7439-96-5	D	61	61	1.45E+02	5.37E+02			5.1E+02					1.5E+03	1.8E-02	9.0E+04	3.0E-04						3.3E+03	8.1E-03	2.5E+04	1.1E-03
INORG	Mercury	7439-97-6	D	61	18	1.89E-02	1.96E-01	1.70E-02	1.93E-02	1.3E-01	8.9E+01	7.4E-04	6.2E+01	1.1E-03	8.8E+03	7.4E-06	5.8E+02	1.1E-04	4.8E+01	1.4E-03	5.2E+01	1.3E-03	2.0E+04	3.3E-06	1.6E+02	4.1E-04
INORG	Nickel	7440-02-0	A	61	61	5.36E+00	2.34E+01			3.0E+01					1.6E+04		1.5E+05							1.3E+04		4.0E+04	
INORG	Selenium	7782-49-2	D	51	13	2.56E-01	9.37E-01	2.28E-01	2.64E-01	4.1E-01					5.9E+04	8.9E-06	9.6E+03	5.5E-05						1.3E+05	4.1E-06	2.6E+03	2.0E-04
INORG	Silver	7440-22-4	D	51				4.40E-02	6.14E-02						2.9E+03		9.0E+03							6.7E+03		2.5E+03	
INORG	Thallium	7440-28-0		61	40	3.51E-01	9.53E-01	2.40E-01	3.44E-01								1.3E+02	7.3E-03								3.5E+01	2.7E-02
INORG	Vanadium	7440-62-2		61	61	5.47E+00	2.33E+01			3.3E+01							5.5E+03									7.5E+02	
INORG	Zinc	7440-66-6	D	61	61	2.00E+01	1.78E+02			1.9E+02							6.3E+05									1.7E+05	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-29: Data Summary for AOI P-09 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	6	5	2.40E-03	7.10E-01	6.60E-04	6.60E-04	1.0E+06	7.1E-07	3.1E+04	2.3E-05	7.3E-01	9.7E-01
Shallow	VOC	Benzene	71-43-2	T	A	6				2.00E-04	4.10E-03	3.5E+01		1.1E+01		5.0E-03	
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	3				2.00E-04	1.10E-03	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	6				3.20E-04	4.10E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	6				1.60E-04	3.30E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	6	4	2.50E-03	1.10E-01	3.60E-04	5.90E-04	2.4E+05	4.6E-07	2.4E+05	4.6E-07	1.3E+01	8.5E-03
Shallow	VOC	Carbon Disulfide	75-15-0	T		6	2	3.00E-04	3.40E-04	2.10E-04	2.70E-03	5.5E+02	6.2E-07	1.2E+03	2.8E-07	8.0E-01	4.3E-04
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.80E-04	4.10E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	6				1.60E-04	4.20E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		6				2.20E-04	3.20E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	6				2.10E-04	3.90E-03	1.8E+02		1.5E+02		1.0E-01	
Shallow	VOC	Chloromethane	74-87-3	T	D	6				2.60E-04	5.40E-03	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	6				1.50E-04	4.30E-03	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	6				3.30E-04	3.70E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				5.30E-04	9.10E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	6				2.50E-04	4.10E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	3.80E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.50E-04	4.20E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				2.00E-04	4.20E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.60E-04	4.20E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		6				2.30E-04	5.40E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	5	4	5.40E-04	1.10E-03	1.50E-03	1.50E-03	2.3E+03	4.8E-07	2.4E+03	4.6E-07	8.8E-01	1.3E-03
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.20E-04	3.10E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.20E-04	3.40E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.50E-04	3.90E-03	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				2.40E-04	3.70E-03	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.80E-04	4.60E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				1.50E-04	3.90E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	6				1.90E-04	4.60E-03	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		6				3.10E-04	6.40E-03	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		6				5.40E-04	6.00E-03						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		6				2.10E-04	3.00E-03	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6	4	9.80E-04	2.90E-02	2.60E-04	3.40E-04	2.0E+04	1.5E-06	1.3E+04	2.2E-06	1.8E+00	1.6E-02
Shallow	VOC	Methylcyclohexane	108-87-2	T		6				2.40E-04	4.70E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	6				2.80E-04	3.20E-03	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		4				1.60E-04	3.90E-03	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.30E-04	4.00E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	6				1.20E-04	4.70E-03	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	6				1.70E-04	4.30E-03	5.3E+02		5.3E+02		1.0E+00	
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.50E-04	4.40E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6				1.80E-04	4.30E-03	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				2.10E-04	4.00E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	6				2.20E-04	4.70E-03	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		6				2.50E-04	6.00E-03	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				2.30E-04	3.60E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	4				2.60E-04	4.00E-03	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	6				4.40E-04	4.90E-03	1.9E+02		1.9E+02		1.0E+01	
Shallow	SVOC	Acenaphthene	83-32-9	T		6				6.90E-04	3.40E-02	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	6				4.10E-04	2.00E-02	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	6				6.50E-04	3.20E-02	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	6				5.90E-04	3.00E-02	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		6				3.50E-04	1.80E-02			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		6				5.90E-04	3.00E-02						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				6.80E-04	3.40E-02			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				5.30E-04	2.60E-02			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				7.00E-04	3.60E-02			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				7.00E-04	3.50E-02			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				6.40E-04	3.20E-02			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	6				6.50E-04	3.20E-02						

Table 4-29: Data Summary for AOI P-09 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				1.00E-03	5.00E-02						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	6				1.70E-03	8.50E-02	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6				2.00E-04	1.00E-02			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				7.80E-04	3.90E-02						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				2.30E-04	1.20E-02			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		6				4.50E-04	2.20E-02			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	6	2	9.90E-04	3.20E-02	6.10E-04	3.00E-02			7.4E+00	4.3E-03	8.5E-02	3.8E-01
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				5.50E-04	2.80E-02			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		3				9.00E-04	4.50E-02						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		6				7.30E-04	3.60E-02			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		6				1.30E-03	6.50E-02			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				6.60E-04	3.30E-02						
Shallow	SVOC	Chrysene	218-01-9	T	B2	6				6.70E-04	3.40E-02			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				6.80E-04	3.40E-02			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	6				6.60E-04	3.30E-02						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	3				4.70E-04	2.40E-02			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		6				7.00E-04	3.50E-02			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	6				2.50E-04	1.20E-02			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		6	2	3.00E-01	6.00E-01	1.00E-03	2.50E-03			5.2E+02	1.2E-03	3.7E-01	**1.6E+00**
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	6				2.00E-04	1.00E-02			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				3.70E-04	1.80E-02			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				2.10E-03	1.00E-01			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.30E-03	1.60E-01						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				4.60E-04	2.30E-02			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				7.10E-04	3.60E-02						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		6				6.90E-04	3.40E-02			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	6				7.10E-04	3.60E-02	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	6	1	1.65E-03	1.65E-03	7.50E-04	3.80E-02	2.0E+00	8.3E-04	2.0E+00	8.3E-04	8.8E-01	1.9E-03
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.70E-04	3.80E-02	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	6				1.50E-03	7.50E-02	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	1				1.10E-03	1.10E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	6				1.60E-03	8.00E-02	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.90E-04	3.40E-02			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	6				8.60E-04	4.30E-02			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	6				9.30E-04	4.60E-02			2.5E+01		2.6E-01	
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		6	4	2.15E-03	1.28E+00	9.00E-04	2.20E-03			8.1E+02	1.6E-03	3.7E-01	**3.5E+00**
Shallow	SVOC	Naphthalene	91-20-3	T	C	6	2	7.50E-02	9.90E-02	1.30E-03	3.25E-03	3.1E+01	3.2E-03	3.1E+01	3.2E-03	5.2E-01	1.9E-01
Shallow	SVOC	2-Nitroaniline	88-74-4	T		6				4.90E-04	2.40E-02						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	3				4.80E-04	2.40E-02						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	6				5.90E-04	3.00E-02						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	6				1.30E-03	6.50E-02	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		6				9.50E-04	4.80E-02			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		6				3.50E-03	1.80E-01						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				6.40E-04	3.20E-02			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				1.10E-03	5.50E-02			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				1.80E-03	9.00E-02						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	6	1	3.90E-03	3.90E-03	2.60E-03	1.30E-01			2.0E-01	2.0E-02	1.0E-03	**3.9E+00**
Shallow	SVOC	Phenanthrene	85-01-8	T	D	6	1	2.35E-03	2.35E-03	6.80E-04	3.40E-02	1.0E+00	2.4E-03	1.0E+00	2.4E-03	5.2E-02	4.5E-02
Shallow	SVOC	Phenol	108-95-2	T	ID	6	4	3.30E-03	1.60E+00	1.30E-03	3.20E-03			2.9E+04	5.5E-05	4.4E+00	3.6E-01
Shallow	SVOC	Pyrene	129-00-0	T	D	6				6.30E-04	3.20E-02	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				8.60E-04	4.30E-02			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				7.10E-04	3.60E-02			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	6	1	3.69E-04	3.69E-04	8.20E-05	8.20E-05	4.5E-02	8.2E-03	3.3E-03	1.1E-01	5.0E-04	7.4E-01
Shallow	INORG	Antimony	7440-36-0	T		6	2	9.40E-03	1.31E-02	3.10E-03	3.40E-03			6.8E+01	1.9E-04	6.0E-03	**2.2E+00**
Shallow	INORG	Arsenic	7440-38-2	T	A	6	5	3.20E-03	4.49E-02	2.10E-03	2.10E-03			4.3E+00	1.0E-02	5.0E-02	9.0E-01
Shallow	INORG	Barium	7440-39-3	T	D	6	6	3.10E-03	5.16E-02					1.4E+04	3.7E-06	2.0E+00	2.6E-02
Shallow	INORG	Beryllium	7440-41-7	T	B1	6				4.70E-04	6.00E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	6				2.80E-04	3.60E-04			1.9E+02		5.0E-03	
Shallow	INORG	Chromium (total)	7440-47-3	T		6	1	5.30E-03	5.30E-03	1.00E-03	1.50E-03			4.6E+02	1.2E-05	1.0E-01	5.3E-02

Table 4-29: Data Summary for AOI P-09 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Cobalt	7440-48-4	T	B1	6	2	1.20E-03	1.60E-03	7.40E-04	1.10E-03			2.4E+03	6.7E-07	4.0E-02	4.0E-02
Shallow	INORG	Copper	7440-50-8	T	D	6	2	4.35E-03	6.70E-03	1.70E-03	1.80E-03			7.4E+03	9.1E-07	1.4E+00	4.8E-03
Shallow	INORG	Lead	7439-92-1	T	B2	6	1	2.85E-03	2.85E-03	1.60E-03	2.30E-03					4.0E-03	7.1E-01
Shallow	INORG	Manganese	7439-96-5	T	D	6	4	3.80E-03	4.36E-02	6.60E-04	6.60E-04			9.1E+03	4.8E-06	8.6E-01	5.1E-02
Shallow	INORG	Mercury	7439-97-6	T	D	6				6.70E-05	8.70E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Nickel	7440-02-0	T	A	6	5	5.60E-03	1.28E-01	2.90E-03	2.90E-03			7.4E+04	1.7E-06	1.0E-01	**1.3E+00**
Shallow	INORG	Selenium	7782-49-2	T	D	6	3	4.40E-03	6.07E-02	3.90E-03	4.70E-03			9.7E+02	6.3E-05	5.0E-02	**1.2E+00**
Shallow	INORG	Silver	7440-22-4	T	D	6				9.80E-04	1.10E-03			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	T		6				1.50E-05	3.30E-05			1.3E+01		2.0E-03	
Shallow	INORG	Vanadium	7440-62-2	T		6	4	8.70E-03	5.78E-01	6.70E-04	9.60E-04			9.7E+02	6.0E-04	4.5E-03	**1.3E+02**
Shallow	INORG	Zinc	7440-66-6	T	D	6	1	2.02E-02	2.02E-02	1.30E-02	1.40E-02			1.1E+05	1.8E-07	2.4E+00	8.4E-03

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 4-30
DATA SUMMARY FOR AOI P-10 (HISTORICAL)
FORMER PLANT 18 TRANSFORMER OIL RELEASE
ANALYTICAL RESULTS (LIQUID OR SEDIMENT*) - JULY 1978
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

No.	SAMPLE LOCATION	AROCLOR 1242 *(ppb)*	AROCLOR 1254 *(ppb)*	AROCLOR 1260 *(ppb)*	Total PCBs *(ppb)*
1	First manhole west of N-7 in parking lot west of Former Plant 18 (ST321A)	--	82,000	8,600	90,600
2	Manhole northwest corner of Former Plant 18 (ST321)	--	1,500	140	1,640
3	Manhole exit road north of Former Plant 18	--	760	81	841
4	Manhole in entrance road north of Former Plant 18 (ST322)	--	540	57	597
5	Bituminous Island 70" sewer north of Former Plant 18	--	1,400	220	1,620
6	Junction 70" to Joslyn drain	--	360	16	376
7	East Blvd. Raw	1.5	3.7	1	6.2
8	East Blvd. Pri. Eff.	1.3	3.8	1.3	6.4
9	East Blvd. Raw	1.2	3.9	1.1	6.2
10	East Blvd. Pri. Eff.	1.8	3.3	1	6.1
11	Auburn Raw	2.6	--	10.1	12.7
12	Auburn Pri. Eff.	1.8	--	2.1	3.9
13	Joslyn sanitary in lot	--	2	0.11	2.11
14	Joslyn drain above sump before Clinton Rriver	1.4	3	0.35	4.75
15	Joslyn drain sump before Clinton Rriver	2.4	6.1	0.95	9.45
16	Clinton River at Paddock	0.9	--	1.6	2.5
17	Clinton River at Opdyke Bridge	1.6	7.1	1.4	10.1
18	From Transformer	--	650 g / L	36 g / L	686 g / L
19	Manhole 48" sewer entrance road north of Former Plant 18	--	18.5	--	18.5
20	Manhole 48" sewer on exit road north of Former Plant 18		8.8		8.8
21	Manhole northwest corner of Former Plant 18	--	--	--	--
22	PMD 78" sewer Bituminous Island north of Former Plant 18	--	--	--	--
23	PMD 78" sewer entering Joslyn drain	--	70.6	--	70.6
24	Manhole on 48" and exit road north of Former Plant 18	--	5	--	5
25	Manhole on 48" on entrance road 48" sewer	--	4.7	--	4.7
26	Manhole north of Former Plant 18 on 78" sewer	--	2.7	--	2.7
27	Manhole 78" at Joslyn drain	--	6.7	--	6.7
28	#1 Manhole (ST321A)	--	6.8	--	6.8
29	#2 Manhole (ST321)	--	2	--	2

NOTE: Samples collected July 1978
*Record did not indicate which samples were liquids or solids

TABLE 4-31
DATA SUMMARY FOR AOI P-10 (STORM SEWER)
FORMER PLANT 18 INVESTIGATION
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

SAMPLE ID	ST321-SW-110702	ST1219-SW-110702	ST1241-SW-110702	PT637-SW-110702	ST322-SW-110802	CB204-SW-110802
SAMPLE DATE (mm/dd/yy)	11/07/02	11/07/02	11/07/02	11/07/02	11/08/02	11/08/02
SAMPLE MATRIX	Water	Water	Water	Water	Water	Water
SAMPLE LOCATION	Manhole ST321	Manhole ST1219	Manhole ST1241	Manhole PT637	Manhole ST322	Catch Basin CB204
PCBs (µg/L)						
Aroclor 1016	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1221	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1232	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor 1242	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1248	ND (0.20)	0.091 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1254	2.9	ND (0.20)	0.082 J	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1260	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Total PCBs	2.9	0.091 J	0.082 J	ND	ND	ND
Oil and Grease (mg/L)	1.6 B	ND (5.0)	1.7 B	ND (5.0)	ND (5.0)	ND (5.0)

Note: B = Estimated result

SAMPLE ID	CB204-SD-110802	BD110-SD-110802	PT637-SD-110702	ST18-1-SD-110702	ST321-SD-110702
SAMPLE DATE (mm/dd/yy)	11/08/02	11/08/02	11/07/02	11/07/02	11/07/02
SAMPLE MATRIX	Sediment	Sediment	Sediment	Sediment	Sediment
SAMPLE LOCATION	Catch Basin CB204	Catch Basin CB204 Duplicate	Manhole PT637	Manhole ST18-1	Manhole ST321
PCBs (µg/L)					
Aroclor 1016	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1221	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1232	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor 1242	ND (0.20)	ND (0.20)	28 J	ND (0.20)	ND (0.20)
Aroclor 1248	1,700	2,300	ND (0.20)	75	37 J
Aroclor 1254	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1260	ND (0.20)	350	ND (0.20)	ND (0.20)	ND (0.20)
Total PCBs	1,700	2,650	28 J	75	37 J
Total Residue as Percent Solids (%)	82	82.1	77.5	80.1	78.1

SAMPLE ID	ST322-SD-110802	ST1239-SD-110702	ST1241-SD-110702	ST321SOUTH-SD-110702
SAMPLE DATE (mm/dd/yy)	11/08/02	11/07/02	11/07/02	11/07/02
SAMPLE MATRIX	Sediment	Sediment	Sediment	Sediment
SAMPLE LOCATION	Manhole ST322	Manhole ST1239	Manhole ST1241	Manhole ST321
PCBs (µg/L)				
Aroclor 1016	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1221	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor 1232	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor 1242	ND (0.20)	82	ND (0.20)	ND (0.20)
Aroclor 1248	1,200	ND (0.20)	44	ND (0.20)
Aroclor 1254	ND (0.20)	ND (0.20)	ND (0.20)	1,600
Aroclor 1260	ND (0.20)	93	34 J	ND (0.20)
Total PCBs	1,200	175	78	1,600
Total Residue as Percent Solids (%)	79.5	80.8	77.2	84.6

Note: J = Estimated result

Table 4-32: Data Summary – AOI P-11 – Soil
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min 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 Detect 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 Detect 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	ID	23	16	3.50E-03	9.20E-02	2.60E-03	4.60E-02		1.1E+05	8.4E-07	1.6E+05	5.8E-07	1.7E+08	5.4E-10	7.3E+04	1.3E-06	1.1E+05	8.4E-07	1.3E+05	7.1E-07	3.9E+08	2.4E-10	2.3E+04	4.0E-06
VOC	Benzene	71-43-2	A	23	2	7.70E-04	1.70E-03	2.70E-04	5.70E-03		8.4E+00	2.0E-04	4.5E+01	3.8E-05	4.7E+05	3.6E-09	4.0E+02	4.3E-06	1.6E+00	1.1E-03	1.3E+01	1.3E-04	3.8E+05	4.5E-09	1.8E+02	9.4E-06
VOC	Bromodichloromethane	75-27-4	B2	23				4.30E-04	7.90E-03		6.4E+00		3.1E+01		1.1E+05		4.9E+02		1.2E+00		9.1E+00		8.4E+04		1.1E+02	
VOC	Bromoform	75-25-2	B2	23				5.70E-04	1.10E-02		7.7E+02		3.1E+03		3.6E+06		8.7E+02		1.5E+02		9.0E+02		2.8E+06		8.2E+02	
VOC	Bromomethane	74-83-9	D	23				1.20E-03	4.10E-02		1.6E+00		1.3E+01		1.5E+05		1.0E+03		8.6E-01		1.1E+01		3.3E+05		3.2E+02	
VOC	2-Butanone	78-93-3	ID	23	4	1.40E-03	1.50E-02	1.20E-03	5.00E-02		2.7E+04	5.6E-07	3.5E+04	4.3E-07	2.9E+07	5.2E-10	2.7E+04	5.6E-07	2.7E+04	5.6E-07	2.9E+04	5.2E-07	6.7E+07	2.2E-10	2.7E+04	5.6E-07
VOC	Carbon Disulfide	75-15-0		23	2	2.50E-04	3.40E-04	2.20E-04	4.40E-03		1.4E+02	2.4E-06	1.6E+03	2.1E-07	2.1E+07	1.6E-11	2.8E+02	1.2E-06	7.6E+01	4.5E-06	1.3E+03	2.6E-07	4.7E+07	7.2E-12	2.8E+02	1.2E-06
VOC	Carbon Tetrachloride	56-23-5	B2	23				3.90E-04	1.40E-02		9.9E-01		1.2E+01		1.7E+05		3.9E+02		1.9E-01		3.5E+00		1.3E+05		9.6E+01	
VOC	Chlorobenzene	108-90-7	D	23				3.10E-04	5.60E-03		2.2E+02		9.2E+02		2.1E+06		2.6E+02		1.2E+02		7.7E+02		4.7E+06		2.6E+02	
VOC	Chloroethane	75-00-3		23				7.50E-04	4.50E-02		9.5E+02		3.6E+04		2.9E+08		9.5E+02		9.5E+02		3.0E+04		6.7E+08		9.5E+02	
VOC	Chloroform	67-66-3	B2	23				4.20E-04	1.20E-02		3.8E+01		1.5E+02		1.6E+06		1.5E+03		7.2E+00		4.5E+01		1.3E+06		1.2E+03	
VOC	Chloromethane	74-87-3	D	23				3.80E-04	1.40E-02		1.0E+01		1.2E+02		2.6E+06		1.1E+03		2.3E+00		4.0E+01		4.9E+06		1.1E+03	
VOC	Cumene	98-82-8	D	23				4.40E-04	8.20E-03		3.9E+02		2.0E+03		2.6E+06		3.9E+02		3.9E+02		1.7E+03		5.8E+06		3.9E+02	
VOC	Cyclohexane	110-82-7	ID	23				3.70E-04	6.00E-03																	
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	23				9.10E-04	2.20E-02		1.2E+00		1.5E+01		5.9E+03		1.2E+00		1.2E+00		1.3E+01		1.3E+04		1.2E+00	
VOC	Dibromochloromethane	124-48-1	C	23				5.00E-04	1.10E-02		2.1E+01		8.0E+01		1.6E+05		5.0E+02		3.9E+00		2.4E+01		1.3E+05		1.1E+02	
VOC	1,2-Dibromoethane	106-93-4	B2	23				2.90E-04	7.30E-03		3.6E+00		5.8E+00		1.8E+04		4.3E-01		6.7E-01		1.7E+00		1.4E+04		2.5E-01	
VOC	1,2-Dichlorobenzene	95-50-1	D	23				3.50E-04	6.70E-03		2.1E+02		4.6E+04		4.4E+07		2.1E+02		2.1E+02		3.9E+04		1.0E+08		2.1E+02	
VOC	1,3-Dichlorobenzene	541-73-1	D	23				5.40E-04	8.00E-03								1.7E+02								1.7E+02	
VOC	1,4-Dichlorobenzene	106-46-7	C	23				3.80E-04	8.30E-03		1.0E+02		2.6E+02		5.7E+05		1.9E+03		1.9E+01		7.7E+01		4.5E+05		4.0E+02	
VOC	Dichlorodifluoromethane	75-71-8		23				7.00E-04	2.20E-02		1.7E+03		6.3E+04		1.5E+09		1.0E+03		9.0E+02		5.3E+04		3.3E+09		1.0E+03	
VOC	1,1-Dichloroethane	75-34-3	C	23				2.50E-04	1.10E-02		4.3E+02		2.5E+03		1.5E+07		8.9E+02		2.3E+02		2.1E+03		3.3E+07		8.9E+02	
VOC	1,2-Dichloroethane	107-06-2	B2	23				3.50E-04	1.30E-02		1.1E+01		2.1E+01		1.5E+05		4.2E+02		2.1E+00		6.2E+00		1.2E+05		9.1E+01	
VOC	1,1-Dichloroethene	75-35-4	C	23				4.30E-04	7.60E-03		3.3E-01		3.7E+00		7.8E+04		5.7E+02		6.2E-02		1.1E+00		6.2E+04		2.0E+02	
VOC	cis-1,2-Dichloroethene	156-59-2	D	23				2.70E-04	7.50E-03		4.1E+01		2.1E+02		1.0E+06		6.4E+02		2.2E+01		1.8E+02		2.3E+06		6.4E+02	
VOC	trans-1,2-Dichloroethene	156-60-5		23				3.10E-04	9.70E-03		4.3E+01		3.3E+02		2.1E+06		1.4E+03		2.3E+01		2.8E+02		4.7E+06		1.4E+03	
VOC	1,2-Dichloropropane	78-87-5	B2	23				2.70E-04	9.10E-03		7.4E+00		3.0E+01		1.2E+05		5.5E+02		4.0E+00		2.5E+01		2.7E+05		1.4E+02	
VOC	1,3-Dichloropropene (total)	542-75-6	B2	23				4.00E-04	7.40E-03		5.4E+00		6.0E+01		5.9E+05		2.4E+02		1.0E+00		1.8E+01		7.8E+05		1.0E+01	
VOC	Ethyl Benzene	100-41-4	D	23	1	9.20E-04	9.20E-04	4.90E-04	6.30E-03		1.4E+02	6.6E-06	2.4E+03	3.8E-07	1.3E+07	7.1E-11	1.4E+02	6.6E-06	8.7E+01	1.1E-05	7.2E+02	1.3E-06	1.0E+07	9.2E-11	1.4E+02	6.6E-06
VOC	2-Hexanone	591-78-6		23				1.10E-03	1.50E-02		1.8E+03		1.3E+03		1.2E+06		2.5E+03		9.9E+02		1.1E+03		2.7E+06		2.5E+03	
VOC	Methyl Acetate	79-20-9		23	4	1.30E-03	1.10E-01	1.10E-03	1.60E-03																	
VOC	Methyl tert-butyl ether	1634-04-4		23				2.50E-04	7.90E-03		5.9E+03		3.0E+04		8.8E+07		5.9E+03		5.9E+03		2.5E+04		2.0E+08		1.5E+03	
VOC	4-Methyl-2-pentanone	108-10-1	ID	23	3	1.30E-03	3.00E-03	7.30E-04	2.30E-02		2.7E+03	1.1E-06	5.3E+04	5.7E-08	6.0E+07	5.0E-11	2.7E+03	1.1E-06	2.7E+03	1.1E-06	4.5E+04	6.7E-08	1.4E+08	2.1E-11	2.7E+03	1.1E-06
VOC	Methylcyclohexane	108-87-2		23	2	6.90E-04	7.70E-04	3.70E-04	8.60E-03																	
VOC	Methylene Chloride	75-09-2	B2	23	1	2.40E-03	2.40E-03	1.40E-03	1.50E-02		2.4E+02	1.0E-05	7.0E+02	3.4E-06	8.3E+06	2.9E-10	2.3E+03	1.0E-06	4.5E+01	5.3E-05	2.1E+02	1.1E-05	6.6E+06	3.6E-10	1.3E+03	1.8E-06
VOC	Styrene	100-42-5		23				2.60E-04	7.00E-03		5.2E+02		3.3E+03		6.9E+06		5.2E+02		2.5E+02		9.7E+02		5.5E+06		4.0E+02	
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	18				3.40E-04	9.70E-03		2.3E+01		3.4E+01		6.8E+04		2.4E+02		4.3E+00		1.0E+01		5.4E+04		5.3E+01	
VOC	Tetrachloroethene	127-18-4	C-B2	23	1	5.70E-04	5.70E-04	4.20E-04	1.10E-02		6.0E+01	9.5E-06	6.0E+02	9.5E-07	6.8E+06	8.4E-11	8.8E+01	6.5E-06	1.1E+01	5.2E-05	1.8E+02	3.2E-06	5.4E+06	1.1E-10	8.8E+01	6.5E-06
VOC	Toluene	108-88-3	D	23	4	3.70E-04	1.80E-02	2.90E-04	4.20E-04		2.5E+02	7.2E-05	3.3E+03	5.5E-06	1.2E+07	1.5E-09	2.5E+02	7.2E-05	2.5E+02	7.2E-05	2.8E+03	6.4E-06	2.7E+07	6.7E-10	2.5E+02	7.2E-05
VOC	1,2,4-Trichlorobenzene	120-82-1	D	23				4.90E-04	1.10E-02		1.1E+03		3.4E+04		1.1E+07		1.1E+03		1.1E+03		2.8E+04		2.5E+07		9.9E+02	
VOC	1,1,1-Trichloroethane	71-55-6	D	23				3.40E-04	8.60E-03		4.6E+02		4.5E+03		2.9E+07		4.6E+02		2.5E+02		3.8E+03		6.7E+07		4.6E+02	
VOC	1,1,2-Trichloroethane	79-00-5	C	23				2.90E-04	7.60E-03		2.4E+01		5.7E+01		2.5E+05		8.4E+02		4.6E+00		1.7E+01		1.9E+05		1.8E+02	
VOC	Trichloroethene	79-01-6	C-B2	23	1	1.10E+00	1.10E+00	5.20E-04	7.60E-04		3.7E+01	3.0E-02	2.6E+02	4.2E-03	2.3E+06	4.8E-07	5.0E+02	2.2E-03	7.1E+00	1.5E-01	7.8E+01	1.4E-02	1.8E+06	6.1E-07	5.0E+02	2.2E-03
VOC	Trichlorofluoromethane	75-69-4		23				3.10E-04	8.50E-03		5.6E+02		1.1E+05		1.7E+09		5.6E+02		5.6E+02		9.2E+04		3.8E+09		5.6E+02	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		23				1.20E-03	2.80E-02		5.5E+02		2.1E+05		2.3E+09		5.5E+02		5.5E+02		1.8E+05		5.1E+09		5.5E+02	
VOC	Vinyl Chloride	75-01-4	A	23				3.70E-04	1.10E-02		2.8E+00		2.9E+01		8.9E+05		3.4E+01		2.7E-01		4.2E+00		3.5E+05		3.8E+00	
VOC	Xylenes (total)	1330-20-7	ID	23				9.90E-04	1.80E-02		1.5E+02		5.4E+04		1.3E+08		1.5E+02		1.5E+02		4.6E+04		2.9E+08		1.5E+02	
SVOC	Acenaphthene	83-32-9		23	4	4.50E-02	3.60E-01	1.50E-02	4.40E-01		3.5E+05	1.0E-06	9.7E+04	3.7E-06	6.2E+06	5.8E-08	1.3E+05	2.8E-06	1.9E+05	1.9E-06	8.1E+04	4.4E-06	1.4E+07	2.6E-08	4.1E+04	8.8E-06
SVOC	Acenaphthylene	208-96-8	D	23				2.00E-02	6.00E-01		3.0E+03		2.7E+03		1.0E+06		5.2E+03		1.6E+03		2.2E+03		2.3E+06		1.6E+03	
SVOC	Acetophenone	98-86-2	D	23				2.10E-02	6.30E-01		1.1E+03		5.2E+04		1.4E+07		1.1E+03		1.1E+03		4.4E+04		3.3E+07		1.1E+03	
SVOC	Anthracene	120-12-7	D	23	4	9.80E-02	2.30E+00	1.80E-02	2.00E-02		1.0E+06	2.3E-06	1.6E+06	1.4E-06	2.9E+07	7.9E-08	7.3E+05	3.2E-06	1.0E+06	2.3E-06	1.4E+06	1.6E-06	6.7E+07	3.4E-08	2.3E+05	1.0E-05
SVOC	Atrazine	1912-24-9		23				2.30E-02	6.90E-01								3.3E+02								7.1E+01	
SVOC	Benzaldehyde	100-52-7		23				1.50E-02	4.40E-01																	
SVOC	Benzo(a)anthracene	56-55-3	B2	23	6	7.00E-02	2.80E+00	2.40E-02	2.80E-02								8.0E+01	3.5E-02							2.0E+01	1.4E-01
SVOC	Benzo(a)pyrene	50-32-8	B2	23	6	1.70E-02	1.20E+00	1.60E-02	1.80E-02						1.9E+03	6.3E-04	8.0E+00	1.5E-01					1.5E+03	8.0E-04	2.0E+00	6.0E-01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	23	5	2.60E-02	1.60E+00	2.10E-02	2.40E-02								8.0E+01	2.0E-02							2.0E+01	8.0E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	D	23	5	2.20E-02	8.60E-01	1.70E-02	1.90E-02						3.5E+05	2.5E-06	7.0E+03	1.2E-04					8.0E+05	1.1E-06	2.5E+03	3.4E-04
SVOC	Benzo(k)fluoranthene	207-08-9	B2	23	4	1.30E-01	7.90E-01	1.70E-02	1.90E-02								8.0E+02	9.9E-04							2.0E+02	4.0E-03
SVOC	Biphenyl	92-52-4	D	23	3	7.90E-02	9.10E-02	1.90E-02	5.60E-01																	
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	11				2.70E-02	7.50E-02																	
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	14				1.90E-02	5.20E-02		4.4E+01		1.3E+01		1.2E+04		5.8E+01		8.3E+00		3.8E+00		9.4E+03		1.3E+01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	23	4	8.90E-02	2.20E-01	1.40E-02	4.10E-01						8.9E+05	2.5E-07	1.0E+04	2.2E-05					7.0E+05	3.1E-07	2.8E+03	7.9E-05
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	23				1.60E-02	4.70E-01																	
SVOC	Butylbenzylphthalate	85-68-7	C	20	3	3.80E-02	4.20E+01	2.20E-02	2.50E-02						2.1E+07	2.0E-06	3.1E+02	1.4E-01					4.7E+07	8.9E-07	3.1E+02	1.4E-01
SVOC	Caprolactam	105-60-2		23				2.90E-02	8.80E-01						2.9E+05		3.1E+05						6.7E+05		5.3E+04	
SVOC	Carbazole	86-74-8	B2	23	5	5.10E-02	2.20E+00	2.00E-02	2.30E-02								2.4E+03	9.2E-04							5.3E+02	4.2E-03
SVOC	4-Chloro-3-methylphenol	59-50-7		23				2.00E-02	6.00E-01								1.5E+04								4.5E+03	
SVOC	4-Chloroaniline	106-47-8		23				2.10E-02	6.30E-01																	
SVOC	2-Chloronaphthalene	91-58-7		23				1.80E-02	5.30E-01								1.8E+05								5.6E+04	
SVOC	2-Chlorophenol	95-57-8		23				1.90E-02	5.60E-01								4.5E+03								1.4E+03	
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		23				1.80E-02	5.30E-01																	
SVOC	Chrysene	218-01-9	B2	23	5	3.40E-02	1.40E+00	2.30E-02	2.60E-02								8.0E+03	1.8E-04							2.0E+03	7.0E-04
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	23	3	4.50E-02	1.90E-01	1.90E-02	5.60E-01								8.0E+00	2.4E-02							2.0E+00	9.5E-02

Table 4-32: Data Summary – AOI P-11 – Soil
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	No of Analyses	No of Detects	Min 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 Detect 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 Detect 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	Dibenzofuran	132-64-9	D	23	4	2.70E-02	2.10E-01	1.80E-02	5.30E-01																	
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	23				1.90E-02	5.60E-01						8.2E+03		3.0E+01							6.5E+03		6.6E+00	
SVOC	2,4-Dichlorophenol	120-83-2		11				1.70E-02	4.60E-02						2.3E+06		1.8E+03							5.1E+06		6.6E+02	
SVOC	Diethylphthalate	84-66-2	D	23				2.00E-02	6.00E-01						1.5E+06		7.4E+02							3.3E+06		7.4E+02	
SVOC	2,4-Dimethylphenol	105-67-9		23				1.90E-02	5.60E-01						2.1E+06		3.6E+04							4.7E+06		1.1E+04	
SVOC	Dimethylphthalate	131-11-3	D	23				1.80E-02	5.30E-01						1.5E+06		7.9E+02							3.3E+06		7.9E+02	
SVOC	Di-n-butylphthalate	84-74-2	D	23	1	1.60E+00	1.60E+00	2.40E-02	6.60E-02						1.5E+06	1.1E-06	7.6E+02	2.1E-03						3.3E+06	4.8E-07	7.6E+02	2.1E-03
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		23				5.00E-02	1.50E+00								2.6E+02									7.9E+01	
SVOC	2,4-Dinitrophenol	51-28-5		23				4.90E-02	1.50E+00																		
SVOC	2,4-Dinitrotoluene	121-14-2	B2	23				2.30E-02	6.90E-01						2.0E+04		2.2E+02							1.6E+04		4.8E+01	
SVOC	2,6-Dinitrotoluene	606-20-2	B2	23				1.60E-02	4.70E-01																		
SVOC	Di-n-octylphthalate	117-84-0		23				6.70E-02	2.00E+00								2.0E+04									6.9E+03	
SVOC	Fluoranthene	206-44-0	D	23	5	2.60E-02	2.90E+00	1.70E-02	1.90E-02		1.0E+06	2.9E-06	8.9E+05	3.3E-06	4.1E+06	7.1E-07	1.3E+05	2.2E-05	1.0E+06	2.9E-06	7.4E+05	3.9E-06	9.3E+06	3.1E-07	4.6E+04	6.3E-05
SVOC	Fluorene	86-73-7	D	23	5	4.00E-02	2.60E+00	1.60E-02	1.80E-02		1.0E+06	2.6E-06	1.5E+05	1.7E-05	4.1E+06	6.3E-07	8.7E+04	3.0E-05	5.8E+05	4.5E-06	1.3E+05	2.0E-05	9.3E+06	2.8E-07	2.7E+04	9.6E-05
SVOC	Hexachlorobenzene	118-74-1	B2	23				2.30E-02	6.90E-01		2.2E+02		5.6E+01		8.5E+03		3.7E+01		4.1E+01		1.7E+01		6.8E+03		8.9E+00	
SVOC	Hexachlorobutadiene	87-68-3	C	14				1.70E-02	4.60E-02		3.5E+02		4.6E+02		1.8E+05		3.5E+02		1.3E+02		1.3E+02		1.4E+05		1.0E+02	
SVOC	Hexachlorocyclopentadiene	77-47-4	E	23				1.00E-02	3.10E-01		5.6E+01		6.0E+01		5.9E+03		7.2E+02		3.0E+01		5.0E+01		1.3E+04		7.2E+02	
SVOC	Hexachloroethane	67-72-1	C	14				1.80E-02	4.90E-02		7.9E+01		6.6E+02		1.0E+05		7.3E+02		4.0E+01		5.5E+02		2.3E+05		2.3E+02	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	23	4	1.50E-01	8.40E-01	2.00E-02	2.30E-02								8.0E+01	1.1E-02								2.0E+01	4.2E-02
SVOC	Isophorone	78-59-1	C	23				2.30E-02	6.90E-01						8.2E+06		2.4E+03							1.2E+07		2.4E+03	
SVOC	2-Methylnaphthalene	91-57-6	ID	23	8	3.90E-02	1.60E+00	1.80E-02	2.00E-02								2.6E+04	6.2E-05								8.1E+03	2.0E-04
SVOC	Methylphenol (total)	1319-77-3		23				2.20E-02	6.60E-01						2.9E+06		3.6E+04							6.7E+06		1.1E+04	
SVOC	Naphthalene	91-20-3	C	13	5	2.30E-02	5.30E-01	1.80E-02	2.00E-02		4.7E+02	1.1E-03	3.5E+02	1.5E-03	8.8E+04	6.0E-06	5.2E+04	1.0E-05	2.5E+02	2.1E-03	3.0E+02	1.8E-03	2.0E+05	2.7E-06	1.6E+04	3.3E-05
SVOC	2-Nitroaniline	88-74-4		23				1.40E-02	4.10E-01																		
SVOC	3-Nitroaniline	99-09-2	C	23				2.30E-02	6.90E-01																		
SVOC	4-Nitroaniline	100-01-6	C	23				1.80E-02	5.30E-01																		
SVOC	Nitrobenzene	98-95-3	D	11				2.50E-02	6.90E-02		1.7E+02		6.4E+01		2.1E+04		3.4E+02		9.1E+01		5.4E+01		4.7E+04		1.0E+02	
SVOC	2-Nitrophenol	88-75-5		23				2.20E-02	6.60E-01								2.0E+03									6.3E+02	
SVOC	4-Nitrophenol	100-02-7		23				5.50E-02	1.70E+00																		
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	23				2.00E-02	6.00E-01								7.8E+03									1.7E+03	
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	23				1.60E-02	4.70E-01						2.0E+03		5.4E+00							1.6E+03		1.2E+00	
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	23				2.80E-02	8.50E-01																		
SVOC	Pentachlorophenol	87-86-5	B2	23				6.20E-02	1.90E+00						1.3E+05		3.2E+02							1.0E+05		9.0E+01	
SVOC	Phenanthrene	85-01-8	D	23	6	3.70E-02	3.00E+00	2.20E-02	2.50E-02		5.1E+03	5.9E-04	1.9E+02	1.6E-02	2.9E+03	1.0E-03	5.2E+03	5.8E-04	2.8E+03	1.1E-03	1.6E+02	1.9E-02	6.7E+03	4.5E-04	1.6E+03	1.9E-03
SVOC	Phenol	108-95-2	ID	23				1.90E-02	5.60E-01						1.8E+07		1.2E+04							4.0E+07		1.2E+04	
SVOC	Pyrene	129-00-0	D	23	4	5.70E-01	2.90E+00	2.20E-02	2.50E-02		1.0E+06	2.9E-06	7.8E+05	3.7E-06	2.9E+06	1.0E-06	8.4E+04	3.5E-05	1.0E+06	2.9E-06	6.5E+05	4.5E-06	6.7E+06	4.3E-07	2.9E+04	1.0E-04
SVOC	2,4,5-Trichlorophenol	95-95-4		23				1.60E-02	4.70E-01						1.0E+07		7.3E+04							2.3E+07		2.3E+04	
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	23				2.00E-02	6.00E-01						1.3E+06		3.3E+03							1.0E+06		7.1E+02	
P/PCB	PCBs (total)	1336-36-3	B2	23	3	5.00E-02	5.68E+00	2.30E-02	2.80E-02		1.6E+04	3.6E-04	8.1E+02	7.0E-03	6.5E+03	8.7E-04	1.6E+01	3.6E-01	3.0E+03	1.9E-03	2.4E+02	2.4E-02	5.2E+03	1.1E-03	4.0E+00	**1.4E+00**
INORG	Antimony	7440-36-0		14	5	2.51E-01	5.36E-01	1.20E-01	1.37E-01						5.9E+03	9.1E-05	6.7E+02	8.0E-04						1.3E+04	4.1E-05	1.8E+02	3.0E-03
INORG	Arsenic	7440-38-2	A	23	23	2.49E+00	7.39E+00			1.3E+01					9.1E+02		3.7E+01							7.2E+02		7.6E+00	
INORG	Barium	7440-39-3	D	23	23	4.38E+00	1.92E+02			1.1E+02					1.5E+05	5.5E-04	1.3E+05	6.3E-04						3.3E+05	2.5E-04	3.7E+04	2.2E-03
INORG	Beryllium	7440-41-7	B1	23	23	9.48E-02	9.74E-01			1.5E+00					5.9E+02		1.6E+03							1.3E+03		4.1E+02	
INORG	Cadmium	7440-43-9	B1	23	15	1.39E-02	5.37E-01	8.70E-03	4.72E-02	1.2E+00					2.2E+03		2.1E+03							1.7E+03		5.5E+02	
INORG	Chromium (total)	7440-47-3		23	23	3.73E+00	7.34E+01			4.9E+01					2.4E+02	1.0E-01	9.2E+03	2.6E-03						2.6E+02	9.3E-02	2.5E+03	9.7E-03
INORG	Cobalt	7440-48-4	B1	23	23	1.72E+00	8.70E+00			1.7E+01					5.9E+03		9.0E+03							1.3E+04		2.6E+03	
INORG	Copper	7440-50-8	D	23	23	4.22E+00	5.56E+01			3.2E+01					5.9E+04	4.0E-04	7.3E+04	3.2E-04						1.3E+05	1.8E-04	2.0E+04	1.2E-03
INORG	Lead	7439-92-1	B2	23	23	2.29E+00	6.08E+01			4.9E+01					4.4E+04	2.6E-04	9.0E+02	1.3E-02						1.0E+05	1.2E-04	4.0E+02	2.9E-02
INORG	Manganese	7439-96-5	D	23	23	1.29E+02	3.26E+03			5.1E+02					1.5E+03	**1.8E+00**	9.0E+04	3.1E-02						3.3E+03	8.3E-01	2.5E+04	1.1E-01
INORG	Mercury	7439-97-6	D	23	10	1.86E-02	7.95E-02	1.67E-02	1.87E-02	1.3E-01	8.9E+01		6.2E+01		8.8E+03		5.8E+02		4.8E+01		5.2E+01		2.0E+04		1.6E+02	
INORG	Nickel	7440-02-0	A	23	23	4.62E+00	3.09E+01			3.0E+01					1.6E+04	5.0E-05	1.5E+05	5.3E-06						1.3E+04	6.1E-05	4.0E+04	2.0E-05
INORG	Selenium	7782-49-2	D	23	3	3.64E-01	7.08E-01	2.24E-01	1.27E+00	4.1E-01					5.9E+04	5.1E-06	9.6E+03	3.1E-05						1.3E+05	2.3E-06	2.6E+03	1.1E-04
INORG	Silver	7440-22-4	D	23				5.21E-02	2.95E-01						2.9E+03		9.0E+03							6.7E+03		2.5E+03	
INORG	Thallium	7440-28-0		23	3	7.67E-01	9.40E-01	3.02E-01	1.71E+00								1.3E+02	7.2E-03								3.5E+01	2.7E-02
INORG	Vanadium	7440-62-2		23	23	4.73E+00	2.14E+01			3.3E+01							5.5E+03									7.5E+02	
INORG	Zinc	7440-66-6	D	23	23	1.56E+01	1.71E+02			1.9E+02							6.3E+05									1.7E+05	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-33: Data Summary for AOI P-11 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	2	1	1.90E-02	1.90E-02	1.10E-03	1.10E-03	1.0E+06	1.9E-08	3.1E+04	6.1E-07	7.3E-01	2.6E-02
Shallow	VOC	Benzene	71-43-2	T	A	2				3.70E-04	1.50E-03	3.5E+01		1.1E+01		5.0E-03	
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	1				3.20E-04	3.20E-04	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	2				3.70E-04	1.50E-03	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	2				3.00E-04	1.25E-03	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	2				5.90E-04	2.50E-03	2.4E+05		2.4E+05		1.3E+01	
Shallow	VOC	Carbon Disulfide	75-15-0	T		2				2.40E-04	1.00E-03	5.5E+02		1.2E+03		8.0E-01	
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	2				3.70E-04	1.50E-03	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	2				3.80E-04	1.60E-03	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		2				2.90E-04	1.19E-03	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	2				3.50E-04	1.50E-03	1.8E+02		1.5E+02		1.0E-01	
Shallow	VOC	Chloromethane	74-87-3	T	D	2				4.90E-04	2.00E-03	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	2				3.90E-04	1.65E-03	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	2				3.30E-04	1.35E-03						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2				8.20E-04	3.40E-03	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	2				3.70E-04	1.50E-03	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	2				3.40E-04	1.40E-03	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	2				3.80E-04	1.60E-03	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	2				3.80E-04	1.60E-03			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	2				3.80E-04	1.60E-03	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		2				4.90E-04	2.00E-03	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	2				3.00E-04	1.25E-03	2.3E+03		2.4E+03		8.8E-01	
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	2				2.80E-04	1.17E-03	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	2				3.10E-04	1.30E-03	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	1				3.50E-04	3.50E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		2				3.30E-04	1.35E-03	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	2				4.10E-04	1.70E-03	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	2				3.50E-04	1.50E-03	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	1				1.70E-03	1.70E-03	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		2				5.80E-04	2.40E-03	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		2				5.40E-04	2.25E-03						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		2				2.70E-04	1.15E-03	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	2	1	2.30E-03	2.30E-03	2.60E-04	2.60E-04	2.0E+04	1.2E-07	1.3E+04	1.8E-07	1.8E+00	1.3E-03
Shallow	VOC	Methylcyclohexane	108-87-2	T		2				4.20E-04	1.75E-03						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	2				2.90E-04	1.19E-03	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2				3.60E-04	1.50E-03	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	1				1.75E-03	1.75E-03	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	2				3.90E-04	1.65E-03	5.3E+02		5.3E+02		1.0E+00	
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2				4.00E-04	1.65E-03	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	2				3.90E-04	1.65E-03	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	2				3.60E-04	1.50E-03	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	2				4.20E-04	1.75E-03	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		2				5.40E-04	2.25E-03	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2				3.20E-04	1.35E-03	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	1				3.60E-04	3.60E-04	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	2				4.40E-04	1.85E-03	1.9E+02		1.9E+02		1.0E+01	
Shallow	SVOC	Acenaphthene	83-32-9	T		2				6.90E-04	6.90E-03	4.2E+00		4.2E+00		1.3E+00	
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	2				4.10E-04	4.10E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	2				6.50E-04	6.50E-03	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	2				5.90E-04	5.90E-03	4.3E-02		4.3E-02		4.3E-02	
Shallow	SVOC	Atrazine	1912-24-9	T		2				3.50E-04	3.50E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		2				5.90E-04	5.90E-03						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	2				6.80E-04	6.80E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	2				5.30E-04	5.30E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2				7.10E-04	7.10E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2				7.00E-04	7.00E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2				6.40E-04	6.40E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	2				6.50E-04	6.50E-03						
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2				1.00E-03	1.00E-02						

Table 4-33: Data Summary for AOI P-11 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2				1.70E-03	1.70E-02	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2				2.00E-04	2.00E-03			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2				7.80E-04	7.80E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	2				2.30E-04	2.30E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		2				4.50E-04	4.50E-03			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	2				6.10E-04	6.10E-03			7.4E+00		8.5E-02	
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		2				5.50E-04	5.50E-03			7.9E+01		1.5E-01	
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		2				7.30E-04	7.30E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		2				1.30E-03	1.30E-02			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2				6.60E-04	6.60E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	2				6.70E-04	6.70E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2				6.80E-04	6.80E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	2				6.60E-04	6.60E-03						
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		2				7.00E-04	7.00E-03			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	2				2.50E-04	2.50E-03			1.1E+03		5.5E+00	
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		2				1.00E-03	1.00E-02			5.2E+02		3.7E-01	
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	2				2.00E-04	2.00E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	2				3.70E-04	3.70E-03			1.1E+01		8.8E-01	
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2				2.10E-03	2.10E-02			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		2				3.30E-03	3.30E-02						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2				4.60E-04	4.60E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2				7.10E-04	7.10E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		2				6.90E-04	6.90E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	2				7.10E-04	7.10E-03	2.1E-01		2.1E-01		2.1E-01	
Shallow	SVOC	Fluorene	86-73-7	T	D	2				7.50E-04	7.50E-03	2.0E+00		2.0E+00		8.8E-01	
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	2				7.70E-04	7.70E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	2				1.50E-03	1.50E-02	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	2				1.60E-03	1.60E-02	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2				6.90E-04	6.90E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	2				8.60E-04	8.60E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	2				9.30E-04	9.30E-03			2.5E+01		2.6E-01	
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		2				9.00E-04	9.00E-03			8.1E+02		3.7E-01	
Shallow	SVOC	Naphthalene	91-20-3	T	C	2				1.30E-03	1.30E-02	3.1E+01		3.1E+01		5.2E-01	
Shallow	SVOC	2-Nitroaniline	88-74-4	T		2				4.90E-04	4.90E-03						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	2				5.90E-04	5.90E-03						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	2				1.30E-03	1.30E-02	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		2				9.50E-04	9.50E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		2				3.50E-03	3.50E-02						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2				6.40E-04	6.40E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2				1.10E-03	1.10E-02			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2				1.80E-03	1.80E-02						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	1				2.60E-02	2.60E-02			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	2				6.80E-04	6.80E-03	1.0E+00		1.0E+00		5.2E-02	
Shallow	SVOC	Phenol	108-95-2	T	ID	2				1.30E-03	1.30E-02			2.9E+04		4.4E+00	
Shallow	SVOC	Pyrene	129-00-0	T	D	2				6.30E-04	6.30E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		2				8.60E-04	8.60E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2				7.10E-04	7.10E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	2				8.20E-05	8.20E-05	4.5E-02		3.3E-03		5.0E-04	
Shallow	INORG	Antimony	7440-36-0	T		2				3.40E-03	3.40E-03			6.8E+01		6.0E-03	
Shallow	INORG	Arsenic	7440-38-2	T	A	2	2	3.90E-03	2.36E-02					4.3E+00	5.5E-03	5.0E-02	4.7E-01
Shallow	INORG	Barium	7440-39-3	T	D	2	2	4.23E-02	3.97E-01					1.4E+04	2.8E-05	2.0E+00	2.0E-01
Shallow	INORG	Beryllium	7440-41-7	T	B1	2				6.00E-04	6.00E-04			2.9E+02		4.0E-03	
Shallow	INORG	Cadmium	7440-43-9	T	B1	2				2.80E-04	2.80E-04			1.9E+02		5.0E-03	
Shallow	INORG	Chromium (total)	7440-47-3	T		2				1.50E-03	1.50E-03			4.6E+02		1.0E-01	
Shallow	INORG	Cobalt	7440-48-4	T	B1	2	1	5.35E-02	5.35E-02	7.40E-04	7.40E-04			2.4E+03	2.2E-05	4.0E-02	**1.3E+00**
Shallow	INORG	Copper	7440-50-8	T	D	2	1	9.10E-03	9.10E-03	1.70E-03	1.70E-03			7.4E+03	1.2E-06	1.4E+00	6.5E-03
Shallow	INORG	Lead	7439-92-1	T	B2	2				1.60E-03	1.60E-03					4.0E-03	
Shallow	INORG	Manganese	7439-96-5	T	D	2	2	3.11E-02	5.01E-01					9.1E+03	5.5E-05	8.6E-01	5.8E-01
Shallow	INORG	Mercury	7439-97-6	T	D	2				8.70E-05	8.70E-05	5.6E-02		5.6E-02		2.0E-03	

Table 4-33: Data Summary for AOI P-11 (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Nickel	7440-02-0	T	A	2	1	9.75E-03	9.75E-03	2.90E-03	2.90E-03			7.4E+04	1.3E-07	1.0E-01	9.8E-02
Shallow	INORG	Selenium	7782-49-2	T	D	2				4.70E-03	4.70E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	T	D	2				9.80E-04	9.80E-04			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	T		2				3.30E-05	3.30E-05			1.3E+01		2.0E-03	
Shallow	INORG	Vanadium	7440-62-2	T		2	1	5.98E-04	5.98E-04	6.70E-04	6.70E-04			9.7E+02	6.2E-07	4.5E-03	1.3E-01
Shallow	INORG	Zinc	7440-66-6	T	D	2				1.40E-02	1.40E-02			1.1E+05		2.4E+00	

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-34: Data Summary for Storm Water Detention Facility (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	VOC	Acetone	67-64-1	T	ID	10	3	2.10E-03	5.50E-03	1.10E-03	1.10E-03	1.0E+06	5.5E-09	3.1E+04	1.8E-07	7.3E-01	7.5E-03
Shallow	VOC	Benzene	71-43-2	T	A	10	1	4.50E-04	4.50E-04	3.70E-04	3.70E-04	3.5E+01	1.3E-05	1.1E+01	4.1E-05	5.0E-03	9.0E-02
Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	10				3.20E-04	3.20E-04	3.7E+01		1.4E+01		1.0E-01	
Shallow	VOC	Bromoform	75-25-2	T	B2	10				3.70E-04	3.70E-04	3.1E+03		1.4E+02		1.0E-01	
Shallow	VOC	Bromomethane	74-83-9	T	D	10				3.00E-04	3.00E-04	9.0E+00		7.0E+01		1.0E-02	
Shallow	VOC	2-Butanone	78-93-3	T	ID	10	1	1.30E-03	1.30E-03	5.90E-04	5.90E-04	2.4E+05	5.4E-09	2.4E+05	5.4E-09	1.3E+01	1.0E-04
Shallow	VOC	Carbon Disulfide	75-15-0	T		10	6	1.80E-04	2.30E-03	2.40E-04	2.40E-04	5.5E+02	4.2E-06	1.2E+03	1.9E-06	8.0E-01	2.9E-03
Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	10				3.70E-04	3.70E-04	2.4E+00		4.6E+00		5.0E-03	
Shallow	VOC	Chlorobenzene	108-90-7	T	D	10				3.80E-04	3.80E-04	4.7E+02		8.6E+01		1.0E-01	
Shallow	VOC	Chloroethane	75-00-3	T		10				2.90E-04	2.90E-04	5.7E+03		4.4E+02		4.3E-01	
Shallow	VOC	Chloroform	67-66-3	T	B2	10				3.50E-04	3.50E-04	1.8E+02		1.5E+02		1.0E-01	
Shallow	VOC	Chloromethane	74-87-3	T	D	10				4.90E-04	4.90E-04	4.5E+01		4.9E+02		2.6E-01	
Shallow	VOC	Cumene	98-82-8	T	D	10				3.90E-04	3.90E-04	5.6E+01		5.6E+01		8.0E-01	
Shallow	VOC	Cyclohexane	110-82-7	T	ID	10				3.30E-04	3.30E-04						
Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	10				8.20E-04	8.20E-04	1.2E+00		3.9E-01		2.0E-04	
Shallow	VOC	Dibromochloromethane	124-48-1	T	C	10				3.70E-04	3.70E-04	1.1E+02		1.8E+01		1.0E-01	
Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	10				3.40E-04	3.40E-04	1.5E+01		2.5E-02		1.0E-03	
Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	10				3.80E-04	3.80E-04	1.6E+02		1.6E+02		6.0E-01	
Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	10				3.80E-04	3.80E-04			2.0E+00		6.6E-03	
Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	10				3.80E-04	3.80E-04	7.4E+01		6.4E+00		7.5E-02	
Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		10				4.90E-04	4.90E-04	3.0E+02		3.0E+02		1.7E+00	
Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	10	1	5.40E-04	5.40E-04	3.00E-04	3.00E-04	2.3E+03	2.3E-07	2.4E+03	2.3E-07	8.8E-01	6.1E-04
Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	10				2.80E-04	2.80E-04	5.9E+01		1.9E+01		5.0E-03	
Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	10				3.10E-04	3.10E-04	1.3E+00		1.1E+01		7.0E-03	
Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	10				3.50E-04	3.50E-04	2.1E+02		2.0E+02		7.0E-02	
Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		10				3.30E-04	3.30E-04	2.0E+02		2.2E+02		1.0E-01	
Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	10				4.10E-04	4.10E-04	3.6E+01		1.6E+01		5.0E-03	
Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	10				3.50E-04	3.50E-04	2.6E+01		5.5E+00		8.5E-03	
Shallow	VOC	Ethyl Benzene	100-41-4	T	D	10				4.10E-04	4.10E-04	1.7E+02		1.7E+02		7.0E-01	
Shallow	VOC	2-Hexanone	591-78-6	T		10				5.80E-04	5.80E-04	8.7E+03		5.2E+03		1.0E+00	
Shallow	VOC	Methyl Acetate	79-20-9	T		10				5.40E-04	5.40E-04						
Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		10				2.70E-04	2.70E-04	4.7E+04		6.1E+02		2.4E-01	
Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	9	6	7.80E-04	3.30E-03	2.60E-04	2.60E-04	2.0E+04	1.7E-07	1.3E+04	2.5E-07	1.8E+00	1.8E-03
Shallow	VOC	Methylcyclohexane	108-87-2	T		10				4.20E-04	4.20E-04						
Shallow	VOC	Methylene Chloride	75-09-2	T	B2	10				2.90E-04	2.90E-04	1.4E+03		2.2E+02		5.0E-03	
Shallow	VOC	Styrene	100-42-5	T		10				3.50E-04	3.50E-04	3.1E+02		9.7E+00		1.0E-01	
Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	10				3.60E-04	3.60E-04	7.7E+01		4.7E+00		8.5E-03	
Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	10				4.20E-04	4.20E-04	1.7E+02		1.2E+01		5.0E-03	
Shallow	VOC	Toluene	108-88-3	T	D	10	8	4.70E-04	9.50E-04	3.90E-04	3.90E-04	5.3E+02	1.8E-06	5.3E+02	1.8E-06	1.0E+00	9.5E-04
Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	10				4.00E-04	4.00E-04	3.0E+02		1.9E+01		7.0E-02	
Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	10				3.90E-04	3.90E-04	1.3E+03		1.3E+03		2.0E-01	
Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	10				3.60E-04	3.60E-04	1.1E+02		2.1E+01		5.0E-03	
Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	10				4.20E-04	4.20E-04	9.7E+01		2.2E+01		5.0E-03	
Shallow	VOC	Trichlorofluoromethane	75-69-4	T		10				5.40E-04	5.40E-04	1.1E+03		1.1E+03		2.6E+00	
Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		10				3.20E-04	3.20E-04	1.7E+02		1.7E+02		1.7E+02	
Shallow	VOC	Vinyl Chloride	75-01-4	T	A	10				3.60E-04	3.60E-04	1.3E+01		1.0E+00		2.0E-03	
Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	10	6	5.20E-04	1.50E-03	4.40E-04	4.40E-04	1.9E+02	7.9E-06	1.9E+02	7.9E-06	1.0E+01	1.5E-04
Shallow	SVOC	Acenaphthene	83-32-9	T		10	3	8.60E-04	1.35E-03	8.00E-04	2.00E-03	4.2E+00	3.2E-04	4.2E+00	3.2E-04	1.3E+00	1.0E-03
Shallow	SVOC	Acenaphthylene	208-96-8	T	D	10				7.10E-04	1.80E-03	3.9E+00		3.9E+00		5.2E-02	
Shallow	SVOC	Acetophenone	98-86-2	T	D	10				2.60E-03	6.50E-03	6.1E+03		6.1E+03		1.5E+00	
Shallow	SVOC	Anthracene	120-12-7	T	D	10	1	7.40E-04	7.40E-04	6.80E-04	1.70E-03	4.3E-02	1.7E-02	4.3E-02	1.7E-02	4.3E-02	1.7E-02
Shallow	SVOC	Atrazine	1912-24-9	T		10				2.50E-03	6.20E-03			5.4E+00		3.0E-03	
Shallow	SVOC	Benzaldehyde	100-52-7	T		10				2.80E-03	7.00E-03						
Shallow	SVOC	Benzo(a)anthracene	56-55-3	T	B2	10				7.00E-04	1.80E-03			9.4E-03		2.1E-03	
Shallow	SVOC	Benzo(a)pyrene	50-32-8	T	B2	10				7.30E-04	1.80E-03			2.0E-03		5.0E-03	
Shallow	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	10				9.40E-04	2.40E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	10				8.50E-04	2.10E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	10				8.40E-04	2.10E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Biphenyl	92-52-4	T	D	10				2.60E-03	6.50E-03						

Table 4-34: Data Summary for Storm Water Detention Facility (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	10				8.70E-04	2.20E-03						
Shallow	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	10				9.70E-04	2.40E-03	2.1E+02		5.7E+00		2.0E-03	
Shallow	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	10				2.70E-03	6.80E-03			3.2E-01		6.0E-03	
Shallow	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	10				8.80E-04	2.20E-03						
Shallow	SVOC	Butylbenzylphthalate	85-68-7	T	C	10				8.80E-04	2.20E-03			2.7E+00		1.2E+00	
Shallow	SVOC	Caprolactam	105-60-2	T		10				2.50E-03	6.20E-03			3.9E+05		5.8E+00	
Shallow	SVOC	Carbazole	86-74-8	T	B2	10	5	1.00E-03	4.70E-03	8.20E-04	2.00E-03			7.4E+00	6.4E-04	8.5E-02	5.5E-02
Shallow	SVOC	4-Chloro-3-methylphenol	59-50-7	T		10				9.90E-04	2.50E-03			7.9E+01		1.5E-01	
Shallow	SVOC	4-Chloroaniline	106-47-8	T		10				6.10E-04	1.50E-03						
Shallow	SVOC	2-Chloronaphthalene	91-58-7	T		10				8.50E-04	2.10E-03			6.7E+00		1.8E+00	
Shallow	SVOC	2-Chlorophenol	95-57-8	T		10				1.00E-03	2.50E-03			9.4E+01		4.5E-02	
Shallow	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		10				7.90E-04	2.00E-03						
Shallow	SVOC	Chrysene	218-01-9	T	B2	10				7.50E-04	1.90E-03			5.0E-03		5.0E-03	
Shallow	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	10				7.90E-04	2.00E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Dibenzofuran	132-64-9	T	D	10				1.10E-03	2.80E-03						
Shallow	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	2.30E-03			1.8E-01		1.1E-03	
Shallow	SVOC	2,4-Dichlorophenol	120-83-2	T		10				8.50E-04	2.10E-03			4.8E+01		7.3E-02	
Shallow	SVOC	Diethylphthalate	84-66-2	T	D	10	4	8.00E-04	2.30E-03	6.50E-04	1.60E-03			1.1E+03	2.1E-06	5.5E+00	4.2E-04
Shallow	SVOC	2,4-Dimethylphenol	105-67-9	T		10	7	1.30E-03	1.50E-02	8.50E-04	8.50E-04			5.2E+02	2.9E-05	3.7E-01	4.1E-02
Shallow	SVOC	Dimethylphthalate	131-11-3	T	D	10				7.60E-04	1.90E-03			4.2E+03		7.3E+01	
Shallow	SVOC	Di-n-butylphthalate	84-74-2	T	D	10	1	7.70E-04	7.70E-04	6.70E-04	1.70E-03			1.1E+01	7.0E-05	8.8E-01	8.8E-04
Shallow	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		10				1.30E-03	3.20E-03			9.5E+00		2.0E-02	
Shallow	SVOC	2,4-Dinitrophenol	51-28-5	T		10				3.00E-03	7.50E-03						
Shallow	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	10				7.90E-04	2.00E-03			8.6E+00		7.7E-03	
Shallow	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	10				5.70E-04	1.40E-03						
Shallow	SVOC	Di-n-octylphthalate	117-84-0	T		10				1.10E-03	2.80E-03			4.0E-01		1.3E-01	
Shallow	SVOC	Fluoranthene	206-44-0	T	D	10	1	9.15E-04	9.15E-04	8.10E-04	2.00E-03	2.1E-01	4.4E-03	2.1E-01	4.4E-03	2.1E-01	4.4E-03
Shallow	SVOC	Fluorene	86-73-7	T	D	10	2	1.65E-03	1.70E-03	1.00E-03	2.50E-03	2.0E+00	8.5E-04	2.0E+00	8.5E-04	8.8E-01	1.9E-03
Shallow	SVOC	Hexachlorobenzene	118-74-1	T	B2	10				7.40E-04	1.80E-03	3.0E+00		4.6E-03		1.0E-03	
Shallow	SVOC	Hexachlorobutadiene	87-68-3	T	C	10				7.30E-04	1.80E-03	3.2E+00		4.0E-01		1.5E-02	
Shallow	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	10				1.10E-03	2.80E-03	4.2E-01		1.6E+00		5.0E-02	
Shallow	SVOC	Hexachloroethane	67-72-1	T	C	10				7.40E-04	1.80E-03	5.0E+01		1.9E+00		7.3E-03	
Shallow	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	10				6.30E-04	1.60E-03			2.0E-03		2.0E-03	
Shallow	SVOC	Isophorone	78-59-1	T	C	10				6.30E-04	1.60E-03			9.9E+02		7.7E-01	
Shallow	SVOC	2-Methylnaphthalene	91-57-6	T	ID	10	2	7.20E-04	7.30E-04	6.40E-04	1.60E-03			2.5E+01	2.9E-05	2.6E-01	2.8E-03
Shallow	SVOC	Methylphenol (total)	1319-77-3	T		10	7	2.45E-03	1.75E-02	1.30E-03	1.30E-03			8.1E+02	2.2E-05	3.7E-01	4.7E-02
Shallow	SVOC	Naphthalene	91-20-3	T	C	10	6	7.60E-04	3.60E-03	7.50E-04	1.90E-03	3.1E+01	1.2E-04	3.1E+01	1.2E-04	5.2E-01	6.9E-03
Shallow	SVOC	2-Nitroaniline	88-74-4	T		10				7.00E-04	1.80E-03						
Shallow	SVOC	3-Nitroaniline	99-09-2	T	C	10				7.10E-04	1.80E-03						
Shallow	SVOC	4-Nitroaniline	100-01-6	T	C	10				1.30E-03	3.20E-03						
Shallow	SVOC	Nitrobenzene	98-95-3	T	D	10				8.10E-04	2.00E-03	5.5E+02		1.1E+01		3.4E-03	
Shallow	SVOC	2-Nitrophenol	88-75-5	T		10				2.10E-03	5.20E-03			7.9E+01		2.0E-02	
Shallow	SVOC	4-Nitrophenol	100-02-7	T		10				1.90E-03	4.80E-03						
Shallow	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	10				1.40E-03	3.50E-03			3.5E+01		2.7E-01	
Shallow	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	10				6.70E-04	1.70E-03			3.6E-01		5.0E-03	
Shallow	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	10				7.80E-04	2.00E-03						
Shallow	SVOC	Pentachlorophenol	87-86-5	T	B2	10				2.40E-03	6.00E-03			2.0E-01		1.0E-03	
Shallow	SVOC	Phenanthrene	85-01-8	T	D	10	4	9.10E-04	2.25E-03	8.20E-04	2.00E-03	1.0E+00	2.3E-03	1.0E+00	2.3E-03	5.2E-02	4.3E-02
Shallow	SVOC	Phenol	108-95-2	T	ID	10	5	2.70E-03	9.40E-02	2.60E-03	2.60E-03			2.9E+04	3.2E-06	4.4E+00	2.1E-02
Shallow	SVOC	Pyrene	129-00-0	T	D	10				1.10E-03	2.80E-03	1.4E-01		1.4E-01		1.4E-01	
Shallow	SVOC	2,4,5-Trichlorophenol	95-95-4	T		10				1.20E-03	3.00E-03			1.7E+02		7.3E-01	
Shallow	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	10				1.70E-03	4.20E-03			1.0E+01		1.2E-01	
Shallow	P/PCB	PCBs (total)	1336-36-3	T	B2	10	9	1.28E-04	1.40E-03	8.20E-05	8.20E-05	4.5E-02	3.1E-02	3.3E-03	4.2E-01	5.0E-04	**2.8E+00**
Shallow	INORG	Antimony	7440-36-0	D		8	3	8.20E-03	2.23E-02	3.40E-03	3.40E-03			6.8E+01	3.3E-04	6.0E-03	**3.7E+00**
Shallow	INORG	Antimony	7440-36-0	T		9	2	6.70E-03	1.29E-02	3.40E-03	3.40E-03			6.8E+01	1.9E-04	6.0E-03	**2.2E+00**
Shallow	INORG	Arsenic	7440-38-2	D	A	8	7	3.60E-03	1.64E-02	2.10E-03	2.10E-03			4.3E+00	3.8E-03	5.0E-02	3.3E-01
Shallow	INORG	Arsenic	7440-38-2	T	A	9	9	3.40E-03	3.06E-02					4.3E+00	7.1E-03	5.0E-02	6.1E-01
Shallow	INORG	Barium	7440-39-3	D	D	8	8	6.01E-02	3.84E-01					1.4E+04	2.7E-05	2.0E+00	1.9E-01
Shallow	INORG	Barium	7440-39-3	T	D	9	9	1.87E-02	4.13E-01					1.4E+04	3.0E-05	2.0E+00	2.1E-01

Table 4-34: Data Summary for Storm Water Detention Facility (Shallow Groundwater)
General Motors - Pontiac North Campus, Pontiac, Michigan

Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	No of Analyses	No of Detects	Min 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 Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria
Shallow	INORG	Beryllium	7440-41-7	D	B1	8	2	6.10E-04	6.20E-04	6.00E-04	6.00E-04			2.9E+02	2.1E-06	4.0E-03	1.6E-01
Shallow	INORG	Beryllium	7440-41-7	T	B1	9	3	6.90E-04	9.00E-04	6.00E-04	6.00E-04			2.9E+02	3.1E-06	4.0E-03	2.3E-01
Shallow	INORG	Cadmium	7440-43-9	D	B1	8	5	3.80E-04	4.90E-04	2.80E-04	2.80E-04			1.9E+02	2.6E-06	5.0E-03	9.8E-02
Shallow	INORG	Cadmium	7440-43-9	T	B1	9	9	3.80E-04	6.70E-03					1.9E+02	3.5E-05	5.0E-03	**1.3E+00**
Shallow	INORG	Chromium (total)	7440-47-3	D		8				1.50E-03	1.50E-03			4.6E+02		1.0E-01	
Shallow	INORG	Chromium (total)	7440-47-3	T		9	5	4.70E-03	9.00E-02	1.50E-03	1.50E-03			4.6E+02	2.0E-04	1.0E-01	9.0E-01
Shallow	INORG	Cobalt	7440-48-4	D	B1	8	1	1.40E-03	1.40E-03	7.40E-04	7.40E-04			2.4E+03	5.8E-07	4.0E-02	3.5E-02
Shallow	INORG	Cobalt	7440-48-4	T	B1	9	6	9.80E-04	2.80E-02	7.40E-04	7.40E-04			2.4E+03	1.2E-05	4.0E-02	7.0E-01
Shallow	INORG	Copper	7440-50-8	D	D	8	1	8.50E-03	8.50E-03	1.70E-03	1.70E-03			7.4E+03	1.1E-06	1.4E+00	6.1E-03
Shallow	INORG	Copper	7440-50-8	T	D	9	1	1.56E-01	1.56E-01	1.70E-03	1.70E-03			7.4E+03	2.1E-05	1.4E+00	1.1E-01
Shallow	INORG	Lead	7439-92-1	D	B2	8				1.60E-03	1.60E-03					4.0E-03	
Shallow	INORG	Lead	7439-92-1	T	B2	9	6	1.70E-03	1.64E-01	1.60E-03	1.60E-03					4.0E-03	**4.1E+01**
Shallow	INORG	Manganese	7439-96-5	D	D	8	4	2.52E-02	1.02E+00	6.80E-04	6.80E-04			9.1E+03	1.1E-04	8.6E-01	**1.2E+00**
Shallow	INORG	Manganese	7439-96-5	T	D	9	6	5.82E-02	1.64E+00	6.80E-04	6.80E-04			9.1E+03	1.8E-04	8.6E-01	**1.9E+00**
Shallow	INORG	Mercury	7439-97-6	D	D	8				8.70E-05	8.70E-05	5.6E-02		5.6E-02		2.0E-03	
Shallow	INORG	Mercury	7439-97-6	T	D	9	2	1.60E-04	9.30E-04	8.70E-05	8.70E-05	5.6E-02	1.7E-02	5.6E-02	1.7E-02	2.0E-03	4.7E-01
Shallow	INORG	Nickel	7440-02-0	D	A	8	7	3.40E-03	1.45E-02	2.90E-03	2.90E-03			7.4E+04	2.0E-07	1.0E-01	1.5E-01
Shallow	INORG	Nickel	7440-02-0	T	A	9	9	3.00E-03	9.84E-02					7.4E+04	1.3E-06	1.0E-01	9.8E-01
Shallow	INORG	Selenium	7782-49-2	D	D	8				4.70E-03	4.70E-03			9.7E+02		5.0E-02	
Shallow	INORG	Selenium	7782-49-2	T	D	9				4.70E-03	4.70E-03			9.7E+02		5.0E-02	
Shallow	INORG	Silver	7440-22-4	D	D	8				9.80E-04	9.80E-04			1.5E+03		3.4E-02	
Shallow	INORG	Silver	7440-22-4	T	D	9				9.80E-04	9.80E-04			1.5E+03		3.4E-02	
Shallow	INORG	Thallium	7440-28-0	D		8				3.30E-05	3.30E-05			1.3E+01		2.0E-03	
Shallow	INORG	Thallium	7440-28-0	T		9	1	2.50E-04	2.50E-04	3.30E-05	3.30E-05			1.3E+01	1.9E-05	2.0E-03	1.3E-01
Shallow	INORG	Vanadium	7440-62-2	D		8	7	9.90E-04	1.16E-02	6.70E-04	6.70E-04			9.7E+02	1.2E-05	4.5E-03	**2.6E+00**
Shallow	INORG	Vanadium	7440-62-2	T		9	9	1.40E-03	8.70E-02					9.7E+02	9.0E-05	4.5E-03	**1.9E+01**
Shallow	INORG	Zinc	7440-66-6	D	D	8	1	3.59E-02	3.59E-02	1.40E-02	1.40E-02			1.1E+05	3.3E-07	2.4E+00	1.5E-02
Shallow	INORG	Zinc	7440-66-6	T	D	9	2	2.23E-01	3.95E-01	1.40E-02	1.40E-02			1.1E+05	3.6E-06	2.4E+00	1.6E-01

Notes:

Screening Criteria is from Michigan DEQ Act 451, Part 201.

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to the Screening Criteria.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 4-35
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC MIGHIGAN
CORRECTIVE MEASURES PROPOSAL
APPARENT LNAPL THICKNESS MEASUREMENTS

Well	Date (mm/dd/yyyy)	Depth to Water (feet bgs)	Depth to NAPL (feet bgs)	NAPL Thickness (feet)
LNAPL AREA NO. 1				
MWW1-05	10/27/2003*	30.66	29.56	1.10
LNAPL AREA NO. 2				
MWW10-01	10/1 &2/01	16.77	9.92	6.85
	10/8 & 9/01	17.14	9.30	7.84
	11/7 & 8/01	18.82	7.91	10.91
	1/2 & 3/02	19.01	9.25	9.76
	2/7 & 8/02	18.83	10.17	8.66
	3/18/2002	19.10	9.95	9.15
MWW10-06	2/7 & 8/02	14.75	14.70	0.05
	3/18/2002	5.71	5.63	0.08
LNAPL AREA NO. 3				
MWW8-03	10/1 & 2/01	29.98	27.17	2.81
	10/8 & 9/01	31.15	27.82	3.33
	11/7 & 8/01	32.23	28.02	4.21
	1/2 & 3/02	32.50	28.80	3.70
	2/7 & 8/02	32.32	28.75	3.57
	3/18/2002	32.02	29.03	2.99
MWW8-05	10/1 & 2/01	12.01	11.99	0.02
	10/8 & 9/01	13.20	11.83	1.37
	11/7 & 8/01	11.42	N/A	N/A
	1/2 & 3/02	12.58	N/A	N/A
	2/7& 8/02	13.33	N/A	N/A
	3/18/2002	11.98	N/A	N/A
MWW8-06	1/2 & 3/02	32.57	27.94	4.63
	2/7 & 8/02	34.60	27.50	7.10
	3/18/2002	34.67	27.65	7.02
MWW8-07	1/2 & 3/02	32.53	27.41	5.12
	2/7 & 8/02	32.49	27.82	4.67
	3/18/2002	32.57	27.39	5.18
MWW8-09	2/7 & 8/02	23.30	22.23	1.07
	3/18/2002	20.02	17.60	2.42
MWW1-01	10/1 & 12/01	9.42	9.30	0.12
	10/8 & 9/01	8.11	7.98	0.13
	11/7 & 8/01	8.04	7.96	0.08
	1/2 & 3/02	9.61	9.50	0.11
	2/7 & 8/02	11.55	10.67	0.88
	3/18/2002	9.99	8.96	1.03
MW36-99	10/1 & 2/01	17.93	17.56	0.37
	10/8 & 9/01	17.91	17.53	0.38
	11/7 & 8/01	16.86	16.72	0.14
	1/2 & 3/02	17.04	16.91	0.13
	2/7 & 8/02	17.33	17.12	0.21
	3/18/2002	17.19	17.02	0.17
MW22	10/1 & 2/01	23.20	N/A	N/A
	10/8 & 9/01	22.92	N/A	N/A
	11/2 & 8/01	22.02	Sheen	Sheen
	1/2 & 3/02	22.79	N/A	N/A
	2/7 & 8/02	23.02	N/A	N/A
	3/18/2002	N/A	N/A	N/A
MW24-99	10/1 & 2/01	16.84	16.65	0.19
	10/8 & 9/01	16.78	16.65	0.13
	11/7 & 8/01	16.06	16.05	0.01
	1/2 & 3/02	16.06	15.91	0.15
	2/7 & 8/02	16.20	16.09	0.11

TABLE 4-35
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC MIGHIGAN
CORRECTIVE MEASURES PROPOSAL
APPARENT LNAPL THICKNESS MEASUREMENTS

Well	Date (mm/dd/yyyy)	Depth to Water (feet bgs)	Depth to NAPL (feet bgs)	NAPL Thickness (feet)
	3/18/2002	15.87	N/A	Product on Probe
MW25-99	10/1 & 2/01	12.11	12.07	0.04
	10/8 & 9/01	12.03	12.02	0.01
	11/2 & 8/01	11.47	11.45	0.02
	1/2 & 3/02	11.71	11.50	0.21
	2/7 & 8/02	11.82	11.10	0.72
	3/18/2002	11.43	11.39	0.04
MW6	10/1 & 2/01	21.25	19.88	1.37
	10/8 & 9/01	21.25	19.56	1.69
	11/7 & 8/01	18.59	17.42	1.17
	1/2 & 3/02	22.00	19.46	2.54
	2/7 & 8/02	22.16	19.52	2.64
	3/18/2002	22.01	19.30	2.71
MW20	10/1 & 2/01	26.05	N/A	N/A
	10/8 & 9/01	26.14	26.13	0.01
	11/7 & 8/01	25.44	N/A	N/A
	1/2 & 3/02	25.05	N/A	N/A
	2/7 & 8/02	25.3	N/A	N/A
MW4	10/1 & 2/01	12.85	N/A	N/A
	11/7 & 8/01	14.8	N/A	N/A
	1/2 & 3/02	14.8	N/A	N/A
	2/7 & 8/02	Dry	N/A	N/A
	3/18/2002	19.98	N/A	Product on Probe
MW5	11/7 & 8/01	19.45	N/A	N/A
	1/2 & 8/02	19.45	N/A	N/A
	2/7 & 8/02	20.33	20.32	0.01
MW13	10/1 & 2/01	14.38	14.2	0.18
	10/8 & 9/01	13.62	13.08	0.54
	11/7 & 8/01	12.71	12.23	0.48
	1/2 & 3/02	10.56	10.23	0.33
	2/7 & 8/02	11.9	11.81	0.09
	3/18/2002	12.3	11.56	0.74
MWW8-08	10/28/2003*	31.59	30.90	0.69
MWW8-14	10/28/2003	30.25	30.21	0.04
MWW8-15	10/28/2003	32.31	32.29	0.02
MWW8-16	10/28/2003	29.99	29.39	0.60
RWW8-01	10/28/2003	26.18	26.06	0.12
RWW8-02	10/28/2003	31.50	29.93	1.57
LNAPL AREA NO. 4				
MWM2-04	1/2/2002	16.08	16.02	0.06
	Aug. 2002**	16.49	16.48	0.01
MWM2-06	Aug. 2002	17.64	16.62	1.02
	11/11/2002	17.52	16.81	0.71
	05/03/03	18.02	16.70	1.32
	06/12/03	16.92	16.68	0.24
	06/17/03	17.00	16.71	0.29
	06/23/03	17.53	16.98	0.55
	07/16/03	17.40	16.93	0.47
	08/01/03	17.55	17.01	0.54
	08/11/03	17.39	17.02	0.37
	08/27/03	17.44	17.03	0.41
LNAPL AREA NO. 5				
MWM4-06	7/24/2003	5.99	5.54	0.45
	7/25/2003	6.10	5.53	0.57
	7/28/2003	9.15	5.48	3.67

TABLE 4-35
GENERAL MOTORS CORPORATION
PONTIAC NORTH CAMPUS - PONTIAC MIGHIGAN
CORRECTIVE MEASURES PROPOSAL
APPARENT LNAPL THICKNESS MEASUREMENTS

Well	Date (mm/dd/yyyy)	Depth to Water (feet bgs)	Depth to NAPL (feet bgs)	NAPL Thickness (feet)
	8/11/2003	6.11	5.40	0.71
	8/27/2003	6.16	5.41	0.75
MWM16-03	7/24/2003	5.42	Globules in well	
	7/28/2003	5.38	Oil sheen on water, petroleum odor	
	8/11/2003	5.34	Globules present on probe	
	8/27/2003	5.35	Globules in well	
LNAPL AREA NO. 6				
MWW9-02	7/31/2003	33.70	--	--
	8/11/2003	33.17	--	--
	8/27/2003*	33.68	33.66	0.02
	10/27/2003	33.92	33.67	0.25

Note:

* - LNAPL was observed for the first time on this date in this well.

** - LNAPL has not been detected at MWM2-04 since the August 2002 reading.

Table 4-36: Data Summary – AOI M-2 – LNAPL Area No.4
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)
VOC	Acetone	67-64-1	ID	1					5.30E-02	5.30E-02
VOC	Benzene	71-43-2	A	1					7.60E-03	7.60E-03
VOC	Bromodichloromethane	75-27-4	B2	1					9.00E-03	9.00E-03
VOC	Bromoform	75-25-2	B2	1					1.20E-02	1.20E-02
VOC	Bromomethane	74-83-9	D	1					4.60E-02	4.60E-02
VOC	2-Butanone	78-93-3	ID	1					5.70E-02	5.70E-02
VOC	Carbon Disulfide	75-15-0		1					5.00E-03	5.00E-03
VOC	Carbon Tetrachloride	56-23-5	B2	1					1.50E-02	1.50E-02
VOC	Chlorobenzene	108-90-7	D	1					6.40E-03	6.40E-03
VOC	Chloroethane	75-00-3		1					5.20E-02	5.20E-02
VOC	Chloroform	67-66-3	B2	1	1	4.20E-01	4.20E-01	4.20E-01		
VOC	Chloromethane	74-87-3	D	1					1.50E-02	1.50E-02
VOC	Cumene	98-82-8	D	1	1	7.90E-01	7.90E-01	7.90E-01		
VOC	Cyclohexane	110-82-7	ID	1					6.80E-03	6.80E-03
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	1					2.50E-02	2.50E-02
VOC	Dibromochloromethane	124-48-1	C	1					1.20E-02	1.20E-02
VOC	1,2-Dibromoethane	106-93-4	B2	1					8.40E-03	8.40E-03
VOC	1,2-Dichlorobenzene	95-50-1	D	1					7.60E-03	7.60E-03
VOC	1,3-Dichlorobenzene	541-73-1	D	1					9.10E-03	9.10E-03
VOC	1,4-Dichlorobenzene	106-46-7	C	1					9.50E-03	9.50E-03
VOC	Dichlorodifluoromethane	75-71-8		1					2.50E-02	2.50E-02
VOC	1,1-Dichloroethane	75-34-3	C	1	1	2.10E+01	2.10E+01	2.10E+01		
VOC	1,2-Dichloroethane	107-06-2	B2	1					1.40E-02	1.40E-02
VOC	1,1-Dichloroethene	75-35-4	C	1	1	2.40E+00	2.40E+00	2.40E+00		
VOC	cis-1,2-Dichloroethene	156-59-2	D	1					8.60E-03	8.60E-03
VOC	trans-1,2-Dichloroethene	156-60-5		1					1.10E-02	1.10E-02
VOC	1,2-Dichloropropane	78-87-5	B2	1					1.40E-02	1.40E-02
VOC	1,3-Dichloropropene (total)	542-75-6	B2	1					8.50E-03	8.50E-03
VOC	Ethyl Benzene	100-41-4	D	1	1	2.70E+00	2.70E+00	2.70E+00		
VOC	2-Hexanone	591-78-6		1					1.80E-02	1.80E-02
VOC	Methyl Acetate	79-20-9		1					2.60E-02	2.60E-02
VOC	Methyl tert-butyl ether	1634-04-4		1					9.00E-03	9.00E-03
VOC	4-Methyl-2-pentanone	108-10-1	ID	1	1	3.40E-01	3.40E-01	3.40E-01		
VOC	Methylcyclohexane	108-87-2		1	1	2.70E-01	2.70E-01	2.70E-01		
VOC	Methylene Chloride	75-09-2	B2	1	1	1.30E+00	1.30E+00	1.30E+00		
VOC	Styrene	100-42-5		1					7.90E-03	7.90E-03
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1					1.10E-02	1.10E-02
VOC	Tetrachloroethene	127-18-4	C-B2	1	1	1.10E+01	1.10E+01	1.10E+01		
VOC	Toluene	108-88-3	D	1	1	3.30E+00	3.30E+00	3.30E+00		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1					1.20E-02	1.20E-02
VOC	1,1,1-Trichloroethane	71-55-6	D	1	1	4.40E+00	4.40E+00	4.40E+00		
VOC	1,1,2-Trichloroethane	79-00-5	C	1					8.70E-03	8.70E-03
VOC	Trichloroethene	79-01-6	C-B2	1	1	1.40E+00	1.40E+00	1.40E+00		
VOC	Trichlorofluoromethane	75-69-4		1					9.70E-03	9.70E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroetha	76-13-1		1					3.20E-02	3.20E-02
VOC	Vinyl Chloride	75-01-4	A	1					2.00E-02	2.00E-02
VOC	Xylenes (total)	1330-20-7	ID	1	1	1.00E+01	1.00E+01	1.00E+01		
SVOC	Acenaphthene	83-32-9		1					3.50E-01	3.50E-01
SVOC	Acenaphthylene	208-96-8	D	1					4.80E-01	4.80E-01
SVOC	Acetophenone	98-86-2	D	1					5.00E-01	5.00E-01
SVOC	Anthracene	120-12-7	D	1	1	1.20E+02	1.20E+02	1.20E+02		
SVOC	Atrazine	1912-24-9		1					5.50E-01	5.50E-01
SVOC	Benzaldehyde	100-52-7		1					3.50E-01	3.50E-01
SVOC	Benzo(a)anthracene	56-55-3	B2	1					5.80E-01	5.80E-01

Table 4-36: Data Summary – AOI M-2 – LNAPL Area No.4
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)
SVOC	Benzo(a)pyrene	50-32-8	B2	1					3.80E-01	3.80E-01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1					5.00E-01	5.00E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1					4.00E-01	4.00E-01
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1					4.00E-01	4.00E-01
SVOC	Biphenyl	92-52-4	D	1					4.50E-01	4.50E-01
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1					6.50E-01	6.50E-01
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1					4.50E-01	4.50E-01
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1					3.20E-01	3.20E-01
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1					3.80E-01	3.80E-01
SVOC	Butylbenzylphthalate	85-68-7	C	1					5.20E-01	5.20E-01
SVOC	Caprolactam	105-60-2		1					7.00E-01	7.00E-01
SVOC	Carbazole	86-74-8	B2	1					4.80E-01	4.80E-01
SVOC	4-Chloro-3-methylphenol	59-50-7		1					4.80E-01	4.80E-01
SVOC	4-Chloroaniline	106-47-8		1					5.00E-01	5.00E-01
SVOC	2-Chloronaphthalene	91-58-7		1					4.20E-01	4.20E-01
SVOC	2-Chlorophenol	95-57-8		1					4.50E-01	4.50E-01
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		1					4.20E-01	4.20E-01
SVOC	Chrysene	218-01-9	B2	1					5.50E-01	5.50E-01
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1					4.50E-01	4.50E-01
SVOC	Dibenzofuran	132-64-9	D	1					4.20E-01	4.20E-01
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1					4.50E-01	4.50E-01
SVOC	2,4-Dichlorophenol	120-83-2		1					4.00E-01	4.00E-01
SVOC	Diethylphthalate	84-66-2	D	1					4.80E-01	4.80E-01
SVOC	2,4-Dimethylphenol	105-67-9		1					4.50E-01	4.50E-01
SVOC	Dimethylphthalate	131-11-3	D	1					4.20E-01	4.20E-01
SVOC	Di-n-butylphthalate	84-74-2	D	1					5.80E-01	5.80E-01
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1					1.20E+00	1.20E+00
SVOC	2,4-Dinitrophenol	51-28-5		1					1.20E+00	1.20E+00
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1					5.50E-01	5.50E-01
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1					3.80E-01	3.80E-01
SVOC	Di-n-octylphthalate	117-84-0		1					1.60E+00	1.60E+00
SVOC	Fluoranthene	206-44-0	D	1	1	1.30E+02	1.30E+02	1.30E+02		
SVOC	Fluorene	86-73-7	D	1	1	1.70E+02	1.70E+02	1.70E+02		
SVOC	Hexachlorobenzene	118-74-1	B2	1					5.50E-01	5.50E-01
SVOC	Hexachlorobutadiene	87-68-3	C	1					4.00E-01	4.00E-01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1					2.50E-01	2.50E-01
SVOC	Hexachloroethane	67-72-1	C	1					4.20E-01	4.20E-01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1					4.80E-01	4.80E-01
SVOC	Isophorone	78-59-1	C	1					5.50E-01	5.50E-01
SVOC	2-Methylnaphthalene	91-57-6	ID	1	1	5.90E+01	5.90E+01	5.90E+01		
SVOC	Methylphenol (total)	1319-77-3		1					5.20E-01	5.20E-01
SVOC	Naphthalene	91-20-3	C	1					4.20E-01	4.20E-01
SVOC	2-Nitroaniline	88-74-4		1					3.20E-01	3.20E-01
SVOC	3-Nitroaniline	99-09-2	C	1					5.50E-01	5.50E-01
SVOC	4-Nitroaniline	100-01-6	C	1					4.20E-01	4.20E-01
SVOC	Nitrobenzene	98-95-3	D	1					6.00E-01	6.00E-01
SVOC	2-Nitrophenol	88-75-5		1					5.20E-01	5.20E-01
SVOC	4-Nitrophenol	100-02-7		1					1.30E+00	1.30E+00
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1					4.80E-01	4.80E-01
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1					3.80E-01	3.80E-01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1					6.80E-01	6.80E-01
SVOC	Pentachlorophenol	87-86-5	B2	1					1.50E+00	1.50E+00
SVOC	Phenanthrene	85-01-8	D	1	1	6.60E+02	6.60E+02	6.60E+02		
SVOC	Phenol	108-95-2	ID	1					4.50E-01	4.50E-01

Table 4-36: Data Summary – AOI M-2 – LNAPL Area No.4
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)
SVOC	Pyrene	129-00-0	D	1	1	1.70E+02	1.70E+02	1.70E+02		
SVOC	2,4,5-Trichlorophenol	95-95-4		1					3.80E-01	3.80E-01
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1					4.80E-01	4.80E-01
P/PCB	PCBs (total)	1336-36-3	B2	1	1	1.70E+02	1.70E+02	1.70E+02		
INORG	Antimony	7440-36-0		1	1	4.80E-01	4.80E-01	4.80E-01		
INORG	Arsenic	7440-38-2	A	1	1	6.50E+00	6.50E+00	6.50E+00		
INORG	Barium	7440-39-3	D	1					6.60E-02	6.60E-02
INORG	Beryllium	7440-41-7	B1	1					6.80E-02	6.80E-02
INORG	Cadmium	7440-43-9	B1	1					1.60E-02	1.60E-02
INORG	Chromium (total)	7440-47-3		1	1	2.70E+00	2.70E+00	2.70E+00		
INORG	Cobalt	7440-48-4	B1	1	1	8.40E-02	8.40E-02	8.40E-02		
INORG	Copper	7440-50-8	D	1	1	3.20E+00	3.20E+00	3.20E+00		
INORG	Cyanide (total)	57-12-5	D	1	1	1.20E-01	1.20E-01	1.20E-01		
INORG	Lead	7439-92-1	B2	1	1	8.30E-01	8.30E-01	8.30E-01		
INORG	Manganese	7439-96-5	D	1					7.10E-02	7.10E-02
INORG	Mercury	7439-97-6	D	1					1.60E-02	1.60E-02
INORG	Nickel	7440-02-0	A	1	1	9.17E+01	9.20E+01	9.17E+01		
INORG	Selenium	7782-49-2	D	1					4.30E-01	4.30E-01
INORG	Silver	7440-22-4	D	1	1	1.10E-01	1.10E-01	1.10E-01		
INORG	Thallium	7440-28-0		1					5.80E-01	5.80E-01
INORG	Vanadium	7440-62-2		1					6.90E-02	6.90E-02
INORG	Zinc	7440-66-6	D	1	1	1.90E+00	1.90E+00	1.90E+00		

Notes:

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

Table 4-37: Data Summary – AOI M-16 – LNAPL Area No.5
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)
VOC	Acetone	67-64-1	ID	1					5.40E-02	5.40E-02
VOC	Benzene	71-43-2	A	1	1	1.40E-01	1.40E-01	1.40E-01		
VOC	Bromodichloromethane	75-27-4	B2	1					9.20E-03	9.20E-03
VOC	Bromoform	75-25-2	B2	1					1.20E-02	1.20E-02
VOC	Bromomethane	74-83-9	D	1					4.70E-02	4.70E-02
VOC	2-Butanone	78-93-3	ID	1					5.80E-02	5.80E-02
VOC	Carbon Disulfide	75-15-0		1					5.00E-03	5.00E-03
VOC	Carbon Tetrachloride	56-23-5	B2	1					1.60E-02	1.60E-02
VOC	Chlorobenzene	108-90-7	D	1					6.50E-03	6.50E-03
VOC	Chloroethane	75-00-3		1					5.30E-02	5.30E-02
VOC	Chloroform	67-66-3	B2	1					1.30E-02	1.30E-02
VOC	Chloromethane	74-87-3	D	1					1.60E-02	1.60E-02
VOC	Cumene	98-82-8	D	1	1	6.10E-01	6.10E-01	6.10E-01		
VOC	Cyclohexane	110-82-7	ID	1	1	7.30E-01	7.30E-01	7.30E-01		
VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	1					2.60E-02	2.60E-02
VOC	Dibromochloromethane	124-48-1	C	1					1.20E-02	1.20E-02
VOC	1,2-Dibromoethane	106-93-4	B2	1					8.50E-03	8.50E-03
VOC	1,2-Dichlorobenzene	95-50-1	D	1					7.70E-03	7.70E-03
VOC	1,3-Dichlorobenzene	541-73-1	D	1					9.30E-03	9.30E-03
VOC	1,4-Dichlorobenzene	106-46-7	C	1					9.60E-03	9.60E-03
VOC	Dichlorodifluoromethane	75-71-8		1					2.60E-02	2.60E-02
VOC	1,1-Dichloroethane	75-34-3	C	1					1.20E-02	1.20E-02
VOC	1,2-Dichloroethane	107-06-2	B2	1					1.50E-02	1.50E-02
VOC	1,1-Dichloroethene	75-35-4	C	1					8.80E-03	8.80E-03
VOC	cis-1,2-Dichloroethene	156-59-2	D	1	1	3.00E-01	3.00E-01	3.00E-01		
VOC	trans-1,2-Dichloroethene	156-60-5		1					1.10E-02	1.10E-02
VOC	1,2-Dichloropropane	78-87-5	B2	1					1.50E-02	1.50E-02
VOC	1,3-Dichloropropene (total)	542-75-6	B2	1					8.60E-03	8.60E-03
VOC	Ethyl Benzene	100-41-4	D	1	1	7.10E+00	7.10E+00	7.10E+00		
VOC	2-Hexanone	591-78-6		1					1.80E-02	1.80E-02
VOC	Methyl Acetate	79-20-9		1	1	4.80E-01	4.80E-01	4.80E-01		
VOC	Methyl tert-butyl ether	1634-04-4		1					9.20E-03	9.20E-03
VOC	4-Methyl-2-pentanone	108-10-1	ID	1					2.70E-02	2.70E-02
VOC	Methylcyclohexane	108-87-2		1	1	1.90E+00	1.90E+00	1.90E+00		
VOC	Methylene Chloride	75-09-2	B2	1					1.80E-02	1.80E-02
VOC	Styrene	100-42-5		1					8.10E-03	8.10E-03
VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	1					1.10E-02	1.10E-02
VOC	Tetrachloroethene	127-18-4	C-B2	1	1	2.20E-01	2.20E-01	2.20E-01		
VOC	Toluene	108-88-3	D	1	1	1.20E+01	1.20E+01	1.20E+01		
VOC	1,2,4-Trichlorobenzene	120-82-1	D	1					1.20E-02	1.20E-02
VOC	1,1,1-Trichloroethane	71-55-6	D	1					1.00E-02	1.00E-02
VOC	1,1,2-Trichloroethane	79-00-5	C	1					8.80E-03	8.80E-03
VOC	Trichloroethene	79-01-6	C-B2	1	1	5.30E-01	5.30E-01	5.30E-01		
VOC	Trichlorofluoromethane	75-69-4		1					9.90E-03	9.90E-03
VOC	1,1,2-Trichloro-1,2,2-trifluoroetha	76-13-1		1					3.20E-02	3.20E-02
VOC	Vinyl Chloride	75-01-4	A	1					2.00E-02	2.00E-02
VOC	Xylenes (total)	1330-20-7	ID	1	1	3.90E+01	3.90E+01	3.90E+01		
SVOC	Acenaphthene	83-32-9		1					5.70E+01	5.70E+01
SVOC	Acenaphthylene	208-96-8	D	1					5.70E+01	5.70E+01
SVOC	Acetophenone	98-86-2	D	1					5.40E+01	5.40E+01
SVOC	Anthracene	120-12-7	D	1					5.40E+01	5.40E+01
SVOC	Atrazine	1912-24-9		1					5.40E+01	5.40E+01
SVOC	Benzaldehyde	100-52-7		1					6.30E+01	6.30E+01
SVOC	Benzo(a)anthracene	56-55-3	B2	1					5.10E+01	5.10E+01
SVOC	Benzo(a)pyrene	50-32-8	B2	1					5.40E+01	5.40E+01
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1					6.00E+01	6.00E+01

Table 4-37: Data Summary – AOI M-16 – LNAPL Area No.5
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1					6.60E+01	6.60E+01
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1					5.40E+01	5.40E+01
SVOC	Biphenyl	92-52-4	D	1					6.30E+01	6.30E+01
SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	1					5.10E+01	5.10E+01
SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	1					5.40E+01	5.40E+01
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1	1	5.30E+02	5.30E+02	5.30E+02		
SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	1					5.70E+01	5.70E+01
SVOC	Butylbenzylphthalate	85-68-7	C	1	1	4.00E+02	4.00E+02	4.00E+02		
SVOC	Caprolactam	105-60-2		1					6.30E+01	6.30E+01
SVOC	Carbazole	86-74-8	B2	1					6.60E+01	6.60E+01
SVOC	4-Chloro-3-methylphenol	59-50-7		1					5.40E+01	5.40E+01
SVOC	4-Chloroaniline	106-47-8		1					1.80E+01	1.80E+01
SVOC	2-Chloronaphthalene	91-58-7		1					5.70E+01	5.70E+01
SVOC	2-Chlorophenol	95-57-8		1					5.40E+01	5.40E+01
SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		1					5.70E+01	5.70E+01
SVOC	Chrysene	218-01-9	B2	1					5.10E+01	5.10E+01
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1					6.30E+01	6.30E+01
SVOC	Dibenzofuran	132-64-9	D	1					5.70E+01	5.70E+01
SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	1					2.80E+01	2.80E+01
SVOC	2,4-Dichlorophenol	120-83-2		1					4.80E+01	4.80E+01
SVOC	Diethylphthalate	84-66-2	D	1					6.00E+01	6.00E+01
SVOC	2,4-Dimethylphenol	105-67-9		1					9.60E+01	9.60E+01
SVOC	Dimethylphthalate	131-11-3	D	1					5.70E+01	5.70E+01
SVOC	Di-n-butylphthalate	84-74-2	D	1					6.90E+01	6.90E+01
SVOC	4,6-Dinitro-2-methylphenol	534-52-1		1					2.20E+02	2.20E+02
SVOC	2,4-Dinitrophenol	51-28-5		1					3.00E+02	3.00E+02
SVOC	2,4-Dinitrotoluene	121-14-2	B2	1					5.40E+01	5.40E+01
SVOC	2,6-Dinitrotoluene	606-20-2	B2	1					5.40E+01	5.40E+01
SVOC	Di-n-octylphthalate	117-84-0		1					5.40E+01	5.40E+01
SVOC	Fluoranthene	206-44-0	D	1					6.90E+01	6.90E+01
SVOC	Fluorene	86-73-7	D	1	1	1.40E+02	1.40E+02	1.40E+02		
SVOC	Hexachlorobenzene	118-74-1	B2	1					5.40E+01	5.40E+01
SVOC	Hexachlorobutadiene	87-68-3	C	1					5.10E+01	5.10E+01
SVOC	Hexachlorocyclopentadiene	77-47-4	E	1					4.50E+01	4.50E+01
SVOC	Hexachloroethane	67-72-1	C	1					5.40E+01	5.40E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1					6.00E+01	6.00E+01
SVOC	Isophorone	78-59-1	C	1					5.70E+01	5.70E+01
SVOC	2-Methylnaphthalene	91-57-6	ID	1					5.40E+01	5.40E+01
SVOC	Methylphenol (total)	1319-77-3		1					4.50E+01	4.50E+01
SVOC	Naphthalene	91-20-3	C	1					5.70E+01	5.70E+01
SVOC	2-Nitroaniline	88-74-4		1					5.70E+01	5.70E+01
SVOC	3-Nitroaniline	99-09-2	C	1					3.60E+01	3.60E+01
SVOC	4-Nitroaniline	100-01-6	C	1					5.40E+01	5.40E+01
SVOC	Nitrobenzene	98-95-3	D	1					5.40E+01	5.40E+01
SVOC	2-Nitrophenol	88-75-5		1					4.80E+01	4.80E+01
SVOC	4-Nitrophenol	100-02-7		1					3.30E+02	3.30E+02
SVOC	N-Nitrosodiphenylamine	86-30-6	B2	1					6.00E+01	6.00E+01
SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	1					5.70E+01	5.70E+01
SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	1					5.70E+01	5.70E+01
SVOC	Pentachlorophenol	87-86-5	B2	1					2.60E+02	2.60E+02
SVOC	Phenanthrene	85-01-8	D	1	1	2.50E+02	2.50E+02	2.50E+02		
SVOC	Phenol	108-95-2	ID	1					5.40E+01	5.40E+01
SVOC	Pyrene	129-00-0	D	1					5.10E+01	5.10E+01
SVOC	2,4,5-Trichlorophenol	95-95-4		1					6.30E+01	6.30E+01
SVOC	2,4,6-Trichlorophenol	88-06-2	B2	1					5.10E+01	5.10E+01
P/PCB	PCBs (total)	1336-36-3	B2	1	1	8.32E+01	8.30E+01	8.32E+01		

Table 4-37: Data Summary – AOI M-16 – LNAPL Area No.5
General Motors - Pontiac North Campus, Pontiac, Michigan

Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Min QL (mg/kg)	Max QL (mg/kg)
INORG	Antimony	7440-36-0		1	1	2.70E-01	2.70E-01	2.70E-01		
INORG	Arsenic	7440-38-2	A	1	1	1.11E+01	1.10E+01	1.11E+01		
INORG	Barium	7440-39-3	D	1					6.60E-02	6.60E-02
INORG	Beryllium	7440-41-7	B1	1					6.80E-02	6.80E-02
INORG	Cadmium	7440-43-9	B1	1	1	8.90E-02	8.90E-02	8.90E-02		
INORG	Chromium (total)	7440-47-3		1	1	2.90E+00	2.90E+00	2.90E+00		
INORG	Cobalt	7440-48-4	B1	1	1	1.90E-01	1.90E-01	1.90E-01		
INORG	Copper	7440-50-8	D	1	1	4.10E+00	4.10E+00	4.10E+00		
INORG	Lead	7439-92-1	B2	1	1	1.40E+01	1.40E+01	1.40E+01		
INORG	Manganese	7439-96-5	D	1					7.10E-02	7.10E-02
INORG	Mercury	7439-97-6	D	1					1.60E-02	1.60E-02
INORG	Nickel	7440-02-0	A	1	1	1.30E+00	1.30E+00	1.30E+00		
INORG	Selenium	7782-49-2	D	1					4.30E-01	4.30E-01
INORG	Silver	7440-22-4	D	1					1.00E-01	1.00E-01
INORG	Thallium	7440-28-0		1					5.80E-01	5.80E-01
INORG	Vanadium	7440-62-2		1	1	3.10E+00	3.10E+00	3.10E+00		
INORG	Zinc	7440-66-6	D	1	1	2.79E+01	2.80E+01	2.79E+01		

Notes:

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

TABLE 6-1
GROUNDWATER MONITORING PLAN ANALYTICAL SUMMARY
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

Well Designation	VOCs	BETX	Total Inorganics	Total PCBs	Total Dioxins	MNA Parameters
Background						
MWM1			X			
MWS1			X			
MWP4			X			
Site Boundary						
MWF12-01	X		X			
MWF12-02	X		X			
MWM4-07		X				X
MWP6-04		X				X
MWW1-02	X		X		X	
MWW1-04				X	X	
MWW1-06				X		
MW-29-99	X		X		X	
MW-31-99	X		X		X	
MW-40-99	X		X		X	
MWW9-01			X			
MWDP-01			X			
MWDP-02			X			
Upper Sand and Gravel Zone						
GWP3	X		X			
GWD11	X		X			
GWD9	X		X			

VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds
PCBs = Polychlorinated biphenyls
MNA = Monitored Natural Attenuation

Table 8.1: Estimated Cumulative Cancer Risk and HI from Soil - Based on Maximum Concentrations
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Reference	Cumulative Risk	HI
F-07	2	2E-05	5E-01
F-08	2	1E-09	1E-02
F-12	1	4E-07	6E-03
F-13	1	8E-07	1E-04
F-14	1	8E-07	2E-05
F-15	2	3E-05	2E-01
M-01	1	**1E-04**	**7E+00**
M-02	2	2E-05	1E+00
M-04	1	2E-10	9E-05
M-05	1	6E-06	2E-01
M-07	2	2E-05	1E-01
M-09	2	7E-06	9E-02
M-11	1	4E-09	2E-04
M-13	1	5E-07	2E-05
M-16	2	2E-06	1E-01
M-19	1	3E-05	**1E+00**
M-21	1	2E-06	1E-01
M-23	1	2E-07	8E-03
M-24	1	NA	NA
M-25	1	2E-07	2E-02
P-06	1	3E-06	4E-02
P-09	2	1E-04	1E+00
P-10	2	4E-06	7E-02
P-11	2	2E-05	7E-01
SEEP	1	2E-05	2E-01
SWHI	1	3E-06	5E-02
SWRP	2	1E-06	4E-02
W-01	2	**3E-04**	**2E+01**
W-03	1	7E-07	2E-01
W-05	1	3E-05	**2E+00**
W-06	1	8E-06	6E-01
W-08	2	7E-05	**3E+00**
W-09	2	**6E-04**	**4E+01**
W-10	1	2E-05	1E+00
W-13	1	6E-07	4E-02
AIRD	2	**7E-04**	**5E+01**
Notes:			
1 - Cumulative Risks calculated in the RFI Report (ENCORE 2002b).			
2 - Cumulative Risks calculated in the Supplemental RFI Report (ENCORE 2003j).			
NA = All constituents were non-detect for soil.			
AIRD = Area of Industrial Redevelopment.			

Table 8.2: Estimated Cumulative Cancer Risk and HI from Soil - Based on Maximum and 95% UCL Concentrations
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Reference	Cumulative Risk	HI
M-01	1	2E-05	5E-01
M-19	1	2E-05	7E-01
W-01 (routine wrkr)	2	4E-05	1E+00
W-01 (const wrkr)	2	9E-06	5E-01
W-05	1	2E-05	6E-01
W-08	2	7E-05	9E-01
AIRD (routine wrkr)	2	4E-05	1E+00
Notes:			
1 - Cumulative Risks calculated in the RFI Report (ENCORE 2002b).			
2 - Cumulative Risks calculated in the Supplemental RFI Report (ENCORE 2003j).			
AIRD = Area of Industrial Redevelopment.			
95% UCLs are the maximum of either vertically averaged soil concentrations (0-10 ft bgs)			
or surface soil concentrations (0-2 ft bgs), except as noted.			

Table 8.3: Estimated Cumulative Cancer Risk and HI from Soil - Based on Maximum and 95% UCL Concentrations after Soil Removal General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Reference	Cumulative Risk	HI
W-09	2	4E-05	9E-01
AIRD (const wrkr)	2	9E-06	1E+00
Notes:			
1 - Cumulative Risks calculated in the RFI Report (ENCORE 2002b).			
2 - Cumulative Risks calculated in the Supplemental RFI Report (ENCORE 2003j).			
AIRD = Area of Industrial Redevelopment.			
95% UCLs are the maximum of either vertically averaged soil concentrations (0-10 ft bgs)			
or surface soil concentrations (0-2 ft bgs), except as noted.			

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-07	VOC	Acetone	67-64-1	T	ID	4				5.10E-04	1.00E-02	7.3E-01		1.0E+06		3.1E+04	
F-07	VOC	Benzene	71-43-2	T	A	4				1.60E-04	1.00E-03	5.0E-03		3.5E+01		1.1E+01	
F-07	VOC	Bromodichloromethane	75-27-4	T	B2	4	2	2.00E-03	2.20E-03	1.70E-04	1.00E-03	1.0E-01	2.2E-02	3.7E+01	5.9E-05	1.4E+01	1.6E-04
F-07	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
F-07	VOC	Bromomethane	74-83-9	T	D	4				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
F-07	VOC	2-Butanone	78-93-3	T	ID	4				4.10E-04	1.00E-02	1.3E+01		2.4E+05		2.4E+05	
F-07	VOC	Carbon Disulfide	75-15-0	T		4	1	4.70E-04	4.70E-04	2.00E-04	1.00E-03	8.0E-01	5.9E-04	5.5E+02	8.5E-07	1.2E+03	3.9E-07
F-07	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
F-07	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
F-07	VOC	Chloroethane	75-00-3	T		4	2	3.30E-03	4.70E-03	2.60E-04	1.00E-03	4.3E-01	1.1E-02	5.7E+03	8.2E-07	4.4E+02	1.1E-05
F-07	VOC	Chloroform	67-66-3	T	B2	4	3	2.90E-04	9.50E-03	1.40E-04	1.40E-04	1.0E-01	9.5E-02	1.8E+02	5.3E-05	1.5E+02	6.3E-05
F-07	VOC	Chloromethane	74-87-3	T	D	4	1	2.80E-04	2.80E-04	1.30E-04	1.00E-03	2.6E-01	1.1E-03	4.5E+01	6.2E-06	4.9E+02	5.7E-07
F-07	VOC	Cumene	98-82-8	T	D	4				1.20E-04	1.00E-03	8.0E-01		5.6E+01		5.6E+01	
F-07	VOC	Cyclohexane	110-82-7	T	ID	4				1.30E-04	1.00E-03						
F-07	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
F-07	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
F-07	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
F-07	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	1.00E-03	6.0E-01		1.6E+02		1.6E+02	
F-07	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
F-07	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
F-07	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
F-07	VOC	1,1-Dichloroethane	75-34-3	T	C	4	4	6.00E-03	2.30E-02			8.8E-01	2.6E-02	2.3E+03	1.0E-05	2.4E+03	9.6E-06
F-07	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
F-07	VOC	1,1-Dichloroethene	75-35-4	T	C	7	6	1.10E-03	2.00E-02	2.20E-04	2.20E-04	7.0E-03	**2.9E+00**	1.3E+00	1.5E-02	1.1E+01	1.8E-03
F-07	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4	4	2.30E-04	5.60E-04			7.0E-02	8.0E-03	2.1E+02	2.7E-06	2.0E+02	2.8E-06
F-07	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
F-07	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
F-07	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
F-07	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
F-07	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
F-07	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	1.00E-02						
F-07	VOC	Methyl tert-butyl ether	1634-04-4	T		4				1.30E-04	5.00E-03	2.4E-01		4.7E+04		6.1E+02	
F-07	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	4				2.30E-04	1.00E-02	1.8E+00		2.0E+04		1.3E+04	
F-07	VOC	Methylcyclohexane	108-87-2	T		4				1.50E-04	1.00E-03						
F-07	VOC	Methylene Chloride	75-09-2	T	B2	4				3.40E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
F-07	VOC	Styrene	100-42-5	T		4				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
F-07	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
F-07	VOC	Tetrachloroethene	127-18-4	T	C-B2	7	6	5.60E-04	6.30E-03	1.20E-04	1.20E-04	5.0E-03	**1.3E+00**	1.7E+02	3.7E-05	1.2E+01	5.3E-04
F-07	VOC	Toluene	108-88-3	T	D	4	3	2.00E-04	2.60E-04	1.80E-04	1.80E-04	1.0E+00	2.6E-04	5.3E+02	4.9E-07	5.3E+02	4.9E-07
F-07	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
F-07	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4	4	6.30E-03	1.00E-02			2.0E-01	5.0E-02	1.3E+03	7.7E-06	1.3E+03	7.7E-06
F-07	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
F-07	VOC	Trichloroethene	79-01-6	T	C-B2	4	2	3.90E-04	4.20E-04	1.40E-04	1.00E-03	5.0E-03	8.4E-02	9.7E+01	4.3E-06	2.2E+01	1.9E-05
F-07	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	1.00E-03	2.6E+00		1.1E+03		1.1E+03	
F-07	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
F-07	VOC	Vinyl Chloride	75-01-4	T	A	4				1.50E-04	1.00E-03	2.0E-03		1.3E+01		1.0E+00	
F-07	VOC	Xylenes (total)	1330-20-7	T	ID	4				3.30E-04	1.00E-03	1.0E+01		1.9E+02		1.9E+02	
F-07	SVOC	Acenaphthene	83-32-9	T		4				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
F-07	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
F-07	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
F-07	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
F-07	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
F-07	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	1.00E-02						
F-07	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
F-07	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
F-07	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
F-07	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
F-07	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
F-07	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	1.00E-02						
F-07	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	5.00E-03						
F-07	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
F-07	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4				2.70E-03	5.00E-03	6.0E-03				3.2E-01	
F-07	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	5.00E-03						
F-07	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
F-07	SVOC	Caprolactam	105-60-2	T		4	1	4.10E-03	4.10E-03	2.50E-03	1.00E-02	5.8E+00	7.1E-04			3.9E+05	1.1E-08
F-07	SVOC	Carbazole	86-74-8	T	B2	4				8.20E-04	1.00E-02	8.5E-02				7.4E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-07	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
F-07	SVOC	4-Chloroaniline	106-47-8	T		4				6.10E-04	1.00E-02						
F-07	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
F-07	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
F-07	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	5.00E-03						
F-07	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
F-07	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
F-07	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	5.00E-03						
F-07	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
F-07	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
F-07	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
F-07	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
F-07	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
F-07	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
F-07	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
F-07	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	2.00E-02						
F-07	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
F-07	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.00E-03						
F-07	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
F-07	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
F-07	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
F-07	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
F-07	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
F-07	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
F-07	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
F-07	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
F-07	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
F-07	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
F-07	SVOC	Methylphenol (total)	1319-77-3	T		4				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
F-07	SVOC	Naphthalene	91-20-3	T	C	4				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
F-07	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	2.00E-02						
F-07	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	2.00E-02						
F-07	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	2.00E-02						
F-07	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
F-07	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
F-07	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	2.00E-02						
F-07	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
F-07	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
F-07	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	5.00E-03						
F-07	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
F-07	SVOC	Phenanthrene	85-01-8	T	D	4				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
F-07	SVOC	Phenol	108-95-2	T	ID	4				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
F-07	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
F-07	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
F-07	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
F-07	P/PCB	PCBs (total)	1336-36-3	D	B2	2				4.00E-04	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
F-07	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
F-07	INORG	Antimony	7440-36-0	D		4	1	3.00E-03	3.00E-03	2.20E-03	2.50E-02	6.0E-03	5.0E-01			6.8E+01	4.4E-05
F-07	INORG	Antimony	7440-36-0	T		4				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
F-07	INORG	Arsenic	7440-38-2	D	A	4	2	1.24E-02	4.16E-02	3.90E-03	1.00E-02	5.0E-02	8.3E-01			4.3E+00	9.7E-03
F-07	INORG	Arsenic	7440-38-2	T	A	4	2	2.36E-02	3.00E-02	3.90E-03	1.00E-02	5.0E-02	6.0E-01			4.3E+00	7.0E-03
F-07	INORG	Barium	7440-39-3	D	D	4	4	1.85E-02	6.46E-02			2.0E+00	3.2E-02			1.4E+04	4.6E-06
F-07	INORG	Barium	7440-39-3	T	D	4	4	1.73E-02	5.72E-02			2.0E+00	2.9E-02			1.4E+04	4.1E-06
F-07	INORG	Beryllium	7440-41-7	D	B1	4				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
F-07	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
F-07	INORG	Cadmium	7440-43-9	D	B1	4				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
F-07	INORG	Cadmium	7440-43-9	T	B1	4	1	3.80E-04	3.80E-04	2.80E-04	5.00E-03	5.0E-03	7.6E-02			1.9E+02	2.0E-06
F-07	INORG	Chromium (total)	7440-47-3	D		4				1.40E-03	1.00E-02	1.0E-01				4.6E+02	
F-07	INORG	Chromium (total)	7440-47-3	T		4	2	1.50E-03	2.90E-03	1.40E-03	1.00E-02	1.0E-01	2.9E-02			4.6E+02	6.3E-06
F-07	INORG	Cobalt	7440-48-4	D	B1	4				1.30E-03	2.00E-02	4.0E-02				2.4E+03	
F-07	INORG	Cobalt	7440-48-4	T	B1	4				1.30E-03	2.00E-02	4.0E-02				2.4E+03	
F-07	INORG	Copper	7440-50-8	D	D	4	1	1.54E-02	1.54E-02	4.20E-03	5.00E-03	1.4E+00	1.1E-02			7.4E+03	2.1E-06
F-07	INORG	Copper	7440-50-8	T	D	4	1	1.79E-02	1.79E-02	4.20E-03	5.00E-03	1.4E+00	1.3E-02			7.4E+03	2.4E-06
F-07	INORG	Lead	7439-92-1	D	B2	4				2.50E-03	3.00E-03	4.0E-03					
F-07	INORG	Lead	7439-92-1	T	B2	4	1	3.00E-03	3.00E-03	2.50E-03	3.00E-03	4.0E-03	7.5E-01				
F-07	INORG	Manganese	7439-96-5	D	D	4	4	1.10E-03	2.69E-01			8.6E-01	3.1E-01			9.1E+03	3.0E-05

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-07	INORG	Manganese	7439-96-5	T	D	4	4	1.50E-03	2.34E-01			8.6E-01	2.7E-01			9.1E+03	2.6E-05
F-07	INORG	Mercury	7439-97-6	D	D	4				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
F-07	INORG	Mercury	7439-97-6	T	D	4	1	1.70E-04	1.70E-04	6.90E-05	2.00E-04	2.0E-03	8.5E-02	5.6E-02	3.0E-03	5.6E-02	3.0E-03
F-07	INORG	Nickel	7440-02-0	D	A	4	2	2.70E-03	3.60E-03	2.20E-03	2.00E-02	1.0E-01	3.6E-02			7.4E+04	4.9E-08
F-07	INORG	Nickel	7440-02-0	T	A	4	2	4.10E-03	4.90E-03	2.20E-03	2.00E-02	1.0E-01	4.9E-02			7.4E+04	6.6E-08
F-07	INORG	Selenium	7782-49-2	D	D	4				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
F-07	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
F-07	INORG	Silver	7440-22-4	D	D	4				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
F-07	INORG	Silver	7440-22-4	T	D	4				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
F-07	INORG	Thallium	7440-28-0	D		4	1	2.50E-05	2.50E-05	1.80E-05	1.00E-02	2.0E-03	1.3E-02			1.3E+01	1.9E-06
F-07	INORG	Thallium	7440-28-0	T		4	1	2.50E-05	2.50E-05	1.80E-05	1.00E-02	2.0E-03	1.3E-02			1.3E+01	1.9E-06
F-07	INORG	Vanadium	7440-62-2	D		4	3	8.40E-04	2.47E-02	8.20E-04	8.20E-04	4.5E-03	**5.5E+00**			9.7E+02	2.5E-05
F-07	INORG	Vanadium	7440-62-2	T		4	2	7.80E-03	1.71E-02	8.20E-04	1.00E-02	4.5E-03	**3.8E+00**			9.7E+02	1.8E-05
F-07	INORG	Zinc	7440-66-6	D	D	4	2	1.58E-02	2.08E-02	1.20E-02	2.00E-02	2.4E+00	8.7E-03			1.1E+05	1.9E-07
F-07	INORG	Zinc	7440-66-6	T	D	4	3	1.24E-02	1.69E-01	2.00E-02	2.00E-02	2.4E+00	7.0E-02			1.1E+05	1.5E-06
F-08	VOC	Acetone	67-64-1	T	ID	2				5.10E-04	1.00E-02	7.3E-01		1.0E+06		3.1E+04	
F-08	VOC	Benzene	71-43-2	T	A	2				1.60E-04	1.00E-03	5.0E-03		3.5E+01		1.1E+01	
F-08	VOC	Bromodichloromethane	75-27-4	T	B2	2				1.70E-04	1.00E-03	1.0E-01		3.7E+01		1.4E+01	
F-08	VOC	Bromoform	75-25-2	T	B2	2				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
F-08	VOC	Bromomethane	74-83-9	T	D	2				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
F-08	VOC	2-Butanone	78-93-3	T	ID	2				4.10E-04	1.00E-02	1.3E+01		2.4E+05		2.4E+05	
F-08	VOC	Carbon Disulfide	75-15-0	T		2				2.00E-04	1.00E-03	8.0E-01		5.5E+02		1.2E+03	
F-08	VOC	Carbon Tetrachloride	56-23-5	T	B2	2				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
F-08	VOC	Chlorobenzene	108-90-7	T	D	2				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
F-08	VOC	Chloroethane	75-00-3	T		2				2.60E-04	1.00E-03	4.3E-01		5.7E+03		4.4E+02	
F-08	VOC	Chloroform	67-66-3	T	B2	2	2	9.60E-04	2.80E-03			1.0E-01	2.8E-02	1.8E+02	1.6E-05	1.5E+02	1.9E-05
F-08	VOC	Chloromethane	74-87-3	T	D	2				1.30E-04	1.00E-03	2.6E-01		4.5E+01		4.9E+02	
F-08	VOC	Cumene	98-82-8	T	D	2				1.20E-04	1.00E-03	8.0E-01		5.6E+01		5.6E+01	
F-08	VOC	Cyclohexane	110-82-7	T	ID	2				1.30E-04	1.00E-03						
F-08	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
F-08	VOC	Dibromochloromethane	124-48-1	T	C	2				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
F-08	VOC	1,2-Dibromoethane	106-93-4	T	B2	2				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
F-08	VOC	1,2-Dichlorobenzene	95-50-1	T	D	2				1.10E-04	1.00E-03	6.0E-01		1.6E+02		1.6E+02	
F-08	VOC	1,3-Dichlorobenzene	541-73-1	T	D	2				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
F-08	VOC	1,4-Dichlorobenzene	106-46-7	T	C	2				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
F-08	VOC	Dichlorodifluoromethane	75-71-8	T		2				2.60E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
F-08	VOC	1,1-Dichloroethane	75-34-3	T	C	2				1.60E-04	1.00E-03	8.8E-01		2.3E+03		2.4E+03	
F-08	VOC	1,2-Dichloroethane	107-06-2	T	B2	2				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
F-08	VOC	1,1-Dichloroethene	75-35-4	T	C	2				2.40E-04	1.00E-03	7.0E-03		1.3E+00		1.1E+01	
F-08	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	2				2.20E-04	5.00E-04	7.0E-02		2.1E+02		2.0E+02	
F-08	VOC	trans-1,2-Dichloroethene	156-60-5	T		2				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
F-08	VOC	1,2-Dichloropropane	78-87-5	T	B2	2				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
F-08	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	2				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
F-08	VOC	Ethyl Benzene	100-41-4	T	D	2				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
F-08	VOC	2-Hexanone	591-78-6	T		2				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
F-08	VOC	Methyl Acetate	79-20-9	T		2				4.10E-04	1.00E-02						
F-08	VOC	Methyl tert-butyl ether	1634-04-4	T		2				1.30E-04	5.00E-03	2.4E-01		4.7E+04		6.1E+02	
F-08	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	2				2.30E-04	1.00E-02	1.8E+00		2.0E+04		1.3E+04	
F-08	VOC	Methylcyclohexane	108-87-2	T		2				1.50E-04	1.00E-03						
F-08	VOC	Methylene Chloride	75-09-2	T	B2	2				3.40E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
F-08	VOC	Styrene	100-42-5	T		2				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
F-08	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
F-08	VOC	Tetrachloroethene	127-18-4	T	C-B2	2				2.30E-04	1.00E-03	5.0E-03		1.7E+02		1.2E+01	
F-08	VOC	Toluene	108-88-3	T	D	2				1.80E-04	1.00E-03	1.0E+00		5.3E+02		5.3E+02	
F-08	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
F-08	VOC	1,1,1-Trichloroethane	71-55-6	T	D	2				1.50E-04	1.00E-03	2.0E-01		1.3E+03		1.3E+03	
F-08	VOC	1,1,2-Trichloroethane	79-00-5	T	C	2				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
F-08	VOC	Trichloroethene	79-01-6	T	C-B2	2				1.40E-04	1.00E-03	5.0E-03		9.7E+01		2.2E+01	
F-08	VOC	Trichlorofluoromethane	75-69-4	T		2				2.80E-04	1.00E-03	2.6E+00		1.1E+03		1.1E+03	
F-08	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
F-08	VOC	Vinyl Chloride	75-01-4	T	A	2				1.50E-04	1.00E-03	2.0E-03		1.3E+01		1.0E+00	
F-08	VOC	Xylenes (total)	1330-20-7	T	ID	2				3.30E-04	1.00E-03	1.0E+01		1.9E+02		1.9E+02	
F-08	SVOC	Acenaphthene	83-32-9	T		2				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
F-08	SVOC	Acenaphthylene	208-96-8	T	D	2				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
F-08	SVOC	Acetophenone	98-86-2	T	D	2				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
F-08	SVOC	Anthracene	120-12-7	T	D	2				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-08	SVOC	Atrazine	1912-24-9	T		2				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
F-08	SVOC	Benzaldehyde	100-52-7	T		2				2.80E-03	1.00E-02						
F-08	SVOC	Benzo(a)anthracene	56-55-3	T	B2	2				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
F-08	SVOC	Benzo(a)pyrene	50-32-8	T	B2	2				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
F-08	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
F-08	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
F-08	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
F-08	SVOC	Biphenyl	92-52-4	T	D	2				2.60E-03	1.00E-02						
F-08	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2				8.70E-04	5.00E-03						
F-08	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
F-08	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2				2.70E-03	5.00E-03	6.0E-03				3.2E-01	
F-08	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2				8.80E-04	5.00E-03						
F-08	SVOC	Butylbenzylphthalate	85-68-7	T	C	2				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
F-08	SVOC	Caprolactam	105-60-2	T		2				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
F-08	SVOC	Carbazole	86-74-8	T	B2	2				8.20E-04	1.00E-02	8.5E-02				7.4E+00	
F-08	SVOC	4-Chloro-3-methylphenol	59-50-7	T		2				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
F-08	SVOC	4-Chloroaniline	106-47-8	T		2				6.10E-04	1.00E-02						
F-08	SVOC	2-Chloronaphthalene	91-58-7	T		2				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
F-08	SVOC	2-Chlorophenol	95-57-8	T		2				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
F-08	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2				7.90E-04	5.00E-03						
F-08	SVOC	Chrysene	218-01-9	T	B2	2				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
F-08	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
F-08	SVOC	Dibenzofuran	132-64-9	T	D	2				1.10E-03	5.00E-03						
F-08	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	2				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
F-08	SVOC	2,4-Dichlorophenol	120-83-2	T		2				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
F-08	SVOC	Diethylphthalate	84-66-2	T	D	2				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
F-08	SVOC	2,4-Dimethylphenol	105-67-9	T		2				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
F-08	SVOC	Dimethylphthalate	131-11-3	T	D	2				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
F-08	SVOC	Di-n-butylphthalate	84-74-2	T	D	2				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
F-08	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
F-08	SVOC	2,4-Dinitrophenol	51-28-5	T		2				3.00E-03	2.00E-02						
F-08	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
F-08	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2				5.70E-04	5.00E-03						
F-08	SVOC	Di-n-octylphthalate	117-84-0	T		2				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
F-08	SVOC	Fluoranthene	206-44-0	T	D	2				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
F-08	SVOC	Fluorene	86-73-7	T	D	2				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
F-08	SVOC	Hexachlorobenzene	118-74-1	T	B2	2				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
F-08	SVOC	Hexachlorobutadiene	87-68-3	T	C	2				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
F-08	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	2				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
F-08	SVOC	Hexachloroethane	67-72-1	T	C	2				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
F-08	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
F-08	SVOC	Isophorone	78-59-1	T	C	2				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
F-08	SVOC	2-Methylnaphthalene	91-57-6	T	ID	2				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
F-08	SVOC	Methylphenol (total)	1319-77-3	T		2				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
F-08	SVOC	Naphthalene	91-20-3	T	C	2				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
F-08	SVOC	2-Nitroaniline	88-74-4	T		2				7.00E-04	2.00E-02						
F-08	SVOC	3-Nitroaniline	99-09-2	T	C	2				7.10E-04	2.00E-02						
F-08	SVOC	4-Nitroaniline	100-01-6	T	C	2				1.30E-03	2.00E-02						
F-08	SVOC	Nitrobenzene	98-95-3	T	D	2				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
F-08	SVOC	2-Nitrophenol	88-75-5	T		2				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
F-08	SVOC	4-Nitrophenol	100-02-7	T		2				1.90E-03	2.00E-02						
F-08	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
F-08	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
F-08	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2				7.80E-04	5.00E-03						
F-08	SVOC	Pentachlorophenol	87-86-5	T	B2	2				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
F-08	SVOC	Phenanthrene	85-01-8	T	D	2				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
F-08	SVOC	Phenol	108-95-2	T	ID	2				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
F-08	SVOC	Pyrene	129-00-0	T	D	2				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
F-08	SVOC	2,4,5-Trichlorophenol	95-95-4	T		2				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
F-08	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
F-08	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
F-08	P/PCB	PCBs (total)	1336-36-3	T	B2	2				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
F-08	INORG	Antimony	7440-36-0	D		2				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
F-08	INORG	Antimony	7440-36-0	T		2				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
F-08	INORG	Arsenic	7440-38-2	D	A	2				3.90E-03	1.00E-02	5.0E-02				4.3E+00	
F-08	INORG	Arsenic	7440-38-2	T	A	2				3.90E-03	1.00E-02	5.0E-02				4.3E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-08	INORG	Barium	7440-39-3	D	D	2	2	5.46E-02	5.75E-02			2.0E+00	2.9E-02			1.4E+04	4.1E-06
F-08	INORG	Barium	7440-39-3	T	D	2	2	5.49E-02	5.82E-02			2.0E+00	2.9E-02			1.4E+04	4.2E-06
F-08	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
F-08	INORG	Beryllium	7440-41-7	T	B1	2				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
F-08	INORG	Cadmium	7440-43-9	D	B1	2	1	3.20E-04	3.20E-04	5.00E-03	5.00E-03	5.0E-03	6.4E-02			1.9E+02	1.7E-06
F-08	INORG	Cadmium	7440-43-9	T	B1	2				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
F-08	INORG	Chromium (total)	7440-47-3	D		2				1.40E-03	1.00E-02	1.0E-01				4.6E+02	
F-08	INORG	Chromium (total)	7440-47-3	T		2				1.40E-03	1.00E-02	1.0E-01				4.6E+02	
F-08	INORG	Cobalt	7440-48-4	D	B1	2	2	1.40E-03	2.80E-03			4.0E-02	7.0E-02			2.4E+03	1.2E-06
F-08	INORG	Cobalt	7440-48-4	T	B1	2	1	3.00E-03	3.00E-03	1.30E-03	1.30E-03	4.0E-02	7.5E-02			2.4E+03	1.3E-06
F-08	INORG	Copper	7440-50-8	D	D	2				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
F-08	INORG	Copper	7440-50-8	T	D	2				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
F-08	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	3.00E-03	4.0E-03					
F-08	INORG	Lead	7439-92-1	T	B2	2				2.50E-03	3.00E-03	4.0E-03					
F-08	INORG	Manganese	7439-96-5	D	D	2	1	3.60E-01	3.60E-01	9.00E-04	9.00E-04	8.6E-01	4.2E-01			9.1E+03	4.0E-05
F-08	INORG	Manganese	7439-96-5	T	D	2	2	1.06E-01	3.64E-01			8.6E-01	4.2E-01			9.1E+03	4.0E-05
F-08	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
F-08	INORG	Mercury	7439-97-6	T	D	2				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
F-08	INORG	Nickel	7440-02-0	D	A	2	2	6.20E-03	6.70E-03			1.0E-01	6.7E-02			7.4E+04	9.1E-08
F-08	INORG	Nickel	7440-02-0	T	A	2	2	5.00E-03	7.70E-03			1.0E-01	7.7E-02			7.4E+04	1.0E-07
F-08	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
F-08	INORG	Selenium	7782-49-2	T	D	2				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
F-08	INORG	Silver	7440-22-4	D	D	2				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
F-08	INORG	Silver	7440-22-4	T	D	2				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
F-08	INORG	Thallium	7440-28-0	D		2	2	4.10E-05	5.40E-03			2.0E-03	**2.7E+00**			1.3E+01	4.2E-04
F-08	INORG	Thallium	7440-28-0	T		2	1	4.30E-05	4.30E-05	1.00E-02	1.00E-02	2.0E-03	2.2E-02			1.3E+01	3.3E-06
F-08	INORG	Vanadium	7440-62-2	D		2				8.20E-04	1.00E-02	4.5E-03				9.7E+02	
F-08	INORG	Vanadium	7440-62-2	T		2				8.20E-04	1.00E-02	4.5E-03				9.7E+02	
F-08	INORG	Zinc	7440-66-6	D	D	2	1	1.33E-02	1.33E-02	1.20E-02	1.20E-02	2.4E+00	5.5E-03			1.1E+05	1.2E-07
F-08	INORG	Zinc	7440-66-6	T	D	2	1	2.12E-02	2.12E-02	1.20E-02	1.20E-02	2.4E+00	8.8E-03			1.1E+05	1.9E-07
F-12	VOC	Acetone	67-64-1	T	ID	8	1	7.05E-04	7.05E-04	5.10E-04	2.80E-03	7.3E-01	9.7E-04	1.0E+06	7.1E-10	3.1E+04	2.3E-08
F-12	VOC	Benzene	71-43-2	T	A	8				1.60E-04	9.20E-04	5.0E-03		3.5E+01		1.1E+01	
F-12	VOC	Bromodichloromethane	75-27-4	T	B2	8				1.70E-04	8.00E-04	1.0E-01		3.7E+01		1.4E+01	
F-12	VOC	Bromoform	75-25-2	T	B2	8				1.80E-04	9.20E-04	1.0E-01		3.1E+03		1.4E+02	
F-12	VOC	Bromomethane	74-83-9	T	D	6				2.00E-04	6.00E-04	1.0E-02		9.0E+00		7.0E+01	
F-12	VOC	2-Butanone	78-93-3	T	ID	8				4.10E-04	1.50E-03	1.3E+01		2.4E+05		2.4E+05	
F-12	VOC	Carbon Disulfide	75-15-0	T		8				2.00E-04	6.00E-04	8.0E-01		5.5E+02		1.2E+03	
F-12	VOC	Carbon Tetrachloride	56-23-5	T	B2	8				1.20E-04	9.20E-04	5.0E-03		2.4E+00		4.6E+00	
F-12	VOC	Chlorobenzene	108-90-7	T	D	8				1.40E-04	9.50E-04	1.0E-01		4.7E+02		8.6E+01	
F-12	VOC	Chloroethane	75-00-3	T		8				2.60E-04	7.20E-04	4.3E-01		5.7E+03		4.4E+02	
F-12	VOC	Chloroform	67-66-3	T	B2	8	1	1.60E-04	1.60E-04	1.40E-04	8.80E-04	1.0E-01	1.6E-03	1.8E+02	8.9E-07	1.5E+02	1.1E-06
F-12	VOC	Chloromethane	74-87-3	T	D	8				1.30E-04	1.20E-03	2.6E-01		4.5E+01		4.9E+02	
F-12	VOC	Cumene	98-82-8	T	D	8				1.20E-04	9.80E-04	8.0E-01		5.6E+01		5.6E+01	
F-12	VOC	Cyclohexane	110-82-7	T	ID	8				1.30E-04	8.20E-04						
F-12	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	8				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
F-12	VOC	Dibromochloromethane	124-48-1	T	C	8				2.60E-04	9.20E-04	1.0E-01		1.1E+02		1.8E+01	
F-12	VOC	1,2-Dibromoethane	106-93-4	T	B2	8				2.20E-04	8.50E-04	1.0E-03		1.5E+01		2.5E-02	
F-12	VOC	1,2-Dichlorobenzene	95-50-1	T	D	8				1.10E-04	9.50E-04	6.0E-01		1.6E+02		1.6E+02	
F-12	VOC	1,3-Dichlorobenzene	541-73-1	T	D	8				1.50E-04	9.50E-04	6.6E-03				2.0E+00	
F-12	VOC	1,4-Dichlorobenzene	106-46-7	T	C	8				1.70E-04	9.50E-04	7.5E-02		7.4E+01		6.4E+00	
F-12	VOC	Dichlorodifluoromethane	75-71-8	T		8				2.60E-04	1.20E-03	1.7E+00		3.0E+02		3.0E+02	
F-12	VOC	1,1-Dichloroethane	75-34-3	T	C	8	8	5.05E-04	2.50E-02			8.8E-01	2.8E-02	2.3E+03	1.1E-05	2.4E+03	1.0E-05
F-12	VOC	1,2-Dichloroethane	107-06-2	T	B2	8				2.10E-04	7.00E-04	5.0E-03		5.9E+01		1.9E+01	
F-12	VOC	1,1-Dichloroethene	75-35-4	T	C	8	5	1.21E-03	5.80E-03	2.40E-04	3.10E-04	7.0E-03	8.3E-01	1.3E+00	4.5E-03	1.1E+01	5.3E-04
F-12	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	8	2	1.30E-03	1.60E-03	2.20E-04	4.40E-04	7.0E-02	2.3E-02	2.1E+02	7.6E-06	2.0E+02	8.0E-06
F-12	VOC	trans-1,2-Dichloroethene	156-60-5	T		8				1.50E-04	8.20E-04	1.0E-01		2.0E+02		2.2E+02	
F-12	VOC	1,2-Dichloropropane	78-87-5	T	B2	8				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
F-12	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	8				2.70E-04	8.80E-04	8.5E-03		2.6E+01		5.5E+00	
F-12	VOC	Ethyl Benzene	100-41-4	T	D	8				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
F-12	VOC	2-Hexanone	591-78-6	T		8				4.60E-04	1.40E-03	1.0E+00		8.7E+03		5.2E+03	
F-12	VOC	Methyl Acetate	79-20-9	T		8				4.10E-04	1.40E-03						
F-12	VOC	Methyl tert-butyl ether	1634-04-4	T		8				1.30E-04	6.80E-04	2.4E-01		4.7E+04		6.1E+02	
F-12	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6				2.30E-04	5.20E-04	1.8E+00		2.0E+04		1.3E+04	
F-12	VOC	Methylcyclohexane	108-87-2	T		8				1.50E-04	1.00E-03						
F-12	VOC	Methylene Chloride	75-09-2	T	B2	8				2.90E-04	7.20E-04	5.0E-03		1.4E+03		2.2E+02	
F-12	VOC	Styrene	100-42-5	T		8				1.50E-04	8.80E-04	1.0E-01		3.1E+02		9.7E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-12	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	8				2.50E-04	9.00E-04	8.5E-03		7.7E+01		4.7E+00	
F-12	VOC	Tetrachloroethene	127-18-4	T	C-B2	8				2.30E-04	1.00E-03	5.0E-03		1.7E+02		1.2E+01	
F-12	VOC	Toluene	108-88-3	T	D	8	1	4.70E-04	4.70E-04	1.80E-04	9.80E-04	1.0E+00	4.7E-04	5.3E+02	8.9E-07	5.3E+02	8.9E-07
F-12	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	8				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
F-12	VOC	1,1,1-Trichloroethane	71-55-6	T	D	8	8	1.38E-04	7.30E-02			2.0E-01	3.7E-01	1.3E+03	5.6E-05	1.3E+03	5.6E-05
F-12	VOC	1,1,2-Trichloroethane	79-00-5	T	C	8				3.00E-04	9.00E-04	5.0E-03		1.1E+02		2.1E+01	
F-12	VOC	Trichloroethene	79-01-6	T	C-B2	8	1	1.40E-04	1.40E-04	1.40E-04	1.00E-03	5.0E-03	2.8E-02	9.7E+01	1.4E-06	2.2E+01	6.4E-06
F-12	VOC	Trichlorofluoromethane	75-69-4	T		8				2.80E-04	1.40E-03	2.6E+00		1.1E+03		1.1E+03	
F-12	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		8				3.20E-04	8.00E-04	1.7E+02		1.7E+02		1.7E+02	
F-12	VOC	Vinyl Chloride	75-01-4	T	A	8				1.50E-04	9.00E-04	2.0E-03		1.3E+01		1.0E+00	
F-12	VOC	Xylenes (total)	1330-20-7	T	ID	8	1	3.48E-04	3.48E-04	3.30E-04	1.10E-03	1.0E+01	3.5E-05	1.9E+02	1.8E-06	1.9E+02	1.8E-06
F-12	SVOC	Acenaphthene	83-32-9	T		7				8.00E-04	8.00E-04	1.3E+00		4.2E+00		4.2E+00	
F-12	SVOC	Acenaphthylene	208-96-8	T	D	7				7.10E-04	7.10E-04	5.2E-02		3.9E+00		3.9E+00	
F-12	SVOC	Acetophenone	98-86-2	T	D	7				2.60E-03	2.60E-03	1.5E+00		6.1E+03		6.1E+03	
F-12	SVOC	Anthracene	120-12-7	T	D	7				6.80E-04	6.80E-04	4.3E-02		4.3E-02		4.3E-02	
F-12	SVOC	Atrazine	1912-24-9	T		7				2.50E-03	2.50E-03	3.0E-03				5.4E+00	
F-12	SVOC	Benzaldehyde	100-52-7	T		7				2.80E-03	2.80E-03						
F-12	SVOC	Benzo(a)anthracene	56-55-3	T	B2	7				7.00E-04	7.00E-04	2.1E-03				9.4E-03	
F-12	SVOC	Benzo(a)pyrene	50-32-8	T	B2	7				7.30E-04	7.30E-04	5.0E-03				2.0E-03	
F-12	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	7				9.40E-04	9.40E-04	2.0E-03				2.0E-03	
F-12	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	7				8.50E-04	8.50E-04	5.0E-03				5.0E-03	
F-12	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	7				8.40E-04	8.40E-04	5.0E-03				5.0E-03	
F-12	SVOC	Biphenyl	92-52-4	T	D	7				2.60E-03	2.60E-03						
F-12	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	7				8.70E-04	8.70E-04						
F-12	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	7				9.70E-04	9.70E-04	2.0E-03		2.1E+02		5.7E+00	
F-12	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	7				2.70E-03	2.70E-03	6.0E-03				3.2E-01	
F-12	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	7				8.80E-04	8.80E-04						
F-12	SVOC	Butylbenzylphthalate	85-68-7	T	C	7				8.80E-04	8.80E-04	1.2E+00				2.7E+00	
F-12	SVOC	Caprolactam	105-60-2	T		7				2.50E-03	2.50E-03	5.8E+00				3.9E+05	
F-12	SVOC	Carbazole	86-74-8	T	B2	7				8.20E-04	8.20E-04	8.5E-02				7.4E+00	
F-12	SVOC	4-Chloro-3-methylphenol	59-50-7	T		7				9.90E-04	9.90E-04	1.5E-01				7.9E+01	
F-12	SVOC	4-Chloroaniline	106-47-8	T		5				6.10E-04	6.10E-04						
F-12	SVOC	2-Chloronaphthalene	91-58-7	T		7				8.50E-04	8.50E-04	1.8E+00				6.7E+00	
F-12	SVOC	2-Chlorophenol	95-57-8	T		7				1.00E-03	1.00E-03	4.5E-02				9.4E+01	
F-12	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		7				7.90E-04	7.90E-04						
F-12	SVOC	Chrysene	218-01-9	T	B2	7				7.50E-04	7.50E-04	5.0E-03				5.0E-03	
F-12	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	7				7.90E-04	7.90E-04	2.0E-03				2.0E-03	
F-12	SVOC	Dibenzofuran	132-64-9	T	D	7				1.10E-03	1.10E-03						
F-12	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	7				9.30E-04	9.30E-04	1.1E-03				1.8E-01	
F-12	SVOC	2,4-Dichlorophenol	120-83-2	T		7				8.50E-04	8.50E-04	7.3E-02				4.8E+01	
F-12	SVOC	Diethylphthalate	84-66-2	T	D	7				6.50E-04	6.50E-04	5.5E+00				1.1E+03	
F-12	SVOC	2,4-Dimethylphenol	105-67-9	T		7				8.50E-04	8.50E-04	3.7E-01				5.2E+02	
F-12	SVOC	Dimethylphthalate	131-11-3	T	D	7				7.60E-04	7.60E-04	7.3E+01				4.2E+03	
F-12	SVOC	Di-n-butylphthalate	84-74-2	T	D	7				6.70E-04	6.70E-04	8.8E-01				1.1E+01	
F-12	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		7				1.30E-03	1.30E-03	2.0E-02				9.5E+00	
F-12	SVOC	2,4-Dinitrophenol	51-28-5	T		7				3.00E-03	3.00E-03						
F-12	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	7				7.90E-04	7.90E-04	7.7E-03				8.6E+00	
F-12	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	7				5.70E-04	5.70E-04						
F-12	SVOC	Di-n-octylphthalate	117-84-0	T		7				1.10E-03	1.10E-03	1.3E-01				4.0E-01	
F-12	SVOC	Fluoranthene	206-44-0	T	D	7				8.10E-04	8.10E-04	2.1E-01		2.1E-01		2.1E-01	
F-12	SVOC	Fluorene	86-73-7	T	D	7				1.00E-03	1.00E-03	8.8E-01		2.0E+00		2.0E+00	
F-12	SVOC	Hexachlorobenzene	118-74-1	T	B2	7				7.40E-04	7.40E-04	1.0E-03		3.0E+00		4.6E-03	
F-12	SVOC	Hexachlorobutadiene	87-68-3	T	C	7				7.30E-04	7.30E-04	1.5E-02		3.2E+00		4.0E-01	
F-12	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	7				1.10E-03	1.10E-03	5.0E-02		4.2E-01		1.6E+00	
F-12	SVOC	Hexachloroethane	67-72-1	T	C	7				7.40E-04	7.40E-04	7.3E-03		5.0E+01		1.9E+00	
F-12	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	7				6.30E-04	6.30E-04	2.0E-03				2.0E-03	
F-12	SVOC	Isophorone	78-59-1	T	C	7				6.30E-04	6.30E-04	7.7E-01				9.9E+02	
F-12	SVOC	2-Methylnaphthalene	91-57-6	T	ID	7				6.40E-04	6.40E-04	2.6E-01				2.5E+01	
F-12	SVOC	Methylphenol (total)	1319-77-3	T		7				1.30E-03	1.30E-03	3.7E-01				8.1E+02	
F-12	SVOC	Naphthalene	91-20-3	T	C	7				7.50E-04	7.50E-04	5.2E-01		3.1E+01		3.1E+01	
F-12	SVOC	2-Nitroaniline	88-74-4	T		7				7.00E-04	7.00E-04						
F-12	SVOC	3-Nitroaniline	99-09-2	T	C	7				7.10E-04	7.10E-04						
F-12	SVOC	4-Nitroaniline	100-01-6	T	C	7				1.30E-03	1.30E-03						
F-12	SVOC	Nitrobenzene	98-95-3	T	D	7				8.10E-04	8.10E-04	3.4E-03		5.5E+02		1.1E+01	
F-12	SVOC	2-Nitrophenol	88-75-5	T		7				2.10E-03	2.10E-03	2.0E-02				7.9E+01	
F-12	SVOC	4-Nitrophenol	100-02-7	T		7				1.90E-03	1.90E-03						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-12	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	7				1.40E-03	1.40E-03	2.7E-01				3.5E+01	
F-12	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	7				6.70E-04	6.70E-04	5.0E-03				3.6E-01	
F-12	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	7				7.80E-04	7.80E-04						
F-12	SVOC	Pentachlorophenol	87-86-5	T	B2	7				2.40E-03	2.40E-03	1.0E-03				2.0E-01	
F-12	SVOC	Phenanthrene	85-01-8	T	D	7				8.20E-04	8.20E-04	5.2E-02		1.0E+00		1.0E+00	
F-12	SVOC	Phenol	108-95-2	T	ID	7				2.60E-03	2.60E-03	4.4E+00				2.9E+04	
F-12	SVOC	Pyrene	129-00-0	T	D	7				1.10E-03	1.10E-03	1.4E-01		1.4E-01		1.4E-01	
F-12	SVOC	2,4,5-Trichlorophenol	95-95-4	T		7				1.20E-03	1.20E-03	7.3E-01				1.7E+02	
F-12	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	7				1.70E-03	1.70E-03	1.2E-01				1.0E+01	
F-12	P/PCB	PCBs (total)	1336-36-3	D	B2	2				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
F-12	P/PCB	PCBs (total)	1336-36-3	T	B2	8				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
F-12	INORG	Antimony	7440-36-0	D		3				2.20E-03	2.20E-03	6.0E-03				6.8E+01	
F-12	INORG	Antimony	7440-36-0	T		7	1	2.20E-03	2.20E-03	2.20E-03	3.40E-03	6.0E-03	3.7E-01			6.8E+01	3.2E-05
F-12	INORG	Arsenic	7440-38-2	D	A	3				3.90E-03	3.90E-03	5.0E-02				4.3E+00	
F-12	INORG	Arsenic	7440-38-2	T	A	7				2.10E-03	3.90E-03	5.0E-02				4.3E+00	
F-12	INORG	Barium	7440-39-3	D	D	3	3	3.70E-02	8.63E-02			2.0E+00	4.3E-02			1.4E+04	6.2E-06
F-12	INORG	Barium	7440-39-3	T	D	7	7	2.46E-02	8.63E-02			2.0E+00	4.3E-02			1.4E+04	6.2E-06
F-12	INORG	Beryllium	7440-41-7	D	B1	3	1	4.70E-04	4.70E-04	5.40E-04	5.40E-04	4.0E-03	1.2E-01			2.9E+02	1.6E-06
F-12	INORG	Beryllium	7440-41-7	T	B1	7				5.40E-04	6.00E-04	4.0E-03				2.9E+02	
F-12	INORG	Cadmium	7440-43-9	D	B1	3				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
F-12	INORG	Cadmium	7440-43-9	T	B1	7	1	3.50E-04	3.50E-04	2.80E-04	2.80E-04	5.0E-03	7.0E-02			1.9E+02	1.8E-06
F-12	INORG	Chromium (total)	7440-47-3	D		3				1.40E-03	1.40E-03	1.0E-01				4.6E+02	
F-12	INORG	Chromium (total)	7440-47-3	T		7				1.40E-03	1.50E-03	1.0E-01				4.6E+02	
F-12	INORG	Cobalt	7440-48-4	D	B1	3	2	2.40E-03	2.88E-03	1.30E-03	1.30E-03	4.0E-02	7.2E-02			2.4E+03	1.2E-06
F-12	INORG	Cobalt	7440-48-4	T	B1	7	6	9.30E-04	2.93E-03	1.30E-03	1.30E-03	4.0E-02	7.3E-02			2.4E+03	1.2E-06
F-12	INORG	Copper	7440-50-8	D	D	3				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
F-12	INORG	Copper	7440-50-8	T	D	7				1.70E-03	4.20E-03	1.4E+00				7.4E+03	
F-12	INORG	Lead	7439-92-1	D	B2	3				2.50E-03	2.50E-03	4.0E-03					
F-12	INORG	Lead	7439-92-1	T	B2	7				1.60E-03	2.50E-03	4.0E-03					
F-12	INORG	Manganese	7439-96-5	D	D	3	3	1.08E+00	1.46E+00			8.6E-01	**1.7E+00**			9.1E+03	1.6E-04
F-12	INORG	Manganese	7439-96-5	T	D	7	7	1.01E+00	1.34E+00			8.6E-01	**1.6E+00**			9.1E+03	1.5E-04
F-12	INORG	Mercury	7439-97-6	D	D	3				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
F-12	INORG	Mercury	7439-97-6	T	D	7				6.90E-05	8.70E-05	2.0E-03		5.6E-02		5.6E-02	
F-12	INORG	Nickel	7440-02-0	D	A	3	3	3.40E-03	6.50E-03			1.0E-01	6.5E-02			7.4E+04	8.8E-08
F-12	INORG	Nickel	7440-02-0	T	A	7	4	3.20E-03	6.80E-03	2.20E-03	2.90E-03	1.0E-01	6.8E-02			7.4E+04	9.2E-08
F-12	INORG	Selenium	7782-49-2	D	D	3				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
F-12	INORG	Selenium	7782-49-2	T	D	7	1	3.43E-03	3.43E-03	4.50E-03	4.70E-03	5.0E-02	6.9E-02			9.7E+02	3.5E-06
F-12	INORG	Silver	7440-22-4	D	D	3				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
F-12	INORG	Silver	7440-22-4	T	D	7				9.80E-04	1.50E-03	3.4E-02				1.5E+03	
F-12	INORG	Thallium	7440-28-0	D		3	2	2.90E-05	4.30E-05	5.00E-03	5.00E-03	2.0E-03	2.2E-02			1.3E+01	3.3E-06
F-12	INORG	Thallium	7440-28-0	T		7	2	1.90E-05	5.05E-05	3.30E-05	5.00E-03	2.0E-03	2.5E-02			1.3E+01	3.9E-06
F-12	INORG	Vanadium	7440-62-2	D		3				8.20E-04	8.20E-04	4.5E-03				9.7E+02	
F-12	INORG	Vanadium	7440-62-2	T		7				6.70E-04	8.20E-04	4.5E-03				9.7E+02	
F-12	INORG	Zinc	7440-66-6	D	D	3				1.20E-02	1.20E-02	2.4E+00				1.1E+05	
F-12	INORG	Zinc	7440-66-6	T	D	7	1	1.79E-02	1.79E-02	1.20E-02	1.40E-02	2.4E+00	7.4E-03			1.1E+05	1.6E-07
F-15	VOC	Acetone	67-64-1	T	ID	2				5.10E-04	1.00E-02	7.3E-01		1.0E+06		3.1E+04	
F-15	VOC	Benzene	71-43-2	T	A	2				1.60E-04	1.00E-03	5.0E-03		3.5E+01		1.1E+01	
F-15	VOC	Bromodichloromethane	75-27-4	T	B2	2				1.70E-04	1.00E-03	1.0E-01		3.7E+01		1.4E+01	
F-15	VOC	Bromoform	75-25-2	T	B2	2				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
F-15	VOC	Bromomethane	74-83-9	T	D	2				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
F-15	VOC	2-Butanone	78-93-3	T	ID	2				4.10E-04	1.00E-02	1.3E+01		2.4E+05		2.4E+05	
F-15	VOC	Carbon Disulfide	75-15-0	T		2				2.00E-04	1.00E-03	8.0E-01		5.5E+02		1.2E+03	
F-15	VOC	Carbon Tetrachloride	56-23-5	T	B2	2				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
F-15	VOC	Chlorobenzene	108-90-7	T	D	2				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
F-15	VOC	Chloroethane	75-00-3	T		2				2.60E-04	1.00E-03	4.3E-01		5.7E+03		4.4E+02	
F-15	VOC	Chloroform	67-66-3	T	B2	2	1	5.40E-04	5.40E-04	1.40E-04	1.40E-04	1.0E-01	5.4E-03	1.8E+02	3.0E-06	1.5E+02	3.6E-06
F-15	VOC	Chloromethane	74-87-3	T	D	2	1	4.10E-04	4.10E-04	1.30E-04	1.30E-04	2.6E-01	1.6E-03	4.5E+01	9.1E-06	4.9E+02	8.4E-07
F-15	VOC	Cumene	98-82-8	T	D	2				1.20E-04	1.00E-03	8.0E-01		5.6E+01		5.6E+01	
F-15	VOC	Cyclohexane	110-82-7	T	ID	2				1.30E-04	1.00E-03						
F-15	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
F-15	VOC	Dibromochloromethane	124-48-1	T	C	2				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
F-15	VOC	1,2-Dibromoethane	106-93-4	T	B2	2				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
F-15	VOC	1,2-Dichlorobenzene	95-50-1	T	D	2				1.10E-04	1.00E-03	6.0E-01		1.6E+02		1.6E+02	
F-15	VOC	1,3-Dichlorobenzene	541-73-1	T	D	2				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
F-15	VOC	1,4-Dichlorobenzene	106-46-7	T	C	2				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
F-15	VOC	Dichlorodifluoromethane	75-71-8	T		2				2.60E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-15	VOC	1,1-Dichloroethane	75-34-3	T	C	2	2	2.00E-03	7.60E-03			8.8E-01	8.6E-03	2.3E+03	3.3E-06	2.4E+03	3.2E-06
F-15	VOC	1,2-Dichloroethane	107-06-2	T	B2	2				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
F-15	VOC	1,1-Dichloroethene	75-35-4	T	C	2				2.40E-04	1.00E-03	7.0E-03		1.3E+00		1.1E+01	
F-15	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	2				2.20E-04	5.00E-04	7.0E-02		2.1E+02		2.0E+02	
F-15	VOC	trans-1,2-Dichloroethene	156-60-5	T		2				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
F-15	VOC	1,2-Dichloropropane	78-87-5	T	B2	2				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
F-15	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	2				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
F-15	VOC	Ethyl Benzene	100-41-4	T	D	2				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
F-15	VOC	2-Hexanone	591-78-6	T		2				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
F-15	VOC	Methyl Acetate	79-20-9	T		2				4.10E-04	1.00E-02						
F-15	VOC	Methyl tert-butyl ether	1634-04-4	T		2				1.30E-04	5.00E-03	2.4E-01		4.7E+04		6.1E+02	
F-15	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	2				2.30E-04	1.00E-02	1.8E+00		2.0E+04		1.3E+04	
F-15	VOC	Methylcyclohexane	108-87-2	T		2				1.50E-04	1.00E-03						
F-15	VOC	Methylene Chloride	75-09-2	T	B2	2				3.40E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
F-15	VOC	Styrene	100-42-5	T		2				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
F-15	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
F-15	VOC	Tetrachloroethene	127-18-4	T	C-B2	2	1	2.80E-04	2.80E-04	2.30E-04	2.30E-04	5.0E-03	5.6E-02	1.7E+02	1.6E-06	1.2E+01	2.3E-05
F-15	VOC	Toluene	108-88-3	T	D	2	2	2.90E-04	3.60E-04			1.0E+00	3.6E-04	5.3E+02	6.8E-07	5.3E+02	6.8E-07
F-15	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
F-15	VOC	1,1,1-Trichloroethane	71-55-6	T	D	2	1	6.10E-04	6.10E-04	1.00E-03	1.00E-03	2.0E-01	3.1E-03	1.3E+03	4.7E-07	1.3E+03	4.7E-07
F-15	VOC	1,1,2-Trichloroethane	79-00-5	T	C	2				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
F-15	VOC	Trichloroethene	79-01-6	T	C-B2	2				1.40E-04	1.00E-03	5.0E-03		9.7E+01		2.2E+01	
F-15	VOC	Trichlorofluoromethane	75-69-4	T		2				2.80E-04	1.00E-03	2.6E+00		1.1E+03		1.1E+03	
F-15	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
F-15	VOC	Vinyl Chloride	75-01-4	T	A	2				1.50E-04	1.00E-03	2.0E-03		1.3E+01		1.0E+00	
F-15	VOC	Xylenes (total)	1330-20-7	T	ID	2	1	6.40E-04	6.40E-04	1.00E-03	1.00E-03	1.0E+01	6.4E-05	1.9E+02	3.4E-06	1.9E+02	3.4E-06
F-15	SVOC	Acenaphthene	83-32-9	T		2				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
F-15	SVOC	Acenaphthylene	208-96-8	T	D	2				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
F-15	SVOC	Acetophenone	98-86-2	T	D	2				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
F-15	SVOC	Anthracene	120-12-7	T	D	2				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
F-15	SVOC	Atrazine	1912-24-9	T		2				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
F-15	SVOC	Benzaldehyde	100-52-7	T		2				2.80E-03	1.00E-02						
F-15	SVOC	Benzo(a)anthracene	56-55-3	T	B2	2				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
F-15	SVOC	Benzo(a)pyrene	50-32-8	T	B2	2				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
F-15	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
F-15	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
F-15	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
F-15	SVOC	Biphenyl	92-52-4	T	D	2				2.60E-03	1.00E-02						
F-15	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2				8.70E-04	5.00E-03						
F-15	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
F-15	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2				2.70E-03	5.00E-03	6.0E-03				3.2E-01	
F-15	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2				8.80E-04	5.00E-03						
F-15	SVOC	Butylbenzylphthalate	85-68-7	T	C	2				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
F-15	SVOC	Caprolactam	105-60-2	T		2				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
F-15	SVOC	Carbazole	86-74-8	T	B2	2				8.20E-04	1.00E-02	8.5E-02				7.4E+00	
F-15	SVOC	4-Chloro-3-methylphenol	59-50-7	T		2				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
F-15	SVOC	4-Chloroaniline	106-47-8	T		2				6.10E-04	1.00E-02						
F-15	SVOC	2-Chloronaphthalene	91-58-7	T		2				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
F-15	SVOC	2-Chlorophenol	95-57-8	T		2				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
F-15	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2				7.90E-04	5.00E-03						
F-15	SVOC	Chrysene	218-01-9	T	B2	2				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
F-15	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
F-15	SVOC	Dibenzofuran	132-64-9	T	D	2				1.10E-03	5.00E-03						
F-15	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	2				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
F-15	SVOC	2,4-Dichlorophenol	120-83-2	T		2				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
F-15	SVOC	Diethylphthalate	84-66-2	T	D	2				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
F-15	SVOC	2,4-Dimethylphenol	105-67-9	T		2				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
F-15	SVOC	Dimethylphthalate	131-11-3	T	D	2				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
F-15	SVOC	Di-n-butylphthalate	84-74-2	T	D	2				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
F-15	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
F-15	SVOC	2,4-Dinitrophenol	51-28-5	T		2				3.00E-03	2.00E-02						
F-15	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
F-15	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2				5.70E-04	5.00E-03						
F-15	SVOC	Di-n-octylphthalate	117-84-0	T		2				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
F-15	SVOC	Fluoranthene	206-44-0	T	D	2				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
F-15	SVOC	Fluorene	86-73-7	T	D	2				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
F-15	SVOC	Hexachlorobenzene	118-74-1	T	B2	2				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
F-15	SVOC	Hexachlorobutadiene	87-68-3	T	C	2				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
F-15	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	2				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
F-15	SVOC	Hexachloroethane	67-72-1	T	C	2				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
F-15	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
F-15	SVOC	Isophorone	78-59-1	T	C	2				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
F-15	SVOC	2-Methylnaphthalene	91-57-6	T	ID	2				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
F-15	SVOC	Methylphenol (total)	1319-77-3	T		2				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
F-15	SVOC	Naphthalene	91-20-3	T	C	2				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
F-15	SVOC	2-Nitroaniline	88-74-4	T		2				7.00E-04	2.00E-02						
F-15	SVOC	3-Nitroaniline	99-09-2	T	C	2				7.10E-04	2.00E-02						
F-15	SVOC	4-Nitroaniline	100-01-6	T	C	2				1.30E-03	2.00E-02						
F-15	SVOC	Nitrobenzene	98-95-3	T	D	2				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
F-15	SVOC	2-Nitrophenol	88-75-5	T		2				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
F-15	SVOC	4-Nitrophenol	100-02-7	T		2				1.90E-03	2.00E-02						
F-15	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
F-15	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
F-15	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2				7.80E-04	5.00E-03						
F-15	SVOC	Pentachlorophenol	87-86-5	T	B2	2				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
F-15	SVOC	Phenanthrene	85-01-8	T	D	2				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
F-15	SVOC	Phenol	108-95-2	T	ID	2				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
F-15	SVOC	Pyrene	129-00-0	T	D	2				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
F-15	SVOC	2,4,5-Trichlorophenol	95-95-4	T		2				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
F-15	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
F-15	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
F-15	P/PCB	PCBs (total)	1336-36-3	T	B2	2				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
F-15	INORG	Antimony	7440-36-0	D		2				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
F-15	INORG	Antimony	7440-36-0	T		2				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
F-15	INORG	Arsenic	7440-38-2	D	A	2				3.90E-03	1.00E-02	5.0E-02				4.3E+00	
F-15	INORG	Arsenic	7440-38-2	T	A	2				3.90E-03	1.00E-02	5.0E-02				4.3E+00	
F-15	INORG	Barium	7440-39-3	D	D	2	2	1.78E-02	2.14E-02			2.0E+00	1.1E-02			1.4E+04	1.5E-06
F-15	INORG	Barium	7440-39-3	T	D	2	2	1.81E-02	2.15E-02			2.0E+00	1.1E-02			1.4E+04	1.5E-06
F-15	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
F-15	INORG	Beryllium	7440-41-7	T	B1	2				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
F-15	INORG	Cadmium	7440-43-9	D	B1	2				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
F-15	INORG	Cadmium	7440-43-9	T	B1	2	1	4.10E-04	4.10E-04	5.00E-03	5.00E-03	5.0E-03	8.2E-02			1.9E+02	2.2E-06
F-15	INORG	Chromium (total)	7440-47-3	D		2				1.40E-03	1.00E-02	1.0E-01				4.6E+02	
F-15	INORG	Chromium (total)	7440-47-3	T		2				1.40E-03	1.00E-02	1.0E-01				4.6E+02	
F-15	INORG	Cobalt	7440-48-4	D	B1	2				1.30E-03	2.00E-02	4.0E-02				2.4E+03	
F-15	INORG	Cobalt	7440-48-4	T	B1	2	2	1.60E-03	1.70E-03			4.0E-02	4.3E-02			2.4E+03	7.1E-07
F-15	INORG	Copper	7440-50-8	D	D	2				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
F-15	INORG	Copper	7440-50-8	T	D	2				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
F-15	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	3.00E-03	4.0E-03					
F-15	INORG	Lead	7439-92-1	T	B2	2				2.50E-03	3.00E-03	4.0E-03					
F-15	INORG	Manganese	7439-96-5	D	D	2	2	3.99E-01	6.33E-01			8.6E-01	7.4E-01			9.1E+03	7.0E-05
F-15	INORG	Manganese	7439-96-5	T	D	2	2	3.93E-01	6.57E-01			8.6E-01	7.6E-01			9.1E+03	7.2E-05
F-15	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
F-15	INORG	Mercury	7439-97-6	T	D	2				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
F-15	INORG	Nickel	7440-02-0	D	A	2	1	6.60E-03	6.60E-03	2.00E-02	2.00E-02	1.0E-01	6.6E-02			7.4E+04	8.9E-08
F-15	INORG	Nickel	7440-02-0	T	A	2	2	2.80E-03	7.40E-03			1.0E-01	7.4E-02			7.4E+04	1.0E-07
F-15	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
F-15	INORG	Selenium	7782-49-2	T	D	2				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
F-15	INORG	Silver	7440-22-4	D	D	2				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
F-15	INORG	Silver	7440-22-4	T	D	2				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
F-15	INORG	Thallium	7440-28-0	D		2	1	6.40E-05	6.40E-05	1.00E-02	1.00E-02	2.0E-03	3.2E-02			1.3E+01	4.9E-06
F-15	INORG	Thallium	7440-28-0	T		2	1	5.40E-05	5.40E-05	1.00E-02	1.00E-02	2.0E-03	2.7E-02			1.3E+01	4.2E-06
F-15	INORG	Vanadium	7440-62-2	D		2				8.20E-04	1.00E-02	4.5E-03				9.7E+02	
F-15	INORG	Vanadium	7440-62-2	T		2				8.20E-04	1.00E-02	4.5E-03				9.7E+02	
F-15	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	2.00E-02	2.4E+00				1.1E+05	
F-15	INORG	Zinc	7440-66-6	T	D	2				1.20E-02	2.00E-02	2.4E+00				1.1E+05	
M-01	VOC	Acetone	67-64-1	T	ID	6				5.10E-04	1.00E-02	7.3E-01		1.0E+06		3.1E+04	
M-01	VOC	Benzene	71-43-2	T	A	6				1.60E-04	1.00E-03	5.0E-03		3.5E+01		1.1E+01	
M-01	VOC	Bromodichloromethane	75-27-4	T	B2	6	1	1.90E-04	1.90E-04	1.70E-04	1.00E-03	1.0E-01	1.9E-03	3.7E+01	5.1E-06	1.4E+01	1.4E-05
M-01	VOC	Bromoform	75-25-2	T	B2	6				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
M-01	VOC	Bromomethane	74-83-9	T	D	6				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
M-01	VOC	2-Butanone	78-93-3	T	ID	6				4.10E-04	1.00E-02	1.3E+01		2.4E+05		2.4E+05	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-01	VOC	Carbon Disulfide	75-15-0	T		6				2.00E-04	1.00E-03	8.0E-01		5.5E+02		1.2E+03	
M-01	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
M-01	VOC	Chlorobenzene	108-90-7	T	D	6				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
M-01	VOC	Chloroethane	75-00-3	T		6				2.60E-04	1.00E-03	4.3E-01		5.7E+03		4.4E+02	
M-01	VOC	Chloroform	67-66-3	T	B2	6	3	4.20E-04	6.70E-04	1.40E-04	1.40E-04	1.0E-01	6.7E-03	1.8E+02	3.7E-06	1.5E+02	4.5E-06
M-01	VOC	Chloromethane	74-87-3	T	D	6				1.30E-04	1.00E-03	2.6E-01		4.5E+01		4.9E+02	
M-01	VOC	Cumene	98-82-8	T	D	6				1.20E-04	1.00E-03	8.0E-01		5.6E+01		5.6E+01	
M-01	VOC	Cyclohexane	110-82-7	T	ID	6				1.30E-04	1.00E-03						
M-01	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
M-01	VOC	Dibromochloromethane	124-48-1	T	C	6				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
M-01	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
M-01	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.10E-04	1.00E-03	6.0E-01		1.6E+02		1.6E+02	
M-01	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
M-01	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
M-01	VOC	Dichlorodifluoromethane	75-71-8	T		6	4	6.70E-04	2.40E-02	2.60E-04	2.60E-04	1.7E+00	1.4E-02	3.0E+02	8.0E-05	3.0E+02	8.0E-05
M-01	VOC	1,1-Dichloroethane	75-34-3	T	C	6				1.60E-04	1.00E-03	8.8E-01		2.3E+03		2.4E+03	
M-01	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
M-01	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.40E-04	1.00E-03	7.0E-03		1.3E+00		1.1E+01	
M-01	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	6				2.20E-04	5.00E-04	7.0E-02		2.1E+02		2.0E+02	
M-01	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
M-01	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
M-01	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
M-01	VOC	Ethyl Benzene	100-41-4	T	D	6				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
M-01	VOC	2-Hexanone	591-78-6	T		6				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
M-01	VOC	Methyl Acetate	79-20-9	T		6				4.10E-04	1.00E-02						
M-01	VOC	Methyl tert-butyl ether	1634-04-4	T		6				1.30E-04	5.00E-03	2.4E-01		4.7E+04		6.1E+02	
M-01	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6				2.30E-04	1.00E-02	1.8E+00		2.0E+04		1.3E+04	
M-01	VOC	Methylcyclohexane	108-87-2	T		6				1.50E-04	1.00E-03						
M-01	VOC	Methylene Chloride	75-09-2	T	B2	6				3.40E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
M-01	VOC	Styrene	100-42-5	T		6				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
M-01	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
M-01	VOC	Tetrachloroethene	127-18-4	T	C-B2	6	2	3.80E-04	4.10E-04	2.30E-04	1.00E-03	5.0E-03	8.2E-02	1.7E+02	2.4E-06	1.2E+01	3.4E-05
M-01	VOC	Toluene	108-88-3	T	D	6	1	4.40E-04	4.40E-04	1.80E-04	1.00E-03	1.0E+00	4.4E-04	5.3E+02	8.3E-07	5.3E+02	8.3E-07
M-01	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
M-01	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6	3	5.30E-04	1.00E-03	1.50E-04	1.00E-03	2.0E-01	5.0E-03	1.3E+03	7.7E-07	1.3E+03	7.7E-07
M-01	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
M-01	VOC	Trichloroethene	79-01-6	T	C-B2	6				1.40E-04	1.00E-03	5.0E-03		9.7E+01		2.2E+01	
M-01	VOC	Trichlorofluoromethane	75-69-4	T		6				2.80E-04	1.00E-03	2.6E+00		1.1E+03		1.1E+03	
M-01	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
M-01	VOC	Vinyl Chloride	75-01-4	T	A	6				1.50E-04	1.00E-03	2.0E-03		1.3E+01		1.0E+00	
M-01	VOC	Xylenes (total)	1330-20-7	T	ID	6	1	3.70E-04	3.70E-04	3.30E-04	1.00E-03	1.0E+01	3.7E-05	1.9E+02	1.9E-06	1.9E+02	1.9E-06
M-01	SVOC	Acenaphthene	83-32-9	T		6				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
M-01	SVOC	Acenaphthylene	208-96-8	T	D	6				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
M-01	SVOC	Acetophenone	98-86-2	T	D	6				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
M-01	SVOC	Anthracene	120-12-7	T	D	6				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
M-01	SVOC	Atrazine	1912-24-9	T		6				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
M-01	SVOC	Benzaldehyde	100-52-7	T		6				2.80E-03	1.00E-02						
M-01	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
M-01	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
M-01	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
M-01	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
M-01	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
M-01	SVOC	Biphenyl	92-52-4	T	D	6				2.60E-03	1.00E-02						
M-01	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				8.70E-04	5.00E-03						
M-01	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	6				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
M-01	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6				2.70E-03	5.00E-03	6.0E-03				3.2E-01	
M-01	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				8.80E-04	5.00E-03						
M-01	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
M-01	SVOC	Caprolactam	105-60-2	T		6				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
M-01	SVOC	Carbazole	86-74-8	T	B2	6				8.20E-04	1.00E-02	8.5E-02				7.4E+00	
M-01	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
M-01	SVOC	4-Chloroaniline	106-47-8	T		3				6.10E-04	1.00E-02						
M-01	SVOC	2-Chloronaphthalene	91-58-7	T		6				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
M-01	SVOC	2-Chlorophenol	95-57-8	T		6				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
M-01	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				7.90E-04	5.00E-03						
M-01	SVOC	Chrysene	218-01-9	T	B2	6				7.50E-04	5.00E-03	5.0E-03				5.0E-03	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-01	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
M-01	SVOC	Dibenzofuran	132-64-9	T	D	6				1.10E-03	5.00E-03						
M-01	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	3				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
M-01	SVOC	2,4-Dichlorophenol	120-83-2	T		6				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
M-01	SVOC	Diethylphthalate	84-66-2	T	D	6				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
M-01	SVOC	2,4-Dimethylphenol	105-67-9	T		6				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
M-01	SVOC	Dimethylphthalate	131-11-3	T	D	6				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
M-01	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
M-01	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
M-01	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.00E-03	2.00E-02						
M-01	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
M-01	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				5.70E-04	5.00E-03						
M-01	SVOC	Di-n-octylphthalate	117-84-0	T		6				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
M-01	SVOC	Fluoranthene	206-44-0	T	D	6				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
M-01	SVOC	Fluorene	86-73-7	T	D	6				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
M-01	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
M-01	SVOC	Hexachlorobutadiene	87-68-3	T	C	6				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
M-01	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	6				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
M-01	SVOC	Hexachloroethane	67-72-1	T	C	6				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
M-01	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
M-01	SVOC	Isophorone	78-59-1	T	C	6				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
M-01	SVOC	2-Methylnaphthalene	91-57-6	T	ID	6				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
M-01	SVOC	Methylphenol (total)	1319-77-3	T		6				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
M-01	SVOC	Naphthalene	91-20-3	T	C	6				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
M-01	SVOC	2-Nitroaniline	88-74-4	T		6				7.00E-04	2.00E-02						
M-01	SVOC	3-Nitroaniline	99-09-2	T	C	3				7.10E-04	2.00E-02						
M-01	SVOC	4-Nitroaniline	100-01-6	T	C	6				1.30E-03	2.00E-02						
M-01	SVOC	Nitrobenzene	98-95-3	T	D	6				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
M-01	SVOC	2-Nitrophenol	88-75-5	T		6				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
M-01	SVOC	4-Nitrophenol	100-02-7	T		6				1.90E-03	2.00E-02						
M-01	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
M-01	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
M-01	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				7.80E-04	5.00E-03						
M-01	SVOC	Pentachlorophenol	87-86-5	T	B2	6				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
M-01	SVOC	Phenanthrene	85-01-8	T	D	6				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
M-01	SVOC	Phenol	108-95-2	T	ID	6				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
M-01	SVOC	Pyrene	129-00-0	T	D	6				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
M-01	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
M-01	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
M-01	P/PCB	PCBs (total)	1336-36-3	D	B2	3				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-01	P/PCB	PCBs (total)	1336-36-3	T	B2	6				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-01	INORG	Antimony	7440-36-0	D		6	2	4.20E-03	6.00E-03	2.20E-03	2.50E-02	6.0E-03	1.0E+00			6.8E+01	8.8E-05
M-01	INORG	Antimony	7440-36-0	T		6	2	5.00E-03	7.70E-03	2.20E-03	2.50E-02	6.0E-03	**1.3E+00**			6.8E+01	1.1E-04
M-01	INORG	Arsenic	7440-38-2	D	A	6	3	4.20E-03	6.40E-03	3.90E-03	1.00E-02	5.0E-02	1.3E-01			4.3E+00	1.5E-03
M-01	INORG	Arsenic	7440-38-2	T	A	6	5	4.70E-03	7.00E-03	1.00E-02	1.00E-02	5.0E-02	1.4E-01			4.3E+00	1.6E-03
M-01	INORG	Barium	7440-39-3	D	D	6	6	1.41E-02	1.77E-01			2.0E+00	8.9E-02			1.4E+04	1.3E-05
M-01	INORG	Barium	7440-39-3	T	D	6	6	1.36E-02	1.72E-01			2.0E+00	8.6E-02			1.4E+04	1.2E-05
M-01	INORG	Beryllium	7440-41-7	D	B1	6				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
M-01	INORG	Beryllium	7440-41-7	T	B1	6				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
M-01	INORG	Cadmium	7440-43-9	D	B1	6				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
M-01	INORG	Cadmium	7440-43-9	T	B1	6	1	3.80E-04	3.80E-04	2.80E-04	5.00E-03	5.0E-03	7.6E-02			1.9E+02	2.0E-06
M-01	INORG	Chromium (total)	7440-47-3	D		4	1	3.64E-02	3.64E-02	1.40E-03	1.00E-02	1.0E-01	3.6E-01			4.6E+02	7.9E-05
M-01	INORG	Chromium III	16065-83-1	D	D	2	1	3.87E-02	3.87E-02	1.40E-03	1.40E-03	3.8E+01	1.0E-03			2.9E+05	1.3E-07
M-01	INORG	Chromium III	16065-83-1	T	D	6	2		4.85E-02	1.40E-03	1.00E-02	3.8E+01	1.3E-03			2.9E+05	1.7E-07
M-01	INORG	Chromium VI	18540-29-9	D	A	2				6.90E-03	6.90E-03	1.0E-01				4.6E+02	
M-01	INORG	Chromium VI	18540-29-9	T	A	6	1	3.38E-02	3.38E-02	6.90E-03	2.00E-02	1.0E-01	3.4E-01			4.6E+02	7.3E-05
M-01	INORG	Cobalt	7440-48-4	D	B1	6	4	2.20E-03	2.90E-03	1.30E-03	1.30E-03	4.0E-02	7.3E-02			2.4E+03	1.2E-06
M-01	INORG	Cobalt	7440-48-4	T	B1	6	4	2.20E-03	2.80E-03	1.30E-03	1.30E-03	4.0E-02	7.0E-02			2.4E+03	1.2E-06
M-01	INORG	Copper	7440-50-8	D	D	6				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
M-01	INORG	Copper	7440-50-8	T	D	6				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
M-01	INORG	Cyanide (total)	57-12-5	T	D	11	7	5.50E-03	1.30E+00	1.70E-03	1.80E-03	2.0E-01	**6.5E+00**			5.7E+01	2.3E-02
M-01	INORG	Lead	7439-92-1	D	B2	6				2.50E-03	3.00E-03	4.0E-03					
M-01	INORG	Lead	7439-92-1	T	B2	6				2.50E-03	3.00E-03	4.0E-03					
M-01	INORG	Manganese	7439-96-5	D	D	6	5	9.40E-04	5.46E-01	9.00E-04	9.00E-04	8.6E-01	6.3E-01			9.1E+03	6.0E-05
M-01	INORG	Manganese	7439-96-5	T	D	6	5	2.63E-02	5.48E-01	9.00E-04	9.00E-04	8.6E-01	6.4E-01			9.1E+03	6.0E-05
M-01	INORG	Mercury	7439-97-6	D	D	6				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-01	INORG	Mercury	7439-97-6	T	D	6				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
M-01	INORG	Nickel	7440-02-0	D	A	6	2	2.40E-03	3.00E-03	2.20E-03	2.20E-03	1.0E-01	3.0E-02			7.4E+04	4.1E-08
M-01	INORG	Nickel	7440-02-0	T	A	6	1	3.70E-03	3.70E-03	2.20E-03	2.00E-02	1.0E-01	3.7E-02			7.4E+04	5.0E-08
M-01	INORG	Selenium	7782-49-2	D	D	6	2	5.00E-03	5.60E-03	4.50E-03	5.00E-03	5.0E-02	1.1E-01			9.7E+02	5.8E-06
M-01	INORG	Selenium	7782-49-2	T	D	6	2	4.50E-03	6.50E-03	4.50E-03	5.00E-03	5.0E-02	1.3E-01			9.7E+02	6.7E-06
M-01	INORG	Silver	7440-22-4	D	D	6				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
M-01	INORG	Silver	7440-22-4	T	D	6				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
M-01	INORG	Thallium	7440-28-0	D		6	3	2.60E-05	5.40E-05	5.00E-03	1.00E-02	2.0E-03	2.7E-02			1.3E+01	4.2E-06
M-01	INORG	Thallium	7440-28-0	T		6	1	4.50E-05	4.50E-05	1.80E-05	1.00E-02	2.0E-03	2.3E-02			1.3E+01	3.5E-06
M-01	INORG	Vanadium	7440-62-2	D		6	2	1.00E-03	1.70E-03	8.20E-04	1.00E-02	4.5E-03	3.8E-01			9.7E+02	1.8E-06
M-01	INORG	Vanadium	7440-62-2	T		6	1	2.80E-03	2.80E-03	8.20E-04	1.00E-02	4.5E-03	6.2E-01			9.7E+02	2.9E-06
M-01	INORG	Zinc	7440-66-6	D	D	6	1	1.89E-02	1.89E-02	1.20E-02	2.00E-02	2.4E+00	7.9E-03			1.1E+05	1.7E-07
M-01	INORG	Zinc	7440-66-6	T	D	6				1.20E-02	2.00E-02	2.4E+00				1.1E+05	
M-02	VOC	Acetone	67-64-1	T	ID	36	16	8.25E-04	3.40E+00	5.10E-04	6.90E-02	7.3E-01	**4.7E+00**	1.0E+06	3.4E-06	3.1E+04	1.1E-04
M-02	VOC	Benzene	71-43-2	T	A	36				1.60E-04	2.50E-02	5.0E-03		3.5E+01		1.1E+01	
M-02	VOC	Bromodichloromethane	75-27-4	T	B2	36	2	4.80E-04	7.20E-04	1.70E-04	2.50E-02	1.0E-01	7.2E-03	3.7E+01	1.9E-05	1.4E+01	5.1E-05
M-02	VOC	Bromoform	75-25-2	T	B2	36				1.80E-04	2.50E-02	1.0E-01		3.1E+03		1.4E+02	
M-02	VOC	Bromomethane	74-83-9	T	D	36				2.00E-04	2.50E-02	1.0E-02		9.0E+00		7.0E+01	
M-02	VOC	2-Butanone	78-93-3	T	ID	36				4.10E-04	2.50E-01	1.3E+01		2.4E+05		2.4E+05	
M-02	VOC	Carbon Disulfide	75-15-0	T		36				2.00E-04	2.50E-02	8.0E-01		5.5E+02		1.2E+03	
M-02	VOC	Carbon Tetrachloride	56-23-5	T	B2	36				1.20E-04	2.50E-02	5.0E-03		2.4E+00		4.6E+00	
M-02	VOC	Chlorobenzene	108-90-7	T	D	36				1.40E-04	2.50E-02	1.0E-01		4.7E+02		8.6E+01	
M-02	VOC	Chloroethane	75-00-3	T		36	7	2.70E-03	5.80E-02	2.60E-04	1.80E-02	4.3E-01	1.3E-01	5.7E+03	1.0E-05	4.4E+02	1.3E-04
M-02	VOC	Chloroform	67-66-3	T	B2	36	11	2.00E-04	5.80E-03	1.40E-04	2.20E-02	1.0E-01	5.8E-02	1.8E+02	3.2E-05	1.5E+02	3.9E-05
M-02	VOC	Chloromethane	74-87-3	T	D	36	1	1.60E-04	1.60E-04	1.30E-04	3.10E-02	2.6E-01	6.2E-04	4.5E+01	3.6E-06	4.9E+02	3.3E-07
M-02	VOC	Cumene	98-82-8	T	D	36				1.20E-04	2.50E-02	8.0E-01		5.6E+01		5.6E+01	
M-02	VOC	Cyclohexane	110-82-7	T	ID	36				1.30E-04	2.50E-02						
M-02	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	36				6.20E-04	5.10E-02	2.0E-04		1.2E+00		3.9E-01	
M-02	VOC	Dibromochloromethane	124-48-1	T	C	36				2.60E-04	2.50E-02	1.0E-01		1.1E+02		1.8E+01	
M-02	VOC	1,2-Dibromoethane	106-93-4	T	B2	36				2.20E-04	2.50E-02	1.0E-03		1.5E+01		2.5E-02	
M-02	VOC	1,2-Dichlorobenzene	95-50-1	T	D	36				1.10E-04	2.50E-02	6.0E-01		1.6E+02		1.6E+02	
M-02	VOC	1,3-Dichlorobenzene	541-73-1	T	D	36				1.50E-04	2.50E-02	6.6E-03				2.0E+00	
M-02	VOC	1,4-Dichlorobenzene	106-46-7	T	C	36				1.70E-04	2.50E-02	7.5E-02		7.4E+01		6.4E+00	
M-02	VOC	Dichlorodifluoromethane	75-71-8	T		36				2.60E-04	5.00E-02	1.7E+00		3.0E+02		3.0E+02	
M-02	VOC	1,1-Dichloroethane	75-34-3	T	C	36	34	4.80E-04	1.90E+00	3.20E-03	1.10E-02	8.8E-01	**2.2E+00**	2.3E+03	8.3E-04	2.4E+03	7.9E-04
M-02	VOC	1,2-Dichloroethane	107-06-2	T	B2	36	6	6.20E-04	1.00E-02	2.10E-04	2.50E-02	5.0E-03	**2.0E+00**	5.9E+01	1.7E-04	1.9E+01	5.3E-04
M-02	VOC	1,1-Dichloroethene	75-35-4	T	C	36	25	3.30E-04	9.10E-02	2.40E-04	1.60E-02	7.0E-03	**1.3E+01**	1.3E+00	7.0E-02	1.1E+01	8.3E-03
M-02	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	36	9	5.80E-04	7.15E-02	2.20E-04	2.20E-02	7.0E-02	1.0E+00	2.1E+02	3.4E-04	2.0E+02	3.6E-04
M-02	VOC	trans-1,2-Dichloroethene	156-60-5	T		36	3	5.45E-04	3.20E-03	1.50E-04	2.10E-02	1.0E-01	3.2E-02	2.0E+02	1.6E-05	2.2E+02	1.5E-05
M-02	VOC	1,2-Dichloropropane	78-87-5	T	B2	36				1.70E-04	2.60E-02	5.0E-03		3.6E+01		1.6E+01	
M-02	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	36				2.70E-04	2.50E-02	8.5E-03		2.6E+01		5.5E+00	
M-02	VOC	Ethyl Benzene	100-41-4	T	D	29				1.20E-04	2.50E-02	7.0E-01		1.7E+02		1.7E+02	
M-02	VOC	2-Hexanone	591-78-6	T		36				4.60E-04	2.50E-01	1.0E+00		8.7E+03		5.2E+03	
M-02	VOC	Methyl Acetate	79-20-9	T		36				4.10E-04	2.50E-01						
M-02	VOC	Methyl tert-butyl ether	1634-04-4	T		36				1.30E-04	1.20E-01	2.4E-01		4.7E+04		6.1E+02	
M-02	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	36	3	1.00E-03	3.20E-02	2.30E-04	2.50E-01	1.8E+00	1.8E-02	2.0E+04	1.6E-06	1.3E+04	2.5E-06
M-02	VOC	Methylcyclohexane	108-87-2	T		36				1.50E-04	2.60E-02						
M-02	VOC	Methylene Chloride	75-09-2	T	B2	36	10	3.75E-04	2.40E-02	2.90E-04	2.50E-02	5.0E-03	**4.8E+00**	1.4E+03	1.7E-05	2.2E+02	1.1E-04
M-02	VOC	Styrene	100-42-5	T		36				1.50E-04	2.50E-02	1.0E-01		3.1E+02		9.7E+00	
M-02	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	36				2.50E-04	2.50E-02	8.5E-03		7.7E+01		4.7E+00	
M-02	VOC	Tetrachloroethene	127-18-4	T	C-B2	36	6	7.20E-04	7.50E-03	2.30E-04	2.60E-02	5.0E-03	**1.5E+00**	1.7E+02	4.4E-05	1.2E+01	6.3E-04
M-02	VOC	Toluene	108-88-3	T	D	36	1	2.00E-03	2.00E-03	1.80E-04	2.50E-02	1.0E+00	2.0E-03	5.3E+02	3.8E-06	5.3E+02	3.8E-06
M-02	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	36				1.70E-04	2.50E-02	7.0E-02		3.0E+02		1.9E+01	
M-02	VOC	1,1,1-Trichloroethane	71-55-6	T	D	36	27	4.50E-04	6.00E-01	1.50E-04	1.00E-02	2.0E-01	**3.0E+00**	1.3E+03	4.6E-04	1.3E+03	4.6E-04
M-02	VOC	1,1,2-Trichloroethane	79-00-5	T	C	36	3	1.00E-02	2.00E-02	3.00E-04	2.20E-02	5.0E-03	**4.0E+00**	1.1E+02	1.8E-04	2.1E+01	9.5E-04
M-02	VOC	Trichloroethene	79-01-6	T	C-B2	36	10	1.40E-03	5.60E-02	1.40E-04	2.60E-02	5.0E-03	**1.1E+01**	9.7E+01	5.8E-04	2.2E+01	2.5E-03
M-02	VOC	Trichlorofluoromethane	75-69-4	T		36				2.80E-04	3.40E-02	2.6E+00		1.1E+03		1.1E+03	
M-02	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		36	1	6.30E-04	6.30E-04	3.20E-04	2.50E-02	1.7E+02	3.7E-06	1.7E+02	3.7E-06	1.7E+02	3.7E-06
M-02	VOC	Vinyl Chloride	75-01-4	T	A	36	8	3.80E-04	2.10E-02	1.50E-04	2.50E-02	2.0E-03	**1.1E+01**	1.3E+01	1.6E-03	1.0E+00	2.1E-02
M-02	VOC	Xylenes (total)	1330-20-7	T	ID	36				3.30E-04	2.80E-02	1.0E+01		1.9E+02		1.9E+02	
M-02	SVOC	Acenaphthene	83-32-9	T		32	1	8.40E-04	8.40E-04	6.90E-04	5.00E-03	1.3E+00	6.5E-04	4.2E+00	2.0E-04	4.2E+00	2.0E-04
M-02	SVOC	Acenaphthylene	208-96-8	T	D	32				4.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
M-02	SVOC	Acetophenone	98-86-2	T	D	32				6.50E-04	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
M-02	SVOC	Anthracene	120-12-7	T	D	32	1	7.80E-04	7.80E-04	5.90E-04	5.00E-03	4.3E-02	1.8E-02	4.3E-02	1.8E-02	4.3E-02	1.8E-02
M-02	SVOC	Atrazine	1912-24-9	T		32				3.50E-04	5.00E-03	3.0E-03				5.4E+00	
M-02	SVOC	Benzaldehyde	100-52-7	T		32				5.90E-04	1.00E-02						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-02	SVOC	Benzo(a)anthracene	56-55-3	T	B2	32				6.80E-04	5.00E-03	2.1E-03				9.4E-03	
M-02	SVOC	Benzo(a)pyrene	50-32-8	T	B2	32				5.30E-04	5.00E-03	5.0E-03				2.0E-03	
M-02	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	32				7.10E-04	5.00E-03	2.0E-03				2.0E-03	
M-02	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	32				7.00E-04	5.00E-03	5.0E-03				5.0E-03	
M-02	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	32				6.40E-04	5.00E-03	5.0E-03				5.0E-03	
M-02	SVOC	Biphenyl	92-52-4	T	D	32				6.50E-04	1.00E-02						
M-02	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	32				8.70E-04	5.00E-03						
M-02	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	32				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
M-02	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	32	5	1.10E-03	2.40E-02	2.00E-04	5.00E-03	6.0E-03	**4.0E+00**			3.2E-01	7.5E-02
M-02	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	32				7.80E-04	5.00E-03						
M-02	SVOC	Butylbenzylphthalate	85-68-7	T	C	32				2.30E-04	5.00E-03	1.2E+00				2.7E+00	
M-02	SVOC	Caprolactam	105-60-2	T		32	1	4.90E-04	4.90E-04	4.50E-04	1.00E-02	5.8E+00	8.4E-05			3.9E+05	1.3E-09
M-02	SVOC	Carbazole	86-74-8	T	B2	32				6.10E-04	1.00E-02	8.5E-02				7.4E+00	
M-02	SVOC	4-Chloro-3-methylphenol	59-50-7	T		32				5.50E-04	5.00E-03	1.5E-01				7.9E+01	
M-02	SVOC	4-Chloroaniline	106-47-8	T		30				6.10E-04	1.00E-02						
M-02	SVOC	2-Chloronaphthalene	91-58-7	T		32				7.30E-04	5.00E-03	1.8E+00				6.7E+00	
M-02	SVOC	2-Chlorophenol	95-57-8	T		32				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
M-02	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		32				6.60E-04	5.00E-03						
M-02	SVOC	Chrysene	218-01-9	T	B2	32				6.70E-04	5.00E-03	5.0E-03				5.0E-03	
M-02	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	32				6.80E-04	5.00E-03	2.0E-03				2.0E-03	
M-02	SVOC	Dibenzofuran	132-64-9	T	D	32				6.60E-04	5.00E-03						
M-02	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	29				4.70E-04	2.00E-02	1.1E-03				1.8E-01	
M-02	SVOC	2,4-Dichlorophenol	120-83-2	T		32				7.00E-04	1.00E-02	7.3E-02				4.8E+01	
M-02	SVOC	Diethylphthalate	84-66-2	T	D	32	3	5.50E-04	2.40E-03	2.50E-04	5.00E-03	5.5E+00	4.4E-04			1.1E+03	2.2E-06
M-02	SVOC	2,4-Dimethylphenol	105-67-9	T		32	3	1.00E-03	1.30E-03	8.50E-04	5.00E-03	3.7E-01	3.5E-03			5.2E+02	2.5E-06
M-02	SVOC	Dimethylphthalate	131-11-3	T	D	32				2.00E-04	5.00E-03	7.3E+01				4.2E+03	
M-02	SVOC	Di-n-butylphthalate	84-74-2	T	D	32	5	4.40E-04	1.10E-03	3.70E-04	5.00E-03	8.8E-01	1.3E-03			1.1E+01	1.0E-04
M-02	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		32				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
M-02	SVOC	2,4-Dinitrophenol	51-28-5	T		32				3.00E-03	2.00E-02						
M-02	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	32				4.60E-04	5.00E-03	7.7E-03				8.6E+00	
M-02	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	32				5.70E-04	5.00E-03						
M-02	SVOC	Di-n-octylphthalate	117-84-0	T		32				6.90E-04	5.00E-03	1.3E-01				4.0E-01	
M-02	SVOC	Fluoranthene	206-44-0	T	D	32				7.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
M-02	SVOC	Fluorene	86-73-7	T	D	32	6	1.20E-03	4.40E-03	7.50E-04	5.00E-03	8.8E-01	5.0E-03	2.0E+00	2.2E-03	2.0E+00	2.2E-03
M-02	SVOC	Hexachlorobenzene	118-74-1	T	B2	32				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
M-02	SVOC	Hexachlorobutadiene	87-68-3	T	C	32				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
M-02	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	32				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
M-02	SVOC	Hexachloroethane	67-72-1	T	C	32				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
M-02	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	32				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
M-02	SVOC	Isophorone	78-59-1	T	C	32				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
M-02	SVOC	2-Methylnaphthalene	91-57-6	T	ID	32	4	1.10E-03	2.10E-03	6.40E-04	5.00E-03	2.6E-01	8.1E-03			2.5E+01	8.4E-05
M-02	SVOC	Methylphenol (total)	1319-77-3	T		32				9.00E-04	5.00E-03	3.7E-01				8.1E+02	
M-02	SVOC	Naphthalene	91-20-3	T	C	32	4	1.30E-03	1.60E-03	7.50E-04	5.00E-03	5.2E-01	3.1E-03	3.1E+01	5.2E-05	3.1E+01	5.2E-05
M-02	SVOC	2-Nitroaniline	88-74-4	T		32				4.90E-04	2.00E-02						
M-02	SVOC	3-Nitroaniline	99-09-2	T	C	29				4.80E-04	2.00E-02						
M-02	SVOC	4-Nitroaniline	100-01-6	T	C	31				5.90E-04	2.00E-02						
M-02	SVOC	Nitrobenzene	98-95-3	T	D	32				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
M-02	SVOC	2-Nitrophenol	88-75-5	T		32				9.50E-04	5.00E-03	2.0E-02				7.9E+01	
M-02	SVOC	4-Nitrophenol	100-02-7	T		32				1.90E-03	2.00E-02						
M-02	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	32				6.40E-04	5.00E-03	2.7E-01				3.5E+01	
M-02	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	32				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
M-02	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	32				7.80E-04	5.00E-03						
M-02	SVOC	Pentachlorophenol	87-86-5	T	B2	32				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
M-02	SVOC	Phenanthrene	85-01-8	T	D	32	7	9.10E-04	7.50E-03	6.80E-04	5.00E-03	5.2E-02	1.4E-01	1.0E+00	7.5E-03	1.0E+00	7.5E-03
M-02	SVOC	Phenol	108-95-2	T	ID	32				1.30E-03	5.00E-03	4.4E+00				2.9E+04	
M-02	SVOC	Pyrene	129-00-0	T	D	32				6.30E-04	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
M-02	SVOC	2,4,5-Trichlorophenol	95-95-4	T		32				8.60E-04	5.00E-03	7.3E-01				1.7E+02	
M-02	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	32				7.10E-04	5.00E-03	1.2E-01				1.0E+01	
M-02	P/PCB	PCBs (total)	1336-36-3	D	B2	5				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-02	P/PCB	PCBs (total)	1336-36-3	T	B2	32	1	4.12E-04	4.12E-04	8.20E-05	4.00E-04	5.0E-04	8.2E-01	4.5E-02	9.1E-03	3.3E-03	1.2E-01
M-02	INORG	Antimony	7440-36-0	D		10	2	3.40E-03	3.90E-03	2.20E-03	2.20E-03	6.0E-03	6.5E-01			6.8E+01	5.7E-05
M-02	INORG	Antimony	7440-36-0	T		32	2	2.30E-03	2.50E-03	2.20E-03	3.40E-03	6.0E-03	4.2E-01			6.8E+01	3.7E-05
M-02	INORG	Arsenic	7440-38-2	D	A	10	2	1.27E-02	3.07E-02	3.90E-03	3.90E-03	5.0E-02	6.1E-01			4.3E+00	7.1E-03
M-02	INORG	Arsenic	7440-38-2	T	A	32	17	1.83E-03	3.81E-02	2.10E-03	3.90E-03	5.0E-02	7.6E-01			4.3E+00	8.9E-03
M-02	INORG	Barium	7440-39-3	D	D	10	10	2.05E-02	2.09E-01			2.0E+00	1.0E-01			1.4E+04	1.5E-05
M-02	INORG	Barium	7440-39-3	T	D	32	32	1.62E-02	2.58E-01			2.0E+00	1.3E-01			1.4E+04	1.8E-05

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-02	INORG	Beryllium	7440-41-7	D	B1	10				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
M-02	INORG	Beryllium	7440-41-7	T	B1	32				5.40E-04	6.00E-04	4.0E-03				2.9E+02	
M-02	INORG	Cadmium	7440-43-9	D	B1	10	2	2.20E-04	3.30E-04	2.80E-04	2.80E-04	5.0E-03	6.6E-02			1.9E+02	1.7E-06
M-02	INORG	Cadmium	7440-43-9	T	B1	32	8	2.80E-04	3.80E-04	2.80E-04	2.80E-04	5.0E-03	7.6E-02			1.9E+02	2.0E-06
M-02	INORG	Chromium (total)	7440-47-3	D		6				1.40E-03	1.40E-03	1.0E-01				4.6E+02	
M-02	INORG	Chromium (total)	7440-47-3	T		24	6	1.28E-03	3.20E-03	1.50E-03	1.50E-03	1.0E-01	3.2E-02			4.6E+02	7.0E-06
M-02	INORG	Chromium III	16065-83-1	D	D	4	1	3.45E-03	3.45E-03	1.40E-03	1.40E-03	3.8E+01	9.1E-05			2.9E+05	1.2E-08
M-02	INORG	Chromium III	16065-83-1	T	D	8				1.40E-03	1.40E-03	3.8E+01				2.9E+05	
M-02	INORG	Chromium VI	18540-29-9	D	A	4	1	7.90E-03	7.90E-03	6.90E-03	6.90E-03	1.0E-01	7.9E-02			4.6E+02	1.7E-05
M-02	INORG	Chromium VI	18540-29-9	T	A	8				6.90E-03	6.90E-03	1.0E-01				4.6E+02	
M-02	INORG	Cobalt	7440-48-4	D	B1	10	7	1.50E-03	1.87E-02	1.30E-03	1.30E-03	4.0E-02	4.7E-01			2.4E+03	7.8E-06
M-02	INORG	Cobalt	7440-48-4	T	B1	32	27	8.00E-04	3.05E-02	7.40E-04	1.30E-03	4.0E-02	7.6E-01			2.4E+03	1.3E-05
M-02	INORG	Copper	7440-50-8	D	D	10	5	4.80E-03	1.68E-02	4.20E-03	4.20E-03	1.4E+00	1.2E-02			7.4E+03	2.3E-06
M-02	INORG	Copper	7440-50-8	T	D	32	5	4.60E-03	2.51E-01	1.70E-03	4.20E-03	1.4E+00	1.8E-01			7.4E+03	3.4E-05
M-02	INORG	Cyanide (total)	57-12-5	T	D	11	7	3.18E-03	5.50E-01	1.70E-03	1.70E-03	2.0E-01	**2.8E+00**			5.7E+01	9.6E-03
M-02	INORG	Lead	7439-92-1	D	B2	10				2.50E-03	2.50E-03	4.0E-03					
M-02	INORG	Lead	7439-92-1	T	B2	32	1	2.20E-02	2.20E-02	1.60E-03	2.50E-03	4.0E-03	**5.5E+00**				
M-02	INORG	Manganese	7439-96-5	D	D	10	10	3.70E-03	1.17E+00			8.6E-01	**1.4E+00**			9.1E+03	1.3E-04
M-02	INORG	Manganese	7439-96-5	T	D	32	31	3.60E-03	1.21E+00	6.80E-04	6.80E-04	8.6E-01	**1.4E+00**			9.1E+03	1.3E-04
M-02	INORG	Mercury	7439-97-6	D	D	10	1	7.70E-05	7.70E-05	6.90E-05	2.00E-04	2.0E-03	3.9E-02	5.6E-02	1.4E-03	5.6E-02	1.4E-03
M-02	INORG	Mercury	7439-97-6	T	D	32	2	7.70E-05	1.00E-04	6.90E-05	2.00E-04	2.0E-03	5.0E-02	5.6E-02	1.8E-03	5.6E-02	1.8E-03
M-02	INORG	Nickel	7440-02-0	D	A	10	10	2.70E-03	1.68E-01			1.0E-01	**1.7E+00**			7.4E+04	2.3E-06
M-02	INORG	Nickel	7440-02-0	T	A	32	31	3.20E-03	1.06E+01	2.90E-03	2.90E-03	1.0E-01	**1.1E+02**			7.4E+04	1.4E-04
M-02	INORG	Selenium	7782-49-2	D	D	10	1	5.70E-03	5.70E-03	4.50E-03	4.50E-03	5.0E-02	1.1E-01			9.7E+02	5.9E-06
M-02	INORG	Selenium	7782-49-2	T	D	32	2	5.00E-03	5.40E-03	4.50E-03	4.70E-03	5.0E-02	1.1E-01			9.7E+02	5.6E-06
M-02	INORG	Silver	7440-22-4	D	D	10				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
M-02	INORG	Silver	7440-22-4	T	D	32	2	7.95E-04	1.00E-03	9.80E-04	1.50E-03	3.4E-02	2.9E-02			1.5E+03	6.7E-07
M-02	INORG	Thallium	7440-28-0	D		10	4	4.80E-05	5.60E-03	1.80E-05	5.00E-03	2.0E-03	**2.8E+00**			1.3E+01	4.3E-04
M-02	INORG	Thallium	7440-28-0	T		32	4	2.00E-05	5.50E-03	1.80E-05	5.00E-03	2.0E-03	**2.8E+00**			1.3E+01	4.2E-04
M-02	INORG	Vanadium	7440-62-2	D		10	4	1.90E-03	5.80E-03	8.20E-04	8.20E-04	4.5E-03	**1.3E+00**			9.7E+02	6.0E-06
M-02	INORG	Vanadium	7440-62-2	T		32	9	1.00E-03	1.16E-02	6.70E-04	8.20E-04	4.5E-03	**2.6E+00**			9.7E+02	1.2E-05
M-02	INORG	Zinc	7440-66-6	D	D	10	3	1.51E-02	8.48E-02	1.20E-02	1.20E-02	2.4E+00	3.5E-02			1.1E+05	7.7E-07
M-02	INORG	Zinc	7440-66-6	T	D	32	4	1.52E-02	5.54E-01	1.20E-02	1.40E-02	2.4E+00	2.3E-01			1.1E+05	5.0E-06
M-04	VOC	Acetone	67-64-1	T	ID	13	3	2.10E-03	1.70E-01	5.10E-04	3.70E-02	7.3E-01	2.3E-01	1.0E+06	1.7E-07	3.1E+04	5.5E-06
M-04	VOC	Benzene	71-43-2	T	A	19	6	3.30E-04	9.80E-01	1.60E-04	4.00E-04	5.0E-03	**2.0E+02**	3.5E+01	2.8E-02	1.1E+01	8.9E-02
M-04	VOC	Bromodichloromethane	75-27-4	T	B2	13	1	3.00E-04	3.00E-04	1.70E-04	1.10E-02	1.0E-01	3.0E-03	3.7E+01	8.1E-06	1.4E+01	2.1E-05
M-04	VOC	Bromoform	75-25-2	T	B2	13				1.80E-04	1.20E-02	1.0E-01		3.1E+03		1.4E+02	
M-04	VOC	Bromomethane	74-83-9	T	D	13				2.00E-04	1.00E-02	1.0E-02		9.0E+00		7.0E+01	
M-04	VOC	2-Butanone	78-93-3	T	ID	13				4.10E-04	2.00E-02	1.3E+01		2.4E+05		2.4E+05	
M-04	VOC	Carbon Disulfide	75-15-0	T		13	1	2.10E-03	2.10E-03	2.00E-04	8.00E-03	8.0E-01	2.6E-03	5.5E+02	3.8E-06	1.2E+03	1.8E-06
M-04	VOC	Carbon Tetrachloride	56-23-5	T	B2	13				1.20E-04	1.20E-02	5.0E-03		2.4E+00		4.6E+00	
M-04	VOC	Chlorobenzene	108-90-7	T	D	13				1.40E-04	1.30E-02	1.0E-01		4.7E+02		8.6E+01	
M-04	VOC	Chloroethane	75-00-3	T		13				2.60E-04	9.70E-03	4.3E-01		5.7E+03		4.4E+02	
M-04	VOC	Chloroform	67-66-3	T	B2	13	3	8.90E-04	1.30E-03	1.40E-04	1.20E-02	1.0E-01	1.3E-02	1.8E+02	7.2E-06	1.5E+02	8.7E-06
M-04	VOC	Chloromethane	74-87-3	T	D	13				1.30E-04	1.60E-02	2.6E-01		4.5E+01		4.9E+02	
M-04	VOC	Cumene	98-82-8	T	D	13	4	2.70E-04	1.90E-02	1.20E-04	1.30E-02	8.0E-01	2.4E-02	5.6E+01	3.4E-04	5.6E+01	3.4E-04
M-04	VOC	Cyclohexane	110-82-7	T	ID	13	3	1.30E-01	3.00E-01	1.30E-04	3.30E-04						
M-04	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	13				6.20E-04	2.70E-02	2.0E-04		1.2E+00		3.9E-01	
M-04	VOC	Dibromochloromethane	124-48-1	T	C	13				2.60E-04	1.20E-02	1.0E-01		1.1E+02		1.8E+01	
M-04	VOC	1,2-Dibromoethane	106-93-4	T	B2	13				2.20E-04	1.10E-02	1.0E-03		1.5E+01		2.5E-02	
M-04	VOC	1,2-Dichlorobenzene	95-50-1	T	D	13	1	2.10E-04	2.10E-04	1.10E-04	1.30E-02	6.0E-01	3.5E-04	1.6E+02	1.3E-06	1.6E+02	1.3E-06
M-04	VOC	1,3-Dichlorobenzene	541-73-1	T	D	13				1.50E-04	1.30E-02	6.6E-03				2.0E+00	
M-04	VOC	1,4-Dichlorobenzene	106-46-7	T	C	13	1	1.90E-04	1.90E-04	1.70E-04	1.30E-02	7.5E-02	2.5E-03	7.4E+01	2.6E-06	6.4E+00	3.0E-05
M-04	VOC	Dichlorodifluoromethane	75-71-8	T		13				2.60E-04	1.60E-02	1.7E+00		3.0E+02		3.0E+02	
M-04	VOC	1,1-Dichloroethane	75-34-3	T	C	13				1.60E-04	1.00E-02	8.8E-01		2.3E+03		2.4E+03	
M-04	VOC	1,2-Dichloroethane	107-06-2	T	B2	13				2.10E-04	9.30E-03	5.0E-03		5.9E+01		1.9E+01	
M-04	VOC	1,1-Dichloroethene	75-35-4	T	C	13				2.40E-04	1.00E-02	7.0E-03		1.3E+00		1.1E+01	
M-04	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	13				2.20E-04	1.20E-02	7.0E-02		2.1E+02		2.0E+02	
M-04	VOC	trans-1,2-Dichloroethene	156-60-5	T		13				1.50E-04	1.10E-02	1.0E-01		2.0E+02		2.2E+02	
M-04	VOC	1,2-Dichloropropane	78-87-5	T	B2	13				1.70E-04	1.40E-02	5.0E-03		3.6E+01		1.6E+01	
M-04	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	13				2.70E-04	1.20E-02	8.5E-03		2.6E+01		5.5E+00	
M-04	VOC	Ethyl Benzene	100-41-4	T	D	19	7	2.70E-04	1.50E+00	1.20E-04	4.10E-04	7.0E-01	**2.1E+00**	1.7E+02	8.8E-03	1.7E+02	8.8E-03
M-04	VOC	2-Hexanone	591-78-6	T		13				4.60E-04	1.90E-02	1.0E+00		8.7E+03		5.2E+03	
M-04	VOC	Methyl Acetate	79-20-9	T		13				4.10E-04	1.80E-02						
M-04	VOC	Methyl tert-butyl ether	1634-04-4	T		13	1	1.20E-03	1.20E-03	1.30E-04	9.00E-03	2.4E-01	5.0E-03	4.7E+04	2.6E-08	6.1E+02	2.0E-06
M-04	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	13				2.30E-04	8.70E-03	1.8E+00		2.0E+04		1.3E+04	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-04	VOC	Methylcyclohexane	108-87-2	T		13	3	1.80E-02	6.30E-02	1.50E-04	4.20E-04						
M-04	VOC	Methylene Chloride	75-09-2	T	B2	8	2	3.50E-04	1.40E-03	3.40E-04	1.10E-02	5.0E-03	2.8E-01	1.4E+03	1.0E-06	2.2E+02	6.4E-06
M-04	VOC	Styrene	100-42-5	T		13				1.50E-04	1.20E-02	1.0E-01		3.1E+02		9.7E+00	
M-04	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	13				2.50E-04	1.20E-02	8.5E-03		7.7E+01		4.7E+00	
M-04	VOC	Tetrachloroethene	127-18-4	T	C-B2	13				2.30E-04	1.40E-02	5.0E-03		1.7E+02		1.2E+01	
M-04	VOC	Toluene	108-88-3	T	D	19	6	3.10E-04	5.70E-02	1.70E-04	4.50E-04	1.0E+00	5.7E-02	5.3E+02	1.1E-04	5.3E+02	1.1E-04
M-04	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	13	1	2.40E-04	2.40E-04	1.70E-04	1.30E-02	7.0E-02	3.4E-03	3.0E+02	8.0E-07	1.9E+01	1.3E-05
M-04	VOC	1,1,1-Trichloroethane	71-55-6	T	D	13				1.50E-04	1.30E-02	2.0E-01		1.3E+03		1.3E+03	
M-04	VOC	1,1,2-Trichloroethane	79-00-5	T	C	13				3.00E-04	1.20E-02	5.0E-03		1.1E+02		2.1E+01	
M-04	VOC	Trichloroethene	79-01-6	T	C-B2	13				1.40E-04	1.40E-02	5.0E-03		9.7E+01		2.2E+01	
M-04	VOC	Trichlorofluoromethane	75-69-4	T		13				2.80E-04	1.80E-02	2.6E+00		1.1E+03		1.1E+03	
M-04	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		13				3.20E-04	1.10E-02	1.7E+02		1.7E+02		1.7E+02	
M-04	VOC	Vinyl Chloride	75-01-4	T	A	13				1.50E-04	1.20E-02	2.0E-03		1.3E+01		1.0E+00	
M-04	VOC	Xylenes (total)	1330-20-7	T	ID	19	4	3.00E-01	1.40E+00	3.30E-04	8.20E-04	1.0E+01	1.4E-01	1.9E+02	7.4E-03	1.9E+02	7.4E-03
M-04	INORG	Lead	7439-92-1	D	B2	8				2.50E-03	2.50E-03	4.0E-03					
M-04	INORG	Lead	7439-92-1	T	B2	10				1.60E-03	2.50E-03	4.0E-03					
M-05	P/PCB	PCBs (total)	1336-36-3	D	B2	2				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
M-05	P/PCB	PCBs (total)	1336-36-3	T	B2	9	4	4.19E-04	1.64E-03	8.20E-05	8.20E-05	5.0E-04	**3.3E+00**	4.5E-02	3.6E-02	3.3E-03	5.0E-01
M-05	INORG	Antimony	7440-36-0	D		4	1	4.30E-03	4.30E-03	2.20E-03	2.20E-03	6.0E-03	7.2E-01			6.8E+01	6.3E-05
M-05	INORG	Antimony	7440-36-0	T		4	1	3.50E-03	3.50E-03	2.20E-03	2.20E-03	6.0E-03	5.8E-01			6.8E+01	5.1E-05
M-05	INORG	Arsenic	7440-38-2	D	A	4	2	2.49E-02	2.67E-02	3.90E-03	3.90E-03	5.0E-02	5.3E-01			4.3E+00	6.2E-03
M-05	INORG	Arsenic	7440-38-2	T	A	4	3	4.10E-03	2.73E-02	3.90E-03	3.90E-03	5.0E-02	5.5E-01			4.3E+00	6.3E-03
M-05	INORG	Barium	7440-39-3	D	D	4	4	1.28E+00	4.72E+00			2.0E+00	**2.4E+00**			1.4E+04	3.4E-04
M-05	INORG	Barium	7440-39-3	T	D	9	9	2.05E-01	4.80E+00			2.0E+00	**2.4E+00**			1.4E+04	3.4E-04
M-05	INORG	Beryllium	7440-41-7	D	B1	4				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
M-05	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
M-05	INORG	Cadmium	7440-43-9	D	B1	4	3	3.00E-04	6.60E-04	2.80E-04	2.80E-04	5.0E-03	1.3E-01			1.9E+02	3.5E-06
M-05	INORG	Cadmium	7440-43-9	T	B1	4	3	3.60E-04	7.10E-04	2.80E-04	2.80E-04	5.0E-03	1.4E-01			1.9E+02	3.7E-06
M-05	INORG	Chromium (total)	7440-47-3	D		4	3	1.80E-03	2.20E-03	1.40E-03	1.40E-03	1.0E-01	2.2E-02			4.6E+02	4.8E-06
M-05	INORG	Chromium (total)	7440-47-3	T		4	3	2.50E-03	2.05E-02	1.40E-03	1.40E-03	1.0E-01	2.1E-01			4.6E+02	4.5E-05
M-05	INORG	Cobalt	7440-48-4	D	B1	4	1	8.00E-03	8.00E-03	1.30E-03	1.30E-03	4.0E-02	2.0E-01			2.4E+03	3.3E-06
M-05	INORG	Cobalt	7440-48-4	T	B1	4	1	7.90E-03	7.90E-03	1.30E-03	1.30E-03	4.0E-02	2.0E-01			2.4E+03	3.3E-06
M-05	INORG	Copper	7440-50-8	D	D	4				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
M-05	INORG	Copper	7440-50-8	T	D	4	1	5.20E-03	5.20E-03	4.20E-03	4.20E-03	1.4E+00	3.7E-03			7.4E+03	7.0E-07
M-05	INORG	Lead	7439-92-1	D	B2	4				2.50E-03	2.50E-03	4.0E-03					
M-05	INORG	Lead	7439-92-1	T	B2	4				2.50E-03	2.50E-03	4.0E-03					
M-05	INORG	Manganese	7439-96-5	D	D	4	4	9.53E-01	3.57E+00			8.6E-01	**4.2E+00**			9.1E+03	3.9E-04
M-05	INORG	Manganese	7439-96-5	T	D	9	9	1.25E-01	3.63E+00			8.6E-01	**4.2E+00**			9.1E+03	4.0E-04
M-05	INORG	Mercury	7439-97-6	D	D	4				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
M-05	INORG	Mercury	7439-97-6	T	D	4				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
M-05	INORG	Nickel	7440-02-0	D	A	4	2	1.06E-02	1.60E-02	2.20E-03	2.20E-03	1.0E-01	1.6E-01			7.4E+04	2.2E-07
M-05	INORG	Nickel	7440-02-0	T	A	4	2	1.69E-02	1.75E-02	2.20E-03	2.20E-03	1.0E-01	1.8E-01			7.4E+04	2.4E-07
M-05	INORG	Selenium	7782-49-2	D	D	4				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
M-05	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
M-05	INORG	Silver	7440-22-4	D	D	4				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
M-05	INORG	Silver	7440-22-4	T	D	4				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
M-05	INORG	Thallium	7440-28-0	D		4	2	5.00E-03	5.90E-03	1.80E-05	1.80E-05	2.0E-03	**3.0E+00**			1.3E+01	4.5E-04
M-05	INORG	Thallium	7440-28-0	T		4	1	3.00E-05	3.00E-05	1.80E-05	5.00E-03	2.0E-03	1.5E-02			1.3E+01	2.3E-06
M-05	INORG	Vanadium	7440-62-2	D		4	2	8.00E-03	1.00E-02	8.20E-04	8.20E-04	4.5E-03	**2.2E+00**			9.7E+02	1.0E-05
M-05	INORG	Vanadium	7440-62-2	T		4	2	7.80E-03	1.04E-02	8.20E-04	8.20E-04	4.5E-03	**2.3E+00**			9.7E+02	1.1E-05
M-05	INORG	Zinc	7440-66-6	D	D	4	1	1.33E-02	1.33E-02	1.20E-02	1.20E-02	2.4E+00	5.5E-03			1.1E+05	1.2E-07
M-05	INORG	Zinc	7440-66-6	T	D	4				1.20E-02	1.20E-02	2.4E+00				1.1E+05	
M-05	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	D	B2	2				5.02E-09	6.62E-09	3.0E-08				1.0E-08	
M-05	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	2				5.85E-09	9.14E-09	3.0E-08				1.0E-08	
M-07	VOC	Acetone	67-64-1	T	ID	8	4	3.50E-03	4.20E+01	5.10E-04	5.10E-03	7.3E-01	**5.8E+01**	1.0E+06	4.2E-05	3.1E+04	1.4E-03
M-07	VOC	Benzene	71-43-2	T	A	8	2	2.40E-04	4.10E-04	1.60E-04	1.30E-01	5.0E-03	8.2E-02	3.5E+01	1.2E-05	1.1E+01	3.7E-05
M-07	VOC	Bromodichloromethane	75-27-4	T	B2	8				1.70E-04	1.40E-01	1.0E-01		3.7E+01		1.4E+01	
M-07	VOC	Bromoform	75-25-2	T	B2	8				1.80E-04	1.50E-01	1.0E-01		3.1E+03		1.4E+02	
M-07	VOC	Bromomethane	74-83-9	T	D	8				2.00E-04	1.70E-01	1.0E-02		9.0E+00		7.0E+01	
M-07	VOC	2-Butanone	78-93-3	T	ID	8	1	4.70E-03	4.70E-03	4.10E-04	3.40E-01	1.3E+01	3.6E-04	2.4E+05	2.0E-08	2.4E+05	2.0E-08
M-07	VOC	Carbon Disulfide	75-15-0	T		8				2.00E-04	1.70E-01	8.0E-01		5.5E+02		1.2E+03	
M-07	VOC	Carbon Tetrachloride	56-23-5	T	B2	8				1.20E-04	1.00E-01	5.0E-03		2.4E+00		4.6E+00	
M-07	VOC	Chlorobenzene	108-90-7	T	D	8				1.40E-04	1.20E-01	1.0E-01		4.7E+02		8.6E+01	
M-07	VOC	Chloroethane	75-00-3	T		8				2.60E-04	2.20E-01	4.3E-01		5.7E+03		4.4E+02	
M-07	VOC	Chloroform	67-66-3	T	B2	8				1.40E-04	1.20E-01	1.0E-01		1.8E+02		1.5E+02	
M-07	VOC	Chloromethane	74-87-3	T	D	8	1	3.70E-04	3.70E-04	1.30E-04	1.10E-01	2.6E-01	1.4E-03	4.5E+01	8.2E-06	4.9E+02	7.6E-07

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-07	VOC	Cumene	98-82-8	T	D	8				1.20E-04	1.00E-01	8.0E-01		5.6E+01		5.6E+01	
M-07	VOC	Cyclohexane	110-82-7	T	ID	8	1	2.50E-04	2.50E-04	1.30E-04	1.10E-01						
M-07	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	8				6.20E-04	5.20E-01	2.0E-04		1.2E+00		3.9E-01	
M-07	VOC	Dibromochloromethane	124-48-1	T	C	8				2.60E-04	2.20E-01	1.0E-01		1.1E+02		1.8E+01	
M-07	VOC	1,2-Dibromoethane	106-93-4	T	B2	8				2.20E-04	1.80E-01	1.0E-03		1.5E+01		2.5E-02	
M-07	VOC	1,2-Dichlorobenzene	95-50-1	T	D	8				1.10E-04	9.20E-02	6.0E-01		1.6E+02		1.6E+02	
M-07	VOC	1,3-Dichlorobenzene	541-73-1	T	D	8				1.50E-04	1.20E-01	6.6E-03				2.0E+00	
M-07	VOC	1,4-Dichlorobenzene	106-46-7	T	C	8				1.70E-04	1.40E-01	7.5E-02		7.4E+01		6.4E+00	
M-07	VOC	Dichlorodifluoromethane	75-71-8	T		8				2.60E-04	2.20E-01	1.7E+00		3.0E+02		3.0E+02	
M-07	VOC	1,1-Dichloroethane	75-34-3	T	C	8				1.60E-04	1.30E-01	8.8E-01		2.3E+03		2.4E+03	
M-07	VOC	1,2-Dichloroethane	107-06-2	T	B2	8				2.10E-04	1.70E-01	5.0E-03		5.9E+01		1.9E+01	
M-07	VOC	1,1-Dichloroethene	75-35-4	T	C	8				2.40E-04	2.00E-01	7.0E-03		1.3E+00		1.1E+01	
M-07	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	8				2.20E-04	1.80E-01	7.0E-02		2.1E+02		2.0E+02	
M-07	VOC	trans-1,2-Dichloroethene	156-60-5	T		8				1.50E-04	1.20E-01	1.0E-01		2.0E+02		2.2E+02	
M-07	VOC	1,2-Dichloropropane	78-87-5	T	B2	8				1.70E-04	1.40E-01	5.0E-03		3.6E+01		1.6E+01	
M-07	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	8				2.70E-04	2.20E-01	8.5E-03		2.6E+01		5.5E+00	
M-07	VOC	Ethyl Benzene	100-41-4	T	D	8	1	2.30E-04	2.30E-04	1.20E-04	1.00E-01	7.0E-01	3.3E-04	1.7E+02	1.4E-06	1.7E+02	1.4E-06
M-07	VOC	2-Hexanone	591-78-6	T		8				4.60E-04	3.80E-01	1.0E+00		8.7E+03		5.2E+03	
M-07	VOC	Methyl Acetate	79-20-9	T		8				4.10E-04	3.40E-01						
M-07	VOC	Methyl tert-butyl ether	1634-04-4	T		8				1.30E-04	1.10E-01	2.4E-01		4.7E+04		6.1E+02	
M-07	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	8				2.30E-04	1.90E-01	1.8E+00		2.0E+04		1.3E+04	
M-07	VOC	Methylcyclohexane	108-87-2	T		8	1	4.60E-04	4.60E-04	1.50E-04	1.20E-01						
M-07	VOC	Methylene Chloride	75-09-2	T	B2	8				3.40E-04	2.80E-01	5.0E-03		1.4E+03		2.2E+02	
M-07	VOC	Styrene	100-42-5	T		8				1.50E-04	1.20E-01	1.0E-01		3.1E+02		9.7E+00	
M-07	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	8				2.50E-04	2.10E-01	8.5E-03		7.7E+01		4.7E+00	
M-07	VOC	Tetrachloroethene	127-18-4	T	C-B2	8	1	3.60E-03	3.60E-03	2.30E-04	1.90E-01	5.0E-03	7.2E-01	1.7E+02	2.1E-05	1.2E+01	3.0E-04
M-07	VOC	Toluene	108-88-3	T	D	8	2	3.50E-04	1.80E-03	1.80E-04	1.50E-01	1.0E+00	1.8E-03	5.3E+02	3.4E-06	5.3E+02	3.4E-06
M-07	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	8				1.70E-04	1.40E-01	7.0E-02		3.0E+02		1.9E+01	
M-07	VOC	1,1,1-Trichloroethane	71-55-6	T	D	8				1.50E-04	1.20E-01	2.0E-01		1.3E+03		1.3E+03	
M-07	VOC	1,1,2-Trichloroethane	79-00-5	T	C	8				3.00E-04	2.50E-01	5.0E-03		1.1E+02		2.1E+01	
M-07	VOC	Trichloroethene	79-01-6	T	C-B2	8				1.40E-04	1.20E-01	5.0E-03		9.7E+01		2.2E+01	
M-07	VOC	Trichlorofluoromethane	75-69-4	T		8				2.80E-04	2.30E-01	2.6E+00		1.1E+03		1.1E+03	
M-07	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		8				3.20E-04	2.70E-01	1.7E+02		1.7E+02		1.7E+02	
M-07	VOC	Vinyl Chloride	75-01-4	T	A	8				1.50E-04	1.20E-01	2.0E-03		1.3E+01		1.0E+00	
M-07	VOC	Xylenes (total)	1330-20-7	T	ID	8	1	1.20E-03	1.20E-03	3.30E-04	2.70E-01	1.0E+01	1.2E-04	1.9E+02	6.3E-06	1.9E+02	6.3E-06
M-07	SVOC	Acenaphthene	83-32-9	T		8				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
M-07	SVOC	Acenaphthylene	208-96-8	T	D	8				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
M-07	SVOC	Acetophenone	98-86-2	T	D	8				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
M-07	SVOC	Anthracene	120-12-7	T	D	8				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
M-07	SVOC	Atrazine	1912-24-9	T		8				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
M-07	SVOC	Benzaldehyde	100-52-7	T		8				2.80E-03	1.00E-02						
M-07	SVOC	Benzo(a)anthracene	56-55-3	T	B2	8				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
M-07	SVOC	Benzo(a)pyrene	50-32-8	T	B2	8				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
M-07	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	8				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
M-07	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	8				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
M-07	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	8				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
M-07	SVOC	Biphenyl	92-52-4	T	D	8				2.60E-03	1.00E-02						
M-07	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	8				8.70E-04	5.00E-03						
M-07	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	8				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
M-07	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	8				2.70E-03	5.00E-03	6.0E-03				3.2E-01	
M-07	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	8				8.80E-04	5.00E-03						
M-07	SVOC	Butylbenzylphthalate	85-68-7	T	C	8				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
M-07	SVOC	Caprolactam	105-60-2	T		8	1	1.20E-01	1.20E-01	2.50E-03	1.00E-02	5.8E+00	2.1E-02			3.9E+05	3.1E-07
M-07	SVOC	Carbazole	86-74-8	T	B2	8				8.20E-04	1.00E-02	8.5E-02				7.4E+00	
M-07	SVOC	4-Chloro-3-methylphenol	59-50-7	T		8				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
M-07	SVOC	4-Chloroaniline	106-47-8	T		8				6.10E-04	1.00E-02						
M-07	SVOC	2-Chloronaphthalene	91-58-7	T		8				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
M-07	SVOC	2-Chlorophenol	95-57-8	T		8				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
M-07	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		8				7.90E-04	5.00E-03						
M-07	SVOC	Chrysene	218-01-9	T	B2	8				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
M-07	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	8				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
M-07	SVOC	Dibenzofuran	132-64-9	T	D	8				1.10E-03	5.00E-03						
M-07	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	8				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
M-07	SVOC	2,4-Dichlorophenol	120-83-2	T		8				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
M-07	SVOC	Diethylphthalate	84-66-2	T	D	8				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
M-07	SVOC	2,4-Dimethylphenol	105-67-9	T		8				8.50E-04	5.00E-03	3.7E-01				5.2E+02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-07	SVOC	Dimethylphthalate	131-11-3	T	D	8				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
M-07	SVOC	Di-n-butylphthalate	84-74-2	T	D	8				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
M-07	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		8				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
M-07	SVOC	2,4-Dinitrophenol	51-28-5	T		8				3.00E-03	2.00E-02						
M-07	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	8				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
M-07	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	8				5.70E-04	5.00E-03						
M-07	SVOC	Di-n-octylphthalate	117-84-0	T		8				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
M-07	SVOC	Fluoranthene	206-44-0	T	D	8				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
M-07	SVOC	Fluorene	86-73-7	T	D	8				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
M-07	SVOC	Hexachlorobenzene	118-74-1	T	B2	8				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
M-07	SVOC	Hexachlorobutadiene	87-68-3	T	C	8				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
M-07	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	8				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
M-07	SVOC	Hexachloroethane	67-72-1	T	C	8				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
M-07	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	8				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
M-07	SVOC	Isophorone	78-59-1	T	C	8				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
M-07	SVOC	2-Methylnaphthalene	91-57-6	T	ID	8				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
M-07	SVOC	Methylphenol (total)	1319-77-3	T		8				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
M-07	SVOC	Naphthalene	91-20-3	T	C	8				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
M-07	SVOC	2-Nitroaniline	88-74-4	T		8				7.00E-04	2.00E-02						
M-07	SVOC	3-Nitroaniline	99-09-2	T	C	8				7.10E-04	2.00E-02						
M-07	SVOC	4-Nitroaniline	100-01-6	T	C	8				1.30E-03	2.00E-02						
M-07	SVOC	Nitrobenzene	98-95-3	T	D	8				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
M-07	SVOC	2-Nitrophenol	88-75-5	T		8				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
M-07	SVOC	4-Nitrophenol	100-02-7	T		8				1.90E-03	2.00E-02						
M-07	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	8				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
M-07	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	8				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
M-07	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	8				7.80E-04	5.00E-03						
M-07	SVOC	Pentachlorophenol	87-86-5	T	B2	8				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
M-07	SVOC	Phenanthrene	85-01-8	T	D	8				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
M-07	SVOC	Phenol	108-95-2	T	ID	8				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
M-07	SVOC	Pyrene	129-00-0	T	D	8				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
M-07	SVOC	2,4,5-Trichlorophenol	95-95-4	T		8				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
M-07	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	8				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
M-07	P/PCB	PCBs (total)	1336-36-3	D	B2	4				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-07	P/PCB	PCBs (total)	1336-36-3	T	B2	8				8.20E-05	8.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-07	INORG	Antimony	7440-36-0	D		8				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
M-07	INORG	Antimony	7440-36-0	T		8	1	2.70E-03	2.70E-03	2.20E-03	2.50E-02	6.0E-03	4.5E-01			6.8E+01	4.0E-05
M-07	INORG	Arsenic	7440-38-2	D	A	8	2	4.20E-03	6.10E-03	3.90E-03	1.00E-02	5.0E-02	1.2E-01			4.3E+00	1.4E-03
M-07	INORG	Arsenic	7440-38-2	T	A	8	4	4.00E-03	1.46E-02	3.90E-03	1.00E-02	5.0E-02	2.9E-01			4.3E+00	3.4E-03
M-07	INORG	Barium	7440-39-3	D	D	8	8	1.47E-01	3.15E-01			2.0E+00	1.6E-01			1.4E+04	2.3E-05
M-07	INORG	Barium	7440-39-3	T	D	8	8	1.47E-01	3.86E-01			2.0E+00	1.9E-01			1.4E+04	2.8E-05
M-07	INORG	Beryllium	7440-41-7	D	B1	8				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
M-07	INORG	Beryllium	7440-41-7	T	B1	8	1	7.20E-04	7.20E-04	5.40E-04	1.00E-03	4.0E-03	1.8E-01			2.9E+02	2.5E-06
M-07	INORG	Cadmium	7440-43-9	D	B1	8	5	4.00E-04	6.80E-04	2.80E-04	2.80E-04	5.0E-03	1.4E-01			1.9E+02	3.6E-06
M-07	INORG	Cadmium	7440-43-9	T	B1	8	7	3.50E-04	1.40E-03	2.80E-04	2.80E-04	5.0E-03	2.8E-01			1.9E+02	7.4E-06
M-07	INORG	Chromium (total)	7440-47-3	D		8	1	1.40E-03	1.40E-03	1.40E-03	1.00E-02	1.0E-01	1.4E-02			4.6E+02	3.0E-06
M-07	INORG	Chromium (total)	7440-47-3	T		8	3	8.50E-03	1.39E-01	1.40E-03	1.00E-02	1.0E-01	**1.4E+00**			4.6E+02	3.0E-04
M-07	INORG	Cobalt	7440-48-4	D	B1	8	4	3.70E-03	1.36E-02	1.30E-03	2.00E-02	4.0E-02	3.4E-01			2.4E+03	5.7E-06
M-07	INORG	Cobalt	7440-48-4	T	B1	8	5	1.40E-03	2.28E-02	1.30E-03	2.00E-02	4.0E-02	5.7E-01			2.4E+03	9.5E-06
M-07	INORG	Copper	7440-50-8	D	D	8	1	5.60E-03	5.60E-03	4.20E-03	5.00E-03	1.4E+00	4.0E-03			7.4E+03	7.6E-07
M-07	INORG	Copper	7440-50-8	T	D	8	3	1.20E-02	5.11E-02	4.20E-03	5.00E-03	1.4E+00	3.7E-02			7.4E+03	6.9E-06
M-07	INORG	Lead	7439-92-1	D	B2	8				2.50E-03	3.00E-03	4.0E-03					
M-07	INORG	Lead	7439-92-1	T	B2	8	2	1.22E-02	2.38E-02	2.50E-03	3.00E-03	4.0E-03	**6.0E+00**				
M-07	INORG	Manganese	7439-96-5	D	D	8	8	8.62E-02	1.72E+00			8.6E-01	**2.0E+00**			9.1E+03	1.9E-04
M-07	INORG	Manganese	7439-96-5	T	D	8	8	8.47E-02	1.53E+00			8.6E-01	**1.8E+00**			9.1E+03	1.7E-04
M-07	INORG	Mercury	7439-97-6	D	D	8	1	9.40E-05	9.40E-05	6.90E-05	2.00E-04	2.0E-03	4.7E-02	5.6E-02	1.7E-03	5.6E-02	1.7E-03
M-07	INORG	Mercury	7439-97-6	T	D	8	2	6.90E-05	3.40E-04	6.90E-05	2.00E-04	2.0E-03	1.7E-01	5.6E-02	6.1E-03	5.6E-02	6.1E-03
M-07	INORG	Nickel	7440-02-0	D	A	8	7	4.00E-03	7.04E-02	2.20E-03	2.20E-03	1.0E-01	7.0E-01			7.4E+04	9.5E-07
M-07	INORG	Nickel	7440-02-0	T	A	8	7	3.40E-03	9.41E-02	2.20E-03	2.20E-03	1.0E-01	9.4E-01			7.4E+04	1.3E-06
M-07	INORG	Selenium	7782-49-2	D	D	8				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
M-07	INORG	Selenium	7782-49-2	T	D	8				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
M-07	INORG	Silver	7440-22-4	D	D	8				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
M-07	INORG	Silver	7440-22-4	T	D	8				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
M-07	INORG	Thallium	7440-28-0	D		8	8	2.10E-05	1.43E-02			2.0E-03	**7.2E+00**			1.3E+01	1.1E-03
M-07	INORG	Thallium	7440-28-0	T		8	6	6.40E-05	1.56E-02	1.80E-05	5.00E-03	2.0E-03	**7.8E+00**			1.3E+01	1.2E-03
M-07	INORG	Vanadium	7440-62-2	D		8				8.20E-04	1.00E-02	4.5E-03				9.7E+02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-07	INORG	Vanadium	7440-62-2	T		8	3	1.17E-02	5.90E-02	8.20E-04	1.00E-02	4.5E-03	**1.3E+01**			9.7E+02	6.1E-05
M-07	INORG	Zinc	7440-66-6	D	D	8	5	1.57E-02	1.46E-01	1.20E-02	2.00E-02	2.4E+00	6.1E-02			1.1E+05	1.3E-06
M-07	INORG	Zinc	7440-66-6	T	D	8	4	3.46E-02	1.46E-01	1.20E-02	2.00E-02	2.4E+00	6.1E-02			1.1E+05	1.3E-06
M-09	VOC	Acetone	67-64-1	T	ID	2	1	2.00E-02	2.00E-02	1.10E-03	1.10E-03	7.3E-01	2.7E-02	1.0E+06	2.0E-08	3.1E+04	6.5E-07
M-09	VOC	Benzene	71-43-2	T	A	2				1.60E-04	3.70E-04	5.0E-03		3.5E+01		1.1E+01	
M-09	VOC	Bromodichloromethane	75-27-4	T	B2	2	1	3.90E-04	3.90E-04	3.20E-04	3.20E-04	1.0E-01	3.9E-03	3.7E+01	1.1E-05	1.4E+01	2.8E-05
M-09	VOC	Bromoform	75-25-2	T	B2	2				1.80E-04	3.70E-04	1.0E-01		3.1E+03		1.4E+02	
M-09	VOC	Bromomethane	74-83-9	T	D	2				2.00E-04	3.00E-04	1.0E-02		9.0E+00		7.0E+01	
M-09	VOC	2-Butanone	78-93-3	T	ID	2	1	1.90E-03	1.90E-03	5.90E-04	5.90E-04	1.3E+01	1.5E-04	2.4E+05	7.9E-09	2.4E+05	7.9E-09
M-09	VOC	Carbon Disulfide	75-15-0	T		2	2	2.50E-04	4.10E-04			8.0E-01	5.1E-04	5.5E+02	7.5E-07	1.2E+03	3.4E-07
M-09	VOC	Carbon Tetrachloride	56-23-5	T	B2	2				1.20E-04	3.70E-04	5.0E-03		2.4E+00		4.6E+00	
M-09	VOC	Chlorobenzene	108-90-7	T	D	2				1.40E-04	3.80E-04	1.0E-01		4.7E+02		8.6E+01	
M-09	VOC	Chloroethane	75-00-3	T		2				2.60E-04	2.90E-04	4.3E-01		5.7E+03		4.4E+02	
M-09	VOC	Chloroform	67-66-3	T	B2	2	1	2.40E-03	2.40E-03	3.50E-04	3.50E-04	1.0E-01	2.4E-02	1.8E+02	1.3E-05	1.5E+02	1.6E-05
M-09	VOC	Chloromethane	74-87-3	T	D	2				1.30E-04	4.90E-04	2.6E-01		4.5E+01		4.9E+02	
M-09	VOC	Cumene	98-82-8	T	D	2				1.20E-04	3.90E-04	8.0E-01		5.6E+01		5.6E+01	
M-09	VOC	Cyclohexane	110-82-7	T	ID	2				1.30E-04	3.30E-04						
M-09	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2				6.20E-04	8.20E-04	2.0E-04		1.2E+00		3.9E-01	
M-09	VOC	Dibromochloromethane	124-48-1	T	C	2				2.60E-04	3.70E-04	1.0E-01		1.1E+02		1.8E+01	
M-09	VOC	1,2-Dibromoethane	106-93-4	T	B2	2				2.20E-04	3.40E-04	1.0E-03		1.5E+01		2.5E-02	
M-09	VOC	1,2-Dichlorobenzene	95-50-1	T	D	2				1.10E-04	3.80E-04	6.0E-01		1.6E+02		1.6E+02	
M-09	VOC	1,3-Dichlorobenzene	541-73-1	T	D	2				1.50E-04	3.80E-04	6.6E-03				2.0E+00	
M-09	VOC	1,4-Dichlorobenzene	106-46-7	T	C	2				1.70E-04	3.80E-04	7.5E-02		7.4E+01		6.4E+00	
M-09	VOC	Dichlorodifluoromethane	75-71-8	T		2				2.60E-04	4.90E-04	1.7E+00		3.0E+02		3.0E+02	
M-09	VOC	1,1-Dichloroethane	75-34-3	T	C	2				1.60E-04	3.00E-04	8.8E-01		2.3E+03		2.4E+03	
M-09	VOC	1,2-Dichloroethane	107-06-2	T	B2	2				2.10E-04	2.80E-04	5.0E-03		5.9E+01		1.9E+01	
M-09	VOC	1,1-Dichloroethene	75-35-4	T	C	2				2.40E-04	3.10E-04	7.0E-03		1.3E+00		1.1E+01	
M-09	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	2				2.20E-04	3.50E-04	7.0E-02		2.1E+02		2.0E+02	
M-09	VOC	trans-1,2-Dichloroethene	156-60-5	T		2				1.50E-04	3.30E-04	1.0E-01		2.0E+02		2.2E+02	
M-09	VOC	1,2-Dichloropropane	78-87-5	T	B2	2				1.70E-04	4.10E-04	5.0E-03		3.6E+01		1.6E+01	
M-09	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	1				3.50E-04	3.50E-04	8.5E-03		2.6E+01		5.5E+00	
M-09	VOC	Ethyl Benzene	100-41-4	T	D	2				1.20E-04	4.10E-04	7.0E-01		1.7E+02		1.7E+02	
M-09	VOC	2-Hexanone	591-78-6	T		2				4.60E-04	5.80E-04	1.0E+00		8.7E+03		5.2E+03	
M-09	VOC	Methyl Acetate	79-20-9	T		2				4.10E-04	5.40E-04						
M-09	VOC	Methyl tert-butyl ether	1634-04-4	T		2	1	8.10E-04	8.10E-04	2.70E-04	2.70E-04	2.4E-01	3.4E-03	4.7E+04	1.7E-08	6.1E+02	1.3E-06
M-09	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	1				2.60E-04	2.60E-04	1.8E+00		2.0E+04		1.3E+04	
M-09	VOC	Methylcyclohexane	108-87-2	T		2				1.50E-04	4.20E-04						
M-09	VOC	Methylene Chloride	75-09-2	T	B2	1				3.40E-04	3.40E-04	5.0E-03		1.4E+03		2.2E+02	
M-09	VOC	Styrene	100-42-5	T		2				1.50E-04	3.50E-04	1.0E-01		3.1E+02		9.7E+00	
M-09	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2				2.50E-04	3.60E-04	8.5E-03		7.7E+01		4.7E+00	
M-09	VOC	Tetrachloroethene	127-18-4	T	C-B2	1				4.20E-04	4.20E-04	5.0E-03		1.7E+02		1.2E+01	
M-09	VOC	Toluene	108-88-3	T	D	2				1.80E-04	3.90E-04	1.0E+00		5.3E+02		5.3E+02	
M-09	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2				1.70E-04	4.00E-04	7.0E-02		3.0E+02		1.9E+01	
M-09	VOC	1,1,1-Trichloroethane	71-55-6	T	D	2				1.50E-04	3.90E-04	2.0E-01		1.3E+03		1.3E+03	
M-09	VOC	1,1,2-Trichloroethane	79-00-5	T	C	2				3.00E-04	3.60E-04	5.0E-03		1.1E+02		2.1E+01	
M-09	VOC	Trichloroethene	79-01-6	T	C-B2	2				1.40E-04	4.20E-04	5.0E-03		9.7E+01		2.2E+01	
M-09	VOC	Trichlorofluoromethane	75-69-4	T		2				2.80E-04	5.40E-04	2.6E+00		1.1E+03		1.1E+03	
M-09	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2				3.20E-04	3.20E-04	1.7E+02		1.7E+02		1.7E+02	
M-09	VOC	Vinyl Chloride	75-01-4	T	A	2				1.50E-04	3.60E-04	2.0E-03		1.3E+01		1.0E+00	
M-09	VOC	Xylenes (total)	1330-20-7	T	ID	2				3.30E-04	4.40E-04	1.0E+01		1.9E+02		1.9E+02	
M-09	SVOC	Acenaphthene	83-32-9	T		2				8.00E-04	8.00E-04	1.3E+00		4.2E+00		4.2E+00	
M-09	SVOC	Acenaphthylene	208-96-8	T	D	2				7.10E-04	7.10E-04	5.2E-02		3.9E+00		3.9E+00	
M-09	SVOC	Acetophenone	98-86-2	T	D	2				2.60E-03	2.60E-03	1.5E+00		6.1E+03		6.1E+03	
M-09	SVOC	Anthracene	120-12-7	T	D	2				6.80E-04	6.80E-04	4.3E-02		4.3E-02		4.3E-02	
M-09	SVOC	Atrazine	1912-24-9	T		2				2.50E-03	2.50E-03	3.0E-03				5.4E+00	
M-09	SVOC	Benzaldehyde	100-52-7	T		2				2.80E-03	2.80E-03						
M-09	SVOC	Benzo(a)anthracene	56-55-3	T	B2	2				7.00E-04	7.00E-04	2.1E-03				9.4E-03	
M-09	SVOC	Benzo(a)pyrene	50-32-8	T	B2	2				7.30E-04	7.30E-04	5.0E-03				2.0E-03	
M-09	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2				9.40E-04	9.40E-04	2.0E-03				2.0E-03	
M-09	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2				8.50E-04	8.50E-04	5.0E-03				5.0E-03	
M-09	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2				8.40E-04	8.40E-04	5.0E-03				5.0E-03	
M-09	SVOC	Biphenyl	92-52-4	T	D	2				2.60E-03	2.60E-03						
M-09	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2				8.70E-04	8.70E-04						
M-09	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2				9.70E-04	9.70E-04	2.0E-03		2.1E+02		5.7E+00	
M-09	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2				2.70E-03	2.70E-03	6.0E-03				3.2E-01	
M-09	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2				8.80E-04	8.80E-04						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-09	SVOC	Butylbenzylphthalate	85-68-7	T	C	2				8.80E-04	8.80E-04	1.2E+00				2.7E+00	
M-09	SVOC	Caprolactam	105-60-2	T		2				2.50E-03	2.50E-03	5.8E+00				3.9E+05	
M-09	SVOC	Carbazole	86-74-8	T	B2	2				8.20E-04	8.20E-04	8.5E-02				7.4E+00	
M-09	SVOC	4-Chloro-3-methylphenol	59-50-7	T		2				9.90E-04	9.90E-04	1.5E-01				7.9E+01	
M-09	SVOC	4-Chloroaniline	106-47-8	T		2				6.10E-04	6.10E-04						
M-09	SVOC	2-Chloronaphthalene	91-58-7	T		2				8.50E-04	8.50E-04	1.8E+00				6.7E+00	
M-09	SVOC	2-Chlorophenol	95-57-8	T		2				1.00E-03	1.00E-03	4.5E-02				9.4E+01	
M-09	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2				7.90E-04	7.90E-04						
M-09	SVOC	Chrysene	218-01-9	T	B2	2				7.50E-04	7.50E-04	5.0E-03				5.0E-03	
M-09	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2				7.90E-04	7.90E-04	2.0E-03				2.0E-03	
M-09	SVOC	Dibenzofuran	132-64-9	T	D	2				1.10E-03	1.10E-03						
M-09	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	2				9.30E-04	9.30E-04	1.1E-03				1.8E-01	
M-09	SVOC	2,4-Dichlorophenol	120-83-2	T		2				8.50E-04	8.50E-04	7.3E-02				4.8E+01	
M-09	SVOC	Diethylphthalate	84-66-2	T	D	2				6.50E-04	6.50E-04	5.5E+00				1.1E+03	
M-09	SVOC	2,4-Dimethylphenol	105-67-9	T		2				8.50E-04	8.50E-04	3.7E-01				5.2E+02	
M-09	SVOC	Dimethylphthalate	131-11-3	T	D	2				7.60E-04	7.60E-04	7.3E+01				4.2E+03	
M-09	SVOC	Di-n-butylphthalate	84-74-2	T	D	2				6.70E-04	6.70E-04	8.8E-01				1.1E+01	
M-09	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2				1.30E-03	1.30E-03	2.0E-02				9.5E+00	
M-09	SVOC	2,4-Dinitrophenol	51-28-5	T		2				3.00E-03	3.00E-03						
M-09	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2				7.90E-04	7.90E-04	7.7E-03				8.6E+00	
M-09	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2				5.70E-04	5.70E-04						
M-09	SVOC	Di-n-octylphthalate	117-84-0	T		2				1.10E-03	1.10E-03	1.3E-01				4.0E-01	
M-09	SVOC	Fluoranthene	206-44-0	T	D	2				8.10E-04	8.10E-04	2.1E-01		2.1E-01		2.1E-01	
M-09	SVOC	Fluorene	86-73-7	T	D	2				1.00E-03	1.00E-03	8.8E-01		2.0E+00		2.0E+00	
M-09	SVOC	Hexachlorobenzene	118-74-1	T	B2	2				7.40E-04	7.40E-04	1.0E-03		3.0E+00		4.6E-03	
M-09	SVOC	Hexachlorobutadiene	87-68-3	T	C	2				7.30E-04	7.30E-04	1.5E-02		3.2E+00		4.0E-01	
M-09	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	1				1.10E-03	1.10E-03	5.0E-02		4.2E-01		1.6E+00	
M-09	SVOC	Hexachloroethane	67-72-1	T	C	2				7.40E-04	7.40E-04	7.3E-03		5.0E+01		1.9E+00	
M-09	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2				6.30E-04	6.30E-04	2.0E-03				2.0E-03	
M-09	SVOC	Isophorone	78-59-1	T	C	2				6.30E-04	6.30E-04	7.7E-01				9.9E+02	
M-09	SVOC	2-Methylnaphthalene	91-57-6	T	ID	2				6.40E-04	6.40E-04	2.6E-01				2.5E+01	
M-09	SVOC	Methylphenol (total)	1319-77-3	T		2				1.30E-03	1.30E-03	3.7E-01				8.1E+02	
M-09	SVOC	Naphthalene	91-20-3	T	C	2				7.50E-04	7.50E-04	5.2E-01		3.1E+01		3.1E+01	
M-09	SVOC	2-Nitroaniline	88-74-4	T		2				7.00E-04	7.00E-04						
M-09	SVOC	3-Nitroaniline	99-09-2	T	C	2				7.10E-04	7.10E-04						
M-09	SVOC	4-Nitroaniline	100-01-6	T	C	2				1.30E-03	1.30E-03						
M-09	SVOC	Nitrobenzene	98-95-3	T	D	2				8.10E-04	8.10E-04	3.4E-03		5.5E+02		1.1E+01	
M-09	SVOC	2-Nitrophenol	88-75-5	T		2				2.10E-03	2.10E-03	2.0E-02				7.9E+01	
M-09	SVOC	4-Nitrophenol	100-02-7	T		2				1.90E-03	1.90E-03						
M-09	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2				1.40E-03	1.40E-03	2.7E-01				3.5E+01	
M-09	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2				6.70E-04	6.70E-04	5.0E-03				3.6E-01	
M-09	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2				7.80E-04	7.80E-04						
M-09	SVOC	Pentachlorophenol	87-86-5	T	B2	2				2.40E-03	2.40E-03	1.0E-03				2.0E-01	
M-09	SVOC	Phenanthrene	85-01-8	T	D	2				8.20E-04	8.20E-04	5.2E-02		1.0E+00		1.0E+00	
M-09	SVOC	Phenol	108-95-2	T	ID	2				2.60E-03	2.60E-03	4.4E+00				2.9E+04	
M-09	SVOC	Pyrene	129-00-0	T	D	2				1.10E-03	1.10E-03	1.4E-01		1.4E-01		1.4E-01	
M-09	SVOC	2,4,5-Trichlorophenol	95-95-4	T		2				1.20E-03	1.20E-03	7.3E-01				1.7E+02	
M-09	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2				1.70E-03	1.70E-03	1.2E-01				1.0E+01	
M-09	P/PCB	PCBs (total)	1336-36-3	T	B2	2				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
M-09	INORG	Antimony	7440-36-0	D		1				2.20E-03	2.20E-03	6.0E-03				6.8E+01	
M-09	INORG	Antimony	7440-36-0	T		2	1	3.30E-03	3.30E-03	3.40E-03	3.40E-03	6.0E-03	5.5E-01			6.8E+01	4.9E-05
M-09	INORG	Arsenic	7440-38-2	D	A	1	1	5.70E-03	5.70E-03			5.0E-02	1.1E-01			4.3E+00	1.3E-03
M-09	INORG	Arsenic	7440-38-2	T	A	2	1	4.20E-03	4.20E-03	2.10E-03	2.10E-03	5.0E-02	8.4E-02			4.3E+00	9.8E-04
M-09	INORG	Barium	7440-39-3	D	D	1	1	5.48E-01	5.48E-01			2.0E+00	2.7E-01			1.4E+04	3.9E-05
M-09	INORG	Barium	7440-39-3	T	D	2	2	5.04E-01	5.69E-01			2.0E+00	2.8E-01			1.4E+04	4.1E-05
M-09	INORG	Beryllium	7440-41-7	D	B1	1				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
M-09	INORG	Beryllium	7440-41-7	T	B1	2				5.40E-04	6.00E-04	4.0E-03				2.9E+02	
M-09	INORG	Cadmium	7440-43-9	D	B1	1				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
M-09	INORG	Cadmium	7440-43-9	T	B1	2	1	2.90E-04	2.90E-04	2.80E-04	2.80E-04	5.0E-03	5.8E-02			1.9E+02	1.5E-06
M-09	INORG	Chromium (total)	7440-47-3	D		1	1	2.80E-03	2.80E-03			1.0E-01	2.8E-02			4.6E+02	6.1E-06
M-09	INORG	Chromium (total)	7440-47-3	T		2	1	3.00E-03	3.00E-03	1.50E-03	1.50E-03	1.0E-01	3.0E-02			4.6E+02	6.5E-06
M-09	INORG	Cobalt	7440-48-4	D	B1	1	1	2.20E-03	2.20E-03			4.0E-02	5.5E-02			2.4E+03	9.2E-07
M-09	INORG	Cobalt	7440-48-4	T	B1	2	2	2.20E-03	2.40E-03			4.0E-02	6.0E-02			2.4E+03	1.0E-06
M-09	INORG	Copper	7440-50-8	D	D	1				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
M-09	INORG	Copper	7440-50-8	T	D	2				1.70E-03	4.20E-03	1.4E+00				7.4E+03	
M-09	INORG	Lead	7439-92-1	D	B2	1				2.50E-03	2.50E-03	4.0E-03					

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-09	INORG	Lead	7439-92-1	T	B2	2				1.60E-03	2.50E-03	4.0E-03					
M-09	INORG	Manganese	7439-96-5	D	D	1				9.00E-04	9.00E-04	8.6E-01				9.1E+03	
M-09	INORG	Manganese	7439-96-5	T	D	2	1	4.30E-03	4.30E-03	9.00E-04	9.00E-04	8.6E-01	5.0E-03			9.1E+03	4.7E-07
M-09	INORG	Mercury	7439-97-6	D	D	1				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
M-09	INORG	Mercury	7439-97-6	T	D	2				6.90E-05	8.70E-05	2.0E-03		5.6E-02		5.6E-02	
M-09	INORG	Nickel	7440-02-0	D	A	1	1	4.10E-03	4.10E-03			1.0E-01	4.1E-02			7.4E+04	5.5E-08
M-09	INORG	Nickel	7440-02-0	T	A	2	2	3.50E-03	7.30E-03			1.0E-01	7.3E-02			7.4E+04	9.9E-08
M-09	INORG	Selenium	7782-49-2	D	D	1				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
M-09	INORG	Selenium	7782-49-2	T	D	2				4.50E-03	4.70E-03	5.0E-02				9.7E+02	
M-09	INORG	Silver	7440-22-4	D	D	1				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
M-09	INORG	Silver	7440-22-4	T	D	2				9.80E-04	1.50E-03	3.4E-02				1.5E+03	
M-09	INORG	Thallium	7440-28-0	D		1	1	5.10E-05	5.10E-05			2.0E-03	2.6E-02			1.3E+01	3.9E-06
M-09	INORG	Thallium	7440-28-0	T		2	1	7.20E-05	7.20E-05	3.30E-05	3.30E-05	2.0E-03	3.6E-02			1.3E+01	5.5E-06
M-09	INORG	Vanadium	7440-62-2	D		1	1	3.70E-03	3.70E-03			4.5E-03	8.2E-01			9.7E+02	3.8E-06
M-09	INORG	Vanadium	7440-62-2	T		2	2	1.00E-03	4.10E-03			4.5E-03	9.1E-01			9.7E+02	4.2E-06
M-09	INORG	Zinc	7440-66-6	D	D	1	1	1.39E-02	1.39E-02			2.4E+00	5.8E-03			1.1E+05	1.3E-07
M-09	INORG	Zinc	7440-66-6	T	D	2	1	8.23E-02	8.23E-02	1.20E-02	1.20E-02	2.4E+00	3.4E-02			1.1E+05	7.5E-07
M-16	VOC	Acetone	67-64-1	T	ID	4	1	6.95E-03	6.95E-03	5.10E-04	1.00E-02	7.3E-01	9.5E-03	1.0E+06	7.0E-09	3.1E+04	2.2E-07
M-16	VOC	Benzene	71-43-2	T	A	4				1.60E-04	1.00E-03	5.0E-03		3.5E+01		1.1E+01	
M-16	VOC	Bromodichloromethane	75-27-4	T	B2	4	1	2.15E-04	2.15E-04	1.70E-04	1.00E-03	1.0E-01	2.2E-03	3.7E+01	5.8E-06	1.4E+01	1.5E-05
M-16	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
M-16	VOC	Bromomethane	74-83-9	T	D	3				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
M-16	VOC	2-Butanone	78-93-3	T	ID	4				4.10E-04	1.00E-02	1.3E+01		2.4E+05		2.4E+05	
M-16	VOC	Carbon Disulfide	75-15-0	T		4				2.00E-04	1.00E-03	8.0E-01		5.5E+02		1.2E+03	
M-16	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
M-16	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
M-16	VOC	Chloroethane	75-00-3	T		4				2.60E-04	1.00E-03	4.3E-01		5.7E+03		4.4E+02	
M-16	VOC	Chloroform	67-66-3	T	B2	4	2	2.00E-04	6.55E-04	1.40E-04	3.50E-04	1.0E-01	6.6E-03	1.8E+02	3.6E-06	1.5E+02	4.4E-06
M-16	VOC	Chloromethane	74-87-3	T	D	4				1.30E-04	1.00E-03	2.6E-01		4.5E+01		4.9E+02	
M-16	VOC	Cumene	98-82-8	T	D	4				1.20E-04	1.00E-03	8.0E-01		5.6E+01		5.6E+01	
M-16	VOC	Cyclohexane	110-82-7	T	ID	4				1.30E-04	1.00E-03						
M-16	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
M-16	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
M-16	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
M-16	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	1.00E-03	6.0E-01		1.6E+02		1.6E+02	
M-16	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
M-16	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
M-16	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
M-16	VOC	1,1-Dichloroethane	75-34-3	T	C	4				1.60E-04	1.00E-03	8.8E-01		2.3E+03		2.4E+03	
M-16	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
M-16	VOC	1,1-Dichloroethene	75-35-4	T	C	4				2.40E-04	1.00E-03	7.0E-03		1.3E+00		1.1E+01	
M-16	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.20E-04	5.00E-04	7.0E-02		2.1E+02		2.0E+02	
M-16	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
M-16	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
M-16	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
M-16	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
M-16	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
M-16	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	1.00E-02						
M-16	VOC	Methyl tert-butyl ether	1634-04-4	T		4	1	7.15E-03	7.15E-03	1.30E-04	5.00E-03	2.4E-01	3.0E-02	4.7E+04	1.5E-07	6.1E+02	1.2E-05
M-16	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	3				2.30E-04	1.00E-02	1.8E+00		2.0E+04		1.3E+04	
M-16	VOC	Methylcyclohexane	108-87-2	T		4				1.50E-04	1.00E-03						
M-16	VOC	Methylene Chloride	75-09-2	T	B2	4				2.90E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
M-16	VOC	Styrene	100-42-5	T		4				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
M-16	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
M-16	VOC	Tetrachloroethene	127-18-4	T	C-B2	4				2.30E-04	1.00E-03	5.0E-03		1.7E+02		1.2E+01	
M-16	VOC	Toluene	108-88-3	T	D	4	1	1.90E-04	1.90E-04	1.80E-04	1.00E-03	1.0E+00	1.9E-04	5.3E+02	3.6E-07	5.3E+02	3.6E-07
M-16	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
M-16	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4	2	2.90E-03	3.00E-03	1.50E-04	1.00E-03	2.0E-01	1.5E-02	1.3E+03	2.3E-06	1.3E+03	2.3E-06
M-16	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
M-16	VOC	Trichloroethene	79-01-6	T	C-B2	4				1.40E-04	1.00E-03	5.0E-03		9.7E+01		2.2E+01	
M-16	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	1.00E-03	2.6E+00		1.1E+03		1.1E+03	
M-16	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
M-16	VOC	Vinyl Chloride	75-01-4	T	A	5	3	1.40E-02	2.30E-02	1.50E-04	3.60E-04	2.0E-03	**1.2E+01**	1.3E+01	1.8E-03	1.0E+00	2.3E-02
M-16	VOC	Xylenes (total)	1330-20-7	T	ID	4				3.30E-04	1.00E-03	1.0E+01		1.9E+02		1.9E+02	
M-16	SVOC	Acenaphthene	83-32-9	T		4				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
M-16	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-16	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
M-16	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
M-16	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
M-16	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	1.00E-02						
M-16	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
M-16	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
M-16	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
M-16	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
M-16	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
M-16	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	1.00E-02						
M-16	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	5.00E-03						
M-16	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
M-16	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4	3	2.03E-03	5.50E-03	2.70E-03	2.70E-03	6.0E-03	9.2E-01			3.2E-01	1.7E-02
M-16	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	5.00E-03						
M-16	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
M-16	SVOC	Caprolactam	105-60-2	T		4				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
M-16	SVOC	Carbazole	86-74-8	T	B2	4				8.20E-04	1.00E-02	8.5E-02				7.4E+00	
M-16	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
M-16	SVOC	4-Chloroaniline	106-47-8	T		4				6.10E-04	1.00E-02						
M-16	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
M-16	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
M-16	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	5.00E-03						
M-16	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
M-16	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
M-16	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	5.00E-03						
M-16	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
M-16	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
M-16	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
M-16	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
M-16	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
M-16	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
M-16	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
M-16	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	2.00E-02						
M-16	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
M-16	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.00E-03						
M-16	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
M-16	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
M-16	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
M-16	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
M-16	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
M-16	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
M-16	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
M-16	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
M-16	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
M-16	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
M-16	SVOC	Methylphenol (total)	1319-77-3	T		4				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
M-16	SVOC	Naphthalene	91-20-3	T	C	4				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
M-16	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	2.00E-02						
M-16	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	2.00E-02						
M-16	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	2.00E-02						
M-16	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
M-16	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
M-16	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	2.00E-02						
M-16	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
M-16	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
M-16	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	5.00E-03						
M-16	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
M-16	SVOC	Phenanthrene	85-01-8	T	D	4				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
M-16	SVOC	Phenol	108-95-2	T	ID	4				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
M-16	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
M-16	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
M-16	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
M-16	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-16	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
M-16	INORG	Antimony	7440-36-0	D		3				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
M-16	INORG	Antimony	7440-36-0	T		4				2.20E-03	2.50E-02	6.0E-03				6.8E+01	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-16	INORG	Arsenic	7440-38-2	D	A	3	1	8.30E-03	8.30E-03	3.90E-03	1.00E-02	5.0E-02	1.7E-01			4.3E+00	1.9E-03
M-16	INORG	Arsenic	7440-38-2	T	A	4	1	8.80E-03	8.80E-03	2.10E-03	1.00E-02	5.0E-02	1.8E-01			4.3E+00	2.0E-03
M-16	INORG	Barium	7440-39-3	D	D	3	3	4.58E-02	2.12E-01			2.0E+00	1.1E-01			1.4E+04	1.5E-05
M-16	INORG	Barium	7440-39-3	T	D	4	4	3.60E-02	2.15E-01			2.0E+00	1.1E-01			1.4E+04	1.5E-05
M-16	INORG	Beryllium	7440-41-7	D	B1	3				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
M-16	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
M-16	INORG	Cadmium	7440-43-9	D	B1	3				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
M-16	INORG	Cadmium	7440-43-9	T	B1	4				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
M-16	INORG	Chromium (total)	7440-47-3	D		3				1.40E-03	1.00E-02	1.0E-01				4.6E+02	
M-16	INORG	Chromium (total)	7440-47-3	T		4	2	1.40E-03	1.60E-03	1.40E-03	1.00E-02	1.0E-01	1.6E-02			4.6E+02	3.5E-06
M-16	INORG	Cobalt	7440-48-4	D	B1	3	1	2.60E-03	2.60E-03	1.30E-03	2.00E-02	4.0E-02	6.5E-02			2.4E+03	1.1E-06
M-16	INORG	Cobalt	7440-48-4	T	B1	4	2	9.75E-04	2.65E-03	7.40E-04	2.00E-02	4.0E-02	6.6E-02			2.4E+03	1.1E-06
M-16	INORG	Copper	7440-50-8	D	D	3				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
M-16	INORG	Copper	7440-50-8	T	D	4				1.70E-03	5.00E-03	1.4E+00				7.4E+03	
M-16	INORG	Lead	7439-92-1	D	B2	3				2.50E-03	3.00E-03	4.0E-03					
M-16	INORG	Lead	7439-92-1	T	B2	4				1.60E-03	3.00E-03	4.0E-03					
M-16	INORG	Manganese	7439-96-5	D	D	3	3	9.66E-02	1.05E+00			8.6E-01	**1.2E+00**			9.1E+03	1.2E-04
M-16	INORG	Manganese	7439-96-5	T	D	4	3	9.65E-02	1.09E+00	6.80E-04	6.80E-04	8.6E-01	**1.3E+00**			9.1E+03	1.2E-04
M-16	INORG	Mercury	7439-97-6	D	D	3				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
M-16	INORG	Mercury	7439-97-6	T	D	4				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
M-16	INORG	Nickel	7440-02-0	D	A	3	1	3.10E-03	3.10E-03	2.20E-03	2.00E-02	1.0E-01	3.1E-02			7.4E+04	4.2E-08
M-16	INORG	Nickel	7440-02-0	T	A	4	1	4.70E-03	4.70E-03	2.20E-03	2.00E-02	1.0E-01	4.7E-02			7.4E+04	6.4E-08
M-16	INORG	Selenium	7782-49-2	D	D	3				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
M-16	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
M-16	INORG	Silver	7440-22-4	D	D	3				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
M-16	INORG	Silver	7440-22-4	T	D	4				9.80E-04	5.00E-03	3.4E-02				1.5E+03	
M-16	INORG	Thallium	7440-28-0	D		3				1.80E-05	1.00E-02	2.0E-03				1.3E+01	
M-16	INORG	Thallium	7440-28-0	T		4				1.80E-05	1.00E-02	2.0E-03				1.3E+01	
M-16	INORG	Vanadium	7440-62-2	D		3				8.20E-04	1.00E-02	4.5E-03				9.7E+02	
M-16	INORG	Vanadium	7440-62-2	T		4				6.70E-04	1.00E-02	4.5E-03				9.7E+02	
M-16	INORG	Zinc	7440-66-6	D	D	3	2	1.04E-02	1.56E-02	2.00E-02	2.00E-02	2.4E+00	6.5E-03			1.1E+05	1.4E-07
M-16	INORG	Zinc	7440-66-6	T	D	4	1	1.35E-02	1.35E-02	1.20E-02	2.00E-02	2.4E+00	5.6E-03			1.1E+05	1.2E-07
M-25	VOC	Acetone	67-64-1	T	ID	1				6.60E-04	6.60E-04	7.3E-01		1.0E+06		3.1E+04	
M-25	VOC	Benzene	71-43-2	T	A	1				2.00E-04	2.00E-04	5.0E-03		3.5E+01		1.1E+01	
M-25	VOC	Bromodichloromethane	75-27-4	T	B2	1				2.00E-04	2.00E-04	1.0E-01		3.7E+01		1.4E+01	
M-25	VOC	Bromoform	75-25-2	T	B2	1				3.20E-04	3.20E-04	1.0E-01		3.1E+03		1.4E+02	
M-25	VOC	Bromomethane	74-83-9	T	D	1				1.60E-04	1.60E-04	1.0E-02		9.0E+00		7.0E+01	
M-25	VOC	2-Butanone	78-93-3	T	ID	1				3.60E-04	3.60E-04	1.3E+01		2.4E+05		2.4E+05	
M-25	VOC	Carbon Disulfide	75-15-0	T		1	1	2.03E-04	2.03E-04			8.0E-01	2.5E-04	5.5E+02	3.7E-07	1.2E+03	1.7E-07
M-25	VOC	Carbon Tetrachloride	56-23-5	T	B2	1				1.80E-04	1.80E-04	5.0E-03		2.4E+00		4.6E+00	
M-25	VOC	Chlorobenzene	108-90-7	T	D	1				1.60E-04	1.60E-04	1.0E-01		4.7E+02		8.6E+01	
M-25	VOC	Chloroethane	75-00-3	T		1				2.20E-04	2.20E-04	4.3E-01		5.7E+03		4.4E+02	
M-25	VOC	Chloroform	67-66-3	T	B2	1				2.10E-04	2.10E-04	1.0E-01		1.8E+02		1.5E+02	
M-25	VOC	Chloromethane	74-87-3	T	D	1				2.60E-04	2.60E-04	2.6E-01		4.5E+01		4.9E+02	
M-25	VOC	Cumene	98-82-8	T	D	1				1.50E-04	1.50E-04	8.0E-01		5.6E+01		5.6E+01	
M-25	VOC	Cyclohexane	110-82-7	T	ID	1				3.40E-04	3.40E-04						
M-25	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	1				5.30E-04	5.30E-04	2.0E-04		1.2E+00		3.9E-01	
M-25	VOC	Dibromochloromethane	124-48-1	T	C	1				2.50E-04	2.50E-04	1.0E-01		1.1E+02		1.8E+01	
M-25	VOC	1,2-Dibromoethane	106-93-4	T	B2	1				2.20E-04	2.20E-04	1.0E-03		1.5E+01		2.5E-02	
M-25	VOC	1,2-Dichlorobenzene	95-50-1	T	D	1				1.50E-04	1.50E-04	6.0E-01		1.6E+02		1.6E+02	
M-25	VOC	1,3-Dichlorobenzene	541-73-1	T	D	1				2.00E-04	2.00E-04	6.6E-03				2.0E+00	
M-25	VOC	1,4-Dichlorobenzene	106-46-7	T	C	1				1.60E-04	1.60E-04	7.5E-02		7.4E+01		6.4E+00	
M-25	VOC	Dichlorodifluoromethane	75-71-8	T		1				2.30E-04	2.30E-04	1.7E+00		3.0E+02		3.0E+02	
M-25	VOC	1,1-Dichloroethane	75-34-3	T	C	1				2.60E-04	2.60E-04	8.8E-01		2.3E+03		2.4E+03	
M-25	VOC	1,2-Dichloroethane	107-06-2	T	B2	1				2.20E-04	2.20E-04	5.0E-03		5.9E+01		1.9E+01	
M-25	VOC	1,1-Dichloroethene	75-35-4	T	C	1				2.20E-04	2.20E-04	7.0E-03		1.3E+00		1.1E+01	
M-25	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	1				2.50E-04	2.50E-04	7.0E-02		2.1E+02		2.0E+02	
M-25	VOC	trans-1,2-Dichloroethene	156-60-5	T		1				2.40E-04	2.40E-04	1.0E-01		2.0E+02		2.2E+02	
M-25	VOC	1,2-Dichloropropane	78-87-5	T	B2	1				1.80E-04	1.80E-04	5.0E-03		3.6E+01		1.6E+01	
M-25	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	1				1.70E-04	1.70E-04	8.5E-03		2.6E+01		5.5E+00	
M-25	VOC	Methyl Acetate	79-20-9	T		1				6.80E-04	6.80E-04						
M-25	VOC	Methyl tert-butyl ether	1634-04-4	T		1				2.10E-04	2.10E-04	2.4E-01		4.7E+04		6.1E+02	
M-25	VOC	Methylcyclohexane	108-87-2	T		1				2.40E-04	2.40E-04						
M-25	VOC	Methylene Chloride	75-09-2	T	B2	1				2.80E-04	2.80E-04	5.0E-03		1.4E+03		2.2E+02	
M-25	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	1				2.30E-04	2.30E-04	8.5E-03		7.7E+01		4.7E+00	
M-25	VOC	Tetrachloroethene	127-18-4	T	C-B2	1				1.20E-04	1.20E-04	5.0E-03		1.7E+02		1.2E+01	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-25	VOC	Toluene	108-88-3	T	D	1				1.70E-04	1.70E-04	1.0E+00		5.3E+02		5.3E+02	
M-25	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	1				1.50E-04	1.50E-04	7.0E-02		3.0E+02		1.9E+01	
M-25	VOC	1,1,1-Trichloroethane	71-55-6	T	D	1				1.80E-04	1.80E-04	2.0E-01		1.3E+03		1.3E+03	
M-25	VOC	1,1,2-Trichloroethane	79-00-5	T	C	1				2.10E-04	2.10E-04	5.0E-03		1.1E+02		2.1E+01	
M-25	VOC	Trichloroethene	79-01-6	T	C-B2	1				2.20E-04	2.20E-04	5.0E-03		9.7E+01		2.2E+01	
M-25	VOC	Trichlorofluoromethane	75-69-4	T		1				2.50E-04	2.50E-04	2.6E+00		1.1E+03		1.1E+03	
M-25	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		1				2.30E-04	2.30E-04	1.7E+02		1.7E+02		1.7E+02	
M-25	SVOC	Acenaphthene	83-32-9	T		1				6.90E-04	6.90E-04	1.3E+00		4.2E+00		4.2E+00	
M-25	SVOC	Acenaphthylene	208-96-8	T	D	1				4.10E-04	4.10E-04	5.2E-02		3.9E+00		3.9E+00	
M-25	SVOC	Acetophenone	98-86-2	T	D	1				6.50E-04	6.50E-04	1.5E+00		6.1E+03		6.1E+03	
M-25	SVOC	Anthracene	120-12-7	T	D	1				5.90E-04	5.90E-04	4.3E-02		4.3E-02		4.3E-02	
M-25	SVOC	Atrazine	1912-24-9	T		1				3.50E-04	3.50E-04	3.0E-03				5.4E+00	
M-25	SVOC	Benzaldehyde	100-52-7	T		1				5.90E-04	5.90E-04						
M-25	SVOC	Benzo(a)anthracene	56-55-3	T	B2	1				6.80E-04	6.80E-04	2.1E-03				9.4E-03	
M-25	SVOC	Benzo(a)pyrene	50-32-8	T	B2	1				5.30E-04	5.30E-04	5.0E-03				2.0E-03	
M-25	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	1				7.10E-04	7.10E-04	2.0E-03				2.0E-03	
M-25	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	1				7.00E-04	7.00E-04	5.0E-03				5.0E-03	
M-25	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	1				6.40E-04	6.40E-04	5.0E-03				5.0E-03	
M-25	SVOC	Biphenyl	92-52-4	T	D	1				6.50E-04	6.50E-04						
M-25	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	1				1.00E-03	1.00E-03						
M-25	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	1				1.70E-03	1.70E-03	2.0E-03		2.1E+02		5.7E+00	
M-25	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	1				2.00E-04	2.00E-04	6.0E-03				3.2E-01	
M-25	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	1				7.80E-04	7.80E-04						
M-25	SVOC	Butylbenzylphthalate	85-68-7	T	C	1				2.30E-04	2.30E-04	1.2E+00				2.7E+00	
M-25	SVOC	Caprolactam	105-60-2	T		1	1	8.13E-04	8.13E-04			5.8E+00	1.4E-04			3.9E+05	2.1E-09
M-25	SVOC	Carbazole	86-74-8	T	B2	1				6.10E-04	6.10E-04	8.5E-02				7.4E+00	
M-25	SVOC	4-Chloro-3-methylphenol	59-50-7	T		1				5.50E-04	5.50E-04	1.5E-01				7.9E+01	
M-25	SVOC	4-Chloroaniline	106-47-8	T		1				9.00E-04	9.00E-04						
M-25	SVOC	2-Chloronaphthalene	91-58-7	T		1				7.30E-04	7.30E-04	1.8E+00				6.7E+00	
M-25	SVOC	2-Chlorophenol	95-57-8	T		1				1.30E-03	1.30E-03	4.5E-02				9.4E+01	
M-25	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		1				6.60E-04	6.60E-04						
M-25	SVOC	Chrysene	218-01-9	T	B2	1				6.70E-04	6.70E-04	5.0E-03				5.0E-03	
M-25	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	1				6.80E-04	6.80E-04	2.0E-03				2.0E-03	
M-25	SVOC	Dibenzofuran	132-64-9	T	D	1				6.60E-04	6.60E-04						
M-25	SVOC	2,4-Dichlorophenol	120-83-2	T		1				7.00E-04	7.00E-04	7.3E-02				4.8E+01	
M-25	SVOC	Diethylphthalate	84-66-2	T	D	1				2.50E-04	2.50E-04	5.5E+00				1.1E+03	
M-25	SVOC	2,4-Dimethylphenol	105-67-9	T		1				1.00E-03	1.00E-03	3.7E-01				5.2E+02	
M-25	SVOC	Dimethylphthalate	131-11-3	T	D	1				2.00E-04	2.00E-04	7.3E+01				4.2E+03	
M-25	SVOC	Di-n-butylphthalate	84-74-2	T	D	1				3.70E-04	3.70E-04	8.8E-01				1.1E+01	
M-25	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		1				2.10E-03	2.10E-03	2.0E-02				9.5E+00	
M-25	SVOC	2,4-Dinitrophenol	51-28-5	T		1				3.30E-03	3.30E-03						
M-25	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	1				4.60E-04	4.60E-04	7.7E-03				8.6E+00	
M-25	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	1				7.10E-04	7.10E-04						
M-25	SVOC	Di-n-octylphthalate	117-84-0	T		1				6.90E-04	6.90E-04	1.3E-01				4.0E-01	
M-25	SVOC	Fluoranthene	206-44-0	T	D	1				7.10E-04	7.10E-04	2.1E-01		2.1E-01		2.1E-01	
M-25	SVOC	Fluorene	86-73-7	T	D	1				7.50E-04	7.50E-04	8.8E-01		2.0E+00		2.0E+00	
M-25	SVOC	Hexachlorobenzene	118-74-1	T	B2	1				7.70E-04	7.70E-04	1.0E-03		3.0E+00		4.6E-03	
M-25	SVOC	Hexachlorobutadiene	87-68-3	T	C	1				1.50E-03	1.50E-03	1.5E-02		3.2E+00		4.0E-01	
M-25	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	1				1.10E-03	1.10E-03	5.0E-02		4.2E-01		1.6E+00	
M-25	SVOC	Hexachloroethane	67-72-1	T	C	1				1.60E-03	1.60E-03	7.3E-03		5.0E+01		1.9E+00	
M-25	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	1				6.90E-04	6.90E-04	2.0E-03				2.0E-03	
M-25	SVOC	Isophorone	78-59-1	T	C	1				8.60E-04	8.60E-04	7.7E-01				9.9E+02	
M-25	SVOC	2-Methylnaphthalene	91-57-6	T	ID	1				9.30E-04	9.30E-04	2.6E-01				2.5E+01	
M-25	SVOC	Methylphenol (total)	1319-77-3	T		1				9.00E-04	9.00E-04	3.7E-01				8.1E+02	
M-25	SVOC	Naphthalene	91-20-3	T	C	1				1.30E-03	1.30E-03	5.2E-01		3.1E+01		3.1E+01	
M-25	SVOC	2-Nitroaniline	88-74-4	T		1				4.90E-04	4.90E-04						
M-25	SVOC	3-Nitroaniline	99-09-2	T	C	1				4.80E-04	4.80E-04						
M-25	SVOC	4-Nitroaniline	100-01-6	T	C	1				5.90E-04	5.90E-04						
M-25	SVOC	Nitrobenzene	98-95-3	T	D	1				1.30E-03	1.30E-03	3.4E-03		5.5E+02		1.1E+01	
M-25	SVOC	2-Nitrophenol	88-75-5	T		1				9.50E-04	9.50E-04	2.0E-02				7.9E+01	
M-25	SVOC	4-Nitrophenol	100-02-7	T		1				3.50E-03	3.50E-03						
M-25	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	1				6.40E-04	6.40E-04	2.7E-01				3.5E+01	
M-25	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	1				1.10E-03	1.10E-03	5.0E-03				3.6E-01	
M-25	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	1				1.80E-03	1.80E-03						
M-25	SVOC	Pentachlorophenol	87-86-5	T	B2	1				2.60E-03	2.60E-03	1.0E-03				2.0E-01	
M-25	SVOC	Phenanthrene	85-01-8	T	D	1				6.80E-04	6.80E-04	5.2E-02		1.0E+00		1.0E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
M-25	SVOC	Phenol	108-95-2	T	ID	1				1.30E-03	1.30E-03	4.4E+00				2.9E+04	
M-25	SVOC	Pyrene	129-00-0	T	D	1				6.30E-04	6.30E-04	1.4E-01		1.4E-01		1.4E-01	
M-25	SVOC	2,4,5-Trichlorophenol	95-95-4	T		1				8.60E-04	8.60E-04	7.3E-01				1.7E+02	
M-25	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	1				7.10E-04	7.10E-04	1.2E-01				1.0E+01	
M-25	P/PCB	PCBs (total)	1336-36-3	T	B2	1				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
M-25	INORG	Antimony	7440-36-0	T		1				3.10E-03	3.10E-03	6.0E-03				6.8E+01	
M-25	INORG	Arsenic	7440-38-2	T	A	1	1	4.80E-03	4.80E-03			5.0E-02	9.6E-02			4.3E+00	1.1E-03
M-25	INORG	Barium	7440-39-3	T	D	1	1	8.95E-02	8.95E-02			2.0E+00	4.5E-02			1.4E+04	6.4E-06
M-25	INORG	Beryllium	7440-41-7	T	B1	1				4.70E-04	4.70E-04	4.0E-03				2.9E+02	
M-25	INORG	Cadmium	7440-43-9	T	B1	1				3.60E-04	3.60E-04	5.0E-03				1.9E+02	
M-25	INORG	Chromium (total)	7440-47-3	T		1	1	1.05E-03	1.05E-03			1.0E-01	1.1E-02			4.6E+02	2.3E-06
M-25	INORG	Cobalt	7440-48-4	T	B1	1	1	3.20E-03	3.20E-03			4.0E-02	8.0E-02			2.4E+03	1.3E-06
M-25	INORG	Copper	7440-50-8	T	D	1				1.80E-03	1.80E-03	1.4E+00				7.4E+03	
M-25	INORG	Lead	7439-92-1	T	B2	1				2.30E-03	2.30E-03	4.0E-03					
M-25	INORG	Manganese	7439-96-5	T	D	1	1	5.54E-01	5.54E-01			8.6E-01	6.4E-01			9.1E+03	6.1E-05
M-25	INORG	Mercury	7439-97-6	T	D	1				6.70E-05	6.70E-05	2.0E-03		5.6E-02		5.6E-02	
M-25	INORG	Nickel	7440-02-0	T	A	1	1	7.50E-03	7.50E-03			1.0E-01	7.5E-02			7.4E+04	1.0E-07
M-25	INORG	Selenium	7782-49-2	T	D	1				3.90E-03	3.90E-03	5.0E-02				9.7E+02	
M-25	INORG	Silver	7440-22-4	T	D	1				1.10E-03	1.10E-03	3.4E-02				1.5E+03	
M-25	INORG	Thallium	7440-28-0	T		1	1	1.01E-04	1.01E-04			2.0E-03	5.1E-02			1.3E+01	7.8E-06
M-25	INORG	Vanadium	7440-62-2	T		1				9.60E-04	9.60E-04	4.5E-03				9.7E+02	
M-25	INORG	Zinc	7440-66-6	T	D	1				1.30E-02	1.30E-02	2.4E+00				1.1E+05	
P-06	VOC	Acetone	67-64-1	T	ID	14	2	1.20E-02	2.10E-02	5.10E-04	8.50E-02	7.3E-01	2.9E-02	1.0E+06	2.1E-08	3.1E+04	6.8E-07
P-06	VOC	Benzene	71-43-2	T	A	19	14	3.10E-04	1.20E+00	1.60E-04	3.70E-04	5.0E-03	**2.4E+02**	3.5E+01	3.4E-02	1.1E+01	1.1E-01
P-06	VOC	Bromodichloromethane	75-27-4	T	B2	14	1	3.40E-04	3.40E-04	1.70E-04	2.80E-02	1.0E-01	3.4E-03	3.7E+01	9.2E-06	1.4E+01	2.4E-05
P-06	VOC	Bromoform	75-25-2	T	B2	14				1.80E-04	3.00E-02	1.0E-01		3.1E+03		1.4E+02	
P-06	VOC	Bromomethane	74-83-9	T	D	10				2.00E-04	3.30E-02	1.0E-02		9.0E+00		7.0E+01	
P-06	VOC	2-Butanone	78-93-3	T	ID	14	2	5.90E-04	2.00E-03	4.10E-04	6.80E-02	1.3E+01	1.5E-04	2.4E+05	8.3E-09	2.4E+05	8.3E-09
P-06	VOC	Carbon Disulfide	75-15-0	T		14				2.00E-04	3.30E-02	8.0E-01		5.5E+02		1.2E+03	
P-06	VOC	Carbon Tetrachloride	56-23-5	T	B2	14				1.20E-04	2.30E-02	5.0E-03		2.4E+00		4.6E+00	
P-06	VOC	Chlorobenzene	108-90-7	T	D	14				1.40E-04	2.40E-02	1.0E-01		4.7E+02		8.6E+01	
P-06	VOC	Chloroethane	75-00-3	T		14				2.60E-04	4.30E-02	4.3E-01		5.7E+03		4.4E+02	
P-06	VOC	Chloroform	67-66-3	T	B2	14	4	6.50E-04	1.50E-03	1.40E-04	2.30E-02	1.0E-01	1.5E-02	1.8E+02	8.3E-06	1.5E+02	1.0E-05
P-06	VOC	Chloromethane	74-87-3	T	D	14	1	1.80E-04	1.80E-04	1.30E-04	3.10E-02	2.6E-01	6.9E-04	4.5E+01	4.0E-06	4.9E+02	3.7E-07
P-06	VOC	Cumene	98-82-8	T	D	14	2	3.30E-02	3.90E-02	1.20E-04	2.00E-02	8.0E-01	4.9E-02	5.6E+01	7.0E-04	5.6E+01	7.0E-04
P-06	VOC	Cyclohexane	110-82-7	T	ID	14	5	4.20E-04	1.10E-01	1.30E-04	3.30E-04						
P-06	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	14				6.20E-04	1.00E-01	2.0E-04		1.2E+00		3.9E-01	
P-06	VOC	Dibromochloromethane	124-48-1	T	C	14				2.60E-04	4.30E-02	1.0E-01		1.1E+02		1.8E+01	
P-06	VOC	1,2-Dibromoethane	106-93-4	T	B2	14				2.20E-04	3.70E-02	1.0E-03		1.5E+01		2.5E-02	
P-06	VOC	1,2-Dichlorobenzene	95-50-1	T	D	14				1.10E-04	2.40E-02	6.0E-01		1.6E+02		1.6E+02	
P-06	VOC	1,3-Dichlorobenzene	541-73-1	T	D	14				1.50E-04	2.50E-02	6.6E-03				2.0E+00	
P-06	VOC	1,4-Dichlorobenzene	106-46-7	T	C	14				1.70E-04	2.80E-02	7.5E-02		7.4E+01		6.4E+00	
P-06	VOC	Dichlorodifluoromethane	75-71-8	T		14				2.60E-04	4.30E-02	1.7E+00		3.0E+02		3.0E+02	
P-06	VOC	1,1-Dichloroethane	75-34-3	T	C	14	1	5.10E-04	5.10E-04	1.60E-04	2.70E-02	8.8E-01	5.8E-04	2.3E+03	2.2E-07	2.4E+03	2.1E-07
P-06	VOC	1,2-Dichloroethane	107-06-2	T	B2	14				2.10E-04	3.50E-02	5.0E-03		5.9E+01		1.9E+01	
P-06	VOC	1,1-Dichloroethene	75-35-4	T	C	14				2.40E-04	4.00E-02	7.0E-03		1.3E+00		1.1E+01	
P-06	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	14				2.20E-04	3.70E-02	7.0E-02		2.1E+02		2.0E+02	
P-06	VOC	trans-1,2-Dichloroethene	156-60-5	T		14				1.50E-04	2.50E-02	1.0E-01		2.0E+02		2.2E+02	
P-06	VOC	1,2-Dichloropropane	78-87-5	T	B2	14				1.70E-04	2.80E-02	5.0E-03		3.6E+01		1.6E+01	
P-06	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	14				2.70E-04	4.50E-02	8.5E-03		2.6E+01		5.5E+00	
P-06	VOC	Ethyl Benzene	100-41-4	T	D	19	10	1.50E-04	1.60E+00	1.20E-04	4.10E-04	7.0E-01	**2.3E+00**	1.7E+02	9.4E-03	1.7E+02	9.4E-03
P-06	VOC	2-Hexanone	591-78-6	T		14				4.60E-04	7.70E-02	1.0E+00		8.7E+03		5.2E+03	
P-06	VOC	Methyl Acetate	79-20-9	T		14				4.10E-04	6.80E-02						
P-06	VOC	Methyl tert-butyl ether	1634-04-4	T		14	2	5.40E-04	2.10E-03	1.30E-04	2.20E-02	2.4E-01	8.8E-03	4.7E+04	4.5E-08	6.1E+02	3.4E-06
P-06	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	9	1	7.90E-04	7.90E-04	2.30E-04	3.80E-02	1.8E+00	4.4E-04	2.0E+04	4.0E-08	1.3E+04	6.1E-08
P-06	VOC	Methylcyclohexane	108-87-2	T		14	2	4.90E-02	7.80E-02	1.50E-04	2.50E-02						
P-06	VOC	Methylene Chloride	75-09-2	T	B2	13				2.90E-04	5.70E-02	5.0E-03		1.4E+03		2.2E+02	
P-06	VOC	Styrene	100-42-5	T		14				1.50E-04	2.50E-02	1.0E-01		3.1E+02		9.7E+00	
P-06	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	14				2.50E-04	4.20E-02	8.5E-03		7.7E+01		4.7E+00	
P-06	VOC	Tetrachloroethene	127-18-4	T	C-B2	14				2.30E-04	3.80E-02	5.0E-03		1.7E+02		1.2E+01	
P-06	VOC	Toluene	108-88-3	T	D	19	10	1.90E-04	5.40E+00	1.80E-04	3.90E-04	1.0E+00	**5.4E+00**	5.3E+02	1.0E-02	5.3E+02	1.0E-02
P-06	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	14				1.70E-04	2.80E-02	7.0E-02		3.0E+02		1.9E+01	
P-06	VOC	1,1,1-Trichloroethane	71-55-6	T	D	14				1.50E-04	2.50E-02	2.0E-01		1.3E+03		1.3E+03	
P-06	VOC	1,1,2-Trichloroethane	79-00-5	T	C	14				3.00E-04	5.00E-02	5.0E-03		1.1E+02		2.1E+01	
P-06	VOC	Trichloroethene	79-01-6	T	C-B2	14				1.40E-04	2.60E-02	5.0E-03		9.7E+01		2.2E+01	
P-06	VOC	Trichlorofluoromethane	75-69-4	T		14				2.80E-04	4.70E-02	2.6E+00		1.1E+03		1.1E+03	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
P-06	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		14				3.20E-04	5.30E-02	1.7E+02		1.7E+02		1.7E+02	
P-06	VOC	Vinyl Chloride	75-01-4	T	A	14				1.50E-04	2.50E-02	2.0E-03		1.3E+01		1.0E+00	
P-06	VOC	Xylenes (total)	1330-20-7	T	ID	19	6	3.70E-04	4.20E+00	3.30E-04	1.30E-03	1.0E+01	4.2E-01	1.9E+02	2.2E-02	1.9E+02	2.2E-02
P-06	SVOC	Acenaphthene	83-32-9	T		10				8.00E-04	4.00E-03	1.3E+00		4.2E+00		4.2E+00	
P-06	SVOC	Acenaphthylene	208-96-8	T	D	10				7.10E-04	3.60E-03	5.2E-02		3.9E+00		3.9E+00	
P-06	SVOC	Acetophenone	98-86-2	T	D	10				2.60E-03	1.30E-02	1.5E+00		6.1E+03		6.1E+03	
P-06	SVOC	Anthracene	120-12-7	T	D	10				6.80E-04	3.40E-03	4.3E-02		4.3E-02		4.3E-02	
P-06	SVOC	Atrazine	1912-24-9	T		10				2.50E-03	1.20E-02	3.0E-03				5.4E+00	
P-06	SVOC	Benzaldehyde	100-52-7	T		10				2.80E-03	1.40E-02						
P-06	SVOC	Benzo(a)anthracene	56-55-3	T	B2	10				7.00E-04	3.50E-03	2.1E-03				9.4E-03	
P-06	SVOC	Benzo(a)pyrene	50-32-8	T	B2	10				7.30E-04	3.60E-03	5.0E-03				2.0E-03	
P-06	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	10				9.40E-04	4.70E-03	2.0E-03				2.0E-03	
P-06	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	10				8.50E-04	4.20E-03	5.0E-03				5.0E-03	
P-06	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	10				8.40E-04	4.20E-03	5.0E-03				5.0E-03	
P-06	SVOC	Biphenyl	92-52-4	T	D	10				2.60E-03	1.30E-02						
P-06	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	10				8.70E-04	4.40E-03						
P-06	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	10				9.70E-04	4.80E-03	2.0E-03		2.1E+02		5.7E+00	
P-06	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	10				2.70E-03	1.40E-02	6.0E-03				3.2E-01	
P-06	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	10				8.80E-04	4.40E-03						
P-06	SVOC	Butylbenzylphthalate	85-68-7	T	C	10				8.80E-04	4.40E-03	1.2E+00				2.7E+00	
P-06	SVOC	Caprolactam	105-60-2	T		10	1	1.20E-02	1.20E-02	2.50E-03	1.20E-02	5.8E+00	2.1E-03			3.9E+05	3.1E-08
P-06	SVOC	Carbazole	86-74-8	T	B2	10				8.20E-04	4.10E-03	8.5E-02				7.4E+00	
P-06	SVOC	4-Chloro-3-methylphenol	59-50-7	T		10				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
P-06	SVOC	4-Chloroaniline	106-47-8	T		10				6.10E-04	3.00E-03						
P-06	SVOC	2-Chloronaphthalene	91-58-7	T		10				8.50E-04	4.20E-03	1.8E+00				6.7E+00	
P-06	SVOC	2-Chlorophenol	95-57-8	T		10				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
P-06	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		10				7.90E-04	4.00E-03						
P-06	SVOC	Chrysene	218-01-9	T	B2	10				7.50E-04	3.80E-03	5.0E-03				5.0E-03	
P-06	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	10				7.90E-04	4.00E-03	2.0E-03				2.0E-03	
P-06	SVOC	Dibenzofuran	132-64-9	T	D	10				1.10E-03	5.50E-03						
P-06	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	4.60E-03	1.1E-03				1.8E-01	
P-06	SVOC	2,4-Dichlorophenol	120-83-2	T		10				8.50E-04	4.20E-03	7.3E-02				4.8E+01	
P-06	SVOC	Diethylphthalate	84-66-2	T	D	10				6.50E-04	3.20E-03	5.5E+00				1.1E+03	
P-06	SVOC	2,4-Dimethylphenol	105-67-9	T		10	2	3.50E-03	2.80E-02	8.50E-04	8.50E-04	3.7E-01	7.6E-02			5.2E+02	5.4E-05
P-06	SVOC	Dimethylphthalate	131-11-3	T	D	10				7.60E-04	3.80E-03	7.3E+01				4.2E+03	
P-06	SVOC	Di-n-butylphthalate	84-74-2	T	D	10				6.70E-04	3.40E-03	8.8E-01				1.1E+01	
P-06	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		10				1.30E-03	6.50E-03	2.0E-02				9.5E+00	
P-06	SVOC	2,4-Dinitrophenol	51-28-5	T		10				3.00E-03	1.50E-02						
P-06	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	10				7.90E-04	4.00E-03	7.7E-03				8.6E+00	
P-06	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	10				5.70E-04	2.80E-03						
P-06	SVOC	Di-n-octylphthalate	117-84-0	T		10				1.10E-03	5.50E-03	1.3E-01				4.0E-01	
P-06	SVOC	Fluoranthene	206-44-0	T	D	10				8.10E-04	4.00E-03	2.1E-01		2.1E-01		2.1E-01	
P-06	SVOC	Fluorene	86-73-7	T	D	10				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
P-06	SVOC	Hexachlorobenzene	118-74-1	T	B2	10				7.40E-04	3.70E-03	1.0E-03		3.0E+00		4.6E-03	
P-06	SVOC	Hexachlorobutadiene	87-68-3	T	C	10				7.30E-04	3.60E-03	1.5E-02		3.2E+00		4.0E-01	
P-06	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	9				1.10E-03	5.50E-03	5.0E-02		4.2E-01		1.6E+00	
P-06	SVOC	Hexachloroethane	67-72-1	T	C	10				7.40E-04	3.70E-03	7.3E-03		5.0E+01		1.9E+00	
P-06	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	10				6.30E-04	3.20E-03	2.0E-03				2.0E-03	
P-06	SVOC	Isophorone	78-59-1	T	C	10				6.30E-04	3.20E-03	7.7E-01				9.9E+02	
P-06	SVOC	2-Methylnaphthalene	91-57-6	T	ID	10	2	9.90E-03	1.60E-02	6.40E-04	6.40E-04	2.6E-01	6.2E-02			2.5E+01	6.4E-04
P-06	SVOC	Methylphenol (total)	1319-77-3	T		10	1	2.95E-01	2.95E-01	1.30E-03	3.20E-03	3.7E-01	8.0E-01			8.1E+02	3.6E-04
P-06	SVOC	Naphthalene	91-20-3	T	C	10	2	8.60E-02	9.30E-02	7.50E-04	7.50E-04	5.2E-01	1.8E-01	3.1E+01	3.0E-03	3.1E+01	3.0E-03
P-06	SVOC	2-Nitroaniline	88-74-4	T		10				7.00E-04	3.50E-03						
P-06	SVOC	3-Nitroaniline	99-09-2	T	C	10				7.10E-04	3.60E-03						
P-06	SVOC	4-Nitroaniline	100-01-6	T	C	10				1.30E-03	6.50E-03						
P-06	SVOC	Nitrobenzene	98-95-3	T	D	10				8.10E-04	4.00E-03	3.4E-03		5.5E+02		1.1E+01	
P-06	SVOC	2-Nitrophenol	88-75-5	T		10				2.10E-03	1.00E-02	2.0E-02				7.9E+01	
P-06	SVOC	4-Nitrophenol	100-02-7	T		10				1.90E-03	9.50E-03						
P-06	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	10				1.40E-03	7.00E-03	2.7E-01				3.5E+01	
P-06	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	10				6.70E-04	3.40E-03	5.0E-03				3.6E-01	
P-06	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	10				7.80E-04	3.90E-03						
P-06	SVOC	Pentachlorophenol	87-86-5	T	B2	10				2.40E-03	1.20E-02	1.0E-03				2.0E-01	
P-06	SVOC	Phenanthrene	85-01-8	T	D	10				8.20E-04	4.10E-03	5.2E-02		1.0E+00		1.0E+00	
P-06	SVOC	Phenol	108-95-2	T	ID	10	1	3.60E-02	3.60E-02	2.60E-03	6.50E-03	4.4E+00	8.2E-03			2.9E+04	1.2E-06
P-06	SVOC	Pyrene	129-00-0	T	D	10				1.10E-03	5.50E-03	1.4E-01		1.4E-01		1.4E-01	
P-06	SVOC	2,4,5-Trichlorophenol	95-95-4	T		10				1.20E-03	6.00E-03	7.3E-01				1.7E+02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
P-06	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	10				1.70E-03	8.50E-03	1.2E-01				1.0E+01	
P-06	INORG	Antimony	7440-36-0	D		1				2.20E-03	2.20E-03	6.0E-03				6.8E+01	
P-06	INORG	Antimony	7440-36-0	T		1				2.20E-03	2.20E-03	6.0E-03				6.8E+01	
P-06	INORG	Arsenic	7440-38-2	D	A	1				3.90E-03	3.90E-03	5.0E-02				4.3E+00	
P-06	INORG	Arsenic	7440-38-2	T	A	1				3.90E-03	3.90E-03	5.0E-02				4.3E+00	
P-06	INORG	Barium	7440-39-3	D	D	1	1	9.78E-01	9.78E-01			2.0E+00	4.9E-01			1.4E+04	7.0E-05
P-06	INORG	Barium	7440-39-3	T	D	1	1	9.94E-01	9.94E-01			2.0E+00	5.0E-01			1.4E+04	7.1E-05
P-06	INORG	Beryllium	7440-41-7	D	B1	1				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
P-06	INORG	Beryllium	7440-41-7	T	B1	1				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
P-06	INORG	Cadmium	7440-43-9	D	B1	1	1	3.80E-04	3.80E-04			5.0E-03	7.6E-02			1.9E+02	2.0E-06
P-06	INORG	Cadmium	7440-43-9	T	B1	1	1	3.80E-04	3.80E-04			5.0E-03	7.6E-02			1.9E+02	2.0E-06
P-06	INORG	Chromium (total)	7440-47-3	D		1				1.40E-03	1.40E-03	1.0E-01				4.6E+02	
P-06	INORG	Chromium (total)	7440-47-3	T		1				1.40E-03	1.40E-03	1.0E-01				4.6E+02	
P-06	INORG	Cobalt	7440-48-4	D	B1	1	1	8.30E-03	8.30E-03			4.0E-02	2.1E-01			2.4E+03	3.5E-06
P-06	INORG	Cobalt	7440-48-4	T	B1	1	1	8.00E-03	8.00E-03			4.0E-02	2.0E-01			2.4E+03	3.3E-06
P-06	INORG	Copper	7440-50-8	D	D	1				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
P-06	INORG	Copper	7440-50-8	T	D	1				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
P-06	INORG	Lead	7439-92-1	D	B2	9				2.50E-03	2.50E-03	4.0E-03					
P-06	INORG	Lead	7439-92-1	T	B2	10				1.60E-03	2.50E-03	4.0E-03					
P-06	INORG	Manganese	7439-96-5	D	D	1	1	7.22E-01	7.22E-01			8.6E-01	8.4E-01			9.1E+03	7.9E-05
P-06	INORG	Manganese	7439-96-5	T	D	1	1	7.41E-01	7.41E-01			8.6E-01	8.6E-01			9.1E+03	8.1E-05
P-06	INORG	Mercury	7439-97-6	D	D	1				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
P-06	INORG	Mercury	7439-97-6	T	D	1				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
P-06	INORG	Nickel	7440-02-0	D	A	1	1	1.30E-02	1.30E-02			1.0E-01	1.3E-01			7.4E+04	1.8E-07
P-06	INORG	Nickel	7440-02-0	T	A	1	1	1.32E-02	1.32E-02			1.0E-01	1.3E-01			7.4E+04	1.8E-07
P-06	INORG	Selenium	7782-49-2	D	D	1				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
P-06	INORG	Selenium	7782-49-2	T	D	1				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
P-06	INORG	Silver	7440-22-4	D	D	1				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
P-06	INORG	Silver	7440-22-4	T	D	1				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
P-06	INORG	Thallium	7440-28-0	D		1	1	1.50E-04	1.50E-04			2.0E-03	7.5E-02			1.3E+01	1.2E-05
P-06	INORG	Thallium	7440-28-0	T		1	1	1.70E-04	1.70E-04			2.0E-03	8.5E-02			1.3E+01	1.3E-05
P-06	INORG	Vanadium	7440-62-2	D		1				8.20E-04	8.20E-04	4.5E-03				9.7E+02	
P-06	INORG	Vanadium	7440-62-2	T		1				8.20E-04	8.20E-04	4.5E-03				9.7E+02	
P-06	INORG	Zinc	7440-66-6	D	D	1	1	1.25E-02	1.25E-02			2.4E+00	5.2E-03			1.1E+05	1.1E-07
P-06	INORG	Zinc	7440-66-6	T	D	1				1.20E-02	1.20E-02	2.4E+00				1.1E+05	
P-09	VOC	Acetone	67-64-1	T	ID	6	5	2.40E-03	7.10E-01	6.60E-04	6.60E-04	7.3E-01	9.7E-01	1.0E+06	7.1E-07	3.1E+04	2.3E-05
P-09	VOC	Benzene	71-43-2	T	A	6				2.00E-04	4.10E-03	5.0E-03		3.5E+01		1.1E+01	
P-09	VOC	Bromodichloromethane	75-27-4	T	B2	3				2.00E-04	1.10E-03	1.0E-01		3.7E+01		1.4E+01	
P-09	VOC	Bromoform	75-25-2	T	B2	6				3.20E-04	4.10E-03	1.0E-01		3.1E+03		1.4E+02	
P-09	VOC	Bromomethane	74-83-9	T	D	6				1.60E-04	3.30E-03	1.0E-02		9.0E+00		7.0E+01	
P-09	VOC	2-Butanone	78-93-3	T	ID	6	4	2.50E-03	1.10E-01	3.60E-04	5.90E-04	1.3E+01	8.5E-03	2.4E+05	4.6E-07	2.4E+05	4.6E-07
P-09	VOC	Carbon Disulfide	75-15-0	T		6	2	3.00E-04	3.40E-04	2.10E-04	2.70E-03	8.0E-01	4.3E-04	5.5E+02	6.2E-07	1.2E+03	2.8E-07
P-09	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.80E-04	4.10E-03	5.0E-03		2.4E+00		4.6E+00	
P-09	VOC	Chlorobenzene	108-90-7	T	D	6				1.60E-04	4.20E-03	1.0E-01		4.7E+02		8.6E+01	
P-09	VOC	Chloroethane	75-00-3	T		6				2.20E-04	3.20E-03	4.3E-01		5.7E+03		4.4E+02	
P-09	VOC	Chloroform	67-66-3	T	B2	6				2.10E-04	3.90E-03	1.0E-01		1.8E+02		1.5E+02	
P-09	VOC	Chloromethane	74-87-3	T	D	6				2.60E-04	5.40E-03	2.6E-01		4.5E+01		4.9E+02	
P-09	VOC	Cumene	98-82-8	T	D	6				1.50E-04	4.30E-03	8.0E-01		5.6E+01		5.6E+01	
P-09	VOC	Cyclohexane	110-82-7	T	ID	6				3.30E-04	3.70E-03						
P-09	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				5.30E-04	9.10E-03	2.0E-04		1.2E+00		3.9E-01	
P-09	VOC	Dibromochloromethane	124-48-1	T	C	6				2.50E-04	4.10E-03	1.0E-01		1.1E+02		1.8E+01	
P-09	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	3.80E-03	1.0E-03		1.5E+01		2.5E-02	
P-09	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.50E-04	4.20E-03	6.0E-01		1.6E+02		1.6E+02	
P-09	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				2.00E-04	4.20E-03	6.6E-03				2.0E+00	
P-09	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.60E-04	4.20E-03	7.5E-02		7.4E+01		6.4E+00	
P-09	VOC	Dichlorodifluoromethane	75-71-8	T		6				2.30E-04	5.40E-03	1.7E+00		3.0E+02		3.0E+02	
P-09	VOC	1,1-Dichloroethane	75-34-3	T	C	5	4	5.40E-04	1.10E-03	1.50E-03	1.50E-03	8.8E-01	1.3E-03	2.3E+03	4.8E-07	2.4E+03	4.6E-07
P-09	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.20E-04	3.10E-03	5.0E-03		5.9E+01		1.9E+01	
P-09	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.20E-04	3.40E-03	7.0E-03		1.3E+00		1.1E+01	
P-09	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.50E-04	3.90E-03	7.0E-02		2.1E+02		2.0E+02	
P-09	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				2.40E-04	3.70E-03	1.0E-01		2.0E+02		2.2E+02	
P-09	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.80E-04	4.60E-03	5.0E-03		3.6E+01		1.6E+01	
P-09	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				1.50E-04	3.90E-03	8.5E-03		2.6E+01		5.5E+00	
P-09	VOC	Ethyl Benzene	100-41-4	T	D	6				1.90E-04	4.60E-03	7.0E-01		1.7E+02		1.7E+02	
P-09	VOC	2-Hexanone	591-78-6	T		6				3.10E-04	6.40E-03	1.0E+00		8.7E+03		5.2E+03	
P-09	VOC	Methyl Acetate	79-20-9	T		6				5.40E-04	6.00E-03						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
P-09	VOC	Methyl tert-butyl ether	1634-04-4	T		6				2.10E-04	3.00E-03	2.4E-01		4.7E+04		6.1E+02	
P-09	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6	4	9.80E-04	2.90E-02	2.60E-04	3.40E-04	1.8E+00	1.6E-02	2.0E+04	1.5E-06	1.3E+04	2.2E-06
P-09	VOC	Methylcyclohexane	108-87-2	T		6				2.40E-04	4.70E-03						
P-09	VOC	Methylene Chloride	75-09-2	T	B2	6				2.80E-04	3.20E-03	5.0E-03		1.4E+03		2.2E+02	
P-09	VOC	Styrene	100-42-5	T		4				1.60E-04	3.90E-03	1.0E-01		3.1E+02		9.7E+00	
P-09	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.30E-04	4.00E-03	8.5E-03		7.7E+01		4.7E+00	
P-09	VOC	Tetrachloroethene	127-18-4	T	C-B2	6				1.20E-04	4.70E-03	5.0E-03		1.7E+02		1.2E+01	
P-09	VOC	Toluene	108-88-3	T	D	6				1.70E-04	4.30E-03	1.0E+00		5.3E+02		5.3E+02	
P-09	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.50E-04	4.40E-03	7.0E-02		3.0E+02		1.9E+01	
P-09	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6				1.80E-04	4.30E-03	2.0E-01		1.3E+03		1.3E+03	
P-09	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				2.10E-04	4.00E-03	5.0E-03		1.1E+02		2.1E+01	
P-09	VOC	Trichloroethene	79-01-6	T	C-B2	6				2.20E-04	4.70E-03	5.0E-03		9.7E+01		2.2E+01	
P-09	VOC	Trichlorofluoromethane	75-69-4	T		6				2.50E-04	6.00E-03	2.6E+00		1.1E+03		1.1E+03	
P-09	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				2.30E-04	3.60E-03	1.7E+02		1.7E+02		1.7E+02	
P-09	VOC	Vinyl Chloride	75-01-4	T	A	4				2.60E-04	4.00E-03	2.0E-03		1.3E+01		1.0E+00	
P-09	VOC	Xylenes (total)	1330-20-7	T	ID	6				4.40E-04	4.90E-03	1.0E+01		1.9E+02		1.9E+02	
P-09	SVOC	Acenaphthene	83-32-9	T		6				6.90E-04	3.40E-02	1.3E+00		4.2E+00		4.2E+00	
P-09	SVOC	Acenaphthylene	208-96-8	T	D	6				4.10E-04	2.00E-02	5.2E-02		3.9E+00		3.9E+00	
P-09	SVOC	Acetophenone	98-86-2	T	D	6				6.50E-04	3.20E-02	1.5E+00		6.1E+03		6.1E+03	
P-09	SVOC	Anthracene	120-12-7	T	D	6				5.90E-04	3.00E-02	4.3E-02		4.3E-02		4.3E-02	
P-09	SVOC	Atrazine	1912-24-9	T		6				3.50E-04	1.80E-02	3.0E-03				5.4E+00	
P-09	SVOC	Benzaldehyde	100-52-7	T		6				5.90E-04	3.00E-02						
P-09	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				6.80E-04	3.40E-02	2.1E-03				9.4E-03	
P-09	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				5.30E-04	2.60E-02	5.0E-03				2.0E-03	
P-09	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				7.00E-04	3.60E-02	2.0E-03				2.0E-03	
P-09	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				7.00E-04	3.50E-02	5.0E-03				5.0E-03	
P-09	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				6.40E-04	3.20E-02	5.0E-03				5.0E-03	
P-09	SVOC	Biphenyl	92-52-4	T	D	6				6.50E-04	3.20E-02						
P-09	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				1.00E-03	5.00E-02						
P-09	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	6				1.70E-03	8.50E-02	2.0E-03		2.1E+02		5.7E+00	
P-09	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6				2.00E-04	1.00E-02	6.0E-03				3.2E-01	
P-09	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				7.80E-04	3.90E-02						
P-09	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				2.30E-04	1.20E-02	1.2E+00				2.7E+00	
P-09	SVOC	Caprolactam	105-60-2	T		6				4.50E-04	2.20E-02	5.8E+00				3.9E+05	
P-09	SVOC	Carbazole	86-74-8	T	B2	6	2	9.90E-04	3.20E-02	6.10E-04	3.00E-02	8.5E-02	3.8E-01			7.4E+00	4.3E-03
P-09	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				5.50E-04	2.80E-02	1.5E-01				7.9E+01	
P-09	SVOC	4-Chloroaniline	106-47-8	T		3				9.00E-04	4.50E-02						
P-09	SVOC	2-Chloronaphthalene	91-58-7	T		6				7.30E-04	3.60E-02	1.8E+00				6.7E+00	
P-09	SVOC	2-Chlorophenol	95-57-8	T		6				1.30E-03	6.50E-02	4.5E-02				9.4E+01	
P-09	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				6.60E-04	3.30E-02						
P-09	SVOC	Chrysene	218-01-9	T	B2	6				6.70E-04	3.40E-02	5.0E-03				5.0E-03	
P-09	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				6.80E-04	3.40E-02	2.0E-03				2.0E-03	
P-09	SVOC	Dibenzofuran	132-64-9	T	D	6				6.60E-04	3.30E-02						
P-09	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	3				4.70E-04	2.40E-02	1.1E-03				1.8E-01	
P-09	SVOC	2,4-Dichlorophenol	120-83-2	T		6				7.00E-04	3.50E-02	7.3E-02				4.8E+01	
P-09	SVOC	Diethylphthalate	84-66-2	T	D	6				2.50E-04	1.20E-02	5.5E+00				1.1E+03	
P-09	SVOC	2,4-Dimethylphenol	105-67-9	T		6	2	3.00E-01	6.00E-01	1.00E-03	2.50E-03	3.7E-01	**1.6E+00**			5.2E+02	1.2E-03
P-09	SVOC	Dimethylphthalate	131-11-3	T	D	6				2.00E-04	1.00E-02	7.3E+01				4.2E+03	
P-09	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				3.70E-04	1.80E-02	8.8E-01				1.1E+01	
P-09	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				2.10E-03	1.00E-01	2.0E-02				9.5E+00	
P-09	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.30E-03	1.60E-01						
P-09	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				4.60E-04	2.30E-02	7.7E-03				8.6E+00	
P-09	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				7.10E-04	3.60E-02						
P-09	SVOC	Di-n-octylphthalate	117-84-0	T		6				6.90E-04	3.40E-02	1.3E-01				4.0E-01	
P-09	SVOC	Fluoranthene	206-44-0	T	D	6				7.10E-04	3.60E-02	2.1E-01		2.1E-01		2.1E-01	
P-09	SVOC	Fluorene	86-73-7	T	D	6	1	1.65E-03	1.65E-03	7.50E-04	3.80E-02	8.8E-01	1.9E-03	2.0E+00	8.3E-04	2.0E+00	8.3E-04
P-09	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.70E-04	3.80E-02	1.0E-03		3.0E+00		4.6E-03	
P-09	SVOC	Hexachlorobutadiene	87-68-3	T	C	6				1.50E-03	7.50E-02	1.5E-02		3.2E+00		4.0E-01	
P-09	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	1				1.10E-03	1.10E-03	5.0E-02		4.2E-01		1.6E+00	
P-09	SVOC	Hexachloroethane	67-72-1	T	C	6				1.60E-03	8.00E-02	7.3E-03		5.0E+01		1.9E+00	
P-09	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.90E-04	3.40E-02	2.0E-03				2.0E-03	
P-09	SVOC	Isophorone	78-59-1	T	C	6				8.60E-04	4.30E-02	7.7E-01				9.9E+02	
P-09	SVOC	2-Methylnaphthalene	91-57-6	T	ID	6				9.30E-04	4.60E-02	2.6E-01				2.5E+01	
P-09	SVOC	Methylphenol (total)	1319-77-3	T		6	4	2.15E-03	1.28E+00	9.00E-04	2.20E-03	3.7E-01	**3.5E+00**			8.1E+02	1.6E-03
P-09	SVOC	Naphthalene	91-20-3	T	C	6	2	7.50E-02	9.90E-02	1.30E-03	3.25E-03	5.2E-01	1.9E-01	3.1E+01	3.2E-03	3.1E+01	3.2E-03
P-09	SVOC	2-Nitroaniline	88-74-4	T		6				4.90E-04	2.40E-02						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
P-09	SVOC	3-Nitroaniline	99-09-2	T	C	3				4.80E-04	2.40E-02						
P-09	SVOC	4-Nitroaniline	100-01-6	T	C	6				5.90E-04	3.00E-02						
P-09	SVOC	Nitrobenzene	98-95-3	T	D	6				1.30E-03	6.50E-02	3.4E-03		5.5E+02		1.1E+01	
P-09	SVOC	2-Nitrophenol	88-75-5	T		6				9.50E-04	4.80E-02	2.0E-02				7.9E+01	
P-09	SVOC	4-Nitrophenol	100-02-7	T		6				3.50E-03	1.80E-01						
P-09	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				6.40E-04	3.20E-02	2.7E-01				3.5E+01	
P-09	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				1.10E-03	5.50E-02	5.0E-03				3.6E-01	
P-09	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				1.80E-03	9.00E-02						
P-09	SVOC	Pentachlorophenol	87-86-5	T	B2	6	1	3.90E-03	3.90E-03	2.60E-03	1.30E-01	1.0E-03	**3.9E+00**			2.0E-01	2.0E-02
P-09	SVOC	Phenanthrene	85-01-8	T	D	6	1	2.35E-03	2.35E-03	6.80E-04	3.40E-02	5.2E-02	4.5E-02	1.0E+00	2.4E-03	1.0E+00	2.4E-03
P-09	SVOC	Phenol	108-95-2	T	ID	6	4	3.30E-03	1.60E+00	1.30E-03	3.20E-03	4.4E+00	3.6E-01			2.9E+04	5.5E-05
P-09	SVOC	Pyrene	129-00-0	T	D	6				6.30E-04	3.20E-02	1.4E-01		1.4E-01		1.4E-01	
P-09	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				8.60E-04	4.30E-02	7.3E-01				1.7E+02	
P-09	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				7.10E-04	3.60E-02	1.2E-01				1.0E+01	
P-09	P/PCB	PCBs (total)	1336-36-3	T	B2	6	1	3.69E-04	3.69E-04	8.20E-05	8.20E-05	5.0E-04	7.4E-01	4.5E-02	8.2E-03	3.3E-03	1.1E-01
P-09	INORG	Antimony	7440-36-0	T		6	2	9.40E-03	1.31E-02	3.10E-03	3.40E-03	6.0E-03	**2.2E+00**			6.8E+01	1.9E-04
P-09	INORG	Arsenic	7440-38-2	T	A	6	5	3.20E-03	4.49E-02	2.10E-03	2.10E-03	5.0E-02	9.0E-01			4.3E+00	1.0E-02
P-09	INORG	Barium	7440-39-3	T	D	6	6	3.10E-03	5.16E-02			2.0E+00	2.6E-02			1.4E+04	3.7E-06
P-09	INORG	Beryllium	7440-41-7	T	B1	6				4.70E-04	6.00E-04	4.0E-03				2.9E+02	
P-09	INORG	Cadmium	7440-43-9	T	B1	6				2.80E-04	3.60E-04	5.0E-03				1.9E+02	
P-09	INORG	Chromium (total)	7440-47-3	T		6	1	5.30E-03	5.30E-03	1.00E-03	1.50E-03	1.0E-01	5.3E-02			4.6E+02	1.2E-05
P-09	INORG	Cobalt	7440-48-4	T	B1	6	2	1.20E-03	1.60E-03	7.40E-04	1.10E-03	4.0E-02	4.0E-02			2.4E+03	6.7E-07
P-09	INORG	Copper	7440-50-8	T	D	6	2	4.35E-03	6.70E-03	1.70E-03	1.80E-03	1.4E+00	4.8E-03			7.4E+03	9.1E-07
P-09	INORG	Lead	7439-92-1	T	B2	6	1	2.85E-03	2.85E-03	1.60E-03	2.30E-03	4.0E-03	7.1E-01				
P-09	INORG	Manganese	7439-96-5	T	D	6	4	3.80E-03	4.36E-02	6.60E-04	6.60E-04	8.6E-01	5.1E-02			9.1E+03	4.8E-06
P-09	INORG	Mercury	7439-97-6	T	D	6				6.70E-05	8.70E-05	2.0E-03		5.6E-02		5.6E-02	
P-09	INORG	Nickel	7440-02-0	T	A	6	5	5.60E-03	1.28E-01	2.90E-03	2.90E-03	1.0E-01	**1.3E+00**			7.4E+04	1.7E-06
P-09	INORG	Selenium	7782-49-2	T	D	6	3	4.40E-03	6.07E-02	3.90E-03	4.70E-03	5.0E-02	**1.2E+00**			9.7E+02	6.3E-05
P-09	INORG	Silver	7440-22-4	T	D	6				9.80E-04	1.10E-03	3.4E-02				1.5E+03	
P-09	INORG	Thallium	7440-28-0	T		6				1.50E-05	3.30E-05	2.0E-03				1.3E+01	
P-09	INORG	Vanadium	7440-62-2	T		6	4	8.70E-03	5.78E-01	6.70E-04	9.60E-04	4.5E-03	**1.3E+02**			9.7E+02	6.0E-04
P-09	INORG	Zinc	7440-66-6	T	D	6	1	2.02E-02	2.02E-02	1.30E-02	1.40E-02	2.4E+00	8.4E-03			1.1E+05	1.8E-07
P-11	VOC	Acetone	67-64-1	T	ID	2	1	1.90E-02	1.90E-02	1.10E-03	1.10E-03	7.3E-01	2.6E-02	1.0E+06	1.9E-08	3.1E+04	6.1E-07
P-11	VOC	Benzene	71-43-2	T	A	2				3.70E-04	1.50E-03	5.0E-03		3.5E+01		1.1E+01	
P-11	VOC	Bromodichloromethane	75-27-4	T	B2	1				3.20E-04	3.20E-04	1.0E-01		3.7E+01		1.4E+01	
P-11	VOC	Bromoform	75-25-2	T	B2	2				3.70E-04	1.50E-03	1.0E-01		3.1E+03		1.4E+02	
P-11	VOC	Bromomethane	74-83-9	T	D	2				3.00E-04	1.25E-03	1.0E-02		9.0E+00		7.0E+01	
P-11	VOC	2-Butanone	78-93-3	T	ID	2				5.90E-04	2.50E-03	1.3E+01		2.4E+05		2.4E+05	
P-11	VOC	Carbon Disulfide	75-15-0	T		2				2.40E-04	1.00E-03	8.0E-01		5.5E+02		1.2E+03	
P-11	VOC	Carbon Tetrachloride	56-23-5	T	B2	2				3.70E-04	1.50E-03	5.0E-03		2.4E+00		4.6E+00	
P-11	VOC	Chlorobenzene	108-90-7	T	D	2				3.80E-04	1.60E-03	1.0E-01		4.7E+02		8.6E+01	
P-11	VOC	Chloroethane	75-00-3	T		2				2.90E-04	1.19E-03	4.3E-01		5.7E+03		4.4E+02	
P-11	VOC	Chloroform	67-66-3	T	B2	2				3.50E-04	1.50E-03	1.0E-01		1.8E+02		1.5E+02	
P-11	VOC	Chloromethane	74-87-3	T	D	2				4.90E-04	2.00E-03	2.6E-01		4.5E+01		4.9E+02	
P-11	VOC	Cumene	98-82-8	T	D	2				3.90E-04	1.65E-03	8.0E-01		5.6E+01		5.6E+01	
P-11	VOC	Cyclohexane	110-82-7	T	ID	2				3.30E-04	1.35E-03						
P-11	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	2				8.20E-04	3.40E-03	2.0E-04		1.2E+00		3.9E-01	
P-11	VOC	Dibromochloromethane	124-48-1	T	C	2				3.70E-04	1.50E-03	1.0E-01		1.1E+02		1.8E+01	
P-11	VOC	1,2-Dibromoethane	106-93-4	T	B2	2				3.40E-04	1.40E-03	1.0E-03		1.5E+01		2.5E-02	
P-11	VOC	1,2-Dichlorobenzene	95-50-1	T	D	2				3.80E-04	1.60E-03	6.0E-01		1.6E+02		1.6E+02	
P-11	VOC	1,3-Dichlorobenzene	541-73-1	T	D	2				3.80E-04	1.60E-03	6.6E-03				2.0E+00	
P-11	VOC	1,4-Dichlorobenzene	106-46-7	T	C	2				3.80E-04	1.60E-03	7.5E-02		7.4E+01		6.4E+00	
P-11	VOC	Dichlorodifluoromethane	75-71-8	T		2				4.90E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
P-11	VOC	1,1-Dichloroethane	75-34-3	T	C	2				3.00E-04	1.25E-03	8.8E-01		2.3E+03		2.4E+03	
P-11	VOC	1,2-Dichloroethane	107-06-2	T	B2	2				2.80E-04	1.17E-03	5.0E-03		5.9E+01		1.9E+01	
P-11	VOC	1,1-Dichloroethene	75-35-4	T	C	2				3.10E-04	1.30E-03	7.0E-03		1.3E+00		1.1E+01	
P-11	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	1				3.50E-04	3.50E-04	7.0E-02		2.1E+02		2.0E+02	
P-11	VOC	trans-1,2-Dichloroethene	156-60-5	T		2				3.30E-04	1.35E-03	1.0E-01		2.0E+02		2.2E+02	
P-11	VOC	1,2-Dichloropropane	78-87-5	T	B2	2				4.10E-04	1.70E-03	5.0E-03		3.6E+01		1.6E+01	
P-11	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	2				3.50E-04	1.50E-03	8.5E-03		2.6E+01		5.5E+00	
P-11	VOC	Ethyl Benzene	100-41-4	T	D	1				1.70E-03	1.70E-03	7.0E-01		1.7E+02		1.7E+02	
P-11	VOC	2-Hexanone	591-78-6	T		2				5.80E-04	2.40E-03	1.0E+00		8.7E+03		5.2E+03	
P-11	VOC	Methyl Acetate	79-20-9	T		2				5.40E-04	2.25E-03						
P-11	VOC	Methyl tert-butyl ether	1634-04-4	T		2				2.70E-04	1.15E-03	2.4E-01		4.7E+04		6.1E+02	
P-11	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	2	1	2.30E-03	2.30E-03	2.60E-04	2.60E-04	1.8E+00	1.3E-03	2.0E+04	1.2E-07	1.3E+04	1.8E-07
P-11	VOC	Methylcyclohexane	108-87-2	T		2				4.20E-04	1.75E-03						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
P-11	VOC	Methylene Chloride	75-09-2	T	B2	2				2.90E-04	1.19E-03	5.0E-03		1.4E+03		2.2E+02	
P-11	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	2				3.60E-04	1.50E-03	8.5E-03		7.7E+01		4.7E+00	
P-11	VOC	Tetrachloroethene	127-18-4	T	C-B2	1				1.75E-03	1.75E-03	5.0E-03		1.7E+02		1.2E+01	
P-11	VOC	Toluene	108-88-3	T	D	2				3.90E-04	1.65E-03	1.0E+00		5.3E+02		5.3E+02	
P-11	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	2				4.00E-04	1.65E-03	7.0E-02		3.0E+02		1.9E+01	
P-11	VOC	1,1,1-Trichloroethane	71-55-6	T	D	2				3.90E-04	1.65E-03	2.0E-01		1.3E+03		1.3E+03	
P-11	VOC	1,1,2-Trichloroethane	79-00-5	T	C	2				3.60E-04	1.50E-03	5.0E-03		1.1E+02		2.1E+01	
P-11	VOC	Trichloroethene	79-01-6	T	C-B2	2				4.20E-04	1.75E-03	5.0E-03		9.7E+01		2.2E+01	
P-11	VOC	Trichlorofluoromethane	75-69-4	T		2				5.40E-04	2.25E-03	2.6E+00		1.1E+03		1.1E+03	
P-11	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		2				3.20E-04	1.35E-03	1.7E+02		1.7E+02		1.7E+02	
P-11	VOC	Vinyl Chloride	75-01-4	T	A	1				3.60E-04	3.60E-04	2.0E-03		1.3E+01		1.0E+00	
P-11	VOC	Xylenes (total)	1330-20-7	T	ID	2				4.40E-04	1.85E-03	1.0E+01		1.9E+02		1.9E+02	
P-11	SVOC	Acenaphthene	83-32-9	T		2				6.90E-04	6.90E-03	1.3E+00		4.2E+00		4.2E+00	
P-11	SVOC	Acenaphthylene	208-96-8	T	D	2				4.10E-04	4.10E-03	5.2E-02		3.9E+00		3.9E+00	
P-11	SVOC	Acetophenone	98-86-2	T	D	2				6.50E-04	6.50E-03	1.5E+00		6.1E+03		6.1E+03	
P-11	SVOC	Anthracene	120-12-7	T	D	2				5.90E-04	5.90E-03	4.3E-02		4.3E-02		4.3E-02	
P-11	SVOC	Atrazine	1912-24-9	T		2				3.50E-04	3.50E-03	3.0E-03				5.4E+00	
P-11	SVOC	Benzaldehyde	100-52-7	T		2				5.90E-04	5.90E-03						
P-11	SVOC	Benzo(a)anthracene	56-55-3	T	B2	2				6.80E-04	6.80E-03	2.1E-03				9.4E-03	
P-11	SVOC	Benzo(a)pyrene	50-32-8	T	B2	2				5.30E-04	5.30E-03	5.0E-03				2.0E-03	
P-11	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	2				7.10E-04	7.10E-03	2.0E-03				2.0E-03	
P-11	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	2				7.00E-04	7.00E-03	5.0E-03				5.0E-03	
P-11	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	2				6.40E-04	6.40E-03	5.0E-03				5.0E-03	
P-11	SVOC	Biphenyl	92-52-4	T	D	2				6.50E-04	6.50E-03						
P-11	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	2				1.00E-03	1.00E-02						
P-11	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	2				1.70E-03	1.70E-02	2.0E-03		2.1E+02		5.7E+00	
P-11	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	2				2.00E-04	2.00E-03	6.0E-03				3.2E-01	
P-11	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	2				7.80E-04	7.80E-03						
P-11	SVOC	Butylbenzylphthalate	85-68-7	T	C	2				2.30E-04	2.30E-03	1.2E+00				2.7E+00	
P-11	SVOC	Caprolactam	105-60-2	T		2				4.50E-04	4.50E-03	5.8E+00				3.9E+05	
P-11	SVOC	Carbazole	86-74-8	T	B2	2				6.10E-04	6.10E-03	8.5E-02				7.4E+00	
P-11	SVOC	4-Chloro-3-methylphenol	59-50-7	T		2				5.50E-04	5.50E-03	1.5E-01				7.9E+01	
P-11	SVOC	2-Chloronaphthalene	91-58-7	T		2				7.30E-04	7.30E-03	1.8E+00				6.7E+00	
P-11	SVOC	2-Chlorophenol	95-57-8	T		2				1.30E-03	1.30E-02	4.5E-02				9.4E+01	
P-11	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		2				6.60E-04	6.60E-03						
P-11	SVOC	Chrysene	218-01-9	T	B2	2				6.70E-04	6.70E-03	5.0E-03				5.0E-03	
P-11	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	2				6.80E-04	6.80E-03	2.0E-03				2.0E-03	
P-11	SVOC	Dibenzofuran	132-64-9	T	D	2				6.60E-04	6.60E-03						
P-11	SVOC	2,4-Dichlorophenol	120-83-2	T		2				7.00E-04	7.00E-03	7.3E-02				4.8E+01	
P-11	SVOC	Diethylphthalate	84-66-2	T	D	2				2.50E-04	2.50E-03	5.5E+00				1.1E+03	
P-11	SVOC	2,4-Dimethylphenol	105-67-9	T		2				1.00E-03	1.00E-02	3.7E-01				5.2E+02	
P-11	SVOC	Dimethylphthalate	131-11-3	T	D	2				2.00E-04	2.00E-03	7.3E+01				4.2E+03	
P-11	SVOC	Di-n-butylphthalate	84-74-2	T	D	2				3.70E-04	3.70E-03	8.8E-01				1.1E+01	
P-11	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		2				2.10E-03	2.10E-02	2.0E-02				9.5E+00	
P-11	SVOC	2,4-Dinitrophenol	51-28-5	T		2				3.30E-03	3.30E-02						
P-11	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	2				4.60E-04	4.60E-03	7.7E-03				8.6E+00	
P-11	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	2				7.10E-04	7.10E-03						
P-11	SVOC	Di-n-octylphthalate	117-84-0	T		2				6.90E-04	6.90E-03	1.3E-01				4.0E-01	
P-11	SVOC	Fluoranthene	206-44-0	T	D	2				7.10E-04	7.10E-03	2.1E-01		2.1E-01		2.1E-01	
P-11	SVOC	Fluorene	86-73-7	T	D	2				7.50E-04	7.50E-03	8.8E-01		2.0E+00		2.0E+00	
P-11	SVOC	Hexachlorobenzene	118-74-1	T	B2	2				7.70E-04	7.70E-03	1.0E-03		3.0E+00		4.6E-03	
P-11	SVOC	Hexachlorobutadiene	87-68-3	T	C	2				1.50E-03	1.50E-02	1.5E-02		3.2E+00		4.0E-01	
P-11	SVOC	Hexachloroethane	67-72-1	T	C	2				1.60E-03	1.60E-02	7.3E-03		5.0E+01		1.9E+00	
P-11	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	2				6.90E-04	6.90E-03	2.0E-03				2.0E-03	
P-11	SVOC	Isophorone	78-59-1	T	C	2				8.60E-04	8.60E-03	7.7E-01				9.9E+02	
P-11	SVOC	2-Methylnaphthalene	91-57-6	T	ID	2				9.30E-04	9.30E-03	2.6E-01				2.5E+01	
P-11	SVOC	Methylphenol (total)	1319-77-3	T		2				9.00E-04	9.00E-03	3.7E-01				8.1E+02	
P-11	SVOC	Naphthalene	91-20-3	T	C	2				1.30E-03	1.30E-02	5.2E-01		3.1E+01		3.1E+01	
P-11	SVOC	2-Nitroaniline	88-74-4	T		2				4.90E-04	4.90E-03						
P-11	SVOC	4-Nitroaniline	100-01-6	T	C	2				5.90E-04	5.90E-03						
P-11	SVOC	Nitrobenzene	98-95-3	T	D	2				1.30E-03	1.30E-02	3.4E-03		5.5E+02		1.1E+01	
P-11	SVOC	2-Nitrophenol	88-75-5	T		2				9.50E-04	9.50E-03	2.0E-02				7.9E+01	
P-11	SVOC	4-Nitrophenol	100-02-7	T		2				3.50E-03	3.50E-02						
P-11	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	2				6.40E-04	6.40E-03	2.7E-01				3.5E+01	
P-11	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	2				1.10E-03	1.10E-02	5.0E-03				3.6E-01	
P-11	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	2				1.80E-03	1.80E-02						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
P-11	SVOC	Pentachlorophenol	87-86-5	T	B2	1				2.60E-02	2.60E-02	1.0E-03				2.0E-01	
P-11	SVOC	Phenanthrene	85-01-8	T	D	2				6.80E-04	6.80E-03	5.2E-02		1.0E+00		1.0E+00	
P-11	SVOC	Phenol	108-95-2	T	ID	2				1.30E-03	1.30E-02	4.4E+00				2.9E+04	
P-11	SVOC	Pyrene	129-00-0	T	D	2				6.30E-04	6.30E-03	1.4E-01		1.4E-01		1.4E-01	
P-11	SVOC	2,4,5-Trichlorophenol	95-95-4	T		2				8.60E-04	8.60E-03	7.3E-01				1.7E+02	
P-11	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	2				7.10E-04	7.10E-03	1.2E-01				1.0E+01	
P-11	P/PCB	PCBs (total)	1336-36-3	T	B2	2				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
P-11	INORG	Antimony	7440-36-0	T		2				3.40E-03	3.40E-03	6.0E-03				6.8E+01	
P-11	INORG	Arsenic	7440-38-2	T	A	2	2	3.90E-03	2.36E-02			5.0E-02	4.7E-01			4.3E+00	5.5E-03
P-11	INORG	Barium	7440-39-3	T	D	2	2	4.23E-02	3.97E-01			2.0E+00	2.0E-01			1.4E+04	2.8E-05
P-11	INORG	Beryllium	7440-41-7	T	B1	2				6.00E-04	6.00E-04	4.0E-03				2.9E+02	
P-11	INORG	Cadmium	7440-43-9	T	B1	2				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
P-11	INORG	Chromium (total)	7440-47-3	T		2				1.50E-03	1.50E-03	1.0E-01				4.6E+02	
P-11	INORG	Cobalt	7440-48-4	T	B1	2	1	5.35E-02	5.35E-02	7.40E-04	7.40E-04	4.0E-02	**1.3E+00**			2.4E+03	2.2E-05
P-11	INORG	Copper	7440-50-8	T	D	2	1	9.10E-03	9.10E-03	1.70E-03	1.70E-03	1.4E+00	6.5E-03			7.4E+03	1.2E-06
P-11	INORG	Lead	7439-92-1	T	B2	2				1.60E-03	1.60E-03	4.0E-03					
P-11	INORG	Manganese	7439-96-5	T	D	2	2	3.11E-02	5.01E-01			8.6E-01	5.8E-01			9.1E+03	5.5E-05
P-11	INORG	Mercury	7439-97-6	T	D	2				8.70E-05	8.70E-05	2.0E-03		5.6E-02		5.6E-02	
P-11	INORG	Nickel	7440-02-0	T	A	2	1	9.75E-03	9.75E-03	2.90E-03	2.90E-03	1.0E-01	9.8E-02			7.4E+04	1.3E-07
P-11	INORG	Selenium	7782-49-2	T	D	2				4.70E-03	4.70E-03	5.0E-02				9.7E+02	
P-11	INORG	Silver	7440-22-4	T	D	2				9.80E-04	9.80E-04	3.4E-02				1.5E+03	
P-11	INORG	Thallium	7440-28-0	T		2				3.30E-05	3.30E-05	2.0E-03				1.3E+01	
P-11	INORG	Vanadium	7440-62-2	T		2	1	5.98E-04	5.98E-04	6.70E-04	6.70E-04	4.5E-03	1.3E-01			9.7E+02	6.2E-07
P-11	INORG	Zinc	7440-66-6	T	D	2				1.40E-02	1.40E-02	2.4E+00				1.1E+05	
PSB	VOC	Acetone	67-64-1	T	ID	4				5.10E-04	1.00E-03	7.3E-01		1.0E+06		3.1E+04	
PSB	VOC	Benzene	71-43-2	T	A	4	2	1.20E-03	1.40E-03	1.60E-04	1.60E-04	5.0E-03	2.8E-01	3.5E+01	4.0E-05	1.1E+01	1.3E-04
PSB	VOC	Bromodichloromethane	75-27-4	T	B2	4				1.70E-04	3.40E-04	1.0E-01		3.7E+01		1.4E+01	
PSB	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	3.60E-04	1.0E-01		3.1E+03		1.4E+02	
PSB	VOC	Bromomethane	74-83-9	T	D	4				2.00E-04	4.00E-04	1.0E-02		9.0E+00		7.0E+01	
PSB	VOC	2-Butanone	78-93-3	T	ID	4	1	4.00E-03	4.00E-03	4.10E-04	8.20E-04	1.3E+01	3.1E-04	2.4E+05	1.7E-08	2.4E+05	1.7E-08
PSB	VOC	Carbon Disulfide	75-15-0	T		4	1	8.30E-04	8.30E-04	2.00E-04	4.00E-04	8.0E-01	1.0E-03	5.5E+02	1.5E-06	1.2E+03	6.9E-07
PSB	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	2.40E-04	5.0E-03		2.4E+00		4.6E+00	
PSB	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	2.80E-04	1.0E-01		4.7E+02		8.6E+01	
PSB	VOC	Chloroethane	75-00-3	T		4				2.60E-04	5.20E-04	4.3E-01		5.7E+03		4.4E+02	
PSB	VOC	Chloroform	67-66-3	T	B2	4				1.40E-04	2.80E-04	1.0E-01		1.8E+02		1.5E+02	
PSB	VOC	Chloromethane	74-87-3	T	D	4				1.30E-04	2.60E-04	2.6E-01		4.5E+01		4.9E+02	
PSB	VOC	Cumene	98-82-8	T	D	4	3	1.70E-04	3.20E-04	1.20E-04	1.20E-04	8.0E-01	4.0E-04	5.6E+01	5.7E-06	5.6E+01	5.7E-06
PSB	VOC	Cyclohexane	110-82-7	T	ID	4	4	2.00E-04	4.40E-04								
PSB	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	1.20E-03	2.0E-04		1.2E+00		3.9E-01	
PSB	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	5.20E-04	1.0E-01		1.1E+02		1.8E+01	
PSB	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	4.40E-04	1.0E-03		1.5E+01		2.5E-02	
PSB	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	2.20E-04	6.0E-01		1.6E+02		1.6E+02	
PSB	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	3.00E-04	6.6E-03				2.0E+00	
PSB	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	3.40E-04	7.5E-02		7.4E+01		6.4E+00	
PSB	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	5.20E-04	1.7E+00		3.0E+02		3.0E+02	
PSB	VOC	1,1-Dichloroethane	75-34-3	T	C	4				1.60E-04	3.20E-04	8.8E-01		2.3E+03		2.4E+03	
PSB	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	4.20E-04	5.0E-03		5.9E+01		1.9E+01	
PSB	VOC	1,1-Dichloroethene	75-35-4	T	C	4				2.40E-04	4.80E-04	7.0E-03		1.3E+00		1.1E+01	
PSB	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.20E-04	4.40E-04	7.0E-02		2.1E+02		2.0E+02	
PSB	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	3.00E-04	1.0E-01		2.0E+02		2.2E+02	
PSB	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	3.40E-04	5.0E-03		3.6E+01		1.6E+01	
PSB	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	5.40E-04	8.5E-03		2.6E+01		5.5E+00	
PSB	VOC	Ethyl Benzene	100-41-4	T	D	4	2	5.70E-04	7.40E-04	1.20E-04	1.20E-04	7.0E-01	1.1E-03	1.7E+02	4.4E-06	1.7E+02	4.4E-06
PSB	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	9.20E-04	1.0E+00		8.7E+03		5.2E+03	
PSB	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	8.20E-04						
PSB	VOC	Methyl tert-butyl ether	1634-04-4	T		4				1.30E-04	2.60E-04	2.4E-01		4.7E+04		6.1E+02	
PSB	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	4				2.30E-04	4.60E-04	1.8E+00		2.0E+04		1.3E+04	
PSB	VOC	Methylcyclohexane	108-87-2	T		4	4	1.60E-04	4.70E-04								
PSB	VOC	Methylene Chloride	75-09-2	T	B2	4				3.40E-04	6.80E-04	5.0E-03		1.4E+03		2.2E+02	
PSB	VOC	Styrene	100-42-5	T		4				1.50E-04	3.00E-04	1.0E-01		3.1E+02		9.7E+00	
PSB	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	5.00E-04	8.5E-03		7.7E+01		4.7E+00	
PSB	VOC	Tetrachloroethene	127-18-4	T	C-B2	4				2.30E-04	4.60E-04	5.0E-03		1.7E+02		1.2E+01	
PSB	VOC	Toluene	108-88-3	T	D	4	2	1.20E-03	2.40E-03	1.80E-04	1.80E-04	1.0E+00	2.4E-03	5.3E+02	4.5E-06	5.3E+02	4.5E-06
PSB	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	3.40E-04	7.0E-02		3.0E+02		1.9E+01	
PSB	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4				1.50E-04	3.00E-04	2.0E-01		1.3E+03		1.3E+03	
PSB	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	6.00E-04	5.0E-03		1.1E+02		2.1E+01	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
PSB	VOC	Trichloroethene	79-01-6	T	C-B2	4				1.40E-04	2.80E-04	5.0E-03		9.7E+01		2.2E+01	
PSB	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	5.60E-04	2.6E+00		1.1E+03		1.1E+03	
PSB	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	6.40E-04	1.7E+02		1.7E+02		1.7E+02	
PSB	VOC	Vinyl Chloride	75-01-4	T	A	4				1.50E-04	3.00E-04	2.0E-03		1.3E+01		1.0E+00	
PSB	VOC	Xylenes (total)	1330-20-7	T	ID	4	3	4.90E-04	9.50E-03	3.30E-04	3.30E-04	1.0E+01	9.5E-04	1.9E+02	5.0E-05	1.9E+02	5.0E-05
PSB	SVOC	Acenaphthene	83-32-9	T		4	1	1.50E-03	1.50E-03	8.00E-04	8.00E-04	1.3E+00	1.2E-03	4.2E+00	3.6E-04	4.2E+00	3.6E-04
PSB	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	7.10E-04	5.2E-02		3.9E+00		3.9E+00	
PSB	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	2.60E-03	1.5E+00		6.1E+03		6.1E+03	
PSB	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	6.80E-04	4.3E-02		4.3E-02		4.3E-02	
PSB	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	2.50E-03	3.0E-03				5.4E+00	
PSB	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	2.80E-03						
PSB	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	7.00E-04	2.1E-03				9.4E-03	
PSB	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	7.30E-04	5.0E-03				2.0E-03	
PSB	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	9.40E-04	2.0E-03				2.0E-03	
PSB	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	8.50E-04	5.0E-03				5.0E-03	
PSB	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	8.40E-04	5.0E-03				5.0E-03	
PSB	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	2.60E-03						
PSB	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	8.70E-04						
PSB	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	9.70E-04	2.0E-03		2.1E+02		5.7E+00	
PSB	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4				2.70E-03	2.70E-03	6.0E-03				3.2E-01	
PSB	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	8.80E-04						
PSB	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	8.80E-04	1.2E+00				2.7E+00	
PSB	SVOC	Caprolactam	105-60-2	T		4				2.50E-03	2.50E-03	5.8E+00				3.9E+05	
PSB	SVOC	Carbazole	86-74-8	T	B2	4	2	1.10E-03	1.40E-03	8.20E-04	8.20E-04	8.5E-02	1.6E-02			7.4E+00	1.9E-04
PSB	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	9.90E-04	1.5E-01				7.9E+01	
PSB	SVOC	4-Chloroaniline	106-47-8	T		2				6.10E-04	6.10E-04						
PSB	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	8.50E-04	1.8E+00				6.7E+00	
PSB	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	1.00E-03	4.5E-02				9.4E+01	
PSB	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	7.90E-04						
PSB	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	7.50E-04	5.0E-03				5.0E-03	
PSB	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	7.90E-04	2.0E-03				2.0E-03	
PSB	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	1.10E-03						
PSB	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	9.30E-04	1.1E-03				1.8E-01	
PSB	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	8.50E-04	7.3E-02				4.8E+01	
PSB	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	6.50E-04	5.5E+00				1.1E+03	
PSB	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	8.50E-04	3.7E-01				5.2E+02	
PSB	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	7.60E-04	7.3E+01				4.2E+03	
PSB	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	6.70E-04	8.8E-01				1.1E+01	
PSB	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	1.30E-03	2.0E-02				9.5E+00	
PSB	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	3.00E-03						
PSB	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	7.90E-04	7.7E-03				8.6E+00	
PSB	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.70E-04						
PSB	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	1.10E-03	1.3E-01				4.0E-01	
PSB	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	8.10E-04	2.1E-01		2.1E-01		2.1E-01	
PSB	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	1.00E-03	8.8E-01		2.0E+00		2.0E+00	
PSB	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	7.40E-04	1.0E-03		3.0E+00		4.6E-03	
PSB	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	7.30E-04	1.5E-02		3.2E+00		4.0E-01	
PSB	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	1.10E-03	5.0E-02		4.2E-01		1.6E+00	
PSB	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	7.40E-04	7.3E-03		5.0E+01		1.9E+00	
PSB	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	6.30E-04	2.0E-03				2.0E-03	
PSB	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	6.30E-04	7.7E-01				9.9E+02	
PSB	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4	1	8.90E-04	8.90E-04	6.40E-04	6.40E-04	2.6E-01	3.4E-03			2.5E+01	3.6E-05
PSB	SVOC	Methylphenol (total)	1319-77-3	T		4	2	3.75E-03	4.55E-03	1.30E-03	1.30E-03	3.7E-01	1.2E-02			8.1E+02	5.6E-06
PSB	SVOC	Naphthalene	91-20-3	T	C	4	2	5.30E-03	6.80E-03	7.50E-04	7.50E-04	5.2E-01	1.3E-02	3.1E+01	2.2E-04	3.1E+01	2.2E-04
PSB	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	7.00E-04						
PSB	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	7.10E-04						
PSB	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	1.30E-03						
PSB	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	8.10E-04	3.4E-03		5.5E+02		1.1E+01	
PSB	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	2.10E-03	2.0E-02				7.9E+01	
PSB	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	1.90E-03						
PSB	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	1.40E-03	2.7E-01				3.5E+01	
PSB	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	6.70E-04	5.0E-03				3.6E-01	
PSB	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	7.80E-04						
PSB	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	2.40E-03	1.0E-03				2.0E-01	
PSB	SVOC	Phenanthrene	85-01-8	T	D	4	1	1.10E-03	1.10E-03	8.20E-04	8.20E-04	5.2E-02	2.1E-02	1.0E+00	1.1E-03	1.0E+00	1.1E-03
PSB	SVOC	Phenol	108-95-2	T	ID	4	2	6.10E-02	6.70E-02	2.60E-03	2.60E-03	4.4E+00	1.5E-02			2.9E+04	2.3E-06

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
PSB	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	1.10E-03	1.4E-01		1.4E-01		1.4E-01	
PSB	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	1.20E-03	7.3E-01				1.7E+02	
PSB	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	1.70E-03	1.2E-01				1.0E+01	
PSB	P/PCB	PCBs (total)	1336-36-3	D	B2	2				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
PSB	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
PSB	INORG	Antimony	7440-36-0	D		4	1	2.70E-03	2.70E-03	2.20E-03	2.20E-03	6.0E-03	4.5E-01			6.8E+01	4.0E-05
PSB	INORG	Antimony	7440-36-0	T		4				2.20E-03	2.20E-03	6.0E-03				6.8E+01	
PSB	INORG	Arsenic	7440-38-2	D	A	4	4	4.50E-03	1.51E-02			5.0E-02	3.0E-01			4.3E+00	3.5E-03
PSB	INORG	Arsenic	7440-38-2	T	A	4	3	6.00E-03	1.42E-02	3.90E-03	3.90E-03	5.0E-02	2.8E-01			4.3E+00	3.3E-03
PSB	INORG	Barium	7440-39-3	D	D	4	4	5.55E-01	9.09E-01			2.0E+00	4.5E-01			1.4E+04	6.5E-05
PSB	INORG	Barium	7440-39-3	T	D	4	4	5.66E-01	8.79E-01			2.0E+00	4.4E-01			1.4E+04	6.3E-05
PSB	INORG	Beryllium	7440-41-7	D	B1	4				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
PSB	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
PSB	INORG	Cadmium	7440-43-9	D	B1	4				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
PSB	INORG	Cadmium	7440-43-9	T	B1	4				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
PSB	INORG	Chromium (total)	7440-47-3	D		4				1.40E-03	1.40E-03	1.0E-01				4.6E+02	
PSB	INORG	Chromium (total)	7440-47-3	T		4				1.40E-03	1.40E-03	1.0E-01				4.6E+02	
PSB	INORG	Cobalt	7440-48-4	D	B1	4				1.30E-03	1.30E-03	4.0E-02				2.4E+03	
PSB	INORG	Cobalt	7440-48-4	T	B1	4				1.30E-03	1.30E-03	4.0E-02				2.4E+03	
PSB	INORG	Copper	7440-50-8	D	D	4				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
PSB	INORG	Copper	7440-50-8	T	D	4				4.20E-03	4.20E-03	1.4E+00				7.4E+03	
PSB	INORG	Lead	7439-92-1	D	B2	4				2.50E-03	2.50E-03	4.0E-03					
PSB	INORG	Lead	7439-92-1	T	B2	4				2.50E-03	2.50E-03	4.0E-03					
PSB	INORG	Manganese	7439-96-5	D	D	4	2	3.43E-01	4.14E-01	9.00E-04	9.00E-04	8.6E-01	4.8E-01			9.1E+03	4.5E-05
PSB	INORG	Manganese	7439-96-5	T	D	4	4	4.50E-03	3.97E-01			8.6E-01	4.6E-01			9.1E+03	4.4E-05
PSB	INORG	Mercury	7439-97-6	D	D	4	1	2.50E-04	2.50E-04	6.90E-05	6.90E-05	2.0E-03	1.3E-01	5.6E-02	4.5E-03	5.6E-02	4.5E-03
PSB	INORG	Mercury	7439-97-6	T	D	4	2	9.20E-05	1.10E-04	6.90E-05	6.90E-05	2.0E-03	5.5E-02	5.6E-02	2.0E-03	5.6E-02	2.0E-03
PSB	INORG	Nickel	7440-02-0	D	A	4	2	4.30E-03	1.56E-02	2.20E-03	2.20E-03	1.0E-01	1.6E-01			7.4E+04	2.1E-07
PSB	INORG	Nickel	7440-02-0	T	A	4	2	3.90E-03	1.55E-02	2.20E-03	2.20E-03	1.0E-01	1.6E-01			7.4E+04	2.1E-07
PSB	INORG	Selenium	7782-49-2	D	D	4				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
PSB	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
PSB	INORG	Silver	7440-22-4	D	D	4				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
PSB	INORG	Silver	7440-22-4	T	D	4				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
PSB	INORG	Thallium	7440-28-0	D		4				1.80E-05	5.00E-03	2.0E-03				1.3E+01	
PSB	INORG	Thallium	7440-28-0	T		4				1.80E-05	5.00E-03	2.0E-03				1.3E+01	
PSB	INORG	Vanadium	7440-62-2	D		4	1	2.50E-03	2.50E-03	8.20E-04	8.20E-04	4.5E-03	5.6E-01			9.7E+02	2.6E-06
PSB	INORG	Vanadium	7440-62-2	T		4	1	2.40E-03	2.40E-03	8.20E-04	8.20E-04	4.5E-03	5.3E-01			9.7E+02	2.5E-06
PSB	INORG	Zinc	7440-66-6	D	D	4				1.20E-02	1.20E-02	2.4E+00				1.1E+05	
PSB	INORG	Zinc	7440-66-6	T	D	4	3	1.33E-02	1.97E-02	1.20E-02	1.20E-02	2.4E+00	8.2E-03			1.1E+05	1.8E-07
SWDF	VOC	Acetone	67-64-1	T	ID	10	3	2.10E-03	5.50E-03	1.10E-03	1.10E-03	7.3E-01	7.5E-03	1.0E+06	5.5E-09	3.1E+04	1.8E-07
SWDF	VOC	Benzene	71-43-2	T	A	10	1	4.50E-04	4.50E-04	3.70E-04	3.70E-04	5.0E-03	9.0E-02	3.5E+01	1.3E-05	1.1E+01	4.1E-05
SWDF	VOC	Bromodichloromethane	75-27-4	T	B2	10				3.20E-04	3.20E-04	1.0E-01		3.7E+01		1.4E+01	
SWDF	VOC	Bromoform	75-25-2	T	B2	10				3.70E-04	3.70E-04	1.0E-01		3.1E+03		1.4E+02	
SWDF	VOC	Bromomethane	74-83-9	T	D	10				3.00E-04	3.00E-04	1.0E-02		9.0E+00		7.0E+01	
SWDF	VOC	2-Butanone	78-93-3	T	ID	10	1	1.30E-03	1.30E-03	5.90E-04	5.90E-04	1.3E+01	1.0E-04	2.4E+05	5.4E-09	2.4E+05	5.4E-09
SWDF	VOC	Carbon Disulfide	75-15-0	T		10	6	1.80E-04	2.30E-03	2.40E-04	2.40E-04	8.0E-01	2.9E-03	5.5E+02	4.2E-06	1.2E+03	1.9E-06
SWDF	VOC	Carbon Tetrachloride	56-23-5	T	B2	10				3.70E-04	3.70E-04	5.0E-03		2.4E+00		4.6E+00	
SWDF	VOC	Chlorobenzene	108-90-7	T	D	10				3.80E-04	3.80E-04	1.0E-01		4.7E+02		8.6E+01	
SWDF	VOC	Chloroethane	75-00-3	T		10				2.90E-04	2.90E-04	4.3E-01		5.7E+03		4.4E+02	
SWDF	VOC	Chloroform	67-66-3	T	B2	10				3.50E-04	3.50E-04	1.0E-01		1.8E+02		1.5E+02	
SWDF	VOC	Chloromethane	74-87-3	T	D	10				4.90E-04	4.90E-04	2.6E-01		4.5E+01		4.9E+02	
SWDF	VOC	Cumene	98-82-8	T	D	10				3.90E-04	3.90E-04	8.0E-01		5.6E+01		5.6E+01	
SWDF	VOC	Cyclohexane	110-82-7	T	ID	10				3.30E-04	3.30E-04						
SWDF	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	10				8.20E-04	8.20E-04	2.0E-04		1.2E+00		3.9E-01	
SWDF	VOC	Dibromochloromethane	124-48-1	T	C	10				3.70E-04	3.70E-04	1.0E-01		1.1E+02		1.8E+01	
SWDF	VOC	1,2-Dibromoethane	106-93-4	T	B2	10				3.40E-04	3.40E-04	1.0E-03		1.5E+01		2.5E-02	
SWDF	VOC	1,2-Dichlorobenzene	95-50-1	T	D	10				3.80E-04	3.80E-04	6.0E-01		1.6E+02		1.6E+02	
SWDF	VOC	1,3-Dichlorobenzene	541-73-1	T	D	10				3.80E-04	3.80E-04	6.6E-03				2.0E+00	
SWDF	VOC	1,4-Dichlorobenzene	106-46-7	T	C	10				3.80E-04	3.80E-04	7.5E-02		7.4E+01		6.4E+00	
SWDF	VOC	Dichlorodifluoromethane	75-71-8	T		10				4.90E-04	4.90E-04	1.7E+00		3.0E+02		3.0E+02	
SWDF	VOC	1,1-Dichloroethane	75-34-3	T	C	10	1	5.40E-04	5.40E-04	3.00E-04	3.00E-04	8.8E-01	6.1E-04	2.3E+03	2.3E-07	2.4E+03	2.3E-07
SWDF	VOC	1,2-Dichloroethane	107-06-2	T	B2	10				2.80E-04	2.80E-04	5.0E-03		5.9E+01		1.9E+01	
SWDF	VOC	1,1-Dichloroethene	75-35-4	T	C	10				3.10E-04	3.10E-04	7.0E-03		1.3E+00		1.1E+01	
SWDF	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	10				3.50E-04	3.50E-04	7.0E-02		2.1E+02		2.0E+02	
SWDF	VOC	trans-1,2-Dichloroethene	156-60-5	T		10				3.30E-04	3.30E-04	1.0E-01		2.0E+02		2.2E+02	
SWDF	VOC	1,2-Dichloropropane	78-87-5	T	B2	10				4.10E-04	4.10E-04	5.0E-03		3.6E+01		1.6E+01	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
SWDF	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	10				3.50E-04	3.50E-04	8.5E-03		2.6E+01		5.5E+00	
SWDF	VOC	Ethyl Benzene	100-41-4	T	D	10				4.10E-04	4.10E-04	7.0E-01		1.7E+02		1.7E+02	
SWDF	VOC	2-Hexanone	591-78-6	T		10				5.80E-04	5.80E-04	1.0E+00		8.7E+03		5.2E+03	
SWDF	VOC	Methyl Acetate	79-20-9	T		10				5.40E-04	5.40E-04						
SWDF	VOC	Methyl tert-butyl ether	1634-04-4	T		10				2.70E-04	2.70E-04	2.4E-01		4.7E+04		6.1E+02	
SWDF	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	9	6	7.80E-04	3.30E-03	2.60E-04	2.60E-04	1.8E+00	1.8E-03	2.0E+04	1.7E-07	1.3E+04	2.5E-07
SWDF	VOC	Methylcyclohexane	108-87-2	T		10				4.20E-04	4.20E-04						
SWDF	VOC	Methylene Chloride	75-09-2	T	B2	10				2.90E-04	2.90E-04	5.0E-03		1.4E+03		2.2E+02	
SWDF	VOC	Styrene	100-42-5	T		10				3.50E-04	3.50E-04	1.0E-01		3.1E+02		9.7E+00	
SWDF	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	10				3.60E-04	3.60E-04	8.5E-03		7.7E+01		4.7E+00	
SWDF	VOC	Tetrachloroethene	127-18-4	T	C-B2	10				4.20E-04	4.20E-04	5.0E-03		1.7E+02		1.2E+01	
SWDF	VOC	Toluene	108-88-3	T	D	10	8	4.70E-04	9.50E-04	3.90E-04	3.90E-04	1.0E+00	9.5E-04	5.3E+02	1.8E-06	5.3E+02	1.8E-06
SWDF	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	10				4.00E-04	4.00E-04	7.0E-02		3.0E+02		1.9E+01	
SWDF	VOC	1,1,1-Trichloroethane	71-55-6	T	D	10				3.90E-04	3.90E-04	2.0E-01		1.3E+03		1.3E+03	
SWDF	VOC	1,1,2-Trichloroethane	79-00-5	T	C	10				3.60E-04	3.60E-04	5.0E-03		1.1E+02		2.1E+01	
SWDF	VOC	Trichloroethene	79-01-6	T	C-B2	10				4.20E-04	4.20E-04	5.0E-03		9.7E+01		2.2E+01	
SWDF	VOC	Trichlorofluoromethane	75-69-4	T		10				5.40E-04	5.40E-04	2.6E+00		1.1E+03		1.1E+03	
SWDF	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		10				3.20E-04	3.20E-04	1.7E+02		1.7E+02		1.7E+02	
SWDF	VOC	Vinyl Chloride	75-01-4	T	A	10				3.60E-04	3.60E-04	2.0E-03		1.3E+01		1.0E+00	
SWDF	VOC	Xylenes (total)	1330-20-7	T	ID	10	6	5.20E-04	1.50E-03	4.40E-04	4.40E-04	1.0E+01	1.5E-04	1.9E+02	7.9E-06	1.9E+02	7.9E-06
SWDF	SVOC	Acenaphthene	83-32-9	T		10	3	8.60E-04	1.35E-03	8.00E-04	2.00E-03	1.3E+00	1.0E-03	4.2E+00	3.2E-04	4.2E+00	3.2E-04
SWDF	SVOC	Acenaphthylene	208-96-8	T	D	10				7.10E-04	1.80E-03	5.2E-02		3.9E+00		3.9E+00	
SWDF	SVOC	Acetophenone	98-86-2	T	D	10				2.60E-03	6.50E-03	1.5E+00		6.1E+03		6.1E+03	
SWDF	SVOC	Anthracene	120-12-7	T	D	10	1	7.40E-04	7.40E-04	6.80E-04	1.70E-03	4.3E-02	1.7E-02	4.3E-02	1.7E-02	4.3E-02	1.7E-02
SWDF	SVOC	Atrazine	1912-24-9	T		10				2.50E-03	6.20E-03	3.0E-03				5.4E+00	
SWDF	SVOC	Benzaldehyde	100-52-7	T		10				2.80E-03	7.00E-03						
SWDF	SVOC	Benzo(a)anthracene	56-55-3	T	B2	10				7.00E-04	1.80E-03	2.1E-03				9.4E-03	
SWDF	SVOC	Benzo(a)pyrene	50-32-8	T	B2	10				7.30E-04	1.80E-03	5.0E-03				2.0E-03	
SWDF	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	10				9.40E-04	2.40E-03	2.0E-03				2.0E-03	
SWDF	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	10				8.50E-04	2.10E-03	5.0E-03				5.0E-03	
SWDF	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	10				8.40E-04	2.10E-03	5.0E-03				5.0E-03	
SWDF	SVOC	Biphenyl	92-52-4	T	D	10				2.60E-03	6.50E-03						
SWDF	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	10				8.70E-04	2.20E-03						
SWDF	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	10				9.70E-04	2.40E-03	2.0E-03		2.1E+02		5.7E+00	
SWDF	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	10				2.70E-03	6.80E-03	6.0E-03				3.2E-01	
SWDF	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	10				8.80E-04	2.20E-03						
SWDF	SVOC	Butylbenzylphthalate	85-68-7	T	C	10				8.80E-04	2.20E-03	1.2E+00				2.7E+00	
SWDF	SVOC	Caprolactam	105-60-2	T		10				2.50E-03	6.20E-03	5.8E+00				3.9E+05	
SWDF	SVOC	Carbazole	86-74-8	T	B2	10	5	1.00E-03	4.70E-03	8.20E-04	2.00E-03	8.5E-02	5.5E-02			7.4E+00	6.4E-04
SWDF	SVOC	4-Chloro-3-methylphenol	59-50-7	T		10				9.90E-04	2.50E-03	1.5E-01				7.9E+01	
SWDF	SVOC	4-Chloroaniline	106-47-8	T		10				6.10E-04	1.50E-03						
SWDF	SVOC	2-Chloronaphthalene	91-58-7	T		10				8.50E-04	2.10E-03	1.8E+00				6.7E+00	
SWDF	SVOC	2-Chlorophenol	95-57-8	T		10				1.00E-03	2.50E-03	4.5E-02				9.4E+01	
SWDF	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		10				7.90E-04	2.00E-03						
SWDF	SVOC	Chrysene	218-01-9	T	B2	10				7.50E-04	1.90E-03	5.0E-03				5.0E-03	
SWDF	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	10				7.90E-04	2.00E-03	2.0E-03				2.0E-03	
SWDF	SVOC	Dibenzofuran	132-64-9	T	D	10				1.10E-03	2.80E-03						
SWDF	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	2.30E-03	1.1E-03				1.8E-01	
SWDF	SVOC	2,4-Dichlorophenol	120-83-2	T		10				8.50E-04	2.10E-03	7.3E-02				4.8E+01	
SWDF	SVOC	Diethylphthalate	84-66-2	T	D	10	4	8.00E-04	2.30E-03	6.50E-04	1.60E-03	5.5E+00	4.2E-04			1.1E+03	2.1E-06
SWDF	SVOC	2,4-Dimethylphenol	105-67-9	T		10	7	1.30E-03	1.50E-02	8.50E-04	8.50E-04	3.7E-01	4.1E-02			5.2E+02	2.9E-05
SWDF	SVOC	Dimethylphthalate	131-11-3	T	D	10				7.60E-04	1.90E-03	7.3E+01				4.2E+03	
SWDF	SVOC	Di-n-butylphthalate	84-74-2	T	D	10	1	7.70E-04	7.70E-04	6.70E-04	1.70E-03	8.8E-01	8.8E-04			1.1E+01	7.0E-05
SWDF	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		10				1.30E-03	3.20E-03	2.0E-02				9.5E+00	
SWDF	SVOC	2,4-Dinitrophenol	51-28-5	T		10				3.00E-03	7.50E-03						
SWDF	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	10				7.90E-04	2.00E-03	7.7E-03				8.6E+00	
SWDF	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	10				5.70E-04	1.40E-03						
SWDF	SVOC	Di-n-octylphthalate	117-84-0	T		10				1.10E-03	2.80E-03	1.3E-01				4.0E-01	
SWDF	SVOC	Fluoranthene	206-44-0	T	D	10	1	9.15E-04	9.15E-04	8.10E-04	2.00E-03	2.1E-01	4.4E-03	2.1E-01	4.4E-03	2.1E-01	4.4E-03
SWDF	SVOC	Fluorene	86-73-7	T	D	10	2	1.65E-03	1.70E-03	1.00E-03	2.50E-03	8.8E-01	1.9E-03	2.0E+00	8.5E-04	2.0E+00	8.5E-04
SWDF	SVOC	Hexachlorobenzene	118-74-1	T	B2	10				7.40E-04	1.80E-03	1.0E-03		3.0E+00		4.6E-03	
SWDF	SVOC	Hexachlorobutadiene	87-68-3	T	C	10				7.30E-04	1.80E-03	1.5E-02		3.2E+00		4.0E-01	
SWDF	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	10				1.10E-03	2.80E-03	5.0E-02		4.2E-01		1.6E+00	
SWDF	SVOC	Hexachloroethane	67-72-1	T	C	10				7.40E-04	1.80E-03	7.3E-03		5.0E+01		1.9E+00	
SWDF	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	10				6.30E-04	1.60E-03	2.0E-03				2.0E-03	
SWDF	SVOC	Isophorone	78-59-1	T	C	10				6.30E-04	1.60E-03	7.7E-01				9.9E+02	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
SWDF	SVOC	2-Methylnaphthalene	91-57-6	T	ID	10	2	7.20E-04	7.30E-04	6.40E-04	1.60E-03	2.6E-01	2.8E-03			2.5E+01	2.9E-05
SWDF	SVOC	Methylphenol (total)	1319-77-3	T		10	7	2.45E-03	1.75E-02	1.30E-03	1.30E-03	3.7E-01	4.7E-02			8.1E+02	2.2E-05
SWDF	SVOC	Naphthalene	91-20-3	T	C	10	6	7.60E-04	3.60E-03	7.50E-04	1.90E-03	5.2E-01	6.9E-03	3.1E+01	1.2E-04	3.1E+01	1.2E-04
SWDF	SVOC	2-Nitroaniline	88-74-4	T		10				7.00E-04	1.80E-03						
SWDF	SVOC	3-Nitroaniline	99-09-2	T	C	10				7.10E-04	1.80E-03						
SWDF	SVOC	4-Nitroaniline	100-01-6	T	C	10				1.30E-03	3.20E-03						
SWDF	SVOC	Nitrobenzene	98-95-3	T	D	10				8.10E-04	2.00E-03	3.4E-03		5.5E+02		1.1E+01	
SWDF	SVOC	2-Nitrophenol	88-75-5	T		10				2.10E-03	5.20E-03	2.0E-02				7.9E+01	
SWDF	SVOC	4-Nitrophenol	100-02-7	T		10				1.90E-03	4.80E-03						
SWDF	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	10				1.40E-03	3.50E-03	2.7E-01				3.5E+01	
SWDF	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	10				6.70E-04	1.70E-03	5.0E-03				3.6E-01	
SWDF	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	10				7.80E-04	2.00E-03						
SWDF	SVOC	Pentachlorophenol	87-86-5	T	B2	10				2.40E-03	6.00E-03	1.0E-03				2.0E-01	
SWDF	SVOC	Phenanthrene	85-01-8	T	D	10	4	9.10E-04	2.25E-03	8.20E-04	2.00E-03	5.2E-02	4.3E-02	1.0E+00	2.3E-03	1.0E+00	2.3E-03
SWDF	SVOC	Phenol	108-95-2	T	ID	10	5	2.70E-03	9.40E-02	2.60E-03	2.60E-03	4.4E+00	2.1E-02			2.9E+04	3.2E-06
SWDF	SVOC	Pyrene	129-00-0	T	D	10				1.10E-03	2.80E-03	1.4E-01		1.4E-01		1.4E-01	
SWDF	SVOC	2,4,5-Trichlorophenol	95-95-4	T		10				1.20E-03	3.00E-03	7.3E-01				1.7E+02	
SWDF	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	10				1.70E-03	4.20E-03	1.2E-01				1.0E+01	
SWDF	P/PCB	PCBs (total)	1336-36-3	T	B2	10	9	1.28E-04	1.40E-03	8.20E-05	8.20E-05	5.0E-04	**2.8E+00**	4.5E-02	3.1E-02	3.3E-03	4.2E-01
SWDF	INORG	Antimony	7440-36-0	D		8	3	8.20E-03	2.23E-02	3.40E-03	3.40E-03	6.0E-03	**3.7E+00**			6.8E+01	3.3E-04
SWDF	INORG	Antimony	7440-36-0	T		9	2	6.70E-03	1.29E-02	3.40E-03	3.40E-03	6.0E-03	**2.2E+00**			6.8E+01	1.9E-04
SWDF	INORG	Arsenic	7440-38-2	D	A	8	7	3.60E-03	1.64E-02	2.10E-03	2.10E-03	5.0E-02	3.3E-01			4.3E+00	3.8E-03
SWDF	INORG	Arsenic	7440-38-2	T	A	9	9	3.40E-03	3.06E-02			5.0E-02	6.1E-01			4.3E+00	7.1E-03
SWDF	INORG	Barium	7440-39-3	D	D	8	8	6.01E-02	3.84E-01			2.0E+00	1.9E-01			1.4E+04	2.7E-05
SWDF	INORG	Barium	7440-39-3	T	D	9	9	1.87E-02	4.13E-01			2.0E+00	2.1E-01			1.4E+04	3.0E-05
SWDF	INORG	Beryllium	7440-41-7	D	B1	8	2	6.10E-04	6.20E-04	6.00E-04	6.00E-04	4.0E-03	1.6E-01			2.9E+02	2.1E-06
SWDF	INORG	Beryllium	7440-41-7	T	B1	9	3	6.90E-04	9.00E-04	6.00E-04	6.00E-04	4.0E-03	2.3E-01			2.9E+02	3.1E-06
SWDF	INORG	Cadmium	7440-43-9	D	B1	8	5	3.80E-04	4.90E-04	2.80E-04	2.80E-04	5.0E-03	9.8E-02			1.9E+02	2.6E-06
SWDF	INORG	Cadmium	7440-43-9	T	B1	9	9	3.80E-04	6.70E-03			5.0E-03	**1.3E+00**			1.9E+02	3.5E-05
SWDF	INORG	Chromium (total)	7440-47-3	D		8				1.50E-03	1.50E-03	1.0E-01				4.6E+02	
SWDF	INORG	Chromium (total)	7440-47-3	T		9	5	4.70E-03	9.00E-02	1.50E-03	1.50E-03	1.0E-01	9.0E-01			4.6E+02	2.0E-04
SWDF	INORG	Cobalt	7440-48-4	D	B1	8	1	1.40E-03	1.40E-03	7.40E-04	7.40E-04	4.0E-02	3.5E-02			2.4E+03	5.8E-07
SWDF	INORG	Cobalt	7440-48-4	T	B1	9	6	9.80E-04	2.80E-02	7.40E-04	7.40E-04	4.0E-02	7.0E-01			2.4E+03	1.2E-05
SWDF	INORG	Copper	7440-50-8	D	D	8	1	8.50E-03	8.50E-03	1.70E-03	1.70E-03	1.4E+00	6.1E-03			7.4E+03	1.1E-06
SWDF	INORG	Copper	7440-50-8	T	D	9	1	1.56E-01	1.56E-01	1.70E-03	1.70E-03	1.4E+00	1.1E-01			7.4E+03	2.1E-05
SWDF	INORG	Lead	7439-92-1	D	B2	8				1.60E-03	1.60E-03	4.0E-03					
SWDF	INORG	Lead	7439-92-1	T	B2	9	6	1.70E-03	1.64E-01	1.60E-03	1.60E-03	4.0E-03	**4.1E+01**				
SWDF	INORG	Manganese	7439-96-5	D	D	8	4	2.52E-02	1.02E+00	6.80E-04	6.80E-04	8.6E-01	**1.2E+00**			9.1E+03	1.1E-04
SWDF	INORG	Manganese	7439-96-5	T	D	9	6	5.82E-02	1.64E+00	6.80E-04	6.80E-04	8.6E-01	**1.9E+00**			9.1E+03	1.8E-04
SWDF	INORG	Mercury	7439-97-6	D	D	8				8.70E-05	8.70E-05	2.0E-03		5.6E-02		5.6E-02	
SWDF	INORG	Mercury	7439-97-6	T	D	9	2	1.60E-04	9.30E-04	8.70E-05	8.70E-05	2.0E-03	4.7E-01	5.6E-02	1.7E-02	5.6E-02	1.7E-02
SWDF	INORG	Nickel	7440-02-0	D	A	8	7	3.40E-03	1.45E-02	2.90E-03	2.90E-03	1.0E-01	1.5E-01			7.4E+04	2.0E-07
SWDF	INORG	Nickel	7440-02-0	T	A	9	9	3.00E-03	9.84E-02			1.0E-01	9.8E-01			7.4E+04	1.3E-06
SWDF	INORG	Selenium	7782-49-2	D	D	8				4.70E-03	4.70E-03	5.0E-02				9.7E+02	
SWDF	INORG	Selenium	7782-49-2	T	D	9				4.70E-03	4.70E-03	5.0E-02				9.7E+02	
SWDF	INORG	Silver	7440-22-4	D	D	8				9.80E-04	9.80E-04	3.4E-02				1.5E+03	
SWDF	INORG	Silver	7440-22-4	T	D	9				9.80E-04	9.80E-04	3.4E-02				1.5E+03	
SWDF	INORG	Thallium	7440-28-0	D		8				3.30E-05	3.30E-05	2.0E-03				1.3E+01	
SWDF	INORG	Thallium	7440-28-0	T		9	1	2.50E-04	2.50E-04	3.30E-05	3.30E-05	2.0E-03	1.3E-01			1.3E+01	1.9E-05
SWDF	INORG	Vanadium	7440-62-2	D		8	7	9.90E-04	1.16E-02	6.70E-04	6.70E-04	4.5E-03	**2.6E+00**			9.7E+02	1.2E-05
SWDF	INORG	Vanadium	7440-62-2	T		9	9	1.40E-03	8.70E-02			4.5E-03	**1.9E+01**			9.7E+02	9.0E-05
SWDF	INORG	Zinc	7440-66-6	D	D	8	1	3.59E-02	3.59E-02	1.40E-02	1.40E-02	2.4E+00	1.5E-02			1.1E+05	3.3E-07
SWDF	INORG	Zinc	7440-66-6	T	D	9	2	2.23E-01	3.95E-01	1.40E-02	1.40E-02	2.4E+00	1.6E-01			1.1E+05	3.6E-06
SWHI	VOC	Acetone	67-64-1	T	ID	24	6	1.50E-02	7.80E-02	5.10E-04	1.00E-02	7.3E-01	1.1E-01	1.0E+06	7.8E-08	3.1E+04	2.5E-06
SWHI	VOC	Benzene	71-43-2	T	A	24				1.60E-04	1.00E-03	5.0E-03		3.5E+01		1.1E+01	
SWHI	VOC	Bromodichloromethane	75-27-4	T	B2	24	2	1.80E-04	4.20E-04	1.70E-04	1.00E-03	1.0E-01	4.2E-03	3.7E+01	1.1E-05	1.4E+01	3.0E-05
SWHI	VOC	Bromoform	75-25-2	T	B2	24				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
SWHI	VOC	Bromomethane	74-83-9	T	D	23				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
SWHI	VOC	2-Butanone	78-93-3	T	ID	24	1	5.00E-04	5.00E-04	4.10E-04	1.00E-02	1.3E+01	3.8E-05	2.4E+05	2.1E-09	2.4E+05	2.1E-09
SWHI	VOC	Carbon Disulfide	75-15-0	T		24				2.00E-04	1.00E-03	8.0E-01		5.5E+02		1.2E+03	
SWHI	VOC	Carbon Tetrachloride	56-23-5	T	B2	24				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
SWHI	VOC	Chlorobenzene	108-90-7	T	D	24				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
SWHI	VOC	Chloroethane	75-00-3	T		24				2.60E-04	1.00E-03	4.3E-01		5.7E+03		4.4E+02	
SWHI	VOC	Chloroform	67-66-3	T	B2	24	6	1.40E-04	1.70E-03	1.40E-04	1.00E-03	1.0E-01	1.7E-02	1.8E+02	9.4E-06	1.5E+02	1.1E-05
SWHI	VOC	Chloromethane	74-87-3	T	D	24	3	1.30E-04	3.35E-04	1.30E-04	1.00E-03	2.6E-01	1.3E-03	4.5E+01	7.4E-06	4.9E+02	6.8E-07
SWHI	VOC	Cumene	98-82-8	T	D	24				1.20E-04	1.00E-03	8.0E-01		5.6E+01		5.6E+01	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
SWHI	VOC	Cyclohexane	110-82-7	T	ID	24				1.30E-04	1.00E-03						
SWHI	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	24				6.20E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	
SWHI	VOC	Dibromochloromethane	124-48-1	T	C	24				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
SWHI	VOC	1,2-Dibromoethane	106-93-4	T	B2	24				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
SWHI	VOC	1,2-Dichlorobenzene	95-50-1	T	D	24	1	2.20E-04	2.20E-04	1.10E-04	1.00E-03	6.0E-01	3.7E-04	1.6E+02	1.4E-06	1.6E+02	1.4E-06
SWHI	VOC	1,3-Dichlorobenzene	541-73-1	T	D	24				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
SWHI	VOC	1,4-Dichlorobenzene	106-46-7	T	C	24				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
SWHI	VOC	Dichlorodifluoromethane	75-71-8	T		24				2.60E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
SWHI	VOC	1,1-Dichloroethane	75-34-3	T	C	24	2	8.50E-04	1.00E-03	1.60E-04	1.00E-03	8.8E-01	1.1E-03	2.3E+03	4.3E-07	2.4E+03	4.2E-07
SWHI	VOC	1,2-Dichloroethane	107-06-2	T	B2	24				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
SWHI	VOC	1,1-Dichloroethene	75-35-4	T	C	24	2	8.10E-04	9.70E-04	2.40E-04	1.00E-03	7.0E-03	1.4E-01	1.3E+00	7.5E-04	1.1E+01	8.8E-05
SWHI	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	24				2.20E-04	5.00E-04	7.0E-02		2.1E+02		2.0E+02	
SWHI	VOC	trans-1,2-Dichloroethene	156-60-5	T		24				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
SWHI	VOC	1,2-Dichloropropane	78-87-5	T	B2	24				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
SWHI	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	24				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
SWHI	VOC	Ethyl Benzene	100-41-4	T	D	24	1	1.80E-04	1.80E-04	1.20E-04	1.00E-03	7.0E-01	2.6E-04	1.7E+02	1.1E-06	1.7E+02	1.1E-06
SWHI	VOC	2-Hexanone	591-78-6	T		24				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
SWHI	VOC	Methyl Acetate	79-20-9	T		24				4.10E-04	1.00E-02						
SWHI	VOC	Methyl tert-butyl ether	1634-04-4	T		24				1.30E-04	5.00E-03	2.4E-01		4.7E+04		6.1E+02	
SWHI	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	23				2.30E-04	1.00E-02	1.8E+00		2.0E+04		1.3E+04	
SWHI	VOC	Methylcyclohexane	108-87-2	T		24				1.50E-04	1.00E-03						
SWHI	VOC	Methylene Chloride	75-09-2	T	B2	24				2.90E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
SWHI	VOC	Styrene	100-42-5	T		24				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
SWHI	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	24				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
SWHI	VOC	Tetrachloroethene	127-18-4	T	C-B2	24	2	4.60E-04	5.50E-04	2.30E-04	1.00E-03	5.0E-03	1.1E-01	1.7E+02	3.2E-06	1.2E+01	4.6E-05
SWHI	VOC	Toluene	108-88-3	T	D	24	5	1.90E-04	8.10E-04	1.80E-04	1.00E-03	1.0E+00	8.1E-04	5.3E+02	1.5E-06	5.3E+02	1.5E-06
SWHI	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	24				1.70E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
SWHI	VOC	1,1,1-Trichloroethane	71-55-6	T	D	24	5	5.25E-04	7.00E-03	1.50E-04	1.00E-03	2.0E-01	3.5E-02	1.3E+03	5.4E-06	1.3E+03	5.4E-06
SWHI	VOC	1,1,2-Trichloroethane	79-00-5	T	C	24				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
SWHI	VOC	Trichloroethene	79-01-6	T	C-B2	24	2	7.10E-04	1.10E-03	1.40E-04	1.00E-03	5.0E-03	2.2E-01	9.7E+01	1.1E-05	2.2E+01	5.0E-05
SWHI	VOC	Trichlorofluoromethane	75-69-4	T		24				2.80E-04	1.00E-03	2.6E+00		1.1E+03		1.1E+03	
SWHI	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		24				3.20E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
SWHI	VOC	Vinyl Chloride	75-01-4	T	A	24				1.50E-04	1.00E-03	2.0E-03		1.3E+01		1.0E+00	
SWHI	VOC	Xylenes (total)	1330-20-7	T	ID	24	1	9.90E-04	9.90E-04	3.30E-04	1.00E-03	1.0E+01	9.9E-05	1.9E+02	5.2E-06	1.9E+02	5.2E-06
SWHI	SVOC	Acenaphthene	83-32-9	T		24				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
SWHI	SVOC	Acenaphthylene	208-96-8	T	D	24				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
SWHI	SVOC	Acetophenone	98-86-2	T	D	24				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
SWHI	SVOC	Anthracene	120-12-7	T	D	24				6.80E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
SWHI	SVOC	Atrazine	1912-24-9	T		24				2.50E-03	5.00E-03	3.0E-03				5.4E+00	
SWHI	SVOC	Benzaldehyde	100-52-7	T		24				2.80E-03	1.00E-02						
SWHI	SVOC	Benzo(a)anthracene	56-55-3	T	B2	24				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
SWHI	SVOC	Benzo(a)pyrene	50-32-8	T	B2	24				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
SWHI	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	24				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
SWHI	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	24				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
SWHI	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	24				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
SWHI	SVOC	Biphenyl	92-52-4	T	D	24				2.60E-03	1.00E-02						
SWHI	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	24				8.70E-04	5.00E-03						
SWHI	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	24				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
SWHI	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	24				2.70E-03	5.00E-03	6.0E-03				3.2E-01	
SWHI	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	24				8.80E-04	5.00E-03						
SWHI	SVOC	Butylbenzylphthalate	85-68-7	T	C	24				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
SWHI	SVOC	Caprolactam	105-60-2	T		24				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
SWHI	SVOC	Carbazole	86-74-8	T	B2	24				8.20E-04	1.00E-02	8.5E-02				7.4E+00	
SWHI	SVOC	4-Chloro-3-methylphenol	59-50-7	T		24				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
SWHI	SVOC	4-Chloroaniline	106-47-8	T		20				6.10E-04	1.00E-02						
SWHI	SVOC	2-Chloronaphthalene	91-58-7	T		24				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
SWHI	SVOC	2-Chlorophenol	95-57-8	T		24				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
SWHI	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		24				7.90E-04	5.00E-03						
SWHI	SVOC	Chrysene	218-01-9	T	B2	24				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
SWHI	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	24				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
SWHI	SVOC	Dibenzofuran	132-64-9	T	D	24				1.10E-03	5.00E-03						
SWHI	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	20				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
SWHI	SVOC	2,4-Dichlorophenol	120-83-2	T		24				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
SWHI	SVOC	Diethylphthalate	84-66-2	T	D	24				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
SWHI	SVOC	2,4-Dimethylphenol	105-67-9	T		24				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
SWHI	SVOC	Dimethylphthalate	131-11-3	T	D	24				7.60E-04	5.00E-03	7.3E+01				4.2E+03	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
SWHI	SVOC	Di-n-butylphthalate	84-74-2	T	D	24				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
SWHI	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		24				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
SWHI	SVOC	2,4-Dinitrophenol	51-28-5	T		24				3.00E-03	2.00E-02						
SWHI	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	24				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
SWHI	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	24				5.70E-04	5.00E-03						
SWHI	SVOC	Di-n-octylphthalate	117-84-0	T		24				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
SWHI	SVOC	Fluoranthene	206-44-0	T	D	24				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
SWHI	SVOC	Fluorene	86-73-7	T	D	24				1.00E-03	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
SWHI	SVOC	Hexachlorobenzene	118-74-1	T	B2	24				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
SWHI	SVOC	Hexachlorobutadiene	87-68-3	T	C	24				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
SWHI	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	24				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
SWHI	SVOC	Hexachloroethane	67-72-1	T	C	24				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
SWHI	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	24				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
SWHI	SVOC	Isophorone	78-59-1	T	C	24				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
SWHI	SVOC	2-Methylnaphthalene	91-57-6	T	ID	24				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
SWHI	SVOC	Methylphenol (total)	1319-77-3	T		24				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
SWHI	SVOC	Naphthalene	91-20-3	T	C	24				7.50E-04	5.00E-03	5.2E-01		3.1E+01		3.1E+01	
SWHI	SVOC	2-Nitroaniline	88-74-4	T		24				7.00E-04	2.00E-02						
SWHI	SVOC	3-Nitroaniline	99-09-2	T	C	20				7.10E-04	2.00E-02						
SWHI	SVOC	4-Nitroaniline	100-01-6	T	C	24				1.30E-03	2.00E-02						
SWHI	SVOC	Nitrobenzene	98-95-3	T	D	24				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
SWHI	SVOC	2-Nitrophenol	88-75-5	T		24				2.10E-03	5.00E-03	2.0E-02				7.9E+01	
SWHI	SVOC	4-Nitrophenol	100-02-7	T		24				1.90E-03	2.00E-02						
SWHI	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	24				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
SWHI	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	24				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
SWHI	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	24				7.80E-04	5.00E-03						
SWHI	SVOC	Pentachlorophenol	87-86-5	T	B2	24				2.40E-03	5.00E-03	1.0E-03				2.0E-01	
SWHI	SVOC	Phenanthrene	85-01-8	T	D	24				8.20E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
SWHI	SVOC	Phenol	108-95-2	T	ID	24				2.60E-03	5.00E-03	4.4E+00				2.9E+04	
SWHI	SVOC	Pyrene	129-00-0	T	D	24				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
SWHI	SVOC	2,4,5-Trichlorophenol	95-95-4	T		24				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
SWHI	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	24				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
SWHI	P/PCB	PCBs (total)	1336-36-3	D	B2	4				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
SWHI	P/PCB	PCBs (total)	1336-36-3	T	B2	9				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
SWHI	INORG	Antimony	7440-36-0	D		22	1	2.60E-03	2.60E-03	2.20E-03	2.50E-02	6.0E-03	4.3E-01			6.8E+01	3.8E-05
SWHI	INORG	Antimony	7440-36-0	T		24				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
SWHI	INORG	Arsenic	7440-38-2	D	A	22	6	3.90E-03	7.80E-03	3.90E-03	1.00E-02	5.0E-02	1.6E-01			4.3E+00	1.8E-03
SWHI	INORG	Arsenic	7440-38-2	T	A	24	6	2.10E-03	9.60E-03	2.10E-03	1.00E-02	5.0E-02	1.9E-01			4.3E+00	2.2E-03
SWHI	INORG	Barium	7440-39-3	D	D	22	22	5.33E-02	9.29E-01			2.0E+00	4.6E-01			1.4E+04	6.6E-05
SWHI	INORG	Barium	7440-39-3	T	D	24	24	5.04E-02	9.29E-01			2.0E+00	4.6E-01			1.4E+04	6.6E-05
SWHI	INORG	Beryllium	7440-41-7	D	B1	22				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
SWHI	INORG	Beryllium	7440-41-7	T	B1	24				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
SWHI	INORG	Cadmium	7440-43-9	D	B1	22	9	2.90E-04	1.47E-03	2.80E-04	5.00E-03	5.0E-03	2.9E-01			1.9E+02	7.7E-06
SWHI	INORG	Cadmium	7440-43-9	T	B1	24	6	3.50E-04	1.45E-03	2.80E-04	5.00E-03	5.0E-03	2.9E-01			1.9E+02	7.6E-06
SWHI	INORG	Chromium (total)	7440-47-3	D		22	4	1.80E-03	2.70E-03	1.40E-03	1.00E-02	1.0E-01	2.7E-02			4.6E+02	5.9E-06
SWHI	INORG	Chromium (total)	7440-47-3	T		24	6	1.40E-03	2.50E-03	1.40E-03	1.00E-02	1.0E-01	2.5E-02			4.6E+02	5.4E-06
SWHI	INORG	Cobalt	7440-48-4	D	B1	22	5	1.30E-03	4.60E-03	1.30E-03	2.00E-02	4.0E-02	1.2E-01			2.4E+03	1.9E-06
SWHI	INORG	Cobalt	7440-48-4	T	B1	24	4	1.40E-03	4.10E-03	7.40E-04	2.00E-02	4.0E-02	1.0E-01			2.4E+03	1.7E-06
SWHI	INORG	Copper	7440-50-8	D	D	22	4	4.40E-03	6.00E-03	4.20E-03	5.00E-03	1.4E+00	4.3E-03			7.4E+03	8.1E-07
SWHI	INORG	Copper	7440-50-8	T	D	24	2	4.70E-03	4.70E-03	1.70E-03	5.00E-03	1.4E+00	3.4E-03			7.4E+03	6.4E-07
SWHI	INORG	Lead	7439-92-1	D	B2	22				2.50E-03	3.00E-03	4.0E-03					
SWHI	INORG	Lead	7439-92-1	T	B2	24	1	3.50E-03	3.50E-03	1.60E-03	3.00E-03	4.0E-03	8.8E-01				
SWHI	INORG	Manganese	7439-96-5	D	D	22	22	1.60E-03	6.17E-01			8.6E-01	7.2E-01			9.1E+03	6.8E-05
SWHI	INORG	Manganese	7439-96-5	T	D	24	24	9.30E-04	6.37E-01			8.6E-01	7.4E-01			9.1E+03	7.0E-05
SWHI	INORG	Mercury	7439-97-6	D	D	22	2	9.40E-05	1.00E-04	6.90E-05	2.00E-04	2.0E-03	5.0E-02	5.6E-02	1.8E-03	5.6E-02	1.8E-03
SWHI	INORG	Mercury	7439-97-6	T	D	24	2	7.50E-05	9.00E-05	6.90E-05	2.00E-04	2.0E-03	4.5E-02	5.6E-02	1.6E-03	5.6E-02	1.6E-03
SWHI	INORG	Nickel	7440-02-0	D	A	22	11	2.40E-03	1.08E-02	2.20E-03	2.00E-02	1.0E-01	1.1E-01			7.4E+04	1.5E-07
SWHI	INORG	Nickel	7440-02-0	T	A	24	13	2.20E-03	1.06E-02	2.20E-03	2.00E-02	1.0E-01	1.1E-01			7.4E+04	1.4E-07
SWHI	INORG	Selenium	7782-49-2	D	D	22				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
SWHI	INORG	Selenium	7782-49-2	T	D	24	2	5.10E-03	6.00E-03	4.50E-03	5.00E-03	5.0E-02	1.2E-01			9.7E+02	6.2E-06
SWHI	INORG	Silver	7440-22-4	D	D	22				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
SWHI	INORG	Silver	7440-22-4	T	D	24				9.80E-04	5.00E-03	3.4E-02				1.5E+03	
SWHI	INORG	Thallium	7440-28-0	D		22	13	3.10E-05	1.50E-02	1.80E-05	1.00E-02	2.0E-03	**7.5E+00**			1.3E+01	1.2E-03
SWHI	INORG	Thallium	7440-28-0	T		24	12	1.80E-05	1.59E-02	1.80E-05	1.00E-02	2.0E-03	**8.0E+00**			1.3E+01	1.2E-03
SWHI	INORG	Vanadium	7440-62-2	D		22	4	1.40E-03	6.50E-03	8.20E-04	1.00E-02	4.5E-03	**1.4E+00**			9.7E+02	6.7E-06
SWHI	INORG	Vanadium	7440-62-2	T		24	4	1.10E-03	6.40E-03	6.70E-04	1.00E-02	4.5E-03	**1.4E+00**			9.7E+02	6.6E-06

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
SWHI	INORG	Zinc	7440-66-6	D	D	22	3	1.73E-02	2.90E-02	1.20E-02	2.00E-02	2.4E+00	1.2E-02			1.1E+05	2.6E-07
SWHI	INORG	Zinc	7440-66-6	T	D	24	7	1.30E-02	3.46E-02	1.20E-02	2.00E-02	2.4E+00	1.4E-02			1.1E+05	3.1E-07
W-01	VOC	Acetone	67-64-1	T	ID	38	10	6.80E-04	3.30E-02	5.10E-04	1.00E-02	7.3E-01	4.5E-02	1.0E+06	3.3E-08	3.1E+04	1.1E-06
W-01	VOC	Benzene	71-43-2	T	A	38	17	1.60E-04	9.10E-02	1.60E-04	1.00E-03	5.0E-03	**1.8E+01**	3.5E+01	2.6E-03	1.1E+01	8.3E-03
W-01	VOC	Bromodichloromethane	75-27-4	T	B2	38				1.70E-04	1.00E-03	1.0E-01		3.7E+01		1.4E+01	
W-01	VOC	Bromoform	75-25-2	T	B2	38				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
W-01	VOC	Bromomethane	74-83-9	T	D	37				2.00E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
W-01	VOC	2-Butanone	78-93-3	T	ID	38	16	4.30E-04	7.30E-03	4.10E-04	1.00E-02	1.3E+01	5.6E-04	2.4E+05	3.0E-08	2.4E+05	3.0E-08
W-01	VOC	Carbon Disulfide	75-15-0	T		38	1	1.30E-03	1.30E-03	2.00E-04	1.00E-03	8.0E-01	1.6E-03	5.5E+02	2.4E-06	1.2E+03	1.1E-06
W-01	VOC	Carbon Tetrachloride	56-23-5	T	B2	38				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
W-01	VOC	Chlorobenzene	108-90-7	T	D	38				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
W-01	VOC	Chloroethane	75-00-3	T		38	11	5.30E-04	4.50E-02	2.60E-04	1.00E-03	4.3E-01	1.0E-01	5.7E+03	7.9E-06	4.4E+02	1.0E-04
W-01	VOC	Chloroform	67-66-3	T	B2	38	1	8.10E-04	8.10E-04	1.40E-04	1.00E-03	1.0E-01	8.1E-03	1.8E+02	4.5E-06	1.5E+02	5.4E-06
W-01	VOC	Chloromethane	74-87-3	T	D	38	4	1.30E-04	1.70E-04	1.30E-04	1.00E-03	2.6E-01	6.5E-04	4.5E+01	3.8E-06	4.9E+02	3.5E-07
W-01	VOC	Cumene	98-82-8	T	D	38	12	1.70E-04	8.60E-03	1.20E-04	1.00E-03	8.0E-01	1.1E-02	5.6E+01	1.5E-04	5.6E+01	1.5E-04
W-01	VOC	Cyclohexane	110-82-7	T	ID	38	11	1.70E-04	1.90E-02	1.30E-04	1.00E-03						
W-01	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	38				6.20E-04	2.10E-03	2.0E-04		1.2E+00		3.9E-01	
W-01	VOC	Dibromochloromethane	124-48-1	T	C	38				2.60E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
W-01	VOC	1,2-Dibromoethane	106-93-4	T	B2	38				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
W-01	VOC	1,2-Dichlorobenzene	95-50-1	T	D	38	4	4.80E-04	2.00E-03	1.10E-04	1.00E-03	6.0E-01	3.3E-03	1.6E+02	1.3E-05	1.6E+02	1.3E-05
W-01	VOC	1,3-Dichlorobenzene	541-73-1	T	D	38				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
W-01	VOC	1,4-Dichlorobenzene	106-46-7	T	C	38				1.70E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
W-01	VOC	Dichlorodifluoromethane	75-71-8	T		38				2.60E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
W-01	VOC	1,1-Dichloroethane	75-34-3	T	C	38	11	1.60E-04	2.30E-02	1.60E-04	1.00E-03	8.8E-01	2.6E-02	2.3E+03	1.0E-05	2.4E+03	9.6E-06
W-01	VOC	1,2-Dichloroethane	107-06-2	T	B2	38	1	4.50E-04	4.50E-04	2.10E-04	1.00E-03	5.0E-03	9.0E-02	5.9E+01	7.6E-06	1.9E+01	2.4E-05
W-01	VOC	1,1-Dichloroethene	75-35-4	T	C	38				2.40E-04	1.00E-03	7.0E-03		1.3E+00		1.1E+01	
W-01	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	38	7	4.50E-04	3.90E-03	2.20E-04	5.00E-04	7.0E-02	5.6E-02	2.1E+02	1.9E-05	2.0E+02	2.0E-05
W-01	VOC	trans-1,2-Dichloroethene	156-60-5	T		38	3	1.80E-04	2.10E-03	1.50E-04	5.00E-04	1.0E-01	2.1E-02	2.0E+02	1.1E-05	2.2E+02	9.5E-06
W-01	VOC	1,2-Dichloropropane	78-87-5	T	B2	38				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
W-01	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	38				2.70E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
W-01	VOC	Ethyl Benzene	100-41-4	T	D	38	8	2.40E-04	1.90E-02	1.20E-04	1.00E-03	7.0E-01	2.7E-02	1.7E+02	1.1E-04	1.7E+02	1.1E-04
W-01	VOC	2-Hexanone	591-78-6	T		38				4.60E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
W-01	VOC	Methyl Acetate	79-20-9	T		38				4.10E-04	1.00E-02						
W-01	VOC	Methyl tert-butyl ether	1634-04-4	T		38	3	8.40E-04	7.10E-03	1.30E-04	5.00E-03	2.4E-01	3.0E-02	4.7E+04	1.5E-07	6.1E+02	1.2E-05
W-01	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	37	4	2.88E-04	1.60E-03	2.30E-04	1.00E-02	1.8E+00	8.9E-04	2.0E+04	8.0E-08	1.3E+04	1.2E-07
W-01	VOC	Methylcyclohexane	108-87-2	T		38	11	3.30E-04	7.60E-03	1.50E-04	1.00E-03						
W-01	VOC	Methylene Chloride	75-09-2	T	B2	38	5	5.00E-04	7.00E-03	2.90E-04	1.00E-03	5.0E-03	**1.4E+00**	1.4E+03	5.0E-06	2.2E+02	3.2E-05
W-01	VOC	Styrene	100-42-5	T		38				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
W-01	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	38				2.50E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
W-01	VOC	Tetrachloroethene	127-18-4	T	C-B2	37	3	4.30E-04	2.60E-03	2.30E-04	1.00E-03	5.0E-03	5.2E-01	1.7E+02	1.5E-05	1.2E+01	2.2E-04
W-01	VOC	Toluene	108-88-3	T	D	38	14	2.50E-04	1.50E-02	1.80E-04	1.00E-03	1.0E+00	1.5E-02	5.3E+02	2.8E-05	5.3E+02	2.8E-05
W-01	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	38	1	9.20E-04	9.20E-04	1.70E-04	1.00E-03	7.0E-02	1.3E-02	3.0E+02	3.1E-06	1.9E+01	4.8E-05
W-01	VOC	1,1,1-Trichloroethane	71-55-6	T	D	38				1.50E-04	1.00E-03	2.0E-01		1.3E+03		1.3E+03	
W-01	VOC	1,1,2-Trichloroethane	79-00-5	T	C	38				3.00E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
W-01	VOC	Trichloroethene	79-01-6	T	C-B2	38	6	2.40E-04	1.40E-03	1.40E-04	1.00E-03	5.0E-03	2.8E-01	9.7E+01	1.4E-05	2.2E+01	6.4E-05
W-01	VOC	Trichlorofluoromethane	75-69-4	T		38	1	6.60E-04	6.60E-04	2.80E-04	1.00E-03	2.6E+00	2.5E-04	1.1E+03	6.0E-07	1.1E+03	6.0E-07
W-01	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		38				3.20E-04	1.10E-03	1.7E+02		1.7E+02		1.7E+02	
W-01	VOC	Vinyl Chloride	75-01-4	T	A	38	9	1.80E-04	1.80E-02	1.50E-04	1.00E-03	2.0E-03	**9.0E+00**	1.3E+01	1.4E-03	1.0E+00	1.8E-02
W-01	VOC	Xylenes (total)	1330-20-7	T	ID	38	10	6.90E-04	2.00E-01	3.30E-04	1.00E-03	1.0E+01	2.0E-02	1.9E+02	1.1E-03	1.9E+02	1.1E-03
W-01	SVOC	Acenaphthene	83-32-9	T		38	1	2.40E-03	2.40E-03	8.00E-04	2.50E-02	1.3E+00	1.8E-03	4.2E+00	5.7E-04	4.2E+00	5.7E-04
W-01	SVOC	Acenaphthylene	208-96-8	T	D	38				7.10E-04	2.50E-02	5.2E-02		3.9E+00		3.9E+00	
W-01	SVOC	Acetophenone	98-86-2	T	D	38	1	2.70E-03	2.70E-03	2.60E-03	5.00E-02	1.5E+00	1.8E-03	6.1E+03	4.4E-07	6.1E+03	4.4E-07
W-01	SVOC	Anthracene	120-12-7	T	D	38				6.80E-04	2.50E-02	4.3E-02		4.3E-02		4.3E-02	
W-01	SVOC	Atrazine	1912-24-9	T		38				2.50E-03	2.50E-02	3.0E-03				5.4E+00	
W-01	SVOC	Benzaldehyde	100-52-7	T		38				2.80E-03	5.00E-02						
W-01	SVOC	Benzo(a)anthracene	56-55-3	T	B2	38				7.00E-04	2.50E-02	2.1E-03				9.4E-03	
W-01	SVOC	Benzo(a)pyrene	50-32-8	T	B2	38				7.30E-04	2.50E-02	5.0E-03				2.0E-03	
W-01	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	38				9.40E-04	2.50E-02	2.0E-03				2.0E-03	
W-01	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	38				8.50E-04	2.50E-02	5.0E-03				5.0E-03	
W-01	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	38				8.40E-04	2.50E-02	5.0E-03				5.0E-03	
W-01	SVOC	Biphenyl	92-52-4	T	D	38				2.60E-03	5.00E-02						
W-01	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	38				8.70E-04	2.50E-02						
W-01	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	36				9.70E-04	2.50E-02	2.0E-03		2.1E+02		5.7E+00	
W-01	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	38	2	2.70E-03	4.10E-03	2.70E-03	2.50E-02	6.0E-03	6.8E-01			3.2E-01	1.3E-02
W-01	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	38				8.80E-04	2.50E-02						
W-01	SVOC	Butylbenzylphthalate	85-68-7	T	C	38				8.80E-04	2.50E-02	1.2E+00				2.7E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-01	SVOC	Caprolactam	105-60-2	T		38				2.50E-03	5.00E-02	5.8E+00				3.9E+05	
W-01	SVOC	Carbazole	86-74-8	T	B2	38	2	1.50E-03	2.80E-03	8.20E-04	5.00E-02	8.5E-02	3.3E-02			7.4E+00	3.8E-04
W-01	SVOC	4-Chloro-3-methylphenol	59-50-7	T		37				9.90E-04	2.50E-02	1.5E-01				7.9E+01	
W-01	SVOC	4-Chloroaniline	106-47-8	T		37				6.10E-04	5.00E-02						
W-01	SVOC	2-Chloronaphthalene	91-58-7	T		38				8.50E-04	2.50E-02	1.8E+00				6.7E+00	
W-01	SVOC	2-Chlorophenol	95-57-8	T		38				1.00E-03	2.50E-02	4.5E-02				9.4E+01	
W-01	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		38				7.90E-04	2.50E-02						
W-01	SVOC	Chrysene	218-01-9	T	B2	38				7.50E-04	2.50E-02	5.0E-03				5.0E-03	
W-01	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	38				7.90E-04	2.50E-02	2.0E-03				2.0E-03	
W-01	SVOC	Dibenzofuran	132-64-9	T	D	38	1	1.80E-03	1.80E-03	1.10E-03	2.50E-02						
W-01	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	36				9.30E-04	1.00E-01	1.1E-03				1.8E-01	
W-01	SVOC	2,4-Dichlorophenol	120-83-2	T		38				8.50E-04	5.00E-02	7.3E-02				4.8E+01	
W-01	SVOC	Diethylphthalate	84-66-2	T	D	38				6.50E-04	2.50E-02	5.5E+00				1.1E+03	
W-01	SVOC	2,4-Dimethylphenol	105-67-9	T		37	3	1.90E-03	1.10E-02	8.50E-04	2.50E-02	3.7E-01	3.0E-02			5.2E+02	2.1E-05
W-01	SVOC	Dimethylphthalate	131-11-3	T	D	38				7.60E-04	2.50E-02	7.3E+01				4.2E+03	
W-01	SVOC	Di-n-butylphthalate	84-74-2	T	D	38	3	1.35E-03	2.30E-03	6.70E-04	2.50E-02	8.8E-01	2.6E-03			1.1E+01	2.1E-04
W-01	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		38				1.30E-03	1.00E-01	2.0E-02				9.5E+00	
W-01	SVOC	2,4-Dinitrophenol	51-28-5	T		38				3.00E-03	1.00E-01						
W-01	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	38				7.90E-04	2.50E-02	7.7E-03				8.6E+00	
W-01	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	38				5.70E-04	2.50E-02						
W-01	SVOC	Di-n-octylphthalate	117-84-0	T		38				1.10E-03	2.50E-02	1.3E-01				4.0E-01	
W-01	SVOC	Fluoranthene	206-44-0	T	D	38	1	9.90E-04	9.90E-04	8.10E-04	2.50E-02	2.1E-01	4.7E-03	2.1E-01	4.7E-03	2.1E-01	4.7E-03
W-01	SVOC	Fluorene	86-73-7	T	D	38	1	2.20E-03	2.20E-03	1.00E-03	2.50E-02	8.8E-01	2.5E-03	2.0E+00	1.1E-03	2.0E+00	1.1E-03
W-01	SVOC	Hexachlorobenzene	118-74-1	T	B2	38				7.40E-04	2.50E-02	1.0E-03		3.0E+00		4.6E-03	
W-01	SVOC	Hexachlorobutadiene	87-68-3	T	C	36				7.30E-04	2.50E-02	1.5E-02		3.2E+00		4.0E-01	
W-01	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	35				1.10E-03	2.50E-02	5.0E-02		4.2E-01		1.6E+00	
W-01	SVOC	Hexachloroethane	67-72-1	T	C	38				7.40E-04	2.50E-02	7.3E-03		5.0E+01		1.9E+00	
W-01	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	38				6.30E-04	2.50E-02	2.0E-03				2.0E-03	
W-01	SVOC	Isophorone	78-59-1	T	C	38				6.30E-04	2.50E-02	7.7E-01				9.9E+02	
W-01	SVOC	2-Methylnaphthalene	91-57-6	T	ID	38	6	8.50E-04	6.10E-03	6.40E-04	2.50E-02	2.6E-01	2.3E-02			2.5E+01	2.4E-04
W-01	SVOC	Methylphenol (total)	1319-77-3	T		38	1	2.16E-02	2.16E-02	1.30E-03	2.50E-02	3.7E-01	5.8E-02			8.1E+02	2.7E-05
W-01	SVOC	Naphthalene	91-20-3	T	C	37	4	6.20E-03	1.30E-02	7.50E-04	2.50E-02	5.2E-01	2.5E-02	3.1E+01	4.2E-04	3.1E+01	4.2E-04
W-01	SVOC	2-Nitroaniline	88-74-4	T		38				7.00E-04	1.00E-01						
W-01	SVOC	3-Nitroaniline	99-09-2	T	C	37				7.10E-04	1.00E-01						
W-01	SVOC	4-Nitroaniline	100-01-6	T	C	37				1.30E-03	1.00E-01						
W-01	SVOC	Nitrobenzene	98-95-3	T	D	38				8.10E-04	2.50E-02	3.4E-03		5.5E+02		1.1E+01	
W-01	SVOC	2-Nitrophenol	88-75-5	T		38				2.10E-03	2.50E-02	2.0E-02				7.9E+01	
W-01	SVOC	4-Nitrophenol	100-02-7	T		38				1.90E-03	1.00E-01						
W-01	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	38				1.40E-03	2.50E-02	2.7E-01				3.5E+01	
W-01	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	38				6.70E-04	2.50E-02	5.0E-03				3.6E-01	
W-01	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	38				7.80E-04	2.50E-02						
W-01	SVOC	Pentachlorophenol	87-86-5	T	B2	38				2.40E-03	2.50E-02	1.0E-03				2.0E-01	
W-01	SVOC	Phenanthrene	85-01-8	T	D	38				8.20E-04	2.50E-02	5.2E-02		1.0E+00		1.0E+00	
W-01	SVOC	Phenol	108-95-2	T	ID	38	1	1.90E-02	1.90E-02	2.60E-03	2.50E-02	4.4E+00	4.3E-03			2.9E+04	6.6E-07
W-01	SVOC	Pyrene	129-00-0	T	D	38				1.10E-03	2.50E-02	1.4E-01		1.4E-01		1.4E-01	
W-01	SVOC	2,4,5-Trichlorophenol	95-95-4	T		38				1.20E-03	2.50E-02	7.3E-01				1.7E+02	
W-01	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	37				1.70E-03	2.50E-02	1.2E-01				1.0E+01	
W-01	P/PCB	PCBs (total)	1336-36-3	D	B2	12	1	5.22E-04	5.22E-04	8.20E-05	4.00E-04	5.0E-04	1.0E+00	4.5E-02	1.2E-02	3.3E-03	1.6E-01
W-01	P/PCB	PCBs (total)	1336-36-3	T	B2	41	8	3.67E-04	4.59E-03	8.20E-05	4.00E-04	5.0E-04	**9.2E+00**	4.5E-02	1.0E-01	3.3E-03	**1.4E+00**
W-01	INORG	Antimony	7440-36-0	D		28	4	5.80E-03	7.90E-03	2.20E-03	2.50E-02	6.0E-03	**1.3E+00**			6.8E+01	1.2E-04
W-01	INORG	Antimony	7440-36-0	T		38	5	2.60E-03	8.60E-03	2.20E-03	2.50E-02	6.0E-03	**1.4E+00**			6.8E+01	1.3E-04
W-01	INORG	Arsenic	7440-38-2	D	A	28	19	4.00E-03	2.69E-02	3.90E-03	1.00E-02	5.0E-02	5.4E-01			4.3E+00	6.3E-03
W-01	INORG	Arsenic	7440-38-2	T	A	38	26	2.10E-03	2.64E-02	2.10E-03	1.00E-02	5.0E-02	5.3E-01			4.3E+00	6.1E-03
W-01	INORG	Barium	7440-39-3	D	D	28	28	5.63E-02	4.07E+00			2.0E+00	**2.0E+00**			1.4E+04	2.9E-04
W-01	INORG	Barium	7440-39-3	T	D	38	38	3.50E-02	4.57E+00			2.0E+00	**2.3E+00**			1.4E+04	3.3E-04
W-01	INORG	Beryllium	7440-41-7	D	B1	28	1	7.50E-04	7.50E-04	5.40E-04	1.00E-03	4.0E-03	1.9E-01			2.9E+02	2.6E-06
W-01	INORG	Beryllium	7440-41-7	T	B1	38				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
W-01	INORG	Cadmium	7440-43-9	D	B1	28	4	3.00E-04	6.90E-04	2.80E-04	5.00E-03	5.0E-03	1.4E-01			1.9E+02	3.6E-06
W-01	INORG	Cadmium	7440-43-9	T	B1	38	7	2.20E-04	1.10E-03	2.80E-04	5.00E-03	5.0E-03	2.2E-01			1.9E+02	5.8E-06
W-01	INORG	Chromium (total)	7440-47-3	D		28	3	1.80E-03	8.50E-03	1.40E-03	1.00E-02	1.0E-01	8.5E-02			4.6E+02	1.8E-05
W-01	INORG	Chromium (total)	7440-47-3	T		38	5	1.40E-03	3.05E-02	1.40E-03	1.00E-02	1.0E-01	3.1E-01			4.6E+02	6.6E-05
W-01	INORG	Cobalt	7440-48-4	D	B1	28	9	1.30E-03	3.50E-03	1.30E-03	2.00E-02	4.0E-02	8.8E-02			2.4E+03	1.5E-06
W-01	INORG	Cobalt	7440-48-4	T	B1	38	13	7.60E-04	6.60E-03	7.40E-04	2.00E-02	4.0E-02	1.7E-01			2.4E+03	2.8E-06
W-01	INORG	Copper	7440-50-8	D	D	28	2	4.50E-03	5.60E-03	4.20E-03	5.00E-03	1.4E+00	4.0E-03			7.4E+03	7.6E-07
W-01	INORG	Copper	7440-50-8	T	D	38	7	2.30E-03	2.22E-02	1.70E-03	5.00E-03	1.4E+00	1.6E-02			7.4E+03	3.0E-06
W-01	INORG	Cyanide (total)	57-12-5	T	D	33	22	2.00E-03	1.75E-02	1.70E-03	1.00E-02	2.0E-01	8.8E-02			5.7E+01	3.1E-04

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-01	INORG	Lead	7439-92-1	D	B2	28				2.50E-03	3.00E-03	4.0E-03					
W-01	INORG	Lead	7439-92-1	T	B2	38	7	1.80E-03	2.71E-02	1.60E-03	3.00E-03	4.0E-03	**6.8E+00**				
W-01	INORG	Manganese	7439-96-5	D	D	28	27	4.72E-02	9.52E-01	9.00E-04	9.00E-04	8.6E-01	**1.1E+00**			9.1E+03	1.0E-04
W-01	INORG	Manganese	7439-96-5	T	D	38	38	1.30E-03	1.22E+00			8.6E-01	**1.4E+00**			9.1E+03	1.3E-04
W-01	INORG	Mercury	7439-97-6	D	D	28	6	8.00E-05	1.30E-04	6.90E-05	2.00E-04	2.0E-03	6.5E-02	5.6E-02	2.3E-03	5.6E-02	2.3E-03
W-01	INORG	Mercury	7439-97-6	T	D	38	6	6.73E-05	1.20E-04	6.90E-05	2.00E-04	2.0E-03	6.0E-02	5.6E-02	2.1E-03	5.6E-02	2.1E-03
W-01	INORG	Nickel	7440-02-0	D	A	28	19	2.40E-03	1.59E-02	2.20E-03	2.00E-02	1.0E-01	1.6E-01			7.4E+04	2.1E-07
W-01	INORG	Nickel	7440-02-0	T	A	38	21	2.60E-03	1.94E-02	2.20E-03	2.00E-02	1.0E-01	1.9E-01			7.4E+04	2.6E-07
W-01	INORG	Selenium	7782-49-2	D	D	28				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
W-01	INORG	Selenium	7782-49-2	T	D	38	1	4.90E-03	4.90E-03	4.50E-03	5.00E-03	5.0E-02	9.8E-02			9.7E+02	5.1E-06
W-01	INORG	Silver	7440-22-4	D	D	28				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
W-01	INORG	Silver	7440-22-4	T	D	38	1	1.50E-03	1.50E-03	9.80E-04	5.00E-03	3.4E-02	4.4E-02			1.5E+03	1.0E-06
W-01	INORG	Thallium	7440-28-0	D		28	6	4.30E-05	9.10E-03	1.80E-05	1.00E-02	2.0E-03	**4.6E+00**			1.3E+01	7.0E-04
W-01	INORG	Thallium	7440-28-0	T		38	4	1.80E-05	1.02E-02	1.80E-05	1.00E-02	2.0E-03	**5.1E+00**			1.3E+01	7.8E-04
W-01	INORG	Vanadium	7440-62-2	D		28	4	1.00E-03	2.45E-02	8.20E-04	1.00E-02	4.5E-03	**5.4E+00**			9.7E+02	2.5E-05
W-01	INORG	Vanadium	7440-62-2	T		38	8	8.40E-04	4.84E-02	6.70E-04	1.00E-02	4.5E-03	**1.1E+01**			9.7E+02	5.0E-05
W-01	INORG	Zinc	7440-66-6	D	D	28	2	1.56E-02	2.09E-02	1.20E-02	2.00E-02	2.4E+00	8.7E-03			1.1E+05	1.9E-07
W-01	INORG	Zinc	7440-66-6	T	D	38	6	1.85E-02	3.82E-02	1.20E-02	2.00E-02	2.4E+00	1.6E-02			1.1E+05	3.5E-07
W-01	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	D	B2	4	3	1.99E-09	3.03E-09	4.57E-09	4.57E-09	3.0E-08	1.0E-01			1.0E-08	3.0E-01
W-01	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	31	15	1.63E-09	2.16E-08	2.34E-09	3.99E-08	3.0E-08	7.2E-01			1.0E-08	**2.2E+00**
W-05	VOC	Acetone	67-64-1	T	ID	8				5.10E-04	2.00E-02	7.3E-01		1.0E+06		3.1E+04	
W-05	VOC	Benzene	71-43-2	T	A	8	2	3.50E-04	4.90E-04	1.60E-04	2.00E-03	5.0E-03	9.8E-02	3.5E+01	1.4E-05	1.1E+01	4.5E-05
W-05	VOC	Bromodichloromethane	75-27-4	T	B2	8	1	4.60E-04	4.60E-04	1.70E-04	2.00E-03	1.0E-01	4.6E-03	3.7E+01	1.2E-05	1.4E+01	3.3E-05
W-05	VOC	Bromoform	75-25-2	T	B2	8				1.80E-04	2.00E-03	1.0E-01		3.1E+03		1.4E+02	
W-05	VOC	Bromomethane	74-83-9	T	D	8				2.00E-04	2.00E-03	1.0E-02		9.0E+00		7.0E+01	
W-05	VOC	2-Butanone	78-93-3	T	ID	8	2	1.78E-03	4.90E-03	4.10E-04	2.00E-02	1.3E+01	3.8E-04	2.4E+05	2.0E-08	2.4E+05	2.0E-08
W-05	VOC	Carbon Disulfide	75-15-0	T		8				2.00E-04	2.00E-03	8.0E-01		5.5E+02		1.2E+03	
W-05	VOC	Carbon Tetrachloride	56-23-5	T	B2	8				1.20E-04	2.00E-03	5.0E-03		2.4E+00		4.6E+00	
W-05	VOC	Chlorobenzene	108-90-7	T	D	8				1.40E-04	2.00E-03	1.0E-01		4.7E+02		8.6E+01	
W-05	VOC	Chloroethane	75-00-3	T		8	2	3.60E-02	5.00E-02	2.60E-04	1.43E-03	4.3E-01	1.2E-01	5.7E+03	8.8E-06	4.4E+02	1.1E-04
W-05	VOC	Chloroform	67-66-3	T	B2	8	4	5.50E-04	2.10E-03	1.40E-04	7.70E-04	1.0E-01	2.1E-02	1.8E+02	1.2E-05	1.5E+02	1.4E-05
W-05	VOC	Chloromethane	74-87-3	T	D	8	2	3.00E-04	4.75E-04	1.30E-04	2.00E-03	2.6E-01	1.8E-03	4.5E+01	1.1E-05	4.9E+02	9.7E-07
W-05	VOC	Cumene	98-82-8	T	D	8				1.20E-04	2.00E-03	8.0E-01		5.6E+01		5.6E+01	
W-05	VOC	Cyclohexane	110-82-7	T	ID	8				1.30E-04	2.00E-03						
W-05	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	8				6.20E-04	4.00E-03	2.0E-04		1.2E+00		3.9E-01	
W-05	VOC	Dibromochloromethane	124-48-1	T	C	8				2.60E-04	2.00E-03	1.0E-01		1.1E+02		1.8E+01	
W-05	VOC	1,2-Dibromoethane	106-93-4	T	B2	8				2.20E-04	2.00E-03	1.0E-03		1.5E+01		2.5E-02	
W-05	VOC	1,2-Dichlorobenzene	95-50-1	T	D	8				1.10E-04	2.00E-03	6.0E-01		1.6E+02		1.6E+02	
W-05	VOC	1,3-Dichlorobenzene	541-73-1	T	D	8				1.50E-04	2.00E-03	6.6E-03				2.0E+00	
W-05	VOC	1,4-Dichlorobenzene	106-46-7	T	C	8				1.70E-04	2.00E-03	7.5E-02		7.4E+01		6.4E+00	
W-05	VOC	Dichlorodifluoromethane	75-71-8	T		8				2.60E-04	4.00E-03	1.7E+00		3.0E+02		3.0E+02	
W-05	VOC	1,1-Dichloroethane	75-34-3	T	C	8	2	2.00E-02	3.00E-02	1.60E-04	1.00E-03	8.8E-01	3.4E-02	2.3E+03	1.3E-05	2.4E+03	1.3E-05
W-05	VOC	1,2-Dichloroethane	107-06-2	T	B2	8				2.10E-04	2.00E-03	5.0E-03		5.9E+01		1.9E+01	
W-05	VOC	1,1-Dichloroethene	75-35-4	T	C	8	1	7.80E-04	7.80E-04	2.40E-04	1.32E-03	7.0E-03	1.1E-01	1.3E+00	6.0E-04	1.1E+01	7.1E-05
W-05	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	8	3	3.20E-04	1.10E-03	2.20E-04	1.21E-03	7.0E-02	1.6E-02	2.1E+02	5.2E-06	2.0E+02	5.5E-06
W-05	VOC	trans-1,2-Dichloroethene	156-60-5	T		8				1.50E-04	1.00E-03	1.0E-01		2.0E+02		2.2E+02	
W-05	VOC	1,2-Dichloropropane	78-87-5	T	B2	8				1.70E-04	2.00E-03	5.0E-03		3.6E+01		1.6E+01	
W-05	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	8				2.70E-04	2.00E-03	8.5E-03		2.6E+01		5.5E+00	
W-05	VOC	Ethyl Benzene	100-41-4	T	D	8				1.20E-04	2.00E-03	7.0E-01		1.7E+02		1.7E+02	
W-05	VOC	2-Hexanone	591-78-6	T		8				4.60E-04	2.00E-02	1.0E+00		8.7E+03		5.2E+03	
W-05	VOC	Methyl Acetate	79-20-9	T		8				4.10E-04	2.00E-02						
W-05	VOC	Methyl tert-butyl ether	1634-04-4	T		8				1.30E-04	1.00E-02	2.4E-01		4.7E+04		6.1E+02	
W-05	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	8	3	5.00E-04	1.60E-03	2.30E-04	2.00E-02	1.8E+00	8.9E-04	2.0E+04	8.0E-08	1.3E+04	1.2E-07
W-05	VOC	Methylcyclohexane	108-87-2	T		8				1.50E-04	2.00E-03						
W-05	VOC	Methylene Chloride	75-09-2	T	B2	8	1	7.70E-04	7.70E-04	3.40E-04	1.87E-03	5.0E-03	1.5E-01	1.4E+03	5.5E-07	2.2E+02	3.5E-06
W-05	VOC	Styrene	100-42-5	T		8				1.50E-04	2.00E-03	1.0E-01		3.1E+02		9.7E+00	
W-05	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	8				2.50E-04	2.00E-03	8.5E-03		7.7E+01		4.7E+00	
W-05	VOC	Tetrachloroethene	127-18-4	T	C-B2	8				2.30E-04	2.00E-03	5.0E-03		1.7E+02		1.2E+01	
W-05	VOC	Toluene	108-88-3	T	D	8	3	2.60E-04	6.05E-04	1.80E-04	1.00E-03	1.0E+00	6.1E-04	5.3E+02	1.1E-06	5.3E+02	1.1E-06
W-05	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	8				1.70E-04	2.00E-03	7.0E-02		3.0E+02		1.9E+01	
W-05	VOC	1,1,1-Trichloroethane	71-55-6	T	D	8	1	5.65E-04	5.65E-04	1.50E-04	2.00E-03	2.0E-01	2.8E-03	1.3E+03	4.3E-07	1.3E+03	4.3E-07
W-05	VOC	1,1,2-Trichloroethane	79-00-5	T	C	8				3.00E-04	2.00E-03	5.0E-03		1.1E+02		2.1E+01	
W-05	VOC	Trichloroethene	79-01-6	T	C-B2	8				1.40E-04	2.00E-03	5.0E-03		9.7E+01		2.2E+01	
W-05	VOC	Trichlorofluoromethane	75-69-4	T		8				2.80E-04	2.00E-03	2.6E+00		1.1E+03		1.1E+03	
W-05	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		8				3.20E-04	2.00E-03	1.7E+02		1.7E+02		1.7E+02	
W-05	VOC	Vinyl Chloride	75-01-4	T	A	8	2	2.20E-04	2.70E-04	1.50E-04	2.00E-03	2.0E-03	1.4E-01	1.3E+01	2.1E-05	1.0E+00	2.7E-04

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-05	VOC	Xylenes (total)	1330-20-7	T	ID	8	1	4.30E-04	4.30E-04	3.30E-04	2.00E-03	1.0E+01	4.3E-05	1.9E+02	2.3E-06	1.9E+02	2.3E-06
W-05	SVOC	Acenaphthene	83-32-9	T		8				8.00E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
W-05	SVOC	Acenaphthylene	208-96-8	T	D	8				7.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
W-05	SVOC	Acetophenone	98-86-2	T	D	8				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
W-05	SVOC	Anthracene	120-12-7	T	D	8	2	1.15E-03	1.20E-03	6.80E-04	5.00E-03	4.3E-02	2.8E-02	4.3E-02	2.8E-02	4.3E-02	2.8E-02
W-05	SVOC	Atrazine	1912-24-9	T		8				2.50E-03	6.20E-03	3.0E-03				5.4E+00	
W-05	SVOC	Benzaldehyde	100-52-7	T		8				2.80E-03	1.00E-02						
W-05	SVOC	Benzo(a)anthracene	56-55-3	T	B2	8				7.00E-04	5.00E-03	2.1E-03				9.4E-03	
W-05	SVOC	Benzo(a)pyrene	50-32-8	T	B2	8				7.30E-04	5.00E-03	5.0E-03				2.0E-03	
W-05	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	8				9.40E-04	5.00E-03	2.0E-03				2.0E-03	
W-05	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	8				8.50E-04	5.00E-03	5.0E-03				5.0E-03	
W-05	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	8				8.40E-04	5.00E-03	5.0E-03				5.0E-03	
W-05	SVOC	Biphenyl	92-52-4	T	D	8				2.60E-03	1.00E-02						
W-05	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	8				8.70E-04	5.00E-03						
W-05	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	8				9.70E-04	5.00E-03	2.0E-03		2.1E+02		5.7E+00	
W-05	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	8				2.70E-03	6.80E-03	6.0E-03				3.2E-01	
W-05	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	8				8.80E-04	5.00E-03						
W-05	SVOC	Butylbenzylphthalate	85-68-7	T	C	8				8.80E-04	5.00E-03	1.2E+00				2.7E+00	
W-05	SVOC	Caprolactam	105-60-2	T		8				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
W-05	SVOC	Carbazole	86-74-8	T	B2	8	2	1.30E-03	1.55E-03	8.20E-04	1.00E-02	8.5E-02	1.8E-02			7.4E+00	2.1E-04
W-05	SVOC	4-Chloro-3-methylphenol	59-50-7	T		8				9.90E-04	5.00E-03	1.5E-01				7.9E+01	
W-05	SVOC	4-Chloroaniline	106-47-8	T		8				6.10E-04	1.00E-02						
W-05	SVOC	2-Chloronaphthalene	91-58-7	T		8				8.50E-04	5.00E-03	1.8E+00				6.7E+00	
W-05	SVOC	2-Chlorophenol	95-57-8	T		8				1.00E-03	5.00E-03	4.5E-02				9.4E+01	
W-05	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		8				7.90E-04	5.00E-03						
W-05	SVOC	Chrysene	218-01-9	T	B2	8				7.50E-04	5.00E-03	5.0E-03				5.0E-03	
W-05	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	8				7.90E-04	5.00E-03	2.0E-03				2.0E-03	
W-05	SVOC	Dibenzofuran	132-64-9	T	D	8				1.10E-03	5.00E-03						
W-05	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	8				9.30E-04	2.00E-02	1.1E-03				1.8E-01	
W-05	SVOC	2,4-Dichlorophenol	120-83-2	T		8				8.50E-04	1.00E-02	7.3E-02				4.8E+01	
W-05	SVOC	Diethylphthalate	84-66-2	T	D	8				6.50E-04	5.00E-03	5.5E+00				1.1E+03	
W-05	SVOC	2,4-Dimethylphenol	105-67-9	T		8				8.50E-04	5.00E-03	3.7E-01				5.2E+02	
W-05	SVOC	Dimethylphthalate	131-11-3	T	D	8				7.60E-04	5.00E-03	7.3E+01				4.2E+03	
W-05	SVOC	Di-n-butylphthalate	84-74-2	T	D	8				6.70E-04	5.00E-03	8.8E-01				1.1E+01	
W-05	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		8				1.30E-03	2.00E-02	2.0E-02				9.5E+00	
W-05	SVOC	2,4-Dinitrophenol	51-28-5	T		8				3.00E-03	2.00E-02						
W-05	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	8				7.90E-04	5.00E-03	7.7E-03				8.6E+00	
W-05	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	8				5.70E-04	5.00E-03						
W-05	SVOC	Di-n-octylphthalate	117-84-0	T		8				1.10E-03	5.00E-03	1.3E-01				4.0E-01	
W-05	SVOC	Fluoranthene	206-44-0	T	D	8				8.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
W-05	SVOC	Fluorene	86-73-7	T	D	8	2	2.80E-03	6.80E-03	1.00E-03	5.00E-03	8.8E-01	7.7E-03	2.0E+00	3.4E-03	2.0E+00	3.4E-03
W-05	SVOC	Hexachlorobenzene	118-74-1	T	B2	8				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
W-05	SVOC	Hexachlorobutadiene	87-68-3	T	C	8				7.30E-04	5.00E-03	1.5E-02		3.2E+00		4.0E-01	
W-05	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	8				1.10E-03	5.00E-03	5.0E-02		4.2E-01		1.6E+00	
W-05	SVOC	Hexachloroethane	67-72-1	T	C	8				7.40E-04	5.00E-03	7.3E-03		5.0E+01		1.9E+00	
W-05	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	8				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
W-05	SVOC	Isophorone	78-59-1	T	C	8				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
W-05	SVOC	2-Methylnaphthalene	91-57-6	T	ID	8				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
W-05	SVOC	Methylphenol (total)	1319-77-3	T		8				1.30E-03	5.00E-03	3.7E-01				8.1E+02	
W-05	SVOC	Naphthalene	91-20-3	T	C	8	1	2.50E-03	2.50E-03	7.50E-04	5.00E-03	5.2E-01	4.8E-03	3.1E+01	8.1E-05	3.1E+01	8.1E-05
W-05	SVOC	2-Nitroaniline	88-74-4	T		8				7.00E-04	2.00E-02						
W-05	SVOC	3-Nitroaniline	99-09-2	T	C	8				7.10E-04	2.00E-02						
W-05	SVOC	4-Nitroaniline	100-01-6	T	C	8				1.30E-03	2.00E-02						
W-05	SVOC	Nitrobenzene	98-95-3	T	D	8				8.10E-04	5.00E-03	3.4E-03		5.5E+02		1.1E+01	
W-05	SVOC	2-Nitrophenol	88-75-5	T		8				2.10E-03	5.20E-03	2.0E-02				7.9E+01	
W-05	SVOC	4-Nitrophenol	100-02-7	T		8				1.90E-03	2.00E-02						
W-05	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	8				1.40E-03	5.00E-03	2.7E-01				3.5E+01	
W-05	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	8				6.70E-04	5.00E-03	5.0E-03				3.6E-01	
W-05	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	8				7.80E-04	5.00E-03						
W-05	SVOC	Pentachlorophenol	87-86-5	T	B2	8				2.40E-03	6.00E-03	1.0E-03				2.0E-01	
W-05	SVOC	Phenanthrene	85-01-8	T	D	8	1	2.30E-03	2.30E-03	8.20E-04	5.00E-03	5.2E-02	4.4E-02	1.0E+00	2.3E-03	1.0E+00	2.3E-03
W-05	SVOC	Phenol	108-95-2	T	ID	8				2.60E-03	6.50E-03	4.4E+00				2.9E+04	
W-05	SVOC	Pyrene	129-00-0	T	D	8				1.10E-03	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
W-05	SVOC	2,4,5-Trichlorophenol	95-95-4	T		8				1.20E-03	5.00E-03	7.3E-01				1.7E+02	
W-05	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	8				1.70E-03	5.00E-03	1.2E-01				1.0E+01	
W-05	P/PCB	PCBs (total)	1336-36-3	D	B2	4				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-05	P/PCB	PCBs (total)	1336-36-3	T	B2	8				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
W-05	INORG	Antimony	7440-36-0	D		8	2	8.30E-03	9.80E-03	2.20E-03	2.50E-02	6.0E-03	**1.6E+00**			6.8E+01	1.4E-04
W-05	INORG	Antimony	7440-36-0	T		8	2	9.25E-03	1.07E-02	2.20E-03	2.50E-02	6.0E-03	**1.8E+00**			6.8E+01	1.6E-04
W-05	INORG	Arsenic	7440-38-2	D	A	8	4	5.10E-03	4.73E-02	3.90E-03	1.00E-02	5.0E-02	9.5E-01			4.3E+00	1.1E-02
W-05	INORG	Arsenic	7440-38-2	T	A	8	4	5.70E-03	5.85E-02	3.90E-03	1.00E-02	5.0E-02	**1.2E+00**			4.3E+00	1.4E-02
W-05	INORG	Barium	7440-39-3	D	D	8	8	3.06E-02	3.00E-01			2.0E+00	1.5E-01			1.4E+04	2.1E-05
W-05	INORG	Barium	7440-39-3	T	D	8	8	3.25E-02	2.85E-01			2.0E+00	1.4E-01			1.4E+04	2.0E-05
W-05	INORG	Beryllium	7440-41-7	D	B1	8				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
W-05	INORG	Beryllium	7440-41-7	T	B1	8	1	5.60E-04	5.60E-04	5.40E-04	1.00E-03	4.0E-03	1.4E-01			2.9E+02	1.9E-06
W-05	INORG	Cadmium	7440-43-9	D	B1	8	3	2.20E-04	3.90E-04	2.80E-04	5.00E-03	5.0E-03	7.8E-02			1.9E+02	2.1E-06
W-05	INORG	Cadmium	7440-43-9	T	B1	8	3	2.90E-04	4.70E-04	2.80E-04	5.00E-03	5.0E-03	9.4E-02			1.9E+02	2.5E-06
W-05	INORG	Chromium (total)	7440-47-3	D		8	2	9.60E-03	1.72E-02	1.40E-03	1.00E-02	1.0E-01	1.7E-01			4.6E+02	3.7E-05
W-05	INORG	Chromium (total)	7440-47-3	T		8	2	1.04E-02	1.72E-02	1.40E-03	1.00E-02	1.0E-01	1.7E-01			4.6E+02	3.7E-05
W-05	INORG	Cobalt	7440-48-4	D	B1	8	4	3.00E-03	5.80E-03	1.30E-03	2.00E-02	4.0E-02	1.5E-01			2.4E+03	2.4E-06
W-05	INORG	Cobalt	7440-48-4	T	B1	8	4	1.70E-03	5.50E-03	1.30E-03	2.00E-02	4.0E-02	1.4E-01			2.4E+03	2.3E-06
W-05	INORG	Copper	7440-50-8	D	D	8	2	1.05E-02	4.26E-02	4.20E-03	5.00E-03	1.4E+00	3.0E-02			7.4E+03	5.8E-06
W-05	INORG	Copper	7440-50-8	T	D	8	2	1.37E-02	4.74E-02	4.20E-03	5.00E-03	1.4E+00	3.4E-02			7.4E+03	6.4E-06
W-05	INORG	Lead	7439-92-1	D	B2	8				2.50E-03	3.00E-03	4.0E-03					
W-05	INORG	Lead	7439-92-1	T	B2	8				2.50E-03	3.00E-03	4.0E-03					
W-05	INORG	Manganese	7439-96-5	D	D	8	8	1.38E-03	8.15E-01			8.6E-01	9.5E-01			9.1E+03	9.0E-05
W-05	INORG	Manganese	7439-96-5	T	D	8	8	2.48E-03	7.66E-01			8.6E-01	8.9E-01			9.1E+03	8.4E-05
W-05	INORG	Mercury	7439-97-6	D	D	8	2	8.20E-05	2.20E-04	6.90E-05	2.00E-04	2.0E-03	1.1E-01	5.6E-02	3.9E-03	5.6E-02	3.9E-03
W-05	INORG	Mercury	7439-97-6	T	D	8	1	3.00E-04	3.00E-04	6.90E-05	2.00E-04	2.0E-03	1.5E-01	5.6E-02	5.4E-03	5.6E-02	5.4E-03
W-05	INORG	Nickel	7440-02-0	D	A	8	6	2.70E-03	1.63E-02	2.20E-03	2.00E-02	1.0E-01	1.6E-01			7.4E+04	2.2E-07
W-05	INORG	Nickel	7440-02-0	T	A	8	6	2.90E-03	1.62E-02	2.20E-03	2.00E-02	1.0E-01	1.6E-01			7.4E+04	2.2E-07
W-05	INORG	Selenium	7782-49-2	D	D	8	2	2.78E-02	4.78E-02	4.50E-03	5.00E-03	5.0E-02	9.6E-01			9.7E+02	4.9E-05
W-05	INORG	Selenium	7782-49-2	T	D	8	2	2.88E-02	4.89E-02	4.50E-03	5.00E-03	5.0E-02	9.8E-01			9.7E+02	5.0E-05
W-05	INORG	Silver	7440-22-4	D	D	8				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
W-05	INORG	Silver	7440-22-4	T	D	8				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
W-05	INORG	Thallium	7440-28-0	D		8	5	3.25E-05	9.00E-03	1.80E-05	5.00E-03	2.0E-03	**4.5E+00**			1.3E+01	6.9E-04
W-05	INORG	Thallium	7440-28-0	T		8	3	3.60E-05	7.10E-03	1.80E-05	1.00E-02	2.0E-03	**3.6E+00**			1.3E+01	5.5E-04
W-05	INORG	Vanadium	7440-62-2	D		8	3	1.00E-03	7.32E-02	8.20E-04	1.00E-02	4.5E-03	**1.6E+01**			9.7E+02	7.5E-05
W-05	INORG	Vanadium	7440-62-2	T		8	4	8.30E-04	7.66E-02	8.20E-04	1.00E-02	4.5E-03	**1.7E+01**			9.7E+02	7.9E-05
W-05	INORG	Zinc	7440-66-6	D	D	8	1	1.28E-02	1.28E-02	1.20E-02	2.00E-02	2.4E+00	5.3E-03			1.1E+05	1.2E-07
W-05	INORG	Zinc	7440-66-6	T	D	8	2	1.33E-02	1.85E-02	1.20E-02	2.00E-02	2.4E+00	7.7E-03			1.1E+05	1.7E-07
W-08	VOC	Acetone	67-64-1	T	ID	19	6	1.63E-03	1.60E-01	5.10E-04	1.10E-03	7.3E-01	2.2E-01	1.0E+06	1.6E-07	3.1E+04	5.2E-06
W-08	VOC	Benzene	71-43-2	T	A	19	7	1.80E-04	6.25E-04	1.60E-04	4.00E-03	5.0E-03	1.3E-01	3.5E+01	1.8E-05	1.1E+01	5.7E-05
W-08	VOC	Bromodichloromethane	75-27-4	T	B2	19				1.70E-04	4.00E-03	1.0E-01		3.7E+01		1.4E+01	
W-08	VOC	Bromoform	75-25-2	T	B2	19				1.80E-04	4.00E-03	1.0E-01		3.1E+03		1.4E+02	
W-08	VOC	Bromomethane	74-83-9	T	D	16				1.60E-04	4.00E-03	1.0E-02		9.0E+00		7.0E+01	
W-08	VOC	2-Butanone	78-93-3	T	ID	19	3	5.40E-04	4.40E-03	3.60E-04	4.00E-02	1.3E+01	3.4E-04	2.4E+05	1.8E-08	2.4E+05	1.8E-08
W-08	VOC	Carbon Disulfide	75-15-0	T		19	8	2.40E-04	1.10E-03	2.00E-04	4.00E-03	8.0E-01	1.4E-03	5.5E+02	2.0E-06	1.2E+03	9.2E-07
W-08	VOC	Carbon Tetrachloride	56-23-5	T	B2	19				1.20E-04	4.00E-03	5.0E-03		2.4E+00		4.6E+00	
W-08	VOC	Chlorobenzene	108-90-7	T	D	19				1.40E-04	4.00E-03	1.0E-01		4.7E+02		8.6E+01	
W-08	VOC	Chloroethane	75-00-3	T		19				2.20E-04	4.00E-03	4.3E-01		5.7E+03		4.4E+02	
W-08	VOC	Chloroform	67-66-3	T	B2	19	4	1.40E-04	2.40E-04	1.40E-04	4.00E-03	1.0E-01	2.4E-03	1.8E+02	1.3E-06	1.5E+02	1.6E-06
W-08	VOC	Chloromethane	74-87-3	T	D	19	1	2.60E-04	2.60E-04	1.30E-04	4.00E-03	2.6E-01	1.0E-03	4.5E+01	5.8E-06	4.9E+02	5.3E-07
W-08	VOC	Cumene	98-82-8	T	D	19	6	1.80E-04	1.70E-03	1.20E-04	4.00E-03	8.0E-01	2.1E-03	5.6E+01	3.0E-05	5.6E+01	3.0E-05
W-08	VOC	Cyclohexane	110-82-7	T	ID	19	1	2.20E-04	2.20E-04	1.30E-04	4.00E-03						
W-08	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	19				5.30E-04	8.00E-03	2.0E-04		1.2E+00		3.9E-01	
W-08	VOC	Dibromochloromethane	124-48-1	T	C	19				2.50E-04	4.00E-03	1.0E-01		1.1E+02		1.8E+01	
W-08	VOC	1,2-Dibromoethane	106-93-4	T	B2	19				2.20E-04	4.00E-03	1.0E-03		1.5E+01		2.5E-02	
W-08	VOC	1,2-Dichlorobenzene	95-50-1	T	D	19				1.10E-04	4.00E-03	6.0E-01		1.6E+02		1.6E+02	
W-08	VOC	1,3-Dichlorobenzene	541-73-1	T	D	19				1.50E-04	4.00E-03	6.6E-03				2.0E+00	
W-08	VOC	1,4-Dichlorobenzene	106-46-7	T	C	19				1.60E-04	4.00E-03	7.5E-02		7.4E+01		6.4E+00	
W-08	VOC	Dichlorodifluoromethane	75-71-8	T		19				2.30E-04	8.00E-03	1.7E+00		3.0E+02		3.0E+02	
W-08	VOC	1,1-Dichloroethane	75-34-3	T	C	19	6	1.90E-04	3.00E-03	1.60E-04	4.00E-03	8.8E-01	3.4E-03	2.3E+03	1.3E-06	2.4E+03	1.3E-06
W-08	VOC	1,2-Dichloroethane	107-06-2	T	B2	19				2.10E-04	4.00E-03	5.0E-03		5.9E+01		1.9E+01	
W-08	VOC	1,1-Dichloroethene	75-35-4	T	C	19				2.20E-04	4.00E-03	7.0E-03		1.3E+00		1.1E+01	
W-08	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	19	2	3.00E-04	2.30E-03	2.20E-04	2.00E-03	7.0E-02	3.3E-02	2.1E+02	1.1E-05	2.0E+02	1.2E-05
W-08	VOC	trans-1,2-Dichloroethene	156-60-5	T		19	1	6.30E-04	6.30E-04	1.50E-04	2.00E-03	1.0E-01	6.3E-03	2.0E+02	3.2E-06	2.2E+02	2.9E-06
W-08	VOC	1,2-Dichloropropane	78-87-5	T	B2	19				1.70E-04	4.00E-03	5.0E-03		3.6E+01		1.6E+01	
W-08	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	19				1.50E-04	4.00E-03	8.5E-03		2.6E+01		5.5E+00	
W-08	VOC	Ethyl Benzene	100-41-4	T	D	19	8	1.50E-04	7.00E-04	1.20E-04	4.00E-03	7.0E-01	1.0E-03	1.7E+02	4.1E-06	1.7E+02	4.1E-06
W-08	VOC	2-Hexanone	591-78-6	T		19				3.10E-04	4.00E-02	1.0E+00		8.7E+03		5.2E+03	
W-08	VOC	Methyl Acetate	79-20-9	T		19				4.10E-04	4.00E-02						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-08	VOC	Methyl tert-butyl ether	1634-04-4	T		19				1.30E-04	2.00E-02	2.4E-01		4.7E+04		6.1E+02	
W-08	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	18	8	4.30E-04	4.90E-03	2.30E-04	4.00E-02	1.8E+00	2.7E-03	2.0E+04	2.5E-07	1.3E+04	3.8E-07
W-08	VOC	Methylcyclohexane	108-87-2	T		19	1	1.90E-04	1.90E-04	1.50E-04	4.00E-03						
W-08	VOC	Methylene Chloride	75-09-2	T	B2	18	1	5.00E-04	5.00E-04	2.80E-04	4.00E-03	5.0E-03	1.0E-01	1.4E+03	3.6E-07	2.2E+02	2.3E-06
W-08	VOC	Styrene	100-42-5	T		19				1.50E-04	4.00E-03	1.0E-01		3.1E+02		9.7E+00	
W-08	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	19				2.30E-04	4.00E-03	8.5E-03		7.7E+01		4.7E+00	
W-08	VOC	Tetrachloroethene	127-18-4	T	C-B2	19	1	8.90E-04	8.90E-04	1.20E-04	4.00E-03	5.0E-03	1.8E-01	1.7E+02	5.2E-06	1.2E+01	7.4E-05
W-08	VOC	Toluene	108-88-3	T	D	19	9	2.00E-04	2.00E-03	1.80E-04	4.00E-03	1.0E+00	2.0E-03	5.3E+02	3.8E-06	5.3E+02	3.8E-06
W-08	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	19				1.50E-04	4.00E-03	7.0E-02		3.0E+02		1.9E+01	
W-08	VOC	1,1,1-Trichloroethane	71-55-6	T	D	19				1.50E-04	4.00E-03	2.0E-01		1.3E+03		1.3E+03	
W-08	VOC	1,1,2-Trichloroethane	79-00-5	T	C	19				2.10E-04	4.00E-03	5.0E-03		1.1E+02		2.1E+01	
W-08	VOC	Trichloroethene	79-01-6	T	C-B2	19	2	2.00E-04	2.60E-03	1.40E-04	4.00E-03	5.0E-03	5.2E-01	9.7E+01	2.7E-05	2.2E+01	1.2E-04
W-08	VOC	Trichlorofluoromethane	75-69-4	T		19				2.50E-04	4.00E-03	2.6E+00		1.1E+03		1.1E+03	
W-08	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		19				2.30E-04	4.00E-03	1.7E+02		1.7E+02		1.7E+02	
W-08	VOC	Vinyl Chloride	75-01-4	T	A	19	1	3.10E-04	3.10E-04	1.50E-04	4.00E-03	2.0E-03	1.6E-01	1.3E+01	2.4E-05	1.0E+00	3.1E-04
W-08	VOC	Xylenes (total)	1330-20-7	T	ID	19	9	5.10E-04	2.80E-03	3.30E-04	4.00E-03	1.0E+01	2.8E-04	1.9E+02	1.5E-05	1.9E+02	1.5E-05
W-08	SVOC	Acenaphthene	83-32-9	T		19	2	2.20E-03	3.10E-03	8.00E-04	1.40E-01	1.3E+00	2.4E-03	4.2E+00	7.4E-04	4.2E+00	7.4E-04
W-08	SVOC	Acenaphthylene	208-96-8	T	D	19				7.10E-04	8.20E-02	5.2E-02		3.9E+00		3.9E+00	
W-08	SVOC	Acetophenone	98-86-2	T	D	19				2.60E-03	1.30E-01	1.5E+00		6.1E+03		6.1E+03	
W-08	SVOC	Anthracene	120-12-7	T	D	19	2	7.30E-04	7.90E-04	6.80E-04	1.20E-01	4.3E-02	1.8E-02	4.3E-02	1.8E-02	4.3E-02	1.8E-02
W-08	SVOC	Atrazine	1912-24-9	T		19				2.50E-03	7.00E-02	3.0E-03				5.4E+00	
W-08	SVOC	Benzaldehyde	100-52-7	T		19				2.80E-03	1.20E-01						
W-08	SVOC	Benzo(a)anthracene	56-55-3	T	B2	19				7.00E-04	1.40E-01	2.1E-03				9.4E-03	
W-08	SVOC	Benzo(a)pyrene	50-32-8	T	B2	19				7.30E-04	1.10E-01	5.0E-03				2.0E-03	
W-08	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	19				9.40E-04	1.40E-01	2.0E-03				2.0E-03	
W-08	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	19				8.50E-04	1.40E-01	5.0E-03				5.0E-03	
W-08	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	19				8.40E-04	1.30E-01	5.0E-03				5.0E-03	
W-08	SVOC	Biphenyl	92-52-4	T	D	19				2.60E-03	1.30E-01						
W-08	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	19				8.70E-04	2.00E-01						
W-08	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	19				9.70E-04	3.40E-01	2.0E-03		2.1E+02		5.7E+00	
W-08	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	19				2.70E-03	5.40E-02	6.0E-03				3.2E-01	
W-08	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	19				8.80E-04	1.60E-01						
W-08	SVOC	Butylbenzylphthalate	85-68-7	T	C	19				8.80E-04	4.60E-02	1.2E+00				2.7E+00	
W-08	SVOC	Caprolactam	105-60-2	T		19	1	5.50E+00	5.50E+00	2.50E-03	9.00E-02	5.8E+00	9.5E-01			3.9E+05	1.4E-05
W-08	SVOC	Carbazole	86-74-8	T	B2	19				8.20E-04	1.20E-01	8.5E-02				7.4E+00	
W-08	SVOC	4-Chloro-3-methylphenol	59-50-7	T		19				9.90E-04	1.10E-01	1.5E-01				7.9E+01	
W-08	SVOC	4-Chloroaniline	106-47-8	T		18				6.10E-04	1.80E-01						
W-08	SVOC	2-Chloronaphthalene	91-58-7	T		19				8.50E-04	1.50E-01	1.8E+00				6.7E+00	
W-08	SVOC	2-Chlorophenol	95-57-8	T		19				1.00E-03	2.60E-01	4.5E-02				9.4E+01	
W-08	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		19				7.90E-04	1.30E-01						
W-08	SVOC	Chrysene	218-01-9	T	B2	19				7.50E-04	1.30E-01	5.0E-03				5.0E-03	
W-08	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	19				7.90E-04	1.40E-01	2.0E-03				2.0E-03	
W-08	SVOC	Dibenzofuran	132-64-9	T	D	19				1.10E-03	1.30E-01						
W-08	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	17				9.30E-04	9.40E-02	1.1E-03				1.8E-01	
W-08	SVOC	2,4-Dichlorophenol	120-83-2	T		19				8.50E-04	1.40E-01	7.3E-02				4.8E+01	
W-08	SVOC	Diethylphthalate	84-66-2	T	D	19				6.50E-04	5.00E-02	5.5E+00				1.1E+03	
W-08	SVOC	2,4-Dimethylphenol	105-67-9	T		19	1	2.50E+00	2.50E+00	8.50E-04	1.70E-02	3.7E-01	**6.8E+00**			5.2E+02	4.8E-03
W-08	SVOC	Dimethylphthalate	131-11-3	T	D	19				7.60E-04	4.00E-02	7.3E+01				4.2E+03	
W-08	SVOC	Di-n-butylphthalate	84-74-2	T	D	19				6.70E-04	7.40E-02	8.8E-01				1.1E+01	
W-08	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		19				1.30E-03	4.20E-01	2.0E-02				9.5E+00	
W-08	SVOC	2,4-Dinitrophenol	51-28-5	T		19				3.00E-03	6.60E-01						
W-08	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	19				7.90E-04	9.20E-02	7.7E-03				8.6E+00	
W-08	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	19				5.70E-04	1.40E-01						
W-08	SVOC	Di-n-octylphthalate	117-84-0	T		19				1.10E-03	1.40E-01	1.3E-01				4.0E-01	
W-08	SVOC	Fluoranthene	206-44-0	T	D	19				8.10E-04	1.40E-01	2.1E-01		2.1E-01		2.1E-01	
W-08	SVOC	Fluorene	86-73-7	T	D	19	8	1.50E-03	2.10E-02	1.00E-03	1.50E-01	8.8E-01	2.4E-02	2.0E+00	1.1E-02	2.0E+00	1.1E-02
W-08	SVOC	Hexachlorobenzene	118-74-1	T	B2	19				7.40E-04	1.50E-01	1.0E-03		3.0E+00		4.6E-03	
W-08	SVOC	Hexachlorobutadiene	87-68-3	T	C	19				7.30E-04	3.00E-01	1.5E-02		3.2E+00		4.0E-01	
W-08	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	17				1.10E-03	2.20E-01	5.0E-02		4.2E-01		1.6E+00	
W-08	SVOC	Hexachloroethane	67-72-1	T	C	19				7.40E-04	3.20E-01	7.3E-03		5.0E+01		1.9E+00	
W-08	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	19				6.30E-04	1.40E-01	2.0E-03				2.0E-03	
W-08	SVOC	Isophorone	78-59-1	T	C	19				6.30E-04	1.70E-01	7.7E-01				9.9E+02	
W-08	SVOC	2-Methylnaphthalene	91-57-6	T	ID	19	4	6.50E-04	5.10E-03	6.40E-04	1.90E-01	2.6E-01	2.0E-02			2.5E+01	2.0E-04
W-08	SVOC	Methylphenol (total)	1319-77-3	T		19	1	4.69E+00	4.69E+00	1.30E-03	2.60E-02	3.7E-01	**1.3E+01**			8.1E+02	5.8E-03
W-08	SVOC	Naphthalene	91-20-3	T	C	19	4	1.70E-03	2.60E-03	7.50E-04	2.60E-01	5.2E-01	5.0E-03	3.1E+01	8.4E-05	3.1E+01	8.4E-05
W-08	SVOC	2-Nitroaniline	88-74-4	T		19				7.00E-04	9.80E-02						

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-08	SVOC	3-Nitroaniline	99-09-2	T	C	18				7.10E-04	9.60E-02						
W-08	SVOC	4-Nitroaniline	100-01-6	T	C	19				1.30E-03	1.20E-01						
W-08	SVOC	Nitrobenzene	98-95-3	T	D	19				8.10E-04	2.60E-01	3.4E-03		5.5E+02		1.1E+01	
W-08	SVOC	2-Nitrophenol	88-75-5	T		19				2.10E-03	1.90E-01	2.0E-02				7.9E+01	
W-08	SVOC	4-Nitrophenol	100-02-7	T		19				1.90E-03	7.00E-01						
W-08	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	19				1.40E-03	1.30E-01	2.7E-01				3.5E+01	
W-08	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	19				6.70E-04	2.20E-01	5.0E-03				3.6E-01	
W-08	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	19				7.80E-04	3.60E-01						
W-08	SVOC	Pentachlorophenol	87-86-5	T	B2	19				2.40E-03	5.20E-01	1.0E-03				2.0E-01	
W-08	SVOC	Phenanthrene	85-01-8	T	D	19	9	1.00E-03	2.80E-02	8.20E-04	1.40E-01	5.2E-02	5.4E-01	1.0E+00	2.8E-02	1.0E+00	2.8E-02
W-08	SVOC	Phenol	108-95-2	T	ID	19	2	4.60E-02	1.20E+00	2.60E-03	5.20E-02	4.4E+00	2.7E-01			2.9E+04	4.1E-05
W-08	SVOC	Pyrene	129-00-0	T	D	19				1.10E-03	1.30E-01	1.4E-01		1.4E-01		1.4E-01	
W-08	SVOC	2,4,5-Trichlorophenol	95-95-4	T		19				1.20E-03	1.70E-01	7.3E-01				1.7E+02	
W-08	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	19				1.70E-03	1.40E-01	1.2E-01				1.0E+01	
W-08	P/PCB	PCBs (total)	1336-36-3	D	B2	5				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
W-08	P/PCB	PCBs (total)	1336-36-3	T	B2	19	1	7.36E-04	7.36E-04	8.20E-05	4.00E-04	5.0E-04	**1.5E+00**	4.5E-02	1.6E-02	3.3E-03	2.2E-01
W-08	INORG	Antimony	7440-36-0	D		14	3	2.50E-03	8.00E-03	2.20E-03	2.20E-03	6.0E-03	**1.3E+00**			6.8E+01	1.2E-04
W-08	INORG	Antimony	7440-36-0	T		19	3	2.80E-03	7.90E-03	2.20E-03	3.40E-03	6.0E-03	**1.3E+00**			6.8E+01	1.2E-04
W-08	INORG	Arsenic	7440-38-2	D	A	14	10	4.10E-03	3.41E-02	3.90E-03	1.00E-02	5.0E-02	6.8E-01			4.3E+00	7.9E-03
W-08	INORG	Arsenic	7440-38-2	T	A	19	15	4.10E-03	8.49E-02	3.90E-03	1.00E-02	5.0E-02	**1.7E+00**			4.3E+00	2.0E-02
W-08	INORG	Barium	7440-39-3	D	D	14	14	2.60E-02	3.01E-01			2.0E+00	1.5E-01			1.4E+04	2.2E-05
W-08	INORG	Barium	7440-39-3	T	D	19	18	2.65E-02	1.03E+00	8.20E-04	8.20E-04	2.0E+00	5.2E-01			1.4E+04	7.4E-05
W-08	INORG	Beryllium	7440-41-7	D	B1	14				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
W-08	INORG	Beryllium	7440-41-7	T	B1	19	2	6.20E-04	5.40E-03	4.70E-04	1.00E-03	4.0E-03	**1.4E+00**			2.9E+02	1.9E-05
W-08	INORG	Cadmium	7440-43-9	D	B1	14	3	2.80E-04	5.50E-04	2.80E-04	2.80E-04	5.0E-03	1.1E-01			1.9E+02	2.9E-06
W-08	INORG	Cadmium	7440-43-9	T	B1	19	7	2.90E-04	3.90E-03	2.80E-04	3.60E-04	5.0E-03	7.8E-01			1.9E+02	2.1E-05
W-08	INORG	Chromium (total)	7440-47-3	D		14	2	5.00E-03	4.76E-02	1.40E-03	1.00E-02	1.0E-01	4.8E-01			4.6E+02	1.0E-04
W-08	INORG	Chromium (total)	7440-47-3	T		19	6	1.15E-03	2.95E-01	1.00E-03	1.00E-02	1.0E-01	**3.0E+00**			4.6E+02	6.4E-04
W-08	INORG	Cobalt	7440-48-4	D	B1	14	5	1.40E-03	9.30E-03	1.30E-03	2.00E-02	4.0E-02	2.3E-01			2.4E+03	3.9E-06
W-08	INORG	Cobalt	7440-48-4	T	B1	19	6	1.90E-03	8.79E-02	7.40E-04	2.00E-02	4.0E-02	**2.2E+00**			2.4E+03	3.7E-05
W-08	INORG	Copper	7440-50-8	D	D	14	2	4.40E-03	5.20E-03	4.20E-03	5.00E-03	1.4E+00	3.7E-03			7.4E+03	7.0E-07
W-08	INORG	Copper	7440-50-8	T	D	19	3	6.60E-03	2.14E-01	1.70E-03	5.00E-03	1.4E+00	1.5E-01			7.4E+03	2.9E-05
W-08	INORG	Lead	7439-92-1	D	B2	14				2.50E-03	3.00E-03	4.0E-03					
W-08	INORG	Lead	7439-92-1	T	B2	19	3	5.70E-03	1.22E-01	1.60E-03	3.00E-03	4.0E-03	**3.1E+01**				
W-08	INORG	Manganese	7439-96-5	D	D	14	14	2.10E-03	3.24E+00			8.6E-01	**3.8E+00**			9.1E+03	3.6E-04
W-08	INORG	Manganese	7439-96-5	T	D	19	19	3.50E-03	5.41E+00			8.6E-01	**6.3E+00**			9.1E+03	5.9E-04
W-08	INORG	Mercury	7439-97-6	D	D	14	2	1.10E-04	1.90E-04	6.90E-05	2.00E-04	2.0E-03	9.5E-02	5.6E-02	3.4E-03	5.6E-02	3.4E-03
W-08	INORG	Mercury	7439-97-6	T	D	19	5	7.00E-05	2.60E-04	6.90E-05	2.00E-04	2.0E-03	1.3E-01	5.6E-02	4.6E-03	5.6E-02	4.6E-03
W-08	INORG	Nickel	7440-02-0	D	A	14	11	2.30E-03	1.56E-02	2.20E-03	2.20E-03	1.0E-01	1.6E-01			7.4E+04	2.1E-07
W-08	INORG	Nickel	7440-02-0	T	A	19	14	3.40E-03	3.07E-01	2.20E-03	2.00E-02	1.0E-01	**3.1E+00**			7.4E+04	4.1E-06
W-08	INORG	Selenium	7782-49-2	D	D	14				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
W-08	INORG	Selenium	7782-49-2	T	D	19				3.90E-03	5.00E-03	5.0E-02				9.7E+02	
W-08	INORG	Silver	7440-22-4	D	D	14				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
W-08	INORG	Silver	7440-22-4	T	D	19				9.80E-04	5.00E-03	3.4E-02				1.5E+03	
W-08	INORG	Thallium	7440-28-0	D		14	3	2.10E-05	7.40E-03	1.80E-05	5.00E-03	2.0E-03	**3.7E+00**			1.3E+01	5.7E-04
W-08	INORG	Thallium	7440-28-0	T		19	3	1.00E-03	6.10E-03	1.50E-05	1.00E-02	2.0E-03	**3.1E+00**			1.3E+01	4.7E-04
W-08	INORG	Vanadium	7440-62-2	D		14	4	6.40E-04	3.80E-03	8.20E-04	1.00E-02	4.5E-03	8.4E-01			9.7E+02	3.9E-06
W-08	INORG	Vanadium	7440-62-2	T		19	8	6.70E-04	2.39E-01	6.70E-04	1.00E-02	4.5E-03	**5.3E+01**			9.7E+02	2.5E-04
W-08	INORG	Zinc	7440-66-6	D	D	14	2	2.25E-02	3.21E-02	1.20E-02	2.00E-02	2.4E+00	1.3E-02			1.1E+05	2.9E-07
W-08	INORG	Zinc	7440-66-6	T	D	19	3	3.38E-02	6.31E-01	1.20E-02	2.00E-02	2.4E+00	2.6E-01			1.1E+05	5.7E-06
W-08	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	4	4	1.95E-09	1.97E-08			3.0E-08	6.6E-01			1.0E-08	**2.0E+00**
W-09	VOC	Acetone	67-64-1	T	ID	6	2	1.50E-02	3.50E-02	5.10E-04	6.60E-04	7.3E-01	4.8E-02	1.0E+06	3.5E-08	3.1E+04	1.1E-06
W-09	VOC	Benzene	71-43-2	T	A	6	1	2.85E-04	2.85E-04	1.60E-04	1.00E-03	5.0E-03	5.7E-02	3.5E+01	8.1E-06	1.1E+01	2.6E-05
W-09	VOC	Bromodichloromethane	75-27-4	T	B2	6				1.70E-04	1.00E-03	1.0E-01		3.7E+01		1.4E+01	
W-09	VOC	Bromoform	75-25-2	T	B2	6				1.80E-04	1.00E-03	1.0E-01		3.1E+03		1.4E+02	
W-09	VOC	Bromomethane	74-83-9	T	D	6				1.60E-04	1.00E-03	1.0E-02		9.0E+00		7.0E+01	
W-09	VOC	2-Butanone	78-93-3	T	ID	6	1	2.05E-03	2.05E-03	3.60E-04	1.00E-02	1.3E+01	1.6E-04	2.4E+05	8.5E-09	2.4E+05	8.5E-09
W-09	VOC	Carbon Disulfide	75-15-0	T		6	1	1.40E-03	1.40E-03	2.00E-04	1.00E-03	8.0E-01	1.8E-03	5.5E+02	2.5E-06	1.2E+03	1.2E-06
W-09	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.20E-04	1.00E-03	5.0E-03		2.4E+00		4.6E+00	
W-09	VOC	Chlorobenzene	108-90-7	T	D	6				1.40E-04	1.00E-03	1.0E-01		4.7E+02		8.6E+01	
W-09	VOC	Chloroethane	75-00-3	T		6				2.20E-04	1.00E-03	4.3E-01		5.7E+03		4.4E+02	
W-09	VOC	Chloroform	67-66-3	T	B2	6				1.40E-04	1.00E-03	1.0E-01		1.8E+02		1.5E+02	
W-09	VOC	Chloromethane	74-87-3	T	D	6				1.30E-04	1.00E-03	2.6E-01		4.5E+01		4.9E+02	
W-09	VOC	Cumene	98-82-8	T	D	6	1	2.55E-04	2.55E-04	1.20E-04	1.00E-03	8.0E-01	3.2E-04	5.6E+01	4.6E-06	5.6E+01	4.6E-06
W-09	VOC	Cyclohexane	110-82-7	T	ID	6	1	7.90E-04	7.90E-04	1.30E-04	1.00E-03						
W-09	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				5.30E-04	2.00E-03	2.0E-04		1.2E+00		3.9E-01	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-09	VOC	Dibromochloromethane	124-48-1	T	C	6				2.50E-04	1.00E-03	1.0E-01		1.1E+02		1.8E+01	
W-09	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	1.00E-03	1.0E-03		1.5E+01		2.5E-02	
W-09	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.10E-04	1.00E-03	6.0E-01		1.6E+02		1.6E+02	
W-09	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				1.50E-04	1.00E-03	6.6E-03				2.0E+00	
W-09	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.60E-04	1.00E-03	7.5E-02		7.4E+01		6.4E+00	
W-09	VOC	Dichlorodifluoromethane	75-71-8	T		6				2.30E-04	2.00E-03	1.7E+00		3.0E+02		3.0E+02	
W-09	VOC	1,1-Dichloroethane	75-34-3	T	C	6				1.60E-04	1.00E-03	8.8E-01		2.3E+03		2.4E+03	
W-09	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.10E-04	1.00E-03	5.0E-03		5.9E+01		1.9E+01	
W-09	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.20E-04	1.00E-03	7.0E-03		1.3E+00		1.1E+01	
W-09	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	6				2.20E-04	5.00E-04	7.0E-02		2.1E+02		2.0E+02	
W-09	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				1.50E-04	5.00E-04	1.0E-01		2.0E+02		2.2E+02	
W-09	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.70E-04	1.00E-03	5.0E-03		3.6E+01		1.6E+01	
W-09	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				1.50E-04	1.00E-03	8.5E-03		2.6E+01		5.5E+00	
W-09	VOC	Ethyl Benzene	100-41-4	T	D	6				1.20E-04	1.00E-03	7.0E-01		1.7E+02		1.7E+02	
W-09	VOC	2-Hexanone	591-78-6	T		6				3.10E-04	1.00E-02	1.0E+00		8.7E+03		5.2E+03	
W-09	VOC	Methyl Acetate	79-20-9	T		6				4.10E-04	1.00E-02						
W-09	VOC	Methyl tert-butyl ether	1634-04-4	T		6				1.30E-04	5.00E-03	2.4E-01		4.7E+04		6.1E+02	
W-09	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	4	1	2.55E-03	2.55E-03	2.30E-04	1.00E-02	1.8E+00	1.4E-03	2.0E+04	1.3E-07	1.3E+04	2.0E-07
W-09	VOC	Methylcyclohexane	108-87-2	T		6	1	8.55E-04	8.55E-04	1.50E-04	1.00E-03						
W-09	VOC	Methylene Chloride	75-09-2	T	B2	6				2.80E-04	1.00E-03	5.0E-03		1.4E+03		2.2E+02	
W-09	VOC	Styrene	100-42-5	T		6				1.50E-04	1.00E-03	1.0E-01		3.1E+02		9.7E+00	
W-09	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.30E-04	1.00E-03	8.5E-03		7.7E+01		4.7E+00	
W-09	VOC	Tetrachloroethene	127-18-4	T	C-B2	6				1.20E-04	1.00E-03	5.0E-03		1.7E+02		1.2E+01	
W-09	VOC	Toluene	108-88-3	T	D	6	1	2.75E-04	2.75E-04	1.70E-04	1.00E-03	1.0E+00	2.8E-04	5.3E+02	5.2E-07	5.3E+02	5.2E-07
W-09	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.50E-04	1.00E-03	7.0E-02		3.0E+02		1.9E+01	
W-09	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6	1	2.50E-04	2.50E-04	1.80E-04	1.00E-03	2.0E-01	1.3E-03	1.3E+03	1.9E-07	1.3E+03	1.9E-07
W-09	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				2.10E-04	1.00E-03	5.0E-03		1.1E+02		2.1E+01	
W-09	VOC	Trichloroethene	79-01-6	T	C-B2	6				1.40E-04	1.00E-03	5.0E-03		9.7E+01		2.2E+01	
W-09	VOC	Trichlorofluoromethane	75-69-4	T		6	2	9.50E-04	2.20E-03	2.50E-04	2.50E-04	2.6E+00	8.5E-04	1.1E+03	2.0E-06	1.1E+03	2.0E-06
W-09	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				2.30E-04	1.00E-03	1.7E+02		1.7E+02		1.7E+02	
W-09	VOC	Vinyl Chloride	75-01-4	T	A	6				1.50E-04	1.00E-03	2.0E-03		1.3E+01		1.0E+00	
W-09	VOC	Xylenes (total)	1330-20-7	T	ID	6	1	1.25E-03	1.25E-03	3.30E-04	1.00E-03	1.0E+01	1.3E-04	1.9E+02	6.6E-06	1.9E+02	6.6E-06
W-09	SVOC	Acenaphthene	83-32-9	T		6				6.90E-04	5.00E-03	1.3E+00		4.2E+00		4.2E+00	
W-09	SVOC	Acenaphthylene	208-96-8	T	D	6				4.10E-04	5.00E-03	5.2E-02		3.9E+00		3.9E+00	
W-09	SVOC	Acetophenone	98-86-2	T	D	6				6.50E-04	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
W-09	SVOC	Anthracene	120-12-7	T	D	6				5.90E-04	5.00E-03	4.3E-02		4.3E-02		4.3E-02	
W-09	SVOC	Atrazine	1912-24-9	T		6				3.50E-04	5.00E-03	3.0E-03				5.4E+00	
W-09	SVOC	Benzaldehyde	100-52-7	T		6				5.90E-04	1.00E-02						
W-09	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				6.80E-04	5.00E-03	2.1E-03				9.4E-03	
W-09	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				5.30E-04	5.00E-03	5.0E-03				2.0E-03	
W-09	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				7.00E-04	5.00E-03	2.0E-03				2.0E-03	
W-09	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				7.00E-04	5.00E-03	5.0E-03				5.0E-03	
W-09	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				6.40E-04	5.00E-03	5.0E-03				5.0E-03	
W-09	SVOC	Biphenyl	92-52-4	T	D	6				6.50E-04	1.00E-02						
W-09	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				8.70E-04	5.00E-03						
W-09	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	6				9.70E-04	8.50E-03	2.0E-03		2.1E+02		5.7E+00	
W-09	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6	1	5.80E-04	5.80E-04	2.00E-04	5.00E-03	6.0E-03	9.7E-02			3.2E-01	1.8E-03
W-09	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				7.80E-04	5.00E-03						
W-09	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				2.30E-04	5.00E-03	1.2E+00				2.7E+00	
W-09	SVOC	Caprolactam	105-60-2	T		6				4.50E-04	1.00E-02	5.8E+00				3.9E+05	
W-09	SVOC	Carbazole	86-74-8	T	B2	6				6.10E-04	1.00E-02	8.5E-02				7.4E+00	
W-09	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				5.50E-04	5.00E-03	1.5E-01				7.9E+01	
W-09	SVOC	4-Chloroaniline	106-47-8	T		5				9.00E-04	1.00E-02						
W-09	SVOC	2-Chloronaphthalene	91-58-7	T		6				7.30E-04	5.00E-03	1.8E+00				6.7E+00	
W-09	SVOC	2-Chlorophenol	95-57-8	T		6				1.00E-03	6.50E-03	4.5E-02				9.4E+01	
W-09	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				6.60E-04	5.00E-03						
W-09	SVOC	Chrysene	218-01-9	T	B2	6				6.70E-04	5.00E-03	5.0E-03				5.0E-03	
W-09	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				6.80E-04	5.00E-03	2.0E-03				2.0E-03	
W-09	SVOC	Dibenzofuran	132-64-9	T	D	6				6.60E-04	5.00E-03						
W-09	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	5				4.70E-04	2.00E-02	1.1E-03				1.8E-01	
W-09	SVOC	2,4-Dichlorophenol	120-83-2	T		6				7.00E-04	1.00E-02	7.3E-02				4.8E+01	
W-09	SVOC	Diethylphthalate	84-66-2	T	D	6				2.50E-04	5.00E-03	5.5E+00				1.1E+03	
W-09	SVOC	2,4-Dimethylphenol	105-67-9	T		6	1	1.04E-02	1.04E-02	8.50E-04	5.00E-03	3.7E-01	2.8E-02			5.2E+02	2.0E-05
W-09	SVOC	Dimethylphthalate	131-11-3	T	D	6				2.00E-04	5.00E-03	7.3E+01				4.2E+03	
W-09	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				3.70E-04	5.00E-03	8.8E-01				1.1E+01	
W-09	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				1.30E-03	2.00E-02	2.0E-02				9.5E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-09	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.00E-03	2.00E-02						
W-09	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				4.60E-04	5.00E-03	7.7E-03				8.6E+00	
W-09	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				5.70E-04	5.00E-03						
W-09	SVOC	Di-n-octylphthalate	117-84-0	T		6				6.90E-04	5.00E-03	1.3E-01				4.0E-01	
W-09	SVOC	Fluoranthene	206-44-0	T	D	6				7.10E-04	5.00E-03	2.1E-01		2.1E-01		2.1E-01	
W-09	SVOC	Fluorene	86-73-7	T	D	6				7.50E-04	5.00E-03	8.8E-01		2.0E+00		2.0E+00	
W-09	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.40E-04	5.00E-03	1.0E-03		3.0E+00		4.6E-03	
W-09	SVOC	Hexachlorobutadiene	87-68-3	T	C	6				7.30E-04	7.50E-03	1.5E-02		3.2E+00		4.0E-01	
W-09	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	6				1.10E-03	5.50E-03	5.0E-02		4.2E-01		1.6E+00	
W-09	SVOC	Hexachloroethane	67-72-1	T	C	6				7.40E-04	8.00E-03	7.3E-03		5.0E+01		1.9E+00	
W-09	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.30E-04	5.00E-03	2.0E-03				2.0E-03	
W-09	SVOC	Isophorone	78-59-1	T	C	6				6.30E-04	5.00E-03	7.7E-01				9.9E+02	
W-09	SVOC	2-Methylnaphthalene	91-57-6	T	ID	6				6.40E-04	5.00E-03	2.6E-01				2.5E+01	
W-09	SVOC	Methylphenol (total)	1319-77-3	T		6				9.00E-04	5.00E-03	3.7E-01				8.1E+02	
W-09	SVOC	Naphthalene	91-20-3	T	C	6				7.50E-04	6.50E-03	5.2E-01		3.1E+01		3.1E+01	
W-09	SVOC	2-Nitroaniline	88-74-4	T		6				4.90E-04	2.00E-02						
W-09	SVOC	3-Nitroaniline	99-09-2	T	C	5				4.80E-04	2.00E-02						
W-09	SVOC	4-Nitroaniline	100-01-6	T	C	6				5.90E-04	2.00E-02						
W-09	SVOC	Nitrobenzene	98-95-3	T	D	6				8.10E-04	6.50E-03	3.4E-03		5.5E+02		1.1E+01	
W-09	SVOC	2-Nitrophenol	88-75-5	T		6				9.50E-04	5.00E-03	2.0E-02				7.9E+01	
W-09	SVOC	4-Nitrophenol	100-02-7	T		6				1.90E-03	2.00E-02						
W-09	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				6.40E-04	5.00E-03	2.7E-01				3.5E+01	
W-09	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				6.70E-04	5.50E-03	5.0E-03				3.6E-01	
W-09	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				7.80E-04	9.00E-03						
W-09	SVOC	Pentachlorophenol	87-86-5	T	B2	6				2.40E-03	1.30E-02	1.0E-03				2.0E-01	
W-09	SVOC	Phenanthrene	85-01-8	T	D	6				6.80E-04	5.00E-03	5.2E-02		1.0E+00		1.0E+00	
W-09	SVOC	Phenol	108-95-2	T	ID	6				1.30E-03	6.50E-03	4.4E+00				2.9E+04	
W-09	SVOC	Pyrene	129-00-0	T	D	6				6.30E-04	5.00E-03	1.4E-01		1.4E-01		1.4E-01	
W-09	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				8.60E-04	5.00E-03	7.3E-01				1.7E+02	
W-09	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				7.10E-04	5.00E-03	1.2E-01				1.0E+01	
W-09	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
W-09	P/PCB	PCBs (total)	1336-36-3	T	B2	6				8.20E-05	4.00E-04	5.0E-04		4.5E-02		3.3E-03	
W-09	INORG	Antimony	7440-36-0	D		2				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
W-09	INORG	Antimony	7440-36-0	T		6				2.20E-03	2.50E-02	6.0E-03				6.8E+01	
W-09	INORG	Arsenic	7440-38-2	D	A	2				3.90E-03	1.00E-02	5.0E-02				4.3E+00	
W-09	INORG	Arsenic	7440-38-2	T	A	6	3	3.70E-03	1.54E-02	2.90E-03	1.00E-02	5.0E-02	3.1E-01			4.3E+00	3.6E-03
W-09	INORG	Barium	7440-39-3	D	D	2	2	5.40E-02	1.47E-01			2.0E+00	7.4E-02			1.4E+04	1.1E-05
W-09	INORG	Barium	7440-39-3	T	D	6	6	1.73E-02	4.20E-01			2.0E+00	2.1E-01			1.4E+04	3.0E-05
W-09	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	1.00E-03	4.0E-03				2.9E+02	
W-09	INORG	Beryllium	7440-41-7	T	B1	6				4.70E-04	1.00E-03	4.0E-03				2.9E+02	
W-09	INORG	Cadmium	7440-43-9	D	B1	2				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
W-09	INORG	Cadmium	7440-43-9	T	B1	6				2.80E-04	5.00E-03	5.0E-03				1.9E+02	
W-09	INORG	Chromium (total)	7440-47-3	D		2	1	1.04E-02	1.04E-02	1.00E-02	1.00E-02	1.0E-01	1.0E-01			4.6E+02	2.3E-05
W-09	INORG	Chromium (total)	7440-47-3	T		6	2	1.12E-02	5.68E-02	1.00E-03	1.00E-02	1.0E-01	5.7E-01			4.6E+02	1.2E-04
W-09	INORG	Cobalt	7440-48-4	D	B1	2	1	1.40E-03	1.40E-03	1.30E-03	1.30E-03	4.0E-02	3.5E-02			2.4E+03	5.8E-07
W-09	INORG	Cobalt	7440-48-4	T	B1	6	3	2.35E-03	2.90E-03	1.10E-03	1.30E-03	4.0E-02	7.3E-02			2.4E+03	1.2E-06
W-09	INORG	Copper	7440-50-8	D	D	2				4.20E-03	5.00E-03	1.4E+00				7.4E+03	
W-09	INORG	Copper	7440-50-8	T	D	6	1	2.80E-03	2.80E-03	1.80E-03	5.00E-03	1.4E+00	2.0E-03			7.4E+03	3.8E-07
W-09	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	3.00E-03	4.0E-03					
W-09	INORG	Lead	7439-92-1	T	B2	6	1	3.91E-02	3.91E-02	2.30E-03	3.00E-03	4.0E-03	**9.8E+00**				
W-09	INORG	Manganese	7439-96-5	D	D	2	2	1.98E-02	2.42E-01			8.6E-01	2.8E-01			9.1E+03	2.7E-05
W-09	INORG	Manganese	7439-96-5	T	D	6	6	1.65E-02	6.70E-01			8.6E-01	7.8E-01			9.1E+03	7.4E-05
W-09	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	2.00E-04	2.0E-03		5.6E-02		5.6E-02	
W-09	INORG	Mercury	7439-97-6	T	D	6	1	8.60E-05	8.60E-05	6.70E-05	2.00E-04	2.0E-03	4.3E-02	5.6E-02	1.5E-03	5.6E-02	1.5E-03
W-09	INORG	Nickel	7440-02-0	D	A	2	1	2.20E-03	2.20E-03	2.20E-03	2.20E-03	1.0E-01	2.2E-02			7.4E+04	3.0E-08
W-09	INORG	Nickel	7440-02-0	T	A	6	3	3.80E-03	3.85E-02	2.10E-03	2.20E-03	1.0E-01	3.9E-01			7.4E+04	5.2E-07
W-09	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	5.00E-03	5.0E-02				9.7E+02	
W-09	INORG	Selenium	7782-49-2	T	D	6				3.90E-03	5.00E-03	5.0E-02				9.7E+02	
W-09	INORG	Silver	7440-22-4	D	D	2				1.50E-03	5.00E-03	3.4E-02				1.5E+03	
W-09	INORG	Silver	7440-22-4	T	D	6				1.10E-03	5.00E-03	3.4E-02				1.5E+03	
W-09	INORG	Thallium	7440-28-0	D		2	2	3.80E-05	5.30E-03			2.0E-03	**2.7E+00**			1.3E+01	4.1E-04
W-09	INORG	Thallium	7440-28-0	T		6	1	1.24E-02	1.24E-02	1.50E-05	1.80E-05	2.0E-03	**6.2E+00**			1.3E+01	9.5E-04
W-09	INORG	Vanadium	7440-62-2	D		2				8.20E-04	1.00E-02	4.5E-03				9.7E+02	
W-09	INORG	Vanadium	7440-62-2	T		6	2	1.90E-03	4.50E-03	8.20E-04	1.00E-02	4.5E-03	1.0E+00			9.7E+02	4.6E-06
W-09	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	2.00E-02	2.4E+00				1.1E+05	
W-09	INORG	Zinc	7440-66-6	T	D	6	1	5.44E-02	5.44E-02	1.20E-02	2.00E-02	2.4E+00	2.3E-02			1.1E+05	4.9E-07

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-10	VOC	Acetone	67-64-1	T	ID	10	1	3.10E-03	3.10E-03	5.10E-04	1.10E-03	7.3E-01	4.2E-03	1.0E+06	3.1E-09	3.1E+04	1.0E-07
W-10	VOC	Benzene	71-43-2	T	A	10	3	1.90E-04	5.80E-04	1.60E-04	3.70E-04	5.0E-03	1.2E-01	3.5E+01	1.7E-05	1.1E+01	5.3E-05
W-10	VOC	Bromodichloromethane	75-27-4	T	B2	10	1	3.00E-04	3.00E-04	1.70E-04	3.20E-04	1.0E-01	3.0E-03	3.7E+01	8.1E-06	1.4E+01	2.1E-05
W-10	VOC	Bromoform	75-25-2	T	B2	10				1.80E-04	3.70E-04	1.0E-01		3.1E+03		1.4E+02	
W-10	VOC	Bromomethane	74-83-9	T	D	10				2.00E-04	3.00E-04	1.0E-02		9.0E+00		7.0E+01	
W-10	VOC	2-Butanone	78-93-3	T	ID	10	1	1.00E-03	1.00E-03	4.10E-04	5.90E-04	1.3E+01	7.7E-05	2.4E+05	4.2E-09	2.4E+05	4.2E-09
W-10	VOC	Carbon Disulfide	75-15-0	T		10	1	2.00E-04	2.00E-04	2.00E-04	2.40E-04	8.0E-01	2.5E-04	5.5E+02	3.6E-07	1.2E+03	1.7E-07
W-10	VOC	Carbon Tetrachloride	56-23-5	T	B2	10				1.20E-04	3.70E-04	5.0E-03		2.4E+00		4.6E+00	
W-10	VOC	Chlorobenzene	108-90-7	T	D	10				1.40E-04	3.80E-04	1.0E-01		4.7E+02		8.6E+01	
W-10	VOC	Chloroethane	75-00-3	T		10				2.60E-04	2.90E-04	4.3E-01		5.7E+03		4.4E+02	
W-10	VOC	Chloroform	67-66-3	T	B2	10	3	2.00E-04	5.70E-04	1.40E-04	3.50E-04	1.0E-01	5.7E-03	1.8E+02	3.2E-06	1.5E+02	3.8E-06
W-10	VOC	Chloromethane	74-87-3	T	D	10				1.30E-04	4.90E-04	2.6E-01		4.5E+01		4.9E+02	
W-10	VOC	Cumene	98-82-8	T	D	10	1	3.00E-04	3.00E-04	1.20E-04	3.90E-04	8.0E-01	3.8E-04	5.6E+01	5.4E-06	5.6E+01	5.4E-06
W-10	VOC	Cyclohexane	110-82-7	T	ID	10				1.30E-04	3.30E-04						
W-10	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	10				6.20E-04	8.20E-04	2.0E-04		1.2E+00		3.9E-01	
W-10	VOC	Dibromochloromethane	124-48-1	T	C	10				2.60E-04	3.70E-04	1.0E-01		1.1E+02		1.8E+01	
W-10	VOC	1,2-Dibromoethane	106-93-4	T	B2	10				2.20E-04	3.40E-04	1.0E-03		1.5E+01		2.5E-02	
W-10	VOC	1,2-Dichlorobenzene	95-50-1	T	D	10				1.10E-04	3.80E-04	6.0E-01		1.6E+02		1.6E+02	
W-10	VOC	1,3-Dichlorobenzene	541-73-1	T	D	10				1.50E-04	3.80E-04	6.6E-03				2.0E+00	
W-10	VOC	1,4-Dichlorobenzene	106-46-7	T	C	10				1.70E-04	3.80E-04	7.5E-02		7.4E+01		6.4E+00	
W-10	VOC	Dichlorodifluoromethane	75-71-8	T		10				2.60E-04	4.90E-04	1.7E+00		3.0E+02		3.0E+02	
W-10	VOC	1,1-Dichloroethane	75-34-3	T	C	10	3	7.30E-04	1.20E-03	1.60E-04	3.00E-04	8.8E-01	1.4E-03	2.3E+03	5.2E-07	2.4E+03	5.0E-07
W-10	VOC	1,2-Dichloroethane	107-06-2	T	B2	10				2.10E-04	2.80E-04	5.0E-03		5.9E+01		1.9E+01	
W-10	VOC	1,1-Dichloroethene	75-35-4	T	C	10				2.40E-04	3.10E-04	7.0E-03		1.3E+00		1.1E+01	
W-10	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	10				2.20E-04	3.50E-04	7.0E-02		2.1E+02		2.0E+02	
W-10	VOC	trans-1,2-Dichloroethene	156-60-5	T		10				1.50E-04	3.30E-04	1.0E-01		2.0E+02		2.2E+02	
W-10	VOC	1,2-Dichloropropane	78-87-5	T	B2	10				1.70E-04	4.10E-04	5.0E-03		3.6E+01		1.6E+01	
W-10	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	10				2.70E-04	3.50E-04	8.5E-03		2.6E+01		5.5E+00	
W-10	VOC	Ethyl Benzene	100-41-4	T	D	10	4	1.50E-04	1.00E-03	1.20E-04	4.10E-04	7.0E-01	1.4E-03	1.7E+02	5.9E-06	1.7E+02	5.9E-06
W-10	VOC	2-Hexanone	591-78-6	T		10				4.60E-04	5.80E-04	1.0E+00		8.7E+03		5.2E+03	
W-10	VOC	Methyl Acetate	79-20-9	T		10				4.10E-04	5.40E-04						
W-10	VOC	Methyl tert-butyl ether	1634-04-4	T		10	4	6.70E-04	2.00E-02	1.30E-04	2.70E-04	2.4E-01	8.3E-02	4.7E+04	4.3E-07	6.1E+02	3.3E-05
W-10	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	10	1	2.40E-04	2.40E-04	2.30E-04	2.60E-04	1.8E+00	1.3E-04	2.0E+04	1.2E-08	1.3E+04	1.8E-08
W-10	VOC	Methylcyclohexane	108-87-2	T		10				1.50E-04	4.20E-04						
W-10	VOC	Methylene Chloride	75-09-2	T	B2	6				2.90E-04	3.40E-04	5.0E-03		1.4E+03		2.2E+02	
W-10	VOC	Styrene	100-42-5	T		10				1.50E-04	3.50E-04	1.0E-01		3.1E+02		9.7E+00	
W-10	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	10				2.50E-04	3.60E-04	8.5E-03		7.7E+01		4.7E+00	
W-10	VOC	Tetrachloroethene	127-18-4	T	C-B2	10				2.30E-04	4.20E-04	5.0E-03		1.7E+02		1.2E+01	
W-10	VOC	Toluene	108-88-3	T	D	10	4	5.90E-04	1.90E-03	1.80E-04	3.90E-04	1.0E+00	1.9E-03	5.3E+02	3.6E-06	5.3E+02	3.6E-06
W-10	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	10				1.70E-04	4.00E-04	7.0E-02		3.0E+02		1.9E+01	
W-10	VOC	1,1,1-Trichloroethane	71-55-6	T	D	10	2	4.10E-04	6.20E-04	1.50E-04	3.90E-04	2.0E-01	3.1E-03	1.3E+03	4.8E-07	1.3E+03	4.8E-07
W-10	VOC	1,1,2-Trichloroethane	79-00-5	T	C	10				3.00E-04	3.60E-04	5.0E-03		1.1E+02		2.1E+01	
W-10	VOC	Trichloroethene	79-01-6	T	C-B2	10				1.40E-04	4.20E-04	5.0E-03		9.7E+01		2.2E+01	
W-10	VOC	Trichlorofluoromethane	75-69-4	T		10				2.80E-04	5.40E-04	2.6E+00		1.1E+03		1.1E+03	
W-10	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		10				3.20E-04	3.20E-04	1.7E+02		1.7E+02		1.7E+02	
W-10	VOC	Vinyl Chloride	75-01-4	T	A	10				1.50E-04	3.60E-04	2.0E-03		1.3E+01		1.0E+00	
W-10	VOC	Xylenes (total)	1330-20-7	T	ID	10	4	5.80E-04	7.80E-03	3.30E-04	4.40E-04	1.0E+01	7.8E-04	1.9E+02	4.1E-05	1.9E+02	4.1E-05
W-10	SVOC	Acenaphthene	83-32-9	T		10				8.00E-04	3.20E-03	1.3E+00		4.2E+00		4.2E+00	
W-10	SVOC	Acenaphthylene	208-96-8	T	D	10				7.10E-04	2.80E-03	5.2E-02		3.9E+00		3.9E+00	
W-10	SVOC	Acetophenone	98-86-2	T	D	10				2.60E-03	1.00E-02	1.5E+00		6.1E+03		6.1E+03	
W-10	SVOC	Anthracene	120-12-7	T	D	10				6.80E-04	2.70E-03	4.3E-02		4.3E-02		4.3E-02	
W-10	SVOC	Atrazine	1912-24-9	T		10				2.50E-03	1.00E-02	3.0E-03				5.4E+00	
W-10	SVOC	Benzaldehyde	100-52-7	T		10				2.80E-03	1.10E-02						
W-10	SVOC	Benzo(a)anthracene	56-55-3	T	B2	10				7.00E-04	2.80E-03	2.1E-03				9.4E-03	
W-10	SVOC	Benzo(a)pyrene	50-32-8	T	B2	10				7.30E-04	2.90E-03	5.0E-03				2.0E-03	
W-10	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	10				9.40E-04	3.80E-03	2.0E-03				2.0E-03	
W-10	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	10				8.50E-04	3.40E-03	5.0E-03				5.0E-03	
W-10	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	10				8.40E-04	3.40E-03	5.0E-03				5.0E-03	
W-10	SVOC	Biphenyl	92-52-4	T	D	10				2.60E-03	1.00E-02						
W-10	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	10				8.70E-04	3.50E-03						
W-10	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	10				9.70E-04	3.90E-03	2.0E-03		2.1E+02		5.7E+00	
W-10	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	10	1	1.50E-01	1.50E-01	2.70E-03	1.10E-02	6.0E-03	**2.5E+01**			3.2E-01	4.7E-01
W-10	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	10				8.80E-04	3.50E-03						
W-10	SVOC	Butylbenzylphthalate	85-68-7	T	C	10				8.80E-04	3.50E-03	1.2E+00				2.7E+00	
W-10	SVOC	Caprolactam	105-60-2	T		10				2.50E-03	1.00E-02	5.8E+00				3.9E+05	
W-10	SVOC	Carbazole	86-74-8	T	B2	10				8.20E-04	3.30E-03	8.5E-02				7.4E+00	

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-10	SVOC	4-Chloro-3-methylphenol	59-50-7	T		10				9.90E-04	4.00E-03	1.5E-01				7.9E+01	
W-10	SVOC	4-Chloroaniline	106-47-8	T		10				6.10E-04	2.40E-03						
W-10	SVOC	2-Chloronaphthalene	91-58-7	T		10				8.50E-04	3.40E-03	1.8E+00				6.7E+00	
W-10	SVOC	2-Chlorophenol	95-57-8	T		10				1.00E-03	4.00E-03	4.5E-02				9.4E+01	
W-10	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		10				7.90E-04	3.20E-03						
W-10	SVOC	Chrysene	218-01-9	T	B2	10				7.50E-04	3.00E-03	5.0E-03				5.0E-03	
W-10	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	10				7.90E-04	3.20E-03	2.0E-03				2.0E-03	
W-10	SVOC	Dibenzofuran	132-64-9	T	D	10				1.10E-03	4.40E-03						
W-10	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	3.70E-03	1.1E-03				1.8E-01	
W-10	SVOC	2,4-Dichlorophenol	120-83-2	T		10				8.50E-04	3.40E-03	7.3E-02				4.8E+01	
W-10	SVOC	Diethylphthalate	84-66-2	T	D	10				6.50E-04	2.60E-03	5.5E+00				1.1E+03	
W-10	SVOC	2,4-Dimethylphenol	105-67-9	T		10				8.50E-04	3.40E-03	3.7E-01				5.2E+02	
W-10	SVOC	Dimethylphthalate	131-11-3	T	D	10				7.60E-04	3.00E-03	7.3E+01				4.2E+03	
W-10	SVOC	Di-n-butylphthalate	84-74-2	T	D	10				6.70E-04	2.70E-03	8.8E-01				1.1E+01	
W-10	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		10				1.30E-03	5.20E-03	2.0E-02				9.5E+00	
W-10	SVOC	2,4-Dinitrophenol	51-28-5	T		10				3.00E-03	1.20E-02						
W-10	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	10				7.90E-04	3.20E-03	7.7E-03				8.6E+00	
W-10	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	10				5.70E-04	2.30E-03						
W-10	SVOC	Di-n-octylphthalate	117-84-0	T		10				1.10E-03	4.40E-03	1.3E-01				4.0E-01	
W-10	SVOC	Fluoranthene	206-44-0	T	D	10	1	8.20E-04	8.20E-04	8.10E-04	3.20E-03	2.1E-01	3.9E-03	2.1E-01	3.9E-03	2.1E-01	3.9E-03
W-10	SVOC	Fluorene	86-73-7	T	D	10	1	1.90E-03	1.90E-03	1.00E-03	4.00E-03	8.8E-01	2.2E-03	2.0E+00	9.5E-04	2.0E+00	9.5E-04
W-10	SVOC	Hexachlorobenzene	118-74-1	T	B2	10				7.40E-04	3.00E-03	1.0E-03		3.0E+00		4.6E-03	
W-10	SVOC	Hexachlorobutadiene	87-68-3	T	C	10				7.30E-04	2.90E-03	1.5E-02		3.2E+00		4.0E-01	
W-10	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	6				1.10E-03	4.40E-03	5.0E-02		4.2E-01		1.6E+00	
W-10	SVOC	Hexachloroethane	67-72-1	T	C	10				7.40E-04	3.00E-03	7.3E-03		5.0E+01		1.9E+00	
W-10	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	10				6.30E-04	2.50E-03	2.0E-03				2.0E-03	
W-10	SVOC	Isophorone	78-59-1	T	C	10				6.30E-04	2.50E-03	7.7E-01				9.9E+02	
W-10	SVOC	2-Methylnaphthalene	91-57-6	T	ID	10	1	7.50E-03	7.50E-03	6.40E-04	6.40E-04	2.6E-01	2.9E-02			2.5E+01	3.0E-04
W-10	SVOC	Methylphenol (total)	1319-77-3	T		10				1.30E-03	5.20E-03	3.7E-01				8.1E+02	
W-10	SVOC	Naphthalene	91-20-3	T	C	10	1	6.90E-03	6.90E-03	7.50E-04	7.50E-04	5.2E-01	1.3E-02	3.1E+01	2.2E-04	3.1E+01	2.2E-04
W-10	SVOC	2-Nitroaniline	88-74-4	T		10				7.00E-04	2.80E-03						
W-10	SVOC	3-Nitroaniline	99-09-2	T	C	10				7.10E-04	2.80E-03						
W-10	SVOC	4-Nitroaniline	100-01-6	T	C	10				1.30E-03	5.20E-03						
W-10	SVOC	Nitrobenzene	98-95-3	T	D	10				8.10E-04	3.20E-03	3.4E-03		5.5E+02		1.1E+01	
W-10	SVOC	2-Nitrophenol	88-75-5	T		10				2.10E-03	8.40E-03	2.0E-02				7.9E+01	
W-10	SVOC	4-Nitrophenol	100-02-7	T		10				1.90E-03	7.60E-03						
W-10	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	10				1.40E-03	5.60E-03	2.7E-01				3.5E+01	
W-10	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	10				6.70E-04	2.70E-03	5.0E-03				3.6E-01	
W-10	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	10				7.80E-04	3.10E-03						
W-10	SVOC	Pentachlorophenol	87-86-5	T	B2	10				2.40E-03	9.60E-03	1.0E-03				2.0E-01	
W-10	SVOC	Phenanthrene	85-01-8	T	D	10				8.20E-04	3.30E-03	5.2E-02		1.0E+00		1.0E+00	
W-10	SVOC	Phenol	108-95-2	T	ID	10				2.60E-03	1.00E-02	4.4E+00				2.9E+04	
W-10	SVOC	Pyrene	129-00-0	T	D	10				1.10E-03	4.40E-03	1.4E-01		1.4E-01		1.4E-01	
W-10	SVOC	2,4,5-Trichlorophenol	95-95-4	T		10				1.20E-03	4.80E-03	7.3E-01				1.7E+02	
W-10	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	10				1.70E-03	6.80E-03	1.2E-01				1.0E+01	
W-10	P/PCB	PCBs (total)	1336-36-3	D	B2	1				8.20E-05	8.20E-05	5.0E-04		4.5E-02		3.3E-03	
W-10	P/PCB	PCBs (total)	1336-36-3	T	B2	10	2	4.09E-04	8.31E-04	8.20E-05	8.20E-05	5.0E-04	**1.7E+00**	4.5E-02	1.8E-02	3.3E-03	2.5E-01
W-10	INORG	Antimony	7440-36-0	D		5				2.20E-03	2.20E-03	6.0E-03				6.8E+01	
W-10	INORG	Antimony	7440-36-0	T		10	1	2.30E-03	2.30E-03	2.20E-03	3.40E-03	6.0E-03	3.8E-01			6.8E+01	3.4E-05
W-10	INORG	Arsenic	7440-38-2	D	A	5	2	5.00E-03	5.91E-02	3.90E-03	3.90E-03	5.0E-02	**1.2E+00**			4.3E+00	1.4E-02
W-10	INORG	Arsenic	7440-38-2	T	A	10	4	4.90E-03	6.33E-02	2.10E-03	3.90E-03	5.0E-02	**1.3E+00**			4.3E+00	1.5E-02
W-10	INORG	Barium	7440-39-3	D	D	5	5	1.05E-02	1.09E-01			2.0E+00	5.5E-02			1.4E+04	7.8E-06
W-10	INORG	Barium	7440-39-3	T	D	10	10	1.16E-02	2.19E-01			2.0E+00	1.1E-01			1.4E+04	1.6E-05
W-10	INORG	Beryllium	7440-41-7	D	B1	5				5.40E-04	5.40E-04	4.0E-03				2.9E+02	
W-10	INORG	Beryllium	7440-41-7	T	B1	10				5.40E-04	6.00E-04	4.0E-03				2.9E+02	
W-10	INORG	Cadmium	7440-43-9	D	B1	5				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
W-10	INORG	Cadmium	7440-43-9	T	B1	10				2.80E-04	2.80E-04	5.0E-03				1.9E+02	
W-10	INORG	Chromium (total)	7440-47-3	D		5	2	5.30E-03	6.50E-03	1.40E-03	1.40E-03	1.0E-01	6.5E-02			4.6E+02	1.4E-05
W-10	INORG	Chromium (total)	7440-47-3	T		10	3	5.60E-03	1.84E-02	1.40E-03	1.50E-03	1.0E-01	1.8E-01			4.6E+02	4.0E-05
W-10	INORG	Cobalt	7440-48-4	D	B1	5	2	2.50E-03	1.11E-02	1.30E-03	1.30E-03	4.0E-02	2.8E-01			2.4E+03	4.6E-06
W-10	INORG	Cobalt	7440-48-4	T	B1	10	4	1.30E-03	1.14E-02	7.40E-04	1.30E-03	4.0E-02	2.9E-01			2.4E+03	4.8E-06
W-10	INORG	Copper	7440-50-8	D	D	5	1	4.60E-03	4.60E-03	4.20E-03	4.20E-03	1.4E+00	3.3E-03			7.4E+03	6.2E-07
W-10	INORG	Copper	7440-50-8	T	D	10	1	4.30E-03	4.30E-03	1.70E-03	4.20E-03	1.4E+00	3.1E-03			7.4E+03	5.8E-07
W-10	INORG	Lead	7439-92-1	D	B2	5				2.50E-03	2.50E-03	4.0E-03					
W-10	INORG	Lead	7439-92-1	T	B2	10				1.60E-03	2.50E-03	4.0E-03					
W-10	INORG	Manganese	7439-96-5	D	D	5	5	1.09E-02	4.83E-01			8.6E-01	5.6E-01			9.1E+03	5.3E-05

Table 8.4: Shallow Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Max Detected to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Max Detected to Groundwater Contact Criteria
W-10	INORG	Manganese	7439-96-5	T	D	10	10	9.90E-03	5.11E-01			8.6E-01	5.9E-01			9.1E+03	5.6E-05
W-10	INORG	Mercury	7439-97-6	D	D	5				6.90E-05	6.90E-05	2.0E-03		5.6E-02		5.6E-02	
W-10	INORG	Mercury	7439-97-6	T	D	10	2	7.50E-05	9.10E-05	6.90E-05	8.70E-05	2.0E-03	4.6E-02	5.6E-02	1.6E-03	5.6E-02	1.6E-03
W-10	INORG	Nickel	7440-02-0	D	A	5	3	3.10E-03	2.42E-02	2.20E-03	2.20E-03	1.0E-01	2.4E-01			7.4E+04	3.3E-07
W-10	INORG	Nickel	7440-02-0	T	A	10	5	3.50E-03	2.47E-02	2.20E-03	2.90E-03	1.0E-01	2.5E-01			7.4E+04	3.3E-07
W-10	INORG	Selenium	7782-49-2	D	D	5				4.50E-03	4.50E-03	5.0E-02				9.7E+02	
W-10	INORG	Selenium	7782-49-2	T	D	10	1	4.90E-03	4.90E-03	4.50E-03	4.70E-03	5.0E-02	9.8E-02			9.7E+02	5.1E-06
W-10	INORG	Silver	7440-22-4	D	D	5				1.50E-03	1.50E-03	3.4E-02				1.5E+03	
W-10	INORG	Silver	7440-22-4	T	D	10				9.80E-04	1.50E-03	3.4E-02				1.5E+03	
W-10	INORG	Thallium	7440-28-0	D		5	2	2.80E-05	5.50E-03	1.80E-05	1.80E-05	2.0E-03	**2.8E+00**			1.3E+01	4.2E-04
W-10	INORG	Thallium	7440-28-0	T		10	1	6.80E-03	6.80E-03	1.80E-05	3.30E-05	2.0E-03	**3.4E+00**			1.3E+01	5.2E-04
W-10	INORG	Vanadium	7440-62-2	D		5	2	1.70E-03	2.40E-03	8.20E-04	8.20E-04	4.5E-03	5.3E-01			9.7E+02	2.5E-06
W-10	INORG	Vanadium	7440-62-2	T		10	3	1.20E-03	3.00E-03	6.70E-04	8.20E-04	4.5E-03	6.7E-01			9.7E+02	3.1E-06
W-10	INORG	Zinc	7440-66-6	D	D	5				1.20E-02	1.20E-02	2.4E+00				1.1E+05	
W-10	INORG	Zinc	7440-66-6	T	D	10	1	1.46E-02	1.46E-02	1.20E-02	1.40E-02	2.4E+00	6.1E-03			1.1E+05	1.3E-07
W-10	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	T	B2	9	3	1.74E-09	4.88E-09	2.71E-09	3.99E-08	3.0E-08	1.6E-01			1.0E-08	4.9E-01

Notes:

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.
The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.
The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).
The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.
The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects and Aroclor 1254 for noncancer effects.
The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.
The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.
The MDEQ Drinking Water Criteria for Chromium III was calculated by ENVIRON to be account for valence specific toxicity.

Chem Group - Chemical Group
Meas Basis - Measured Basis; T = Total, D = Dissolved
Carc Class - EPA Weight-of-Evidence Cancer Classification
Min QL - Minimum Quantitation Limit
Max QL - Maximum Quantitation Limit
The evaluation of shallow groundwater is from the Supplemental RFI Report (ENCORE 2003j).

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
SWHI	Deep	VOC	Acetone	67-64-1	T	ID	12	9	2.40E-02	7.10E+00	5.10E-04	3.40E-03	7.3E-01	**9.7E+00**	2.1E+00	**3.4E+00**
SWHI	Deep	VOC	Benzene	71-43-2	T	A	12	2	2.60E-04	1.60E-03	1.60E-04	8.30E-02	5.0E-03	3.2E-01	5.0E-03	3.2E-01
SWHI	Deep	VOC	Bromodichloromethane	75-27-4	T	B2	12				1.70E-04	8.30E-02	1.0E-01		1.0E-01	
SWHI	Deep	VOC	Bromoform	75-25-2	T	B2	12				1.80E-04	8.30E-02	1.0E-01		1.0E-01	
SWHI	Deep	VOC	Bromomethane	74-83-9	T	D	12				2.00E-04	8.30E-02	1.0E-02		2.9E-02	
SWHI	Deep	VOC	2-Butanone	78-93-3	T	ID	12				4.10E-04	8.30E-01	1.3E+01		3.8E+01	
SWHI	Deep	VOC	Carbon Disulfide	75-15-0	T		12				2.00E-04	8.30E-02	8.0E-01		2.3E+00	
SWHI	Deep	VOC	Carbon Tetrachloride	56-23-5	T	B2	12				1.20E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	Chlorobenzene	108-90-7	T	D	12				1.40E-04	8.30E-02	1.0E-01		1.0E-01	
SWHI	Deep	VOC	Chloroethane	75-00-3	T		12				2.60E-04	8.30E-02	4.3E-01		1.7E+00	
SWHI	Deep	VOC	Chloroform	67-66-3	T	B2	12	1	3.55E-04	3.55E-04	1.40E-04	8.30E-02	1.0E-01	3.6E-03	1.0E-01	3.6E-03
SWHI	Deep	VOC	Chloromethane	74-87-3	T	D	12				1.30E-04	8.30E-02	2.6E-01		1.1E+00	
SWHI	Deep	VOC	Cumene	98-82-8	T	D	12				1.20E-04	8.30E-02	8.0E-01		2.3E+00	
SWHI	Deep	VOC	Cyclohexane	110-82-7	T	ID	12				1.30E-04	8.30E-02				
SWHI	Deep	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	12				6.20E-04	1.70E-01	2.0E-04		2.0E-04	
SWHI	Deep	VOC	Dibromochloromethane	124-48-1	T	C	12				2.60E-04	8.30E-02	1.0E-01		1.0E-01	
SWHI	Deep	VOC	1,2-Dibromoethane	106-93-4	T	B2	12				2.20E-04	8.30E-02	1.0E-03		1.0E-03	
SWHI	Deep	VOC	1,2-Dichlorobenzene	95-50-1	T	D	12				1.10E-04	8.30E-02	6.0E-01		6.0E-01	
SWHI	Deep	VOC	1,3-Dichlorobenzene	541-73-1	T	D	12				1.50E-04	8.30E-02	6.6E-03		1.9E-02	
SWHI	Deep	VOC	1,4-Dichlorobenzene	106-46-7	T	C	12				1.70E-04	8.30E-02	7.5E-02		7.5E-02	
SWHI	Deep	VOC	Dichlorodifluoromethane	75-71-8	T		12				2.60E-04	1.70E-01	1.7E+00		4.8E+00	
SWHI	Deep	VOC	1,1-Dichloroethane	75-34-3	T	C	12				1.60E-04	8.30E-02	8.8E-01		2.5E+00	
SWHI	Deep	VOC	1,2-Dichloroethane	107-06-2	T	B2	12				2.10E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	1,1-Dichloroethene	75-35-4	T	C	12				2.40E-04	8.30E-02	7.0E-03		7.0E-03	
SWHI	Deep	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	12				2.20E-04	4.20E-02	7.0E-02		7.0E-02	
SWHI	Deep	VOC	trans-1,2-Dichloroethene	156-60-5	T		12				1.50E-04	4.20E-02	1.0E-01		1.0E-01	
SWHI	Deep	VOC	1,2-Dichloropropane	78-87-5	T	B2	12				1.70E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	12				2.70E-04	8.30E-02	8.5E-03		3.5E-02	
SWHI	Deep	VOC	Ethyl Benzene	100-41-4	T	D	12				1.20E-04	8.30E-02	7.0E-01		7.0E-01	
SWHI	Deep	VOC	2-Hexanone	591-78-6	T		12				4.60E-04	8.30E-01	1.0E+00		2.9E+00	
SWHI	Deep	VOC	Methyl Acetate	79-20-9	T		12				4.10E-04	8.30E-01				
SWHI	Deep	VOC	Methyl tert-butyl ether	1634-04-4	T		12				1.30E-04	4.20E-01	2.4E-01		6.9E-01	
SWHI	Deep	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	12				2.30E-04	8.30E-01	1.8E+00		5.2E+00	
SWHI	Deep	VOC	Methylcyclohexane	108-87-2	T		12				1.50E-04	8.30E-02				
SWHI	Deep	VOC	Methylene Chloride	75-09-2	T	B2	12				2.90E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	Styrene	100-42-5	T		12				1.50E-04	8.30E-02	1.0E-01		1.0E-01	
SWHI	Deep	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	12				2.50E-04	8.30E-02	8.5E-03		3.5E-02	
SWHI	Deep	VOC	Tetrachloroethene	127-18-4	T	C-B2	12				2.30E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	Toluene	108-88-3	T	D	12	3	4.30E-04	1.00E-03	1.80E-04	8.30E-02	1.0E+00	1.0E-03	1.0E+00	1.0E-03
SWHI	Deep	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	12				1.70E-04	8.30E-02	7.0E-02		7.0E-02	
SWHI	Deep	VOC	1,1,1-Trichloroethane	71-55-6	T	D	12				1.50E-04	8.30E-02	2.0E-01		2.0E-01	
SWHI	Deep	VOC	1,1,2-Trichloroethane	79-00-5	T	C	12				3.00E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	Trichloroethene	79-01-6	T	C-B2	12				1.40E-04	8.30E-02	5.0E-03		5.0E-03	
SWHI	Deep	VOC	Trichlorofluoromethane	75-69-4	T		12				2.80E-04	8.30E-02	2.6E+00		7.3E+00	
SWHI	Deep	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		12				3.20E-04	8.30E-02	1.7E+02		1.7E+02	
SWHI	Deep	VOC	Vinyl Chloride	75-01-4	T	A	12				1.50E-04	8.30E-02	2.0E-03		2.0E-03	
SWHI	Deep	VOC	Xylenes (total)	1330-20-7	T	ID	12	3	3.50E-04	6.10E-04	3.30E-04	8.30E-02	1.0E+01	6.1E-05	1.0E+01	6.1E-05
SWHI	Deep	SVOC	Acenaphthene	83-32-9	T		12				8.00E-04	5.00E-03	1.3E+00		3.8E+00	
SWHI	Deep	SVOC	Acenaphthylene	208-96-8	T	D	12				7.10E-04	5.00E-03	5.2E-02		1.5E-01	
SWHI	Deep	SVOC	Acetophenone	98-86-2	T	D	12				2.60E-03	1.00E-02	1.5E+00		4.4E+00	
SWHI	Deep	SVOC	Anthracene	120-12-7	T	D	12				6.80E-04	5.00E-03	4.3E-02		4.3E-02	
SWHI	Deep	SVOC	Atrazine	1912-24-9	T		12				2.50E-03	5.00E-03	3.0E-03		3.0E-03	
SWHI	Deep	SVOC	Benzaldehyde	100-52-7	T		12				2.80E-03	1.00E-02				
SWHI	Deep	SVOC	Benzo(a)anthracene	56-55-3	T	B2	12				7.00E-04	5.00E-03	2.1E-03		8.5E-03	
SWHI	Deep	SVOC	Benzo(a)pyrene	50-32-8	T	B2	12				7.30E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Deep	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	12				9.40E-04	5.00E-03	2.0E-03		2.0E-03	
SWHI	Deep	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	12				8.50E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Deep	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	12				8.40E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Deep	SVOC	Biphenyl	92-52-4	T	D	12				2.60E-03	1.00E-02				
SWHI	Deep	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	12				8.70E-04	5.00E-03				
SWHI	Deep	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	12				9.70E-04	5.00E-03	2.0E-03		8.3E-03	
SWHI	Deep	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	12	1	3.90E-03	3.90E-03	2.70E-03	5.00E-03	6.0E-03	6.5E-01	6.0E-03	6.5E-01
SWHI	Deep	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	12				8.80E-04	5.00E-03				
SWHI	Deep	SVOC	Butylbenzylphthalate	85-68-7	T	C	12				8.80E-04	5.00E-03	1.2E+00		2.7E+00	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
SWHI	Deep	SVOC	Caprolactam	105-60-2	T		12	5	9.70E-03	5.40E-01	2.50E-03	1.00E-02	5.8E+00	9.3E-02	1.7E+01	3.2E-02
SWHI	Deep	SVOC	Carbazole	86-74-8	T	B2	12				8.20E-04	1.00E-02	8.5E-02		3.5E-01	
SWHI	Deep	SVOC	4-Chloro-3-methylphenol	59-50-7	T		12				9.90E-04	5.00E-03	1.5E-01		4.2E-01	
SWHI	Deep	SVOC	4-Chloroaniline	106-47-8	T		12				6.10E-04	1.00E-02				
SWHI	Deep	SVOC	2-Chloronaphthalene	91-58-7	T		12				8.50E-04	5.00E-03	1.8E+00		5.2E+00	
SWHI	Deep	SVOC	2-Chlorophenol	95-57-8	T		12				1.00E-03	5.00E-03	4.5E-02		1.3E-01	
SWHI	Deep	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		12				7.90E-04	5.00E-03				
SWHI	Deep	SVOC	Chrysene	218-01-9	T	B2	12				7.50E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Deep	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	12				7.90E-04	5.00E-03	2.0E-03		2.0E-03	
SWHI	Deep	SVOC	Dibenzofuran	132-64-9	T	D	12				1.10E-03	5.00E-03				
SWHI	Deep	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	12				9.30E-04	2.00E-02	1.1E-03		4.3E-03	
SWHI	Deep	SVOC	2,4-Dichlorophenol	120-83-2	T		12				8.50E-04	1.00E-02	7.3E-02		2.1E-01	
SWHI	Deep	SVOC	Diethylphthalate	84-66-2	T	D	12				6.50E-04	5.00E-03	5.5E+00		1.6E+01	
SWHI	Deep	SVOC	2,4-Dimethylphenol	105-67-9	T		12				8.50E-04	5.00E-03	3.7E-01		1.0E+00	
SWHI	Deep	SVOC	Dimethylphthalate	131-11-3	T	D	12				7.60E-04	5.00E-03	7.3E+01		2.1E+02	
SWHI	Deep	SVOC	Di-n-butylphthalate	84-74-2	T	D	12				6.70E-04	5.00E-03	8.8E-01		2.5E+00	
SWHI	Deep	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		12				1.30E-03	2.00E-02	2.0E-02		2.0E-02	
SWHI	Deep	SVOC	2,4-Dinitrophenol	51-28-5	T		12				3.00E-03	2.00E-02				
SWHI	Deep	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	12				7.90E-04	5.00E-03	7.7E-03		3.2E-02	
SWHI	Deep	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	12				5.70E-04	5.00E-03				
SWHI	Deep	SVOC	Di-n-octylphthalate	117-84-0	T		12				1.10E-03	5.00E-03	1.3E-01		3.8E-01	
SWHI	Deep	SVOC	Fluoranthene	206-44-0	T	D	12				8.10E-04	5.00E-03	2.1E-01		2.1E-01	
SWHI	Deep	SVOC	Fluorene	86-73-7	T	D	12				1.00E-03	5.00E-03	8.8E-01		2.0E+00	
SWHI	Deep	SVOC	Hexachlorobenzene	118-74-1	T	B2	12				7.40E-04	5.00E-03	1.0E-03		1.0E-03	
SWHI	Deep	SVOC	Hexachlorobutadiene	87-68-3	T	C	12				7.30E-04	5.00E-03	1.5E-02		4.2E-02	
SWHI	Deep	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	12				1.10E-03	5.00E-03	5.0E-02		5.0E-02	
SWHI	Deep	SVOC	Hexachloroethane	67-72-1	T	C	12				7.40E-04	5.00E-03	7.3E-03		2.1E-02	
SWHI	Deep	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	12				6.30E-04	5.00E-03	2.0E-03		2.0E-03	
SWHI	Deep	SVOC	Isophorone	78-59-1	T	C	12	1	2.65E-03	2.65E-03	6.30E-04	5.00E-03	7.7E-01	3.4E-03	3.1E+00	8.5E-04
SWHI	Deep	SVOC	2-Methylnaphthalene	91-57-6	T	ID	12				6.40E-04	5.00E-03	2.6E-01		7.5E-01	
SWHI	Deep	SVOC	Methylphenol (total)	1319-77-3	T		12				1.30E-03	5.00E-03	3.7E-01		1.0E+00	
SWHI	Deep	SVOC	Naphthalene	91-20-3	T	C	12				7.50E-04	5.00E-03	5.2E-01		1.5E+00	
SWHI	Deep	SVOC	2-Nitroaniline	88-74-4	T		12				7.00E-04	2.00E-02				
SWHI	Deep	SVOC	3-Nitroaniline	99-09-2	T	C	12				7.10E-04	2.00E-02				
SWHI	Deep	SVOC	4-Nitroaniline	100-01-6	T	C	12				1.30E-03	2.00E-02				
SWHI	Deep	SVOC	Nitrobenzene	98-95-3	T	D	12				8.10E-04	5.00E-03	3.4E-03		9.6E-03	
SWHI	Deep	SVOC	2-Nitrophenol	88-75-5	T		12				2.10E-03	5.00E-03	2.0E-02		5.8E-02	
SWHI	Deep	SVOC	4-Nitrophenol	100-02-7	T		12				1.90E-03	2.00E-02				
SWHI	Deep	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	12				1.40E-03	5.00E-03	2.7E-01		1.1E+00	
SWHI	Deep	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	12				6.70E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Deep	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	12				7.80E-04	5.00E-03				
SWHI	Deep	SVOC	Pentachlorophenol	87-86-5	T	B2	12				2.40E-03	5.00E-03	1.0E-03		1.0E-03	
SWHI	Deep	SVOC	Phenanthrene	85-01-8	T	D	12				8.20E-04	5.00E-03	5.2E-02		1.5E-01	
SWHI	Deep	SVOC	Phenol	108-95-2	T	ID	12				2.60E-03	5.00E-03	4.4E+00		1.3E+01	
SWHI	Deep	SVOC	Pyrene	129-00-0	T	D	12				1.10E-03	5.00E-03	1.4E-01		1.4E-01	
SWHI	Deep	SVOC	2,4,5-Trichlorophenol	95-95-4	T		12				1.20E-03	5.00E-03	7.3E-01		2.1E+00	
SWHI	Deep	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	12				1.70E-03	5.00E-03	1.2E-01		4.7E-01	
SWHI	Deep	P/PCB	PCBs (total)	1336-36-3	T	B2	1				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
SWHI	Deep	INORG	Antimony	7440-36-0	D		10				2.20E-03	2.50E-02	6.0E-03		6.0E-03	
SWHI	Deep	INORG	Antimony	7440-36-0	T		12				2.20E-03	2.50E-02	6.0E-03		6.0E-03	
SWHI	Deep	INORG	Arsenic	7440-38-2	D	A	10	6	6.90E-03	1.88E-02	3.90E-03	1.00E-02	5.0E-02	3.8E-01	5.0E-02	3.8E-01
SWHI	Deep	INORG	Arsenic	7440-38-2	T	A	12	8	4.70E-03	3.19E-02	3.90E-03	1.00E-02	5.0E-02	6.4E-01	5.0E-02	6.4E-01
SWHI	Deep	INORG	Barium	7440-39-3	D	D	10	10	6.46E-02	3.24E-01			2.0E+00	1.6E-01	2.0E+00	1.6E-01
SWHI	Deep	INORG	Barium	7440-39-3	T	D	12	12	4.88E-02	3.31E-01			2.0E+00	1.7E-01	2.0E+00	1.7E-01
SWHI	Deep	INORG	Beryllium	7440-41-7	D	B1	10				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
SWHI	Deep	INORG	Beryllium	7440-41-7	T	B1	12				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
SWHI	Deep	INORG	Cadmium	7440-43-9	D	B1	10				2.80E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Deep	INORG	Cadmium	7440-43-9	T	B1	12	2	3.10E-04	3.30E-04	2.80E-04	5.00E-03	5.0E-03	6.6E-02	5.0E-03	6.6E-02
SWHI	Deep	INORG	Chromium (total)	7440-47-3	D		10	1	1.50E-03	1.50E-03	1.40E-03	1.00E-02	1.0E-01	1.5E-02	1.0E-01	1.5E-02
SWHI	Deep	INORG	Chromium (total)	7440-47-3	T		12	7	3.60E-03	1.13E-02	1.40E-03	1.00E-02	1.0E-01	1.1E-01	1.0E-01	1.1E-01
SWHI	Deep	INORG	Cobalt	7440-48-4	D	B1	10				1.30E-03	2.00E-02	4.0E-02		1.0E-01	
SWHI	Deep	INORG	Cobalt	7440-48-4	T	B1	12	2	1.30E-03	4.80E-03	7.40E-04	2.00E-02	4.0E-02	1.2E-01	1.0E-01	4.8E-02
SWHI	Deep	INORG	Copper	7440-50-8	D	D	10				4.20E-03	5.00E-03	1.4E+00		4.0E+00	
SWHI	Deep	INORG	Copper	7440-50-8	T	D	12	1	3.60E-03	3.60E-03	1.70E-03	5.00E-03	1.4E+00	2.6E-03	4.0E+00	9.0E-04

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
SWHI	Deep	INORG	Lead	7439-92-1	D	B2	10				2.50E-03	3.00E-03	4.0E-03		4.0E-03	
SWHI	Deep	INORG	Lead	7439-92-1	T	B2	12				1.60E-03	3.00E-03	4.0E-03		4.0E-03	
SWHI	Deep	INORG	Manganese	7439-96-5	D	D	10	10	3.11E-02	2.32E-01			8.6E-01	2.7E-01	2.5E+00	9.3E-02
SWHI	Deep	INORG	Manganese	7439-96-5	T	D	12	12	3.44E-02	2.52E-01			8.6E-01	2.9E-01	2.5E+00	1.0E-01
SWHI	Deep	INORG	Mercury	7439-97-6	D	D	10				6.90E-05	2.00E-04	2.0E-03		2.0E-03	
SWHI	Deep	INORG	Mercury	7439-97-6	T	D	12	1	8.80E-05	8.80E-05	6.90E-05	2.00E-04	2.0E-03	4.4E-02	2.0E-03	4.4E-02
SWHI	Deep	INORG	Nickel	7440-02-0	D	A	10	3	2.40E-03	5.60E-03	2.20E-03	2.00E-02	1.0E-01	5.6E-02	1.0E-01	5.6E-02
SWHI	Deep	INORG	Nickel	7440-02-0	T	A	12	8	2.90E-03	7.40E-03	2.20E-03	2.00E-02	1.0E-01	7.4E-02	1.0E-01	7.4E-02
SWHI	Deep	INORG	Selenium	7782-49-2	D	D	10				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
SWHI	Deep	INORG	Selenium	7782-49-2	T	D	12				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
SWHI	Deep	INORG	Silver	7440-22-4	D	D	10				1.50E-03	5.00E-03	3.4E-02		9.8E-02	
SWHI	Deep	INORG	Silver	7440-22-4	T	D	12				9.80E-04	5.00E-03	3.4E-02		9.8E-02	
SWHI	Deep	INORG	Thallium	7440-28-0	D		11				1.80E-05	1.00E-02	2.0E-03		2.0E-03	
SWHI	Deep	INORG	Thallium	7440-28-0	T		13				1.80E-05	1.00E-02	2.0E-03		2.0E-03	
SWHI	Deep	INORG	Vanadium	7440-62-2	D		10				8.20E-04	1.00E-02	4.5E-03		6.2E-02	
SWHI	Deep	INORG	Vanadium	7440-62-2	T		12				6.70E-04	1.00E-02	4.5E-03		6.2E-02	
SWHI	Deep	INORG	Zinc	7440-66-6	D	D	10				1.20E-02	2.00E-02	2.4E+00		5.0E+00	
SWHI	Deep	INORG	Zinc	7440-66-6	T	D	12	2	1.28E-02	2.76E-02	1.20E-02	2.00E-02	2.4E+00	1.2E-02	5.0E+00	5.5E-03
SWHI	Intermediate	VOC	Acetone	67-64-1	T	ID	8	6	6.50E-01	1.30E+01	1.10E-03	3.60E-02	7.3E-01	**1.8E+01**	2.1E+00	**6.2E+00**
SWHI	Intermediate	VOC	Benzene	71-43-2	T	A	8				3.70E-04	4.00E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	Bromodichloromethane	75-27-4	T	B2	8				3.20E-04	4.20E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	Bromoform	75-25-2	T	B2	8				3.70E-04	4.50E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	Bromomethane	74-83-9	T	D	7				3.00E-04	5.00E-02	1.0E-02		2.9E-02	
SWHI	Intermediate	VOC	2-Butanone	78-93-3	T	ID	8				5.90E-04	1.40E-01	1.3E+01		3.8E+01	
SWHI	Intermediate	VOC	Carbon Disulfide	75-15-0	T		8				2.40E-04	5.00E-02	8.0E-01		2.3E+00	
SWHI	Intermediate	VOC	Carbon Tetrachloride	56-23-5	T	B2	8				3.70E-04	3.00E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	Chlorobenzene	108-90-7	T	D	8				3.80E-04	3.50E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	Chloroethane	75-00-3	T		8				2.90E-04	6.50E-02	4.3E-01		1.7E+00	
SWHI	Intermediate	VOC	Chloroform	67-66-3	T	B2	8				3.50E-04	3.50E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	Chloromethane	74-87-3	T	D	8				4.90E-04	3.20E-02	2.6E-01		1.1E+00	
SWHI	Intermediate	VOC	Cumene	98-82-8	T	D	8				3.90E-04	3.00E-02	8.0E-01		2.3E+00	
SWHI	Intermediate	VOC	Cyclohexane	110-82-7	T	ID	8				3.30E-04	3.20E-02				
SWHI	Intermediate	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	8				8.20E-04	1.60E-01	2.0E-04		2.0E-04	
SWHI	Intermediate	VOC	Dibromochloromethane	124-48-1	T	C	8				3.70E-04	6.50E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	1,2-Dibromoethane	106-93-4	T	B2	8				3.40E-04	5.50E-02	1.0E-03		1.0E-03	
SWHI	Intermediate	VOC	1,2-Dichlorobenzene	95-50-1	T	D	8				3.80E-04	2.80E-02	6.0E-01		6.0E-01	
SWHI	Intermediate	VOC	1,3-Dichlorobenzene	541-73-1	T	D	8				3.80E-04	3.80E-02	6.6E-03		1.9E-02	
SWHI	Intermediate	VOC	1,4-Dichlorobenzene	106-46-7	T	C	8				3.80E-04	4.20E-02	7.5E-02		7.5E-02	
SWHI	Intermediate	VOC	Dichlorodifluoromethane	75-71-8	T		8				4.90E-04	6.50E-02	1.7E+00		4.8E+00	
SWHI	Intermediate	VOC	1,1-Dichloroethane	75-34-3	T	C	8				3.00E-04	4.00E-02	8.8E-01		2.5E+00	
SWHI	Intermediate	VOC	1,2-Dichloroethane	107-06-2	T	B2	8				2.80E-04	5.20E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	1,1-Dichloroethene	75-35-4	T	C	8				3.10E-04	6.00E-02	7.0E-03		7.0E-03	
SWHI	Intermediate	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	8				3.50E-04	5.50E-02	7.0E-02		7.0E-02	
SWHI	Intermediate	VOC	trans-1,2-Dichloroethene	156-60-5	T		8				3.30E-04	3.80E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	1,2-Dichloropropane	78-87-5	T	B2	8				4.10E-04	4.20E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	8				3.50E-04	6.80E-02	8.5E-03		3.5E-02	
SWHI	Intermediate	VOC	Ethyl Benzene	100-41-4	T	D	8	1	6.50E-03	6.50E-03	4.10E-04	3.00E-02	7.0E-01	9.3E-03	7.0E-01	9.3E-03
SWHI	Intermediate	VOC	2-Hexanone	591-78-6	T		8				5.80E-04	1.40E-01	1.0E+00		2.9E+00	
SWHI	Intermediate	VOC	Methyl Acetate	79-20-9	T		8				5.40E-04	1.40E-01				
SWHI	Intermediate	VOC	Methyl tert-butyl ether	1634-04-4	T		8				2.70E-04	7.10E-02	2.4E-01		6.9E-01	
SWHI	Intermediate	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	7	1	8.50E-03	8.50E-03	2.60E-04	1.40E-01	1.8E+00	4.7E-03	5.2E+00	1.6E-03
SWHI	Intermediate	VOC	Methylcyclohexane	108-87-2	T		8				4.20E-04	3.80E-02				
SWHI	Intermediate	VOC	Methylene Chloride	75-09-2	T	B2	8				2.90E-04	8.50E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	Styrene	100-42-5	T		8				3.50E-04	3.80E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	8				3.60E-04	6.20E-02	8.5E-03		3.5E-02	
SWHI	Intermediate	VOC	Tetrachloroethene	127-18-4	T	C-B2	8				4.20E-04	5.80E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	Toluene	108-88-3	T	D	8	1	1.90E-02	1.90E-02	3.90E-04	4.50E-02	1.0E+00	1.9E-02	1.0E+00	1.9E-02
SWHI	Intermediate	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	8				4.00E-04	4.20E-02	7.0E-02		7.0E-02	
SWHI	Intermediate	VOC	1,1,1-Trichloroethane	71-55-6	T	D	8				3.90E-04	3.80E-02	2.0E-01		2.0E-01	
SWHI	Intermediate	VOC	1,1,2-Trichloroethane	79-00-5	T	C	8				3.60E-04	7.50E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	Trichloroethene	79-01-6	T	C-B2	8				4.20E-04	3.50E-02	5.0E-03		5.0E-03	
SWHI	Intermediate	VOC	Trichlorofluoromethane	75-69-4	T		8				5.40E-04	7.00E-02	2.6E+00		7.3E+00	
SWHI	Intermediate	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		8				3.20E-04	8.00E-02	1.7E+02		1.7E+02	
SWHI	Intermediate	VOC	Vinyl Chloride	75-01-4	T	A	8				3.60E-04	3.80E-02	2.0E-03		2.0E-03	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
SWHI	Intermediate	VOC	Xylenes (total)	1330-20-7	T	ID	8	1	2.50E-02	2.50E-02	4.40E-04	8.20E-02	1.0E+01	2.5E-03	1.0E+01	2.5E-03
SWHI	Intermediate	SVOC	Acenaphthene	83-32-9	T		8				8.00E-04	5.00E-03	1.3E+00		3.8E+00	
SWHI	Intermediate	SVOC	Acenaphthylene	208-96-8	T	D	8				7.10E-04	5.00E-03	5.2E-02		1.5E-01	
SWHI	Intermediate	SVOC	Acetophenone	98-86-2	T	D	8				2.60E-03	1.00E-02	1.5E+00		4.4E+00	
SWHI	Intermediate	SVOC	Anthracene	120-12-7	T	D	8				6.80E-04	5.00E-03	4.3E-02		4.3E-02	
SWHI	Intermediate	SVOC	Atrazine	1912-24-9	T		8				2.50E-03	5.00E-03	3.0E-03		3.0E-03	
SWHI	Intermediate	SVOC	Benzaldehyde	100-52-7	T		8				2.80E-03	1.00E-02				
SWHI	Intermediate	SVOC	Benzo(a)anthracene	56-55-3	T	B2	8				7.00E-04	5.00E-03	2.1E-03		8.5E-03	
SWHI	Intermediate	SVOC	Benzo(a)pyrene	50-32-8	T	B2	8				7.30E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Intermediate	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	8				9.40E-04	5.00E-03	2.0E-03		2.0E-03	
SWHI	Intermediate	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	8				8.50E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Intermediate	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	8				8.40E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Intermediate	SVOC	Biphenyl	92-52-4	T	D	8				2.60E-03	1.00E-02				
SWHI	Intermediate	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	8				8.70E-04	5.00E-03				
SWHI	Intermediate	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	8				9.70E-04	5.00E-03	2.0E-03		8.3E-03	
SWHI	Intermediate	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	8				2.70E-03	5.00E-03	6.0E-03		6.0E-03	
SWHI	Intermediate	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	8				8.80E-04	5.00E-03				
SWHI	Intermediate	SVOC	Butylbenzylphthalate	85-68-7	T	C	8				8.80E-04	5.00E-03	1.2E+00		2.7E+00	
SWHI	Intermediate	SVOC	Caprolactam	105-60-2	T		8	5	3.30E-03	8.20E-01	2.50E-03	2.50E-03	5.8E+00	1.4E-01	1.7E+01	4.8E-02
SWHI	Intermediate	SVOC	Carbazole	86-74-8	T	B2	8				8.20E-04	1.00E-02	8.5E-02		3.5E-01	
SWHI	Intermediate	SVOC	4-Chloro-3-methylphenol	59-50-7	T		8				9.90E-04	5.00E-03	1.5E-01		4.2E-01	
SWHI	Intermediate	SVOC	4-Chloroaniline	106-47-8	T		8				6.10E-04	1.00E-02				
SWHI	Intermediate	SVOC	2-Chloronaphthalene	91-58-7	T		8				8.50E-04	5.00E-03	1.8E+00		5.2E+00	
SWHI	Intermediate	SVOC	2-Chlorophenol	95-57-8	T		8				1.00E-03	5.00E-03	4.5E-02		1.3E-01	
SWHI	Intermediate	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		8				7.90E-04	5.00E-03				
SWHI	Intermediate	SVOC	Chrysene	218-01-9	T	B2	8				7.50E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Intermediate	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	8				7.90E-04	5.00E-03	2.0E-03		2.0E-03	
SWHI	Intermediate	SVOC	Dibenzofuran	132-64-9	T	D	8				1.10E-03	5.00E-03				
SWHI	Intermediate	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	8				9.30E-04	2.00E-02	1.1E-03		4.3E-03	
SWHI	Intermediate	SVOC	2,4-Dichlorophenol	120-83-2	T		8				8.50E-04	1.00E-02	7.3E-02		2.1E-01	
SWHI	Intermediate	SVOC	Diethylphthalate	84-66-2	T	D	8				6.50E-04	5.00E-03	5.5E+00		1.6E+01	
SWHI	Intermediate	SVOC	2,4-Dimethylphenol	105-67-9	T		8				8.50E-04	5.00E-03	3.7E-01		1.0E+00	
SWHI	Intermediate	SVOC	Dimethylphthalate	131-11-3	T	D	8				7.60E-04	5.00E-03	7.3E+01		2.1E+02	
SWHI	Intermediate	SVOC	Di-n-butylphthalate	84-74-2	T	D	8				6.70E-04	5.00E-03	8.8E-01		2.5E+00	
SWHI	Intermediate	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		8				1.30E-03	2.00E-02	2.0E-02		2.0E-02	
SWHI	Intermediate	SVOC	2,4-Dinitrophenol	51-28-5	T		8				3.00E-03	2.00E-02				
SWHI	Intermediate	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	8				7.90E-04	5.00E-03	7.7E-03		3.2E-02	
SWHI	Intermediate	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	8				5.70E-04	5.00E-03				
SWHI	Intermediate	SVOC	Di-n-octylphthalate	117-84-0	T		8				1.10E-03	5.00E-03	1.3E-01		3.8E-01	
SWHI	Intermediate	SVOC	Fluoranthene	206-44-0	T	D	8				8.10E-04	5.00E-03	2.1E-01		2.1E-01	
SWHI	Intermediate	SVOC	Fluorene	86-73-7	T	D	8				1.00E-03	5.00E-03	8.8E-01		2.0E+00	
SWHI	Intermediate	SVOC	Hexachlorobenzene	118-74-1	T	B2	8				7.40E-04	5.00E-03	1.0E-03		1.0E-03	
SWHI	Intermediate	SVOC	Hexachlorobutadiene	87-68-3	T	C	8				7.30E-04	5.00E-03	1.5E-02		4.2E-02	
SWHI	Intermediate	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	7				1.10E-03	5.00E-03	5.0E-02		5.0E-02	
SWHI	Intermediate	SVOC	Hexachloroethane	67-72-1	T	C	8				7.40E-04	5.00E-03	7.3E-03		2.1E-02	
SWHI	Intermediate	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	8				6.30E-04	5.00E-03	2.0E-03		2.0E-03	
SWHI	Intermediate	SVOC	Isophorone	78-59-1	T	C	8				6.30E-04	5.00E-03	7.7E-01		3.1E+00	
SWHI	Intermediate	SVOC	2-Methylnaphthalene	91-57-6	T	ID	8				6.40E-04	5.00E-03	2.6E-01		7.5E-01	
SWHI	Intermediate	SVOC	Methylphenol (total)	1319-77-3	T		8				1.30E-03	5.00E-03	3.7E-01		1.0E+00	
SWHI	Intermediate	SVOC	Naphthalene	91-20-3	T	C	8				7.50E-04	5.00E-03	5.2E-01		1.5E+00	
SWHI	Intermediate	SVOC	2-Nitroaniline	88-74-4	T		8				7.00E-04	2.00E-02				
SWHI	Intermediate	SVOC	3-Nitroaniline	99-09-2	T	C	8				7.10E-04	2.00E-02				
SWHI	Intermediate	SVOC	4-Nitroaniline	100-01-6	T	C	8				1.30E-03	2.00E-02				
SWHI	Intermediate	SVOC	Nitrobenzene	98-95-3	T	D	8				8.10E-04	5.00E-03	3.4E-03		9.6E-03	
SWHI	Intermediate	SVOC	2-Nitrophenol	88-75-5	T		8				2.10E-03	5.00E-03	2.0E-02		5.8E-02	
SWHI	Intermediate	SVOC	4-Nitrophenol	100-02-7	T		8				1.90E-03	2.00E-02				
SWHI	Intermediate	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	8				1.40E-03	5.00E-03	2.7E-01		1.1E+00	
SWHI	Intermediate	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	8				6.70E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Intermediate	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	8				7.80E-04	5.00E-03				
SWHI	Intermediate	SVOC	Pentachlorophenol	87-86-5	T	B2	8				2.40E-03	5.00E-03	1.0E-03		1.0E-03	
SWHI	Intermediate	SVOC	Phenanthrene	85-01-8	T	D	8				8.20E-04	5.00E-03	5.2E-02		1.5E-01	
SWHI	Intermediate	SVOC	Phenol	108-95-2	T	ID	8				2.60E-03	5.00E-03	4.4E+00		1.3E+01	
SWHI	Intermediate	SVOC	Pyrene	129-00-0	T	D	8				1.10E-03	5.00E-03	1.4E-01		1.4E-01	
SWHI	Intermediate	SVOC	2,4,5-Trichlorophenol	95-95-4	T		8				1.20E-03	5.00E-03	7.3E-01		2.1E+00	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
SWHI	Intermediate	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	8				1.70E-03	5.00E-03	1.2E-01		4.7E-01	
SWHI	Intermediate	P/PCB	PCBs (total)	1336-36-3	T	B2	1				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
SWHI	Intermediate	INORG	Antimony	7440-36-0	D		6				2.20E-03	2.50E-02	6.0E-03		6.0E-03	
SWHI	Intermediate	INORG	Antimony	7440-36-0	T		8				2.20E-03	2.50E-02	6.0E-03		6.0E-03	
SWHI	Intermediate	INORG	Arsenic	7440-38-2	D	A	6	4	6.10E-03	2.74E-02	3.90E-03	3.90E-03	5.0E-02	5.5E-01	5.0E-02	5.5E-01
SWHI	Intermediate	INORG	Arsenic	7440-38-2	T	A	8	4	7.40E-03	2.66E-02	2.10E-03	3.90E-03	5.0E-02	5.3E-01	5.0E-02	5.3E-01
SWHI	Intermediate	INORG	Barium	7440-39-3	D	D	6	6	8.18E-02	3.04E-01			2.0E+00	1.5E-01	2.0E+00	1.5E-01
SWHI	Intermediate	INORG	Barium	7440-39-3	T	D	8	8	1.01E-01	2.88E-01			2.0E+00	1.4E-01	2.0E+00	1.4E-01
SWHI	Intermediate	INORG	Beryllium	7440-41-7	D	B1	6				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
SWHI	Intermediate	INORG	Beryllium	7440-41-7	T	B1	8				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
SWHI	Intermediate	INORG	Cadmium	7440-43-9	D	B1	6				2.80E-04	5.00E-03	5.0E-03		5.0E-03	
SWHI	Intermediate	INORG	Cadmium	7440-43-9	T	B1	8	1	3.30E-04	3.30E-04	2.80E-04	5.00E-03	5.0E-03	6.6E-02	5.0E-03	6.6E-02
SWHI	Intermediate	INORG	Chromium (total)	7440-47-3	D		6				1.40E-03	1.00E-02	1.0E-01		1.0E-01	
SWHI	Intermediate	INORG	Chromium (total)	7440-47-3	T		8	6	1.90E-03	6.05E-02	1.40E-03	1.00E-02	1.0E-01	6.1E-01	1.0E-01	6.1E-01
SWHI	Intermediate	INORG	Cobalt	7440-48-4	D	B1	6	2	1.90E-03	2.10E-03	1.30E-03	2.00E-02	4.0E-02	5.3E-02	1.0E-01	2.1E-02
SWHI	Intermediate	INORG	Cobalt	7440-48-4	T	B1	8	5	1.80E-03	6.20E-03	1.30E-03	2.00E-02	4.0E-02	1.6E-01	1.0E-01	6.2E-02
SWHI	Intermediate	INORG	Copper	7440-50-8	D	D	6				4.20E-03	5.00E-03	1.4E+00		4.0E+00	
SWHI	Intermediate	INORG	Copper	7440-50-8	T	D	8	3	5.60E-03	9.90E-03	1.70E-03	4.20E-03	1.4E+00	7.1E-03	4.0E+00	2.5E-03
SWHI	Intermediate	INORG	Lead	7439-92-1	D	B2	6				2.50E-03	3.00E-03	4.0E-03		4.0E-03	
SWHI	Intermediate	INORG	Lead	7439-92-1	T	B2	8	1	2.80E-03	2.80E-03	1.60E-03	3.00E-03	4.0E-03	7.0E-01	4.0E-03	7.0E-01
SWHI	Intermediate	INORG	Manganese	7439-96-5	D	D	6	6	3.49E-02	2.19E-01			8.6E-01	2.5E-01	2.5E+00	8.8E-02
SWHI	Intermediate	INORG	Manganese	7439-96-5	T	D	8	8	3.75E-02	3.52E-01			8.6E-01	4.1E-01	2.5E+00	1.4E-01
SWHI	Intermediate	INORG	Mercury	7439-97-6	D	D	6				6.90E-05	2.00E-04	2.0E-03		2.0E-03	
SWHI	Intermediate	INORG	Mercury	7439-97-6	T	D	8				6.90E-05	2.00E-04	2.0E-03		2.0E-03	
SWHI	Intermediate	INORG	Nickel	7440-02-0	D	A	6	3	2.30E-03	2.32E-02	2.20E-03	2.00E-02	1.0E-01	2.3E-01	1.0E-01	2.3E-01
SWHI	Intermediate	INORG	Nickel	7440-02-0	T	A	8	7	2.30E-03	5.90E-02	2.20E-03	2.20E-03	1.0E-01	5.9E-01	1.0E-01	5.9E-01
SWHI	Intermediate	INORG	Selenium	7782-49-2	D	D	6				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
SWHI	Intermediate	INORG	Selenium	7782-49-2	T	D	8				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
SWHI	Intermediate	INORG	Silver	7440-22-4	D	D	6				1.50E-03	5.00E-03	3.4E-02		9.8E-02	
SWHI	Intermediate	INORG	Silver	7440-22-4	T	D	8				9.80E-04	5.00E-03	3.4E-02		9.8E-02	
SWHI	Intermediate	INORG	Thallium	7440-28-0	D		6	2	6.80E-04	6.10E-03	1.80E-05	1.00E-02	2.0E-03	**3.1E+00**	2.0E-03	**3.1E+00**
SWHI	Intermediate	INORG	Thallium	7440-28-0	T		8	1	9.20E-05	9.20E-05	1.80E-05	1.00E-02	2.0E-03	4.6E-02	2.0E-03	4.6E-02
SWHI	Intermediate	INORG	Vanadium	7440-62-2	D		6				8.20E-04	1.00E-02	4.5E-03		6.2E-02	
SWHI	Intermediate	INORG	Vanadium	7440-62-2	T		8	2	2.20E-03	3.40E-03	6.70E-04	1.00E-02	4.5E-03	7.6E-01	6.2E-02	5.5E-02
SWHI	Intermediate	INORG	Zinc	7440-66-6	D	D	6	1	1.56E-02	1.56E-02	1.20E-02	2.00E-02	2.4E+00	6.5E-03	5.0E+00	3.1E-03
SWHI	Intermediate	INORG	Zinc	7440-66-6	T	D	8	4	1.34E-02	3.03E-02	1.20E-02	2.00E-02	2.4E+00	1.3E-02	5.0E+00	6.1E-03
W-01	Deep	VOC	Acetone	67-64-1	T	ID	11	5	4.50E-02	3.10E+00	5.10E-04	3.70E-01	7.3E-01	**4.2E+00**	2.1E+00	**1.5E+00**
W-01	Deep	VOC	Benzene	71-43-2	T	A	11	2	5.60E-04	4.50E-03	1.60E-04	1.20E-01	5.0E-03	9.0E-01	5.0E-03	9.0E-01
W-01	Deep	VOC	Bromodichloromethane	75-27-4	T	B2	10				1.70E-04	4.00E-02	1.0E-01		1.0E-01	
W-01	Deep	VOC	Bromoform	75-25-2	T	B2	11				1.80E-04	1.20E-01	1.0E-01		1.0E-01	
W-01	Deep	VOC	Bromomethane	74-83-9	T	D	10				2.00E-04	1.00E-01	1.0E-02		2.9E-02	
W-01	Deep	VOC	2-Butanone	78-93-3	T	ID	11	1	9.60E-04	9.60E-04	4.10E-04	4.00E-01	1.3E+01	7.4E-05	3.8E+01	2.5E-05
W-01	Deep	VOC	Carbon Disulfide	75-15-0	T		11	1	9.40E-03	9.40E-03	2.00E-04	8.00E-02	8.0E-01	1.2E-02	2.3E+00	4.1E-03
W-01	Deep	VOC	Carbon Tetrachloride	56-23-5	T	B2	11				1.20E-04	1.20E-01	5.0E-03		5.0E-03	
W-01	Deep	VOC	Chlorobenzene	108-90-7	T	D	11				1.40E-04	1.30E-01	1.0E-01		1.0E-01	
W-01	Deep	VOC	Chloroethane	75-00-3	T		11				2.60E-04	9.70E-02	4.3E-01		1.7E+00	
W-01	Deep	VOC	Chloroform	67-66-3	T	B2	11	1	1.60E-04	1.60E-04	3.50E-04	1.20E-01	1.0E-01	1.6E-03	1.0E-01	1.6E-03
W-01	Deep	VOC	Chloromethane	74-87-3	T	D	11				1.30E-04	1.60E-01	2.6E-01		1.1E+00	
W-01	Deep	VOC	Cumene	98-82-8	T	D	11				1.20E-04	1.30E-01	8.0E-01		2.3E+00	
W-01	Deep	VOC	Cyclohexane	110-82-7	T	ID	11				1.30E-04	1.10E-01				
W-01	Deep	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	11				6.20E-04	2.70E-01	2.0E-04		2.0E-04	
W-01	Deep	VOC	Dibromochloromethane	124-48-1	T	C	11				2.60E-04	1.20E-01	1.0E-01		1.0E-01	
W-01	Deep	VOC	1,2-Dibromoethane	106-93-4	T	B2	11				2.20E-04	1.10E-01	1.0E-03		1.0E-03	
W-01	Deep	VOC	1,2-Dichlorobenzene	95-50-1	T	D	11				1.10E-04	1.30E-01	6.0E-01		6.0E-01	
W-01	Deep	VOC	1,3-Dichlorobenzene	541-73-1	T	D	11				1.50E-04	1.30E-01	6.6E-03		1.9E-02	
W-01	Deep	VOC	1,4-Dichlorobenzene	106-46-7	T	C	11				1.70E-04	1.30E-01	7.5E-02		7.5E-02	
W-01	Deep	VOC	Dichlorodifluoromethane	75-71-8	T		11				2.60E-04	1.60E-01	1.7E+00		4.8E+00	
W-01	Deep	VOC	1,1-Dichloroethane	75-34-3	T	C	11				1.60E-04	1.00E-01	8.8E-01		2.5E+00	
W-01	Deep	VOC	1,2-Dichloroethane	107-06-2	T	B2	11				2.10E-04	9.30E-02	5.0E-03		5.0E-03	
W-01	Deep	VOC	1,1-Dichloroethene	75-35-4	T	C	10				2.40E-04	4.00E-02	7.0E-03		7.0E-03	
W-01	Deep	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	10				2.20E-04	2.00E-02	7.0E-02		7.0E-02	
W-01	Deep	VOC	trans-1,2-Dichloroethene	156-60-5	T		11				1.50E-04	1.10E-01	1.0E-01		1.0E-01	
W-01	Deep	VOC	1,2-Dichloropropane	78-87-5	T	B2	11				1.70E-04	1.40E-01	5.0E-03		5.0E-03	
W-01	Deep	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	10				3.50E-04	1.20E-01	8.5E-03		3.5E-02	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-01	Deep	VOC	Ethyl Benzene	100-41-4	T	D	10				1.20E-04	1.40E-01	7.0E-01		7.0E-01	
W-01	Deep	VOC	2-Hexanone	591-78-6	T		11				4.60E-04	4.00E-01	1.0E+00		2.9E+00	
W-01	Deep	VOC	Methyl Acetate	79-20-9	T		11				4.10E-04	4.00E-01				
W-01	Deep	VOC	Methyl tert-butyl ether	1634-04-4	T		11				1.30E-04	2.00E-01	2.4E-01		6.9E-01	
W-01	Deep	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	8	1	3.20E-04	3.20E-04	2.60E-04	4.00E-01	1.8E+00	1.8E-04	5.2E+00	6.2E-05
W-01	Deep	VOC	Methylcyclohexane	108-87-2	T		11				1.50E-04	1.40E-01				
W-01	Deep	VOC	Methylene Chloride	75-09-2	T	B2	11	1	1.60E-03	1.60E-03	2.90E-04	9.70E-02	5.0E-03	3.2E-01	5.0E-03	3.2E-01
W-01	Deep	VOC	Styrene	100-42-5	T		11				1.50E-04	1.20E-01	1.0E-01		1.0E-01	
W-01	Deep	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	11				2.50E-04	1.20E-01	8.5E-03		3.5E-02	
W-01	Deep	VOC	Tetrachloroethene	127-18-4	T	C-B2	10				4.20E-04	1.40E-01	5.0E-03		5.0E-03	
W-01	Deep	VOC	Toluene	108-88-3	T	D	11				1.80E-04	1.30E-01	1.0E+00		1.0E+00	
W-01	Deep	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	11				1.70E-04	1.30E-01	7.0E-02		7.0E-02	
W-01	Deep	VOC	1,1,1-Trichloroethane	71-55-6	T	D	11				1.50E-04	1.30E-01	2.0E-01		2.0E-01	
W-01	Deep	VOC	1,1,2-Trichloroethane	79-00-5	T	C	11				3.00E-04	1.20E-01	5.0E-03		5.0E-03	
W-01	Deep	VOC	Trichloroethene	79-01-6	T	C-B2	11				1.40E-04	1.40E-01	5.0E-03		5.0E-03	
W-01	Deep	VOC	Trichlorofluoromethane	75-69-4	T		11				2.80E-04	1.80E-01	2.6E+00		7.3E+00	
W-01	Deep	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		11				3.20E-04	1.10E-01	1.7E+02		1.7E+02	
W-01	Deep	VOC	Vinyl Chloride	75-01-4	T	A	11				1.50E-04	1.20E-01	2.0E-03		2.0E-03	
W-01	Deep	VOC	Xylenes (total)	1330-20-7	T	ID	11				3.30E-04	1.50E-01	1.0E+01		1.0E+01	
W-01	Deep	SVOC	Acenaphthene	83-32-9	T		11				8.00E-04	5.00E-03	1.3E+00		3.8E+00	
W-01	Deep	SVOC	Acenaphthylene	208-96-8	T	D	11				7.10E-04	5.00E-03	5.2E-02		1.5E-01	
W-01	Deep	SVOC	Acetophenone	98-86-2	T	D	11				2.60E-03	1.00E-02	1.5E+00		4.4E+00	
W-01	Deep	SVOC	Anthracene	120-12-7	T	D	11				6.80E-04	5.00E-03	4.3E-02		4.3E-02	
W-01	Deep	SVOC	Atrazine	1912-24-9	T		11				2.50E-03	5.00E-03	3.0E-03		3.0E-03	
W-01	Deep	SVOC	Benzaldehyde	100-52-7	T		11				2.80E-03	1.00E-02				
W-01	Deep	SVOC	Benzo(a)anthracene	56-55-3	T	B2	11				7.00E-04	5.00E-03	2.1E-03		8.5E-03	
W-01	Deep	SVOC	Benzo(a)pyrene	50-32-8	T	B2	11				7.30E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	11				9.40E-04	5.00E-03	2.0E-03		2.0E-03	
W-01	Deep	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	11				8.50E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	11				8.40E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	SVOC	Biphenyl	92-52-4	T	D	11				2.60E-03	1.00E-02				
W-01	Deep	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	11				8.70E-04	5.00E-03				
W-01	Deep	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	11				9.70E-04	5.00E-03	2.0E-03		8.3E-03	
W-01	Deep	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	11	1	2.90E-03	2.90E-03	2.70E-03	5.00E-03	6.0E-03	4.8E-01	6.0E-03	4.8E-01
W-01	Deep	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	11				8.80E-04	5.00E-03				
W-01	Deep	SVOC	Butylbenzylphthalate	85-68-7	T	C	11				8.80E-04	5.00E-03	1.2E+00		2.7E+00	
W-01	Deep	SVOC	Caprolactam	105-60-2	T		11				2.50E-03	1.00E-02	5.8E+00		1.7E+01	
W-01	Deep	SVOC	Carbazole	86-74-8	T	B2	11				8.20E-04	1.00E-02	8.5E-02		3.5E-01	
W-01	Deep	SVOC	4-Chloro-3-methylphenol	59-50-7	T		11				9.90E-04	5.00E-03	1.5E-01		4.2E-01	
W-01	Deep	SVOC	4-Chloroaniline	106-47-8	T		11				6.10E-04	1.00E-02				
W-01	Deep	SVOC	2-Chloronaphthalene	91-58-7	T		11				8.50E-04	5.00E-03	1.8E+00		5.2E+00	
W-01	Deep	SVOC	2-Chlorophenol	95-57-8	T		11				1.00E-03	5.00E-03	4.5E-02		1.3E-01	
W-01	Deep	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		11				7.90E-04	5.00E-03				
W-01	Deep	SVOC	Chrysene	218-01-9	T	B2	11				7.50E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	11				7.90E-04	5.00E-03	2.0E-03		2.0E-03	
W-01	Deep	SVOC	Dibenzofuran	132-64-9	T	D	11				1.10E-03	5.00E-03				
W-01	Deep	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	10				9.30E-04	2.00E-02	1.1E-03		4.3E-03	
W-01	Deep	SVOC	2,4-Dichlorophenol	120-83-2	T		11				8.50E-04	1.00E-02	7.3E-02		2.1E-01	
W-01	Deep	SVOC	Diethylphthalate	84-66-2	T	D	11	1	7.10E-04	7.10E-04	6.50E-04	5.00E-03	5.5E+00	1.3E-04	1.6E+01	4.4E-05
W-01	Deep	SVOC	2,4-Dimethylphenol	105-67-9	T		11				8.50E-04	5.00E-03	3.7E-01		1.0E+00	
W-01	Deep	SVOC	Dimethylphthalate	131-11-3	T	D	11				7.60E-04	5.00E-03	7.3E+01		2.1E+02	
W-01	Deep	SVOC	Di-n-butylphthalate	84-74-2	T	D	11				6.70E-04	5.00E-03	8.8E-01		2.5E+00	
W-01	Deep	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		11				1.30E-03	2.00E-02	2.0E-02		2.0E-02	
W-01	Deep	SVOC	2,4-Dinitrophenol	51-28-5	T		11				3.00E-03	2.00E-02				
W-01	Deep	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	11				7.90E-04	5.00E-03	7.7E-03		3.2E-02	
W-01	Deep	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	11				5.70E-04	5.00E-03				
W-01	Deep	SVOC	Di-n-octylphthalate	117-84-0	T		11				1.10E-03	5.00E-03	1.3E-01		3.8E-01	
W-01	Deep	SVOC	Fluoranthene	206-44-0	T	D	11				8.10E-04	5.00E-03	2.1E-01		2.1E-01	
W-01	Deep	SVOC	Fluorene	86-73-7	T	D	11				1.00E-03	5.00E-03	8.8E-01		2.0E+00	
W-01	Deep	SVOC	Hexachlorobenzene	118-74-1	T	B2	11				7.40E-04	5.00E-03	1.0E-03		1.0E-03	
W-01	Deep	SVOC	Hexachlorobutadiene	87-68-3	T	C	11				7.30E-04	5.00E-03	1.5E-02		4.2E-02	
W-01	Deep	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	10				1.10E-03	5.00E-03	5.0E-02		5.0E-02	
W-01	Deep	SVOC	Hexachloroethane	67-72-1	T	C	11				7.40E-04	5.00E-03	7.3E-03		2.1E-02	
W-01	Deep	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	11				6.30E-04	5.00E-03	2.0E-03		2.0E-03	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-01	Deep	SVOC	Isophorone	78-59-1	T	C	11				6.30E-04	5.00E-03	7.7E-01		3.1E+00	
W-01	Deep	SVOC	2-Methylnaphthalene	91-57-6	T	ID	11				6.40E-04	5.00E-03	2.6E-01		7.5E-01	
W-01	Deep	SVOC	Methylphenol (total)	1319-77-3	T		11				1.30E-03	5.00E-03	3.7E-01		1.0E+00	
W-01	Deep	SVOC	Naphthalene	91-20-3	T	C	11				7.50E-04	5.00E-03	5.2E-01		1.5E+00	
W-01	Deep	SVOC	2-Nitroaniline	88-74-4	T		11				7.00E-04	2.00E-02				
W-01	Deep	SVOC	3-Nitroaniline	99-09-2	T	C	11				7.10E-04	2.00E-02				
W-01	Deep	SVOC	4-Nitroaniline	100-01-6	T	C	11				1.30E-03	2.00E-02				
W-01	Deep	SVOC	Nitrobenzene	98-95-3	T	D	11				8.10E-04	5.00E-03	3.4E-03		9.6E-03	
W-01	Deep	SVOC	2-Nitrophenol	88-75-5	T		11				2.10E-03	5.00E-03	2.0E-02		5.8E-02	
W-01	Deep	SVOC	4-Nitrophenol	100-02-7	T		11				1.90E-03	2.00E-02				
W-01	Deep	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	11				1.40E-03	5.00E-03	2.7E-01		1.1E+00	
W-01	Deep	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	11				6.70E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	11				7.80E-04	5.00E-03				
W-01	Deep	SVOC	Pentachlorophenol	87-86-5	T	B2	11				2.40E-03	5.00E-03	1.0E-03		1.0E-03	
W-01	Deep	SVOC	Phenanthrene	85-01-8	T	D	11				8.20E-04	5.00E-03	5.2E-02		1.5E-01	
W-01	Deep	SVOC	Phenol	108-95-2	T	ID	11	4	5.20E-03	8.80E-03	2.60E-03	5.00E-03	4.4E+00	2.0E-03	1.3E+01	6.8E-04
W-01	Deep	SVOC	Pyrene	129-00-0	T	D	11				1.10E-03	5.00E-03	1.4E-01		1.4E-01	
W-01	Deep	SVOC	2,4,5-Trichlorophenol	95-95-4	T		11				1.20E-03	5.00E-03	7.3E-01		2.1E+00	
W-01	Deep	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	11				1.70E-03	5.00E-03	1.2E-01		4.7E-01	
W-01	Deep	P/PCB	PCBs (total)	1336-36-3	D	B2	1				4.00E-04	4.00E-04	5.0E-04		5.0E-04	
W-01	Deep	P/PCB	PCBs (total)	1336-36-3	T	B2	11				8.20E-05	4.00E-04	5.0E-04		5.0E-04	
W-01	Deep	INORG	Antimony	7440-36-0	D		5	1	2.30E-03	2.30E-03	2.20E-03	2.50E-02	6.0E-03	3.8E-01	6.0E-03	3.8E-01
W-01	Deep	INORG	Antimony	7440-36-0	T		11				2.20E-03	2.50E-02	6.0E-03		6.0E-03	
W-01	Deep	INORG	Arsenic	7440-38-2	D	A	5	2	4.40E-03	7.10E-03	3.90E-03	1.00E-02	5.0E-02	1.4E-01	5.0E-02	1.4E-01
W-01	Deep	INORG	Arsenic	7440-38-2	T	A	11	7	4.40E-03	1.45E-02	3.90E-03	1.00E-02	5.0E-02	2.9E-01	5.0E-02	2.9E-01
W-01	Deep	INORG	Barium	7440-39-3	D	D	5	5	1.15E-01	3.73E-01			2.0E+00	1.9E-01	2.0E+00	1.9E-01
W-01	Deep	INORG	Barium	7440-39-3	T	D	11	11	1.26E-01	4.58E-01			2.0E+00	2.3E-01	2.0E+00	2.3E-01
W-01	Deep	INORG	Beryllium	7440-41-7	D	B1	5				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
W-01	Deep	INORG	Beryllium	7440-41-7	T	B1	11				5.40E-04	1.00E-03	4.0E-03		4.0E-03	
W-01	Deep	INORG	Cadmium	7440-43-9	D	B1	5				2.80E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	INORG	Cadmium	7440-43-9	T	B1	11				2.80E-04	5.00E-03	5.0E-03		5.0E-03	
W-01	Deep	INORG	Chromium (total)	7440-47-3	D		5	1	2.30E-03	2.30E-03	1.40E-03	1.00E-02	1.0E-01	2.3E-02	1.0E-01	2.3E-02
W-01	Deep	INORG	Chromium (total)	7440-47-3	T		11	8	2.30E-03	9.10E-03	1.40E-03	1.00E-02	1.0E-01	9.1E-02	1.0E-01	9.1E-02
W-01	Deep	INORG	Cobalt	7440-48-4	D	B1	5	1	2.40E-03	2.40E-03	1.30E-03	2.00E-02	4.0E-02	6.0E-02	1.0E-01	2.4E-02
W-01	Deep	INORG	Cobalt	7440-48-4	T	B1	11	5	7.60E-04	2.20E-03	7.40E-04	2.00E-02	4.0E-02	5.5E-02	1.0E-01	2.2E-02
W-01	Deep	INORG	Copper	7440-50-8	D	D	5				4.20E-03	5.00E-03	1.4E+00		4.0E+00	
W-01	Deep	INORG	Copper	7440-50-8	T	D	11				1.70E-03	5.00E-03	1.4E+00		4.0E+00	
W-01	Deep	INORG	Lead	7439-92-1	D	B2	5				2.50E-03	3.00E-03	4.0E-03		4.0E-03	
W-01	Deep	INORG	Lead	7439-92-1	T	B2	11	1	1.60E-03	1.60E-03	1.60E-03	3.00E-03	4.0E-03	4.0E-01	4.0E-03	4.0E-01
W-01	Deep	INORG	Manganese	7439-96-5	D	D	5	4	3.45E-02	7.03E-02	9.00E-04	9.00E-04	8.6E-01	8.2E-02	2.5E+00	2.8E-02
W-01	Deep	INORG	Manganese	7439-96-5	T	D	11	8	2.81E-02	7.12E-02	6.80E-04	9.00E-04	8.6E-01	8.3E-02	2.5E+00	2.8E-02
W-01	Deep	INORG	Mercury	7439-97-6	D	D	5	1	7.20E-05	7.20E-05	6.90E-05	6.90E-05	2.0E-03	3.6E-02	2.0E-03	3.6E-02
W-01	Deep	INORG	Mercury	7439-97-6	T	D	11				6.90E-05	2.00E-04	2.0E-03		2.0E-03	
W-01	Deep	INORG	Nickel	7440-02-0	D	A	5	1	6.40E-03	6.40E-03	2.20E-03	2.00E-02	1.0E-01	6.4E-02	1.0E-01	6.4E-02
W-01	Deep	INORG	Nickel	7440-02-0	T	A	11	7	3.00E-03	9.90E-03	2.20E-03	2.00E-02	1.0E-01	9.9E-02	1.0E-01	9.9E-02
W-01	Deep	INORG	Selenium	7782-49-2	D	D	5				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
W-01	Deep	INORG	Selenium	7782-49-2	T	D	11				4.50E-03	5.00E-03	5.0E-02		5.0E-02	
W-01	Deep	INORG	Silver	7440-22-4	D	D	5				1.50E-03	5.00E-03	3.4E-02		9.8E-02	
W-01	Deep	INORG	Silver	7440-22-4	T	D	11				9.80E-04	5.00E-03	3.4E-02		9.8E-02	
W-01	Deep	INORG	Thallium	7440-28-0	D		5				1.80E-05	1.00E-02	2.0E-03		2.0E-03	
W-01	Deep	INORG	Thallium	7440-28-0	T		11				1.80E-05	1.00E-02	2.0E-03		2.0E-03	
W-01	Deep	INORG	Vanadium	7440-62-2	D		5				8.20E-04	1.00E-02	4.5E-03		6.2E-02	
W-01	Deep	INORG	Vanadium	7440-62-2	T		11				6.70E-04	1.00E-02	4.5E-03		6.2E-02	
W-01	Deep	INORG	Zinc	7440-66-6	D	D	5	1	2.36E-02	2.36E-02	1.20E-02	2.00E-02	2.4E+00	9.8E-03	5.0E+00	4.7E-03
W-01	Deep	INORG	Zinc	7440-66-6	T	D	11	1	1.65E-02	1.65E-02	1.20E-02	2.00E-02	2.4E+00	6.9E-03	5.0E+00	3.3E-03
W-01	Intermediate	VOC	Acetone	67-64-1	T	ID	4	1	3.80E-02	3.80E-02	5.10E-04	7.30E-03	7.3E-01	5.2E-02	2.1E+00	1.8E-02
W-01	Intermediate	VOC	Benzene	71-43-2	T	A	4				1.60E-04	2.30E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	Bromodichloromethane	75-27-4	T	B2	4				1.70E-04	2.40E-03	1.0E-01		1.0E-01	
W-01	Intermediate	VOC	Bromoform	75-25-2	T	B2	4				1.80E-04	2.60E-03	1.0E-01		1.0E-01	
W-01	Intermediate	VOC	Bromomethane	74-83-9	T	D	3				2.00E-04	2.90E-03	1.0E-02		2.9E-02	
W-01	Intermediate	VOC	2-Butanone	78-93-3	T	ID	4				4.10E-04	5.90E-03	1.3E+01		3.8E+01	
W-01	Intermediate	VOC	Carbon Disulfide	75-15-0	T		4				2.00E-04	2.90E-03	8.0E-01		2.3E+00	
W-01	Intermediate	VOC	Carbon Tetrachloride	56-23-5	T	B2	4				1.20E-04	1.70E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	Chlorobenzene	108-90-7	T	D	4				1.40E-04	2.00E-03	1.0E-01		1.0E-01	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-01	Intermediate	VOC	Chloroethane	75-00-3	T		4				2.60E-04	3.70E-03	4.3E-01		1.7E+00	
W-01	Intermediate	VOC	Chloroform	67-66-3	T	B2	4	1	1.70E-04	1.70E-04	3.50E-04	2.00E-03	1.0E-01	1.7E-03	1.0E-01	1.7E-03
W-01	Intermediate	VOC	Chloromethane	74-87-3	T	D	4	1	2.10E-04	2.10E-04	4.90E-04	1.90E-03	2.6E-01	8.1E-04	1.1E+00	1.9E-04
W-01	Intermediate	VOC	Cumene	98-82-8	T	D	4				1.20E-04	1.70E-03	8.0E-01		2.3E+00	
W-01	Intermediate	VOC	Cyclohexane	110-82-7	T	ID	4				1.30E-04	1.90E-03				
W-01	Intermediate	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	4				6.20E-04	8.90E-03	2.0E-04		2.0E-04	
W-01	Intermediate	VOC	Dibromochloromethane	124-48-1	T	C	4				2.60E-04	3.70E-03	1.0E-01		1.0E-01	
W-01	Intermediate	VOC	1,2-Dibromoethane	106-93-4	T	B2	4				2.20E-04	3.10E-03	1.0E-03		1.0E-03	
W-01	Intermediate	VOC	1,2-Dichlorobenzene	95-50-1	T	D	4				1.10E-04	1.60E-03	6.0E-01		6.0E-01	
W-01	Intermediate	VOC	1,3-Dichlorobenzene	541-73-1	T	D	4				1.50E-04	2.10E-03	6.6E-03		1.9E-02	
W-01	Intermediate	VOC	1,4-Dichlorobenzene	106-46-7	T	C	4				1.70E-04	2.40E-03	7.5E-02		7.5E-02	
W-01	Intermediate	VOC	Dichlorodifluoromethane	75-71-8	T		4				2.60E-04	3.70E-03	1.7E+00		4.8E+00	
W-01	Intermediate	VOC	1,1-Dichloroethane	75-34-3	T	C	4				1.60E-04	2.30E-03	8.8E-01		2.5E+00	
W-01	Intermediate	VOC	1,2-Dichloroethane	107-06-2	T	B2	4				2.10E-04	3.00E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	1,1-Dichloroethene	75-35-4	T	C	4				2.40E-04	3.40E-03	7.0E-03		7.0E-03	
W-01	Intermediate	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	4				2.20E-04	3.10E-03	7.0E-02		7.0E-02	
W-01	Intermediate	VOC	trans-1,2-Dichloroethene	156-60-5	T		4				1.50E-04	2.10E-03	1.0E-01		1.0E-01	
W-01	Intermediate	VOC	1,2-Dichloropropane	78-87-5	T	B2	4				1.70E-04	2.40E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	4				2.70E-04	3.90E-03	8.5E-03		3.5E-02	
W-01	Intermediate	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	1.70E-03	7.0E-01		7.0E-01	
W-01	Intermediate	VOC	2-Hexanone	591-78-6	T		4				4.60E-04	6.60E-03	1.0E+00		2.9E+00	
W-01	Intermediate	VOC	Methyl Acetate	79-20-9	T		4				4.10E-04	5.90E-03				
W-01	Intermediate	VOC	Methyl tert-butyl ether	1634-04-4	T		4				1.30E-04	1.90E-03	2.4E-01		6.9E-01	
W-01	Intermediate	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	3				2.30E-04	3.30E-03	1.8E+00		5.2E+00	
W-01	Intermediate	VOC	Methylcyclohexane	108-87-2	T		4				1.50E-04	2.10E-03				
W-01	Intermediate	VOC	Methylene Chloride	75-09-2	T	B2	3				2.90E-04	4.90E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	Styrene	100-42-5	T		4				1.50E-04	2.10E-03	1.0E-01		1.0E-01	
W-01	Intermediate	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	4				2.50E-04	3.60E-03	8.5E-03		3.5E-02	
W-01	Intermediate	VOC	Tetrachloroethene	127-18-4	T	C-B2	4				2.30E-04	3.30E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	Toluene	108-88-3	T	D	4				1.80E-04	2.60E-03	1.0E+00		1.0E+00	
W-01	Intermediate	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	4				1.70E-04	2.40E-03	7.0E-02		7.0E-02	
W-01	Intermediate	VOC	1,1,1-Trichloroethane	71-55-6	T	D	4				1.50E-04	2.10E-03	2.0E-01		2.0E-01	
W-01	Intermediate	VOC	1,1,2-Trichloroethane	79-00-5	T	C	4				3.00E-04	4.30E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	Trichloroethene	79-01-6	T	C-B2	4				1.40E-04	2.00E-03	5.0E-03		5.0E-03	
W-01	Intermediate	VOC	Trichlorofluoromethane	75-69-4	T		4				2.80E-04	4.00E-03	2.6E+00		7.3E+00	
W-01	Intermediate	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		4				3.20E-04	4.60E-03	1.7E+02		1.7E+02	
W-01	Intermediate	VOC	Vinyl Chloride	75-01-4	T	A	4				1.50E-04	2.10E-03	2.0E-03		2.0E-03	
W-01	Intermediate	VOC	Xylenes (total)	1330-20-7	T	ID	4				3.30E-04	4.70E-03	1.0E+01		1.0E+01	
W-01	Intermediate	SVOC	Acenaphthene	83-32-9	T		4				8.00E-04	8.00E-04	1.3E+00		3.8E+00	
W-01	Intermediate	SVOC	Acenaphthylene	208-96-8	T	D	4				7.10E-04	7.10E-04	5.2E-02		1.5E-01	
W-01	Intermediate	SVOC	Acetophenone	98-86-2	T	D	4				2.60E-03	2.60E-03	1.5E+00		4.4E+00	
W-01	Intermediate	SVOC	Anthracene	120-12-7	T	D	4				6.80E-04	6.80E-04	4.3E-02		4.3E-02	
W-01	Intermediate	SVOC	Atrazine	1912-24-9	T		4				2.50E-03	2.50E-03	3.0E-03		3.0E-03	
W-01	Intermediate	SVOC	Benzaldehyde	100-52-7	T		4				2.80E-03	2.80E-03				
W-01	Intermediate	SVOC	Benzo(a)anthracene	56-55-3	T	B2	4				7.00E-04	7.00E-04	2.1E-03		8.5E-03	
W-01	Intermediate	SVOC	Benzo(a)pyrene	50-32-8	T	B2	4				7.30E-04	7.30E-04	5.0E-03		5.0E-03	
W-01	Intermediate	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	4				9.40E-04	9.40E-04	2.0E-03		2.0E-03	
W-01	Intermediate	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	4				8.50E-04	8.50E-04	5.0E-03		5.0E-03	
W-01	Intermediate	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	4				8.40E-04	8.40E-04	5.0E-03		5.0E-03	
W-01	Intermediate	SVOC	Biphenyl	92-52-4	T	D	4				2.60E-03	2.60E-03				
W-01	Intermediate	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	4				8.70E-04	8.70E-04				
W-01	Intermediate	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	4				9.70E-04	9.70E-04	2.0E-03		8.3E-03	
W-01	Intermediate	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	4	1	8.80E-03	8.80E-03	2.70E-03	2.70E-03	6.0E-03	**1.5E+00**	6.0E-03	**1.5E+00**
W-01	Intermediate	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	4				8.80E-04	8.80E-04				
W-01	Intermediate	SVOC	Butylbenzylphthalate	85-68-7	T	C	4				8.80E-04	8.80E-04	1.2E+00		2.7E+00	
W-01	Intermediate	SVOC	Caprolactam	105-60-2	T		4	3	6.70E-03	3.90E-02	2.50E-03	2.50E-03	5.8E+00	6.7E-03	1.7E+01	2.3E-03
W-01	Intermediate	SVOC	Carbazole	86-74-8	T	B2	4				8.20E-04	8.20E-04	8.5E-02		3.5E-01	
W-01	Intermediate	SVOC	4-Chloro-3-methylphenol	59-50-7	T		4				9.90E-04	9.90E-04	1.5E-01		4.2E-01	
W-01	Intermediate	SVOC	4-Chloroaniline	106-47-8	T		4				6.10E-04	6.10E-04				
W-01	Intermediate	SVOC	2-Chloronaphthalene	91-58-7	T		4				8.50E-04	8.50E-04	1.8E+00		5.2E+00	
W-01	Intermediate	SVOC	2-Chlorophenol	95-57-8	T		4				1.00E-03	1.00E-03	4.5E-02		1.3E-01	
W-01	Intermediate	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		4				7.90E-04	7.90E-04				
W-01	Intermediate	SVOC	Chrysene	218-01-9	T	B2	4				7.50E-04	7.50E-04	5.0E-03		5.0E-03	
W-01	Intermediate	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	4				7.90E-04	7.90E-04	2.0E-03		2.0E-03	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-01	Intermediate	SVOC	Dibenzofuran	132-64-9	T	D	4				1.10E-03	1.10E-03				
W-01	Intermediate	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	4				9.30E-04	9.30E-04	1.1E-03		4.3E-03	
W-01	Intermediate	SVOC	2,4-Dichlorophenol	120-83-2	T		4				8.50E-04	8.50E-04	7.3E-02		2.1E-01	
W-01	Intermediate	SVOC	Diethylphthalate	84-66-2	T	D	4				6.50E-04	6.50E-04	5.5E+00		1.6E+01	
W-01	Intermediate	SVOC	2,4-Dimethylphenol	105-67-9	T		4				8.50E-04	8.50E-04	3.7E-01		1.0E+00	
W-01	Intermediate	SVOC	Dimethylphthalate	131-11-3	T	D	4				7.60E-04	7.60E-04	7.3E+01		2.1E+02	
W-01	Intermediate	SVOC	Di-n-butylphthalate	84-74-2	T	D	4				6.70E-04	6.70E-04	8.8E-01		2.5E+00	
W-01	Intermediate	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		4				1.30E-03	1.30E-03	2.0E-02		2.0E-02	
W-01	Intermediate	SVOC	2,4-Dinitrophenol	51-28-5	T		4				3.00E-03	3.00E-03				
W-01	Intermediate	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	4				7.90E-04	7.90E-04	7.7E-03		3.2E-02	
W-01	Intermediate	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	4				5.70E-04	5.70E-04				
W-01	Intermediate	SVOC	Di-n-octylphthalate	117-84-0	T		4				1.10E-03	1.10E-03	1.3E-01		3.8E-01	
W-01	Intermediate	SVOC	Fluoranthene	206-44-0	T	D	4				8.10E-04	8.10E-04	2.1E-01		2.1E-01	
W-01	Intermediate	SVOC	Fluorene	86-73-7	T	D	4				1.00E-03	1.00E-03	8.8E-01		2.0E+00	
W-01	Intermediate	SVOC	Hexachlorobenzene	118-74-1	T	B2	4				7.40E-04	7.40E-04	1.0E-03		1.0E-03	
W-01	Intermediate	SVOC	Hexachlorobutadiene	87-68-3	T	C	4				7.30E-04	7.30E-04	1.5E-02		4.2E-02	
W-01	Intermediate	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	4				1.10E-03	1.10E-03	5.0E-02		5.0E-02	
W-01	Intermediate	SVOC	Hexachloroethane	67-72-1	T	C	4				7.40E-04	7.40E-04	7.3E-03		2.1E-02	
W-01	Intermediate	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	4				6.30E-04	6.30E-04	2.0E-03		2.0E-03	
W-01	Intermediate	SVOC	Isophorone	78-59-1	T	C	4				6.30E-04	6.30E-04	7.7E-01		3.1E+00	
W-01	Intermediate	SVOC	2-Methylnaphthalene	91-57-6	T	ID	4				6.40E-04	6.40E-04	2.6E-01		7.5E-01	
W-01	Intermediate	SVOC	Methylphenol (total)	1319-77-3	T		4	1	2.65E-03	2.65E-03	1.30E-03	1.30E-03	3.7E-01	7.2E-03	1.0E+00	2.7E-03
W-01	Intermediate	SVOC	Naphthalene	91-20-3	T	C	4				7.50E-04	7.50E-04	5.2E-01		1.5E+00	
W-01	Intermediate	SVOC	2-Nitroaniline	88-74-4	T		4				7.00E-04	7.00E-04				
W-01	Intermediate	SVOC	3-Nitroaniline	99-09-2	T	C	4				7.10E-04	7.10E-04				
W-01	Intermediate	SVOC	4-Nitroaniline	100-01-6	T	C	4				1.30E-03	1.30E-03				
W-01	Intermediate	SVOC	Nitrobenzene	98-95-3	T	D	4				8.10E-04	8.10E-04	3.4E-03		9.6E-03	
W-01	Intermediate	SVOC	2-Nitrophenol	88-75-5	T		4				2.10E-03	2.10E-03	2.0E-02		5.8E-02	
W-01	Intermediate	SVOC	4-Nitrophenol	100-02-7	T		4				1.90E-03	1.90E-03				
W-01	Intermediate	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	4				1.40E-03	1.40E-03	2.7E-01		1.1E+00	
W-01	Intermediate	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	4				6.70E-04	6.70E-04	5.0E-03		5.0E-03	
W-01	Intermediate	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	4				7.80E-04	7.80E-04				
W-01	Intermediate	SVOC	Pentachlorophenol	87-86-5	T	B2	4				2.40E-03	2.40E-03	1.0E-03		1.0E-03	
W-01	Intermediate	SVOC	Phenanthrene	85-01-8	T	D	4				8.20E-04	8.20E-04	5.2E-02		1.5E-01	
W-01	Intermediate	SVOC	Phenol	108-95-2	T	ID	4	1	7.00E-03	7.00E-03	2.60E-03	2.60E-03	4.4E+00	1.6E-03	1.3E+01	5.4E-04
W-01	Intermediate	SVOC	Pyrene	129-00-0	T	D	4				1.10E-03	1.10E-03	1.4E-01		1.4E-01	
W-01	Intermediate	SVOC	2,4,5-Trichlorophenol	95-95-4	T		4				1.20E-03	1.20E-03	7.3E-01		2.1E+00	
W-01	Intermediate	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	4				1.70E-03	1.70E-03	1.2E-01		4.7E-01	
W-01	Intermediate	P/PCB	PCBs (total)	1336-36-3	D	B2	1				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
W-01	Intermediate	P/PCB	PCBs (total)	1336-36-3	T	B2	4				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
W-01	Intermediate	INORG	Antimony	7440-36-0	D		2				2.20E-03	2.20E-03	6.0E-03		6.0E-03	
W-01	Intermediate	INORG	Antimony	7440-36-0	T		4				2.20E-03	3.40E-03	6.0E-03		6.0E-03	
W-01	Intermediate	INORG	Arsenic	7440-38-2	D	A	2	1	6.20E-03	6.20E-03	3.90E-03	3.90E-03	5.0E-02	1.2E-01	5.0E-02	1.2E-01
W-01	Intermediate	INORG	Arsenic	7440-38-2	T	A	4	3	2.70E-03	5.20E-03	2.10E-03	2.10E-03	5.0E-02	1.0E-01	5.0E-02	1.0E-01
W-01	Intermediate	INORG	Barium	7440-39-3	D	D	2	2	4.00E-02	4.04E-01			2.0E+00	2.0E-01	2.0E+00	2.0E-01
W-01	Intermediate	INORG	Barium	7440-39-3	T	D	4	4	6.77E-02	4.32E-01			2.0E+00	2.2E-01	2.0E+00	2.2E-01
W-01	Intermediate	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	5.40E-04	4.0E-03		4.0E-03	
W-01	Intermediate	INORG	Beryllium	7440-41-7	T	B1	4				5.40E-04	6.00E-04	4.0E-03		4.0E-03	
W-01	Intermediate	INORG	Cadmium	7440-43-9	D	B1	2	1	2.80E-04	2.80E-04	2.80E-04	2.80E-04	5.0E-03	5.6E-02	5.0E-03	5.6E-02
W-01	Intermediate	INORG	Cadmium	7440-43-9	T	B1	4	2	2.80E-04	5.70E-04	2.80E-04	2.80E-04	5.0E-03	1.1E-01	5.0E-03	1.1E-01
W-01	Intermediate	INORG	Chromium (total)	7440-47-3	D		2				1.40E-03	1.40E-03	1.0E-01		1.0E-01	
W-01	Intermediate	INORG	Chromium (total)	7440-47-3	T		4	1	6.80E-03	6.80E-03	1.40E-03	1.50E-03	1.0E-01	6.8E-02	1.0E-01	6.8E-02
W-01	Intermediate	INORG	Cobalt	7440-48-4	D	B1	2				1.30E-03	1.30E-03	4.0E-02		1.0E-01	
W-01	Intermediate	INORG	Cobalt	7440-48-4	T	B1	4	1	1.40E-03	1.40E-03	7.40E-04	1.30E-03	4.0E-02	3.5E-02	1.0E-01	1.4E-02
W-01	Intermediate	INORG	Copper	7440-50-8	D	D	2				4.20E-03	4.20E-03	1.4E+00		4.0E+00	
W-01	Intermediate	INORG	Copper	7440-50-8	T	D	4				1.70E-03	4.20E-03	1.4E+00		4.0E+00	
W-01	Intermediate	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	2.50E-03	4.0E-03		4.0E-03	
W-01	Intermediate	INORG	Lead	7439-92-1	T	B2	4	1	1.35E-02	1.35E-02	1.60E-03	2.50E-03	4.0E-03	**3.4E+00**	4.0E-03	**3.4E+00**
W-01	Intermediate	INORG	Manganese	7439-96-5	D	D	2	2	2.80E-03	1.59E-01			8.6E-01	1.8E-01	2.5E+00	6.4E-02
W-01	Intermediate	INORG	Manganese	7439-96-5	T	D	4	4	6.31E-02	1.77E-01			8.6E-01	2.1E-01	2.5E+00	7.1E-02
W-01	Intermediate	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	6.90E-05	2.0E-03		2.0E-03	
W-01	Intermediate	INORG	Mercury	7439-97-6	T	D	4				6.90E-05	8.70E-05	2.0E-03		2.0E-03	
W-01	Intermediate	INORG	Nickel	7440-02-0	D	A	2				2.20E-03	2.20E-03	1.0E-01		1.0E-01	
W-01	Intermediate	INORG	Nickel	7440-02-0	T	A	4	1	5.70E-03	5.70E-03	2.20E-03	2.90E-03	1.0E-01	5.7E-02	1.0E-01	5.7E-02

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-01	Intermediate	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	4.50E-03	5.0E-02		5.0E-02	
W-01	Intermediate	INORG	Selenium	7782-49-2	T	D	4				4.50E-03	4.70E-03	5.0E-02		5.0E-02	
W-01	Intermediate	INORG	Silver	7440-22-4	D	D	2				1.50E-03	1.50E-03	3.4E-02		9.8E-02	
W-01	Intermediate	INORG	Silver	7440-22-4	T	D	4				9.80E-04	1.50E-03	3.4E-02		9.8E-02	
W-01	Intermediate	INORG	Thallium	7440-28-0	D		2				1.80E-05	5.00E-03	2.0E-03		2.0E-03	
W-01	Intermediate	INORG	Thallium	7440-28-0	T		4	1	4.40E-05	4.40E-05	3.30E-05	5.00E-03	2.0E-03	2.2E-02	2.0E-03	2.2E-02
W-01	Intermediate	INORG	Vanadium	7440-62-2	D		2	1	2.50E-03	2.50E-03	8.20E-04	8.20E-04	4.5E-03	5.6E-01	6.2E-02	4.0E-02
W-01	Intermediate	INORG	Vanadium	7440-62-2	T		4	1	4.90E-03	4.90E-03	6.70E-04	8.20E-04	4.5E-03	**1.1E+00**	6.2E-02	7.9E-02
W-01	Intermediate	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	1.20E-02	2.4E+00		5.0E+00	
W-01	Intermediate	INORG	Zinc	7440-66-6	T	D	4	1	5.92E-01	5.92E-01	1.20E-02	1.40E-02	2.4E+00	2.5E-01	5.0E+00	1.2E-01
W-09	Deep	VOC	Acetone	67-64-1	T	ID	6	2	6.60E-04	1.60E-03	1.10E-03	1.10E-03	7.3E-01	2.2E-03	2.1E+00	7.6E-04
W-09	Deep	VOC	Benzene	71-43-2	T	A	6				1.60E-04	3.70E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	Bromodichloromethane	75-27-4	T	B2	6				1.70E-04	3.20E-04	1.0E-01		1.0E-01	
W-09	Deep	VOC	Bromoform	75-25-2	T	B2	6				1.80E-04	3.70E-04	1.0E-01		1.0E-01	
W-09	Deep	VOC	Bromomethane	74-83-9	T	D	6				2.00E-04	3.00E-04	1.0E-02		2.9E-02	
W-09	Deep	VOC	2-Butanone	78-93-3	T	ID	6				4.10E-04	5.90E-04	1.3E+01		3.8E+01	
W-09	Deep	VOC	Carbon Disulfide	75-15-0	T		6	3	2.40E-04	9.30E-04	2.00E-04	2.40E-04	8.0E-01	1.2E-03	2.3E+00	4.0E-04
W-09	Deep	VOC	Carbon Tetrachloride	56-23-5	T	B2	6				1.20E-04	3.70E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	Chlorobenzene	108-90-7	T	D	6				1.40E-04	3.80E-04	1.0E-01		1.0E-01	
W-09	Deep	VOC	Chloroethane	75-00-3	T		6				2.60E-04	2.90E-04	4.3E-01		1.7E+00	
W-09	Deep	VOC	Chloroform	67-66-3	T	B2	6	1	2.80E-04	2.80E-04	1.40E-04	3.50E-04	1.0E-01	2.8E-03	1.0E-01	2.8E-03
W-09	Deep	VOC	Chloromethane	74-87-3	T	D	6				1.30E-04	4.90E-04	2.6E-01		1.1E+00	
W-09	Deep	VOC	Cumene	98-82-8	T	D	6				1.20E-04	3.90E-04	8.0E-01		2.3E+00	
W-09	Deep	VOC	Cyclohexane	110-82-7	T	ID	6				1.30E-04	3.30E-04				
W-09	Deep	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	6				6.20E-04	8.20E-04	2.0E-04		2.0E-04	
W-09	Deep	VOC	Dibromochloromethane	124-48-1	T	C	6				2.60E-04	3.70E-04	1.0E-01		1.0E-01	
W-09	Deep	VOC	1,2-Dibromoethane	106-93-4	T	B2	6				2.20E-04	3.40E-04	1.0E-03		1.0E-03	
W-09	Deep	VOC	1,2-Dichlorobenzene	95-50-1	T	D	6				1.10E-04	3.80E-04	6.0E-01		6.0E-01	
W-09	Deep	VOC	1,3-Dichlorobenzene	541-73-1	T	D	6				1.50E-04	3.80E-04	6.6E-03		1.9E-02	
W-09	Deep	VOC	1,4-Dichlorobenzene	106-46-7	T	C	6				1.70E-04	3.80E-04	7.5E-02		7.5E-02	
W-09	Deep	VOC	Dichlorodifluoromethane	75-71-8	T		6				2.60E-04	4.90E-04	1.7E+00		4.8E+00	
W-09	Deep	VOC	1,1-Dichloroethane	75-34-3	T	C	6				1.60E-04	3.00E-04	8.8E-01		2.5E+00	
W-09	Deep	VOC	1,2-Dichloroethane	107-06-2	T	B2	6				2.10E-04	2.80E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	1,1-Dichloroethene	75-35-4	T	C	6				2.40E-04	3.10E-04	7.0E-03		7.0E-03	
W-09	Deep	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	6				2.20E-04	3.50E-04	7.0E-02		7.0E-02	
W-09	Deep	VOC	trans-1,2-Dichloroethene	156-60-5	T		6				1.50E-04	3.30E-04	1.0E-01		1.0E-01	
W-09	Deep	VOC	1,2-Dichloropropane	78-87-5	T	B2	6				1.70E-04	4.10E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	6				2.70E-04	3.50E-04	8.5E-03		3.5E-02	
W-09	Deep	VOC	Ethyl Benzene	100-41-4	T	D	4				1.20E-04	4.10E-04	7.0E-01		7.0E-01	
W-09	Deep	VOC	2-Hexanone	591-78-6	T		6				4.60E-04	5.80E-04	1.0E+00		2.9E+00	
W-09	Deep	VOC	Methyl Acetate	79-20-9	T		6				4.10E-04	5.40E-04				
W-09	Deep	VOC	Methyl tert-butyl ether	1634-04-4	T		6	4	2.40E-04	5.20E-03	2.70E-04	2.70E-04	2.4E-01	2.2E-02	6.9E-01	7.5E-03
W-09	Deep	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	6				2.30E-04	2.60E-04	1.8E+00		5.2E+00	
W-09	Deep	VOC	Methylcyclohexane	108-87-2	T		6				1.50E-04	4.20E-04				
W-09	Deep	VOC	Methylene Chloride	75-09-2	T	B2	7	1	1.80E-02	1.80E-02	2.80E-04	3.40E-04	5.0E-03	**3.6E+00**	5.0E-03	**3.6E+00**
W-09	Deep	VOC	Styrene	100-42-5	T		6				1.50E-04	3.50E-04	1.0E-01		1.0E-01	
W-09	Deep	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	6				2.50E-04	3.60E-04	8.5E-03		3.5E-02	
W-09	Deep	VOC	Tetrachloroethene	127-18-4	T	C-B2	6				2.30E-04	4.20E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	Toluene	108-88-3	T	D	6				1.80E-04	3.90E-04	1.0E+00		1.0E+00	
W-09	Deep	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	6				1.70E-04	4.00E-04	7.0E-02		7.0E-02	
W-09	Deep	VOC	1,1,1-Trichloroethane	71-55-6	T	D	6				1.50E-04	3.90E-04	2.0E-01		2.0E-01	
W-09	Deep	VOC	1,1,2-Trichloroethane	79-00-5	T	C	6				3.00E-04	3.60E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	Trichloroethene	79-01-6	T	C-B2	6				1.40E-04	4.20E-04	5.0E-03		5.0E-03	
W-09	Deep	VOC	Trichlorofluoromethane	75-69-4	T		6				2.80E-04	5.40E-04	2.6E+00		7.3E+00	
W-09	Deep	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		6				3.20E-04	3.20E-04	1.7E+02		1.7E+02	
W-09	Deep	VOC	Vinyl Chloride	75-01-4	T	A	6				1.50E-04	3.60E-04	2.0E-03		2.0E-03	
W-09	Deep	VOC	Xylenes (total)	1330-20-7	T	ID	6				3.30E-04	4.40E-04	1.0E+01		1.0E+01	
W-09	Deep	SVOC	Acenaphthene	83-32-9	T		6				8.00E-04	8.00E-04	1.3E+00		3.8E+00	
W-09	Deep	SVOC	Acenaphthylene	208-96-8	T	D	6				7.10E-04	7.10E-04	5.2E-02		1.5E-01	
W-09	Deep	SVOC	Acetophenone	98-86-2	T	D	6				2.60E-03	2.60E-03	1.5E+00		4.4E+00	
W-09	Deep	SVOC	Anthracene	120-12-7	T	D	6				6.80E-04	6.80E-04	4.3E-02		4.3E-02	
W-09	Deep	SVOC	Atrazine	1912-24-9	T		6				2.50E-03	2.50E-03	3.0E-03		3.0E-03	
W-09	Deep	SVOC	Benzaldehyde	100-52-7	T		6				2.80E-03	2.80E-03				
W-09	Deep	SVOC	Benzo(a)anthracene	56-55-3	T	B2	6				7.00E-04	7.00E-04	2.1E-03		8.5E-03	

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-09	Deep	SVOC	Benzo(a)pyrene	50-32-8	T	B2	6				7.30E-04	7.30E-04	5.0E-03		5.0E-03	
W-09	Deep	SVOC	Benzo(b)fluoranthene	205-99-2	T	B2	6				9.40E-04	9.40E-04	2.0E-03		2.0E-03	
W-09	Deep	SVOC	Benzo(g,h,i)perylene	191-24-2	T	D	6				8.50E-04	8.50E-04	5.0E-03		5.0E-03	
W-09	Deep	SVOC	Benzo(k)fluoranthene	207-08-9	T	B2	6				8.40E-04	8.40E-04	5.0E-03		5.0E-03	
W-09	Deep	SVOC	Biphenyl	92-52-4	T	D	6				2.60E-03	2.60E-03				
W-09	Deep	SVOC	bis(2-Chloroethoxy)methane	111-91-1	T	D	6				8.70E-04	8.70E-04				
W-09	Deep	SVOC	bis(2-Chloroethyl) ether	111-44-4	T	B2	5				9.70E-04	9.70E-04	2.0E-03		8.3E-03	
W-09	Deep	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	T	B2	6				2.70E-03	2.70E-03	6.0E-03		6.0E-03	
W-09	Deep	SVOC	4-Bromophenyl-phenyl ether	101-55-3	T	D	6				8.80E-04	8.80E-04				
W-09	Deep	SVOC	Butylbenzylphthalate	85-68-7	T	C	6				8.80E-04	8.80E-04	1.2E+00		2.7E+00	
W-09	Deep	SVOC	Caprolactam	105-60-2	T		6	1	3.10E-03	3.10E-03	2.50E-03	2.50E-03	5.8E+00	5.3E-04	1.7E+01	1.8E-04
W-09	Deep	SVOC	Carbazole	86-74-8	T	B2	6				8.20E-04	8.20E-04	8.5E-02		3.5E-01	
W-09	Deep	SVOC	4-Chloro-3-methylphenol	59-50-7	T		6				9.90E-04	9.90E-04	1.5E-01		4.2E-01	
W-09	Deep	SVOC	4-Chloroaniline	106-47-8	T		6				6.10E-04	6.10E-04				
W-09	Deep	SVOC	2-Chloronaphthalene	91-58-7	T		6				8.50E-04	8.50E-04	1.8E+00		5.2E+00	
W-09	Deep	SVOC	2-Chlorophenol	95-57-8	T		6				1.00E-03	1.00E-03	4.5E-02		1.3E-01	
W-09	Deep	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3	T		6				7.90E-04	7.90E-04				
W-09	Deep	SVOC	Chrysene	218-01-9	T	B2	6				7.50E-04	7.50E-04	5.0E-03		5.0E-03	
W-09	Deep	SVOC	Dibenz(a,h)anthracene	53-70-3	T	B2	6				7.90E-04	7.90E-04	2.0E-03		2.0E-03	
W-09	Deep	SVOC	Dibenzofuran	132-64-9	T	D	6				1.10E-03	1.10E-03				
W-09	Deep	SVOC	3,3'-Dichlorobenzidine	91-94-1	T	B2	6				9.30E-04	9.30E-04	1.1E-03		4.3E-03	
W-09	Deep	SVOC	2,4-Dichlorophenol	120-83-2	T		6				8.50E-04	8.50E-04	7.3E-02		2.1E-01	
W-09	Deep	SVOC	Diethylphthalate	84-66-2	T	D	6				6.50E-04	6.50E-04	5.5E+00		1.6E+01	
W-09	Deep	SVOC	2,4-Dimethylphenol	105-67-9	T		6				8.50E-04	8.50E-04	3.7E-01		1.0E+00	
W-09	Deep	SVOC	Dimethylphthalate	131-11-3	T	D	6				7.60E-04	7.60E-04	7.3E+01		2.1E+02	
W-09	Deep	SVOC	Di-n-butylphthalate	84-74-2	T	D	6				6.70E-04	6.70E-04	8.8E-01		2.5E+00	
W-09	Deep	SVOC	4,6-Dinitro-2-methylphenol	534-52-1	T		6				1.30E-03	1.30E-03	2.0E-02		2.0E-02	
W-09	Deep	SVOC	2,4-Dinitrophenol	51-28-5	T		6				3.00E-03	3.00E-03				
W-09	Deep	SVOC	2,4-Dinitrotoluene	121-14-2	T	B2	6				7.90E-04	7.90E-04	7.7E-03		3.2E-02	
W-09	Deep	SVOC	2,6-Dinitrotoluene	606-20-2	T	B2	6				5.70E-04	5.70E-04				
W-09	Deep	SVOC	Di-n-octylphthalate	117-84-0	T		6				1.10E-03	1.10E-03	1.3E-01		3.8E-01	
W-09	Deep	SVOC	Fluoranthene	206-44-0	T	D	6				8.10E-04	8.10E-04	2.1E-01		2.1E-01	
W-09	Deep	SVOC	Fluorene	86-73-7	T	D	6				1.00E-03	1.00E-03	8.8E-01		2.0E+00	
W-09	Deep	SVOC	Hexachlorobenzene	118-74-1	T	B2	6				7.40E-04	7.40E-04	1.0E-03		1.0E-03	
W-09	Deep	SVOC	Hexachlorobutadiene	87-68-3	T	C	5				7.30E-04	7.30E-04	1.5E-02		4.2E-02	
W-09	Deep	SVOC	Hexachlorocyclopentadiene	77-47-4	T	E	5				1.10E-03	1.10E-03	5.0E-02		5.0E-02	
W-09	Deep	SVOC	Hexachloroethane	67-72-1	T	C	6				7.40E-04	7.40E-04	7.3E-03		2.1E-02	
W-09	Deep	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	B2	6				6.30E-04	6.30E-04	2.0E-03		2.0E-03	
W-09	Deep	SVOC	Isophorone	78-59-1	T	C	6				6.30E-04	6.30E-04	7.7E-01		3.1E+00	
W-09	Deep	SVOC	2-Methylnaphthalene	91-57-6	T	ID	5				6.40E-04	6.40E-04	2.6E-01		7.5E-01	
W-09	Deep	SVOC	Methylphenol (total)	1319-77-3	T		6				1.30E-03	1.30E-03	3.7E-01		1.0E+00	
W-09	Deep	SVOC	Naphthalene	91-20-3	T	C	5				7.50E-04	7.50E-04	5.2E-01		1.5E+00	
W-09	Deep	SVOC	2-Nitroaniline	88-74-4	T		6				7.00E-04	7.00E-04				
W-09	Deep	SVOC	3-Nitroaniline	99-09-2	T	C	6				7.10E-04	7.10E-04				
W-09	Deep	SVOC	4-Nitroaniline	100-01-6	T	C	6				1.30E-03	1.30E-03				
W-09	Deep	SVOC	Nitrobenzene	98-95-3	T	D	6				8.10E-04	8.10E-04	3.4E-03		9.6E-03	
W-09	Deep	SVOC	2-Nitrophenol	88-75-5	T		6				2.10E-03	2.10E-03	2.0E-02		5.8E-02	
W-09	Deep	SVOC	4-Nitrophenol	100-02-7	T		6				1.90E-03	1.90E-03				
W-09	Deep	SVOC	N-Nitrosodiphenylamine	86-30-6	T	B2	6				1.40E-03	1.40E-03	2.7E-01		1.1E+00	
W-09	Deep	SVOC	N-Nitroso-di-n-propylamine	621-64-7	T	B2	6				6.70E-04	6.70E-04	5.0E-03		5.0E-03	
W-09	Deep	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	T	C	6				7.80E-04	7.80E-04				
W-09	Deep	SVOC	Pentachlorophenol	87-86-5	T	B2	6				2.40E-03	2.40E-03	1.0E-03		1.0E-03	
W-09	Deep	SVOC	Phenanthrene	85-01-8	T	D	6				8.20E-04	8.20E-04	5.2E-02		1.5E-01	
W-09	Deep	SVOC	Phenol	108-95-2	T	ID	6				2.60E-03	2.60E-03	4.4E+00		1.3E+01	
W-09	Deep	SVOC	Pyrene	129-00-0	T	D	6				1.10E-03	1.10E-03	1.4E-01		1.4E-01	
W-09	Deep	SVOC	2,4,5-Trichlorophenol	95-95-4	T		6				1.20E-03	1.20E-03	7.3E-01		2.1E+00	
W-09	Deep	SVOC	2,4,6-Trichlorophenol	88-06-2	T	B2	6				1.70E-03	1.70E-03	1.2E-01		4.7E-01	
W-09	Deep	P/PCB	PCBs (total)	1336-36-3	T	B2	6				8.20E-05	8.20E-05	5.0E-04		5.0E-04	
W-09	Deep	INORG	Antimony	7440-36-0	D		2	1	2.70E-03	2.70E-03	2.20E-03	2.20E-03	6.0E-03	4.5E-01	6.0E-03	4.5E-01
W-09	Deep	INORG	Antimony	7440-36-0	T		6	1	4.90E-03	4.90E-03	2.20E-03	3.40E-03	6.0E-03	8.2E-01	6.0E-03	8.2E-01
W-09	Deep	INORG	Arsenic	7440-38-2	D	A	2	2	5.20E-03	2.59E-02			5.0E-02	5.2E-01	5.0E-02	5.2E-01
W-09	Deep	INORG	Arsenic	7440-38-2	T	A	6	5	3.10E-03	3.95E-02	2.10E-03	2.10E-03	5.0E-02	7.9E-01	5.0E-02	7.9E-01
W-09	Deep	INORG	Barium	7440-39-3	D	D	2	2	9.89E-02	2.02E-01			2.0E+00	1.0E-01	2.0E+00	1.0E-01
W-09	Deep	INORG	Barium	7440-39-3	T	D	6	6	3.60E-02	5.85E-01			2.0E+00	2.9E-01	2.0E+00	2.9E-01

Table 8.5: Intermediate and Deep Groundwater Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Min QL (mg/L)	Max QL (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detected to Residential Drinking Water Criteria	Industrial Drinking Water Criteria (mg/L)	Ratio of Max Detected to Industrial Drinking Water Criteria
W-09	Deep	INORG	Beryllium	7440-41-7	D	B1	2				5.40E-04	5.40E-04	4.0E-03		4.0E-03	
W-09	Deep	INORG	Beryllium	7440-41-7	T	B1	6				5.40E-04	6.00E-04	4.0E-03		4.0E-03	
W-09	Deep	INORG	Cadmium	7440-43-9	D	B1	2				2.80E-04	2.80E-04	5.0E-03		5.0E-03	
W-09	Deep	INORG	Cadmium	7440-43-9	T	B1	6	1	3.00E-04	3.00E-04	2.80E-04	2.80E-04	5.0E-03	6.0E-02	5.0E-03	6.0E-02
W-09	Deep	INORG	Chromium (total)	7440-47-3	D		2				1.40E-03	1.40E-03	1.0E-01		1.0E-01	
W-09	Deep	INORG	Chromium (total)	7440-47-3	T		6	5	2.80E-03	8.40E-03	1.40E-03	1.40E-03	1.0E-01	8.4E-02	1.0E-01	8.4E-02
W-09	Deep	INORG	Cobalt	7440-48-4	D	B1	2				1.30E-03	1.30E-03	4.0E-02		1.0E-01	
W-09	Deep	INORG	Cobalt	7440-48-4	T	B1	6	3	7.60E-04	8.40E-03	7.40E-04	1.30E-03	4.0E-02	2.1E-01	1.0E-01	8.4E-02
W-09	Deep	INORG	Copper	7440-50-8	D	D	2				4.20E-03	4.20E-03	1.4E+00		4.0E+00	
W-09	Deep	INORG	Copper	7440-50-8	T	D	6				1.70E-03	4.20E-03	1.4E+00		4.0E+00	
W-09	Deep	INORG	Lead	7439-92-1	D	B2	2				2.50E-03	2.50E-03	4.0E-03		4.0E-03	
W-09	Deep	INORG	Lead	7439-92-1	T	B2	6				1.60E-03	2.50E-03	4.0E-03		4.0E-03	
W-09	Deep	INORG	Manganese	7439-96-5	D	D	2	1	6.18E-02	6.18E-02	9.00E-04	9.00E-04	8.6E-01	7.2E-02	2.5E+00	2.5E-02
W-09	Deep	INORG	Manganese	7439-96-5	T	D	6	5	4.61E-02	2.55E-01	9.00E-04	9.00E-04	8.6E-01	3.0E-01	2.5E+00	1.0E-01
W-09	Deep	INORG	Mercury	7439-97-6	D	D	2				6.90E-05	6.90E-05	2.0E-03		2.0E-03	
W-09	Deep	INORG	Mercury	7439-97-6	T	D	6				6.90E-05	8.70E-05	2.0E-03		2.0E-03	
W-09	Deep	INORG	Nickel	7440-02-0	D	A	2				2.20E-03	2.20E-03	1.0E-01		1.0E-01	
W-09	Deep	INORG	Nickel	7440-02-0	T	A	6	4	3.10E-03	9.30E-03	2.20E-03	2.90E-03	1.0E-01	9.3E-02	1.0E-01	9.3E-02
W-09	Deep	INORG	Selenium	7782-49-2	D	D	2				4.50E-03	4.50E-03	5.0E-02		5.0E-02	
W-09	Deep	INORG	Selenium	7782-49-2	T	D	6				4.50E-03	4.70E-03	5.0E-02		5.0E-02	
W-09	Deep	INORG	Silver	7440-22-4	D	D	2				1.50E-03	1.50E-03	3.4E-02		9.8E-02	
W-09	Deep	INORG	Silver	7440-22-4	T	D	6	1	1.30E-03	1.30E-03	9.80E-04	1.50E-03	3.4E-02	3.8E-02	9.8E-02	1.3E-02
W-09	Deep	INORG	Thallium	7440-28-0	D		2				1.80E-05	1.80E-05	2.0E-03		2.0E-03	
W-09	Deep	INORG	Thallium	7440-28-0	T		6				1.80E-05	3.30E-05	2.0E-03		2.0E-03	
W-09	Deep	INORG	Vanadium	7440-62-2	D		2				8.20E-04	8.20E-04	4.5E-03		6.2E-02	
W-09	Deep	INORG	Vanadium	7440-62-2	T		6				6.70E-04	8.20E-04	4.5E-03		6.2E-02	
W-09	Deep	INORG	Zinc	7440-66-6	D	D	2				1.20E-02	1.20E-02	2.4E+00		5.0E+00	
W-09	Deep	INORG	Zinc	7440-66-6	T	D	6				1.20E-02	1.40E-02	2.4E+00		5.0E+00	

Notes:

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.

The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects and Aroclor 1254 for noncancer effects.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.

The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

The MDEQ Drinking Water Criteria for Chromium III was calculated by ENVIRON to be account for valence specific toxicity.

Chem Group - Chemical Group

Meas Basis - Measured Basis; T = Total, D = Dissolved

Carc Class - EPA Weight-of-Evidence Cancer Classification

Min QL - Minimum Quantitation Limit

Max QL - Maximum Quantitation Limit

The evaluation of intermediate and deep groundwater is from the Supplemental RFI Report (ENCORE 2003j).

Table 8.6: Estimated Cumulative Cancer Risk and HI from LNAPL - Based on Maximum and 95% UCL Concentrations
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Source		Smear Zone Soil Ingestion	Smear Zone Soil Dermal Contact	NAPL Dermal Contact	NAPL Vapor Inhalation
M-02	2	Cancer Risk	1E-06	2E-07	3E-05	1E-06
M-02		HI	1E-01	4E-02	4E-02	4E-02
M-16	2	Cancer Risk	7E-07	1E-07	2E-05	6E-08
M-16		HI	7E-02	2E-02	5E-02	1E-02
W-01	1	Cancer Risk	9E-06	2E-06	4E-05	4E-05
W-01		HI	1E+00	3E-01	4E-01	2E-02
W-08	1	Cancer Risk	2E-08	4E-09	7E-10	8E-17
W-08		HI	3E-02	8E-04	5E-04	2E-05
W-10	1	Cancer Risk	1E-06	3E-07	2E-06	7E-07
W-10		HI	2E-01	4E-02	4E-02	4E-04
Notes:						
1 - Cumulative Risks calculated in the RFI Report (ENCORE 2002b).						
2 - Cumulative Risks calculated in the Supplemental RFI Report (ENCORE 2003j).						

Table 8.7: Estimated Indoor Air Concentrations from LNAPL
General Motors - Pontiac North Campus, Pontiac, Michigan

				M-02 NAPL						M-16 NAPL						W-08 NAPL					
Chem Group	**Chemical**	**CASRN**	**Criteria (mg/m^3)**	**C_{LNAPL} (mg/kg)**	**VP (mm Hg)**	**C_{vapor} (mg/m^3)**	**α_∞**	**$C_{indoor\ air}$ (mg/m^3)**	**Ratio of Conc to Criteria**	**C_{LNAPL} (mg/kg)**	**VP (mm Hg)**	**C_{vapor} (mg/m^3)**	**α_∞**	**$C_{indoor\ air}$ (mg/m^3)**	**Ratio of Conc to Criteria**	**C_{LNAPL} (mg/kg)**	**VP (mm Hg)**	**C_{vapor} (mg/m^3)**	**α_∞**	**$C_{indoor\ air}$ (mg/m^3)**	**Ratio of Conc to Criteria**
VOC	Benzene	71-43-2	3.19E+00		9.50E+01		7.60E-06			1.40E-01	9.50E+01	1.11E-01	7.60E-06	8.45E-07	2.7E-07		9.50E+01		7.60E-06		
VOC	Chloroform	67-66-3	9.78E+00	4.20E-01	1.97E+02	6.93E-01	1.08E-05	7.48E-06	7.6E-07		1.97E+02		1.08E-05				1.97E+02		1.08E-05		
VOC	Cumene	98-82-8	2.45E+02	7.90E-01	4.50E+00	2.97E-02	6.24E-08	1.85E-09	7.6E-12	6.10E-01	4.50E+00	2.29E-02	6.24E-08	1.43E-09	5.8E-12	8.00E-01	4.50E+00	3.01E-02	6.24E-08	1.88E-09	7.7E-12
VOC	Cyclohexane	110-82-7	1.05E+03		9.69E+01		3.69E-07			7.30E-01	9.69E+01	5.91E-01	3.69E-07	2.18E-07	2.1E-10		9.69E+01		3.69E-07		
VOC	1,1-Dichloroethane	75-34-3	4.00E+02	2.10E+01	2.27E+02	3.99E+01	7.75E-06	3.09E-04	7.7E-07		2.27E+02		7.75E-06				2.27E+02		7.75E-06		
VOC	1,1-Dichloroethene	75-35-4	1.98E+01	2.40E+00	6.00E+02	1.20E+01	2.30E-06	2.76E-05	1.4E-06		6.00E+02		2.30E-06				6.00E+02		2.30E-06		
VOC	cis-1,2-Dichloroethene	156-59-2	7.93E+02		2.03E+02		1.03E-05			3.00E-01	2.03E+02	5.09E-01	1.03E-05	5.26E-06	6.6E-09		2.03E+02		1.03E-05		
VOC	Ethyl Benzene	100-41-4	4.35E+02	2.70E+00	9.60E+00	2.17E-01	4.74E-06	1.03E-06	2.4E-09	7.10E+00	9.60E+00	5.70E-01	4.74E-06	2.70E-06	6.2E-09	1.20E+00	9.60E+00	9.63E-02	4.74E-06	4.56E-07	1.0E-09
VOC	Methyl Acetate	79-20-9	6.10E+02		2.16E+02		5.94E-05			4.80E-01	2.16E+02	8.66E-01	5.94E-05	5.14E-05	8.4E-08		2.16E+02		5.94E-05		
VOC	4-Methyl-2-pentanone	108-10-1	4.10E+02	3.40E-01	1.99E+01	5.65E-02	4.66E-05	2.63E-06	6.4E-09		1.99E+01		4.66E-05				1.99E+01		4.66E-05		
VOC	Methylcyclohexane	108-87-2	2.00E+03	2.70E-01	4.60E+01	1.04E-01	1.64E-07	1.70E-08	8.5E-12	1.90E+00	4.60E+01	7.31E-01	1.64E-07	1.20E-07	6.0E-11	6.20E-01	4.60E+01	2.38E-01	1.64E-07	3.91E-08	2.0E-11
VOC	Methylene Chloride	75-09-2	8.70E+01	1.30E+00	4.33E+02	4.71E+00	1.70E-05	7.98E-05	9.2E-07		4.33E+02		1.70E-05				4.33E+02		1.70E-05		
VOC	Tetrachloroethene	127-18-4	1.70E+02	1.10E+01	1.86E+01	1.71E+00	2.45E-06	4.18E-06	2.5E-08	2.20E-01	1.86E+01	3.41E-02	2.45E-06	8.36E-08	4.9E-10		1.86E+01		2.45E-06		
VOC	Toluene	108-88-3	3.75E+02	3.30E+00	2.84E+01	7.84E-01	5.99E-06	4.69E-06	1.3E-08	1.20E+01	2.84E+01	2.85E+00	5.99E-06	1.71E-05	4.5E-08		2.84E+01		5.99E-06		
VOC	1,1,1-Trichloroethane	71-55-6	1.90E+03	4.40E+00	1.24E+02	4.55E+00	2.78E-06	1.26E-05	6.7E-09		1.24E+02		2.78E-06				1.24E+02		2.78E-06		
VOC	Trichloroethene	79-01-6	2.70E+02	1.40E+00	7.35E+01	8.60E-01	4.36E-06	3.75E-06	1.4E-08	5.30E-01	7.35E+01	3.26E-01	4.36E-06	1.42E-06	5.3E-09		7.35E+01		4.36E-06		
VOC	Xylenes (total)	1330-20-7	4.35E+02	1.00E+01	1.00E+01	8.36E-01	7.86E-06	6.57E-06	1.5E-08	3.90E+01	1.00E+01	3.26E+00	7.86E-06	2.56E-05	5.9E-08	1.30E+00	1.00E+01	1.09E-01	7.86E-06	8.55E-07	2.0E-09
SVOC	Anthracene	120-12-7		1.20E+02	2.67E-06	2.68E-06	4.58E-05	1.23E-10			2.67E-06		4.58E-05				2.67E-06		4.58E-05		
SVOC	Biphenyl	92-52-4	1.00E+00		9.64E-03		3.25E-05				9.64E-03		3.25E-05			1.60E+02	9.64E-03	1.29E-02	3.25E-05	4.19E-07	4.2E-07
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	5.00E+00		6.45E-06		7.17E-05			5.30E+02	6.45E-06	2.86E-05	7.17E-05	2.05E-09	4.1E-10		6.45E-06		7.17E-05		
SVOC	Butylbenzylphthalate	85-68-7			8.25E-06		5.55E-05			4.00E+02	8.25E-06	2.76E-05	5.55E-05	1.53E-09			8.25E-06		5.55E-05		
SVOC	Fluoranthene	206-44-0		1.30E+02	7.80E-06	8.48E-06	5.32E-05	4.51E-10			7.80E-06		5.32E-05				7.80E-06		5.32E-05		
SVOC	Fluorene	86-73-7		1.70E+02	6.33E-04	9.00E-04	4.75E-05	4.27E-08		1.40E+02	6.33E-04	7.41E-04	4.75E-05	3.52E-08		1.90E+02	6.33E-04	1.01E-03	4.75E-05	4.78E-08	
SVOC	2-Methylnaphthalene	91-57-6		5.90E+01	5.50E-02	2.71E-02					5.50E-02					1.20E+02	5.50E-02	5.52E-02			
SVOC	Phenanthrene	85-01-8		6.60E+02	1.12E-04	6.18E-04	5.33E-05	3.29E-08		2.50E+02	1.12E-04	2.34E-04	5.33E-05	1.25E-08		7.80E+02	1.12E-04	7.30E-04	5.33E-05	3.89E-08	
SVOC	Pyrene	129-00-0		1.70E+02	4.59E-06	6.52E-06	5.44E-05	3.55E-10			4.59E-06		5.44E-05				4.59E-06		5.44E-05		
P/PCB	PCBs (total)	1336-36-3	5.00E-01	1.70E+02	7.70E-05	1.10E-04	1.32E-05	1.44E-09	2.9E-09	8.32E+01	7.70E-05	5.36E-05	1.32E-05	7.06E-10	1.4E-09	2.70E+00	7.70E-05	1.74E-06	1.32E-05	2.29E-11	4.6E-11
INORG	Antimony	7440-36-0	5.00E-01	4.80E-01						2.70E-01											
INORG	Arsenic	7440-38-2	1.00E-02	6.50E+00						1.11E+01											
INORG	Cadmium	7440-43-9	5.00E-03							8.90E-02											
INORG	Chromium (total)	7440-47-3	1.00E+00	2.70E+00						2.90E+00											
INORG	Cobalt	7440-48-4	5.00E-02	8.40E-02						1.90E-01											
INORG	Copper	7440-50-8	1.00E+00	3.20E+00						4.10E+00						2.90E-01					
INORG	Cyanide (total)	57-12-5	5.00E+00	1.20E-01	1.38E+01	1.39E-02					1.38E+01						1.38E+01				
INORG	Lead	7439-92-1	5.00E-02	8.30E-01						1.40E+01											
INORG	Nickel	7440-02-0	1.00E+00	9.17E+01						1.30E+00											
INORG	Silver	7440-22-4	1.00E-02	1.10E-01																	
INORG	Vanadium	7440-62-2								3.10E+00											
INORG	Zinc	7440-66-6		1.90E+00						2.79E+01											
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6			1.49E-09		4.85E-05				1.49E-09		4.85E-05			7.38E-06	1.49E-09	9.19E-17	4.85E-05	4.46E-21	
			Sum						**3.93E-06**						**4.74E-07**						**4.23E-07**

Note:

The contribution from assumed vapor migration from LNAPLs to indoor air was calculated in the Supplemental RFI Report (ENCORE 2003j).

Table 8.8: Estimated Residential Cumulative Cancer Risk and HI for the Pontiac School Board Property General Motors - Pontiac North Campus, Pontiac, Michigan											
Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Conc in Soil[1] (mg/kg)	Screening Criteria at 10^{-6} Risk (mg/kg)	Screening Criteria at HQ of 1 (mg/kg)	Back-ground (mg/kg)	Cancer Risk	HQ
VOC	Acetone	67-64-1	D	31	22	8.40E-02		1.6E+03			5.4E-05
VOC	Benzene	71-43-2	A	31	2	**5.27E-01**	6.5E-01	7.2E+00		8.1E-07	7.3E-02
VOC	2-Butanone	78-93-3	D	31	14	1.30E-02		7.3E+03			1.8E-06
VOC	Carbon Disulfide	75-15-0		31	3	3.00E-03		3.6E+02			8.4E-06
VOC	Cumene	98-82-8	D	31	1	1.40E-01		1.6E+02			8.9E-04
VOC	Cyclohexane	110-82-7		31	3	6.10E-01		9.5E+03			6.4E-05
VOC	1,2-Dichlorobenzene	95-50-1	D	31	1	1.20E-03		9.0E+02			1.3E-06
VOC	Ethyl Benzene	100-41-4	D	31	1	2.20E+00		1.5E+03			1.4E-03
VOC	Methyl Acetate	79-20-9		31	5	1.40E-01		2.2E+04			6.3E-06
VOC	Methyl tert-butyl ether	1634-04-4		31	1	4.70E-01					
VOC	Methylcyclohexane	108-87-2		31	5	2.90E-01		2.6E+03			1.1E-04
VOC	Methylene Chloride	75-09-2	B2	31	5	1.90E-03	8.9E+00	1.9E+03		2.1E-10	9.9E-07
VOC	Toluene	108-88-3	D	31	22	1.60E-01		5.9E+02			2.7E-04
VOC	Xylenes (total)	1330-20-7	D	31	1	8.10E+00		1.4E+03			6.0E-03
SVOC	Acenaphthene	83-32-9		31	5	1.90E-01		3.7E+03			5.2E-05
SVOC	Acetophenone	98-86-2	D	31	1	7.70E-02		4.9E-01			1.6E-01
SVOC	Anthracene	120-12-7	D	31	6	2.70E-01		2.2E+04			1.2E-05
SVOC	Benzo(a)anthracene	56-55-3	B2	31	14	1.70E+00	6.2E-01			2.7E-06	
SVOC	Benzo(a)pyrene	50-32-8	B2	31	12	1.60E+00	6.2E-02			2.6E-05	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	31	16	2.90E+00	6.2E-01			4.7E-06	
SVOC	Benzo(g,h,i)perylene	191-24-2	D	31	9	1.20E+00		2.3E+03			5.2E-04
SVOC	Benzo(k)fluoranthene	207-08-9	B2	31	7	1.00E+00	6.2E+00			1.6E-07	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	31	5	1.90E-01	3.5E+01	1.2E+03		5.5E-09	1.6E-04
SVOC	Butylbenzylphthalate	85-68-7	C	31	5	2.70E-01		1.2E+04			2.2E-05
SVOC	Caprolactam	105-60-2		31	2	1.40E+00		3.1E+04			4.6E-05
SVOC	Carbazole	86-74-8	B2	31	3	1.80E-01	2.4E+01			7.4E-09	
SVOC	Chrysene	218-01-9	B2	31	17	1.90E+00	6.2E+01			3.1E-08	
SVOC	Di-n-butylphthalate	84-74-2	D	31	2	2.10E-01		6.1E+03			3.4E-05
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	31	2	1.80E-01	6.2E-02			2.9E-06	
SVOC	Fluoranthene	206-44-0	D	31	21	3.80E+00		2.3E+03			1.7E-03
SVOC	Fluorene	86-73-7	D	31	5	2.30E-01		2.6E+03			8.7E-05
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	31	7	1.10E+00	6.2E-01			1.8E-06	
SVOC	2-Methylnaphthalene	91-57-6		31	8	1.30E+00		5.6E+01			2.3E-02
SVOC	Naphthalene	91-20-3	C	31	4	1.20E-01		5.6E+01			2.1E-03
SVOC	Phenanthrene	85-01-8	D	31	21	1.30E+00		2.3E+03			5.6E-04
SVOC	Pyrene	129-00-0	D	31	24	3.00E+00		2.3E+03			1.3E-03
P/PCB	PCBs (total)	1336-36-3	B2	31	10	**1.27E-01**	2.2E-01	1.1E+00		5.7E-07	1.1E-01
INORG	Antimony	7440-36-0		31	7	2.90E+00		3.1E+01			9.3E-02
INORG	Arsenic	7440-38-2	A	31	31	1.41E+01	3.9E-01	2.2E+01	1.32E+01	2.3E-06	4.2E-02
INORG	Barium	7440-39-3	D	31	31	**2.48E+02**		5.4E+03	1.10E+02		2.6E-02
INORG	Beryllium	7440-41-7	B1	31	31	1.28E+00	1.1E+03	1.5E+02	1.53E+00		
INORG	Cadmium	7440-43-9	B1	31	31	**2.15E+00**	1.4E+03	3.7E+01	1.20E+00	6.8E-10	2.6E-02
INORG	Chromium (total)	7440-47-3		31	31	**4.30E+01**	2.1E+02	2.3E+02	4.92E+01		

Table 8.8: Estimated Residential Cumulative Cancer Risk and HI for the Pontiac School Board Property General Motors - Pontiac North Campus, Pontiac, Michigan											
Chem Group	**Chemical**	**CASRN**	**Carc Class**	**Analyzed**	**Detected**	**Conc in Soil[1] (mg/kg)**	**Screening Criteria at 10^{-6} Risk (mg/kg)**	**Screening Criteria at HQ of 1 (mg/kg)**	**Back-ground (mg/kg)**	**Cancer Risk**	**HQ**
INORG	Cobalt	7440-48-4		31	31	7.28E+00		4.7E+03	1.74E+01		
INORG	Copper	7440-50-8	D	31	31	3.18E+02		2.9E+03	3.20E+01		9.8E-02
INORG	Lead	7439-92-1	B2	31	31	4.29E+02		4.0E+02	4.92E+01		
INORG	Manganese	7439-96-5	D	31	31	**5.04E+02**		1.8E+03	5.10E+02		
INORG	Mercury	7439-97-6	D	31	21	4.26E-01		3.7E+00	1.30E-01		8.1E-02
INORG	Nickel	7440-02-0	A	31	31	1.54E+02		1.6E+03	3.01E+01		7.9E-02
INORG	Selenium	7782-49-2	D	31	6	2.23E+00		3.9E+02	4.10E-01		4.7E-03
INORG	Silver	7440-22-4	D	31	5	5.11E-01		3.9E+02			1.3E-03
INORG	Thallium	7440-28-0		31	1	**5.10E-01**		5.2E+00			9.9E-02
INORG	Vanadium	7440-62-2		31	31	2.50E+01		5.5E+02	3.28E+01		
INORG	Zinc	7440-66-6	D	31	31	**8.11E+02**		2.3E+04	4.70E+01		3.3E-02
CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	6	6	1.49E-05	3.9E-06			3.8E-06	
									Sum	**5E-05**	**1E+00**
Notes:											
	All concentration are the maximum detected, except the concentrations in bold are 95% UCLs.										
	The Screening Criteria for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.										
	The Screening Criteria for Naphthalene was used as a surrogate for 2-Methylnaphthalene.										
	The Screening Criteria for Chromium (total) is based on a 1:6 ratio of Cr VI:Cr III										
	The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.										
	The Screening Criteria for Mercury was calculated by ENVIRON to account for the vapor inhalation pathway using:										
	EPA Region 9 equations, RfC from IRIS, and chemical properties from EPA's Soil Screening Guidance.										
	The concentrations for all PCB isomers were summed before comparing to the Screening Levels.										
	The non-cancer Screening Criteria for Aroclor 1254 was used as a surrogate for PCB (total).										
	The concentrations for the Target Dioxin congeners were used to calculate an 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs,										
	before comparing to the Screening Levels for 2,3,7,8-TCDD.										
	Only chemicals detected at the PSB are shown.										
	Cancer risk and HQ are calculated using concentrations in excess of background.										
	Lead is evaluated using EPA criterion based on blood-lead modeling, and therefore has no cancer or HQ calculation.										
	95% UCLs are the maximum of the vertically averaged soil concentrations.										
	Risks for the PSB were calculated in the RFI Report (ENCORE 2002b).										

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
HL	VOC	Acetone	67-64-1	D	68	67	3.20E-03	1.90E+01		1.10E+05	2E-04	2.30E+04	8E-04
HL	VOC	Benzene	71-43-2	A	68	7	1.38E-03	2.10E-02		4.00E+02	5E-05	1.80E+02	1E-04
HL	VOC	Bromodichloromethane	75-27-4	B2	68					7.50E+02		1.10E+02	
HL	VOC	Bromoform	75-25-2	B2	68					8.70E+02		8.20E+02	
HL	VOC	Bromomethane	74-83-9	D	68					1.60E+03		3.20E+02	
HL	VOC	2-Butanone	78-93-3	D	68	43	7.10E-03	1.90E-01		2.70E+04	7E-06	2.70E+04	7E-06
HL	VOC	Carbon Disulfide	75-15-0		68	24	1.50E-03	3.80E-02		2.80E+02	1E-04	2.80E+02	1E-04
HL	VOC	Carbon Tetrachloride	56-23-5	B2	68					3.90E+02		9.60E+01	
HL	VOC	Chlorobenzene	108-90-7	D	68	1	1.80E-03	1.80E-03		2.60E+02	7E-06	2.60E+02	7E-06
HL	VOC	Chloroethane	75-00-3		68					9.50E+02		9.50E+02	
HL	VOC	Chloroform	67-66-3	B2	68					1.50E+03		1.20E+03	
HL	VOC	Chloromethane	74-87-3	D	68					1.10E+03		1.10E+03	
HL	VOC	Cumene	98-82-8	D	68	5	4.10E-03	1.00E-01		3.90E+02	3E-04	3.90E+02	3E-04
HL	VOC	Cyclohexane	110-82-7		68	12	1.90E-03	2.30E-01					
HL	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	68					1.20E+00		1.20E+00	
HL	VOC	Dibromochloromethane	124-48-1	C	68					6.10E+02		1.10E+02	
HL	VOC	1,2-Dibromoethane	106-93-4	B2	68					6.60E-01		9.20E-02	
HL	VOC	1,2-Dichlorobenzene	95-50-1	D	68					2.10E+02		2.10E+02	
HL	VOC	1,3-Dichlorobenzene	541-73-1	D	68					1.70E+02		1.70E+02	
HL	VOC	1,4-Dichlorobenzene	106-46-7	C	68					2.90E+03		4.00E+02	
HL	VOC	Dichlorodifluoromethane	75-71-8		68					1.00E+03		1.00E+03	
HL	VOC	1,1-Dichloroethane	75-34-3	C	68					8.90E+02		8.90E+02	
HL	VOC	1,2-Dichloroethane	107-06-2	B2	68					6.40E+02		9.10E+01	
HL	VOC	1,1-Dichloroethene	75-35-4	C	68					5.70E+02		2.00E+02	
HL	VOC	cis-1,2-Dichloroethene	156-59-2	D	68					6.40E+02		6.40E+02	
HL	VOC	trans-1,2-Dichloroethene	156-60-5		68	1	6.00E-03	6.00E-03		1.40E+03	4E-06	1.40E+03	4E-06
HL	VOC	1,2-Dichloropropane	78-87-5	B2	68					5.50E+02		1.40E+02	
HL	VOC	1,3-Dichloropropene (summed)	542-75-6	B2	68					6.20E+02		1.30E+02	
HL	VOC	Ethyl Benzene	100-41-4	D	68	5	1.70E-03	1.90E-02		1.40E+02	1E-04	1.40E+02	1E-04
HL	VOC	2-Hexanone	591-78-6		68					2.50E+03		2.50E+03	
HL	VOC	Methyl Acetate	79-20-9		68	19	2.73E-03	2.00E+00					
HL	VOC	Methyl tert-butyl ether	1634-04-4		68	1	6.40E-03	6.40E-03		5.90E+03	1E-06	1.80E+03	4E-06
HL	VOC	4-Methyl-2-pentanone	108-10-1		68					2.70E+03		2.70E+03	
HL	VOC	Methylcyclohexane	108-87-2		68	26	1.53E-03	1.50E+00					
HL	VOC	Methylene Chloride	75-09-2	B2	68	33	3.50E-03	2.40E+00		2.30E+03	1E-03	1.30E+03	2E-03
HL	VOC	Styrene	100-42-5		68	2	3.60E-03	1.30E-02		5.20E+02	3E-05	4.00E+02	3E-05
HL	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	68					3.70E+02		5.30E+01	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
HL	VOC	Tetrachloroethene	127-18-4	C-B2	68					8.80E+01		8.80E+01	
HL	VOC	Toluene	108-88-3	D	68	19	9.10E-04	1.30E-01		2.50E+02	5E-04	2.50E+02	5E-04
HL	VOC	1,2,4-Trichlorobenzene	120-82-1	D	68					1.10E+03		9.90E+02	
HL	VOC	1,1,1-Trichloroethane	71-55-6	D	68					4.60E+02		4.60E+02	
HL	VOC	1,1,2-Trichloroethane	79-00-5	C	68					9.20E+02		1.80E+02	
HL	VOC	Trichloroethene	79-01-6	C-B2	68					5.00E+02		5.00E+02	
HL	VOC	Trichlorofluoromethane	75-69-4		68					5.60E+02		5.60E+02	
HL	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		68					5.50E+02		5.50E+02	
HL	VOC	Vinyl Chloride	75-01-4	A	68					2.90E+01		4.00E+00	
HL	VOC	Xylenes (total)	1330-20-7	D	68	11	2.70E-03	5.30E-02		1.50E+02	4E-04	1.50E+02	4E-04
HL	SVOC	Acenaphthene	83-32-9		68	16	6.90E-02	6.90E+00		2.00E+05	3E-05	4.10E+04	2E-04
HL	SVOC	Acenaphthylene	208-96-8	D	68					8.00E+03		1.60E+03	
HL	SVOC	Acetophenone	98-86-2	D	68					1.10E+03		1.10E+03	
HL	SVOC	Anthracene	120-12-7	D	68	21	1.80E-01	9.80E+00		1.00E+06	1E-05	2.30E+05	4E-05
HL	SVOC	Atrazine	1912-24-9		68					5.00E+02		7.10E+01	
HL	SVOC	Benzaldehyde	100-52-7		68								
HL	SVOC	Benzo(a)anthracene	56-55-3	B2	68	30	2.30E-01	1.30E+01		1.00E+02	1E-01	2.00E+01	7E-01
HL	SVOC	Benzo(a)pyrene	50-32-8	B2	68	27	2.90E-01	1.20E+01		1.00E+01	**1E+00**	2.00E+00	**6E+00**
HL	SVOC	Benzo(b)fluoranthene	205-99-2	B2	68	30	4.80E-01	1.40E+01		1.00E+02	1E-01	2.00E+01	7E-01
HL	SVOC	Benzo(g,h,i)perylene	191-24-2	D	68	25	2.20E-01	1.00E+01		9.10E+03	1E-03	2.50E+03	4E-03
HL	SVOC	Benzo(k)fluoranthene	207-08-9	B2	68	25	2.40E-01	5.60E+00		1.00E+03	6E-03	2.00E+02	3E-02
HL	SVOC	Biphenyl	92-52-4		68								
HL	SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	68								
HL	SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	68					8.90E+01		1.30E+01	
HL	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	68	38	1.90E-01	8.50E+00		1.00E+04	9E-04	2.80E+03	3E-03
HL	SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	68								
HL	SVOC	Butylbenzylphthalate	85-68-7	C	68	22	7.70E-02	7.10E+00		3.10E+02	2E-02	3.10E+02	2E-02
HL	SVOC	Caprolactam	105-60-2		68	1	1.40E+01	1.40E+01		4.50E+05	3E-05	5.30E+04	3E-04
HL	SVOC	Carbazole	86-74-8	B2	68	15	9.55E-02	4.10E+00		3.70E+03	1E-03	5.30E+02	8E-03
HL	SVOC	4-Chloro-3-methylphenol	59-50-7		68					2.20E+04		4.50E+03	
HL	SVOC	4-Chloroaniline	106-47-8		68								
HL	SVOC	2-Chloronaphthalene	91-58-7		68					2.80E+05		5.60E+04	
HL	SVOC	2-Chlorophenol	95-57-8		68					6.90E+03		1.40E+03	
HL	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		68								
HL	SVOC	Chrysene	218-01-9	B2	68	33	1.80E-01	1.40E+01		1.00E+04	1E-03	2.00E+03	7E-03
HL	SVOC	Di-n-butylphthalate	84-74-2	D	68					7.60E+02		7.60E+02	
HL	SVOC	Di-n-octylphthalate	117-84-0		68					2.80E+04		6.90E+03	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
HL	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	68	13	6.60E-02	3.70E+00		1.00E+01	4E-01	2.00E+00	**2E+00**
HL	SVOC	Dibenzofuran	132-64-9	D	68	11	1.00E-01	2.80E+00					
HL	SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	68					4.70E+01		6.60E+00	
HL	SVOC	2,4-Dichlorophenol	120-83-2		68					1.80E+03		6.60E+02	
HL	SVOC	Diethylphthalate	84-66-2	D	68					7.40E+02		7.40E+02	
HL	SVOC	2,4-Dimethylphenol	105-67-9		68					5.60E+04		1.10E+04	
HL	SVOC	Dimethylphthalate	131-11-3	D	68					7.90E+02		7.90E+02	
HL	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		68					3.90E+02		7.90E+01	
HL	SVOC	2,4-Dinitrophenol	51-28-5		68								
HL	SVOC	2,4-Dinitrotoluene	121-14-2	B2	68					3.40E+02		4.80E+01	
HL	SVOC	2,6-Dinitrotoluene	606-20-2	B2	68								
HL	SVOC	Fluoranthene	206-44-0	D	68	36	2.80E-01	4.80E+01		1.80E+05	3E-04	4.60E+04	1E-03
HL	SVOC	Fluorene	86-73-7	D	68	19	1.10E-01	8.80E+00		1.30E+05	7E-05	2.70E+04	3E-04
HL	SVOC	Hexachlorobenzene	118-74-1	B2	68					5.10E+01		8.90E+00	
HL	SVOC	Hexachlorobutadiene	87-68-3	C	68					3.50E+02		1.00E+02	
HL	SVOC	Hexachlorocyclopentadiene	77-47-4	E	68					7.20E+02		7.20E+02	
HL	SVOC	Hexachloroethane	67-72-1	C	68					1.10E+03		2.30E+02	
HL	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	68	24	2.00E-01	9.60E+00		1.00E+02	1E-01	2.00E+01	5E-01
HL	SVOC	Isophorone	78-59-1	C	68					2.40E+03		2.40E+03	
HL	SVOC	2-Methylnaphthalene	91-57-6		68	13	1.50E-01	4.10E+00		4.00E+04	1E-04	8.10E+03	5E-04
HL	SVOC	Methylphenol (summed)	1319-77-3		68	5	1.69E-01	6.60E-01		5.60E+04	1E-05	1.10E+04	6E-05
HL	SVOC	Naphthalene	91-20-3	C	68	10	1.20E-01	1.00E+00		8.00E+04	1E-05	1.60E+04	6E-05
HL	SVOC	2-Nitroaniline	88-74-4		68								
HL	SVOC	3-Nitroaniline	99-09-2	C	68								
HL	SVOC	4-Nitroaniline	100-01-6	C	68								
HL	SVOC	Nitrobenzene	98-95-3	D	68					4.90E+02		1.00E+02	
HL	SVOC	2-Nitrophenol	88-75-5		68					3.10E+03		6.30E+02	
HL	SVOC	4-Nitrophenol	100-02-7		68								
HL	SVOC	N-Nitrosodiphenylamine	86-30-6	B2	68					1.20E+04		1.70E+03	
HL	SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	68					8.30E+00		1.20E+00	
HL	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	68								
HL	SVOC	Pentachlorophenol	87-86-5	B2	68					3.90E+02		9.00E+01	
HL	SVOC	Phenanthrene	85-01-8	D	68	33	3.00E-01	4.90E+01		8.00E+03	6E-03	1.60E+03	3E-02
HL	SVOC	Phenol	108-95-2	D	68					1.20E+04		1.20E+04	
HL	SVOC	Pyrene	129-00-0	D	68	36	2.30E-01	2.50E+01		1.10E+05	2E-04	2.90E+04	9E-04
HL	SVOC	2,4,5-Trichlorophenol	95-95-4		68					1.10E+05		2.30E+04	
HL	SVOC	2,4,6-Trichlorophenol	88-06-2	B2	68					5.00E+03		7.10E+02	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
HL	P/PCB	PCBs (total)	1336-36-3	B2	68	37	5.17E-02	3.16E+00		2.00E+01	2E-01	4.00E+00	8E-01
HL	INORG	Antimony	7440-36-0		68	37	4.42E-01	3.79E+02		1.20E+03	3E-01	1.80E+02	**2E+00**
HL	INORG	Arsenic	7440-38-2	A	68	60	4.64E-01	9.05E+01	1.32E+01	6.10E+01	**1E+00**	7.60E+00	**1E+01**
HL	INORG	Barium	7440-39-3	D	68	68	2.92E+01	1.06E+03	1.10E+02	2.50E+05	4E-03	3.70E+04	3E-02
HL	INORG	Beryllium	7440-41-7	B1	68	35	8.56E-02	1.34E+00	1.53E+00	3.10E+03		4.10E+02	
HL	INORG	Cadmium	7440-43-9	B1	68	46	6.53E-02	2.54E+01	1.20E+00	4.10E+03	6E-03	5.50E+02	4E-02
HL	INORG	Chromium (total)	7440-47-3		68	64	6.81E-01	2.47E+03	4.92E+01	1.70E+04	1E-01	2.50E+03	1E+00
HL	INORG	Cobalt	7440-48-4		68	63	2.19E-01	1.96E+01	1.74E+01	1.80E+04	1E-04	2.60E+03	9E-04
HL	INORG	Copper	7440-50-8	D	68	68	5.17E-01	2.53E+03	3.20E+01	1.40E+05	2E-02	2.00E+04	1E-01
HL	INORG	Cyanide (total)	57-12-5	D	62	30	2.73E-01	4.52E+01		2.50E+02	2E-01	1.20E+01	**4E+00**
HL	INORG	Lead	7439-92-1	B2	68	50	4.55E-01	1.13E+04	4.92E+01	9.00E+02	**1E+01**	4.00E+02	**3E+01**
HL	INORG	Manganese	7439-96-5	D	68	68	3.89E+01	3.97E+03	5.10E+02	1.70E+05	2E-02	2.50E+04	1E-01
HL	INORG	Mercury	7439-97-6	D	68	45	2.72E-02	8.48E-01	1.30E-01	1.10E+03	7E-04	1.60E+02	4E-03
HL	INORG	Nickel	7440-02-0	A	68	68	9.65E-01	1.01E+03	3.01E+01	2.70E+05	4E-03	4.00E+04	2E-02
HL	INORG	Selenium	7782-49-2	D	68	40	5.07E-01	6.78E+00	4.10E-01	1.80E+04	4E-04	2.60E+03	2E-03
HL	INORG	Silver	7440-22-4	D	68	8	1.66E-01	1.45E+00		1.70E+04	9E-05	2.50E+03	6E-04
HL	INORG	Thallium	7440-28-0		68	22	5.97E-01	4.84E+00		2.40E+02	2E-02	3.50E+01	1E-01
HL	INORG	Vanadium	7440-62-2		68	68	3.26E-01	2.96E+01	3.28E+01	1.00E+04		7.50E+02	
HL	INORG	Zinc	7440-66-6	D	68	68	1.66E+00	1.67E+03	4.70E+01	1.00E+06	2E-03	1.70E+05	1E-02
HL	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	14	14	6.47E-06	2.19E-04		9.90E-04	2E-01	9.00E-05	**2E+00**
OL	VOC	Acetone	67-64-1	D	6	6	5.40E-02	1.50E-01		1.10E+05	1E-06	2.30E+04	7E-06
OL	VOC	Benzene	71-43-2	A	6					4.00E+02		1.80E+02	
OL	VOC	Bromodichloromethane	75-27-4	B2	6					7.50E+02		1.10E+02	
OL	VOC	Bromoform	75-25-2	B2	6					8.70E+02		8.20E+02	
OL	VOC	Bromomethane	74-83-9	D	6					1.60E+03		3.20E+02	
OL	VOC	2-Butanone	78-93-3	D	6	6	4.30E-03	1.60E-02		2.70E+04	6E-07	2.70E+04	6E-07
OL	VOC	Carbon Disulfide	75-15-0		6					2.80E+02		2.80E+02	
OL	VOC	Carbon Tetrachloride	56-23-5	B2	6					3.90E+02		9.60E+01	
OL	VOC	Chlorobenzene	108-90-7	D	6					2.60E+02		2.60E+02	
OL	VOC	Chloroethane	75-00-3		6					9.50E+02		9.50E+02	
OL	VOC	Chloroform	67-66-3	B2	6					1.50E+03		1.20E+03	
OL	VOC	Chloromethane	74-87-3	D	6					1.10E+03		1.10E+03	
OL	VOC	Cumene	98-82-8	D	6	1	3.70E-03	3.70E-03		3.90E+02	9E-06	3.90E+02	9E-06
OL	VOC	Cyclohexane	110-82-7		6								
OL	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	6					1.20E+00		1.20E+00	
OL	VOC	Dibromochloromethane	124-48-1	C	6					6.10E+02		1.10E+02	
OL	VOC	1,2-Dibromoethane	106-93-4	B2	6					6.60E-01		9.20E-02	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
OL	VOC	1,2-Dichlorobenzene	95-50-1	D	6	1	1.50E-02	1.50E-02		2.10E+02	7E-05	2.10E+02	7E-05
OL	VOC	1,3-Dichlorobenzene	541-73-1	D	6					1.70E+02		1.70E+02	
OL	VOC	1,4-Dichlorobenzene	106-46-7	C	6	2	2.90E-03	1.90E-02		2.90E+03	7E-06	4.00E+02	5E-05
OL	VOC	Dichlorodifluoromethane	75-71-8		6					1.00E+03		1.00E+03	
OL	VOC	1,1-Dichloroethane	75-34-3	C	6					8.90E+02		8.90E+02	
OL	VOC	1,2-Dichloroethane	107-06-2	B2	6					6.40E+02		9.10E+01	
OL	VOC	1,1-Dichloroethene	75-35-4	C	6					5.70E+02		2.00E+02	
OL	VOC	cis-1,2-Dichloroethene	156-59-2	D	6					6.40E+02		6.40E+02	
OL	VOC	trans-1,2-Dichloroethene	156-60-5		6					1.40E+03		1.40E+03	
OL	VOC	1,2-Dichloropropane	78-87-5	B2	6					5.50E+02		1.40E+02	
OL	VOC	1,3-Dichloropropene (summed)	542-75-6	B2	6					6.20E+02		1.30E+02	
OL	VOC	Ethyl Benzene	100-41-4	D	6	2	1.80E-03	2.30E-03		1.40E+02	2E-05	1.40E+02	2E-05
OL	VOC	2-Hexanone	591-78-6		6					2.50E+03		2.50E+03	
OL	VOC	Methyl Acetate	79-20-9		6								
OL	VOC	Methyl tert-butyl ether	1634-04-4		6					5.90E+03		1.80E+03	
OL	VOC	4-Methyl-2-pentanone	108-10-1		6					2.70E+03		2.70E+03	
OL	VOC	Methylcyclohexane	108-87-2		6								
OL	VOC	Methylene Chloride	75-09-2	B2	6					2.30E+03		1.30E+03	
OL	VOC	Styrene	100-42-5		6					5.20E+02		4.00E+02	
OL	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	6					3.70E+02		5.30E+01	
OL	VOC	Tetrachloroethene	127-18-4	C-B2	6					8.80E+01		8.80E+01	
OL	VOC	Toluene	108-88-3	D	6	2	2.60E-03	3.60E-03		2.50E+02	1E-05	2.50E+02	1E-05
OL	VOC	1,2,4-Trichlorobenzene	120-82-1	D	6					1.10E+03		9.90E+02	
OL	VOC	1,1,1-Trichloroethane	71-55-6	D	6					4.60E+02		4.60E+02	
OL	VOC	1,1,2-Trichloroethane	79-00-5	C	6					9.20E+02		1.80E+02	
OL	VOC	Trichloroethene	79-01-6	C-B2	6					5.00E+02		5.00E+02	
OL	VOC	Trichlorofluoromethane	75-69-4		6					5.60E+02		5.60E+02	
OL	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		6					5.50E+02		5.50E+02	
OL	VOC	Vinyl Chloride	75-01-4	A	6					2.90E+01		4.00E+00	
OL	VOC	Xylenes (total)	1330-20-7	D	6	1	8.00E-03	8.00E-03		1.50E+02	5E-05	1.50E+02	5E-05
OL	SVOC	Acenaphthene	83-32-9		6					2.00E+05		4.10E+04	
OL	SVOC	Acenaphthylene	208-96-8	D	6					8.00E+03		1.60E+03	
OL	SVOC	Acetophenone	98-86-2	D	6					1.10E+03		1.10E+03	
OL	SVOC	Anthracene	120-12-7	D	6	1	1.70E-01	1.70E-01		1.00E+06	2E-07	2.30E+05	7E-07
OL	SVOC	Atrazine	1912-24-9		6					5.00E+02		7.10E+01	
OL	SVOC	Benzaldehyde	100-52-7		6								
OL	SVOC	Benzo(a)anthracene	56-55-3	B2	6	3	3.00E-01	6.00E-01		1.00E+02	6E-03	2.00E+01	3E-02

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
OL	SVOC	Benzo(a)pyrene	50-32-8	B2	6	3	3.40E-01	6.30E-01		1.00E+01	6E-02	2.00E+00	3E-01
OL	SVOC	Benzo(b)fluoranthene	205-99-2	B2	6	3	4.00E-01	9.60E-01		1.00E+02	1E-02	2.00E+01	5E-02
OL	SVOC	Benzo(g,h,i)perylene	191-24-2	D	6	3	2.40E-01	4.10E-01		9.10E+03	5E-05	2.50E+03	2E-04
OL	SVOC	Benzo(k)fluoranthene	207-08-9	B2	6	3	2.40E-01	5.10E-01		1.00E+03	5E-04	2.00E+02	3E-03
OL	SVOC	Biphenyl	92-52-4		6								
OL	SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	6								
OL	SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	6					8.90E+01		1.30E+01	
OL	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	6	3	2.20E-01	2.50E+00		1.00E+04	3E-04	2.80E+03	9E-04
OL	SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	6								
OL	SVOC	Butylbenzylphthalate	85-68-7	C	6	2	2.20E+00	2.30E+00		3.10E+02	7E-03	3.10E+02	7E-03
OL	SVOC	Caprolactam	105-60-2		6					4.50E+05		5.30E+04	
OL	SVOC	Carbazole	86-74-8	B2	6					3.70E+03		5.30E+02	
OL	SVOC	4-Chloro-3-methylphenol	59-50-7		6					2.20E+04		4.50E+03	
OL	SVOC	4-Chloroaniline	106-47-8		6								
OL	SVOC	2-Chloronaphthalene	91-58-7		6					2.80E+05		5.60E+04	
OL	SVOC	2-Chlorophenol	95-57-8		6					6.90E+03		1.40E+03	
OL	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		6								
OL	SVOC	Chrysene	218-01-9	B2	6	3	4.60E-01	1.10E+00		1.00E+04	1E-04	2.00E+03	6E-04
OL	SVOC	Di-n-butylphthalate	84-74-2	D	6					7.60E+02		7.60E+02	
OL	SVOC	Di-n-octylphthalate	117-84-0		6					2.80E+04		6.90E+03	
OL	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	6					1.00E+01		2.00E+00	
OL	SVOC	Dibenzofuran	132-64-9	D	6								
OL	SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	6					4.70E+01		6.60E+00	
OL	SVOC	2,4-Dichlorophenol	120-83-2		6					1.80E+03		6.60E+02	
OL	SVOC	Diethylphthalate	84-66-2	D	6					7.40E+02		7.40E+02	
OL	SVOC	2,4-Dimethylphenol	105-67-9		6					5.60E+04		1.10E+04	
OL	SVOC	Dimethylphthalate	131-11-3	D	6					7.90E+02		7.90E+02	
OL	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		6					3.90E+02		7.90E+01	
OL	SVOC	2,4-Dinitrophenol	51-28-5		6								
OL	SVOC	2,4-Dinitrotoluene	121-14-2	B2	6					3.40E+02		4.80E+01	
OL	SVOC	2,6-Dinitrotoluene	606-20-2	B2	6								
OL	SVOC	Fluoranthene	206-44-0	D	6	4	1.10E-01	2.20E+00		1.80E+05	1E-05	4.60E+04	5E-05
OL	SVOC	Fluorene	86-73-7	D	6	1	1.50E-01	1.50E-01		1.30E+05	1E-06	2.70E+04	6E-06
OL	SVOC	Hexachlorobenzene	118-74-1	B2	6					5.10E+01		8.90E+00	
OL	SVOC	Hexachlorobutadiene	87-68-3	C	6					3.50E+02		1.00E+02	
OL	SVOC	Hexachlorocyclopentadiene	77-47-4	E	6					7.20E+02		7.20E+02	
OL	SVOC	Hexachloroethane	67-72-1	C	6					1.10E+03		2.30E+02	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
OL	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	6	3	2.10E-01	3.60E-01		1.00E+02	4E-03	2.00E+01	2E-02
OL	SVOC	Isophorone	78-59-1	C	6					2.40E+03		2.40E+03	
OL	SVOC	2-Methylnaphthalene	91-57-6		6					4.00E+04		8.10E+03	
OL	SVOC	Methylphenol (summed)	1319-77-3		6					5.60E+04		1.10E+04	
OL	SVOC	Naphthalene	91-20-3	C	6					8.00E+04		1.60E+04	
OL	SVOC	2-Nitroaniline	88-74-4		6								
OL	SVOC	3-Nitroaniline	99-09-2	C	6								
OL	SVOC	4-Nitroaniline	100-01-6	C	6								
OL	SVOC	Nitrobenzene	98-95-3	D	6					4.90E+02		1.00E+02	
OL	SVOC	2-Nitrophenol	88-75-5		6					3.10E+03		6.30E+02	
OL	SVOC	4-Nitrophenol	100-02-7		6								
OL	SVOC	N-Nitrosodiphenylamine	86-30-6	B2	6					1.20E+04		1.70E+03	
OL	SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	6					8.30E+00		1.20E+00	
OL	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	6								
OL	SVOC	Pentachlorophenol	87-86-5	B2	6					3.90E+02		9.00E+01	
OL	SVOC	Phenanthrene	85-01-8	D	6	3	4.30E-01	8.40E-01		8.00E+03	1E-04	1.60E+03	5E-04
OL	SVOC	Phenol	108-95-2	D	6					1.20E+04		1.20E+04	
OL	SVOC	Pyrene	129-00-0	D	6	3	8.30E-02	1.10E+00		1.10E+05	1E-05	2.90E+04	4E-05
OL	SVOC	2,4,5-Trichlorophenol	95-95-4		6					1.10E+05		2.30E+04	
OL	SVOC	2,4,6-Trichlorophenol	88-06-2	B2	6					5.00E+03		7.10E+02	
OL	P/PCB	PCBs (total)	1336-36-3	B2	6	1	3.79E-01	3.79E-01		2.00E+01	2E-02	4.00E+00	9E-02
OL	INORG	Antimony	7440-36-0		6	3	3.52E-01	1.06E+01		1.20E+03	9E-03	1.80E+02	6E-02
OL	INORG	Arsenic	7440-38-2	A	6	6	1.54E+00	7.22E+00	1.32E+01	6.10E+01		7.60E+00	
OL	INORG	Barium	7440-39-3	D	6	6	5.18E+01	3.41E+02	1.10E+02	2.50E+05	9E-04	3.70E+04	6E-03
OL	INORG	Beryllium	7440-41-7	B1	6	2	1.13E-01	1.16E-01	1.53E+00	3.10E+03		4.10E+02	
OL	INORG	Cadmium	7440-43-9	B1	6	6	1.62E-01	1.90E+00	1.20E+00	4.10E+03	2E-04	5.50E+02	1E-03
OL	INORG	Chromium (total)	7440-47-3		6	6	3.68E+00	1.23E+02	4.92E+01	1.70E+04	4E-03	2.50E+03	3E-02
OL	INORG	Cobalt	7440-48-4		6	6	6.85E-01	3.59E+00	1.74E+01	1.80E+04		2.60E+03	
OL	INORG	Copper	7440-50-8	D	6	6	5.98E+00	8.93E+01	3.20E+01	1.40E+05	4E-04	2.00E+04	3E-03
OL	INORG	Cyanide (total)	57-12-5	D	6					2.50E+02		1.20E+01	
OL	INORG	Lead	7439-92-1	B2	6	6	9.95E+00	5.92E+02	4.92E+01	9.00E+02	6E-01	4.00E+02	**1E+00**
OL	INORG	Manganese	7439-96-5	D	6	6	2.87E+02	8.10E+02	5.10E+02	1.70E+05	2E-03	2.50E+04	1E-02
OL	INORG	Mercury	7439-97-6	D	6	1	1.84E-01	1.84E-01	1.30E-01	1.10E+03	5E-05	1.60E+02	3E-04
OL	INORG	Nickel	7440-02-0	A	6	6	2.59E+00	2.78E+01	3.01E+01	2.70E+05		4.00E+04	
OL	INORG	Selenium	7782-49-2	D	6	3	2.76E-01	9.78E-01	4.10E-01	1.80E+04	3E-05	2.60E+03	2E-04
OL	INORG	Silver	7440-22-4	D	6	1	9.23E-01	9.23E-01		1.70E+04	5E-05	2.50E+03	4E-04
OL	INORG	Thallium	7440-28-0		6	4	3.78E-01	9.86E-01		2.40E+02	4E-03	3.50E+01	3E-02

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
OL	INORG	Vanadium	7440-62-2		6	6	1.98E+00	1.26E+01	3.28E+01	1.00E+04		7.50E+02	
OL	INORG	Zinc	7440-66-6	D	6	6	4.75E+01	4.05E+02	4.70E+01	1.00E+06	4E-04	1.70E+05	2E-03
PSB	VOC	Acetone	67-64-1	D	5	5	8.80E-03	1.00E-01		1.10E+05	9E-07	2.30E+04	4E-06
PSB	VOC	Benzene	71-43-2	A	5					4.00E+02		1.80E+02	
PSB	VOC	Bromodichloromethane	75-27-4	B2	5					7.50E+02		1.10E+02	
PSB	VOC	Bromoform	75-25-2	B2	5					8.70E+02		8.20E+02	
PSB	VOC	Bromomethane	74-83-9	D	5					1.60E+03		3.20E+02	
PSB	VOC	2-Butanone	78-93-3	D	5	2	1.20E-02	2.10E-02		2.70E+04	8E-07	2.70E+04	8E-07
PSB	VOC	Carbon Disulfide	75-15-0		5					2.80E+02		2.80E+02	
PSB	VOC	Carbon Tetrachloride	56-23-5	B2	5					3.90E+02		9.60E+01	
PSB	VOC	Chlorobenzene	108-90-7	D	5					2.60E+02		2.60E+02	
PSB	VOC	Chloroethane	75-00-3		5					9.50E+02		9.50E+02	
PSB	VOC	Chloroform	67-66-3	B2	5					1.50E+03		1.20E+03	
PSB	VOC	Chloromethane	74-87-3	D	5					1.10E+03		1.10E+03	
PSB	VOC	Cumene	98-82-8	D	5	2	1.00E-02	1.80E-02		3.90E+02	5E-05	3.90E+02	5E-05
PSB	VOC	Cyclohexane	110-82-7		5	2	2.50E-02	2.80E-02					
PSB	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	5					1.20E+00		1.20E+00	
PSB	VOC	Dibromochloromethane	124-48-1	C	5					6.10E+02		1.10E+02	
PSB	VOC	1,2-Dibromoethane	106-93-4	B2	5					6.60E-01		9.20E-02	
PSB	VOC	1,2-Dichlorobenzene	95-50-1	D	5					2.10E+02		2.10E+02	
PSB	VOC	1,3-Dichlorobenzene	541-73-1	D	5					1.70E+02		1.70E+02	
PSB	VOC	1,4-Dichlorobenzene	106-46-7	C	5					2.90E+03		4.00E+02	
PSB	VOC	Dichlorodifluoromethane	75-71-8		5					1.00E+03		1.00E+03	
PSB	VOC	1,1-Dichloroethane	75-34-3	C	5					8.90E+02		8.90E+02	
PSB	VOC	1,2-Dichloroethane	107-06-2	B2	5					6.40E+02		9.10E+01	
PSB	VOC	1,1-Dichloroethene	75-35-4	C	5					5.70E+02		2.00E+02	
PSB	VOC	cis-1,2-Dichloroethene	156-59-2	D	5					6.40E+02		6.40E+02	
PSB	VOC	trans-1,2-Dichloroethene	156-60-5		5					1.40E+03		1.40E+03	
PSB	VOC	1,2-Dichloropropane	78-87-5	B2	5					5.50E+02		1.40E+02	
PSB	VOC	1,3-Dichloropropene (summed)	542-75-6	B2	5					6.20E+02		1.30E+02	
PSB	VOC	Ethyl Benzene	100-41-4	D	5	2	7.20E-03	1.40E-02		1.40E+02	1E-04	1.40E+02	1E-04
PSB	VOC	2-Hexanone	591-78-6		5					2.50E+03		2.50E+03	
PSB	VOC	Methyl Acetate	79-20-9		5								
PSB	VOC	Methyl tert-butyl ether	1634-04-4		5					5.90E+03		1.80E+03	
PSB	VOC	4-Methyl-2-pentanone	108-10-1		5					2.70E+03		2.70E+03	
PSB	VOC	Methylcyclohexane	108-87-2		5	2	2.00E-02	2.00E-02					
PSB	VOC	Methylene Chloride	75-09-2	B2	5					2.30E+03		1.30E+03	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
PSB	VOC	Styrene	100-42-5		5					5.20E+02		4.00E+02	
PSB	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	5					3.70E+02		5.30E+01	
PSB	VOC	Tetrachloroethene	127-18-4	C-B2	5					8.80E+01		8.80E+01	
PSB	VOC	Toluene	108-88-3	D	5	1	2.10E-03	2.10E-03		2.50E+02	8E-06	2.50E+02	8E-06
PSB	VOC	1,2,4-Trichlorobenzene	120-82-1	D	5					1.10E+03		9.90E+02	
PSB	VOC	1,1,1-Trichloroethane	71-55-6	D	5					4.60E+02		4.60E+02	
PSB	VOC	1,1,2-Trichloroethane	79-00-5	C	5					9.20E+02		1.80E+02	
PSB	VOC	Trichloroethene	79-01-6	C-B2	5					5.00E+02		5.00E+02	
PSB	VOC	Trichlorofluoromethane	75-69-4		5	1	1.45E-03	1.45E-03		5.60E+02	3E-06	5.60E+02	3E-06
PSB	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		5					5.50E+02		5.50E+02	
PSB	VOC	Vinyl Chloride	75-01-4	A	5					2.90E+01		4.00E+00	
PSB	VOC	Xylenes (total)	1330-20-7	D	5	2	4.30E-02	9.50E-02		1.50E+02	6E-04	1.50E+02	6E-04
PSB	SVOC	Acenaphthene	83-32-9		5	4	3.71E-01	6.70E+00		2.00E+05	3E-05	4.10E+04	2E-04
PSB	SVOC	Acenaphthylene	208-96-8	D	5					8.00E+03		1.60E+03	
PSB	SVOC	Acetophenone	98-86-2	D	5					1.10E+03		1.10E+03	
PSB	SVOC	Anthracene	120-12-7	D	5	5	6.60E-01	1.00E+01		1.00E+06	1E-05	2.30E+05	4E-05
PSB	SVOC	Atrazine	1912-24-9		5					5.00E+02		7.10E+01	
PSB	SVOC	Benzaldehyde	100-52-7		5								
PSB	SVOC	Benzo(a)anthracene	56-55-3	B2	5	5	1.40E+00	5.30E+01		1.00E+02	5E-01	2.00E+01	**3E+00**
PSB	SVOC	Benzo(a)pyrene	50-32-8	B2	5	5	1.30E+00	5.00E+01		1.00E+01	**5E+00**	2.00E+00	**3E+01**
PSB	SVOC	Benzo(b)fluoranthene	205-99-2	B2	5	5	2.00E+00	6.90E+01		1.00E+02	7E-01	2.00E+01	**3E+00**
PSB	SVOC	Benzo(g,h,i)perylene	191-24-2	D	5	5	1.10E+00	3.10E+01		9.10E+03	3E-03	2.50E+03	1E-02
PSB	SVOC	Benzo(k)fluoranthene	207-08-9	B2	5	5	1.10E+00	3.20E+01		1.00E+03	3E-02	2.00E+02	2E-01
PSB	SVOC	Biphenyl	92-52-4		5								
PSB	SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	5								
PSB	SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	5					8.90E+01		1.30E+01	
PSB	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	5	5	1.30E+00	5.80E+00		1.00E+04	6E-04	2.80E+03	2E-03
PSB	SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	5								
PSB	SVOC	Butylbenzylphthalate	85-68-7	C	5	3	6.95E-01	1.10E+01		3.10E+02	4E-02	3.10E+02	4E-02
PSB	SVOC	Caprolactam	105-60-2		5					4.50E+05		5.30E+04	
PSB	SVOC	Carbazole	86-74-8	B2	5	3	6.50E-01	5.50E+00		3.70E+03	1E-03	5.30E+02	1E-02
PSB	SVOC	4-Chloro-3-methylphenol	59-50-7		5					2.20E+04		4.50E+03	
PSB	SVOC	4-Chloroaniline	106-47-8		5								
PSB	SVOC	2-Chloronaphthalene	91-58-7		5					2.80E+05		5.60E+04	
PSB	SVOC	2-Chlorophenol	95-57-8		5					6.90E+03		1.40E+03	
PSB	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		5								
PSB	SVOC	Chrysene	218-01-9	B2	5	5	2.10E+00	7.10E+01		1.00E+04	7E-03	2.00E+03	4E-02

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
PSB	SVOC	Di-n-butylphthalate	84-74-2	D	5					7.60E+02		7.60E+02	
PSB	SVOC	Di-n-octylphthalate	117-84-0		5					2.80E+04		6.90E+03	
PSB	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	5	4	5.75E-01	7.60E+00		1.00E+01	8E-01	2.00E+00	**4E+00**
PSB	SVOC	Dibenzofuran	132-64-9	D	5	2	3.12E-01	2.50E+00					
PSB	SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	5					4.70E+01		6.60E+00	
PSB	SVOC	2,4-Dichlorophenol	120-83-2		5					1.80E+03		6.60E+02	
PSB	SVOC	Diethylphthalate	84-66-2	D	5					7.40E+02		7.40E+02	
PSB	SVOC	2,4-Dimethylphenol	105-67-9		5					5.60E+04		1.10E+04	
PSB	SVOC	Dimethylphthalate	131-11-3	D	5					7.90E+02		7.90E+02	
PSB	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		5					3.90E+02		7.90E+01	
PSB	SVOC	2,4-Dinitrophenol	51-28-5		5								
PSB	SVOC	2,4-Dinitrotoluene	121-14-2	B2	5					3.40E+02		4.80E+01	
PSB	SVOC	2,6-Dinitrotoluene	606-20-2	B2	5								
PSB	SVOC	Fluoranthene	206-44-0	D	5	5	4.00E+00	1.30E+02		1.80E+05	7E-04	4.60E+04	3E-03
PSB	SVOC	Fluorene	86-73-7	D	5	5	5.66E-01	5.70E+00		1.30E+05	4E-05	2.70E+04	2E-04
PSB	SVOC	Hexachlorobenzene	118-74-1	B2	5					5.10E+01		8.90E+00	
PSB	SVOC	Hexachlorobutadiene	87-68-3	C	5					3.50E+02		1.00E+02	
PSB	SVOC	Hexachlorocyclopentadiene	77-47-4	E	5					7.20E+02		7.20E+02	
PSB	SVOC	Hexachloroethane	67-72-1	C	5					1.10E+03		2.30E+02	
PSB	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	5	5	8.70E-01	2.80E+01		1.00E+02	3E-01	2.00E+01	**1E+00**
PSB	SVOC	Isophorone	78-59-1	C	5					2.40E+03		2.40E+03	
PSB	SVOC	2-Methylnaphthalene	91-57-6		5	3	4.46E-01	3.20E+00		4.00E+04	8E-05	8.10E+03	4E-04
PSB	SVOC	Methylphenol (summed)	1319-77-3		5					5.60E+04		1.10E+04	
PSB	SVOC	Naphthalene	91-20-3	C	5	2	3.72E-01	7.80E-01		8.00E+04	1E-05	1.60E+04	5E-05
PSB	SVOC	2-Nitroaniline	88-74-4		5								
PSB	SVOC	3-Nitroaniline	99-09-2	C	5								
PSB	SVOC	4-Nitroaniline	100-01-6	C	5								
PSB	SVOC	Nitrobenzene	98-95-3	D	5					4.90E+02		1.00E+02	
PSB	SVOC	2-Nitrophenol	88-75-5		5					3.10E+03		6.30E+02	
PSB	SVOC	4-Nitrophenol	100-02-7		5								
PSB	SVOC	N-Nitrosodiphenylamine	86-30-6	B2	5					1.20E+04		1.70E+03	
PSB	SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	5					8.30E+00		1.20E+00	
PSB	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	5								
PSB	SVOC	Pentachlorophenol	87-86-5	B2	5					3.90E+02		9.00E+01	
PSB	SVOC	Phenanthrene	85-01-8	D	5	5	2.80E+00	5.60E+01		8.00E+03	7E-03	1.60E+03	4E-02
PSB	SVOC	Phenol	108-95-2	D	5					1.20E+04		1.20E+04	
PSB	SVOC	Pyrene	129-00-0	D	5	5	3.30E+00	1.20E+02		1.10E+05	1E-03	2.90E+04	4E-03

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
PSB	SVOC	2,4,5-Trichlorophenol	95-95-4		5					1.10E+05		2.30E+04	
PSB	SVOC	2,4,6-Trichlorophenol	88-06-2	B2	5					5.00E+03		7.10E+02	
PSB	P/PCB	PCBs (total)	1336-36-3	B2	5	5	1.23E-01	4.17E-01		2.00E+01	2E-02	4.00E+00	1E-01
PSB	INORG	Antimony	7440-36-0		5	4	1.52E+00	5.18E+00		1.20E+03	4E-03	1.80E+02	3E-02
PSB	INORG	Arsenic	7440-38-2	A	5	5	4.86E+00	2.30E+01	1.32E+01	6.10E+01	2E-01	7.60E+00	**1E+00**
PSB	INORG	Barium	7440-39-3	D	5	5	6.79E+01	2.27E+02	1.10E+02	2.50E+05	5E-04	3.70E+04	3E-03
PSB	INORG	Beryllium	7440-41-7	B1	5	5	6.28E-01	1.67E+00	1.53E+00	3.10E+03	5E-05	4.10E+02	3E-04
PSB	INORG	Cadmium	7440-43-9	B1	5	5	6.03E-01	7.43E+00	1.20E+00	4.10E+03	2E-03	5.50E+02	1E-02
PSB	INORG	Chromium (total)	7440-47-3		5	5	2.46E+01	1.28E+02	4.92E+01	1.70E+04	5E-03	2.50E+03	3E-02
PSB	INORG	Cobalt	7440-48-4		5	5	2.41E+00	6.73E+00	1.74E+01	1.80E+04		2.60E+03	
PSB	INORG	Copper	7440-50-8	D	5	5	6.24E+01	2.30E+02	3.20E+01	1.40E+05	1E-03	2.00E+04	1E-02
PSB	INORG	Lead	7439-92-1	B2	5	5	1.75E+02	6.59E+02	4.92E+01	9.00E+02	7E-01	4.00E+02	**2E+00**
PSB	INORG	Manganese	7439-96-5	D	5	5	6.31E+02	2.01E+03	5.10E+02	1.70E+05	9E-03	2.50E+04	6E-02
PSB	INORG	Mercury	7439-97-6	D	5	5	3.42E-02	3.35E-01	1.30E-01	1.10E+03	2E-04	1.60E+02	1E-03
PSB	INORG	Nickel	7440-02-0	A	5	5	1.22E+01	4.54E+01	3.01E+01	2.70E+05	6E-05	4.00E+04	4E-04
PSB	INORG	Selenium	7782-49-2	D	5				4.10E-01	1.80E+04		2.60E+03	
PSB	INORG	Silver	7440-22-4	D	5	3	6.45E-01	1.46E+00		1.70E+04	9E-05	2.50E+03	6E-04
PSB	INORG	Thallium	7440-28-0		5	4	8.28E-01	1.39E+00		2.40E+02	6E-03	3.50E+01	4E-02
PSB	INORG	Vanadium	7440-62-2		5	5	9.09E+00	2.55E+01	3.28E+01	1.00E+04		7.50E+02	
PSB	INORG	Zinc	7440-66-6	D	5	5	4.04E+02	1.52E+03	4.70E+01	1.00E+06	1E-03	1.70E+05	9E-03
PSB	CDD/F	2,3,7,8-TCDD Equivalent	1746-01-6-TEF	B2	2	2	8.25E-06	8.84E-06		9.90E-04	9E-03	9.00E-05	1E-01
TL	VOC	Acetone	67-64-1	D	3	3	1.80E+00	9.10E+00		1.10E+05	8E-05	2.30E+04	4E-04
TL	VOC	Benzene	71-43-2	A	3					4.00E+02		1.80E+02	
TL	VOC	Bromodichloromethane	75-27-4	B2	3					7.50E+02		1.10E+02	
TL	VOC	Bromoform	75-25-2	B2	3					8.70E+02		8.20E+02	
TL	VOC	Bromomethane	74-83-9	D	3					1.60E+03		3.20E+02	
TL	VOC	2-Butanone	78-93-3	D	3	2	9.30E-02	1.00E-01		2.70E+04	4E-06	2.70E+04	4E-06
TL	VOC	Carbon Disulfide	75-15-0		3					2.80E+02		2.80E+02	
TL	VOC	Carbon Tetrachloride	56-23-5	B2	3					3.90E+02		9.60E+01	
TL	VOC	Chlorobenzene	108-90-7	D	3	1	2.20E-02	2.20E-02		2.60E+02	8E-05	2.60E+02	8E-05
TL	VOC	Chloroethane	75-00-3		3					9.50E+02		9.50E+02	
TL	VOC	Chloroform	67-66-3	B2	3					1.50E+03		1.20E+03	
TL	VOC	Chloromethane	74-87-3	D	3					1.10E+03		1.10E+03	
TL	VOC	Cumene	98-82-8	D	3					3.90E+02		3.90E+02	
TL	VOC	Cyclohexane	110-82-7		3								
TL	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	3					1.20E+00		1.20E+00	
TL	VOC	Dibromochloromethane	124-48-1	C	3					6.10E+02		1.10E+02	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
TL	VOC	1,2-Dibromoethane	106-93-4	B2	3					6.60E-01		9.20E-02	
TL	VOC	1,2-Dichlorobenzene	95-50-1	D	3					2.10E+02		2.10E+02	
TL	VOC	1,3-Dichlorobenzene	541-73-1	D	3					1.70E+02		1.70E+02	
TL	VOC	1,4-Dichlorobenzene	106-46-7	C	3	1	7.20E-03	7.20E-03		2.90E+03	2E-06	4.00E+02	2E-05
TL	VOC	Dichlorodifluoromethane	75-71-8		3					1.00E+03		1.00E+03	
TL	VOC	1,1-Dichloroethane	75-34-3	C	3					8.90E+02		8.90E+02	
TL	VOC	1,2-Dichloroethane	107-06-2	B2	3					6.40E+02		9.10E+01	
TL	VOC	1,1-Dichloroethene	75-35-4	C	3					5.70E+02		2.00E+02	
TL	VOC	cis-1,2-Dichloroethene	156-59-2	D	3					6.40E+02		6.40E+02	
TL	VOC	trans-1,2-Dichloroethene	156-60-5		3					1.40E+03		1.40E+03	
TL	VOC	1,2-Dichloropropane	78-87-5	B2	3					5.50E+02		1.40E+02	
TL	VOC	1,3-Dichloropropene (summed)	542-75-6	B2	3					6.20E+02		1.30E+02	
TL	VOC	Ethyl Benzene	100-41-4	D	3					1.40E+02		1.40E+02	
TL	VOC	2-Hexanone	591-78-6		3					2.50E+03		2.50E+03	
TL	VOC	Methyl Acetate	79-20-9		3	1	1.80E-02	1.80E-02					
TL	VOC	Methyl tert-butyl ether	1634-04-4		3					5.90E+03		1.80E+03	
TL	VOC	4-Methyl-2-pentanone	108-10-1		3					2.70E+03		2.70E+03	
TL	VOC	Methylcyclohexane	108-87-2		3	1	7.00E-03	7.00E-03					
TL	VOC	Methylene Chloride	75-09-2	B2	3					2.30E+03		1.30E+03	
TL	VOC	Styrene	100-42-5		3					5.20E+02		4.00E+02	
TL	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	3					3.70E+02		5.30E+01	
TL	VOC	Tetrachloroethene	127-18-4	C-B2	3					8.80E+01		8.80E+01	
TL	VOC	Toluene	108-88-3	D	3					2.50E+02		2.50E+02	
TL	VOC	1,2,4-Trichlorobenzene	120-82-1	D	3					1.10E+03		9.90E+02	
TL	VOC	1,1,1-Trichloroethane	71-55-6	D	3					4.60E+02		4.60E+02	
TL	VOC	1,1,2-Trichloroethane	79-00-5	C	3					9.20E+02		1.80E+02	
TL	VOC	Trichloroethene	79-01-6	C-B2	3					5.00E+02		5.00E+02	
TL	VOC	Trichlorofluoromethane	75-69-4		3					5.60E+02		5.60E+02	
TL	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		3					5.50E+02		5.50E+02	
TL	VOC	Vinyl Chloride	75-01-4	A	3					2.90E+01		4.00E+00	
TL	VOC	Xylenes (total)	1330-20-7	D	3	1	1.70E-02	1.70E-02		1.50E+02	1E-04	1.50E+02	1E-04
TL	SVOC	Acenaphthene	83-32-9		3	2	1.10E-01	3.90E-01		2.00E+05	2E-06	4.10E+04	1E-05
TL	SVOC	Acenaphthylene	208-96-8	D	3					8.00E+03		1.60E+03	
TL	SVOC	Acetophenone	98-86-2	D	3					1.10E+03		1.10E+03	
TL	SVOC	Anthracene	120-12-7	D	3	3	2.30E-01	1.40E+00		1.00E+06	1E-06	2.30E+05	6E-06
TL	SVOC	Atrazine	1912-24-9		3					5.00E+02		7.10E+01	
TL	SVOC	Benzaldehyde	100-52-7		3								

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
TL	SVOC	Benzo(a)anthracene	56-55-3	B2	3	3	8.20E-01	3.50E+00		1.00E+02	4E-02	2.00E+01	2E-01
TL	SVOC	Benzo(a)pyrene	50-32-8	B2	3	3	8.80E-01	3.50E+00		1.00E+01	4E-01	2.00E+00	**2E+00**
TL	SVOC	Benzo(b)fluoranthene	205-99-2	B2	3	3	1.20E+00	4.90E+00		1.00E+02	5E-02	2.00E+01	2E-01
TL	SVOC	Benzo(g,h,i)perylene	191-24-2	D	3	3	4.50E-01	1.70E+00		9.10E+03	2E-04	2.50E+03	7E-04
TL	SVOC	Benzo(k)fluoranthene	207-08-9	B2	3	3	5.40E-01	2.30E+00		1.00E+03	2E-03	2.00E+02	1E-02
TL	SVOC	Biphenyl	92-52-4		3								
TL	SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	3								
TL	SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	3					8.90E+01		1.30E+01	
TL	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	3	3	6.70E-01	1.30E+00		1.00E+04	1E-04	2.80E+03	5E-04
TL	SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	3								
TL	SVOC	Butylbenzylphthalate	85-68-7	C	3	2	3.10E-01	3.20E-01		3.10E+02	1E-03	3.10E+02	1E-03
TL	SVOC	Caprolactam	105-60-2		3					4.50E+05		5.30E+04	
TL	SVOC	Carbazole	86-74-8	B2	3	3	1.30E-01	9.90E-01		3.70E+03	3E-04	5.30E+02	2E-03
TL	SVOC	4-Chloro-3-methylphenol	59-50-7		3					2.20E+04		4.50E+03	
TL	SVOC	4-Chloroaniline	106-47-8		3								
TL	SVOC	2-Chloronaphthalene	91-58-7		3					2.80E+05		5.60E+04	
TL	SVOC	2-Chlorophenol	95-57-8		3					6.90E+03		1.40E+03	
TL	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		3								
TL	SVOC	Chrysene	218-01-9	B2	3	3	1.20E+00	4.40E+00		1.00E+04	4E-04	2.00E+03	2E-03
TL	SVOC	Di-n-butylphthalate	84-74-2	D	3					7.60E+02		7.60E+02	
TL	SVOC	Di-n-octylphthalate	117-84-0		3					2.80E+04		6.90E+03	
TL	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	3	2	1.20E-01	4.80E-01		1.00E+01	5E-02	2.00E+00	2E-01
TL	SVOC	Dibenzofuran	132-64-9	D	3								
TL	SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	3					4.70E+01		6.60E+00	
TL	SVOC	2,4-Dichlorophenol	120-83-2		3					1.80E+03		6.60E+02	
TL	SVOC	Diethylphthalate	84-66-2	D	3					7.40E+02		7.40E+02	
TL	SVOC	2,4-Dimethylphenol	105-67-9		3					5.60E+04		1.10E+04	
TL	SVOC	Dimethylphthalate	131-11-3	D	3					7.90E+02		7.90E+02	
TL	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		3					3.90E+02		7.90E+01	
TL	SVOC	2,4-Dinitrophenol	51-28-5		3								
TL	SVOC	2,4-Dinitrotoluene	121-14-2	B2	3					3.40E+02		4.80E+01	
TL	SVOC	2,6-Dinitrotoluene	606-20-2	B2	3								
TL	SVOC	Fluoranthene	206-44-0	D	3	3	2.10E+00	1.10E+01		1.80E+05	6E-05	4.60E+04	2E-04
TL	SVOC	Fluorene	86-73-7	D	3	2	1.60E-01	5.70E-01		1.30E+05	4E-06	2.70E+04	2E-05
TL	SVOC	Hexachlorobenzene	118-74-1	B2	3					5.10E+01		8.90E+00	
TL	SVOC	Hexachlorobutadiene	87-68-3	C	3					3.50E+02		1.00E+02	
TL	SVOC	Hexachlorocyclopentadiene	77-47-4	E	3					7.20E+02		7.20E+02	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
TL	SVOC	Hexachloroethane	67-72-1	C	3					1.10E+03		2.30E+02	
TL	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3	3	4.00E-01	1.70E+00		1.00E+02	2E-02	2.00E+01	9E-02
TL	SVOC	Isophorone	78-59-1	C	3					2.40E+03		2.40E+03	
TL	SVOC	2-Methylnaphthalene	91-57-6		3	1	8.40E-02	8.40E-02		4.00E+04	2E-06	8.10E+03	1E-05
TL	SVOC	Methylphenol (summed)	1319-77-3		3					5.60E+04		1.10E+04	
TL	SVOC	Naphthalene	91-20-3	C	3					8.00E+04		1.60E+04	
TL	SVOC	2-Nitroaniline	88-74-4		3								
TL	SVOC	3-Nitroaniline	99-09-2	C	3								
TL	SVOC	4-Nitroaniline	100-01-6	C	3								
TL	SVOC	Nitrobenzene	98-95-3	D	3					4.90E+02		1.00E+02	
TL	SVOC	2-Nitrophenol	88-75-5		3					3.10E+03		6.30E+02	
TL	SVOC	4-Nitrophenol	100-02-7		3								
TL	SVOC	N-Nitrosodiphenylamine	86-30-6	B2	3					1.20E+04		1.70E+03	
TL	SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	3					8.30E+00		1.20E+00	
TL	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	3								
TL	SVOC	Pentachlorophenol	87-86-5	B2	3					3.90E+02		9.00E+01	
TL	SVOC	Phenanthrene	85-01-8	D	3	3	1.40E+00	7.20E+00		8.00E+03	9E-04	1.60E+03	5E-03
TL	SVOC	Phenol	108-95-2	D	3					1.20E+04		1.20E+04	
TL	SVOC	Pyrene	129-00-0	D	3	3	2.20E+00	7.90E+00		1.10E+05	7E-05	2.90E+04	3E-04
TL	SVOC	2,4,5-Trichlorophenol	95-95-4		3					1.10E+05		2.30E+04	
TL	SVOC	2,4,6-Trichlorophenol	88-06-2	B2	3					5.00E+03		7.10E+02	
TL	P/PCB	PCBs (total)	1336-36-3	B2	3	3	1.42E-01	2.83E-01		2.00E+01	1E-02	4.00E+00	7E-02
TL	INORG	Antimony	7440-36-0		3	3	1.02E+00	1.36E+00		1.20E+03	1E-03	1.80E+02	8E-03
TL	INORG	Arsenic	7440-38-2	A	3	3	2.63E+00	4.62E+00	1.32E+01	6.10E+01		7.60E+00	
TL	INORG	Barium	7440-39-3	D	3	3	5.19E+01	6.55E+01	1.10E+02	2.50E+05		3.70E+04	
TL	INORG	Beryllium	7440-41-7	B1	3	3	6.57E-02	1.27E-01	1.53E+00	3.10E+03		4.10E+02	
TL	INORG	Cadmium	7440-43-9	B1	3	3	4.79E-01	1.17E+00	1.20E+00	4.10E+03		5.50E+02	
TL	INORG	Chromium (total)	7440-47-3		3	3	1.98E+01	3.18E+01	4.92E+01	1.70E+04		2.50E+03	
TL	INORG	Cobalt	7440-48-4		3	3	1.48E+00	3.13E+00	1.74E+01	1.80E+04		2.60E+03	
TL	INORG	Copper	7440-50-8	D	3	3	3.42E+01	6.62E+01	3.20E+01	1.40E+05	2E-04	2.00E+04	2E-03
TL	INORG	Cyanide (total)	57-12-5	D	3	3	4.89E-01	1.03E+00		2.50E+02	4E-03	1.20E+01	9E-02
TL	INORG	Lead	7439-92-1	B2	3	3	1.04E+02	1.76E+02	4.92E+01	9.00E+02	1E-01	4.00E+02	3E-01
TL	INORG	Manganese	7439-96-5	D	3	3	2.23E+02	5.06E+02	5.10E+02	1.70E+05		2.50E+04	
TL	INORG	Mercury	7439-97-6	D	3	3	3.49E-02	9.21E-02	1.30E-01	1.10E+03		1.60E+02	
TL	INORG	Nickel	7440-02-0	A	3	3	1.25E+01	1.68E+01	3.01E+01	2.70E+05		4.00E+04	
TL	INORG	Selenium	7782-49-2	D	3	1	7.74E-01	7.74E-01	4.10E-01	1.80E+04	2E-05	2.60E+03	1E-04
TL	INORG	Silver	7440-22-4	D	3					1.70E+04		2.50E+03	

Table 8.9: Sediment Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Industrial Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Industrial Direct Contact Criteria	Residential Direct Contact Criteria (mg/kg)	Ratio of Max Detect to Residential Direct Contact Criteria
TL	INORG	Thallium	7440-28-0		3	1	8.26E-01	8.26E-01		2.40E+02	3E-03	3.50E+01	2E-02
TL	INORG	Vanadium	7440-62-2		3	3	5.85E+00	1.13E+01	3.28E+01	1.00E+04		7.50E+02	
TL	INORG	Zinc	7440-66-6	D	3	3	8.57E+01	2.54E+02	4.70E+01	1.00E+06	2E-04	1.70E+05	1E-03
	Notes:												
	Screening Criteria is from Michigan DEQ Part 201 (MDEQ 2000).												
	The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.												
	The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.												
	The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.												
	The concentrations for all PCB isomers were summed before comparing to the Screening Levels.												
	The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.												
	The concentrations for the Target Dioxin congeners were used to calculate an 2,3,7,8-TCDD Equivalent, using EPA 1998 TEFs,												
	before comparing to the Screening Levels for 2,3,7,8-TCDD.												
	Chem Group - Chemical Group												
	Carc Class - EPA Weight-of-Evidence Cancer Classification												
	The evaluation of sediments is from the RFI Report (ENCORE 2002b).												

Table 8.10: Estimates of High-End Cumulative Cancer Risk and Hazard Index for Harris Lake
General Motors - Pontiac North Campus, Pontiac, Michigan

	Ingestion	Dermal Contact	Particulate Inhalation	Vapor Inhalation	Sum
	Cumulative Cancer Risk				
Surface Soil	5E-05	1E-05	4E-07	3E-07	6E-05
Sediment	1E-05	1E-06	NA	NA	1E-05
Surface Water and Oil	9E-07	8E-06	NA	NA	9E-06
Fish	4E-06	NA	NA	NA	4E-06
	Hazard Index (HI)				
Surface Soil	1E+00	2E-02	2E-02	9E-02	1E+00
Sediment	1E-01	3E-03	NA	NA	1E-01
Surface Water and Oil	5E-02	7E-01	NA	NA	8E-01
Fish	3E-01	NA	NA	NA	3E-01
Note:					
Risks for Harris Lake were calculated in the Baseline Human Health Risk Assessment for Harris Lake, Michigan (ENVIRON 2002).					

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
HL	VOC	Acetone	67-64-1	D	10	3	7.60E-04	9.50E-04	7.30E-01	1E-03	3.10E+04	3E-08
HL	VOC	Benzene	71-43-2	A	10	4	1.90E-04	3.40E-04	5.00E-03	7E-02	1.10E+01	3E-05
HL	VOC	Bromodichloromethane	75-27-4	B2	10				1.00E-01		1.40E+01	
HL	VOC	Bromoform	75-25-2	B2	10				1.00E-01		1.40E+02	
HL	VOC	Bromomethane	74-83-9	D	10				1.00E-02		7.00E+01	
HL	VOC	2-Butanone	78-93-3	D	10	1	7.20E-04	7.20E-04	1.30E+01	6E-05	2.40E+05	3E-09
HL	VOC	Carbon Disulfide	75-15-0		10				8.00E-01		1.20E+03	
HL	VOC	Carbon Tetrachloride	56-23-5	B2	10				5.00E-03		4.60E+00	
HL	VOC	Chlorobenzene	108-90-7	D	10				1.00E-01		8.60E+01	
HL	VOC	Chloroethane	75-00-3		10				4.30E-01		4.40E+02	
HL	VOC	Chloroform	67-66-3	B2	10				1.00E-01		1.50E+02	
HL	VOC	Chloromethane	74-87-3	D	10				2.60E-01		4.90E+02	
HL	VOC	Cumene	98-82-8	D	10				8.00E-01		5.60E+01	
HL	VOC	Cyclohexane	110-82-7		10							
HL	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	10				2.00E-04		3.90E-01	
HL	VOC	Dibromochloromethane	124-48-1	C	10				1.00E-01		1.80E+01	
HL	VOC	1,2-Dibromoethane	106-93-4	B2	10				1.00E-03		2.50E-02	
HL	VOC	1,2-Dichlorobenzene	95-50-1	D	10				6.00E-01		1.60E+02	
HL	VOC	1,3-Dichlorobenzene	541-73-1	D	10				6.60E-03		2.00E+00	
HL	VOC	1,4-Dichlorobenzene	106-46-7	C	10				7.50E-02		6.40E+00	
HL	VOC	Dichlorodifluoromethane	75-71-8		10				1.70E+00		3.00E+02	
HL	VOC	1,1-Dichloroethane	75-34-3	C	10				8.80E-01		2.40E+03	
HL	VOC	1,2-Dichloroethane	107-06-2	B2	10				5.00E-03		1.90E+01	
HL	VOC	1,1-Dichloroethene	75-35-4	C	10				7.00E-03		1.10E+01	
HL	VOC	cis-1,2-Dichloroethene	156-59-2	D	10				7.00E-02		2.00E+02	
HL	VOC	trans-1,2-Dichloroethene	156-60-5		10				1.00E-01		2.20E+02	
HL	VOC	1,2-Dichloropropane	78-87-5	B2	10				5.00E-03		1.60E+01	
HL	VOC	1,3-Dichloropropene (summed)	542-75-6	B2	10				2.10E-02		1.30E+01	
HL	VOC	Ethyl Benzene	100-41-4	D	10	2	1.20E-04	1.70E-04	7.00E-01	2E-04	1.70E+02	1E-06
HL	VOC	2-Hexanone	591-78-6		10				1.00E+00		5.20E+03	
HL	VOC	Methyl Acetate	79-20-9		10							
HL	VOC	Methyl tert-butyl ether	1634-04-4		10	1	1.10E-03	1.10E-03	2.40E-01	5E-03	6.90E+02	2E-06
HL	VOC	4-Methyl-2-pentanone	108-10-1		10	1	1.70E-03	1.70E-03	1.80E+00	9E-04	1.30E+04	1E-07
HL	VOC	Methylcyclohexane	108-87-2		10							
HL	VOC	Methylene Chloride	75-09-2	B2	10				5.00E-03		2.20E+02	
HL	VOC	Styrene	100-42-5		10				1.00E-01		9.70E+00	
HL	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	10				8.50E-03		4.70E+00	

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
HL	VOC	Tetrachloroethene	127-18-4	C-B2	10				5.00E-03		1.20E+01	
HL	VOC	Toluene	108-88-3	D	10	9	2.20E-04	1.10E-03	1.00E+00	1E-03	5.30E+02	2E-06
HL	VOC	1,2,4-Trichlorobenzene	120-82-1	D	10				7.00E-02		1.90E+01	
HL	VOC	1,1,1-Trichloroethane	71-55-6	D	10				2.00E-01		1.30E+03	
HL	VOC	1,1,2-Trichloroethane	79-00-5	C	10				5.00E-03		2.10E+01	
HL	VOC	Trichloroethene	79-01-6	C-B2	10				5.00E-03		3.70E+01	
HL	VOC	Trichlorofluoromethane	75-69-4		10				2.60E+00		1.10E+03	
HL	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		10				1.70E+02		1.70E+02	
HL	VOC	Vinyl Chloride	75-01-4	A	10				2.00E-03		5.70E-01	
HL	VOC	Xylenes (total)	1330-20-7	D	10	3	5.50E-04	1.00E-03	1.00E+01	1E-04	1.90E+02	5E-06
HL	SVOC	Acenaphthene	83-32-9		10				1.30E+00		4.20E+00	
HL	SVOC	Acenaphthylene	208-96-8	D	10				5.20E-02		3.90E+00	
HL	SVOC	Acetophenone	98-86-2	D	10				1.50E+00		6.10E+03	
HL	SVOC	Anthracene	120-12-7	D	10				4.30E-02		4.30E-02	
HL	SVOC	Atrazine	1912-24-9		10				3.00E-03		5.40E+00	
HL	SVOC	Benzaldehyde	100-52-7		10							
HL	SVOC	Benzo(a)anthracene	56-55-3	B2	10				2.10E-03		9.40E-03	
HL	SVOC	Benzo(a)pyrene	50-32-8	B2	10				5.00E-03		5.00E-03	
HL	SVOC	Benzo(b)fluoranthene	205-99-2	B2	10				2.00E-03		2.00E-03	
HL	SVOC	Benzo(g,h,i)perylene	191-24-2	D	10				5.00E-03		5.00E-03	
HL	SVOC	Benzo(k)fluoranthene	207-08-9	B2	10				5.00E-03		5.00E-03	
HL	SVOC	Biphenyl	92-52-4		10							
HL	SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	10							
HL	SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	10				2.00E-03		5.70E+00	
HL	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	10				6.00E-03		3.20E-01	
HL	SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	10							
HL	SVOC	Butylbenzylphthalate	85-68-7	C	10				1.20E+00		2.70E+00	
HL	SVOC	Caprolactam	105-60-2		10				5.80E+00		3.90E+05	
HL	SVOC	Carbazole	86-74-8	B2	10				8.50E-02		7.40E+00	
HL	SVOC	4-Chloro-3-methylphenol	59-50-7		10				1.50E-01		7.90E+01	
HL	SVOC	4-Chloroaniline	106-47-8		10							
HL	SVOC	2-Chloronaphthalene	91-58-7		10				1.80E+00		6.70E+00	
HL	SVOC	2-Chlorophenol	95-57-8		10				4.50E-02		9.40E+01	
HL	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		10							
HL	SVOC	Chrysene	218-01-9	B2	10				5.00E-03		5.00E-03	
HL	SVOC	Di-n-butylphthalate	84-74-2	D	10				8.80E-01		1.10E+01	
HL	SVOC	Di-n-octylphthalate	117-84-0		10				1.30E-01		4.00E-01	

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
HL	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	10				5.00E-03		5.00E-03	
HL	SVOC	Dibenzofuran	132-64-9	D	10							
HL	SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	10				1.10E-03		1.80E-01	
HL	SVOC	2,4-Dichlorophenol	120-83-2		10				7.30E-02		4.80E+01	
HL	SVOC	Diethylphthalate	84-66-2	D	10				5.50E+00		1.10E+03	
HL	SVOC	2,4-Dimethylphenol	105-67-9		10				3.70E-01		5.20E+02	
HL	SVOC	Dimethylphthalate	131-11-3	D	10				7.30E+01		4.20E+03	
HL	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		10				2.00E-02		9.50E+00	
HL	SVOC	2,4-Dinitrophenol	51-28-5		10							
HL	SVOC	2,4-Dinitrotoluene	121-14-2	B2	10				7.70E-03		8.60E+00	
HL	SVOC	2,6-Dinitrotoluene	606-20-2	B2	10							
HL	SVOC	Fluoranthene	206-44-0	D	10				2.10E-01		2.10E-01	
HL	SVOC	Fluorene	86-73-7	D	10				8.80E-01		2.00E+00	
HL	SVOC	Hexachlorobenzene	118-74-1	B2	10				1.00E-03		4.60E-03	
HL	SVOC	Hexachlorobutadiene	87-68-3	C	10				1.50E-02		4.00E-01	
HL	SVOC	Hexachlorocyclopentadiene	77-47-4	E	10				5.00E-02		1.80E+00	
HL	SVOC	Hexachloroethane	67-72-1	C	10				7.30E-03		1.90E+00	
HL	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	10				5.00E-03		5.00E-03	
HL	SVOC	Isophorone	78-59-1	C	10				7.70E-01		9.90E+02	
HL	SVOC	2-Methylnaphthalene	91-57-6		10	1	1.01E-03	1.01E-03	2.60E-01	4E-03	2.50E+01	4E-05
HL	SVOC	Methylphenol (summed)	1319-77-3		10				3.70E-01		8.10E+02	
HL	SVOC	Naphthalene	91-20-3	C	10	1	1.19E-03	1.19E-03	5.20E-01	2E-03	3.10E+01	4E-05
HL	SVOC	2-Nitroaniline	88-74-4		10							
HL	SVOC	3-Nitroaniline	99-09-2	C	10							
HL	SVOC	4-Nitroaniline	100-01-6	C	10							
HL	SVOC	Nitrobenzene	98-95-3	D	10				3.40E-03		1.10E+01	
HL	SVOC	2-Nitrophenol	88-75-5		10				2.00E-02		7.90E+01	
HL	SVOC	4-Nitrophenol	100-02-7		10							
HL	SVOC	N-Nitrosodiphenylamine	86-30-6	B2	10				2.70E-01		3.50E+01	
HL	SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	10				5.00E-03		3.60E-01	
HL	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	10							
HL	SVOC	Pentachlorophenol	87-86-5	B2	10				1.00E-03		2.00E-01	
HL	SVOC	Phenanthrene	85-01-8	D	10				5.20E-02		1.00E+00	
HL	SVOC	Phenol	108-95-2	D	10				4.40E+00		2.90E+04	
HL	SVOC	Pyrene	129-00-0	D	10				1.40E-01		1.40E-01	
HL	SVOC	2,4,5-Trichlorophenol	95-95-4		10				7.30E-01		1.70E+02	
HL	SVOC	2,4,6-Trichlorophenol	88-06-2	B2	10				1.20E-01		1.00E+01	

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
HL	P/PCB	PCBs (total)	1336-36-3	B2	10				5.00E-04		3.30E-03	
HL	INORG	Antimony	7440-36-0		10	2	3.00E-03	3.80E-03	6.00E-03	6E-01	6.80E+01	6E-05
HL	INORG	Arsenic	7440-38-2	A	10	5	4.10E-03	6.70E-03	5.00E-02	1E-01	4.30E+00	2E-03
HL	INORG	Barium	7440-39-3	D	10	10	2.14E-01	1.32E+00	2.00E+00	7E-01	1.40E+04	9E-05
HL	INORG	Beryllium	7440-41-7	B1	10				4.00E-03		2.90E+02	
HL	INORG	Cadmium	7440-43-9	B1	10	7	2.80E-04	3.80E-04	5.00E-03	8E-02	1.90E+02	2E-06
HL	INORG	Chromium (total)	7440-47-3		10	2	1.15E-03	2.40E-03	1.00E-01	2E-02	4.60E+02	5E-06
HL	INORG	Cobalt	7440-48-4		10				4.00E-02		2.40E+03	
HL	INORG	Copper	7440-50-8	D	10	7	4.20E-03	8.00E-03	1.40E+00	6E-03	7.40E+03	1E-06
HL	INORG	Lead	7439-92-1	B2	10				4.00E-03			
HL	INORG	Manganese	7439-96-5	D	10	10	2.49E-02	2.95E-01	8.60E-01	3E-01	9.10E+03	3E-05
HL	INORG	Mercury	7439-97-6	D	10				2.00E-03		5.60E-02	
HL	INORG	Nickel	7440-02-0	A	10	10	3.00E-03	6.40E-03	1.00E-01	6E-02	7.40E+04	9E-08
HL	INORG	Selenium	7782-49-2	D	10				5.00E-02		9.70E+02	
HL	INORG	Silver	7440-22-4	D	10				3.40E-02		1.50E+03	
HL	INORG	Thallium	7440-28-0		10	4	6.60E-03	1.18E-02	2.00E-03	**6E+00**	1.30E+01	9E-04
HL	INORG	Vanadium	7440-62-2		10	1	9.70E-04	9.70E-04	4.50E-03	2E-01	9.70E+02	1E-06
HL	INORG	Zinc	7440-66-6	D	10	4	1.29E-02	1.87E-02	2.40E+00	8E-03	1.10E+05	2E-07
OUTFALL 001	VOC	Acetone	67-64-1	D	2				7.30E-01		3.10E+04	
OUTFALL 001	VOC	Benzene	71-43-2	A	2				5.00E-03		1.10E+01	
OUTFALL 001	VOC	Bromodichloromethane	75-27-4	B2	2	2	5.80E-04	7.30E-03	1.00E-01	7E-02	1.40E+01	5E-04
OUTFALL 001	VOC	Bromoform	75-25-2	B2	2				1.00E-01		1.40E+02	
OUTFALL 001	VOC	Bromomethane	74-83-9	D	2				1.00E-02		7.00E+01	
OUTFALL 001	VOC	2-Butanone	78-93-3	D	2	1	7.90E-04	7.90E-04	1.30E+01	6E-05	2.40E+05	3E-09
OUTFALL 001	VOC	Carbon Disulfide	75-15-0		2				8.00E-01		1.20E+03	
OUTFALL 001	VOC	Carbon Tetrachloride	56-23-5	B2	2				5.00E-03		4.60E+00	
OUTFALL 001	VOC	Chlorobenzene	108-90-7	D	2				1.00E-01		8.60E+01	
OUTFALL 001	VOC	Chloroethane	75-00-3		2				4.30E-01		4.40E+02	
OUTFALL 001	VOC	Chloroform	67-66-3	B2	2	2	9.40E-04	1.20E-02	1.00E-01	1E-01	1.50E+02	8E-05
OUTFALL 001	VOC	Chloromethane	74-87-3	D	2				2.60E-01		4.90E+02	
OUTFALL 001	VOC	Cumene	98-82-8	D	2				8.00E-01		5.60E+01	
OUTFALL 001	VOC	Cyclohexane	110-82-7		2							
OUTFALL 001	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	2				2.00E-04		3.90E-01	
OUTFALL 001	VOC	Dibromochloromethane	124-48-1	C	2	1	2.90E-03	2.90E-03	1.00E-01	3E-02	1.80E+01	2E-04
OUTFALL 001	VOC	1,2-Dibromoethane	106-93-4	B2	2				1.00E-03		2.50E-02	
OUTFALL 001	VOC	1,2-Dichlorobenzene	95-50-1	D	2				6.00E-01		1.60E+02	
OUTFALL 001	VOC	1,3-Dichlorobenzene	541-73-1	D	2				6.60E-03		2.00E+00	

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
OUTFALL 001	VOC	1,4-Dichlorobenzene	106-46-7	C	2				7.50E-02		6.40E+00	
OUTFALL 001	VOC	Dichlorodifluoromethane	75-71-8		2				1.70E+00		3.00E+02	
OUTFALL 001	VOC	1,1-Dichloroethane	75-34-3	C	2				8.80E-01		2.40E+03	
OUTFALL 001	VOC	1,2-Dichloroethane	107-06-2	B2	2				5.00E-03		1.90E+01	
OUTFALL 001	VOC	1,1-Dichloroethene	75-35-4	C	2				7.00E-03		1.10E+01	
OUTFALL 001	VOC	cis-1,2-Dichloroethene	156-59-2	D	2				7.00E-02		2.00E+02	
OUTFALL 001	VOC	trans-1,2-Dichloroethene	156-60-5		2				1.00E-01		2.20E+02	
OUTFALL 001	VOC	1,2-Dichloropropane	78-87-5	B2	2				5.00E-03		1.60E+01	
OUTFALL 001	VOC	1,3-Dichloropropene (summed)	542-75-6	B2	2				2.10E-02		1.30E+01	
OUTFALL 001	VOC	Ethyl Benzene	100-41-4	D	2				7.00E-01		1.70E+02	
OUTFALL 001	VOC	2-Hexanone	591-78-6		2				1.00E+00		5.20E+03	
OUTFALL 001	VOC	Methyl Acetate	79-20-9		2							
OUTFALL 001	VOC	Methyl tert-butyl ether	1634-04-4		2				2.40E-01		6.90E+02	
OUTFALL 001	VOC	4-Methyl-2-pentanone	108-10-1		2	1	1.90E-03	1.90E-03	1.80E+00	1E-03	1.30E+04	1E-07
OUTFALL 001	VOC	Methylcyclohexane	108-87-2		2							
OUTFALL 001	VOC	Methylene Chloride	75-09-2	B2	2				5.00E-03		2.20E+02	
OUTFALL 001	VOC	Styrene	100-42-5		2				1.00E-01		9.70E+00	
OUTFALL 001	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	2				8.50E-03		4.70E+00	
OUTFALL 001	VOC	Tetrachloroethene	127-18-4	C-B2	2				5.00E-03		1.20E+01	
OUTFALL 001	VOC	Toluene	108-88-3	D	2				1.00E+00		5.30E+02	
OUTFALL 001	VOC	1,2,4-Trichlorobenzene	120-82-1	D	2				7.00E-02		1.90E+01	
OUTFALL 001	VOC	1,1,1-Trichloroethane	71-55-6	D	2				2.00E-01		1.30E+03	
OUTFALL 001	VOC	1,1,2-Trichloroethane	79-00-5	C	2				5.00E-03		2.10E+01	
OUTFALL 001	VOC	Trichloroethene	79-01-6	C-B2	2				5.00E-03		3.70E+01	
OUTFALL 001	VOC	Trichlorofluoromethane	75-69-4		2				2.60E+00		1.10E+03	
OUTFALL 001	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		2				1.70E+02		1.70E+02	
OUTFALL 001	VOC	Vinyl Chloride	75-01-4	A	2				2.00E-03		5.70E-01	
OUTFALL 001	VOC	Xylenes (total)	1330-20-7	D	2				1.00E+01		1.90E+02	
OUTFALL 001	SVOC	Acenaphthene	83-32-9		2				1.30E+00		4.20E+00	
OUTFALL 001	SVOC	Acenaphthylene	208-96-8	D	2				5.20E-02		3.90E+00	
OUTFALL 001	SVOC	Acetophenone	98-86-2	D	2				1.50E+00		6.10E+03	
OUTFALL 001	SVOC	Anthracene	120-12-7	D	2				4.30E-02		4.30E-02	
OUTFALL 001	SVOC	Atrazine	1912-24-9		2				3.00E-03		5.40E+00	
OUTFALL 001	SVOC	Benzaldehyde	100-52-7		2							
OUTFALL 001	SVOC	Benzo(a)anthracene	56-55-3	B2	2				2.10E-03		9.40E-03	
OUTFALL 001	SVOC	Benzo(a)pyrene	50-32-8	B2	2				5.00E-03		5.00E-03	
OUTFALL 001	SVOC	Benzo(b)fluoranthene	205-99-2	B2	2				2.00E-03		2.00E-03	

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
OUTFALL 001	SVOC	Benzo(g,h,i)perylene	191-24-2	D	2				5.00E-03		5.00E-03	
OUTFALL 001	SVOC	Benzo(k)fluoranthene	207-08-9	B2	2				5.00E-03		5.00E-03	
OUTFALL 001	SVOC	Biphenyl	92-52-4		2							
OUTFALL 001	SVOC	bis(2-Chloroethoxy)methane	111-91-1	D	2							
OUTFALL 001	SVOC	bis(2-Chloroethyl) ether	111-44-4	B2	2				2.00E-03		5.70E+00	
OUTFALL 001	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	2				6.00E-03		3.20E-01	
OUTFALL 001	SVOC	4-Bromophenyl-phenyl ether	101-55-3	D	2							
OUTFALL 001	SVOC	Butylbenzylphthalate	85-68-7	C	2				1.20E+00		2.70E+00	
OUTFALL 001	SVOC	Caprolactam	105-60-2		2				5.80E+00		3.90E+05	
OUTFALL 001	SVOC	Carbazole	86-74-8	B2	2				8.50E-02		7.40E+00	
OUTFALL 001	SVOC	4-Chloro-3-methylphenol	59-50-7		2				1.50E-01		7.90E+01	
OUTFALL 001	SVOC	4-Chloroaniline	106-47-8		2							
OUTFALL 001	SVOC	2-Chloronaphthalene	91-58-7		2				1.80E+00		6.70E+00	
OUTFALL 001	SVOC	2-Chlorophenol	95-57-8		2				4.50E-02		9.40E+01	
OUTFALL 001	SVOC	4-Chlorophenyl-phenyl ether	7005-72-3		2							
OUTFALL 001	SVOC	Chrysene	218-01-9	B2	2				5.00E-03		5.00E-03	
OUTFALL 001	SVOC	Di-n-butylphthalate	84-74-2	D	2				8.80E-01		1.10E+01	
OUTFALL 001	SVOC	Di-n-octylphthalate	117-84-0		2				1.30E-01		4.00E-01	
OUTFALL 001	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	2				5.00E-03		5.00E-03	
OUTFALL 001	SVOC	Dibenzofuran	132-64-9	D	2							
OUTFALL 001	SVOC	3,3'-Dichlorobenzidine	91-94-1	B2	2				1.10E-03		1.80E-01	
OUTFALL 001	SVOC	2,4-Dichlorophenol	120-83-2		2				7.30E-02		4.80E+01	
OUTFALL 001	SVOC	Diethylphthalate	84-66-2	D	2				5.50E+00		1.10E+03	
OUTFALL 001	SVOC	2,4-Dimethylphenol	105-67-9		2				3.70E-01		5.20E+02	
OUTFALL 001	SVOC	Dimethylphthalate	131-11-3	D	2				7.30E+01		4.20E+03	
OUTFALL 001	SVOC	4,6-Dinitro-2-methylphenol	534-52-1		2				2.00E-02		9.50E+00	
OUTFALL 001	SVOC	2,4-Dinitrophenol	51-28-5		2							
OUTFALL 001	SVOC	2,4-Dinitrotoluene	121-14-2	B2	2				7.70E-03		8.60E+00	
OUTFALL 001	SVOC	2,6-Dinitrotoluene	606-20-2	B2	2							
OUTFALL 001	SVOC	Fluoranthene	206-44-0	D	2				2.10E-01		2.10E-01	
OUTFALL 001	SVOC	Fluorene	86-73-7	D	2				8.80E-01		2.00E+00	
OUTFALL 001	SVOC	Hexachlorobenzene	118-74-1	B2	2				1.00E-03		4.60E-03	
OUTFALL 001	SVOC	Hexachlorobutadiene	87-68-3	C	2				1.50E-02		4.00E-01	
OUTFALL 001	SVOC	Hexachlorocyclopentadiene	77-47-4	E	2				5.00E-02		1.80E+00	
OUTFALL 001	SVOC	Hexachloroethane	67-72-1	C	2				7.30E-03		1.90E+00	
OUTFALL 001	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	2				5.00E-03		5.00E-03	
OUTFALL 001	SVOC	Isophorone	78-59-1	C	2				7.70E-01		9.90E+02	

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
OUTFALL 001	SVOC	2-Methylnaphthalene	91-57-6		2				2.60E-01		2.50E+01	
OUTFALL 001	SVOC	Methylphenol (summed)	1319-77-3		2				3.70E-01		8.10E+02	
OUTFALL 001	SVOC	Naphthalene	91-20-3	C	2				5.20E-01		3.10E+01	
OUTFALL 001	SVOC	2-Nitroaniline	88-74-4		2							
OUTFALL 001	SVOC	3-Nitroaniline	99-09-2	C	2							
OUTFALL 001	SVOC	4-Nitroaniline	100-01-6	C	2							
OUTFALL 001	SVOC	Nitrobenzene	98-95-3	D	2				3.40E-03		1.10E+01	
OUTFALL 001	SVOC	2-Nitrophenol	88-75-5		2				2.00E-02		7.90E+01	
OUTFALL 001	SVOC	4-Nitrophenol	100-02-7		2							
OUTFALL 001	SVOC	N-Nitrosodiphenylamine	86-30-6	B2	2				2.70E-01		3.50E+01	
OUTFALL 001	SVOC	N-Nitroso-di-n-propylamine	621-64-7	B2	2				5.00E-03		3.60E-01	
OUTFALL 001	SVOC	2,2'-oxybis(1-Chloropropane)	108-60-1	C	2							
OUTFALL 001	SVOC	Pentachlorophenol	87-86-5	B2	2				1.00E-03		2.00E-01	
OUTFALL 001	SVOC	Phenanthrene	85-01-8	D	2				5.20E-02		1.00E+00	
OUTFALL 001	SVOC	Phenol	108-95-2	D	2				4.40E+00		2.90E+04	
OUTFALL 001	SVOC	Pyrene	129-00-0	D	2				1.40E-01		1.40E-01	
OUTFALL 001	SVOC	2,4,5-Trichlorophenol	95-95-4		2				7.30E-01		1.70E+02	
OUTFALL 001	SVOC	2,4,6-Trichlorophenol	88-06-2	B2	2				1.20E-01		1.00E+01	
OUTFALL 001	P/PCB	PCBs (total)	1336-36-3	B2	2	1	9.50E-04	9.50E-04	5.00E-04	**2E+00**	3.30E-03	3E-01
OUTFALL 001	INORG	Antimony	7440-36-0		2				6.00E-03		6.80E+01	
OUTFALL 001	INORG	Arsenic	7440-38-2	A	2				5.00E-02		4.30E+00	
OUTFALL 001	INORG	Barium	7440-39-3	D	2	2	1.47E-02	3.29E-02	2.00E+00	2E-02	1.40E+04	2E-06
OUTFALL 001	INORG	Beryllium	7440-41-7	B1	2				4.00E-03		2.90E+02	
OUTFALL 001	INORG	Cadmium	7440-43-9	B1	2	1	5.60E-04	5.60E-04	5.00E-03	1E-01	1.90E+02	3E-06
OUTFALL 001	INORG	Chromium (total)	7440-47-3		2	1	3.40E-03	3.40E-03	1.00E-01	3E-02	4.60E+02	7E-06
OUTFALL 001	INORG	Cobalt	7440-48-4		2	1	1.80E-03	1.80E-03	4.00E-02	5E-02	2.40E+03	8E-07
OUTFALL 001	INORG	Copper	7440-50-8	D	2	1	1.49E-02	1.49E-02	1.40E+00	1E-02	7.40E+03	2E-06
OUTFALL 001	INORG	Lead	7439-92-1	B2	2	1	7.70E-03	7.70E-03	4.00E-03	**2E+00**		
OUTFALL 001	INORG	Manganese	7439-96-5	D	2	2	1.20E-03	1.35E-01	8.60E-01	2E-01	9.10E+03	1E-05
OUTFALL 001	INORG	Mercury	7439-97-6	D	2				2.00E-03		5.60E-02	
OUTFALL 001	INORG	Nickel	7440-02-0	A	2	1	4.60E-03	4.60E-03	1.00E-01	5E-02	7.40E+04	6E-08
OUTFALL 001	INORG	Selenium	7782-49-2	D	2				5.00E-02		9.70E+02	
OUTFALL 001	INORG	Silver	7440-22-4	D	2				3.40E-02		1.50E+03	
OUTFALL 001	INORG	Thallium	7440-28-0		2	2	6.70E-03	1.03E-02	2.00E-03	**5E+00**	1.30E+01	8E-04
OUTFALL 001	INORG	Vanadium	7440-62-2		2	1	4.00E-03	4.00E-03	4.50E-03	9E-01	9.70E+02	4E-06
OUTFALL 001	INORG	Zinc	7440-66-6	D	2	1	1.18E-01	1.18E-01	2.40E+00	5E-02	1.10E+05	1E-06

Table 8.11: Surface Water Screening Results
General Motors - Pontiac North Campus, Pontiac, Michigan

AOI	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	Residential Drinking Water Criteria (mg/L)	Ratio of Max Detect to Residential Drinking Water Criteria	Contact Criteria (mg/L)	Ratio of Max Detect to Contact Criteria
	Notes:											
	Screening Criteria is from Michigan DEQ Part 201 (MDEQ 2000).											
	The Screening Levels for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.											
	The Screening Levels for Naphthalene was used as a surrogate for 2-Methylnaphthalene.											
	The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Levels.											
	The concentrations for all PCB isomers were summed before comparing to the Screening Levels.											
	The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Levels.											
	The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Levels.											
	Chem Group - Chemical Group											
	Meas Basis - Measured Basis; T = Total, D = Dissolved											
	Carc Class - EPA Weight-of-Evidence Cancer Classification											
	The evaluation of surface water is from the RFI Report (ENCORE 2002b).											

TABLE 9-1
COST SUMMARY - ON-SITE GROUNDWATER
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHI
(AOIs W-1, W-5, W-8, W-9, W-11, M-1, M-2, M-5, M-16, F-7, P-9, AND P-11)
INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

INITIAL COSTS FOR GROUNDWATER MONITORING	
Notification/coordination with sewer authority	$5,000
GSI Evaluation	$30,000
Mixing Zone Determination/Site-specific GSI Criteria Development	$40,000
Update Groundwater Monitoring Plan	$30,000
Install Groundwater Monitoring Wells	$80,000
Background Metals Evaluation	$50,000
ANNUAL COSTS FOR GROUNDWATER MONITORING, YEARS 1 THROUGH 5	
Sampling, Laboratory Analysis & Reporting (1)	$80,000
Well Inspection and Repairs	$5,000
Coordination with sewer rehabilitation, site redevelopment	$10,000
ANNUAL COSTS FOR GROUNDWATER MONITORING, YEARS 6 THROUGH 30	
Sampling, Laboratory Analysis & Reporting	$50,000
Well Inspection and Repairs	$5,000
Coordination with sewer rehabilitation, site redevelopment	$10,000
OPERATION AND MAINTENANCE COSTS, EVERY 5 YEARS	
Update Monitoring Plan	$5,000
Install/Replace Monitoring Wells	$30,000
COSTS FOR ON-SITE GROUNDWATER INSTITUTIONAL CONTROLS	
Prepare and File Deed Restriction	$30,000
TOTAL (2,4)	$2,575,000

(1) As proposed in Section 6.0

(2) Including 30 years O & M

(3) Does not include cost for implementing active remediation system

TABLE 9-2
COST SUMMARY - AOI W-9 SOILS
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
CAP AND INSTITUTIONAL CONTROLS

CAPITAL COSTS FOR CAP CONSTRUCTION	
Engineering Oversight and Administration	$5,000
Construction	$25,000
Update Due Care Documentation	$2,500
COSTS FOR INSTITUTIONAL CONTROLS	
Deed Restriction	$20,000
ANNUAL O & M FOR INSTITUTIONAL CONTROLS	
Cap Maintenance	$500
TOTAL (1)	$67,500

(1) Including 30 years O & M

TABLE 9-3
COST SUMMARY - AOI M-4 GROUNDWATER
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
ORC ® INJECTION

CAPITAL COSTS	
ORC ® Slurry Injection	$12,000
Engineering and Administration	$12,000
MONITORING COSTS	
Groundwater sampling, analysis & reporting (1)	$45,000
TOTAL	$69,000

(1) Includes 2 years monitoring.

TABLE 9-4
COST SUMMARY - AOI M-4 GROUNDWATER
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
PUMP AND TREAT WITH GAC

CAPITAL COSTS	
Equipment	$20,000
Engineering & Administration	$12,000
OPERATION & MAINTENANCE COSTS	
Labor, equipment, sampling (1)	$21,000
MONITORING COSTS	
Groundwater sampling, analysis & reporting (2)	$45,000
TOTAL	$98,000

(1) Includes 12 months of operation

(2) Includes 2 years of monitoring

TABLE 9-5
COST SUMMARY - AOI M-4 GROUNDWATER
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

CAPITAL COSTS	
None	$0
ANNUAL COSTS	
None	$0
TOTAL (1)	$0

(1) Assumes deed restriction is filed for Pontiac North Campus for on-Site groundwater at other AOIs that includes AOI M-4, and therefore no additional costs are incurred for including AOI M-4.

TABLE 9-6
COST SUMMARY - AOI P-6 GROUNDWATER
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
ORC ® INJECTION

CAPITAL COSTS	
ORC ® Slurry Injection	$16,000
Engineering and Administration	$12,000
MONITORING COSTS	
Groundwater sampling, analysis & reporting (1)	$45,000
TOTAL	$73,000

(1) Includes 2 years monitoring.

TABLE 9-7
COST SUMMARY - AOI P-6 GROUNDWATER
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
PUMP AND TREAT WITH GAC

CAPITAL COSTS	
Equipment	$24,000
Engineering & Administration	$12,000
OPERATION & MAINTENANCE COSTS	
Labor, equipment, sampling (1)	$22,000
MONITORING COSTS	
Groundwater sampling, analysis & reporting (2)	$45,000
TOTAL	$103,000

(1) Includes 12 months of operation

(2) Includes 2 years of monitoring

TABLE 9-8
COST SUMMARY - AOI P-6 GROUNDWATER
GENERAL MOTORS PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

CAPITAL COSTS	
None	$0
ANNUAL COSTS	
None	$0
TOTAL (1)	$0

(1) Assumes deed restriction is filed for Pontiac North Campus for on-Site groundwater at other AOIs, that includes AOI P-6, and therefore no additional costs are incurred for including AOI P-6.

TABLE 9-9
LNAPL VOLUME CALCULATIONS
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN

LNAPL AREAS NO. 1 AND NO. 2

Contour Line (ft)	Total Area (ft^2)	Assumed Average LNAPL Thickness (ft)	Total Volume LNAPL (ft^3)
0-1	81,600	0.5	40,800
1-2	25,400	1.5	38,100
2-3	26,200	2.5	65,500
3-4	19,800	3.5	69,300
4-5	7,800	4.5	35,100
5-6	2,40	5.5	13,200
6-7	2,400	6.5	15,600

The total areal extent of LNAPL at LNAPL Areas No. 1 and No. 2 is approximately 166,000 ft^2
The total volume of LNAPL/air/water and surrounding soil matrix = 277,600 ft^3

277,600 ft^3 of soil potentially containing LNAPL multiplied by an assumed LNAPL saturation of 0.05 gives approximately **104,000 gallons** of LNAPL in LNAPL Areas No. 1 and No. 2 (combined)

LNAPL AREA NO. 3

Contour Line (ft)	Total Area (ft^2)	Assumed Average LNAPL Thickness (ft)	Total Volume LNAPL (ft^3)
0-1	5,900	0.5	2,950
1-2	4,000	1.5	6,000
2-3	3,800	2.5	9,500
3-4	3,100	3.5	10,850
4-5	3,630	4.5	16,335
5-6	2,500	5.5	13,750
6-max thickness	260	6.18	1,600

The total areal extent of LNAPL at LNAPL Area No. 3 is approximately 22,900 ft^2
The total volume of LNAPL/air/water and surrounding soil matrix = 60,985 ft^3

60,985 ft^3 of soil potentially containing LNAPL multiplied by an assumed LNAPL saturation of 0.05 gives approximately **23,000 gallons** of LNAPL in LNAPL Area No. 3

LNAPL AREA NO. 6

The total areal extent of LNAPL at LNAPL Area No. 6 is approximately 3,850 ft^2
The total volume of LNAPL/air/water and surrounding soil matrix = 1,540 ft^3

1,540 ft^3 of soil potentially containing LNAPL multiplied by an assumed LNAPL saturation of 0.05 gives approximately **575 gallons** of LNAPL in LNAPL Area No. 6

TABLE 9-10
COST SUMMARY - LNAPL AREAS NO. 1 AND NO. 2
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
EXTRACTION WELL SYSTEM

CAPITAL COSTS	
Extraction Wells	$360,000
Downhole Pumps	$180,000
Mechanical (Piping, Controls)	$40,000
Treatment System (Oil/Water Seperation, GAC)	$50,000
Soil Disposal	$10,000
Engineering Administration	$50,000
OPERATION & MAINTENANCE COSTS (1) (2)	
Labor	$730,000
Parts & Equipment (includes carbon replacement)	$190,000
Power	$135,000
LNAPL Disposal	$350,000
NPDES Effluent Monitoring	$187,500
TOTAL	$2,282,500

Notes:
(1) Operation & Maintenance costs based on 10 years of system operation.
(2) Assumes any groundwater monitoring would be computed as part of the Site-wide monitoring activities.

TABLE 9-11
COST SUMMARY - LNAPL AREAS NO. 1 AND NO. 2
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
COLLECTION TRENCH SYSTEM

CAPITAL COSTS	
Recovery Sumps	$120,000
Downhole Pumps	$50,000
Mechanical (Piping, Controls)	$20,000
Trenches	$170,000
Treatment System (Oil/Water Separation, GAC)	$50,000
Soil Disposal	$600,000
Engineering Administration	$50,000
OPERATION & MAINTENANCE COSTS (1), (2)	
Labor	$365,000
Parts & Equipment (includes carbon replacement)	$80,000
Power	$45,000
LNAPL Disposal	$350,000
NPDES Effluent Monitoring	$187,500
TOTAL	$2,087,500

Notes:
(1) Operation & Maintenance costs based on 10 years of system operation.
(2) Assumes any groundwater monitoring would be completed as part of the Site-wide monitoring activities.

TABLE 9-12
COST SUMMARY - LNAPL AREAS NO. 1 AND NO. 2
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
EXCAVATION

CAPITAL COSTS	
Excavation	$525,000
Transportation & Disposal of Vadose Zone Soils(1)	$2,125,000
Transportation & Disposal of LNAPL-Impacted Soils(2)	$10,300,000
Water Handling	$2,000,000
OPERATION AND MAINTENANCE COST (3)	$0
TOTAL	$14,950,000

Notes:
(1) Assumes vadose zone soils will be 100% non-hazardous waste
(2) Assumes 50% of LNAPL-impacted soils will require TSCA incineration, 50% will require landfilling as a hazardous waste
(3) Assumes any groundwater monitoring would be completed as part of the Site-wide monitoring activities.

TABLE 9-13
COST SUMMARY - LNAPL AREA NO. 4
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS - PONTIAC, MICHIGAN
BAILING/PUMPING

CAPITAL COSTS	
Bailer/Peristaltic Pump	$1,000
OPERATION & MAINTENANCE COSTS (1)	
Labor, equipment, sampling	$35,000
Disposal	$10,000
MONITORING COSTS	
Groundwater sampling, analysis & reporting	$15,000
TOTAL	$61,000

Notes: (1)Operation and Maintenance cost based on 5 years.

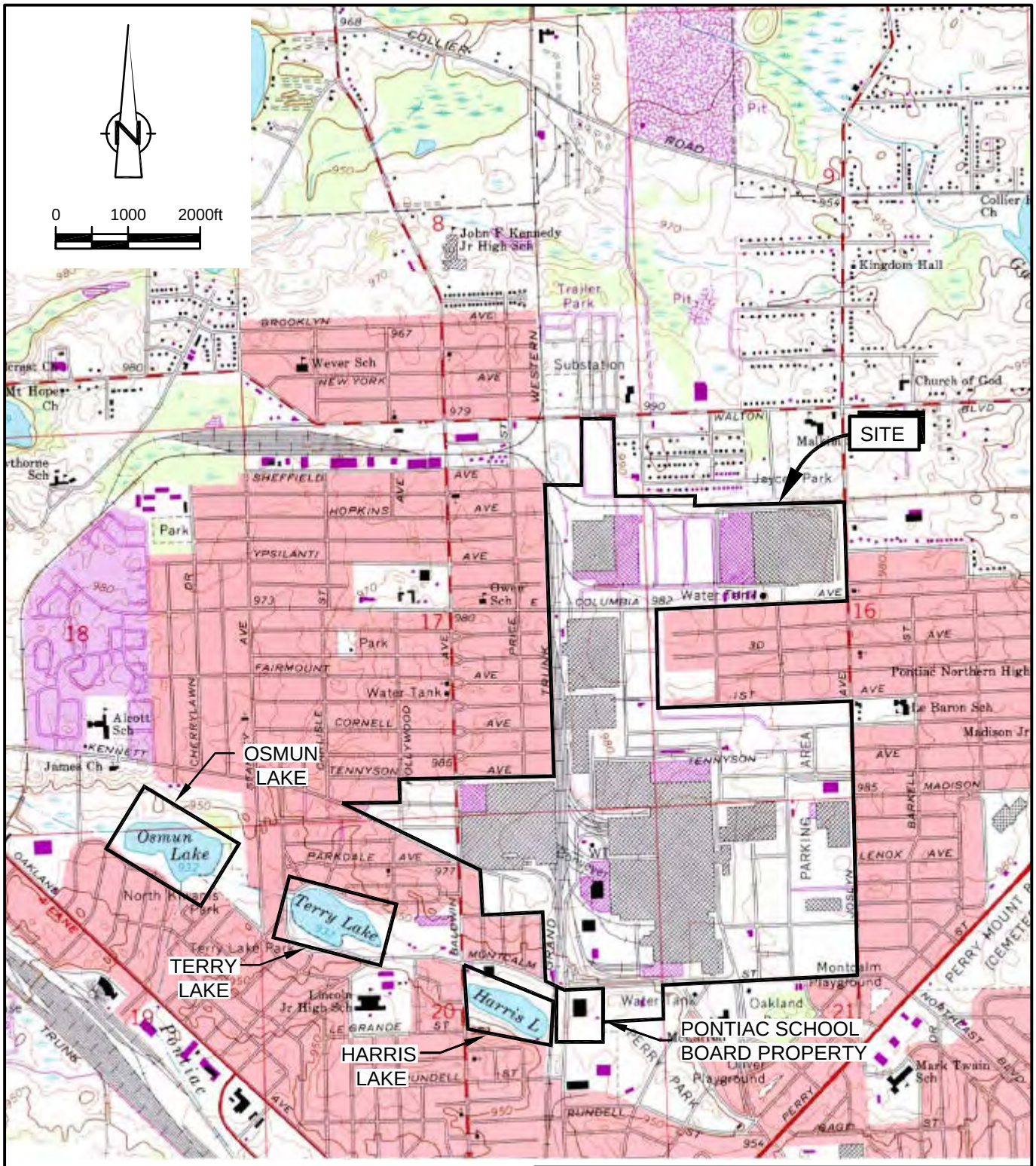
TABLE 10-1
PROPOSED FINAL CORRECTIVE MEASURES
GENERAL MOTORS CORPORATION PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

AOI/Area DESIGNATION	DESCRIPTION	MEDIA	FINAL CORRECTIVE MEASURES	STATUS
F-1, F-2, F-3, F-4, F-5, F-6, F-8, F-9, F-10, F-11, F-12, F-13, F-14, F-15, W-2, W-3, W-4, W-6, W-7, W-12, W-13, M-3, M-6, M-7, M-8, M-9, M-10, M-11, M-12, M-13, M-14, M-15, M-17, M-18, M-19, M-20, M-21, M-22, M-23, M-24, M-25, P-1, P-2, P-3, P-4, P-5, P-7, P-8, P-10, S-1, S-2, M-5, Terry Lake, Osmun Lake	Multiple	Multiple	No Further Action	NFA
W-9	Former Central Foundry (Plant 6)	Soil	PCB Soil Excavation, Soil Cap, and Institutional Controls	IM Underway
AOI W-8: LNAPL Area No. 3	Plant 9 Basement	LNAPL	Corrective Measures to be proposed in IM Work Plan	IM Underway
Off-Site Property	Pontiac School Board	Sediment in Sewer	Complete Interim Measures (Storm Sewer Removal)	IM Underway
Off-Site Property	Harris Lake	Soil, Sediment	Complete Interim Measures (Sediment and Soil Removal)	IM Underway/ Fieldwork Completed
Storm Sewers	Sitewide	Groundwater	To be determined as per Storm Sewer Feasibility Analysis Report (ENCORE, 2003)	
W-1, W-5, W-8, W-9, W-10, W-11, M-1, M-2, M-5, M-16, F-7, P-9, P-11	Multiple	On-Site	Institutional Controls and Groundwater Monitoring	Proposed
M-4	Plant 25 Former Gasoline UST & Current Gasoline AST	Groundwater	Institutional Controls and Groundwater Monitoring	Proposed
P-6	Former UST Farm & Stoddard Solvent AST	Groundwater	Institutional Controls and Groundwater Monitoring	Proposed
AOIs W-1 and W-10: LNAPL Area No. 1	West Yard, Railroad Marshalling Area	LNAPL	LNAPL Recovery via Collection Trench or Extraction Well System	Proposed
AOI W-10: LNAPL Area No. 2	Railroad Marshalling Area	LNAPL	LNAPL Recovery via Collection Trench or Extraction Well System	Proposed
AOI M-2: LNAPL Area No. 4	Active Production Area	LNAPL	Manual LNAPL Recovery via Bailing or Pumping	Proposed
AOIs M-2 and M-16: LNAPL Area No. 5	Plant 25	LNAPL	To be evaluated upon completion of investigation and LNAPL delineation	TBD
AOI W-9: LNAPL Area No. 6	Former Central Foundry (Plant 6)	LNAPL	Corrective measures to be proposed in a IM Work Plan to follow.	TBD
Off-Site Property	None	Off-Site Groundwater	To be evaluated upon completion of delineation of constituents in off-Site groundwater.	TBD

NFA = No Further Action IM = Interim Measure TBD = To Be Determined

Figures

ENCORE
Environmental Corporate Remediation



SOURCE: USGS QUADRANGLE MAP;
PONTIAC NORTH, MICHIGAN



GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

SITE LOCATION

ENCORE

FIGURE
1-1

17487-28(001)GN-WA001 NOV 24/2003

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

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
CATALINA SUBSTATION
PLANT 12
PLANT 15
PLANT 25
PLANT 33
PLANT 5 & 23
PLANT 56 (OLD PLT 2)
PLANT 49
PLANT 11
FORMER PLANT 8
FORMER PLANT 9
FORMER PLANT 6
FORMER PLANT 18
ELPO BLDG
POWER TRAIN HQ BLDG
POWERTRAIN ENGINEERING
EMISSIONS CONTROL BUILDING
MONTCALM SUBSTATION
WASTEWATER TREATMENT
SWDF
WATER TOWER

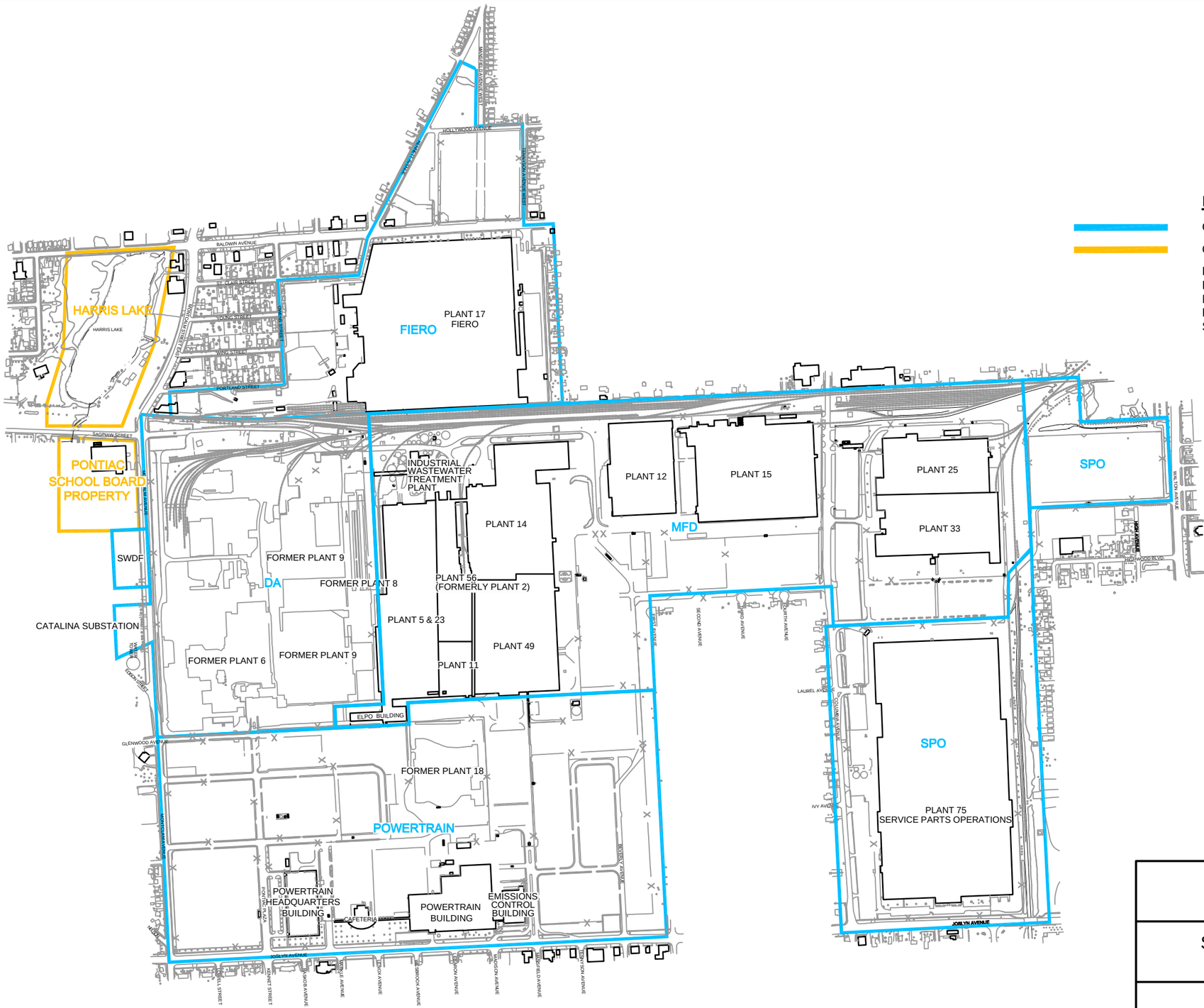
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

SITE FACILITIES

ENCORE

FIGURE
1-2

17487-28(001)GN-WA002 NOV 24/2003



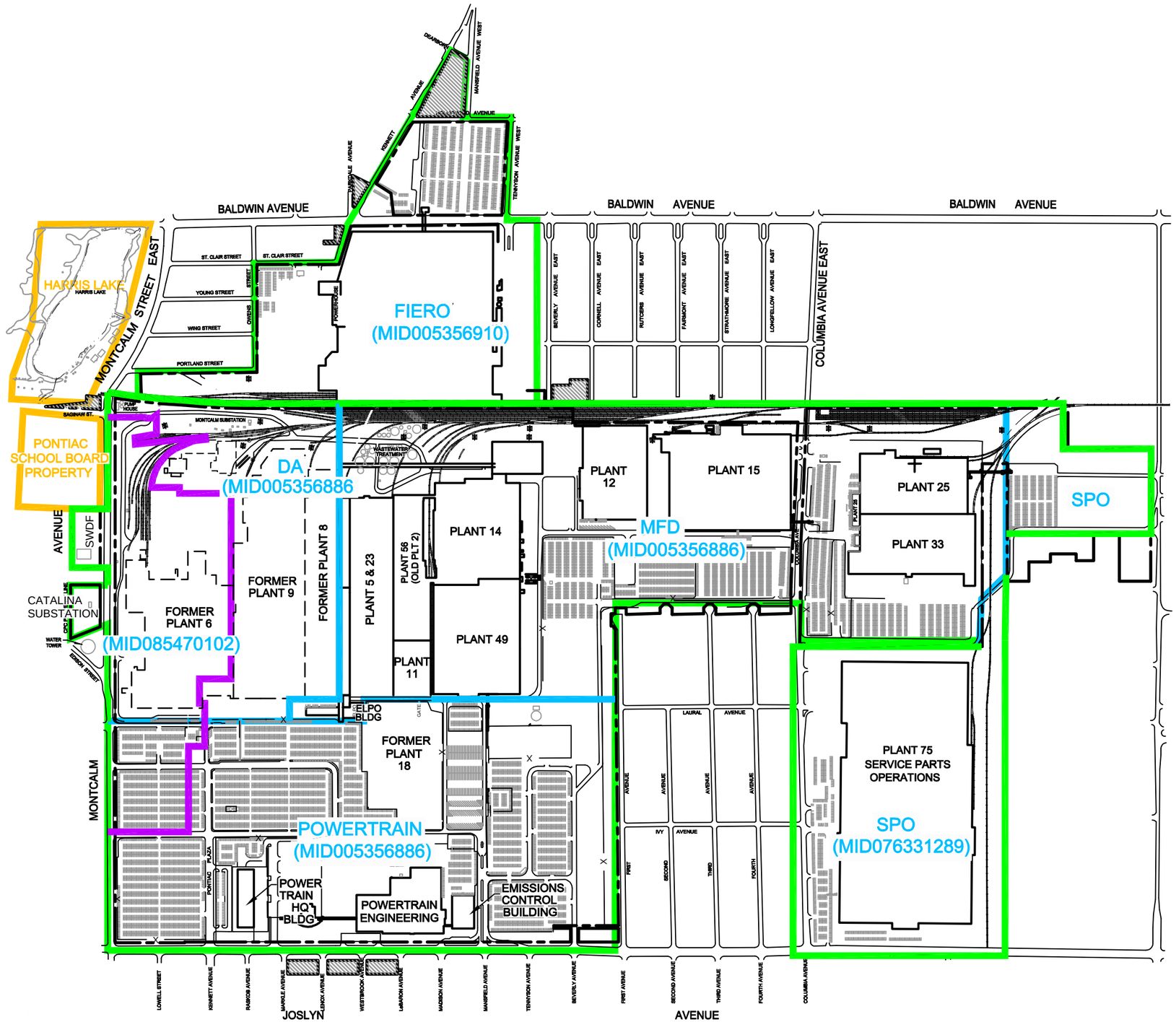
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

SITE OPERATIONAL AREAS
AND OFFSITE AREAS

ENCORE

FIGURE
1-3

17487-28(001)GN-WA003 NOV 24/2003



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 CMP

SUMMARY OF SITE OPERATIONAL AREAS AND FACILITIES

ENCORE

FIGURE 1-4

17487-28(001)GN-WA004 NOV 24/2003

N

M-4
M-25
M-16
M-5
M-23
M-17
M-11
M-24
F-8
F-13
F-7
F-15
F-14
F-12
M-13
M-21
M-2
M-1
M-9
M-19
P-11
P-9
P-10
P-6
M-7
W-3
W-5
W-6
W-8
W-13
W-11
W-10
W-1
W-9
SWDF
OUTFALL 001
HARRIS LAKE
PONTIAC SCHOOL BOARD PROPERTY

WALTON AVENUE
HIGH AVENUE
HIGHWOOD BLVD
PLANT 25
PLANT 33
PLANT 75 PSERVICE PARTS OPERATIONS
JOSLYN AVENUE
COLUMBIA AVENUE
LAUREL AVENUE
IVY AVENUE
FOURTH AVENUE
THIRD AVENUE
SECOND AVENUE
FIRST AVENUE
PLANT 15
PLANT 8
BEVERLY AVENUE
TENNYSON AVENUE
MANSFIELD AVENUE
MADISON AVENUE
LEBARON AVENUE
WESBROOK AVENUE
LENOX AVENUE
MARKLE AVENUE
RASKOB AVENUE
KENNET STREET
LOWELL STREET
TENNYSON AVENUE WEST
HOLLYWOOD AVENUE
KENSETT AVENUE
PLANT 17 FIERO
PLANT 49
PLANT 14
PLANT 56 (FORMERLY PLANT 2)
PLANT 11
FORMER PLANT 18
PLANT 5 & 23
INDUSTRIAL WASTEWATER TREAT MENT PLANT
ELPO BUILDING
FORMER PLANT 9
FORMER PLANT 6
POWERTRAIN BUILDING
CAFETERIA
POWERTRAIN HEADQUARTERS BUILDING
PONTIAC PLAZA
DEMISTER TOOL BUILDING
OWENS STREET
BALDWIN AVENUE
STEVENS STREET
YOUNG STREET
WINS STREET
PORTLAND STREET
MONTCALM STREET EAST
MONTCALM AVENUE
SAGINAW STREET
WATER TOWER
EDISON STREET
GLENWOOD AVENUE
TELEGRAPH

Legend:

- RAILROAD
- ROADS
- BUILDINGS
- AOI AND OFFSITE AREAS
- W- 9 AOI ID

0 125 250 500 750 1,000 Feet

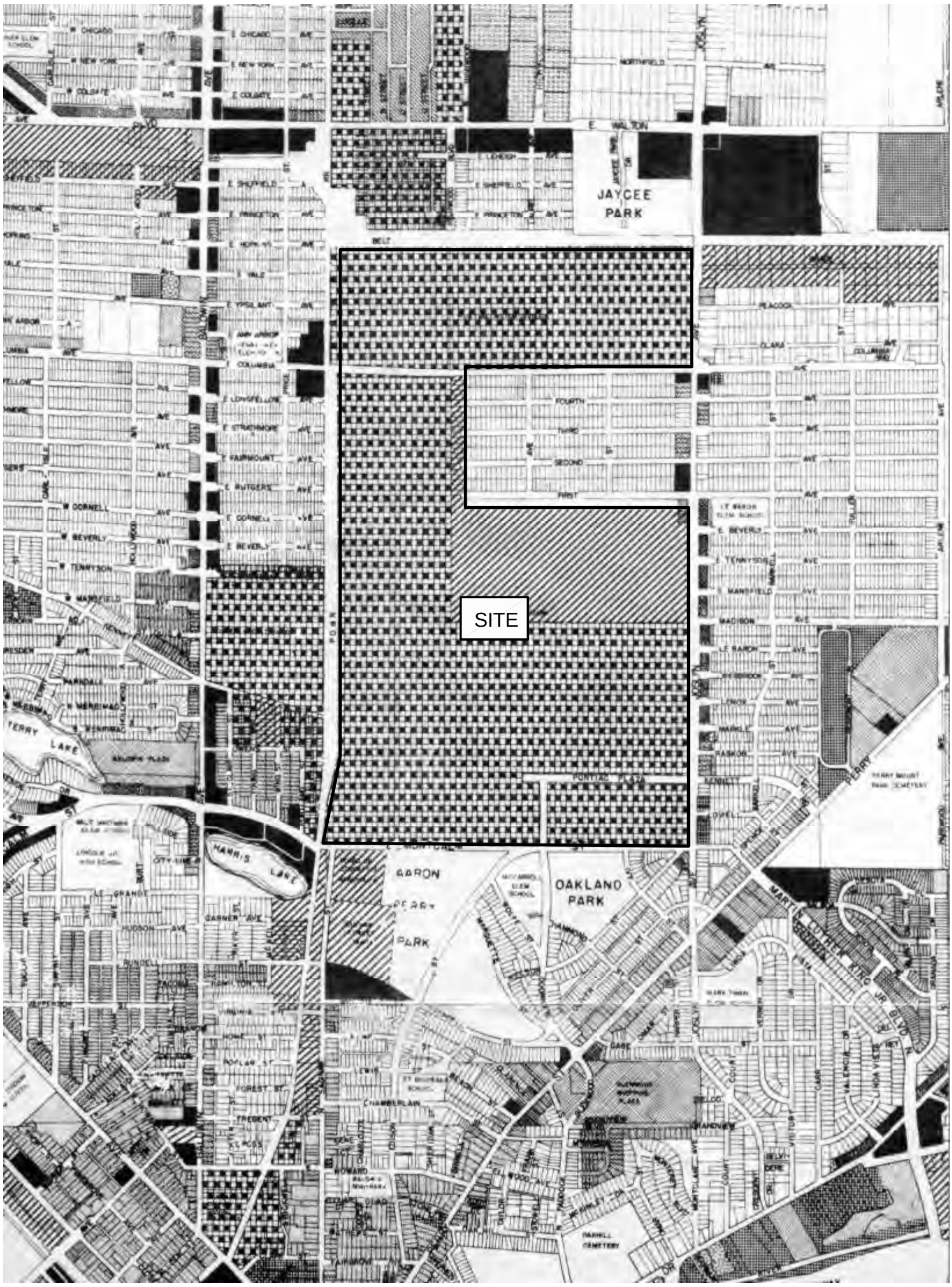
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AREAS OF INTEREST AND OFFSITE AREAS

ENCORE

Figure
1-5

11/24/03 SYR-85 EIB TBR
PNC - 64411.310
PNC/RFI_NOV03/MXD/PontiacAOI.mxd



SOURCE: CITY OF PONTIAC PLANNING DIVISION;
COMMUNITY DEVELOPMENT DEPT. - D.B.

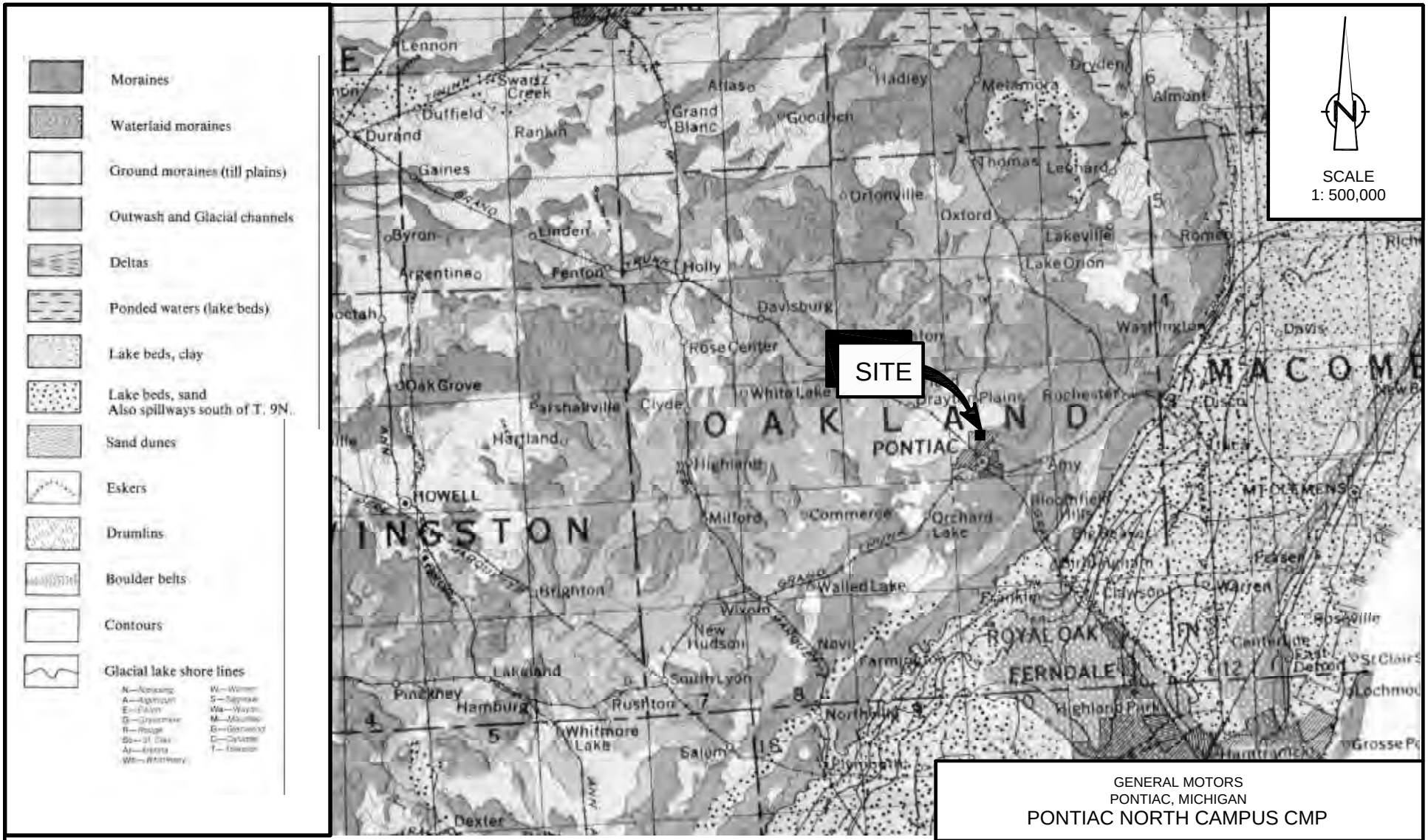
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

CITY OF PONTIAC LAND USE MAP

ENCORE

FIGURE
2-1

17487-28(001)GN-WA005 NOV 24/2003



SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN, 1955
WESTERN MICHIGAN UNIVERSITY,
DEPARTMENT OF GEOLOGY

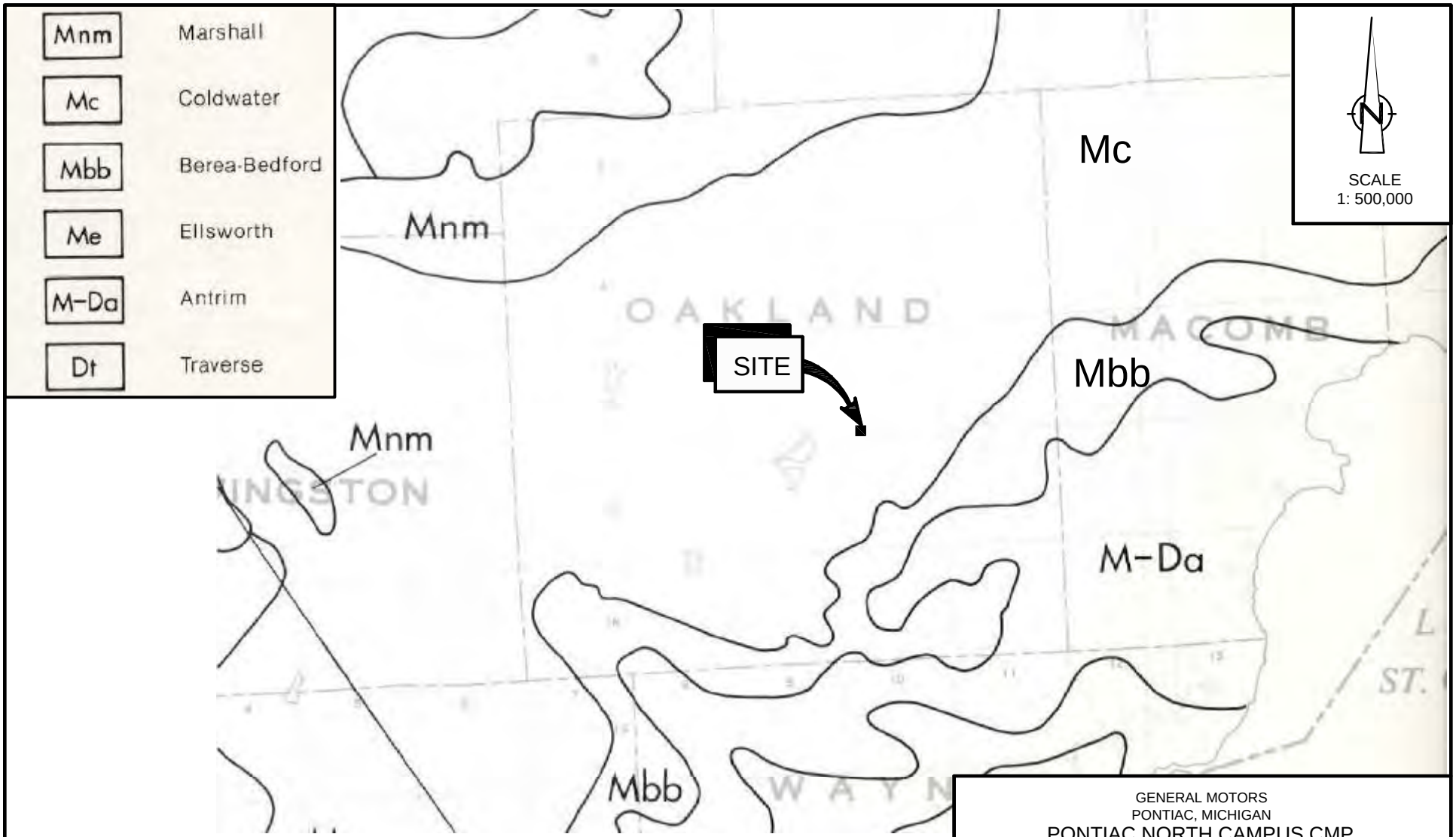
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

REGIONAL SURFICIAL GEOLOGY

ENCORE

FIGURE
2-2

17487-28(001)GN-WA006 NOV 24/2003



SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN, 1981
WESTERN MICHIGAN UNIVERSITY,
DEPARTMENT OF GEOLOGY

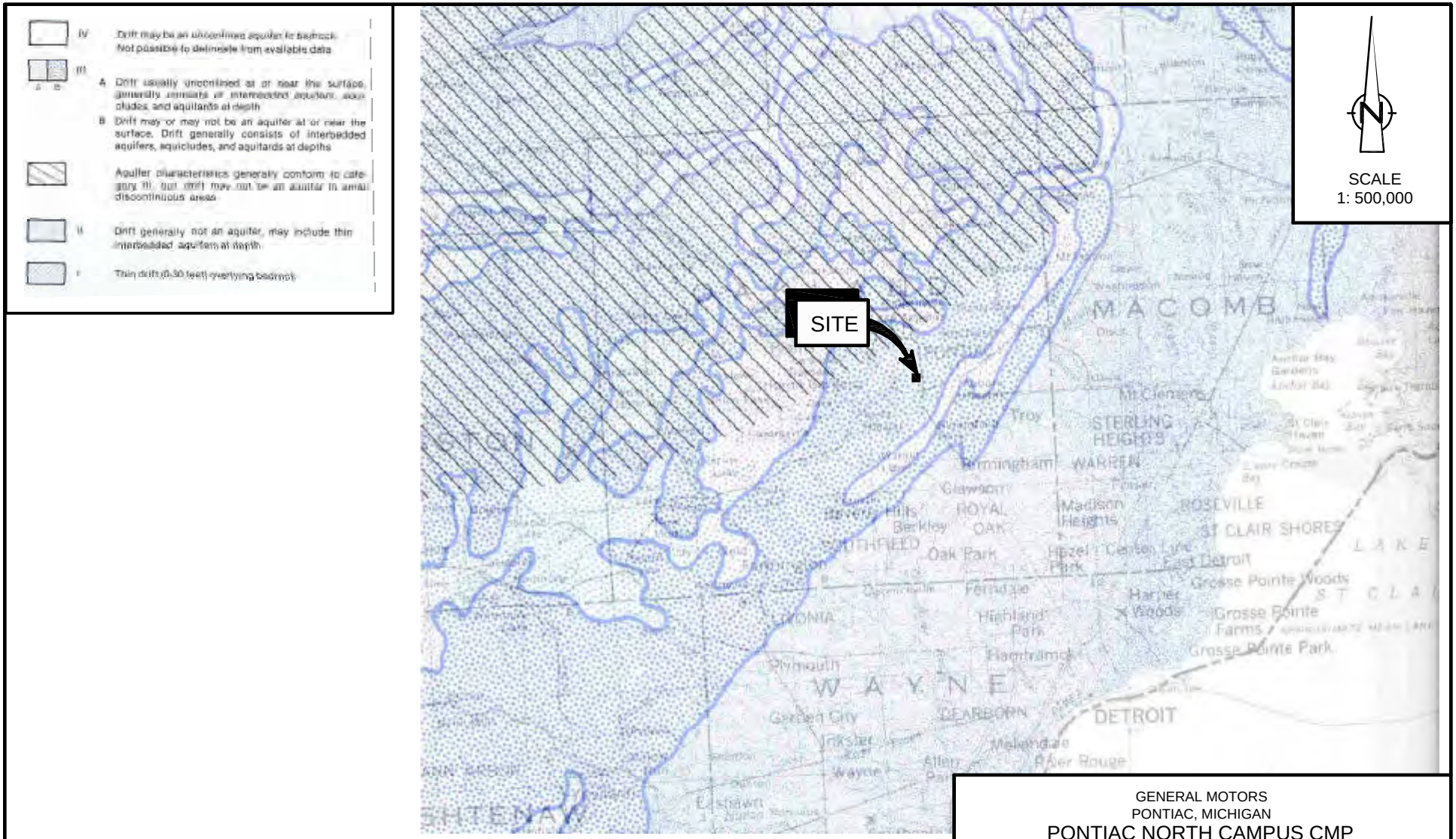
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

REGIONAL BEDROCK GEOLOGY

ENCORE

FIGURE
2-3

17487-28(001)GN-WA007 NOV 24/2003



SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN, 1981
WESTERN MICHIGAN UNIVERSITY,
DEPARTMENT OF GEOLOGY

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AQUIFER CHARACTERIZATION OF THE GLACIAL DRIFT

ENCORE

FIGURE
2-4



LEGEND:

- MW1-1 — GROUNDWATER MONITORING WELL LOCATION
- FENCED AREA
- APPROXIMATE AOI AREA
- 951.29 — GROUNDWATER ELEVATION IN FEET
- 974 — GROUNDWATER ELEVATION CONTOUR LINE IN FEET (4-FOOT INTERVAL UNLESS OTHERWISE INDICATED)
- GROUNDWATER FLOW DIRECTION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED MAY 2003.

0 400' 800'
GRAPHIC SCALE

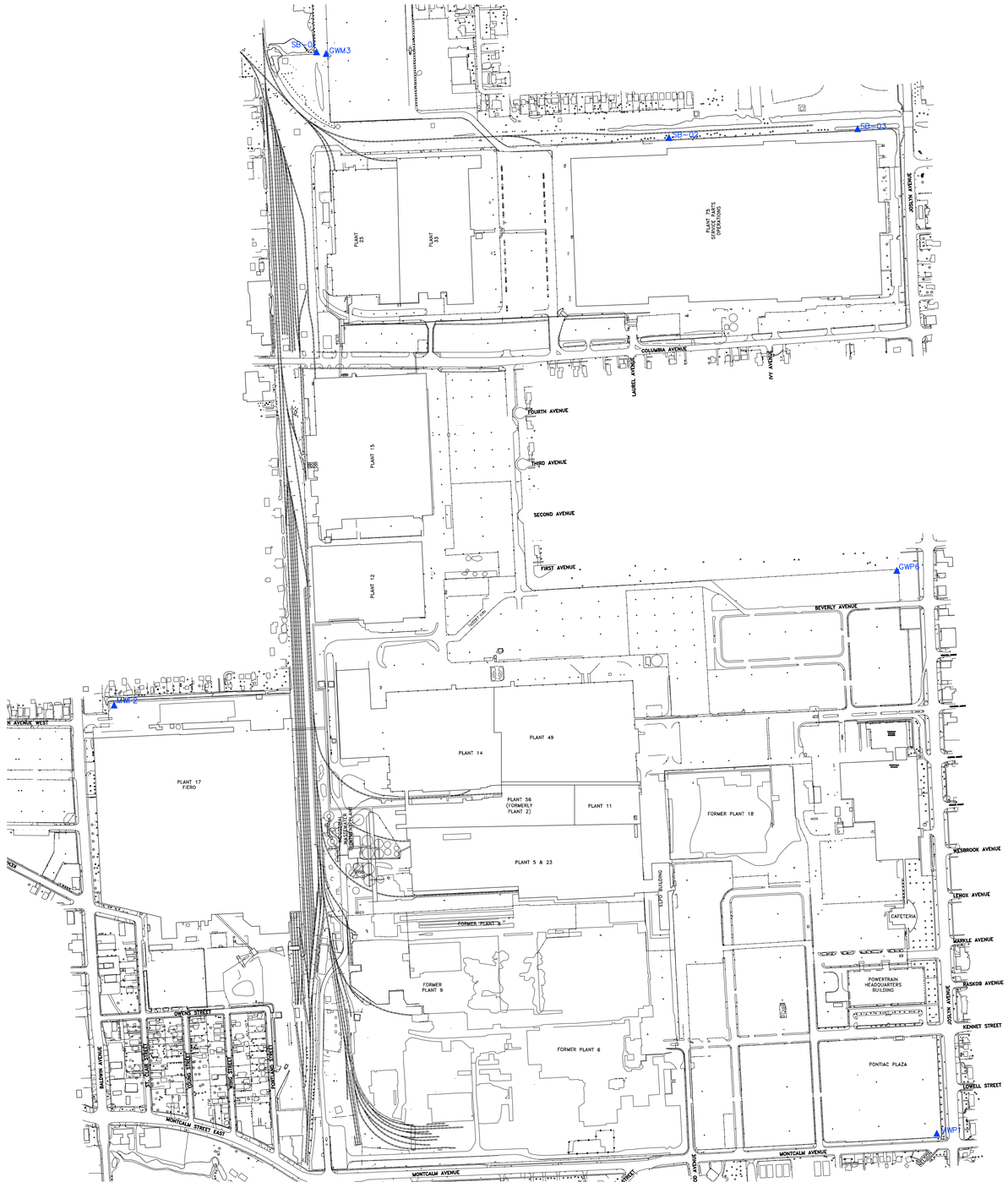
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

GROUNDWATER FLOW CONTOUR MAP-MAY 2003

ENCORE

FIGURE 2-5

X: 64411x00, X01.DWG, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/25/03 SYR-85-RCB RCB GMS
64411300/CMP-REPT/64411W01.DWG



LEGEND:

BM5-02 ▲ SOIL BORING SAMPLE LOCATION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 400' 800'

GRAPHIC SCALE

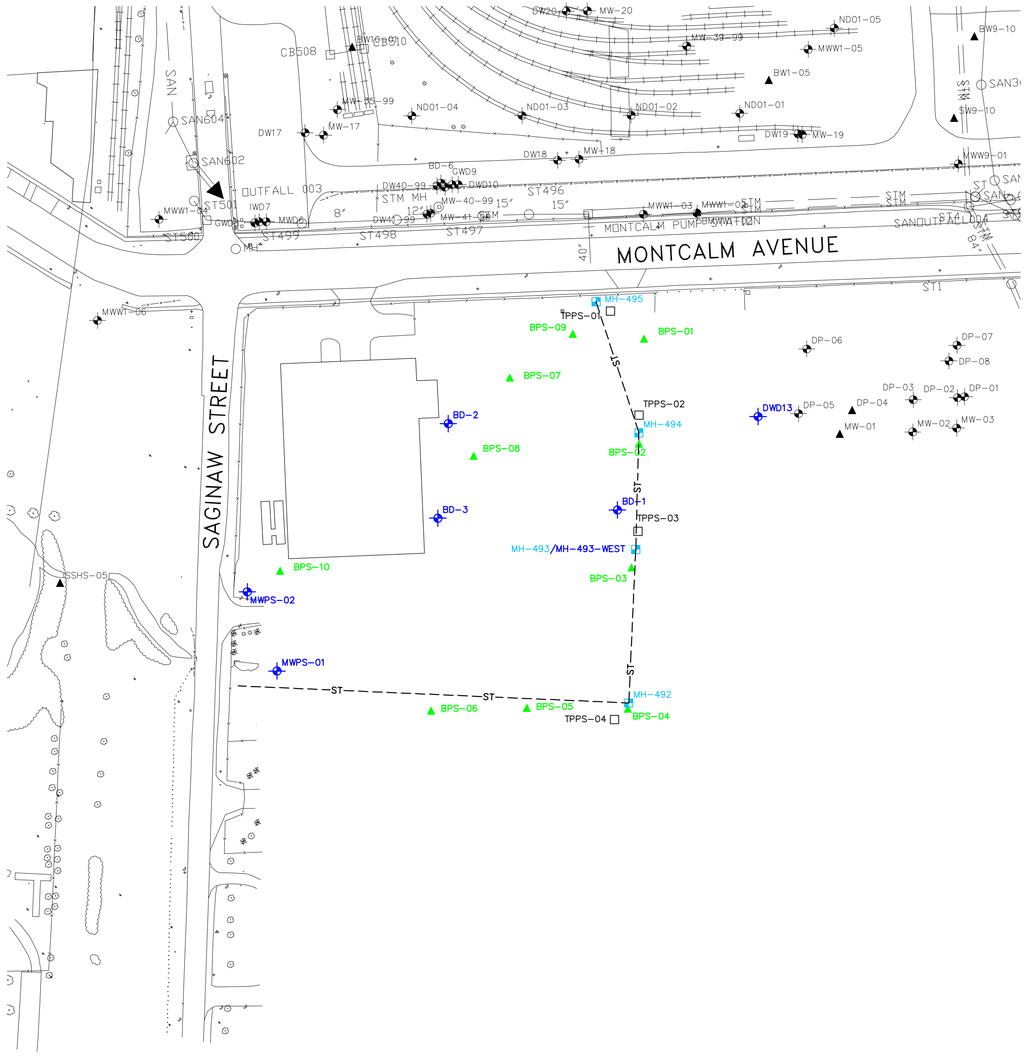
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

SITE BACKGROUND SOIL SAMPLING LOCATIONS

ENCORE

FIGURE 2-6

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
11/25/03 SYR-54-GMS DJP DJP
64411300/CMP-RPT/64411G11.DWG





SITE LOCATION

LEGEND:

MWPS-01	GROUNDWATER MONITORING WELL LOCATION
BPS-05	SOIL BORING LOCATION
TPPS-01	TEST PIT SAMPLE COLLECTION LOCATION
MH-494	PIPE SEDIMENT SAMPLE COLLECTION LOCATION
— —ST— —	ABANDONED STORM SEWER LINE (APPROXIMATE)

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 100' 200'

GRAPHIC SCALE

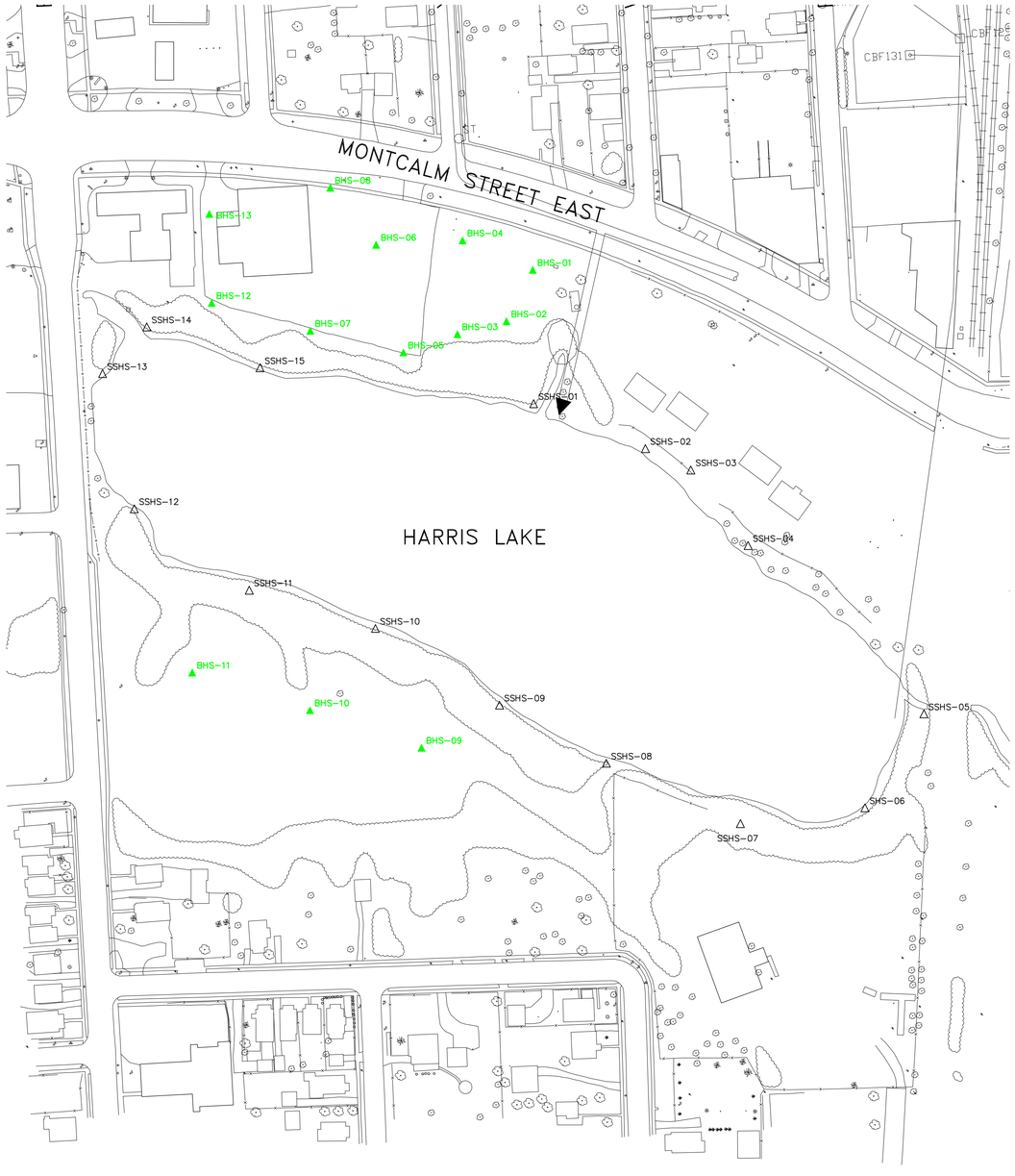
X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS SDL
64411300/CMP-REPT/64411C01.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

PONTIAC SCHOOL BOARD - SAMPLE LOCATIONS

ENCORE

FIGURE
4-1





SITE LOCATION

LEGEND:

BF13-01 ▲ SOIL BORING LOCATION

SW8-03 △ SURFACE SOIL SAMPLE COLLECTION LOCATION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 100' 200'

GRAPHIC SCALE

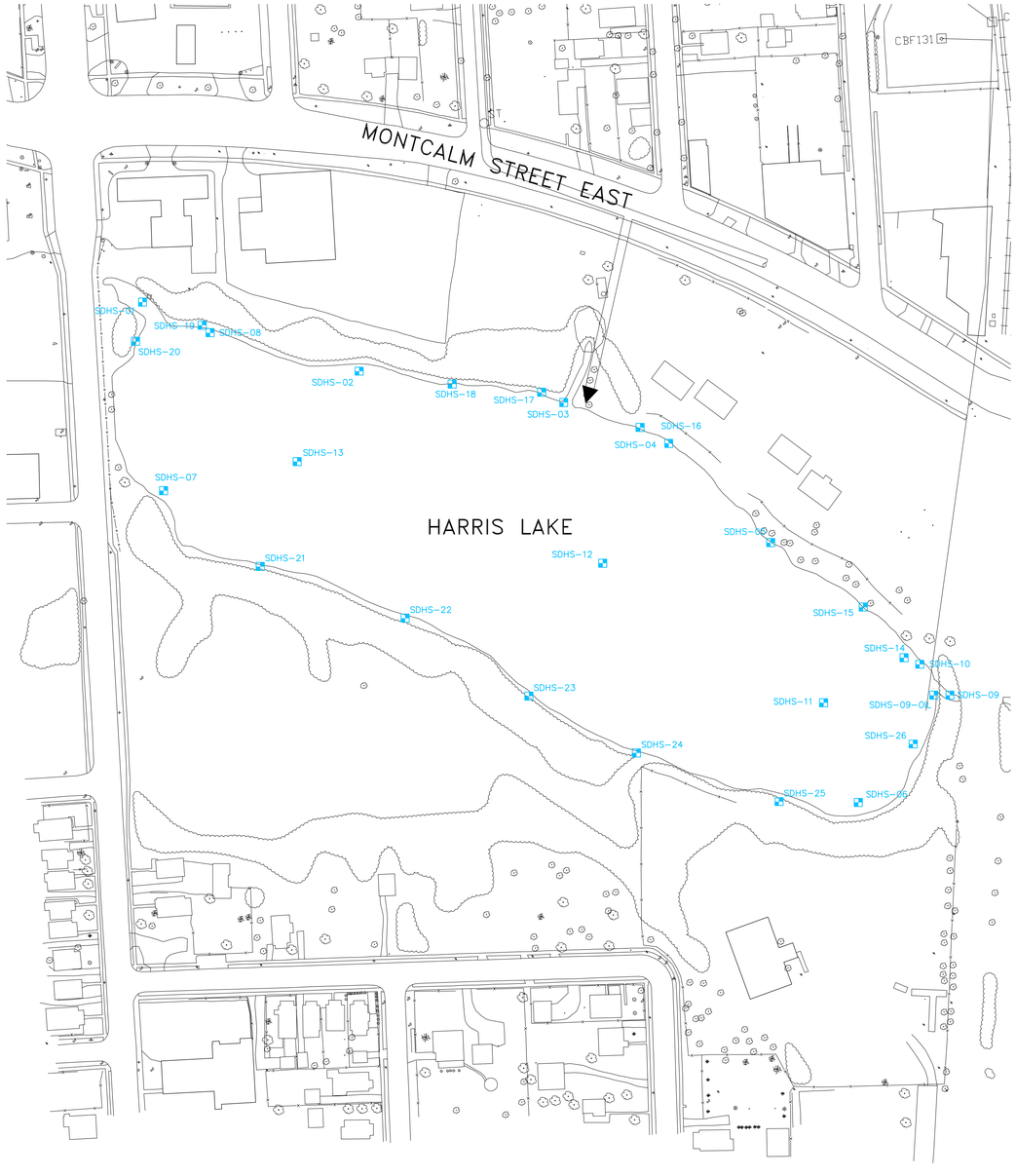
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

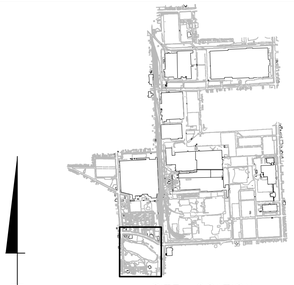
HARRIS LAKE - SOIL SAMPLE LOCATIONS

ENCORE

FIGURE 4-2

X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/25/03 SYR-85-GMS LJP GMS
64411300/CMP-REPT/64411C02.DWG





SITE LOCATION

LEGEND:

SDHS-05 SEDIMENT SAMPLE COLLECTION LOCATION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 100' 200'
GRAPHIC SCALE

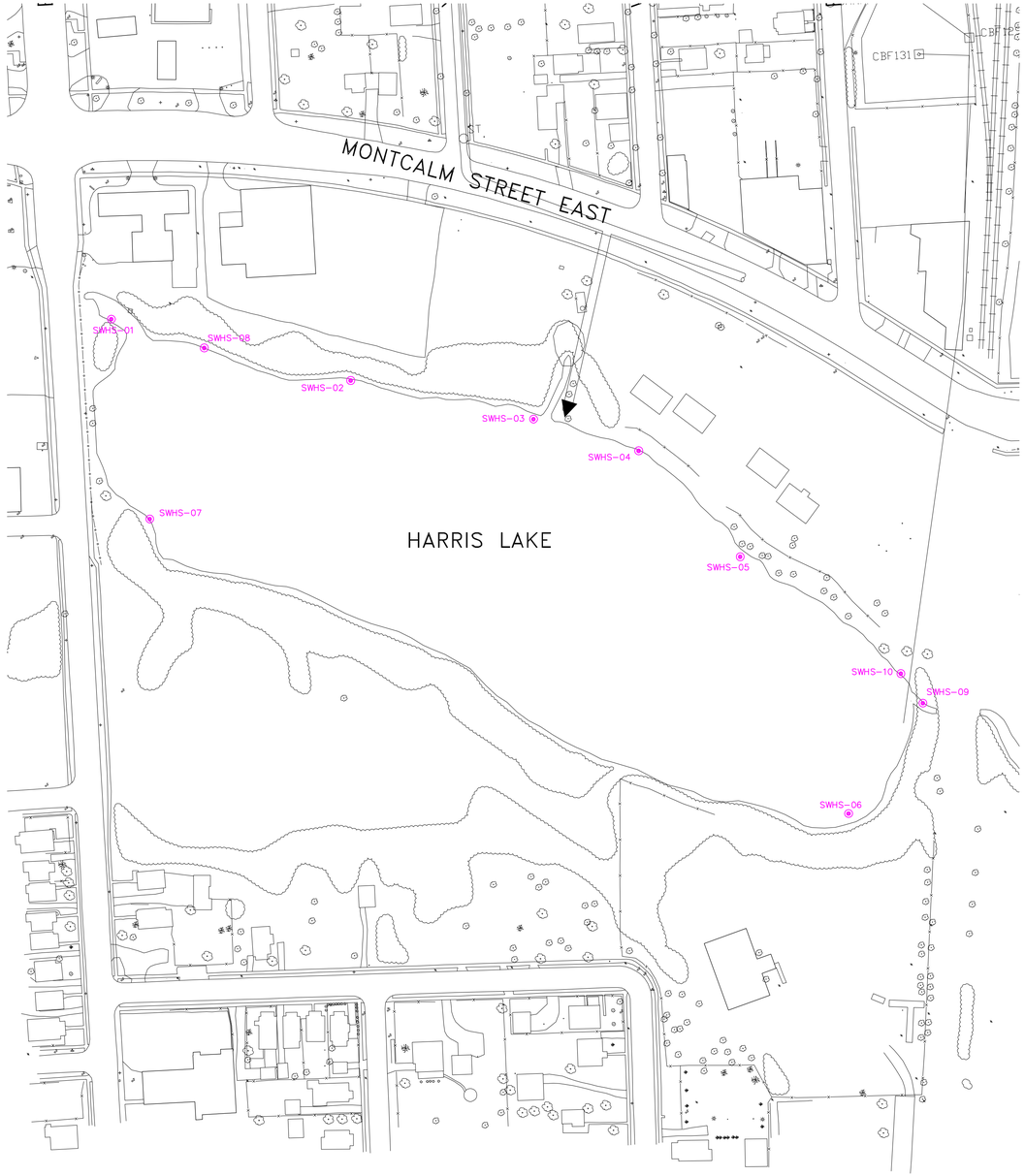
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

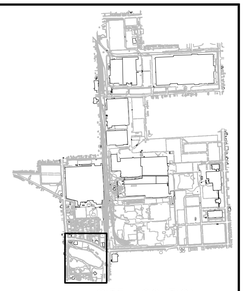
HARRIS LAKE - SEDIMENT SAMPLE LOCATIONS

ENCORE

FIGURE
4-3

X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS SDL
64411300/CMP-REPT/64411C03.DWG





SITE LOCATION

LEGEND:

SWHS-05 ◉ SURFACE WATER SAMPLE COLLECTION LOCATION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 100' 200'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

HARRIS LAKE - SURFACE WATER SAMPLE LOCATIONS

ENCORE

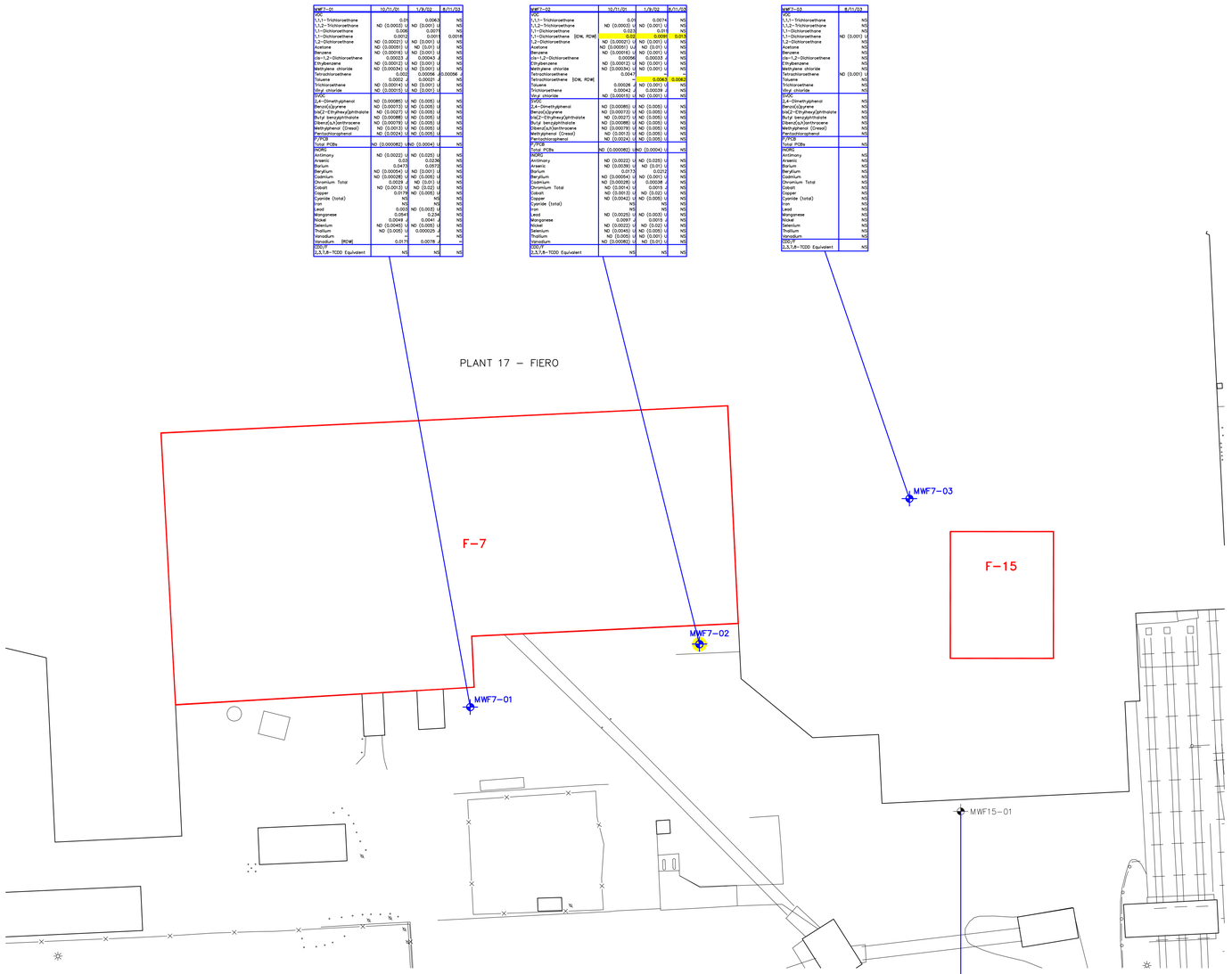
FIGURE
4-4

X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS SDL
64411300/CMP-REPT/64411C04.DWG

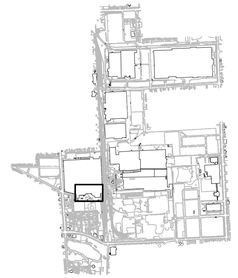
MWF7-01	10/11/01	1/9/02	8/21/03
VOC			
1,1,1-Trichloroethane	0.01	0.0043	NS
1,1,2-Trichloroethane	ND (0.0003) U	ND (0.003) U	NS
1,1-Dichloroethane	0.006	0.007	NS
1,1-Dichloroethene	0.0052	0.0051	0.0058
1,2-Dichloroethane	ND (0.00021) U	ND (0.001) U	NS
Acetone	ND (0.00091) U	ND (0.01) U	NS
Benzene	ND (0.00016) U	ND (0.001) U	NS
cis-1,2-Dichloroethene	0.00553 J	0.00043 J	NS
Ethylbenzene	ND (0.00012) U	ND (0.001) U	NS
Methylene chloride	ND (0.00034) U	ND (0.001) U	NS
Tetrachloroethene	0.002	0.00056 J	0.00056 J
Toluene	0.0002 J	0.00021 J	NS
Trichloroethene	ND (0.00041) U	ND (0.001) U	NS
Vinyl chloride	ND (0.00015) U	ND (0.001) U	NS
SVOC			
2,4-Dimethylphenol	ND (0.00088) U	ND (0.005) U	NS
Benzo(a)pyrene	ND (0.00073) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	ND (0.0027) U	ND (0.005) U	NS
Butyl benzylphthalate	ND (0.00088) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.00079) U	ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.0013) U	ND (0.005) U	NS
Pentachlorophenol	ND (0.0024) U	ND (0.005) U	NS
PCB			
Total PCBs	ND (0.0000852 UJ	ND (0.0004) U	NS
INORG			
Antimony	ND (0.0022) U	ND (0.025) U	NS
Arsenic	0.03	0.0236	NS
Barium	0.0478	0.0172	NS
Beryllium	ND (0.00004) U	ND (0.001) U	NS
Cadmium	ND (0.00008) U	ND (0.001) U	NS
Chromium Total	0.0028 J	ND (0.01) U	NS
Cobalt	ND (0.0013) U	ND (0.02) U	NS
Copper	0.0179	ND (0.005) U	NS
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	0.002	ND (0.003) U	NS
Manganese	0.0428 J	0.0247 J	NS
Nickel	0.0048 J	0.0041 J	NS
Selenium	ND (0.0045) U	ND (0.005) U	NS
Thallium	ND (0.005) U	0.00025 J	NS
Vanadium			NS
Vanadium [RDW]	0.0171	0.0078 J	
DIOXY			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWF7-02	10/11/01	1/9/02	8/21/03
VOC			
1,1,1-Trichloroethane	0.01	0.0074	NS
1,1,2-Trichloroethane	ND (0.0003) U	ND (0.003) U	NS
1,1-Dichloroethane	0.023	0.01	NS
1,1-Dichloroethene [EDL, RDW]	0.02	0.0081	0.013
1,2-Dichloroethane	ND (0.00021) U	ND (0.001) U	NS
Acetone	ND (0.00091) U	ND (0.01) U	NS
Benzene	ND (0.00016) U	ND (0.001) U	NS
cis-1,2-Dichloroethene	0.00098 J	0.00053 J	NS
Ethylbenzene	ND (0.00012) U	ND (0.001) U	NS
Methylene chloride	ND (0.00034) U	ND (0.001) U	NS
Tetrachloroethene	0.0047	0.0063	0.0062
Tetrachloroethene [EDL, RDW]		0.0063	0.0062
Toluene	0.00528 J	ND (0.001) U	NS
Trichloroethene	0.00542 J	0.0033 J	NS
Vinyl chloride	ND (0.00015) U	ND (0.001) U	NS
SVOC			
2,4-Dimethylphenol	ND (0.00088) U	ND (0.005) U	NS
Benzo(a)pyrene	ND (0.00073) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	ND (0.0027) U	ND (0.005) U	NS
Butyl benzylphthalate	ND (0.00088) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.00079) U	ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.0013) U	ND (0.005) U	NS
Pentachlorophenol	ND (0.0024) U	ND (0.005) U	NS
PCB			
Total PCBs	ND (0.0000852 UJ	ND (0.0004) U	NS
INORG			
Antimony	ND (0.0022) U	ND (0.025) U	NS
Arsenic	ND (0.0039) U	ND (0.01) U	NS
Barium	0.0179	0.0172	NS
Beryllium	ND (0.00004) U	ND (0.001) U	NS
Cadmium	ND (0.00008) U	ND (0.001) U	NS
Chromium Total	ND (0.0014) U	0.0015 J	NS
Cobalt	ND (0.0013) U	ND (0.02) U	NS
Copper	ND (0.0042) U	ND (0.005) U	NS
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	ND (0.0023) U	ND (0.003) U	NS
Manganese	0.0097 J	0.0053 J	NS
Nickel	ND (0.0022) U	ND (0.02) U	NS
Selenium	ND (0.0045) U	ND (0.005) U	NS
Thallium	ND (0.006) U	ND (0.001) U	NS
Vanadium			NS
DIOXY	ND (0.000082 UJ	ND (0.01) U	
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWF7-03	8/21/03
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	NS
Acetone	NS
Benzene	NS
cis-1,2-Dichloroethene	NS
Ethylbenzene	NS
Methylene chloride	NS
Tetrachloroethene	ND (0.001) U
Toluene	NS
Trichloroethene	NS
Vinyl chloride	NS
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	NS
INORG	
Antimony	NS
Arsenic	NS
Barium	NS
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	NS
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
DIOXY	
2,3,7,8-TCDD Equivalent	NS



MWF15-01	10/11/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.00015) U	0.00081 J
1,1,2-Trichloroethane	ND (0.0003) U	ND (0.003) U
1,1-Dichloroethane	0.00124 J	ND (0.001) U
1,1-Dichloroethene	ND (0.00024) U	ND (0.001) U
1,2-Dichloroethane	ND (0.00021) U	ND (0.001) U
Acetone	ND (0.00091) U	ND (0.01) U
Benzene	ND (0.00016) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.00022) U	ND (0.003) U
Ethylbenzene	ND (0.00012) U	ND (0.001) U
Methylene chloride	ND (0.00034) U	ND (0.001) U
Tetrachloroethene	0.00038 J	0.00029 J
Toluene	ND (0.00014) U	ND (0.001) U
Vinyl chloride	ND (0.00015) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.00088) U	ND (0.005) U
Benzo(a)pyrene	ND (0.00073) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.0027) U	ND (0.005) U
Butyl benzylphthalate	ND (0.00088) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.00079) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.0013) U	ND (0.005) U
Pentachlorophenol	ND (0.0024) U	ND (0.005) U
PCB		
Total PCBs	ND (0.0000852 UJ	ND (0.0004) U
INORG		
Antimony	ND (0.0022) U	ND (0.025) U
Arsenic	ND (0.0039) U	ND (0.01) U
Barium	0.0181	0.0215
Beryllium	ND (0.00004) U	ND (0.001) U
Cadmium	ND (0.00008) U	0.00041 J
Chromium Total	ND (0.0014) U	ND (0.01) U
Cobalt	0.0015 J	0.0017 J
Copper	ND (0.0042) U	ND (0.005) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.0023) U	ND (0.003) U
Manganese	0.383	0.857
Nickel	0.0028 J	0.0074 J
Selenium	ND (0.0045) U	ND (0.005) U
Thallium	ND (0.005) U	0.000054 J
Vanadium	ND (0.00082) U	ND (0.01) U
DIOXY		
2,3,7,8-TCDD Equivalent	NS	NS



SITE LOCATION

LEGEND:

MWF1 GROUNDWATER MONITORING WELL LOCATION

CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

APPROXIMATE AOI AREA

F-7 = POWERHOUSE BASEMENT SUMPS

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

RDW – RESIDENTIAL DRINKING WATER CRITERIA
IDW – 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

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. NS – NOT SAMPLED.

0 50' 100'
GRAPHIC SCALE

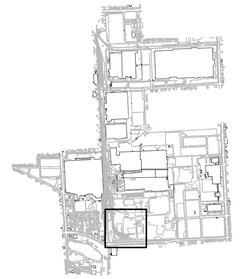
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI F-7 - GROUNDWATER

ENCORE

FIGURE
4-5

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=REF, DATA_POINT
P: PAGESET/PLT=DL
11/26/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411C05.DWG



SITE LOCATION

LEGEND:

- MW-19 — GROUNDWATER MONITORING WELL LOCATION
- P18-01 — SOIL BORING LOCATION
- CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA
- LOCATION WHERE NAPL HAS BEEN IDENTIFIED DURING RECENT RFI ACTIVITIES AT A MEASURABLE THICKNESS (>0.01 FEET)
- APPROXIMATE AOI AREA
- W-1 = WEST YARD

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

RDW – RESIDENTIAL DRINKING WATER CRITERIA
IDW – 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

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. NS – NOT SAMPLED.
8. R – DATA REJECTED FROM DATA VALIDATION.

0 100' 200'
GRAPHIC SCALE

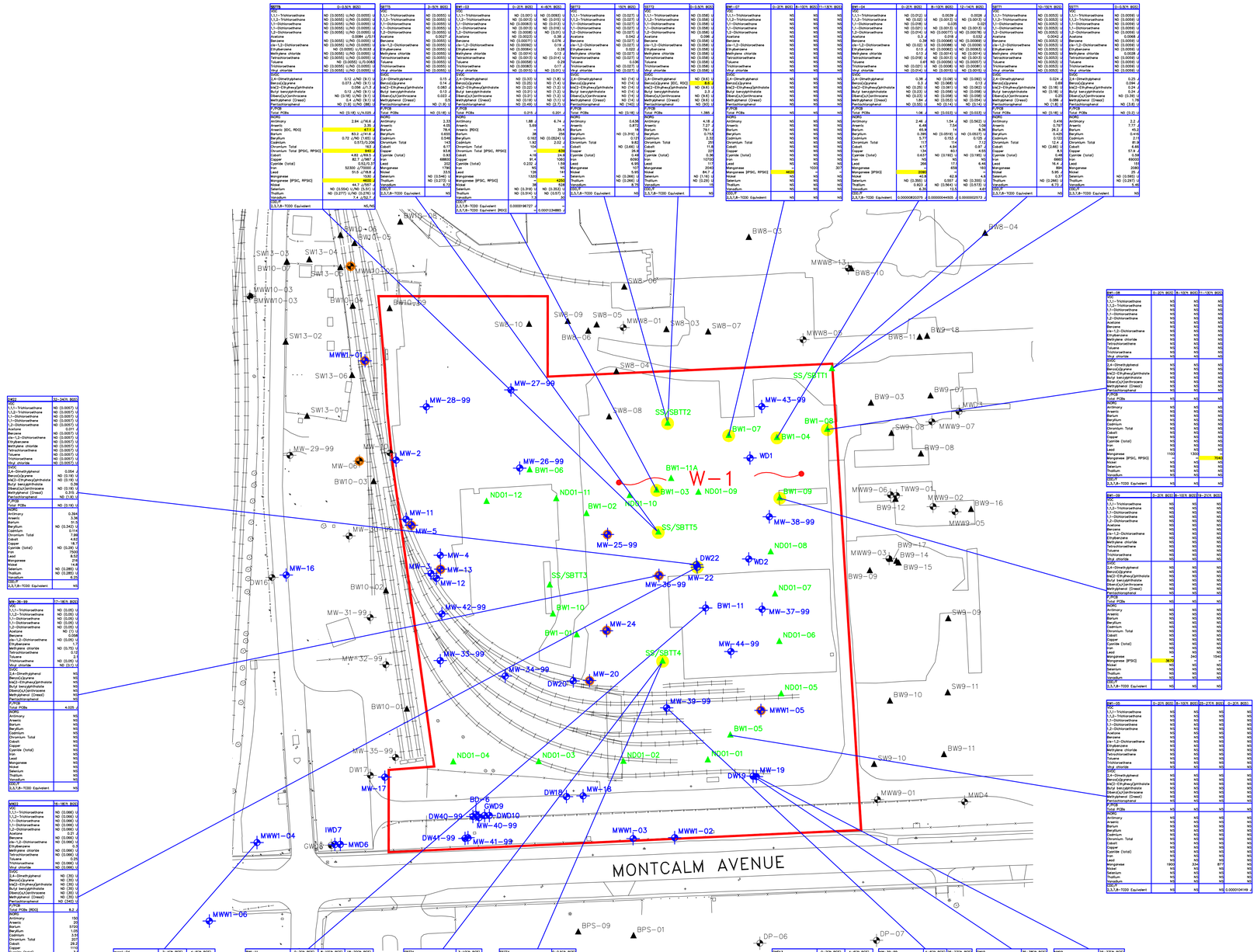
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

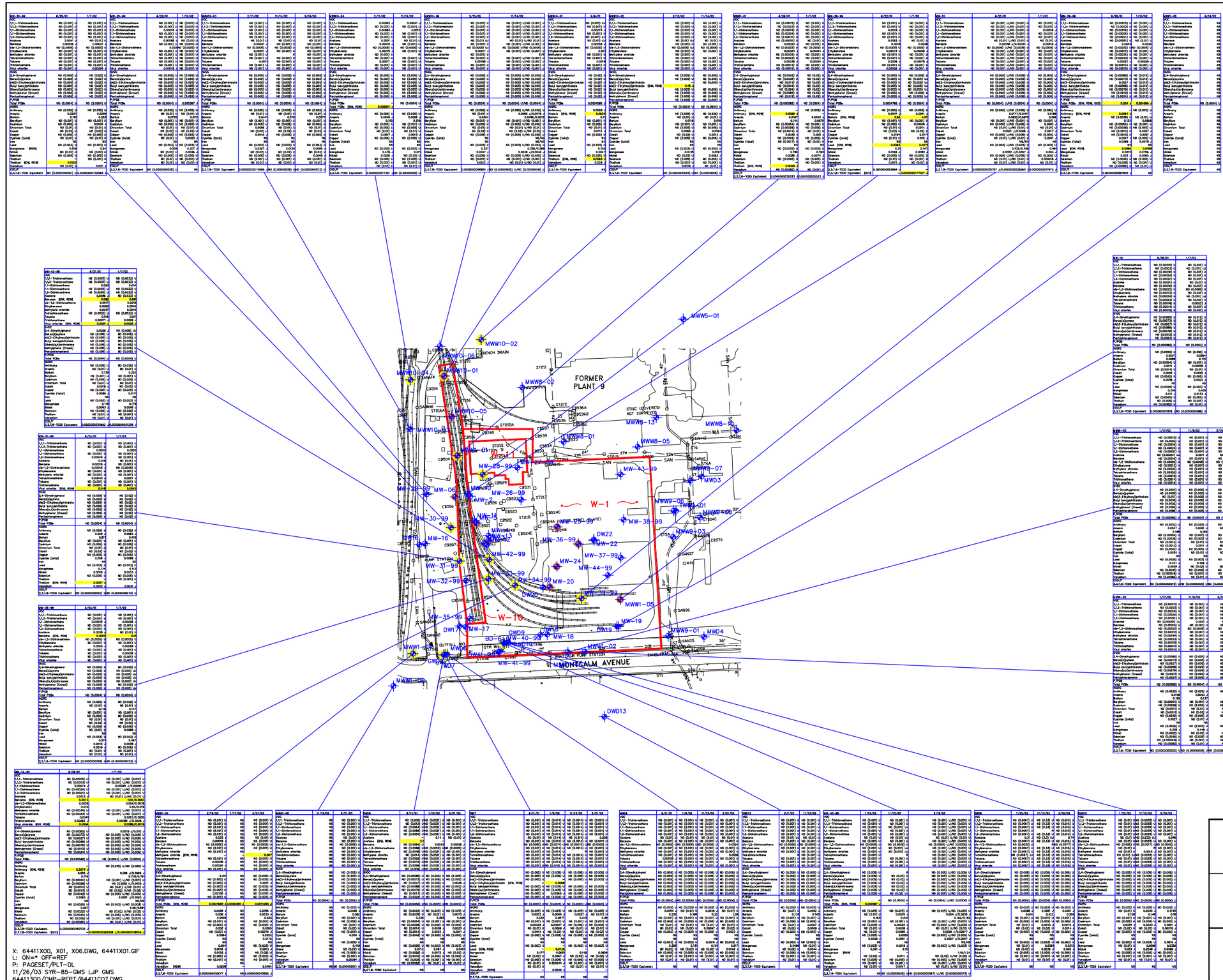
AOI W-1 - SOIL

ENCORE

FIGURE 4-6A

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=REF, DATA_POINT
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411C06.DWG


MW-19
P18-01
MW-1
W-1
MW-27-99
MW-28-99
MW-29-99
MW-2
MW-11
MW-5
MW-4
MW-13
MW-12
MW-16
MW-42-99
MW-31-99
MW-32-99
MW-33-99
MW-34-99
MW-35-99
MW-17
MW-26-99
BW1-06
BW1-11A
BW1-03
BW1-02
MW-25-99
SS/SBTT5
SS/SBTT3
SS/SBTT4
SS/SBTT2
SS/SBTT1
DW22
MW-22
MW-36-99
MW-24
MW-20
DW20
MW-39-99
MW-18
DW18
DW19
MW-19
BD-6
GWD9
DW10
DW40-99
MW-40-99
DW41-99
MW-41-99
MWW1-04
IWD7
GWD8
MWD6
MWW1-06
MWW1-03
MWW1-02
MWW1-05
BW1-05
MW-43-99
BW1-08
BW1-04
BW1-07
WD1
BW1-09
MW-38-99
WD2
ND01-08
MW-37-99
ND01-07
MW-44-99
ND01-06
ND01-05
ND01-04
ND01-03
ND01-02
ND01-01
ND01-12
ND01-11
ND01-10
BW1-10
BW1-01
BW1-11
DW13
BPS-09
BPS-01
DP-06
DP-07
MONTCALM AVENUE
BW8-01
BW8-02
BW8-03
BW8-04
BW8-05
BW8-06
BW8-07
BW8-08
BW8-09
BW8-10
BW8-11
MWW8-01
MWW8-05
MWW8-13
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SW8-09
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BW9-14
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BW9-17
BW9-18
MWW9-01
MWW9-02
MWW9-03
MWW9-04
MWW9-05
MWW9-06
MWW9-07
MWD4
TWW9-01
SW9-01
SW9-02
SW9-03
SW9-04
SW9-05
SW9-06
SW9-07
SW9-08
SW9-09
SW9-10
SW9-11
SW13-01
SW13-02
SW13-03
SW13-04
SW13-05
SW13-06
MWW10-01
MWW10-02
MWW10-03
BW10-01
BW10-02
BW10-03
BW10-04
BW10-05
BW10-06
BW10-07
BW10-08
BW10-09
DW16
DW17
MWW13-01
MWW13-02
MWW13-03
MWW13-04
MWW13-05
MWW13-06
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MWW13-08
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MWW13-29
MWW13-30
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MWW8-13	8/23/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	0.0007 J
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	0.0018 J
bis(2-Ethylhexyl)phthalate	ND (1) U
Butyl benzylphthalate	ND (1) U
Dibenz(a,h)anthracene	ND (1) U
Methylphenol (Cresol) [SOIL, RDW]	4.88 J
Pentachlorophenol	ND (1) U
PCBs	
Total PCBs	ND (0.0004) UND (0.0004) U
INORG	
Antimony	ND (0.035) U
Arsenic	0.0188
Barium	ND (0.01) U
Beryllium	ND (0.001) U
Cadmium	ND (0.001) U
Chromium Total	ND (0.002) U
Cobalt	ND (0.02) U
Copper	ND (0.008) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.0053) U
Manganese	0.0418
Nickel	0.0063 J
Selenium	ND (0.005) U
Thallium	ND (0.01) U
Vanadium	ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWW8-10	5/12/02	11/12/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	0.009 J	ND (0.01) U
Benzene	0.0008 J	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	0.0043 J	0.00324 J
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	0.001 J	0.0009 J
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	0.0041 J	0.0063 J
Barium	0.055 J	0.039 J
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	0.0046 J	0.0048 J
Chromium Total	0.0478	ND (0.002) U
Cobalt	ND (0.02) U	ND (0.02) U
Copper	0.0048 J	0.0045 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.0053) U	ND (0.0053) U
Manganese	0.0	0.0
Nickel	0.0	0.0
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	ND (0.0000000443) J	NS

MWW8-09	2/13/02	11/13/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	0.0104	0.0091
Barium	0.0782	0.0468
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.001) U	ND (0.001) U
Chromium Total	0.0077 J	0.0034 J
Cobalt	0.0094 J	ND (0.02) U
Copper	ND (0.008) U	0.0079 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.0053) U	ND (0.0053) U
Manganese	0.0736	0.285
Nickel	0.0087 J	0.0053 J
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWW8-07	9/14/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.005) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.005) U	ND (0.001) U
1,1-Dichloroethane	0.00018 J	ND (0.001) U
1,1-Dichloroethene	ND (0.005) U	ND (0.001) U
1,2-Dichloroethane	ND (0.005) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	ND (0.005) U	ND (0.001) U
cis-1,2-Dichloroethene	0.0033 J	ND (0.0005) U
Ethylbenzene	ND (0.005) U	ND (0.001) U
Methylene chloride	0.0007 J	ND (0.001) U
Tetrachloroethene	ND (0.005) U	ND (0.001) U
Toluene	0.0008 J	ND (0.001) U
Trichloroethene	ND (0.005) U	ND (0.001) U
Vinyl chloride	ND (0.005) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.0027) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	ND (0.035) U	ND (0.035) U
Barium	0.0841 J	0.0886 J
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.001) U	ND (0.001) U
Chromium Total	ND (0.002) U	ND (0.002) U
Cobalt	ND (0.02) U	ND (0.02) U
Copper	ND (0.008) U	ND (0.008) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.0	0.0
Nickel	ND (0.02) U	ND (0.02) U
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWW8-12	8/27/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.0005) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.0005) U	ND (0.001) U
1,1-Dichloroethane	ND (0.0005) U	ND (0.001) U
1,1-Dichloroethene	ND (0.0005) U	ND (0.001) U
1,2-Dichloroethane	ND (0.0005) U	ND (0.001) U
Acetone	ND (0.005) U	ND (0.01) U
Benzene	ND (0.0005) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	ND (0.0005) U	ND (0.001) U
Methylene chloride	ND (0.0005) U	ND (0.001) U
Tetrachloroethene	ND (0.0005) U	ND (0.001) U
Toluene	ND (0.0005) U	ND (0.001) U
Trichloroethene	ND (0.0005) U	ND (0.001) U
Vinyl chloride	ND (0.0005) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	0.0207 J	0.0088 J/0.0088 J
Arsenic	0.0082 J	0.0085 J/0.007 J
Barium	0.0286 J	0.0244/0.0232
Beryllium	ND (0.001) U	ND (0.001) U/ND (0.001) U
Cadmium	0.0078 J	0.0072/0.0068 J
Chromium Total	0.0266 J	0.0323 J/0.0031 J
Cobalt	ND (0.02) U	0.0136/0.0136 J
Copper	0.0047 J	NS/NS
Cyanide (total)	NS	NS/NS
Iron	NS	NS/NS
Lead	ND (0.003) U	ND (0.003) U/ND (0.003) U
Manganese	0.0492 J	ND (0.01) J/0.01 J
Nickel	0.0499 J	0.0079 J/0.0288
Selenium	ND (0.01) U	0.0009 J/0.0009 J
Vanadium [SOIL, RDW]	0.0796	0.048/0.0606
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS/NS

MWW8-04	1/9/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	0.0008 J
Methylene chloride	ND (0.001) U
Tetrachloroethene	0.0008 J
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	ND (0.0004) UND (0.0004) U
INORG	
Antimony	ND (0.035) U
Arsenic	ND (0.005) U
Barium	0.0244 J
Beryllium	ND (0.001) U
Cadmium	ND (0.001) U
Chromium Total	0.0 J
Cobalt	ND (0.02) U
Copper	0.0049 J
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.0
Nickel	0.0 J
Selenium	ND (0.005) U
Thallium	ND (0.01) U
Vanadium	ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWW8-03	8/17/01
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	0.0018 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	0.0022 J
Ethylbenzene	0.0008 J
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	0.0043 J
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	ND (0.0004) UND (0.0004) U
INORG	
Antimony	ND (0.035) U
Arsenic	0.0188
Barium	0.0778
Beryllium	ND (0.001) U
Cadmium	ND (0.001) U
Chromium Total	0.0074 J
Cobalt	0.0074 J
Copper	0.0047 J
Cyanide (total)	NS
Iron	NS
Lead	ND (0.0053) U
Manganese	0.0
Nickel	0.0 J
Selenium	ND (0.005) U
Thallium	ND (0.01) U
Vanadium	ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWW8-11	2/11/02	11/13/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	0.0078 J	ND (0.01) U
Benzene	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	0.0022 J	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	0.0043 J	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	0.0104	0.0091
Barium	0.0782	0.0468
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.001) U	ND (0.001) U
Chromium Total	0.0077 J	0.0034 J
Cobalt	0.0094 J	ND (0.02) U
Copper	ND (0.008) U	0.0079 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.0053) U	ND (0.0053) U
Manganese	0.0736	0.285
Nickel	0.0087 J	0.0053 J
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWW8-02	5/11/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	0.0007 J	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) UND (0.0005) U	
Ethylbenzene	0.0009 J	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.012) U
Benzo(a)pyrene	ND (0.0027) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.012) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	0.0075 J	0.0047
Barium	0.0969	0.107
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.001) U	0.00032 J
Chromium Total	ND (0.01) U	ND (0.01) U
Cobalt	ND (0.02) U	ND (0.02) U
Copper	ND (0.008) U	ND (0.008) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.167	0.183
Nickel	0.0098 J	0.0024 J
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWW8-01	8/28/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	0.026 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	ND (0.0004) UND (0.0004) U
INORG	
Antimony	ND (0.035) U
Arsenic	0.0056 J
Barium	0.0772 J
Beryllium	ND (0.001) U
Cadmium	ND (0.001) U
Chromium Total	ND (0.002) U
Cobalt	ND (0.02) U
Copper	0.0047 J
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.0
Nickel	0.0 J
Selenium	ND (0.005) U
Thallium	ND (0.01) U
Vanadium	ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWW8-05	8/27/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.005) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.005) U	ND (0.001) U
1,1-Dichloroethane	ND (0.005) U	ND (0.001) U
1,1-Dichloroethene	ND (0.005) U	ND (0.001) U
1,2-Dichloroethane	ND (0.005) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	ND (0.005) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.005) U	ND (0.0005) U
Ethylbenzene	ND (0.005) U	ND (0.001) U
Methylene chloride	ND (0.005) U	ND (0.001) U
Tetrachloroethene	ND (0.005) U	ND (0.001) U
Toluene	ND (0.005) U	ND (0.001) U
Trichloroethene	ND (0.005) U	ND (0.001) U
Vinyl chloride	ND (0.005) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	0.0188	0.0179
Barium	0.0778	0.0746
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	0.0074 J	0.0074 J
Chromium Total	0.0074 J	0.0047 J
Cobalt	ND (0.02) U	ND (0.02) U
Copper	0.0047 J	0.0084 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.0053) U	ND (0.0053) U
Manganese	0.0	0.0
Nickel	0.0 J	0.0 J
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

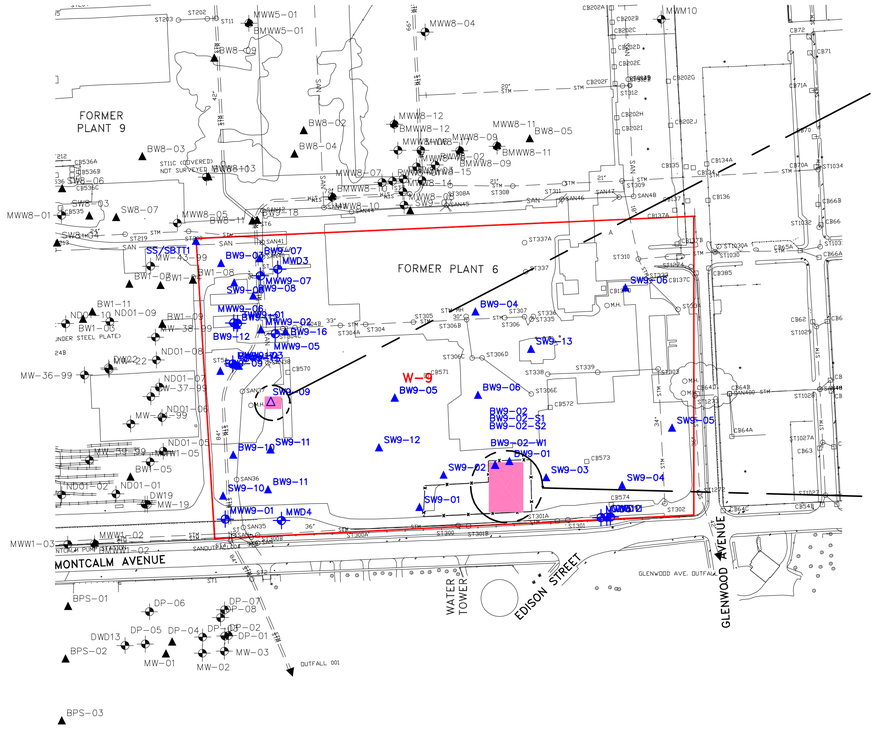
MWW8-06	9/20/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) UJ
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.035) U
Arsenic	0.0048 J
Barium	0.0779
Beryllium	ND (0.001) U
Cadmium	ND (0.001) U
Chromium Total	ND (0.002) U
Cobalt	ND (0.02) U
Copper	ND (0.008) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.0
Nickel	ND (0.02) U
Selenium	ND (0.005) U
Thallium	ND (0.01) U
Vanadium	ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWW8-08	9/20/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	0.16 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	0.0004 J
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.035) U
Arsenic	0.0048 J
Barium	0.0779
Beryllium	ND (0.001) U
Cadmium	ND (0.001) U
Chromium Total	ND (0.002) U
Cobalt	ND (0.02) U
Copper	ND (0.008) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.167
Nickel	0.0098 J
Selenium	ND (0.005) U
Thallium	ND (0.01) U
Vanadium	ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWW8-21	8/21/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	0.003	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	0.0019 J	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	0.0006 J	0.0002 J
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	0.00021 J	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	ND (0.035) U	ND (0.035) U
Barium	0.0841 J	0.0886 J
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.001) U	ND (0.001) U
Chromium Total	ND (0.002) U	ND (0.002) U
Cobalt	ND (0.02) U	ND (0.02) U
Copper	ND (0.008) U	ND (0.008) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.0	0.0
Nickel	ND (0.02) U	ND (0.02) U
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWW8-20	9/20/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	0.00022 J	0.0002 J
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	0.00022 J	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) UND (0.0005) U	
Ethylbenzene	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCBs		
Total PCBs	ND (0.0004) UND (0.0004) U	
INORG		
Antimony	ND (0.035) U	ND (0.035) U
Arsenic	ND (0.035) U	ND (0.035) U
Barium	0.0881 J	0.101
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	0.0024 J	0.0022 J
Chromium Total	ND (0.002) U	ND (0.002) U
Cobalt	ND (0.02) U	ND (0.02) U
Copper	ND (0.008) U	ND (0.008) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.0	0.0
Nickel	ND (0.02) U	ND (0.02) U
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.01) U
Vanadium	ND (0.01) U	ND (0.01) U
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWW8-19	9/20/01	1/9/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	0.0002 J	0.0002 J
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	ND (0.01) U	ND (0.01) U
Benzene	0.00022 J	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) UND (0.0005) U	
Ethylbenzene	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylh


FORMER PLANT 9
FORMER PLANT 6
W-9
MONTCALM AVENUE
WATER TOWER
EDISON STREET
GLENWOOD AVENUE
GLENWOOD AVE. OUTFALL
OUTFALL 001
SS/SBTT1
MWW5-01
BMWW5-01
MWW8-04
MWW10
MWW8-12
BMWW8-12
MWW8-11
BMWW8-11
MWW8-09
BMWW8-09
MWW8-07
BMWW8-07
MWW8-10
BMWW8-10
MWW8-15
BMWW8-15
MWW8-02
BMWW8-02
MWW8-05
BMWW8-05
MWW8-01
MWW8-03
BMWW8-03
MWW8-14
BMWW8-14
MWW8-18
BMWW8-18
MWW9-07
MWW9-08
MWW9-06
MWW9-01
MWW9-02
MWW9-16
MWW9-05
MWW9-03
MWW9-04
MWW9-12
MWW9-13
MWW9-14
MWW9-15
MWW9-10
MWW9-11
MWW1-03
MWW1-02
MWW1-01
MW-36-99
MW-37-99
MW-38-99
MW-39-99
MW-40-99
MW-41-99
MW-42-99
MW-43-99
MW-99
MW-19
MW-01
MW-02
MW-03
BW8-01
BW8-02
BW8-03
BW8-04
BW8-05
BW8-06
BW8-07
BW8-08
BW8-09
BW8-10
BW8-11
BW8-12
BW8-13
BW8-14
BW8-15
BW8-16
BW9-01
BW9-02
BW9-02-S1
BW9-02-S2
BW9-02-W1
BW9-03
BW9-04
BW9-05
BW9-06
BW9-07
BW9-08
BW9-09
BW9-10
BW9-11
BW9-12
BW9-13
BW9-14
BW9-15
BW9-16
SW9-01
SW9-02
SW9-03
SW9-04
SW9-05
SW9-06
SW9-07
SW9-08
SW9-09
SW9-10
SW9-11
SW9-12
SW9-13
MWD1
MWD2
MWD3
MWD4
BW1-01
BW1-02
BW1-03
BW1-04
BW1-05
BW1-06
BW1-07
BW1-08
BW1-09
BW1-10
BW1-11
BW19
ND01-01
ND01-02
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ND01-04
ND01-05
ND01-06
ND01-07
ND01-08
ND01-09
ND01-10
DWD13
DWD22
BPS-01
BPS-02
BPS-03
DP-01
DP-02
DP-03
DP-04
DP-05
DP-06
DP-07
DP-08
SAN35
SAN36
SAN37
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SAN81
SAN82
SAN83

MWM2-01	8/30/01	1/8/02	11/12/02	6/23/03
VOC				
1,1,1-Trichloroethane	0.026	0.03	0.02	0.034
1,1,2-Trichloroethane	ND (0.002) U	ND (0.001) U	ND (0.002) U	ND (0.002) U
1,1-Dichloroethane	0.0016 J	0.0026 J	0.0021 J	0.0035 J
1,1-Dichloroethene	0.00082 J	0.005 J	ND (0.001) U	0.00033 J
1,2-Dichlorobenzene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Acetone	ND (5.01) UJ	ND (0.01) U	ND (0.01) UJ	0.0315 J
Benzene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
SVOC				
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
PCB				
Total PCBs	ND (0.0004) U	ND (0.0004) U	ND (0.0004) U	ND (0.0004) U
INORG				
Antimony	ND (0.025) U	ND (0.025) U	ND (0.025) U	ND (0.025) U
Arsenic	ND (0.01) U	ND (0.01) U	ND (0.01) U	ND (0.01) U
Barium	0.0858	0.0481	0.0466	0.0609
Beryllium	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Chromium Total	ND (0.01) U	ND (0.01) U	ND (0.01) U	ND (0.01) U
Cobalt	ND (0.02) U	ND (0.02) U	ND (0.02) U	ND (0.02) U
Copper	ND (0.025) U	ND (0.025) U	ND (0.025) U	ND (0.025) U
Cyanide (total)	0.0138 J	0.0077 J	ND (0.005) U	ND (0.005) U
Iron	NS	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	ND (0.003) U	ND (0.003) U
Manganese	0.0236 J	0.0236 J	0.0134 J	0.0248 J
Nickel	0.004 J	0.007 J	0.0134 J	0.0248 J
Selenium	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Thallium	0.0055 J	ND (0.002) U	ND (0.002) U	ND (0.002) U
Vanadium	0.0013 J	ND (0.01) U	ND (0.01) U	ND (0.01) U
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWM2-02	8/30/01	1/8/02	11/12/02	6/23/03
VOC				
1,1,1-Trichloroethane	0.0019 J	0.004 J	0.012	0.0032 J
1,1,2-Trichloroethane	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	0.00048 J	0.0026 J	0.0012 J	0.00053 J
1,1-Dichloroethene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
1,2-Dichlorobenzene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Acetone	0.12 J	ND (0.01) U	ND (0.01) U	0.0515 J
Benzene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0017) U	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Toluene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.0017) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
SVOC				
2,4-Dimethylphenol	ND (0.0098) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
PCB				
Total PCBs	ND (0.0004) U	ND (0.0004) U	ND (0.0004) U	ND (0.0004) U
INORG				
Antimony	ND (0.025) U	ND (0.025) U	ND (0.025) U	ND (0.025) U
Arsenic	ND (0.01) U	ND (0.01) U	ND (0.01) U	ND (0.01) U
Barium	0.0774	0.0778	0.0525	0.0162
Beryllium	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Chromium Total	0.0037 J	0.0037 J	0.0062 J	0.0062 J
Cobalt	0.0228 J	0.0198 J	0.0062 J	0.0062 J
Copper	ND (0.025) U	ND (0.025) U	ND (0.025) U	ND (0.025) U
Cyanide (total)	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Iron	NS	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	ND (0.003) U	ND (0.003) U
Manganese	0.523 J	0.552 J	0.174 J	0.0934 J
Nickel	0.0076 J	0.0076 J	0.0062 J	0.0062 J
Selenium	ND (0.005) U	ND (0.005) U	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.002) U	ND (0.002) U	ND (0.002) U
Vanadium	ND (0.01) U	ND (0.01) U	ND (0.01) U	ND (0.01) U
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWM7	8/30/01	1/8/02
VOC		
1,1,1-Trichloroethane	0.003 J	0.0037 J
1,1,2-Trichloroethane	ND (0.0003) U	ND (0.001) U
1,1-Dichloroethane	ND (0.0006) U	ND (0.001) U
1,1-Dichloroethene	ND (0.0024) U	ND (0.001) U
1,2-Dichlorobenzene	ND (0.00025) U	ND (0.001) U
Acetone	0.015 J	ND (0.01) U
Benzene	ND (0.0006) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0006) U	ND (0.0005) U
Ethylbenzene	ND (0.0006) U	ND (0.001) U
Methylene chloride	ND (0.0006) U	ND (0.001) U
Tetrachloroethene	ND (0.0006) U	ND (0.001) U
Toluene	ND (0.0006) U	ND (0.001) U
Trichloroethene	ND (0.0018) U	ND (0.001) U
Vinyl chloride	ND (0.0017) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.00093) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.0087) U	ND (0.005) U
Butyl benzylphthalate	ND (0.0027) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.0086) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.0079) U	ND (0.005) U
Pentachlorophenol	ND (0.0024) U	ND (0.005) U
PCB		
Total PCBs	ND (0.000082) U	ND (0.0004) U
INORG		
Antimony	ND (0.0022) U	ND (0.025) U
Arsenic	ND (0.01) U	ND (0.01) U
Barium	0.0224	0.0778
Beryllium	ND (0.00054) U	ND (0.001) U
Cadmium	0.00037 J	ND (0.005) U
Chromium Total	ND (0.0042) U	0.0062 J
Cobalt	ND (0.0042) U	0.0062 J
Copper	ND (0.0042) U	ND (0.025) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.0023) U	ND (0.003) U
Manganese	0.272	0.0085 J
Nickel	0.0033 J	0.0062 J
Selenium	0.0033 U	ND (0.005) U
Thallium	ND (0.0009) U	ND (0.0009) U
Vanadium	0.0018 J	0.0062 J
2,3,7,8-TCDD Equivalent	NS	NS

MWM2-03	8/30/01	1/8/02	11/12/02	6/23/03
VOC				
1,1,1-Trichloroethane	0.05	0.05/0.052	0.05	0.037
1,1,2-Trichloroethane	ND (0.0008) U	ND (0.001) U/ND (0.002) U	ND (0.002) U	ND (0.002) U
1,1-Dichloroethane	0.015 J	0.015 J/0.016 J	0.012 J	0.0086 J
1,1-Dichloroethene	0.03 J	0.027 J/0.028 J	0.014 J	0.012 J
1,2-Dichlorobenzene	ND (0.00043) U	ND (0.0017) U/ND (0.002) U	ND (0.001) U	ND (0.001) U
Acetone	0.0044 J	ND (0.0017) U/ND (0.002) U	ND (0.02) UJ	ND (0.01) U
Benzene	ND (0.00032) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.00043) U	ND (0.0008) U/ND (0.001) U	ND (0.001) U	ND (0.0005) U
Ethylbenzene	ND (0.00024) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
Methylene chloride	ND (0.00043) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
Tetrachloroethene	ND (0.00043) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
Toluene	ND (0.00038) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
Trichloroethene	ND (0.00038) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
Vinyl chloride	ND (0.00053) U	ND (0.0017) U/ND (0.002) U	ND (0.002) U	ND (0.001) U
SVOC				
2,4-Dimethylphenol	ND (0.00088) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.0027) U	ND (0.005) U/ND (0.005) U	0.014 J	ND (0.005) U
bis(2-Ethylhexyl)phthalate [EDW, RDW]			0.014	
Butyl benzylphthalate	ND (0.00088) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.00079) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.00079) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.0024) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
PCB				
Total PCBs	ND (0.000082) U	ND (0.0004) U/ND (0.0004) U	ND (0.0004) U	ND (0.0004) U
INORG				
Antimony	ND (0.0022) U	ND (0.025) U/ND (0.025) U	ND (0.025) U	ND (0.025) U
Arsenic	ND (0.01) U	ND (0.01) U/ND (0.01) U	ND (0.01) U	ND (0.01) U
Barium	0.202	0.185/0.178	0.0834	0.0345
Beryllium	ND (0.001) U	ND (0.001) U/ND (0.001) U	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.005) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
Chromium Total	NS	ND (0.01) U/ND (0.01) U	ND (0.01) U	ND (0.01) U
Cobalt	0.0073 J	0.0047 J/0.0046 J	ND (0.02) U	ND (0.02) U
Copper	0.0248 J	0.0248 J/0.0248 J	ND (0.025) U	ND (0.025) U
Cyanide (total)	0.0048 J	ND (0.01 U)/0.0055 J	NS	NS
Iron	NS	NS/NS	0.52	NS
Lead	ND (0.003) U	ND (0.003) U/ND (0.003) U	ND (0.003) U	ND (0.003) U
Manganese	0.435	0.312 J/0.3	0.176	0.21
Nickel	0.030 J	0.046 J/0.0138 J	0.071 J	0.0258 J
Selenium	ND (0.005) U	ND (0.005) U/ND (0.005) U	ND (0.005) U	ND (0.005) U
Thallium	ND (0.0009) U	0.00067 J/0.000049 J	ND (0.001) U	ND (0.001) U
Vanadium	0.0018 J	0.0052 J/0.0048 J	0.0054 J	0.0053 J
2,3,7,8-TCDD Equivalent	NS	NS/NS	NS	NS

MWM2-05	7/31/02	11/12/02	6/23/03
VOC			
1,1,1-Trichloroethane	0.04 J	0.04 J	0.025 J
1,1,2-Trichloroethane	ND (0.002) UND	ND (0.002) UND	ND (0.002) UND
1,1-Dichloroethane	0.018 J	0.012 J	0.0086 J
1,1-Dichloroethene	0.0048 J	0.0028 J	ND (0.001) U
1,2-Dichlorobenzene	ND (0.002) UND	ND (0.0029) U	ND (0.001) U
Acetone	0.0044 JND	ND (0.029) U	ND (0.01) U
Benzene	ND (0.002) UND	ND (0.002) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.001) UND	ND (0.0014) UND	ND (0.0005) U
Ethylbenzene	ND (0.002) UND	ND (0.002) U	ND (0.001) U
Methylene chloride	ND (0.002) UND	ND (0.002) U	ND (0.001) U
Tetrachloroethene	ND (0.002) UND	ND (0.002) U	ND (0.001) U
Toluene	ND (0.002) UND	ND (0.0029) U	ND (0.001) U
Trichloroethene	ND (0.002) UND	ND (0.0029) U	ND (0.001) U
Vinyl chloride	ND (0.002) UND	ND (0.0029) U	ND (0.001) U
SVOC			
2,4-Dimethylphenol	NS	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	NS	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	NS	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate [EDW, RDW]	NS	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	NS	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	NS	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	NS	ND (0.005) U	ND (0.005) U
Pentachlorophenol	NS	ND (0.005) U	ND (0.005) U
PCB			
Total PCBs	NSND (0.0004)	ND (0.0004) U	ND (0.0004) U
INORG			
Antimony	NS	ND (0.025) U	ND (0.025) U
Arsenic	NS	0.0064 J	0.0064 J
Barium	NS	ND (0.001) U	0.0345
Beryllium	NS	ND (0.001) U	ND (0.001) U
Cadmium	NS	ND (0.005) U	ND (0.005) U
Chromium Total	NS	ND (0.01) U	ND (0.01) U
Cobalt	NS	ND (0.02) U	ND (0.02) U
Copper	NS	ND (0.025) U	ND (0.025) U
Cyanide (total)	NS	ND (0.005) U	ND (0.005) U
Iron	NS	NS	NS
Lead	NS	0.02	ND (0.003) U
Manganese	NS	0.12	0.0859
Nickel	NS	0.0062 J	0.0062 J
Selenium	NS	ND (0.005) U	ND (0.005) U
Thallium	NS	ND (0.001) U	ND (0.001) U
Vanadium	NS	ND (0.01) U	ND (0.01) U
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWM2-17	8/23/03
VOC	
1,1,1-Trichloroethane	0.0084 J
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.00075 J
1,1-Dichloroethene	ND (0.001) U
1,2-Dichlorobenzene	ND (0.001) U
Acetone	0.0051 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	0.0023 J
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	0.0028 J
Barium	0.0774
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	0.0037 J
Cobalt	0.0057 J
Copper	ND (0.025) U
Cyanide (total)	ND (0.005) U
Iron	NS
Lead	ND (0.003) U
Manganese	0.0468
Nickel	0.0062 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.0018 J
2,3,7,8-TCDD Equivalent	NS

MWM2-15	8/24/03
VOC	
1,1,1-Trichloroethane	0.00045 J
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.00077 J
1,1-Dichloroethene	ND (0.001) U
1,2-Dichlorobenzene	ND (0.001) U
Acetone	0.0098 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	0.0023 J
Toluene	ND (0.001) U
Trichloroethene	0.0016 J
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	0.0039 J
Barium	0.0837
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	0.0035 J
Cobalt	0.0057 J
Copper	ND (0.025) U
Cyanide (total)	ND (0.005) U
Iron	NS
Lead	ND (0.003) U
Manganese	0.183
Nickel	0.0062 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.0018 J
2,3,7,8-TCDD Equivalent	NS

MWM2-16	8/24/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.0022 J
1,1-Dichloroethene	ND (0.001) U
1,2-Dichlorobenzene	ND (0.001) U
Acetone	0.011 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	0.0016 J
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	0.0037 J
Barium	0.0924
Beryllium	ND (0.001) U
Cadmium	0.00028 J
Chromium Total	0.0042 J
Cobalt	0.0057 J
Copper	ND (0.025) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.155
Nickel	0.0062 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.0018 J
2,3,7,8-TCDD Equivalent	NS

MWM2-18	8/24/03
VOC	
1,1,1-Trichloroethane	ND (0.004) U
1,1,2-Trichloroethane	ND (0.004) U
1,1-Dichloroethane	0.067
1,1-Dichloroethene	ND (0.004) U
1,2-Dichlorobenzene	ND (0.04) U
Acetone	ND (0.04) U
Benzene	ND (0.004) U
cis-1,2-Dichloroethene	0.0015 J
Ethylbenzene	ND (0.004) U
Methylene chloride	ND (0.004) U
Tetrachloroethene	ND (0.004) U
Toluene	0.052 J
Trichloroethene [EDW, RDW]	0.0092
Vinyl chloride [EDW, RDW]	0.0054 J
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	0.0585 J
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	0.0044 J
Barium	0.0446
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	0.0063 J
Cobalt	0.0057 J
Copper	ND (0.025) U
Cyanide (total)	ND (0.005) U
Iron	NS
Lead	ND (0.003) U
Manganese	0.158
Nickel	0.0062 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.0018 J
2,3,7,8-TCDD Equivalent	NS

MWM2-19	8/23/03
VOC	
1,1,1-Trichloroethane	0.007
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.0075
1,1-Dichloroethene	ND (0.001) U
1,2-Dichlorobenzene	ND (0.001) U
Acetone	0.011 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	0.0013 J
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	0.0019 J
Toluene	ND (0.001) U
Trichloroethene	0.0017 J
Vinyl chloride	0.001
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	NS
INORG	
Antimony	ND (0.025) U
Arsenic	0.0037 J
Barium	0.0852
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	0.0017 J
Cobalt	0.00097 J
Copper	ND (0.025) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.202
Nickel	ND (0.005) U
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.0018 J
2,3,7,8-TCDD Equivalent	NS

MWM2-20	8/23/03
VOC	
1,1,1-Trichloroethane	0.0084 J
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.0077 J
1,1-Dichloroethene	ND (0.001) U
1,2-Dichlorobenzene	ND (0.001) U
Acetone	0.0098 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	0.0023 J
Toluene	ND (0.001) U
Trichloroethene	0.0016 J
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	NS
Barium	NS
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	NS
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
2,3,7,8-TCDD Equivalent	NS

MWM2-22	6/23/03
VOC	
1,1,1-Trichloroethane	0.0056
1,1,2-Trichloroethane	ND (0.0033) U
1,1-Dichloroethane	0.091
1,1-Dichloroethene	0.0035
1,2-Dichlorobenzene	ND (0.0033) U
Acetone	0.0057 J
Benzene	ND (0.0033) U
cis-1,2-Dichloroethene	0.0027 J
Ethylbenzene	ND (0.0033) U
Methylene chloride	ND (0.0033) U
Tetrachloroethene	0.0027 J
Toluene	ND (0.0033) U
Trichloroethene [EDW, RDW]	0.006
Vinyl chloride	ND (0.0033) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	0.0047 J
Barium	0.0773
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	0.0058 J
Cobalt	0.0058 J
Copper	ND (0.025) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.241
Nickel	0.0062 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	ND (0.01) U
2,3,7,8-TCDD Equivalent	NS

MWM2-24	6/23/03
VOC	
1,1,1-Trichloroethane	0.0042 J
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.055
1,1-Dichloroethene	0.0017 J
1,2-Dichlorobenzene	ND (0.001) U
Acetone	0.0027 J
Benzene	ND (0.0017) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	0.0072 J
Toluene	ND (0.001) U
Trichloroethene [EDW, RDW]	0.0056
Vinyl chloride	0.0033 J
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	ND (0.025) U
Arsenic	0.0047 J
Barium	0.0773
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	0.0058 J
Cobalt	0.0058 J
Copper	ND (0.025) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.241
Nickel	0.0062 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	ND (0.01) U
2,3,7,8-TCDD Equivalent	NS

MWM1-01	8/30/01	1/8/02
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichlorobenzene	ND (0.001) U	ND (0.001) U
Acetone	ND (0.005) U	ND (0.01) U
Benzene	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U
Ethylbenzene	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	0.0041 J	0.0038 J
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	ND (0.001) U	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U
Pentachlorophenol	ND (0.005) U	ND (0.005) U
PCB		
Total PCBs	ND (0.0004) U	ND (0.0004) U
INORG		
Antimony	0.005 J	
Arsenic	0.0077 J	
Barium	0.0053 J	0.0057 J
Beryllium	0.0028	0.0028
Cadmium	ND (0.001) U	ND (0.001) U
Chromium Total	ND (0.005) U	ND (0.005) U
Cobalt	ND (0.02) U	ND (0.02) U
Copper	ND (0.025) U	ND (0.025) U
Cyanide (total)	0.0088 J	ND (0.005) U
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.0263	0.0281
Nickel	ND (0.02) U	ND (0.02) U
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.01) U	ND (0.002) U
Vanadium	ND (0.01) U	ND (0.01) U
2,3,7,8-TCDD Equivalent	NS	NS

MWM1-06	8/12/03
VOC	
1,1,1-Trichloroethane	NS/NS
1,1,2-Trichloroethane	NS/NS
1,1-

MWM1-04	1/10/02	11/14/02	9/30/03
VOC			
1,1,1-Trichloroethane	ND (0.033)	UND (0.033) U	NS
1,1,2-Trichloroethane	ND (0.033)	UND (0.033) U	NS
1,1-Dichloroethane	ND (0.033)	UND (0.033) U	NS
1,1-Dichloroethene	ND (0.033)	UND (0.033) U	NS
1,2-Dichloroethane	ND (0.033)	UND (0.033) U	NS
Acetone	ND (0.33)	UJ ND (0.33) U	NS
Benzene	0.17	J 0.044 J	NS
Benzene [EDR, RDM]	NC (0.017)	U ND (0.017) U	NS
cis-1,2-Dichloroethene		0.85 J	1.6
Ethylbenzene		0.85 J	1.6
Methylene chloride	ND (0.033)	U R	NS
Tetrachloroethene	ND (0.033)	UND (0.033) U	NS
Toluene	0.034 J	0.026 J	0.057
Trichloroethene	ND (0.033)	UND (0.033) U	NS
Vinyl chloride	ND (0.033)	UND (0.033) U	NS
SVOC			
2,4-Dimethylphenol	NS	NS	NS
Benzo(a)pyrene	NS	NS	NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS
Butyl benzylphthalate	NS	NS	NS
Dibenz(a,h)anthracene	NS	NS	NS
Methylphenol (Cresol)	NS	NS	NS
Pentachlorophenol	NS	NS	NS
PCB			
Total PCBs	NS	NS	NS
INORG			
Antimony	NS	NS	NS
Arsenic	NS	NS	NS
Barium	NS	NS	NS
Beryllium	NS	NS	NS
Cadmium	NS	NS	NS
Chromium Total	NS	NS	NS
Cobalt	NS	NS	NS
Copper	NS	NS	NS
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	ND (0.003)	UND (0.003) U	NS
Manganese	NS	NS	NS
Nickel	NS	NS	NS
Selenium	NS	NS	NS
Thallium	NS	NS	NS
Vanadium	NS	NS	NS
DIOXIN			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWM1-05	1/18/02	11/14/02	10/1/03
VOC			
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.01) U	ND (0.01) U	NS
Benzene	ND (0.001) U	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	ND (0.001) U	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.001) U	ND (0.001) U	NS
Toluene	0.0003 J	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.001) U	ND (0.001) U	NS
SVOC			
2,4-Dimethylphenol	NS	NS	NS
Benzo(a)pyrene	NS	NS	NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS
Butyl benzylphthalate	NS	NS	NS
Dibenz(a,h)anthracene	NS	NS	NS
Methylphenol (Cresol)	NS	NS	NS
Pentachlorophenol	NS	NS	NS
PCB			
Total PCBs	NS	NS	NS
INORG			
Antimony	NS	NS	NS
Arsenic	NS	NS	NS
Barium	NS	NS	NS
Beryllium	NS	NS	NS
Cadmium	NS	NS	NS
Chromium Total	NS	NS	NS
Cobalt	NS	NS	NS
Copper	NS	NS	NS
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	ND (0.003)	ND (0.003) U	NS
Manganese	NS	NS	NS
Nickel	NS	NS	NS
Selenium	NS	NS	NS
Thallium	NS	NS	NS
Vanadium	NS	NS	NS
DIOXIN			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWM1-02	8/20/01	1/10/02	11/14/02	10/1/03
VOC				
1,1,1-Trichloroethane	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.1) U	ND (0.01) U	ND (0.01) U	NS
Benzene	0.01	0.0003 J	0.0037	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	0.001 J	0.0049 J	0.0022 J	0.0027 J
Methylene chloride	ND (0.01) U	ND (0.001) U	R	NS
Tetrachloroethene	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
Toluene	0.03 J	ND (0.001) U	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.01) U	ND (0.001) U	ND (0.001) U	NS
SVOC				
2,4-Dimethylphenol	NS	NS	NS	NS
Benzo(a)pyrene	NS	NS	NS	NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS	NS
Butyl benzylphthalate	NS	NS	NS	NS
Dibenz(a,h)anthracene	NS	NS	NS	NS
Methylphenol (Cresol)	NS	NS	NS	NS
Pentachlorophenol	NS	NS	NS	NS
PCB				
Total PCBs	NS	NS	NS	NS
INORG				
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Chromium Total	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	ND (0.003)	ND (0.003) U	NS	NS
Manganese	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
DIOXIN				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWM1-01	8/20/01	1/10/02	11/14/02	9/30/03
VOC				
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.01) U	ND (0.01) U	ND (0.01) U	NS
Benzene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	0.00035 J	ND (0.001) U	ND (0.001) U	NS
Methylene chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Toluene	ND (0.001) U	ND (0.001) U	0.00042 J	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
SVOC				
2,4-Dimethylphenol	NS	NS	NS	NS
Benzo(a)pyrene	NS	NS	NS	NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS	NS
Butyl benzylphthalate	NS	NS	NS	NS
Dibenz(a,h)anthracene	NS	NS	NS	NS
Methylphenol (Cresol)	NS	NS	NS	NS
Pentachlorophenol	NS	NS	NS	NS
PCB				
Total PCBs	NS	NS	NS	NS
INORG				
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Chromium Total	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	ND (0.003)	ND (0.003) U	NS	NS
Manganese	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
DIOXIN				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWM4-03	8/20/01	1/10/02	11/14/02	9/30/03
VOC				
1,1,1-Trichloroethane	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
1,1,2-Trichloroethane	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
1,1-Dichloroethane	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
1,1-Dichloroethene	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
1,2-Dichloroethane	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
Acetone	0.17 J	0.044 J	ND (0.01) U	NS/NS
Benzene	ND (0.00025) U	ND (0.001) U	ND (0.001) U/ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.00025) U	ND (0.0005) U	ND (0.0005) U	NS/NS
Ethylbenzene	ND (0.00025) U	ND (0.001) U	ND (0.001) U/ND (0.001) U	ND (0.001) U
Methylene chloride	0.0014 J	ND (0.001) U	R	NS/NS
Tetrachloroethene	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
Toluene	ND (0.00025) U	ND (0.001) U	ND (0.001) U/ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
Vinyl chloride	ND (0.00025) U	ND (0.001) U	ND (0.001) U	NS/NS
SVOC				
2,4-Dimethylphenol	NS	NS	NS	NS/NS
Benzo(a)pyrene	NS	NS	NS	NS/NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS	NS/NS
Butyl benzylphthalate	NS	NS	NS	NS/NS
Dibenz(a,h)anthracene	NS	NS	NS	NS/NS
Methylphenol (Cresol)	NS	NS	NS	NS/NS
Pentachlorophenol	NS	NS	NS	NS/NS
PCB				
Total PCBs	NS	NS	NS	NS/NS
INORG				
Antimony	NS	NS	NS	NS/NS
Arsenic	NS	NS	NS	NS/NS
Barium	NS	NS	NS	NS/NS
Beryllium	NS	NS	NS	NS/NS
Cadmium	NS	NS	NS	NS/NS
Chromium Total	NS	NS	NS	NS/NS
Cobalt	NS	NS	NS	NS/NS
Copper	NS	NS	NS	NS/NS
Cyanide (total)	NS	NS	NS	NS/NS
Iron	NS	NS	NS	NS/NS
Lead	ND (0.003)	ND (0.003) U	ND (0.004) U	NS/NS
Manganese	NS	NS	NS	NS/NS
Nickel	NS	NS	NS	NS/NS
Selenium	NS	NS	NS	NS/NS
Thallium	NS	NS	NS	NS/NS
Vanadium	NS	NS	NS	NS/NS
DIOXIN				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS/NS

MWM4-07	10/1/03
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	NS
1,2-Dichloroethane	NS
Acetone	NS
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	NS
Ethylbenzene	ND (0.001) U
Methylene chloride	NS
Tetrachloroethene	NS
Toluene	ND (0.001) U
Trichloroethene	NS
Vinyl chloride	NS
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	NS
INORG	
Antimony	NS
Arsenic	NS
Barium	NS
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	NS
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWM4-04	11/14/02
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	NS
1,2-Dichloroethane	NS
Acetone	NS
Benzene	NS
cis-1,2-Dichloroethene	NS
Ethylbenzene	NS
Methylene chloride	NS
Tetrachloroethene	NS
Toluene	NS
Trichloroethene	NS
Vinyl chloride	NS
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	NS
INORG	
Antimony	NS
Arsenic	NS
Barium	NS
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	NS
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MWM4-02	1/27/02	11/13/02	8/01/03
VOC			
1,1,1-Trichloroethane	0.0027/0.0033 J	0.0029 J	NS
1,1,2-Trichloroethane	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.01) U/ND (0.01) U	ND (0.01) U	NS
Benzene	ND (0.001) U/ND (0.001) U	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U/ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	ND (0.001) U/ND (0.001) U	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
Toluene	0.00028 J/ND (0.001) U	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
SVOC			
2,4-Dimethylphenol	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Benzo(a)pyrene	ND (0.0027) U/ND (0.005) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	ND (0.005) U/0.0034 J	ND (0.005) U	NS
Butyl benzylphthalate	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Pentachlorophenol	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
PCB			
Total PCBs	ND (0.0004) U/ND (0.0004) U	ND (0.0004) U	NS
INORG			
Antimony	ND (0.025) U/ND (0.025) U	ND (0.025) U	NS
Arsenic	ND (0.01) U/ND (0.01) U	ND (0.01) U	NS
Barium	0.0891/0.0978	ND (0.01) U	NS
Beryllium	ND (0.002) U/ND (0.002) U	ND (0.002) U	NS
Cadmium	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Chromium Total	ND (0.01) U/ND (0.01) U	0.0014 J	NS
Cobalt	ND (0.02) U/0.0013 J	ND (0.02) U	NS
Copper	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Cyanide (total)	NS/NS	NS	NS
Iron	NS/NS	NS	NS
Lead	ND (0.003) U/ND (0.003) U	ND (0.003) U	NS
Manganese	0.0891/0.0978	ND (0.01) U	NS
Nickel	ND (0.02) U/ND (0.02) U	ND (0.02) U	NS
Selenium	ND (0.005) U/ND (0.005) U	ND (0.005) U	NS
Thallium	ND (0.001) U/ND (0.001) U	ND (0.001) U	NS
Vanadium	ND (0.01) U/ND (0.01) U	ND (0.01) U	NS
DIOXIN			
2,3,7,8-TCDD Equivalent	NS/NS	NS	NS

MWM16-01	8/13/01	1/10/02	8/01/03
VOC			
1,1,1-Trichloroethane	ND (0.00015) U	ND (0.001) U/ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.00013) U	ND (0.001) U/ND (0.001) U	NS
1,1-Dichloroethane	ND (0.00022) U	ND (0.001) U/ND (0.001) U	NS
1,1-Dichloroethene	ND (0.00024) U	ND (0.001) U/ND (0.001) U	NS
1,2-Dichloroethane	ND (0.00013) U	ND (0.001) U/ND (0.001) U	NS
Acetone	ND (0.00098) U	0.0086 J/0.0053 J	NS
Benzene	ND (0.00018) U	ND (0.001) U/ND (0.001) U	NS
cis-1,2-Dichloroethene	ND (0.00022) U	ND (0.0005) U/ND (0.0005) U	NS
Ethylbenzene	ND (0.00012) U	ND (0.001) U/ND (0.001) U	NS
Methylene chloride	ND (0.00043) U	ND (0.001) U/ND (0.001) U	NS
Tetrachloroethene	ND (0.00022) U	ND (0.001) U/ND (0.001) U	NS
Toluene	ND (0.00018) U	ND (0.001) U/ND (0.001) U	NS
Trichloroethene	ND (0.00019) U	ND (0.001) U/ND (0.001) U	NS
Vinyl chloride [EDR, RDM]	0.003	0.0012/0.0012 J	NS
SVOC			
2,4-Dimethylphenol	ND (0.00088) U	ND (0.005) U/ND (0.005) U	NS
Benzo(a)pyrene	ND (0.00073) U	ND (0.005) U/ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	0.0050	ND (0.005) U/0.0027 J	NS
Butyl benzylphthalate	ND (0.00088) U	ND (0.005) U/ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.00079) U	ND (0.005) U/ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.00088) U	ND (0.005) U/ND (0.005) U	NS
Pentachlorophenol	ND (0.00241) U	ND (0.005) U/ND (0.005) U	NS
PCB			
Total PCBs	ND (0.0000882) U	ND (0.0004) U/ND (0.0004) U	NS
INORG			
Antimony	ND (0.0022) U	ND (0.025) U/ND (0.025) U	NS
Arsenic	ND (0.0038) U	0.0077 J/0.0099 J	NS
Barium	0.0	ND (0.01) U/ND (0.01) U	NS
Beryllium	ND (0.00041) U	ND (0.002) U/ND (0.002) U	NS
Cadmium	ND (0.00028) U	ND (0.005) U/ND (0.005) U	NS
Chromium Total	ND (0.0014) U	ND (0.01) U/0.0021 J	NS
Cobalt	ND (0.0013) U	0.0025 J/0.0028 J	NS
Copper	ND (0.0042) U	ND (0.005) U/ND (0.005) U	NS
Cyanide (total)	NS	NS/NS	NS
Iron	NS	NS/NS	NS
Lead	ND (0.0025) U	ND (0.003) U/ND (0.003) U	NS
Manganese [RDM]	1.06	0.816 J/0.87 J	NS
Nickel	ND (0.0022) U	0.0034 J/0.006 J	NS
Selenium	ND (0.0045) U	ND (0.005) U/ND (0.005) U	NS
Thallium	ND (0.0001) U	ND (0.001) U/ND (0.001) U	NS
Vanadium	ND (0.000802) U	ND (0.01) U/ND (0.01) U	NS
DIOXIN			
2,3,7,8-TCDD Equivalent	NS	NS/NS	NS

MWM5-02	8/11/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U/ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U/ND (0.001) U
1,1-Dichloroethane	ND (0.001) U/ND (0.001) U
1,1-Dichloroethene	ND (0.001) U/ND (0.001) U
1,2-Dichloroethane	ND (0.001) U/ND (0.001) U
Acetone	ND (0.01) U/ND (0.01) U
Benzene	ND (0.001) U/ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U/ND (0.0005) U
Ethylbenzene	R/R
Methylene chloride	ND (0.001) U/ND (0.001) U
Tetrachloroethene	ND (0.001) U/ND (0.001) U
Toluene	ND (0.001) U/ND (0.001) U
Trichloroethene	ND (0.001) U/ND (0.001) U
Vinyl chloride	R/R
SVOC	
2,4-Dimethylphenol	ND (0.005) U/ND (0.005) U
Benzo(a)pyrene	ND (0.005) U/ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U/ND (0.005) U
Butyl benzylphthalate	ND (0.005) U/ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U/ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U/ND (0.005) U
Pentachlorophenol	ND (0.005) U/ND (0.005) U
PCB	
Total PCBs	ND (0.0004) U/ND (0.0004) U
INORG	
Antimony	ND (0.025) U/ND (0.025) U
Arsenic	ND (0.01) U/0.0041 J
Barium	1.66
Beryllium	ND (0.001) U/ND (0.001) U
Cadmium	0.00036 J/ND (0.005) U
Chromium Total	ND (0.01) U/0.0032 J
Cobalt	0.0041 J/ND (0.02) U
Copper	ND (0.005) U/ND (0.005) U
Cyanide (total)	NS/NS
Iron	NS/NS
Lead	ND (0.003) U/ND (0.003) U
Manganese	0.567/0.541
Nickel	ND (0.005) U/ND (0.005) U
Selenium	ND (0.005) U/ND (0.005) U
Thallium	0.00018 J/0.000222 J
Vanadium	ND (0.01) U/ND (0.01) U
DIOXIN	
2,3,7,8-TCDD Equivalent	NS/NS

MWM5-04	8/02/03
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	NS
1,2-Dichloroethane	NS
Acetone	NS
Benzene	NS
cis-1,2-Dichloroethene	NS
Ethylbenzene	NS
Methylene chloride	NS
Tetrachloroethene	NS
Toluene	NS
Trichloroethene	NS
Vinyl chloride	NS
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	0.0004185 J
INORG	
Antimony	NS
Arsenic	NS
Barium	0.67
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	0.675
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

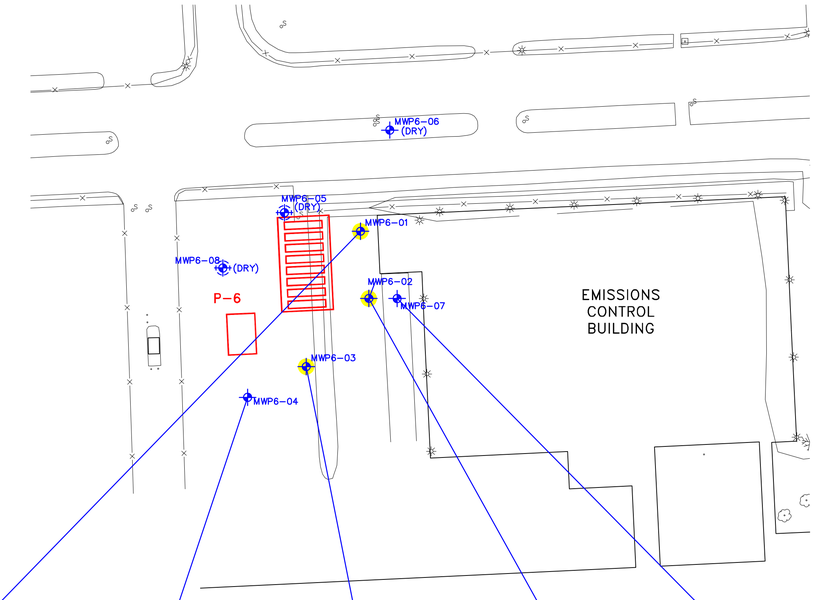
MWM5-03	8/03/03
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	NS
1,2-Dichloroethane	NS
Acetone	NS
Benzene	NS
cis-1,2-Dichloroethene	NS
Ethylbenzene	NS
Methylene chloride	NS
Tetrachloroethene	NS
Toluene	NS
Trichloroethene	NS
Vinyl chloride	NS
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	NS
Arsenic	NS
Barium	0.691
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	0.67
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

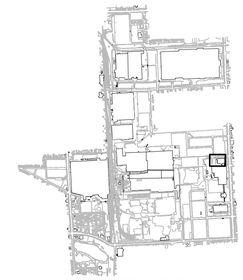
MWM5-01	8/03/03
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	NS
1,2-Dichloroethane	NS
Acetone	NS
Benzene	NS
cis-1,2-Dichloroethene	NS
Ethylbenzene	NS
Methylene chloride	NS
Tetrachloroethene	NS
Toluene	NS
Trichloroethene	NS
Vinyl chloride	NS
SVOC	
2,4-Dimethylphenol	NS
Benzo(a)pyrene	NS
bis(2-Ethylhexyl)phthalate	NS
Butyl benzylphthalate	NS
Dibenz(a,h)anthracene	NS
Methylphenol (Cresol)	NS
Pentachlorophenol	NS
PCB	
Total PCBs	ND (0.0004) U
INORG	
Antimony	NS
Arsenic	NS
Barium	0.691
Beryllium	NS
Cadmium	NS
Chromium Total	NS
Cobalt	NS
Copper	NS
Cyanide (total)	NS
Iron	NS
Lead	NS
Manganese	0.67
Nickel	NS
Selenium	NS
Thallium	NS
Vanadium	NS
DIOXIN	
2,3,7,8-TCDD Equivalent	NS

MW-2-99	9/17/01	1/10/02	8/02/03
VOC			
1,1,1-Trichloroethane	NS	NS	NS
1,1,2-Trichloroethane	NS	NS	NS
1,1-Dichloroethane	NS	NS	NS
1,1-Dichloroethene	NS	NS	NS
1,2-Dichloroethane	NS	NS	NS
Acetone	NS	NS	NS
Benzene	NS	NS	NS
cis-1,2-Dichloroethene	NS	NS	NS
Ethylbenzene	NS	NS	NS
Methylene chloride	NS	NS	NS
Tetrachloroethene	NS	NS	NS
Toluene	NS	NS	NS
Trichloroethene	NS	NS	NS
Vinyl chloride	NS	NS	NS
SVOC			
2,4-Dimethylphenol	NS	NS	NS
Benzo(a)pyrene	NS	NS	NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS
Butyl benzylphthalate	NS	NS	NS
Dibenz(a,h)anthracene	NS	NS	NS
Methylphenol (Cresol)	NS	NS	NS
Pentachlorophenol	NS	NS	NS
PCB			
Total PCBs	ND (0.0004) U	ND (0.0004) U	ND (0.0004) U
INORG			
Antimony	ND (0.025) U	ND (0.025) U	NS
Arsenic	ND (0.01) U	0.0071 J	0.0054 J
Barium	0.0213	0.0239 J	0.0027 J
Beryllium	ND (0.001) U	ND (0.001) U	ND (0.001) U
Cadmium	0.00071 J	0.00054 J	NS
Chromium Total	0.0025 J	0.0027 J	NS
Cobalt	ND (0.02) U	ND (0.02) U	NS
Copper	ND (0.005) U	ND (0.005) U	NS
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	NS
Manganese [RDM]	0.683	1.16 J	1.16
Nickel	ND (0.02) U	ND (0.02) U	NS
Selenium	ND (0.005) U	ND (0.005) U	NS
Thallium	ND (0.01) U	ND (0.001) U	NS
Vanadium	0.0104 J	0.0078 J	NS
DIOXIN			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWM5-00	9/17/01	1/10/02	8/02/03
VOC			
1,1,1-Trichloroethane	NS	NS	NS
1,1,2-Trichloroethane	NS	NS	NS
1,1-Dichloroethane	NS	NS	NS
1,1-Dichloroethene	NS	NS	NS
1,2-Dichloroethane	NS	NS	NS
Acetone	NS	NS	NS
Benzene	NS	NS	NS
cis-1,2-Dichloroethene	NS	NS	NS
Ethylbenzene	NS	NS	NS
Methylene chloride	NS	NS	NS
Tetrachloroethene	NS	NS	NS
Toluene	NS	NS	NS
Trichloroethene	NS	NS	NS
Vinyl chloride	NS	NS	NS
SVOC			
2,4-Dimethylphenol	NS	NS	NS
Benzo(a)pyrene	NS	NS	NS
bis(2-Ethylhexyl)phthalate	NS	NS	NS
Butyl benzylphthalate	NS	NS	NS
Dibenz(a,h)anthracene	NS	NS	NS
Methylphenol (Cresol)	NS	NS	NS
Pentachlorophenol	NS	NS	NS
PCB			
Total PCBs	ND (0.0004) U	0.000877 J	NS
INORG			
Antimony	ND (0.025) U	ND (0.025) U	NS
Arsenic	ND (0.01) U	0.0041 J	NS
Barium	1.66	4.8	2.2
Beryllium	ND (0.001) U	ND (0.001) U	NS
Cadmium	0.00036 J	ND (0.005) U	NS
Chromium Total	ND (0.01) U	0.0032 J	NS
Cobalt	0.0041 J	ND (0.02) U	NS
Copper	ND (0.005) U	ND (0.005) U	NS
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	NS
Manganese	1.66	1.73 J	0.125
Manganese [RDM]	1.66	J	J
Manganese [EDR, RDM]	1.63	0.0179 J	NS
Nickel	0.0169 J	ND (0.005) U	NS
Selenium	ND (0.005) U	ND (0.005) U	NS
Thallium	ND (0.01) U	0.00053 J	NS
Vanadium	ND (0.01) U	ND (0.01) U	NS
DIOXIN			
2,3,7,8-TCDD Equivalent	ND (0.0000000094) U	NS	NS

MWM5-02	8/02/03
VOC	
1,1,1-Trichloroethane	NS
1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS
1,1-Dichloroethene	NS
1,2-Dichloroethane	NS
Acetone	NS
Benzene	NS
cis-1,2-Dichloroethene	NS
Ethylbenzene	NS
Methylene chloride	NS
Tetrachloroethene	NS
Toluene	NS
Trichloroethene





SITE LOCATION

LEGEND:

MWP6-01 GROUNDWATER MONITORING WELL LOCATION

MWP6-06 ABANDONED GROUNDWATER MONITORING WELL LOCATION

CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA

APPROXIMATE AOI AREA

P-6 = FORMER UST FARM AND STODDARD SOLVENT AST

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

RDW – RESIDENTIAL DRINKING WATER CRITERIA
IDW – 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

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. NS – NOT SAMPLED.

0 50' 100'
GRAPHIC SCALE

MWP6-01	8/15/01	1/9/02	11/13/02	5/20/03
VOC				
1,1,1-Trichloroethane	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.04) U	ND (0.01) U	ND (0.01) U	NS
Benzene [EGLE, RDM]	0.003 J	0.0023 J	0.0023 J	0.003
cis-1,2-Dichloroethene	ND (0.002) U	ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	0.0017 J	0.0033 J	0.0032	0.0027
Methylene chloride	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
Toluene	0.0023 J	0.0068 J	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.004) U	ND (0.001) U	ND (0.001) U	NS
SVOC				
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Pentachlorophenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
PCB				
Total PCBs	NS	NS	NS	NS
RCRA				
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Chromium Total	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	ND (0.003) U	NS
Manganese	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
VOC/P				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWP6-04	8/15/01	1/9/02	11/13/02	5/20/03
VOC				
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.01) U	0.022 J	ND (0.01) U	NS
Benzene [EGLE, RDM]	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Toluene	0.0007 J	ND (0.001) U	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
SVOC				
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
Pentachlorophenol	ND (0.005) U	ND (0.005) U	ND (0.005) U	NS
PCB				
Total PCBs	NS	NS	NS	NS
RCRA				
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Chromium Total	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	NS	NS
Manganese	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
VOC/P				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWP6-03	8/15/01	1/9/02	11/13/02	5/27/03
VOC				
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.001) U	0.0005 J	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.01) U	0.012 J	ND (0.01) U	NS
Benzene [EGLE, RDM]	0.0023 J	0.0034 J	0.0046 J	0.004
Benzene [EGLE, RDM]			0.0046	
cis-1,2-Dichloroethene	ND (0.0005) UND (0.0005) U		ND (0.0005) U	NS
Ethylbenzene	ND (0.001) U	ND (0.001) U	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Toluene	0.0019 J	ND (0.001) U	ND (0.001) U	0.0027
Trichloroethene	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.001) U	ND (0.001) U	ND (0.001) U	NS
SVOC				
2,4-Dimethylphenol	NS	ND (0.005) U	ND (0.005) U	NS
Benzo(a)pyrene	NS	ND (0.005) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	NS	ND (0.005) U	ND (0.005) U	NS
Butyl benzylphthalate	NS	ND (0.005) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	NS	ND (0.005) U	ND (0.005) U	NS
Methylphenol (Cresol)	NS	ND (0.005) U	ND (0.005) U	NS
Pentachlorophenol	NS	ND (0.005) U	ND (0.005) U	NS
PCB				
Total PCBs	NS	NS	NS	NS
RCRA				
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Chromium Total	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	ND (0.003) U	ND (0.003) U	NS	NS
Manganese	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
VOC/P				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWP6-02	8/15/01	1/30/02	11/13/02	5/20/03
VOC				
1,1,1-Trichloroethane	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
1,1,2-Trichloroethane	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
1,1-Dichloroethane	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
1,1-Dichloroethene	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
1,2-Dichloroethane	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
Acetone	ND (1.7) U	ND (0.56) U	ND (0.62) U	NS
Benzene [EGLE, RDM]	0.0035 J	0.0035 J	0.0035 J	0.36
cis-1,2-Dichloroethene	ND (0.083) U	ND (0.028) U	ND (0.031) U	NS
Ethylbenzene [EGLE, RDM]	0.87	1.3	1.8	1.1
Methylene chloride	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
Tetrachloroethene	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
Toluene	0.0053 J	0.14	0.11	0.065
Toluene [EGLE, RDM]	0.11	0.14		
Trichloroethene	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
Vinyl chloride	ND (0.17) U	ND (0.056) U	ND (0.062) U	NS
SVOC				
2,4-Dimethylphenol	0.026	0.0035 J	NS	NS
Benzo(a)pyrene	ND (0.025) U	ND (0.012) U	NS	NS
bis(2-Ethylhexyl)phthalate	ND (0.025) U	ND (0.012) U	NS	NS
Butyl benzylphthalate	ND (0.025) U	ND (0.012) U	NS	NS
Dibenz(a,h)anthracene	ND (0.025) U	ND (0.012) U	NS	NS
Methylphenol (Cresol)	0.205 J	ND (0.012) U	NS	NS
Pentachlorophenol	ND (0.025) U	ND (0.012) U	NS	NS
PCB				
Total PCBs	NS	NS	NS	NS
RCRA				
Antimony	NS	NS	NS	NS
Arsenic	NS	NS	NS	NS
Barium	NS	NS	NS	NS
Beryllium	NS	NS	NS	NS
Cadmium	NS	NS	NS	NS
Chromium Total	NS	NS	NS	NS
Cobalt	NS	NS	NS	NS
Copper	NS	NS	NS	NS
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	NS (0.003) U	ND (0.003) U	NS	NS
Manganese	NS	NS	NS	NS
Nickel	NS	NS	NS	NS
Selenium	NS	NS	NS	NS
Thallium	NS	NS	NS	NS
Vanadium	NS	NS	NS	NS
VOC/P				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWP6-07	1/22/02	11/14/02	5/20/03
VOC			
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U	NS
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethane	ND (0.001) U	ND (0.001) U	NS
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U	NS
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U	NS
Acetone	ND (0.01) U	ND (0.01) U	NS
Benzene	0.0013 J	0.0013 J	0.0013 J
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0005) U	NS
Ethylbenzene	0.00015 J	ND (0.001) U	ND (0.001) U
Methylene chloride	ND (0.001) U	ND (0.001) U	NS
Tetrachloroethene	ND (0.001) U	ND (0.001) U	NS
Toluene	0.00053 J	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U	NS
Vinyl chloride	ND (0.001) U	ND (0.001) U	NS
SVOC			
2,4-Dimethylphenol	ND (0.005) U	ND (0.005) U	NS
Benzo(a)pyrene	ND (0.005) U	ND (0.005) U	NS
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.005) U	NS
Butyl benzylphthalate	ND (0.005) U	ND (0.005) U	NS
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U	NS
Methylphenol (Cresol)	ND (0.005) U	ND (0.005) U	NS
Pentachlorophenol	ND (0.005) U	ND (0.005) U	NS
PCB			
Total PCBs	NS	NS	NS
RCRA			
Antimony	ND (0.025) U	NS	NS
Arsenic	ND (0.01) U	NS	NS
Barium	0.0184	NS	NS
Beryllium	ND (0.0005) U	NS	NS
Cadmium	0.00038 J	NS	NS
Chromium Total	ND (0.01) U	NS	NS
Cobalt	0.008 J	NS	NS
Copper	ND (0.005) U	NS	NS
Cyanide (total)	NS	NS	NS
Iron	0.0135 J	NS	NS
Lead	ND (0.003) U	ND (0.003) U	NS
Manganese	0.0135 J	NS	NS
Nickel	0.0132 J	NS	NS
Selenium	ND (0.005) U	NS	NS
Thallium	0.00017 J	NS	NS
Vanadium	ND (0.01) U	NS	NS
VOC/P			
2,3,7,8-TCDD Equivalent	NS	NS	NS

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=REF, DATA_POINT
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411C12.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI P-6 - GROUNDWATER

ENCORE

FIGURE
4-12

MWP8-03	0-.2Ft BGS	8-10Ft BGS	15-17Ft BGS
VOC			
1,1,1-Trichloroethane	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
1,1,2-Trichloroethane	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
1,1-Dichloroethane	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
1,1-Dichloroethene	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
1,2-Dichloroethane	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
Acetone	ND (0.0093) U	0.014 J	0.0038 J
Benzene	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
cis-1,2-Dichloroethene	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
Ethylbenzene	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
Methylene chloride	0.012	0.0032 J	0.0048 J
Tetrachloroethene	ND (0.0046) U	ND (0.0049) U	0.0019 J
Toluene	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
Trichloroethene	ND (0.0046) U	ND (0.0049) U	ND (0.0049) U
Vinyl chloride	ND (0.0092) U	ND (0.0098) U	ND (0.0097) U
SVOC			
2,4-Dimethylphenol	ND (3.37) U	ND (3.38) U	ND (3.37) U
Benzo(a)pyrene	0.14 J	ND (0.33) U	ND (0.337) U
bis(2-Ethylhexyl)phthalate	ND (0.337) U	ND (0.338) U	ND (0.337) U
Butyl benzylphthalate	ND (0.337) U	0.04 J	0.0
Dibenz(a,h)anthracene	ND (0.337) U	ND (0.338) U	ND (0.337) U
Methylphenol (Cresol)	ND (0.337) U	ND (0.338) U	ND (0.337) U
Pentachlorophenol	ND (3.37) U	ND (3.38) U	ND (2.8) U
PCB			
Total PCBs	0.0953 J	0.09095 J	ND (0.037) U
INORG			
Antimony	0.68 J	0.278 J	0.254 J
Arsenic	6.35 J	4.57 J	3.83 J
Barium	76.4	76.2	25.6
Beryllium	0.21 J	ND (0.1161) U	ND (0.111) U
Cadmium	0.469 J	0.198 J	0.223 J
Chromium Total	23.5	8.35	8.39
Cobalt	6.48	3.23	4.17
Copper	43.2	9.69	10.2
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	17.4 J	8.56	6.19
Manganese	537 J	181 J	237
Nickel	23.4	7.81	9
Selenium	0.845	0.256 J	0.377 J
Thallium	0.953 J	0.863 J	0.728 J
Vanadium	20.7	9.35	12.6
DIOXIN			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWP8-07	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0046) U	ND (0.0047) U
1,1,2-Trichloroethane	ND (0.0046) U	ND (0.0047) U
1,1-Dichloroethane	ND (0.0046) U	ND (0.0047) U
1,1-Dichloroethene	ND (0.0046) U	ND (0.0047) U
1,2-Dichloroethane	ND (0.0046) U	ND (0.0047) U
Acetone	ND (0.0093) U	0.034 J
Benzene	ND (0.0046) U	ND (0.0047) U
cis-1,2-Dichloroethene	ND (0.0046) U	ND (0.0047) U
Ethylbenzene	ND (0.0046) U	ND (0.0047) U
Methylene chloride	ND (0.0046) U	ND (0.0047) U
Tetrachloroethene	ND (0.0046) U	ND (0.0047) U
Toluene	ND (0.0046) U	ND (0.0047) U
Trichloroethene	ND (0.0046) U	ND (0.0047) U
Vinyl chloride	ND (0.0092) U	ND (0.0095) U
SVOC		
2,4-Dimethylphenol	ND (7.4) U	ND (3.37) U
Benzo(a)pyrene	0.018 J	ND (0.337) U
bis(2-Ethylhexyl)phthalate	0.45 J	0.034 J
Butyl benzylphthalate	ND (7.4) U	ND (0.337) U
Dibenz(a,h)anthracene	1.8 J	ND (0.337) U
Methylphenol (Cresol)	ND (7.4) U	ND (0.337) U
Pentachlorophenol	ND (7.4) U	ND (3.8) U
PCB		
Total PCBs	0.5343 J	ND (0.037) U
INORG		
Antimony	ND (2.27) U	0.218 J
Arsenic	0.982 J	6.85 J
Barium	30.1	23.3
Beryllium	0.22 J	0.0926 J
Cadmium	ND (0.0669) U	ND (0.0557) U
Chromium Total	7.53	6.84
Cobalt	3.16	3.67
Copper	10.2	9.63
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	9.13	4.78 J
Manganese	186	220
Nickel	12.4	10.6
Selenium	ND (0.5669) U	ND (0.5571) U
Thallium	0.772 J	0.647 J
Vanadium	17.8	12.2
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-11	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	NS	NS
1,1,2-Trichloroethane	NS	NS
1,1-Dichloroethane	NS	NS
1,1-Dichloroethene	NS	NS
1,2-Dichloroethane	NS	NS
Acetone	NS	NS
Benzene	NS	NS
cis-1,2-Dichloroethene	NS	NS
Ethylbenzene	NS	NS
Methylene chloride	NS	NS
Tetrachloroethene	NS	NS
Toluene	NS	NS
Trichloroethene	NS	NS
Vinyl chloride	NS	NS
SVOC		
2,4-Dimethylphenol	NS	NS
Benzo(a)pyrene	0.061 J	ND (0.34) U
bis(2-Ethylhexyl)phthalate	NS	NS
Butyl benzylphthalate	NS	NS
Dibenz(a,h)anthracene	NS	NS
Methylphenol (Cresol)	NS	NS
Pentachlorophenol	NS	NS
PCB		
Total PCBs	NS	NS
INORG		
Antimony	NS	NS
Arsenic	NS	NS
Barium	NS	NS
Beryllium	NS	NS
Cadmium	NS	NS
Chromium Total	NS	NS
Cobalt	NS	NS
Copper	NS	NS
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	NS	NS
Manganese	NS	NS
Nickel	NS	NS
Selenium	NS	NS
Thallium	NS	NS
Vanadium	NS	NS
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-01	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0048) U	ND (0.0047) U
1,1,2-Trichloroethane	ND (0.0048) U	ND (0.0047) U
1,1-Dichloroethane	ND (0.0048) U	ND (0.0047) U
1,1-Dichloroethene	ND (0.0048) U	ND (0.0047) U
1,2-Dichloroethane	ND (0.0048) U	ND (0.0047) U
Acetone	0.037 J	0.017 J
Benzene	ND (0.0048) U	ND (0.0047) U
cis-1,2-Dichloroethene	ND (0.0048) U	ND (0.0047) U
Ethylbenzene	ND (0.0048) U	ND (0.0047) U
Methylene chloride	0.012	0.0048
Tetrachloroethene	0.00034 J	ND (0.0047) U
Toluene	ND (0.0048) U	ND (0.0047) U
Trichloroethene	ND (0.0048) U	ND (0.0047) U
Vinyl chloride	ND (0.0097) U	ND (0.0094) U
SVOC		
2,4-Dimethylphenol	ND (7.4) U	ND (0.37) U
Benzo(a)pyrene	0.023 J	ND (0.37) U
bis(2-Ethylhexyl)phthalate	ND (7.4) U	0.023 J
Butyl benzylphthalate	ND (7.4) U	ND (0.37) U
Dibenz(a,h)anthracene	ND (7.4) U	ND (0.37) U
Methylphenol (Cresol)	ND (7.4) U	ND (0.37) U
Pentachlorophenol	ND (7.4) U	ND (2.8) U
PCB		
Total PCBs	0.07525 J	ND (0.037) U
INORG		
Antimony	ND (2.25) U	ND (2.22) U
Arsenic	3.55 J	3.55 J
Barium	9.7	26
Beryllium	ND (0.1112) U	0.155 J
Cadmium	ND (0.5563) U	ND (0.5554) U
Chromium Total	5.36	10.8
Cobalt	2.13	5.49
Copper	5.97	10.8
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	3.4 J	5.03
Manganese	173	229
Nickel	5.96	16.4
Selenium	ND (0.5563) U	ND (0.5554) U
Thallium	0.46 J	0.856 J
Vanadium	6.5	14.3
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-12	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	NS	NS
1,1,2-Trichloroethane	NS	NS
1,1-Dichloroethane	NS	NS
1,1-Dichloroethene	NS	NS
1,2-Dichloroethane	NS	NS
Acetone	NS	NS
Benzene	NS	NS
cis-1,2-Dichloroethene	NS	NS
Ethylbenzene	NS	NS
Methylene chloride	NS	NS
Tetrachloroethene	NS	NS
Toluene	NS	NS
Trichloroethene	NS	NS
Vinyl chloride	NS	NS
SVOC		
2,4-Dimethylphenol	ND (3.38) U	ND (3.36) U
Benzo(a)pyrene	ND (0.338) U	ND (0.336) U
bis(2-Ethylhexyl)phthalate	NS	NS
Butyl benzylphthalate	NS	NS
Dibenz(a,h)anthracene	NS	NS
Methylphenol (Cresol)	NS	NS
Pentachlorophenol	NS	NS
PCB		
Total PCBs	NS	NS
INORG		
Antimony	NS	NS
Arsenic	NS	NS
Barium	NS	NS
Beryllium	NS	NS
Cadmium	NS	NS
Chromium Total	NS	NS
Cobalt	NS	NS
Copper	NS	NS
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	NS	NS
Manganese	NS	NS
Nickel	NS	NS
Selenium	NS	NS
Thallium	NS	NS
Vanadium	NS	NS
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-02	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0056) U	ND (0.0046) U
1,1,2-Trichloroethane	ND (0.0056) U	ND (0.0046) U
1,1-Dichloroethane	ND (0.0056) U	ND (0.0046) U
1,1-Dichloroethene	ND (0.0056) U	ND (0.0046) U
Acetone	0.0074 J	ND (0.018) U
Benzene	ND (0.0056) U	ND (0.0046) U
cis-1,2-Dichloroethene	ND (0.0056) U	ND (0.0046) U
Ethylbenzene	ND (0.0056) U	ND (0.0046) U
Methylene chloride	ND (0.0056) U	ND (0.0046) U
Tetrachloroethene	0.0059 J	0.0012 J
Toluene	ND (0.0056) U	ND (0.0046) U
Trichloroethene	ND (0.0056) U	ND (0.0046) U
Vinyl chloride	ND (0.011) U	ND (0.0092) U
SVOC		
2,4-Dimethylphenol	ND (1.5) U	ND (2.4) U
Benzo(a)pyrene	0.3 J	ND (0.37) U
bis(2-Ethylhexyl)phthalate	0.82 J	ND (0.37) U
Butyl benzylphthalate	0.17 J	ND (0.37) U
Dibenz(a,h)anthracene	0.3 J	ND (0.37) U
Methylphenol (Cresol)	ND (1.5) U	ND (2.4) U
Pentachlorophenol	ND (1.5) U	ND (2.5) U
PCB		
Total PCBs	23.58 J	ND (0.037) U
Total PCBs (EQL ROC)	5.8875 J	-
INORG		
Antimony	1.11 J	0.305 J
Arsenic	4.59	3.4
Barium	211	32.7
Beryllium	ND (0.112) U	0.0966 J
Cadmium	0.865	0.288 J
Chromium Total	14.8	10.2
Cobalt	4.07	6.98
Copper	18.1	10.8
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	44.9	6.98
Manganese	326	240
Nickel	11.8	15
Selenium	0.43 J	0.28 J
Thallium	0.756 J	0.649 J
Vanadium	13.7	16.3
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-06	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0048) U	ND (0.0047) U
1,1,2-Trichloroethane	ND (0.0048) U	ND (0.0047) U
1,1-Dichloroethane	ND (0.0048) U	ND (0.0047) U
1,1-Dichloroethene	ND (0.0048) U	ND (0.0047) U
1,2-Dichloroethane	ND (0.0048) U	ND (0.0047) U
Acetone	ND (0.0096) U	ND (0.0093) U
Benzene	ND (0.0048) U	ND (0.0047) U
cis-1,2-Dichloroethene	ND (0.0048) U	ND (0.0047) U
Ethylbenzene	ND (0.0048) U	ND (0.0047) U
Methylene chloride	0.0067 J	0.0048 J
Tetrachloroethene	ND (0.0048) U	ND (0.0047) U
Toluene	ND (0.0048) U	ND (0.0047) U
Trichloroethene	ND (0.0048) U	ND (0.0047) U
Vinyl chloride	ND (0.0096) U	ND (0.0094) U
SVOC		
2,4-Dimethylphenol	ND (3.6) U	ND (3.37) U
Benzo(a)pyrene	4	ND (0.337) U
bis(2-Ethylhexyl)phthalate	6.3	0.87 J
Butyl benzylphthalate	0.43 J	ND (0.337) U
Dibenz(a,h)anthracene	2.4	ND (0.337) U
Methylphenol (Cresol)	1.1 J	ND (0.337) U
Pentachlorophenol	ND (3.6) U	ND (1.8) U
PCB		
Total PCBs	2.37	ND (0.037) U
INORG		
Antimony	0.183 J	0.187 J
Arsenic	2.9	9.37
Barium	81.8	29
Beryllium	ND (0.108) U	0.0619 J
Cadmium	0.0535 J	ND (0.0551) U
Chromium Total	7.08	9.09
Cobalt	2.5	3.56
Copper	8.53	9.08
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	12.4	4.73
Manganese	156	194
Nickel	6.41	11.6
Selenium	ND (0.542) U	ND (0.5551) U
Thallium	0.572 J	0.766 J
Vanadium	8.11	14.3
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-05	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0046) U	ND (0.0045) U
1,1,2-Trichloroethane	ND (0.0046) U	ND (0.0045) U
1,1-Dichloroethane	ND (0.0046) U	ND (0.0045) U
1,1-Dichloroethene	ND (0.0046) U	ND (0.0045) U
1,2-Dichloroethane	ND (0.0046) U	ND (0.0045) U
Acetone	ND (0.0092) U	ND (0.0091) U
Benzene	ND (0.0046) U	ND (0.0045) U
cis-1,2-Dichloroethene	ND (0.0046) U	ND (0.0045) U
Ethylbenzene	ND (0.0046) U	ND (0.0045) U
Methylene chloride	ND (0.0046) U	ND (0.0045) U
Tetrachloroethene	ND (0.0046) U	ND (0.0045) U
Toluene	ND (0.0046) U	ND (0.0045) U
Trichloroethene	ND (0.0046) U	ND (0.0045) U
Vinyl chloride	ND (0.0092) U	ND (0.0091) U
SVOC		
2,4-Dimethylphenol	ND (3.37) U	ND (3.36) U
Benzo(a)pyrene	0.072 J	ND (0.336) U
bis(2-Ethylhexyl)phthalate	0.24 J	ND (0.336) U
Butyl benzylphthalate	ND (3.37) U	ND (0.336) U
Dibenz(a,h)anthracene	ND (3.37) U	ND (0.336) U
Methylphenol (Cresol)	ND (3.37) U	ND (0.336) U
Pentachlorophenol	ND (3.37) U	ND (1.8) U
PCB		
Total PCBs	0.4655 J	ND (0.04) U
INORG		
Antimony	0.287 J	0.383 J
Arsenic	3.42 J	4.28 J
Barium	32.4	33.5
Beryllium	0.109 J	0.282 J
Cadmium	0.103 J	0.28 J
Chromium Total	5.01	11.8
Cobalt	2.22	6.9
Copper	16.5	12.5
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	4.02 J	6.54 J
Manganese	462	324
Nickel	6.08	18.4
Selenium	0.4 J	R
Thallium	ND (1.18) U	0.426 J
Vanadium	6.44	14.8
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-09	0-.2Ft BGS	2-4Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0042) U	ND (0.0046) U
1,1,2-Trichloroethane	ND (0.0042) U	ND (0.0046) U
1,1-Dichloroethane	ND (0.0042) U	ND (0.0046) U
1,1-Dichloroethene	ND (0.0042) U	ND (0.0046) U
1,2-Dichloroethane	ND (0.0042) U	ND (0.0046) U
Acetone	ND (0.0083) U	ND (0.0093) U
Benzene	ND (0.0042) U	ND (0.0046) U
cis-1,2-Dichloroethene	ND (0.0042) U	ND (0.0046) U
Ethylbenzene	ND (0.0042) U	ND (0.0046) U
Methylene chloride	ND (0.0042) U	ND (0.0046) U
Tetrachloroethene	ND (0.0042) U	ND (0.0046) U
Toluene	0.00068 J	ND (0.0046) U
Trichloroethene	ND (0.0042) U	ND (0.0046) U
Vinyl chloride	ND (0.0085) U	ND (0.0092) U
SVOC		
2,4-Dimethylphenol	ND (0.702) U	0.14 J
Benzo(a)pyrene	0.36 J	0.43
bis(2-Ethylhexyl)phthalate	ND (0.342) U	ND (0.377) U
Butyl benzylphthalate	R	0.074 J
Dibenz(a,h)anthracene	0.068 J	0.074 J
Methylphenol (Cresol)	ND (0.702) U	0.2315 J
Pentachlorophenol	ND (7.4) U	ND (3.8) U
PCB		
Total PCBs	1.57 J	1.4715 J
INORG		
Antimony	0.47 J	0.521 J
Arsenic	3.58	3.45
Barium	76.9	94.8
Beryllium	ND (0.1026) U	ND (0.111) U
Cadmium	0.322 J	0.41 J
Chromium Total	10.8	8.14
Cobalt	3.66	2.44
Copper	11.4	10.1
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	10	20.3
Manganese	318	203
Nickel	8.95	7.44
Selenium	0.37 J	0.276 J
Thallium	0.624 J	0.727 J
Vanadium	10.4	8.43
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

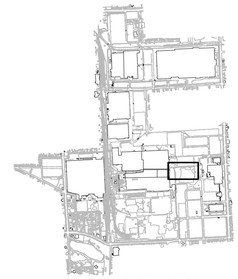
MWP8-10	0-.2Ft BGS	8-10Ft BGS	13-15Ft BGS
VOC			
1,1,1-Trichloroethane	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
1,1,2-Trichloroethane	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
1,1-Dichloroethane	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
1,1-Dichloroethene	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
1,2-Dichloroethane	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
Acetone	ND (0.02) U	0.029 J	0.0078 J
Benzene	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
cis-1,2-Dichloroethene	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
Ethylbenzene	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
Methylene chloride	ND (0.0048) U	0.00056 J	ND (0.0044) U
Tetrachloroethene	ND (0.0048) U	0.0094 J	ND (0.0044) U
Toluene	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
Trichloroethene	ND (0.0048) U	ND (0.0048) U	ND (0.0044) U
Vinyl chloride	ND (0.0096) U	ND (0.0097) U	ND (0.0088) U
SVOC			
2,4-Dimethylphenol	ND (1.5) U	ND (3.39) U	ND (3.36) U
Benzo(a)pyrene	0.5	0.19 J	ND (0.336) U
bis(2-Ethylhexyl)phthalate	0.63 J	0.064 J	ND (0.336) U
Butyl benzylphthalate	0.11 J	ND (0.36) U	ND (0.336) U
Dibenz(a,h)anthracene	0.43 J	0.041 J	ND (0.336) U
Methylphenol (Cresol)	ND (1.5) U	ND (3.39) U	ND (0.336) U
Pentachlorophenol	ND (16) U	ND (4) U	ND (3.9) U
PCB			
Total PCBs [ROC]	5.004 J	0.6175 J	ND (0.036) U
INORG			
Antimony	R	R	R
Arsenic	4.12 J	4.07 J	4.68 J
Barium	110	35.3	28.8
Beryllium	0.163 J	0.0976 J	0.137 J
Cadmium	0.505 J	0.275 J	0.513 J
Chromium Total	10.3	8.84	10.9
Cobalt	3.64 J	3.71 J	5.64 J
Copper	16.4	16.5	16.5
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	24.5	27.3	6.22
Manganese	222	297	231 J
Nickel	9.89 J	10	18.4 J
Selenium	ND (0.578) U	ND (0.564) U	0.894 J
Thallium	ND (1.15) U	ND (1.13) U	ND (0.672) U
Vanadium	13.2	10.3	13.2
DIOXIN			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWP8-13	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0051) U	ND (0.004) U
1,1,2-Trichloroethane	ND (0.0051) U	ND (0.004) U
1,1-Dichloroethane	ND (0.0051) U	ND (0.004) U
1,1-Dichloroethene	ND (0.0051) U	ND (0.004) U
1,2-Dichloroethane	ND (0.0051) U	ND (0.004) U
Acetone	ND (0.02) U	ND (0.016) U
Benzene	ND (0.0051) U	ND (0.004) U
cis-1,2-Dichloroethene	ND (0.0051) U	ND (0.004) U
Ethylbenzene	ND (0.0051) U	ND (0.004) U
Methylene chloride	ND (0.0051) U	ND (0.004) U
Tetrachloroethene	ND (0.0051) U	ND (0.004) U
Toluene	ND (0.0051) U	ND (0.004) U
Trichloroethene	ND (0.0051) U	ND (0.004) U
Vinyl chloride	ND (0.01) U	ND (0.008) U
SVOC		
2,4-Dimethylphenol	ND (3.38) U	ND (3.37) U
Benzo(a)pyrene	ND (0.338) U	ND (0.337) U
bis(2-Ethylhexyl)phthalate	0.031 J	ND (0.337) U
Butyl benzylphthalate	ND (3.38) U	ND (0.337) U
Dibenz(a,h)anthracene	ND (3.38) U	ND (0.337) U
Methylphenol (Cresol)	ND (3.38) U	ND (0.337) U
Pentachlorophenol	ND (3.8) U	ND (1.8) U
PCB		
Total PCBs	0.4435 J	ND (0.037) U
INORG		
Antimony	R	0.156 J
Arsenic	3.8	8.02
Barium	21.8	58.9
Beryllium	0.0775 J	0.0655 J
Cadmium	0.187 J	0.187 J
Chromium Total	7.38 J	9.42 J
Cobalt	4.29	4.76
Copper	11.1	11.8
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	4.93 J	5.07 J
Manganese	280	231
Nickel	11.5	12.3
Selenium	ND (0.574) U	ND (0.556) U
Thallium	0.423 J	0.445 J
Vanadium	10.2	13.3
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

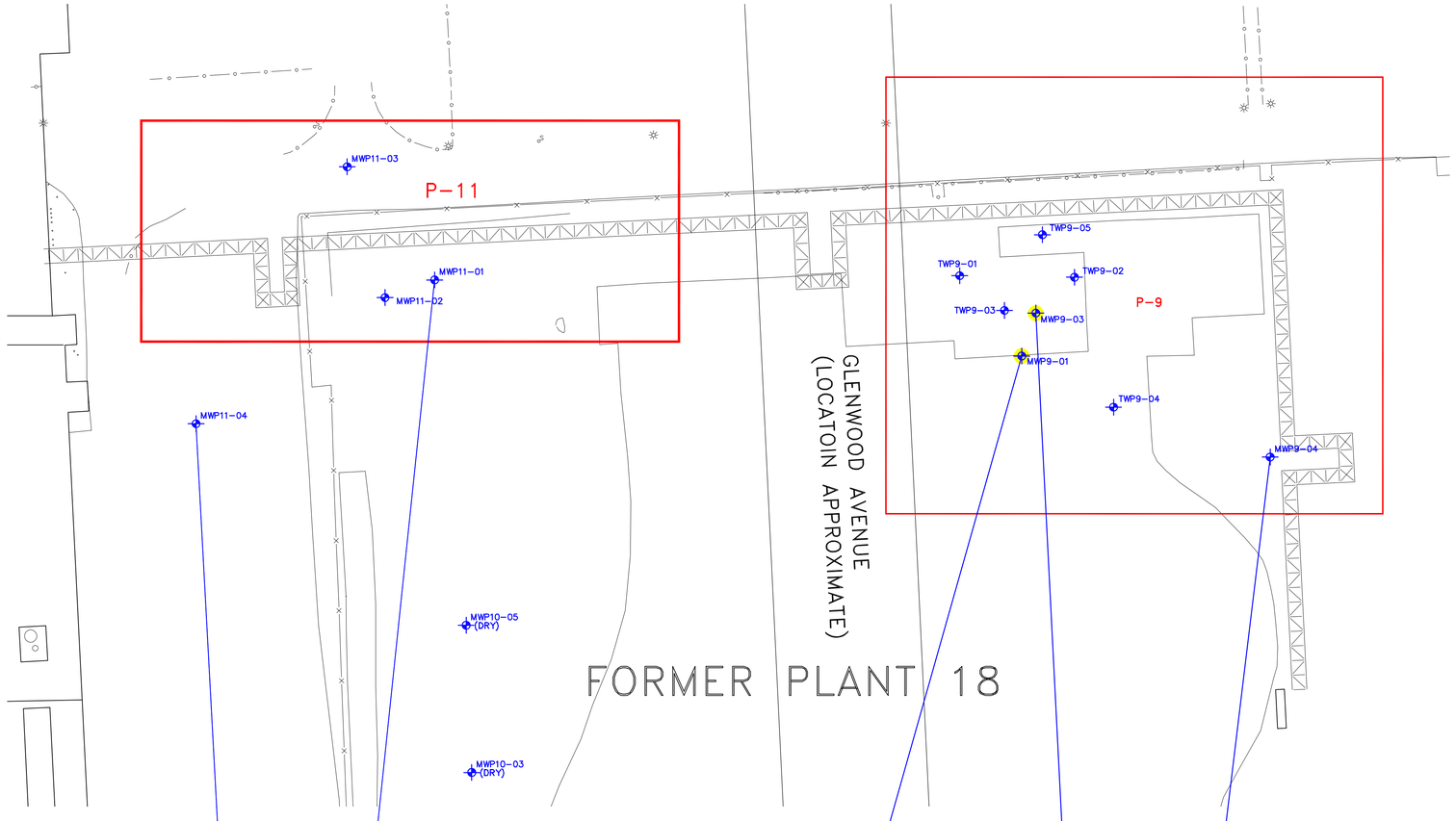
MWP8-04	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.004) U	ND (0.0041) U
1,1,2-Trichloroethane	ND (0.004) U	ND (0.0041) U
1,1-Dichloroethane	ND (0.004) U	ND (0.0041) U
1,1-Dichloroethene	ND (0.004) U	ND (0.0041) U
1,2-Dichloroethane	ND (0.004) U	ND (0.0041) U
Acetone	0.0029 J	ND (0.017) U
Benzene	ND (0.004) U	ND (0.0041) U
cis-1,2-Dichloroethene	ND (0.004) U	ND (0.0041) U
Ethylbenzene	ND (0.004) U	ND (0.0041) U
Methylene chloride	ND (0.004) U	ND (0.0041) U
Tetrachloroethene	ND (0.004) U	ND (0.0041) U
Toluene	0.0006 J	ND (0.0041) U
Trichloroethene	ND (0.004) U	ND (0.0041) U
Vinyl chloride	ND (0.0079) U	ND (0.0083) U
SVOC		
2,4-Dimethylphenol	ND (1.5) U	ND (3.37) U
Benzo(a)pyrene	0.068 J	ND (0.337) U
bis(2-Ethylhexyl)phthalate	0.057 J	ND (0.337) U
Butyl benzylphthalate	0.14 J	ND (0.337) U
Dibenz(a,h)anthracene	0.13 J	ND (0.337) U
Methylphenol (Cresol)	ND (1.5) U	ND (0.337) U
Pentachlorophenol	ND (1.5) U	ND (2.8) U
PCB		
Total PCBs	2.283 J	ND (0.037) U
INORG		
Antimony	R	0.4 J
Arsenic	2.13 J	3.55 J
Barium	58.7	33.7
Beryllium	0.187 J	0.35
Cadmium	0.192 J	ND (0.561) U
Chromium Total	6.98	9.82
Cobalt	1.82 J	4.59 J
Copper	8.4	9.81
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	11.8	4.45
Manganese	152	238
Nickel	5.34	13.3
Selenium	ND (0.566) U	ND (0.56) U
Thallium	ND (1.13) U	ND (1.12) U
Vanadium	5.43	14.2
DIOXIN		
2,3,7,8-TCDD Equivalent	NS	NS

MWP8-14	0-.2Ft BGS	8-10Ft BGS	14-16Ft BGS	20-21Ft BGS
VOC				
1,1,1-Trichloroethane	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
1,1,2-Trichloroethane	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
1,1-Dichloroethane	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
1,1-Dichloroethene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
1,2-Dichloroethane	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Acetone	0.024 J	ND (0.018) U	ND (0.018) U	NS
Benzene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
cis-1,2-Dichloroethene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Ethylbenzene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Methylene chloride	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Tetrachloroethene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Toluene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Trichloroethene	ND (0.0047) U	ND (0.0044) U	ND (0.0044) U	NS
Vinyl chloride	ND (0.0094) U	ND (0.0088) U	ND (0.0088) U	NS
SVOC				
2,4-Dimethylphenol	ND (3.38) U	ND (3.37) U	ND (3.37) U	NS
Benzo(a)pyrene	0.22 J	ND (0.337) U	ND (0.337) U	NS
bis(2-Ethylhexyl)phthalate	6.3	ND (0.337) U	ND (0.337) U	NS
Butyl benzylphthalate	2.6 J	ND (0.337) U	ND (0.337) U	NS
Dibenz(a,h)anthracene	1.1 J	ND (0.337) U	ND (0.337) U	NS
Methylphenol (Cresol)	ND (3.38) U	ND (0.337) U	ND (0.337) U	NS
Pentachlorophenol	ND (3.8) U	ND (1.8) U	ND (1.8) U	NS
PCB				
Total PCBs	0.5444 J	0.0682 J	ND (0.036) U	NS
INORG				
Antimony	0.658 J	0.439 J	0.391 J	0.399 J
Arsenic	4.93 J	5.02 J	4.93 J	5.02 J
Barium	18.9	55.8	40.8	30
Beryllium	0.214 J	0.208 J	0.189 J	0.19 J
Cadmium	0.61 J	0.398 J	0.281 J	0.322 J
Chromium Total	20.2	16.6	11.1	10.7
Cobalt	5.14 J	7.65 J	5.55 J	6.21 J
Copper	23.5 J	16.6 J	12.2 J	10.2 J
Cyanide (total)	NS	NS	NS	NS
Iron	NS	NS	NS	NS
Lead	8.03 J	6.43 J	6.73 J	5.47 J
Manganese	338 J	318 J	295 J	274 J
Nickel	16.2 J	22 J	15.8 J	13.3 J
Selenium	0.937 J	0.703 J	0.46 J	0.487 J
Thallium	0.687 J	0.918 J	0.821 J	0.776 J
Vanadium	13.3	22.4	15.9	15
DIOXIN				
2,3,7,8-TCDD Equivalent	NS	NS	NS	NS

MWP8-15	0-.2Ft BGS	8-10Ft BGS
VOC		
1,1,1-Trichloroethane	ND (0.0046) U	ND (0.0045) U
1,1,2-Trichloroethane	ND (0.0046) U	ND (0.0045) U
1,1-Dichloroethane	ND (0.0046) U	ND (0.0045) U
1,1-Dichloroethene	ND (0.0046) U	ND (0.0045) U
1,2-Dichloroethane	ND (0.0046) U	ND (0.0045) U
Acetone	ND (0.0092) U	ND (0.0091) U
Benzene	ND (0.0046) U	ND (0.0045) U
cis-1,2-Dichloroethene	ND (0.0046) U	ND (0.0045) U
Ethylbenzene	ND (0.0046) U	ND (0.0045) U
Methylene chloride	0.0023 J	0.0048 J
Tetrachloroethene	ND (0.0046) U	ND (0.0045) U
Toluene	ND (0.0046) U	ND (0.0045) U
Trichloroethene	ND (0.0046) U	ND (0.0045) U
Vinyl chloride	ND (0.0092) U	ND (0.0091) U
SVOC		
2,4-Dimethylphenol	ND (3.38) U	ND (3.39) U
Benzo(a)pyrene	0.22 J	ND (0.339) U
bis(2-Ethylhexyl)phthalate	0.87 J	ND (0.339) U
Butyl benzylphthalate	2.5 J	ND (3.39) U
Dibenz(a,h)anthracene	ND (3.8) U	ND (0.339) U
Methylphenol (Cresol)	ND (3.8) U	ND (0.339) U
Pentachlorophenol	ND (3.8) U	ND (1.8) U
PCB		
Total PCBs	0.6682 J	ND (0.038) U
INORG		
Antimony	0.391 J	0.399 J
Arsenic	4.93 J	5.02 J
Barium	40.8	30
Beryllium	0.214 J	0.208 J
Cadmium	0.281 J	0.322 J
Chromium Total	11.1	10.7
Cobalt	5.55 J	6.21 J
Copper	12.2 J	10.2 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	6.73 J	5.47 J
Manganese	295 J	274 J
Nickel	15.



SITE LOCATION



LEGEND:

- MWP6-06 — GROUNDWATER MONITORING WELL LOCATION
- CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA
- TRESTLE
- APPROXIMATE AOI AREA
- P-9 = PIPELINE RELEASE
- P-11 = TRESTLE PIPELINE RELEASE

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

RDW – RESIDENTIAL DRINKING WATER CRITERIA
IDW – 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

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. NS – NOT SAMPLED.

0 50' 100'
GRAPHIC SCALE

MWP11-04	6/13/03
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) UJ
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Methylene chloride	R
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	R
PCB	
Total PCBs	ND (0.0004) U
RCRA	
Antimony	ND (0.025) U
Arsenic	0.0236
Barium	0.397
Beryllium	ND (0.001) U
Cadmium	ND (0.005) U
Chromium Total	ND (0.01) U
Cobalt	ND (0.005) U
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.031
Nickel	ND (0.02) U
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	ND (0.01) U
PCDD/F	
2,3,7,8-TCDD Equivalent	NS

MWP11-01	6/13/03
VOC	
1,1,1-Trichloroethane	ND (0.0033) U/ND (0.005) U
1,1,2-Trichloroethane	ND (0.0033) U/ND (0.005) U
1,1-Dichloroethane	ND (0.0033) U/ND (0.005) U
1,1-Dichloroethene	ND (0.0033) U/ND (0.005) U
1,2-Dichloroethane	ND (0.0033) U/ND (0.005) U
Acetone	0.018 J/0.02 J
Benzene	ND (0.0033) U/ND (0.0033) U
cis-1,2-Dichloroethene	R/R
Methylene chloride	ND (0.0033) U/ND (0.005) U
Tetrachloroethene	ND (0.0033) U/ND (0.005) U
Toluene	ND (0.0033) U/ND (0.005) U
Trichloroethene	ND (0.0033) U/ND (0.005) U
Vinyl chloride	R/NS
SVOC	
2,4-Dimethylphenol	ND (0.05) U/ND (0.05) U
Benzo(a)pyrene	ND (0.05) U/ND (0.05) U
bis(2-Ethylhexyl)phthalate	ND (0.05) U/ND (0.05) U
Butyl benzylphthalate	ND (0.05) U/ND (0.05) U
Dibenz(a,h)anthracene	ND (0.05) U/ND (0.05) U
Methylphenol (Cresol)	0.0015 J/0.0063 J
Pentachlorophenol	R/ND (0.05) U
PCB	
Total PCBs	ND (0.0004) U/ND (0.0004) U
RCRA	
Antimony	ND (0.025) U/ND (0.025) U
Arsenic	0.0033 J/0.0045 J
Barium	0.0415/0.0449
Beryllium	ND (0.001) U/ND (0.001) U
Cadmium	ND (0.0005) U/ND (0.005) U
Chromium Total	ND (0.01) U/ND (0.01) U
Cobalt	0.0062/0.0063
Cyanide (total)	NS/NS
Iron	NS/NS
Lead	ND (0.0033) U/ND (0.003) U
Manganese	0.521/0.489
Nickel	0.01 J/0.0084 J
Selenium	ND (0.0033) U/ND (0.005) U
Thallium	ND (0.0033) U/ND (0.003) U
Vanadium	ND (0.01) U/0.0086 J
PCDD/F	
2,3,7,8-TCDD Equivalent	NS/NS

MWP9-01	6/15/03	9/8/03
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U/ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U/ND (0.001) U
1,1-Dichloroethane	0.0007 J	0.0011/0.0024
1,1-Dichloroethene	ND (0.001) U	ND (0.0007) U/ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U/ND (0.001) U
Acetone	0.025 J	0.065 J/0.055 J
Benzene	ND (0.001) U	ND (0.001) U/ND (0.001) U
cis-1,2-Dichloroethene	R/ND (0.0005) U	ND (0.0005) U/ND (0.0005) U
Methylene chloride	ND (0.001) U	ND (0.0007) U/ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U/ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U/ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U/ND (0.001) U
Vinyl chloride	R	ND (0.001) U/ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.005) U	ND (0.02) U/ND (0.005) U
Benzo(a)pyrene	ND (0.005) U	ND (0.02) U/ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U	ND (0.02) U/ND (0.005) U
Butyl benzylphthalate	ND (0.005) U	ND (0.02) U/ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U	ND (0.005) U/ND (0.02) U
Methylphenol (Cresol)	0.0015 J	0.0055 J/0.0063 J
Pentachlorophenol	ND (0.005) U	ND (0.02) U
Pentachlorophenol [EGLE, RDW]		0.0038 J
PCB		
Total PCBs	ND (0.0004) U	ND (0.0004) U/ND (0.0004) U
RCRA		
Antimony	ND (0.025) U	ND (0.025) U/ND (0.025) U
Arsenic	0.024	0.0225/0.0234
Barium	0.037 J	0.0227/0.0228
Beryllium	ND (0.001) U	ND (0.001) U/ND (0.001) U
Cadmium	ND (0.005) U	ND (0.005) U/ND (0.005) U
Chromium Total	ND (0.01) U	ND (0.01) U/ND (0.01) U
Cobalt	0.0062 J	ND (0.02) U/ND (0.02) U
Cyanide (total)	ND (0.02) U	ND (0.02) U/ND (0.02) U
Copper	0.0067 J	0.0043 J/0.0044 J
Cyanide (total)	NS	NS/NS
Iron	NS	NS/NS
Lead	ND (0.003) U	ND (0.003) U/0.0025 J
Manganese	0.0038 J	ND (0.01) U/ND (0.01) U
Nickel	ND (0.02) U	0.0097 J/0.0104 J
Selenium	0.0057 J	ND (0.005) U/ND (0.005) U
Thallium	ND (0.001) U	ND (0.001) U/ND (0.001) U
Vanadium [EGLE, RDW]	0.578 J	0.0843/0.0853
PCDD/F		
2,3,7,8-TCDD Equivalent	NS	NS/NS

MWP9-03	6/15/03	9/8/03
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.0007) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.0007) U
1,1-Dichloroethane	0.0007 J	ND (0.0007) U
1,1-Dichloroethene	ND (0.001) U	ND (0.0007) U
1,2-Dichloroethane	ND (0.001) U	ND (0.0007) U
Acetone	0.71 J	0.32 J
Benzene	ND (0.001) U	ND (0.0007) U
cis-1,2-Dichloroethene	ND (0.0005) U	ND (0.0029) U
Methylene chloride	ND (0.001) U	ND (0.0007) U
Tetrachloroethene	ND (0.001) U	ND (0.0007) U
Toluene	ND (0.001) U	ND (0.0007) U
Trichloroethene	ND (0.001) U	ND (0.0007) U
Vinyl chloride	ND (0.001) U	ND (0.0007) U
SVOC		
2,4-Dimethylphenol	0.3 J	–
2,4-Dimethylphenol [RDW]	–	0.8
Benzo(a)pyrene	ND (0.25) U	ND (0.25) U
bis(2-Ethylhexyl)phthalate	ND (0.25) U	ND (0.25) U
Butyl benzylphthalate	ND (0.25) U	ND (0.25) U
Dibenz(a,h)anthracene	ND (0.25) U	ND (0.25) U
Methylphenol (Cresol) [EGLE, RDW]	1.276 J	3.2
Pentachlorophenol	ND (0.25) U	ND (0.25) U
PCB	–	–
Total PCBs	0.0003685 J	ND (0.0004) U
RCRA		
Antimony [EGLE, RDW]	0.0044 J	0.0131 J
Arsenic	0.0449	0.031
Barium	0.0134	0.0269
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.005) U	ND (0.005) U
Chromium Total	ND (0.01) U	ND (0.01) U
Cobalt	ND (0.02) U	0.0012 J
Copper	ND (0.005) U	ND (0.005) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.0081 J	ND (0.01) U
Nickel	0.02	0.0082 J
Selenium	0.134	0.0044 J
Thallium	ND (0.001) U	ND (0.001) U
Vanadium [RDW]	0.0113	0.0087 J
PCDD/F		
2,3,7,8-TCDD Equivalent	NS	NS

MWP9-04	6/15/03	9/8/03
VOC		
1,1,1-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U	ND (0.001) U
1,1-Dichloroethane	0.0004 J	0.0008 J
1,1-Dichloroethene	ND (0.001) U	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U	ND (0.001) U
Acetone	0.0024 J	ND (0.01) UJ
Benzene	ND (0.001) U	ND (0.001) U
cis-1,2-Dichloroethene	R/ND (0.0005) U	ND (0.0005) U
Methylene chloride	ND (0.001) U	ND (0.001) U
Tetrachloroethene	ND (0.001) U	ND (0.001) U
Toluene	ND (0.001) U	ND (0.001) U
Trichloroethene	ND (0.001) U	ND (0.001) U
Vinyl chloride	R	ND (0.001) U
SVOC		
2,4-Dimethylphenol	ND (0.012) U	ND (0.005) U
Benzo(a)pyrene	ND (0.012) U	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.012) U	ND (0.005) U
Butyl benzylphthalate	ND (0.012) U	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.012) U	ND (0.005) U
Methylphenol (Cresol)	ND (0.012) U	ND (0.005) U
Pentachlorophenol	ND (0.012) U	ND (0.005) U
PCB		
Total PCBs	ND (0.0004) U	ND (0.0004) U
RCRA		
Antimony	ND (0.025) U	ND (0.025) U
Arsenic	ND (0.01) U	0.0032 J
Barium	0.0419	0.0259
Beryllium	ND (0.001) U	ND (0.001) U
Cadmium	ND (0.005) U	ND (0.005) U
Chromium Total	ND (0.01) U	ND (0.01) U
Cobalt	ND (0.02) U	0.0015 J
Copper	ND (0.005) U	ND (0.005) U
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	ND (0.003) U	ND (0.003) U
Manganese	0.0259	0.0436
Nickel	0.0056 J	0.0108 J
Selenium	ND (0.005) U	ND (0.005) U
Thallium	ND (0.001) U	ND (0.001) U
Vanadium	ND (0.01) U	ND (0.01) U
PCDD/F		
2,3,7,8-TCDD Equivalent	NS	NS

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=REF, DATA_POINT
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411C14.DWG

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AOIs P-9 AND P-11 - GROUNDWATER

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FIGURE 4-14

BP11-04	0-2(ft BGS)	8-10(ft BGS)
VOC		
1,1,1-Trichloroethane	ND (0.0047) U	ND (0.0041) U
1,1,2-Trichloroethane	ND (0.0047) U	ND (0.0041) U
1,1-Dichloroethane	ND (0.0047) U	ND (0.0041) U
1,1-Dichloroethene	ND (0.0047) U	ND (0.0041) U
1,2-Dichloroethane	ND (0.0047) U	ND (0.0041) U
Acetone	0.014 J	ND (0.018) U
Benzene	ND (0.0047) U	ND (0.0041) U
cis-1,2-Dichloroethene	ND (0.0047) U	ND (0.0041) U
Ethylbenzene	ND (0.0047) U	ND (0.0041) U
Methylene chloride	ND (0.0047) U	ND (0.0041) U
Tetrachloroethene	ND (0.0047) U	ND (0.0041) U
Toluene	ND (0.0047) U	ND (0.0041) U
Trichloroethene	ND (0.0047) U	ND (0.0041) U
Vinyl chloride	ND (0.0095) U	ND (0.0082) U
SVOC		
2,4-Dimethylphenol	ND (0.4) U	ND (0.36) U
Benzo(a)pyrene	ND (0.4) U	ND (0.36) U
bis(2-Ethylhexyl)phthalate	ND (0.4) U	ND (0.36) U
Butyl benzylphthalate	ND (0.4) U	ND (0.36) U
Dibenz(a,h)anthracene	ND (0.4) U	ND (0.36) U
Methylphenol (Cresol)	ND (0.4) U	ND (0.36) U
Pentachlorophenol	ND (4.1) U	ND (3.7) U
PCB		
Total PCBs	ND (0.041) U	ND (0.036) U
RCRA		
Antimony	8	8
Arsenic	5.7	4.4
Barium	52.1	38.8
Beryllium	0.455 J	0.328 J
Cadmium	ND (0.61) U	0.0202 J
Chromium Total	14.2	10.4
Cobalt	5.12 J	4.99 J
Copper	14.6	9.1
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	7.05	4.98
Manganese	214	236
Nickel	16	10
Selenium	ND (0.83) U	ND (0.549) U
Thallium	ND (1.2) U	ND (0.114) U
Vanadium	13.7	14.6
2,3,7,8-TCDD		
2,3,7,8-TCDD Equivalent	NS	NS

BP11-05	0-2(ft BGS)	8-10(ft BGS)	12.8-14(ft BGS)
VOC			
1,1,1-Trichloroethane	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
1,1,2-Trichloroethane	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
1,1-Dichloroethane	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
1,1-Dichloroethene	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
1,2-Dichloroethane	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
Acetone	0.011 J	0.0091 J	0.0091 J
Benzene	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
cis-1,2-Dichloroethene	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
Ethylbenzene	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
Methylene chloride	ND (0.0045) U	0.00382 J	ND (0.0046) U
Tetrachloroethene	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
Toluene	ND (0.0045) U	ND (0.00449) U	0.00041 J
Trichloroethene	ND (0.0045) U	ND (0.00449) U	ND (0.0046) U
Vinyl chloride	ND (0.0089) U	ND (0.00881) U	ND (0.00921) U
SVOC			
2,4-Dimethylphenol	ND (0.38) U	ND (0.38) U	ND (0.38) U
Benzo(a)pyrene	ND (0.38) U	ND (0.38) U	ND (0.38) U
bis(2-Ethylhexyl)phthalate	ND (0.38) U	ND (0.38) U	ND (0.38) U
Butyl benzylphthalate	ND (0.38) U	ND (0.38) U	ND (0.38) U
Dibenz(a,h)anthracene	ND (0.38) U	ND (0.38) U	ND (0.38) U
Methylphenol (Cresol)	ND (0.38) U	ND (0.38) U	ND (0.38) U
Pentachlorophenol	ND (3.8) U	ND (3.8) U	ND (3.82) U
PCB			
Total PCBs	ND (0.038) U	ND (0.038) U	ND (0.038) U
RCRA			
Antimony	9	9	9
Arsenic	6.54	4.4	3.24
Barium	46.2	45.5	18
Beryllium	0.445 J	0.386 J	0.205 J
Cadmium	ND (0.61) U	0.0139 J	0.0603 J
Chromium Total	11.7	11.2	8.24
Cobalt	5.12 J	7.07 J	3.49 J
Copper	12.7	15.2	11.2
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	6.7	6.5	5.62 J
Manganese	465	370	219
Nickel	16	15	10 J
Selenium	ND (0.978) U	ND (0.517) U	ND (0.543) U
Thallium	ND (1.16) U	ND (1.01) U	ND (1.14) U
Vanadium	15.7	15.7	8.79
2,3,7,8-TCDD			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWP11-03	0-2(ft BGS)	8-10(ft BGS)
VOC		
1,1,1-Trichloroethane	ND (0.0052) U	ND (0.0049) U
1,1,2-Trichloroethane	ND (0.0052) U	ND (0.0049) U
1,1-Dichloroethane	ND (0.0052) U	ND (0.0049) U
1,1-Dichloroethene	ND (0.0052) U	ND (0.0049) U
1,2-Dichloroethane	ND (0.0052) U	ND (0.0049) U
Acetone	0.092 J	0.049 J
Benzene	ND (0.0052) U	ND (0.0049) U
cis-1,2-Dichloroethene	ND (0.0052) U	ND (0.0049) U
Ethylbenzene	ND (0.0052) U	ND (0.0049) U
Methylene chloride	ND (0.0052) U	ND (0.0049) U
Tetrachloroethene	ND (0.0052) U	ND (0.0049) U
Toluene	0.00037 J	ND (0.0049) U
Trichloroethene	ND (0.0052) U	ND (0.0049) U
Vinyl chloride	ND (0.01) U	ND (0.0097) U
SVOC		
2,4-Dimethylphenol	ND (103) U	ND (0.36) U
Benzo(a)pyrene	ND (10) U	ND (0.36) U
bis(2-Ethylhexyl)phthalate	ND (10) U	ND (0.36) U
Butyl benzylphthalate	42	ND (0.36) U
Dibenz(a,h)anthracene	ND (10) U	ND (0.36) U
Methylphenol (Cresol)	ND (10) U	ND (0.36) U
Pentachlorophenol	ND (103) U	ND (3.7) U
PCB		
Total PCBs	ND (0.041) U	ND (0.036) U
RCRA		
Antimony	8	8
Arsenic	5.63	3.58
Barium	80.9	31.7
Beryllium	0.676	0.205
Cadmium	0.0652 J	0.0316 J
Chromium Total	15	10.4
Cobalt	4.18 J	5.52 J
Copper	14.4	12.3
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	20.4	5.44
Manganese	436	224
Nickel	16	14
Selenium	ND (0.827) U	ND (0.549) U
Thallium	ND (1.25) U	ND (1.09) U
Vanadium	15	14.2
2,3,7,8-TCDD		
2,3,7,8-TCDD Equivalent	NS	NS

MWP11-02	0-2(ft BGS)	8-10(ft BGS)
VOC		
1,1,1-Trichloroethane	ND (0.005) U	ND (0.0052) U
1,1,2-Trichloroethane	ND (0.005) U	ND (0.0052) U
1,1-Dichloroethane	ND (0.005) U	ND (0.0052) U
1,1-Dichloroethene	ND (0.005) U	ND (0.0052) U
1,2-Dichloroethane	ND (0.005) U	ND (0.0052) U
Acetone	ND (0.02) U	0.0046 J
Benzene	ND (0.005) U	0.0017 J
cis-1,2-Dichloroethene	ND (0.005) U	ND (0.0052) U
Ethylbenzene	ND (0.005) U	ND (0.0052) U
Methylene chloride	ND (0.005) U	ND (0.0052) U
Tetrachloroethene	0.00057 J	ND (0.0052) U
Toluene	ND (0.005) U	0.00083 J
Trichloroethene	ND (0.005) U	ND (0.0052) U
Vinyl chloride	ND (0.01) U	ND (0.0095) U
SVOC		
2,4-Dimethylphenol	ND (0.37) U	ND (0.38) U
Benzo(a)pyrene	ND (0.37) U	ND (0.38) U
bis(2-Ethylhexyl)phthalate	0.12 J	ND (0.38) U
Butyl benzylphthalate	0.038 J	ND (0.38) U
Dibenz(a,h)anthracene	0.063 J	0.045 J
Methylphenol (Cresol)	ND (0.37) U	ND (0.38) U
Pentachlorophenol	ND (3.8) U	ND (3.8) U
PCB		
Total PCBs	-	ND (0.038) U
RCRA		
Total PCBs (ROC)	5.6825 J	-
RCRA		
Antimony	0.302 J	ND (2.29) UJ
Arsenic	3.77 J	4.58 J
Barium	192 J	55.3 J
Beryllium	0.277 J	0.338 J
Cadmium	ND (0.53) UJ	ND (0.573) UJ
Chromium Total	10.8 J	12.4 J
Cobalt	3.38 J	5.03 J
Copper	12.4 J	13.2 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	47.7 J	11 J
Manganese	144 J	415 J
Nickel	8.62 J	13.5 J
Selenium	ND (0.563) UJ	ND (0.573) UJ
Thallium	ND (1.13) UJ	ND (1.15) UJ
Vanadium	10.4 J	14.5 J
2,3,7,8-TCDD		
2,3,7,8-TCDD Equivalent	NS	NS

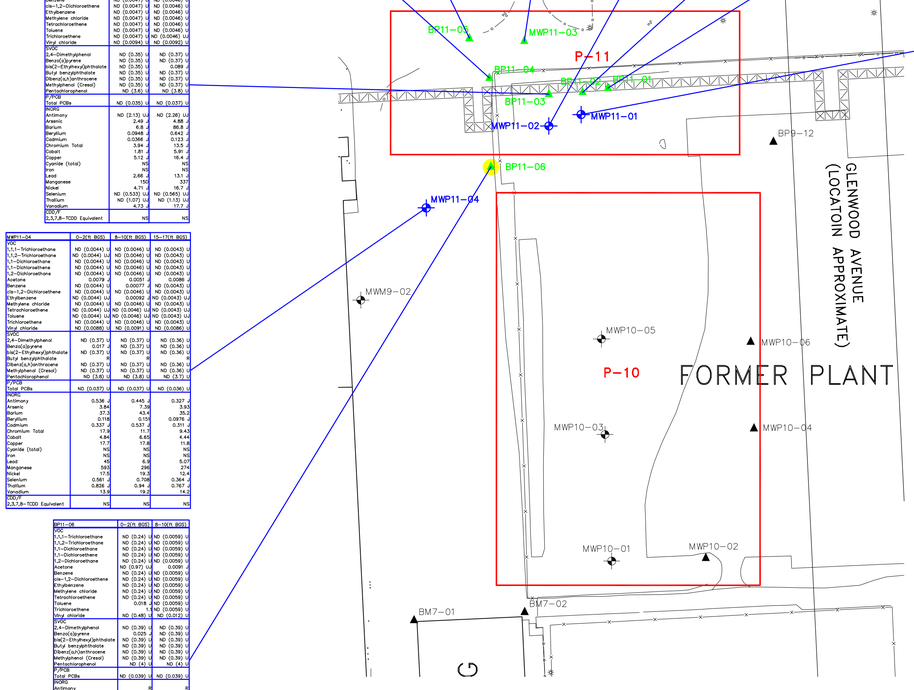
BP11-01	0-2(ft BGS)	8-10(ft BGS)
VOC		
1,1,1-Trichloroethane	ND (0.0052) U	ND (0.0044) U
1,1,2-Trichloroethane	ND (0.0052) U	ND (0.0044) U
1,1-Dichloroethane	ND (0.0052) U	ND (0.0044) U
1,1-Dichloroethene	ND (0.0052) U	ND (0.0044) U
1,2-Dichloroethane	ND (0.0052) U	ND (0.0044) U
Acetone	0.0038 J	0.0038 J
Benzene	ND (0.0052) U	ND (0.0044) U
cis-1,2-Dichloroethene	ND (0.0052) U	ND (0.0044) U
Ethylbenzene	ND (0.0052) U	ND (0.0044) U
Methylene chloride	ND (0.0052) U	ND (0.0044) U
Tetrachloroethene	ND (0.0052) U	ND (0.0044) U
Toluene	ND (0.0052) U	ND (0.0044) U
Trichloroethene	ND (0.0052) U	ND (0.0044) U
Vinyl chloride	ND (0.01) U	ND (0.0087) U
SVOC		
2,4-Dimethylphenol	ND (0.35) U	ND (0.37) U
Benzo(a)pyrene	ND (0.35) U	ND (0.37) U
bis(2-Ethylhexyl)phthalate	0.088 J	ND (0.37) U
Butyl benzylphthalate	ND (0.35) U	ND (0.37) U
Dibenz(a,h)anthracene	ND (0.35) U	ND (0.37) U
Methylphenol (Cresol)	ND (0.35) U	ND (0.37) U
Pentachlorophenol	ND (3.5) U	ND (3.7) U
PCB		
Total PCBs	ND (0.035) U	ND (0.037) U
RCRA		
Antimony	ND (2.12) UJ	ND (2.27) UJ
Arsenic	2.81 J	3.74 J
Barium	7.43 J	44.8 J
Beryllium	0.11 J	0.365 J
Cadmium	0.0246 J	0.0188 J
Chromium Total	4.1 J	11.1 J
Cobalt	1.94 J	6.85 J
Copper	4.71 J	14 J
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	2.99 J	6.11 J
Manganese	156 J	333 J
Nickel	4.92 J	14 J
Selenium	ND (0.53) UJ	ND (0.577) UJ
Thallium	ND (1.06) UJ	ND (1.15) UJ
Vanadium	5.11 J	14.8 J
2,3,7,8-TCDD		
2,3,7,8-TCDD Equivalent	NS	NS

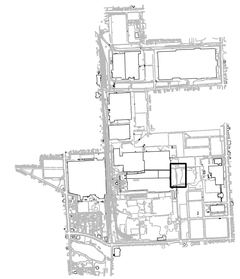
MWP11-09	0-2(ft BGS)	8-10(ft BGS)	14-16(ft BGS)
VOC			
1,1,1-Trichloroethane	ND (0.0046) U	ND (0.006) U	ND (0.005) U
1,1,2-Trichloroethane	ND (0.0046) U	ND (0.006) U	ND (0.005) U
1,1-Dichloroethane	ND (0.0046) U	ND (0.006) U	ND (0.005) U
1,1-Dichloroethene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
1,2-Dichloroethane	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Acetone	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Benzene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
cis-1,2-Dichloroethene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Ethylbenzene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Methylene chloride	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Tetrachloroethene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Toluene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Trichloroethene	ND (0.0046) U	ND (0.006) U	ND (0.005) U
Vinyl chloride	ND (0.0093) U	ND (0.012) U	ND (0.01) U
SVOC			
2,4-Dimethylphenol	ND (0.95) U	ND (0.36) U	ND (0.38) U
Benzo(a)pyrene	1.2 J	ND (0.36) U	ND (0.38) U
bis(2-Ethylhexyl)phthalate	0.22 J	ND (0.36) U	ND (0.38) U
Butyl benzylphthalate	0.14 J	ND (0.36) U	ND (0.38) U
Dibenz(a,h)anthracene	0.19 J	ND (0.36) U	ND (0.38) U
Methylphenol (Cresol)	ND (0.95) U	ND (0.36) U	ND (0.38) U
Pentachlorophenol	ND (3.82) U	ND (3.7) U	ND (3.8) U
PCB			
Total PCBs	3.789 J	0.05 J	ND (0.038) U
RCRA			
Antimony	0.251 J	ND (2.18) UJ	ND (2.33) UJ
Arsenic	3.71 J	2.98 J	3.14 J
Barium	37.7 J	22.8 J	45.2 J
Beryllium	0.188 J	0.131 J	0.32 J
Cadmium	0.203 J	ND (0.544) UJ	ND (0.581) UJ
Chromium Total	10.2 J	6.58 J	4.16 J
Cobalt	3.79 J	2.47 J	1.9 J
Copper	12.9 J	5.2 J	4.44 J
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	30.8 J	2.85 J	2.94 J
Manganese	478 J	261 J	97.2 J
Nickel	10.4 J	6.39 J	4.87 J
Selenium	ND (0.874) UJ	ND (0.544) UJ	ND (0.581) UJ
Thallium	ND (1.15) UJ	ND (1.09) UJ	ND (1.16) UJ
Vanadium	12.4 J	9.09 J	5.62 J
2,3,7,8-TCDD			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MWP11-04	0-2(ft BGS)	8-10(ft BGS)	15-17(ft BGS)
VOC			
1,1,1-Trichloroethane	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
1,1,2-Trichloroethane	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
1,1-Dichloroethane	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
1,1-Dichloroethene	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
1,2-Dichloroethane	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
Acetone	0.0078 J	0.0051 J	0.0086 J
Benzene	ND (0.0044) U	0.00077 J	ND (0.0043) U
cis-1,2-Dichloroethene	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
Ethylbenzene	ND (0.0044) U	0.00082 J	ND (0.0043) U
Methylene chloride	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
Tetrachloroethene	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
Toluene	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
Trichloroethene	ND (0.0044) U	ND (0.0046) U	ND (0.0043) U
Vinyl chloride	ND (0.0088) U	ND (0.0091) U	ND (0.0086) U
SVOC			
2,4-Dimethylphenol	ND (0.37) U	ND (0.37) U	ND (0.36) U
Benzo(a)pyrene	ND (0.37) U	ND (0.37) U	ND (0.36) U
bis(2-Ethylhexyl)phthalate	ND (0.37) U	ND (0.37) U	ND (0.36) U
Butyl benzylphthalate	-	-	-
Dibenz(a,h)anthracene	ND (0.37) U	ND (0.37) U	ND (0.36) U
Methylphenol (Cresol)	ND (0.37) U	ND (0.37) U	ND (0.36) U
Pentachlorophenol	ND (3.8) U	ND (3.8) U	ND (3.7) U
PCB			
Total PCBs	ND (0.037) U	ND (0.037) U	ND (0.036) U
RCRA			
Antimony	0.536 J	0.445 J	0.327 J
Arsenic	3.84	7.39	3.93
Barium	37.3	43.4	35.2
Beryllium	0.118	0.151	0.0978 J
Cadmium	0.337 J	0.537 J	0.311 J
Chromium Total	13.8	11.1	9.43
Cobalt	4.84	6.12	4.44
Copper	15.7	17.8	9.18
Cyanide (total)	NS	NS	NS
Iron	NS	NS	NS
Lead	45	6.8	5.07
Manganese	583	290	274
Nickel	17.5	19.3	12.7
Selenium	0.561 J	0.708 J	0.364 J
Thallium	0.858 J	0.98 J	0.74 J
Vanadium	13.6	14.2	9.03
2,3,7,8-TCDD			
2,3,7,8-TCDD Equivalent	NS	NS	NS

MP11-06	0-2(ft BGS)	8-10(ft BGS)
VOC		
1,1,1-Trichloroethane	ND (0.24) U	ND (0.0059) U
1,1,2-Trichloroethane	ND (0.24) U	ND (0.0059) U
1,1-Dichloroethane	ND (0.24) U	ND (0.0059) U
1,1-Dichloroethene	ND (0.24) U	ND (0.0059) U
1,2-Dichloroethane	ND (0.24) U	ND (0.0059) U
Acetone	ND (0.97) UJ	0.0091 J
Benzene	ND (0.24) U	ND (0.0059) U
cis-1,2-Dichloroethene	ND (0.24) U	ND (0.0059) U
Ethylbenzene	ND (0.24) U	ND (0.0059) U
Methylene chloride	ND (0.24) U	ND (0.0059) U
Tetrachloroethene	ND (0.24) U	ND (0.0059) U
Toluene	0.018 J	ND (0.0059) U
Trichloroethene	1.16	ND (0.0059) U
Vinyl chloride	ND (0.48) U	ND (0.012) U
SVOC		
2,4-Dimethylphenol	ND (0.39) U	ND (0.39) U
Benzo(a)pyrene	0.035 J	ND (0.39) U
bis(2-Ethylhexyl)phthalate	ND (0.39) U	ND (0.39) U
Butyl benzylphthalate	ND (0.39) U	ND (0.39) U
Dibenz(a,h)anthracene	ND (0.39) U	ND (0.39) U
Methylphenol (Cresol)	ND (0.39) U	ND (0.39) U
Pentachlorophenol	ND (4) U	ND (4) U
PCB		
Total PCBs	ND (0.039) U	ND (0.039) U
RCRA		
Antimony	9	8
Arsenic	5.39	6.17
Barium	70.5	45.5
Beryllium	0.974	0.332
Cadmium	ND (2.89) UJ	ND (0.585) UJ
Chromium Total	19.4	9.43
Cobalt	4.14 J	5.33 J
Copper	56.6	13.5
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	60.8	6.28
Manganese	-	223
Manganese [IPSIC]	3360	-
Nickel	-	17
Selenium	ND (2.89) UJ	ND (0.585) UJ
Thallium	ND (5.9) UJ	ND (1.17) UJ
Vanadium	22.2	14.5
2,3,7,8-TCDD		
2,3,7,8-TCDD Equivalent	NS	NS

MP11-08	0-2(ft BGS)	8-10(ft BGS)
VOC		
1,1,1-Trichloroethane	ND (0.24) U	ND (0.0059) U
1,1,2-Trichloroethane	ND (0.24) U	ND (0.0059) U
1,1-Dichloroethane	ND (0.24) U	ND (0.0059) U
1,1-Dichloroethene	ND (0.24) U	ND (0.0059) U
1,2-Dichloroethane	ND (0.24) U	ND (0.0059) U
Acetone	ND (0.97) UJ	0.0099 J
Benzene	ND (0.24) U	ND (0.0059) U
cis-1,2-Dichloroethene	ND (0.24) U	ND (0.0059) U
Ethylbenzene	ND (0.24) U	ND (0.0059) U
Methylene chloride	ND (0.24) U	ND (0.0059) U
Tetrachloroethene	ND (0.24) U	ND (0.0059) U
Toluene	0.018 J	ND (0.0059) U
Trichloroethene	1.16	ND (0.0059) U
Vinyl chloride	ND (0.48) U	ND (0.012) U
SVOC		
2,4-Dimethylphenol	ND (0.39) U	ND (0.39) U
Benzo(a)pyrene	0.035 J	ND (0.39) U
bis(2-Ethylhexyl)phthalate	ND (0.39) U	ND (0.39) U
Butyl benzylphthalate	ND (0.39) U	ND (0.39) U
Dibenz(a,h)anthracene	ND (0.39) U	ND (0.39) U
Methylphenol (Cresol)	ND (0.39) U	ND (0.39) U
Pentachlorophenol	ND (4) U	ND (4) U
PCB		
Total PCBs	ND (0.039) U	ND (0.039) U
RCRA		
Antimony	9	8
Arsenic	5.39	6.17
Barium	70.5	45.5
Beryllium	0.974	0.332
Cadmium	ND (2.89) UJ	ND (0.585) UJ
Chromium Total	19.4	9.43
Cobalt	4.14 J	5.33 J
Copper	56.6	13.5
Cyanide (total)	NS	NS
Iron	NS	NS
Lead	60.8	6.28
Manganese	-	223
Manganese [IPSIC]	3360	-
Nickel	-	17
Selenium	ND (2.89) UJ	ND (0.585) UJ
Thallium	ND (5.9) UJ	ND (1.17) UJ
Vanadium	22.2	14.5
2,3,7,8-TCDD		
2,3,7,8-TCDD Equivalent	NS	NS





SITE LOCATION

LEGEND:

- MWP11-02 — GROUNDWATER MONITORING WELL LOCATION
- BM1-08 — SOIL BORING LOCATION
- CONSTITUENT CONCENTRATION EXCEEDS INDUSTRIAL SCREENING CRITERIA
- TRESTLE
- APPROXIMATE AOI AREA
- P-10 = FORMER PLANT 18
- P-11 = TRESTLE PIPELINE RELASE

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

RDW – RESIDENTIAL DRINKING WATER CRITERIA
IDW – 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

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. NS – NOT SAMPLED.

0 80' 160'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI P-11 - SOIL

ENCORE

FIGURE
4-15

X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=REF, DATA_POINT
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411C15.DWG



N/2	Revision	Date	Initial

0 100 300ft

LEGEND

- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING MANHOLE - NOT SURVEYED
- EXISTING CATCH BASIN - NOT SURVEYED
- STORM SEWER - LOCATION NOT SURVEYED
- STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STORM SEWER - LOCATION BASED ON ACTUAL FIELD VERIFICATION: CLEANED AND TELEVISED
- STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG: CLEANED AND TELEVISED
- STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG: NOT CLEANED, NOT TELEVISED
- STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM. TELEVISED ONLY
- FENCELINE
- TREE / VEGETATION
- STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

PHOTOGRAMMETRIC MAPPING
and STORM SEWER BASE MAP

ENCORE

Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A.PERFETTO	NOVEMBER 2003	
Scale: 1" = 300'	Project N°: 17487-09	Report N°: 012	Figure N°: 4-16

17487-09(012)GN-NF001 NOV 21/2003

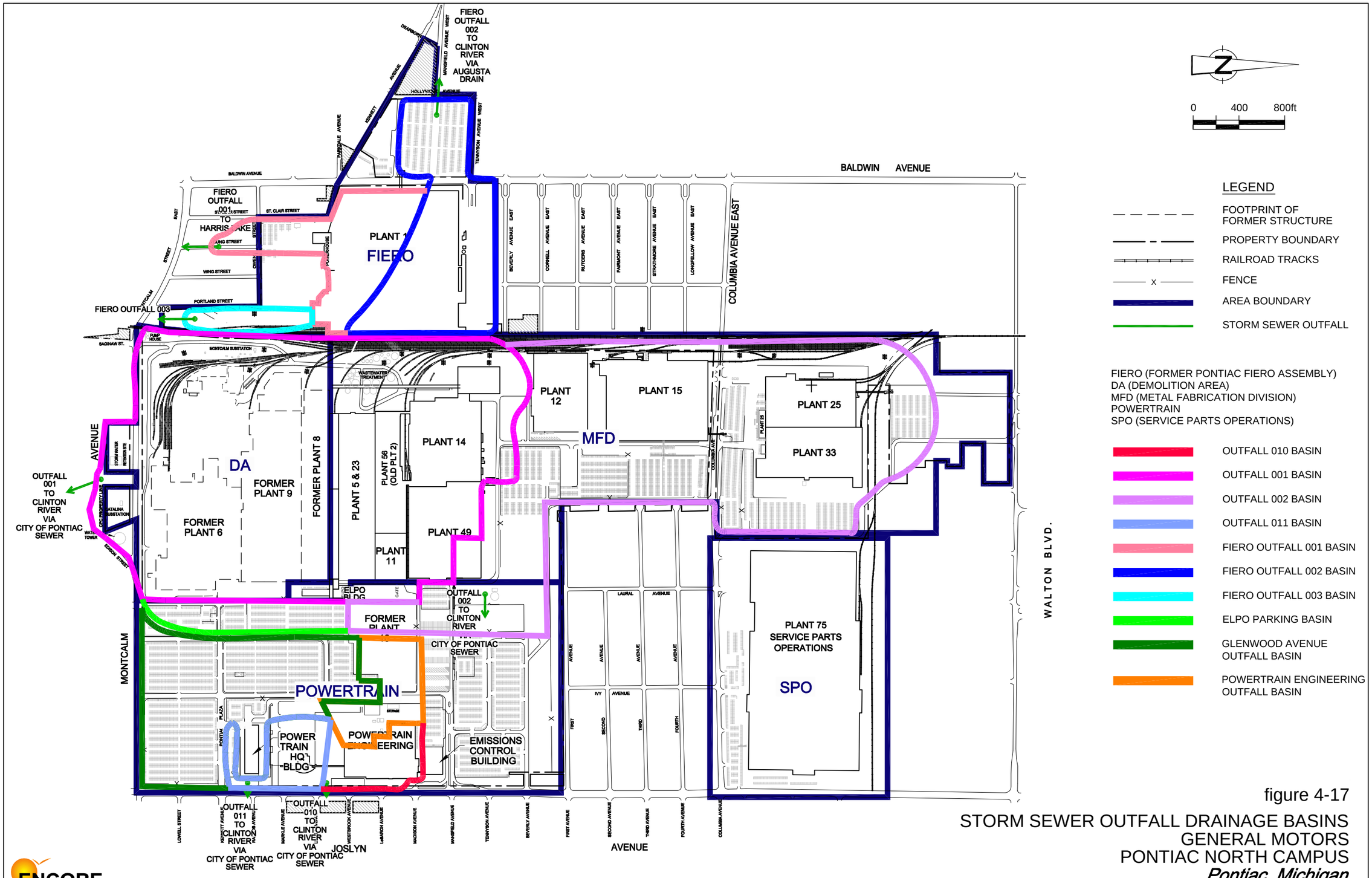


figure 4-17

STORM SEWER OUTFALL DRAINAGE BASINS
GENERAL MOTORS
PONTIAC NORTH CAMPUS
Pontiac, Michigan

ENCORE

17316-00(012)GN-NF001 NOV 20/2003

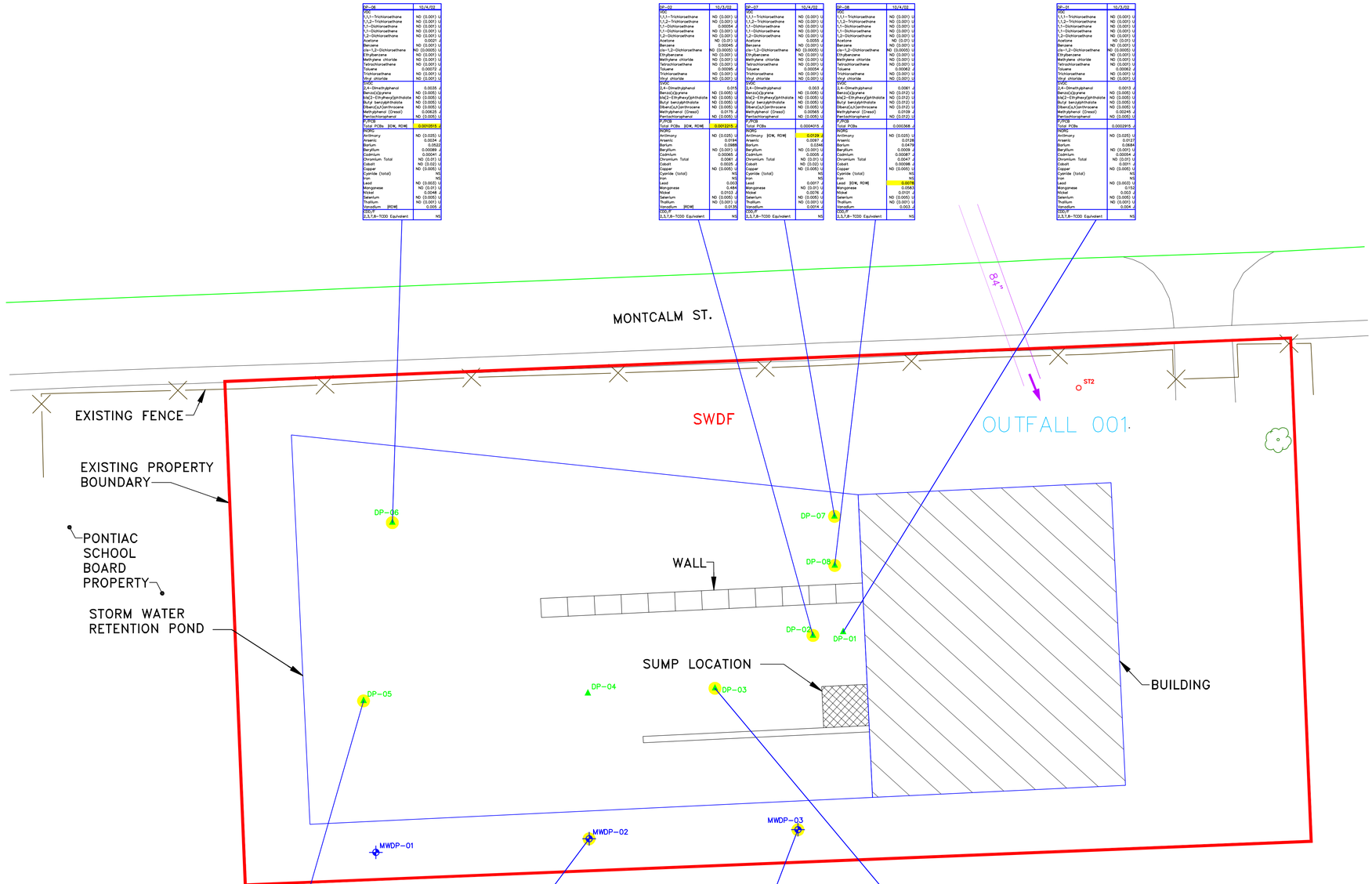
DP-06	10/4/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	0.0021 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.001) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	0.00072 J
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.0038 J
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	0.00825 J
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs [ICW, RDW]	0.0010615 J
RDRC	
Antimony	ND (0.025) U
Arsenic	0.0224 J
Barium	0.0522
Beryllium	0.00089 J
Cadmium	0.00041 J
Chromium Total	ND (0.01) U
Cobalt	ND (0.02) U
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	ND (0.01) U
Nickel	0.0045 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium [RDW]	0.005 J
PDCF	
2,3,7,8-TCDD Equivalent	NS

DP-02	10/3/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	0.00054 J
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	0.00045 J
cis-1,2-Dichloroethene	ND (0.001) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	0.00095 J
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.0058 J
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	0.0175 J
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs [ICW, RDW]	0.0013215 J
RDRC	
Antimony	ND (0.025) U
Arsenic	0.0194 J
Barium	0.0988
Beryllium	ND (0.001) U
Cadmium	0.00065 J
Chromium Total	ND (0.01) U
Cobalt	0.0025 J
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead	0.003 J
Manganese	0.484
Nickel	0.0053 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium [RDW]	0.0139 J
PDCF	
2,3,7,8-TCDD Equivalent	NS

DP-07	10/4/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	0.0055 J
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.001) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	0.00054 J
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.003 J
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	0.00565 J
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	0.0004015 J
RDRC	
Antimony [ICW, RDW]	0.0129 J
Arsenic	0.0097 J
Barium	0.0346
Beryllium	ND (0.001) U
Cadmium	0.0005 J
Chromium Total	ND (0.01) U
Cobalt	ND (0.02) U
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead	0.0077 J
Manganese	ND (0.01) U
Nickel	0.0035 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.0074 J
PDCF	
2,3,7,8-TCDD Equivalent	NS

DP-08	10/4/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.001) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	0.00062 J
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.0061 J
Benzo(a)pyrene	ND (0.012) U
bis(2-Ethylhexyl)phthalate	ND (0.012) U
Butyl benzylphthalate	ND (0.012) U
Dibenz(a,h)anthracene	ND (0.012) U
Methylphenol (Cresol)	0.0109 J
Pentachlorophenol	ND (0.012) U
PCBs	
Total PCBs	0.000368 J
RDRC	
Antimony	ND (0.025) U
Arsenic	0.0128 J
Barium	0.0479
Beryllium	0.0009 J
Cadmium	0.00087 J
Chromium Total	ND (0.01) U
Cobalt	0.00088 J
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead [ICW, RDW]	0.0078
Manganese	0.0583
Nickel	0.0031 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.003 J
PDCF	
2,3,7,8-TCDD Equivalent	NS

DP-04	10/3/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.001) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.0013 J
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	0.00245 J
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	0.0002915 J
RDRC	
Antimony	ND (0.025) U
Arsenic	0.0127
Barium	0.0684
Beryllium	ND (0.001) U
Cadmium	0.00054 J
Chromium Total	ND (0.01) U
Cobalt	0.0011 J
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead	ND (0.003) U
Manganese	0.152
Nickel	0.0037 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium	0.004 J
PDCF	
2,3,7,8-TCDD Equivalent	NS



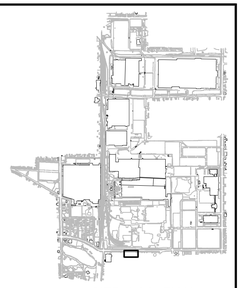
DP-05	10/3/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U/ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U/ND (0.001) U
1,1-Dichloroethane	ND (0.001) U/ND (0.001) U
1,1-Dichloroethene	ND (0.001) U/ND (0.001) U
1,2-Dichloroethane	ND (0.001) U/ND (0.001) U
Acetone	ND (0.01) U/ND (0.01) U
Benzene	ND (0.001) U/ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U/ND (0.0005) U
Ethylbenzene	ND (0.001) U/ND (0.001) U
Methylene chloride	ND (0.001) U/ND (0.001) U
Tetrachloroethene	ND (0.001) U/ND (0.001) U
Toluene	0.00074 J/0.00074 J
Trichloroethene	ND (0.001) U/ND (0.001) U
Vinyl chloride	ND (0.001) U/ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.0041 J/0.002 J
Benzo(a)pyrene	ND (0.005) U/ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U/ND (0.005) U
Butyl benzylphthalate	ND (0.005) U/ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U/ND (0.005) U
Methylphenol (Cresol)	0.00555 J/0.00535 J
Pentachlorophenol	ND (0.005) U/ND (0.005) U
PCBs	
Total PCBs [ICW, RDW]	0.0009715 J/0.0018215 J
RDRC	
Antimony	ND (0.025) U/ND (0.025) U
Arsenic	0.0032 J/0.0044 J
Barium	0.0515/0.0544
Beryllium	ND (0.001) U/ND (0.001) U
Cadmium	0.00041 J/0.00035 J
Chromium Total	ND (0.01) U/ND (0.01) U
Cobalt	ND (0.02) U/ND (0.02) U
Copper	ND (0.005) U/ND (0.005) U
Cyanide (total)	NS/NS
Iron	NS/NS
Lead	ND (0.003) U/ND (0.003) U
Manganese	ND (0.01) U/ND (0.01) U
Nickel	0.0038 J/0.0039 J
Selenium	ND (0.005) U/ND (0.005) U
Thallium	ND (0.001) U/ND (0.001) U
Vanadium [RDW]	0.0072 J/0.0072 J
PDCF	
2,3,7,8-TCDD Equivalent	NS/NS

MW-02	10/4/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	0.00054 J
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	0.000128 J
RDRC	
Antimony	ND (0.025) U
Arsenic	0.0096
Barium	0.473
Beryllium	0.00069 J
Cadmium [ICW, RDW]	0.0087
Chromium Total	0.04
Cobalt	0.0208
Copper	0.0053 J
Cyanide (total)	NS
Iron	NS
Lead [ICW, RDW]	0.0184
Manganese [RDW]	1.64
Nickel	0.0983
Selenium	ND (0.005) U
Thallium	0.0009 J
Vanadium [ICW, RDW]	0.0185
PDCF	
2,3,7,8-TCDD Equivalent	NS

MW-03	10/4/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	ND (0.005) U
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	ND (0.005) U
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs	0.000318 J
RDRC	
Antimony	ND (0.025) U
Arsenic	0.0043 J
Barium	0.0187
Beryllium	ND (0.001) U
Cadmium	0.0043 J
Chromium Total	0.0049 J
Cobalt	0.0053 J
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead [ICW, RDW]	0.0184
Manganese	0.0582
Nickel	0.0056 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium [RDW]	0.0043 J
PDCF	
2,3,7,8-TCDD Equivalent	NS

DP-03	10/3/02
VOC	
1,1,1-Trichloroethane	ND (0.001) U
1,1,2-Trichloroethane	ND (0.001) U
1,1-Dichloroethane	ND (0.001) U
1,1-Dichloroethene	ND (0.001) U
1,2-Dichloroethane	ND (0.001) U
Acetone	ND (0.01) U
Benzene	ND (0.001) U
cis-1,2-Dichloroethene	ND (0.0005) U
Ethylbenzene	ND (0.001) U
Methylene chloride	ND (0.001) U
Tetrachloroethene	ND (0.001) U
Toluene	ND (0.001) U
Trichloroethene	ND (0.001) U
Vinyl chloride	ND (0.001) U
SVOC	
2,4-Dimethylphenol	0.0072 J
Benzo(a)pyrene	ND (0.005) U
bis(2-Ethylhexyl)phthalate	ND (0.005) U
Butyl benzylphthalate	ND (0.005) U
Dibenz(a,h)anthracene	ND (0.005) U
Methylphenol (Cresol)	0.00705 J
Pentachlorophenol	ND (0.005) U
PCBs	
Total PCBs [ICW, RDW]	0.0007515 J
RDRC	
Antimony [ICW, RDW]	0.0067 J
Arsenic	0.0163
Barium	0.134
Beryllium	ND (0.001) U
Cadmium	0.00059 J
Chromium Total	0.01
Cobalt	0.0049 J
Copper	ND (0.005) U
Cyanide (total)	NS
Iron	NS
Lead [ICW, RDW]	0.0137
Manganese	0.396
Nickel	0.0249 J
Selenium	ND (0.005) U
Thallium	ND (0.001) U
Vanadium [RDW]	0.0109 J
PDCF	
2,3,7,8-TCDD Equivalent	NS

X: 64411X00.DWG, 64411X01.GIF
L: ON=* OFF=REF, DATA_POINT
P: PAGESET/PLT=DL
11/25/03 SYR-85-SDL GMS DJP
64411300/CMP-REPT/64411C18.DWG



SITE LOCATION

LEGEND:

- SOIL BORING
- MONITORING WELL
- APPROXIMATE AOI AREA
  SWDF = STORM WATER DETENTION FACILITY

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

RDW – RESIDENTIAL DRINKING WATER CRITERIA
IDW – 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

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. NS – NOT SAMPLED.

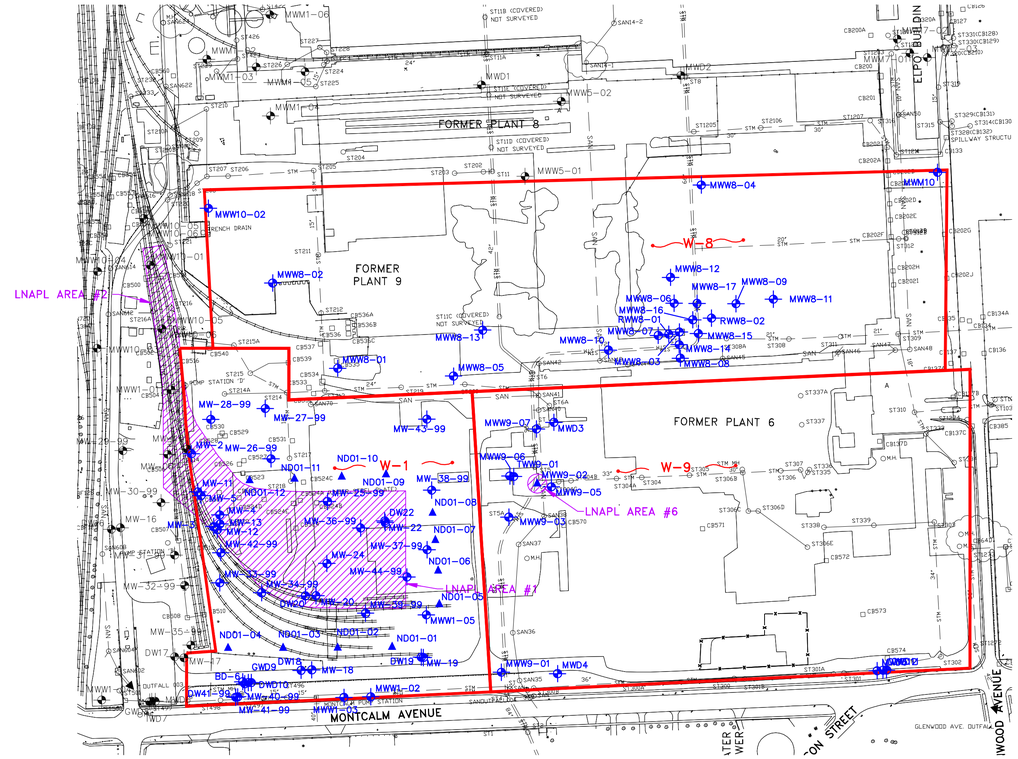
0 20' 40'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

STORM WATER DETENTION FACILITY - GROUNDWATER

ENCORE

FIGURE
4-18



LEGEND:

- MWC6 — GROUNDWATER MONITORING WELL LOCATION
- FENCED AREA
- LNAPL AREA
- APPROXIMATE AOI AREA
- W-1 = WEST YARD
- W-8 = FORMER PLANT 9 BASEMENT AST
- W-9 = FORMER CENTRAL FOUNDRY

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

- RDW – RESIDENTIAL DRINKING WATER CRITERIA
- IDW – 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

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE PRESENTED IN PARTS PER MILLION (ppm).
3. MWW8-05 – LNAPL WAS HISTORICALLY DETECTED IN THIS MONITORING WELL ONLY ON OCTOBER 1st AND 8th 2001.
4. DUPLICATE ANALYSES ARE PRESENTED IN BRACKETS.
5. ND (0.25) – CONSTITUENT NOT DETECTED, ASSOCIATED DETECTION LIMIT PRESENTED IN BRACKETS.
6. J – ESTIMATED CONCENTRATION.
7. B – LABORATORY BLANK CONTAMINATION.
8. NA – NOT ANALYZED.

0 200' 400'
GRAPHIC SCALE

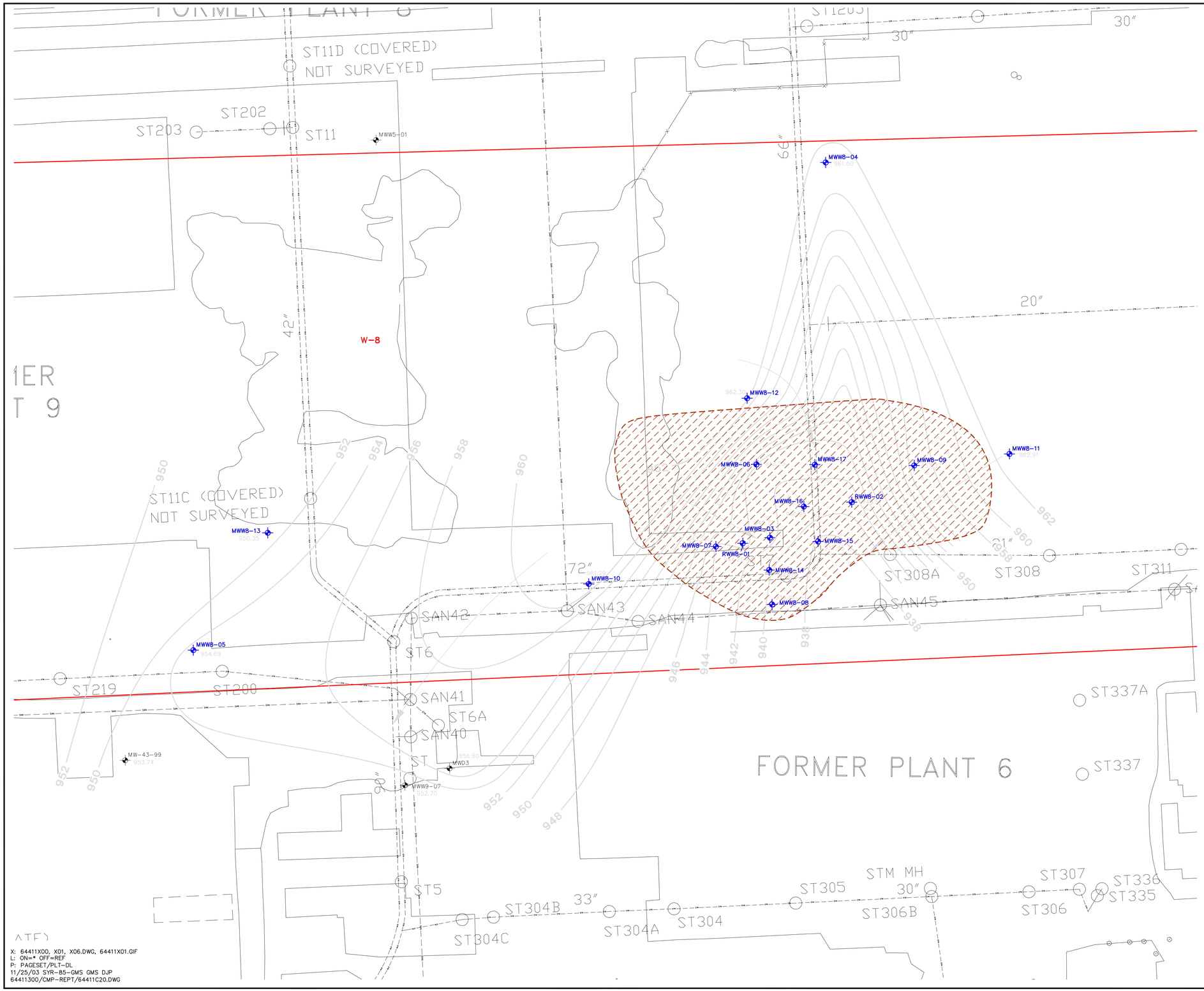
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

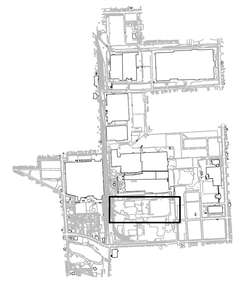
LNAPL AREAS NO. 1, NO. 2, AND NO. 6

ENCORE

FIGURE 4-19

X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS SDL
64411300/CMP-REPT/64411C19.DWG





SITE LOCATION

LEGEND:

- MWW8-04 — GROUNDWATER MONITORING WELL LOCATION
- APPROXIMATE AOI AREA
- W-8 = FORMER PLANT 9 BASEMENT AST
- 957.32 — GROUNDWATER ELEVATION IN FEET
- 950 — GROUNDWATER ELEVATION CONTOUR LINE IN FEET
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE EXTENT OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL)

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED OCTOBER 27 & 28, 2003. WHERE LNAPL WAS PRESENT, AN EQUIVALENT GROUNDWATER ELEVATION WAS CALCULATED USING AN ESTIMATED SPECIFIC DENSITY FOR THE LNAPL OF 0.8".

0 50' 100'
SCALE: 1"=50'

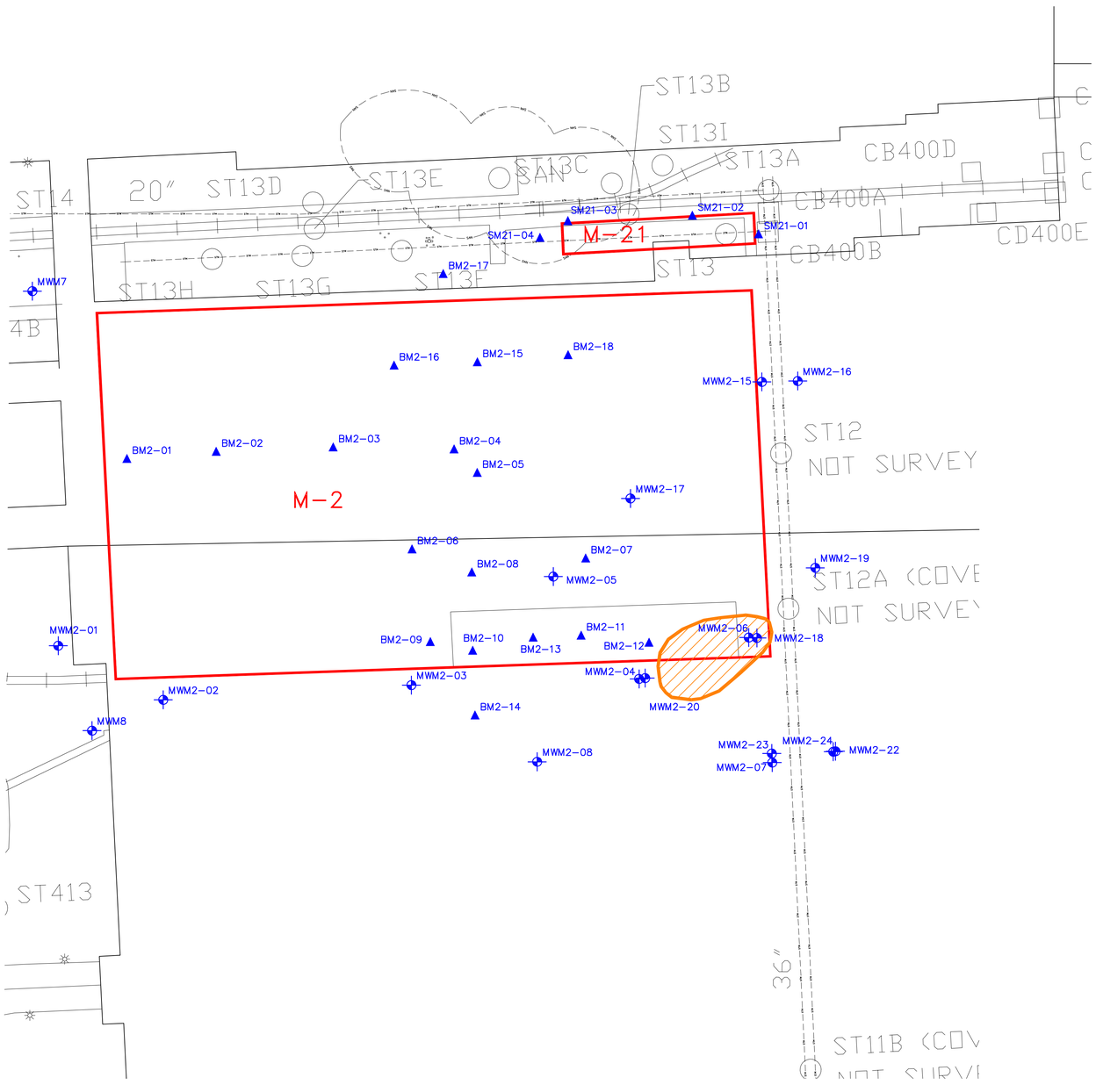
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

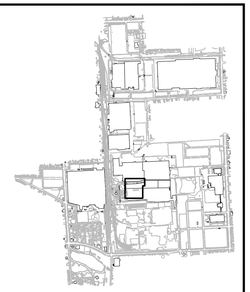
LNAPL AREA NO. 3

ENCORE

FIGURE 4-20

X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/25/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411C20.DWG





SITE LOCATION

LEGEND:

MWM2-05 GROUNDWATER MONITORING WELL LOCATION

BM2-12 SOIL BORING LOCATION

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

APPROXIMATE AOI AREA

M-2 = FORMER PLATING OPERATION AREA
M-21 = ELECTRICAL SUBSTATION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 40' 80'
GRAPHIC SCALE

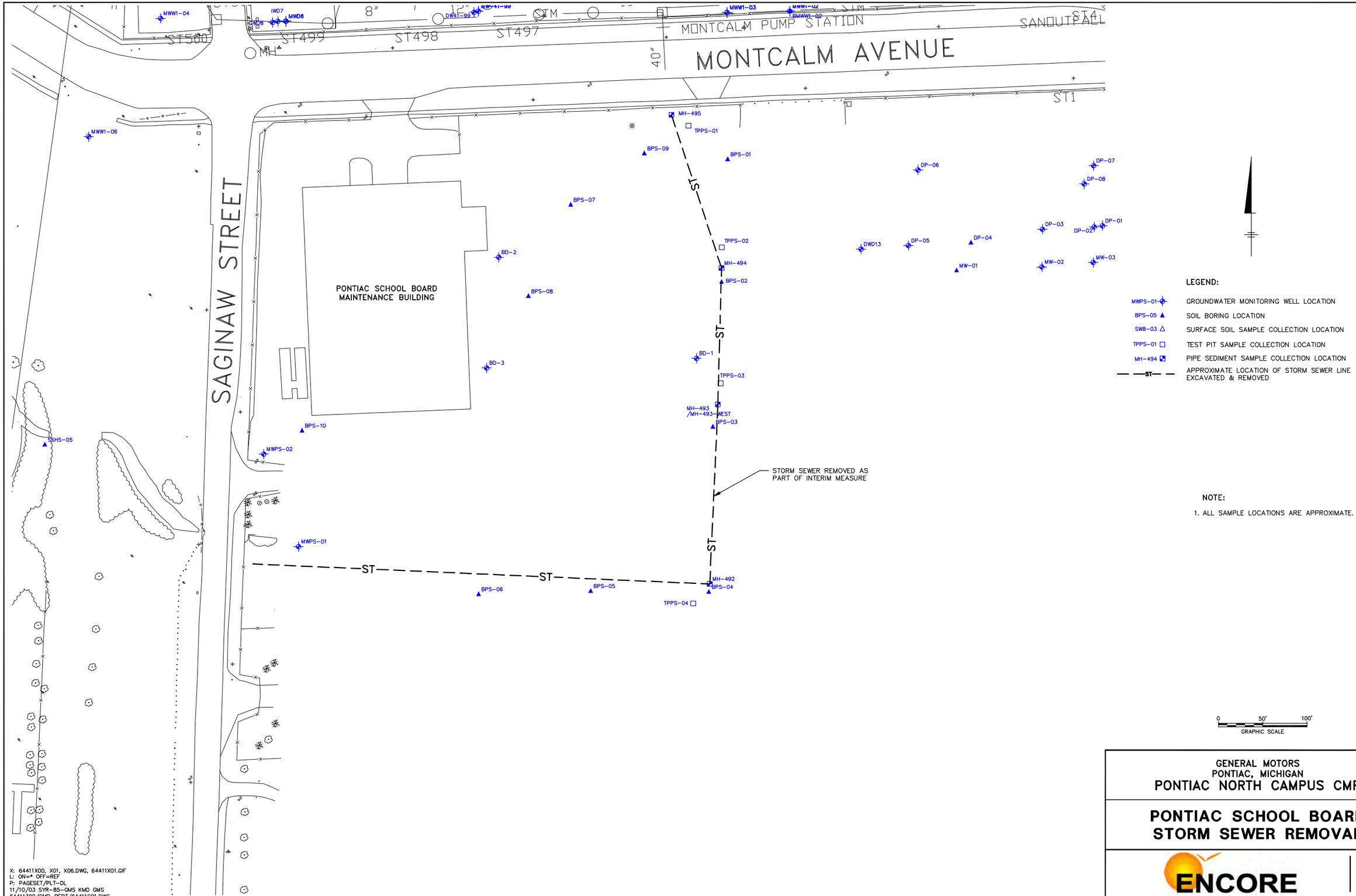
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

LNAPL AREA NO. 4

ENCORE

FIGURE
4-21

X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-GMS GMS SDL
64411210/RFI-ADDM/64411G01.DWG



X: 64411X00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/10/03 SYR-85-GMS KMD GMS
64411300/CMP-REPT/64411G01.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

PONTIAC SCHOOL BOARD STORM SEWER REMOVAL

ENCORE

FIGURE
5-1

CELL 7
DREDGING DEPTH
= 10.5 FT BSS

CELL 6
DREDGING DEPTH
= 2.0 FT BSS

CELL 5
DREDGING DEPTH
= 1.5 FT BSS

CELL 9
BACKFILL = 0.5 FT
ABOVE GRADE

CELL 4
DREDGING DEPTH
= 2.5 FT BSS

CELL 10
BACKFILL = 0.5 FT.
ABOVE GRADE

BALDWIN AVENUE

CELL 8
DREDGING DEPTH
= 4.5 FT BSS

HARRIS LAKE

CELL 1
DREDGING DEPTH
= 1.5 FT BSS

CELL 3
DREDGING DEPTH
RANGES FROM 4.5
TO 8.5 FT. BSS

CELL 2
DREDGING DEPTH
= 2.5 FT BSS

LEGEND:

- EDGE OF WATER
- LIMITS OF SEDIMENT REMOVAL AND BACKFILL PLACEMENT (LAKE)
- LIMITS OF BACKFILL PLACEMENT ONLY
- ADDITIONAL EXCAVATION AREAS TARGETED FOR SOIL/SEDIMENT REMOVAL

NOTES:

1. BASE MAP INFORMATION FROM A DRAWING BY CONESTOGA–ROVERS AND ASSOCIATES, WATERLOO, ONTARIO; (DWG # 17487–02 (003) GN–NF002 SEP 12/2001) AT A SCALE OF 1"=150'.
2. LAKE BED ELEVATION CONTOURS, AND WATER SURFACE ELEVATION TAKEN FROM MAPS OF A HYDROGRAPHIC SURVEY PERFORMED BY CHRIS RANSOME & ASSOCIATES, INC. MAP DATED 1/9/02.
3. SILT CURTAIN REMAINED IN PLACE THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES.
4. DREDGED AREAS BACKFILLED WITH CLEAN SAND/SOIL.
5. DREDGING DEPTHS INCLUDE 0.5 FT. OVERDREDGE.
6. AS INDICATED IN FIGURE 2 OF THE NEARSHORE SEDIMENT REMOVAL PROGRAM DESIGN REPORT (BBL, APRIL 2003), DREDGING DEPTH FOR CELL# 3 RANGES FROM 4.5 TO 8.5 FEET BELOW SEDIMENT SURFACE.
7. BSS = BELOW SEDIMENT SURFACE
8. EXTENT OF INLET DITCH REMOVAL DETAILED ON FIGURE 10.
9. EXTENT OF REMOVAL IN THE INLET DITCH AND SHORELINE AREAS WAS DETERMINED BY VISUAL INSPECTION BASED ON THE PRESENCE OF OILY MATERIALS.

0 50' 100'
GRAPHIC SCALE

DREDGING AND BACKFILL SPECIFICATIONS

CELL NO.	DREDGING DEPTH	BACKFILL MATERIAL
1	1.5 FT	SAND AND GRAVEL TO GRADE
2	2.5 FT	SAND AND GRAVEL TO GRADE
3	4.5 to 8.5 FT	SAND AND GRAVEL TO GRADE
4	2.5 FT	SAND AND GRAVEL TO GRADE
5	1.5 FT	SAND AND GRAVEL TO GRADE
6	2.0 FT	SAND AND GRAVEL TO GRADE
7	10.5 FT	SAND AND GRAVEL TO GRADE
8	4.5 FT	SAND AND GRAVEL TO GRADE
9	0 FT	0.5 FT SAND AND GRAVEL
10	0 FT	0.5 FT SAND AND GRAVEL

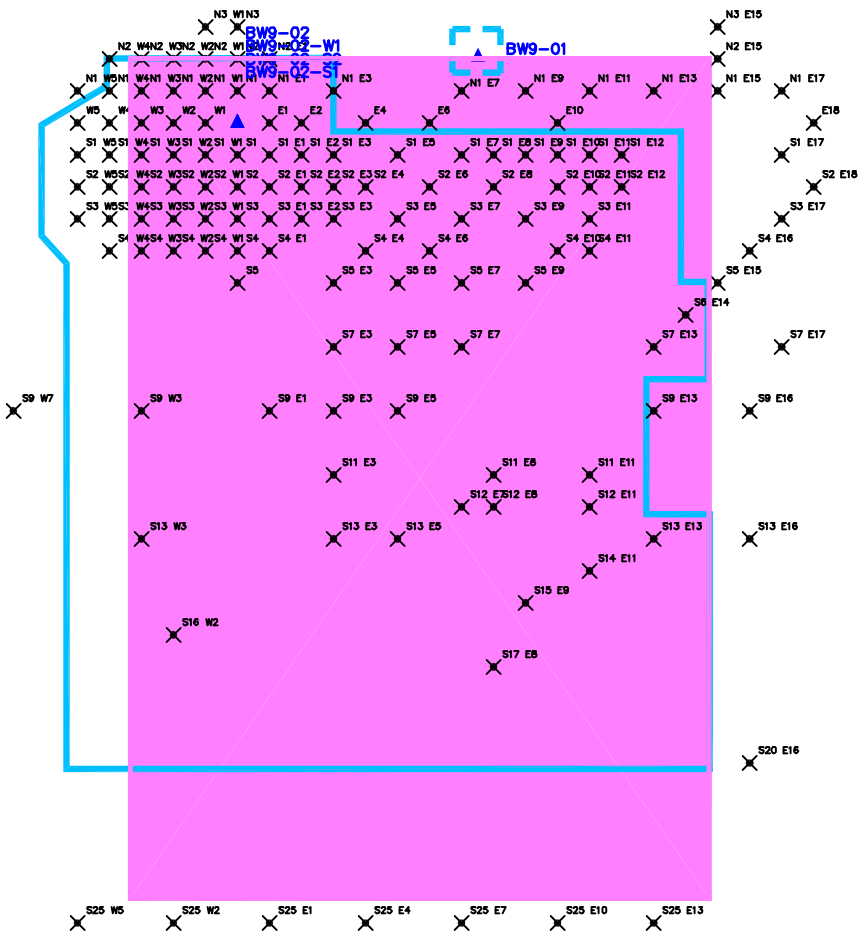
X: 64411X00, X01.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/25/03 SYR-85-NES LAF GMS
64411300/CMP-REPT/64411G10.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

HARRIS LAKE SITE DREDGING AND BACKFILLING SUMMARY

ENCORE

FIGURE
5-2





SITE LOCATION

LEGEND:

BW9-01 ▲ SOIL BORING LOCATION

RFI DELINEATION AREA OF PCB IN SOIL AT BW9-02

× RFI SOIL SAMPLE LOCATION

ESTIMATED AREA TO BE EXCAVATED TO 2' BGS

ESTIMATED AREA TO BE EXCAVATED TO 10' BGS

0 30' 60'

GRAPHIC SCALE

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI W-9 SOIL REMOVAL

ENCORE

FIGURE
5-3

X: 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/25/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411G02.DWG

N

945
945
945
940
940
935
930
925
920
915
910

GWM3
944.4

GWS2
Obstructed

GWP6
921.33

GWP3
906.27

GWF4
927.25

GWD9
917.76

GWD8
918.39

GWD11
918.2

WALTON AVENUE
HIGH AVENUE
HIGHWOOD BLVD
PLANT 25
PLANT 23
PLANT 75
PERFORMANCE PARTS OPERATIONS
JOSLYN AVENUE
COLUMBIA AVENUE
LAUREL AVENUE
IVY AVENUE
FOURTH AVENUE
PLANT 15
THIRD AVENUE
SECOND AVENUE
PLANT 12
FIRST AVENUE
BEVERLY AVENUE
TENNYSON AVENUE
MANSFIELD AVENUE
EMISSIONS CONTROL BUILDING
MADISON AVENUE
LEBARON AVENUE
WESTBROOK AVENUE
LENOX AVENUE
CAFETERIA
MARKLE AVENUE
RASKOB AVENUE
KENNETT STREET
LOWELL STREET
PONTIAC PLAZA
POWERTRAIN BUILDING
POWERTRAIN HEADQUARTERS BUILDING
PLANT 49
PLANT 14
PLANT 17 FIERO
PLANT 56 (FORMERLY PLANT 2)
PLANT 11
FORMER PLANT 18
INDUSTRIAL WASTEWATER TREATMENT PLANT
PLANT 5 & 23
ELIZA BUILDING
FORMER PLANT 8
FORMER PLANT 9
FORMER PLANT 6
TENNYSON AVENUE WEST
HOLLYWOOD AVENUE
KENNETT AVENUE
OWENS STREET
BALDWIN AVENUE
ST. CLAIR STREET
YOUNG STREET
WING STREET
PORTLAND STREET
MONTCALM STREET EAST
MONTCALM AVENUE
SAGINAW STREET
WATER TOWER
EDISON STREET
GLENWOOD AVENUE
HARRIS LAKE
(elev. 934)

Legend:

- GWP3 — MONITORING WELL LOCATION
- RAILROAD
- STORM SEWERS
- ROADS
- BUILDINGS
- 921.33 — GROUNDWATER ELEVATIONS (FT) (ADJUST FOR LNAPL DENSITY)
- 925 — DEEP WATER TABLE GROUNDWATER CONTOUR (FT)
- GROUNDWATER FLOW DIRECTION

0 500 1,000 Feet

Notes:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE
2. GROUNDWATER ELEVATION DATA COLLECTED MAY 2003

GENERAL MOTORS
PONTIAC, MICHIGAN

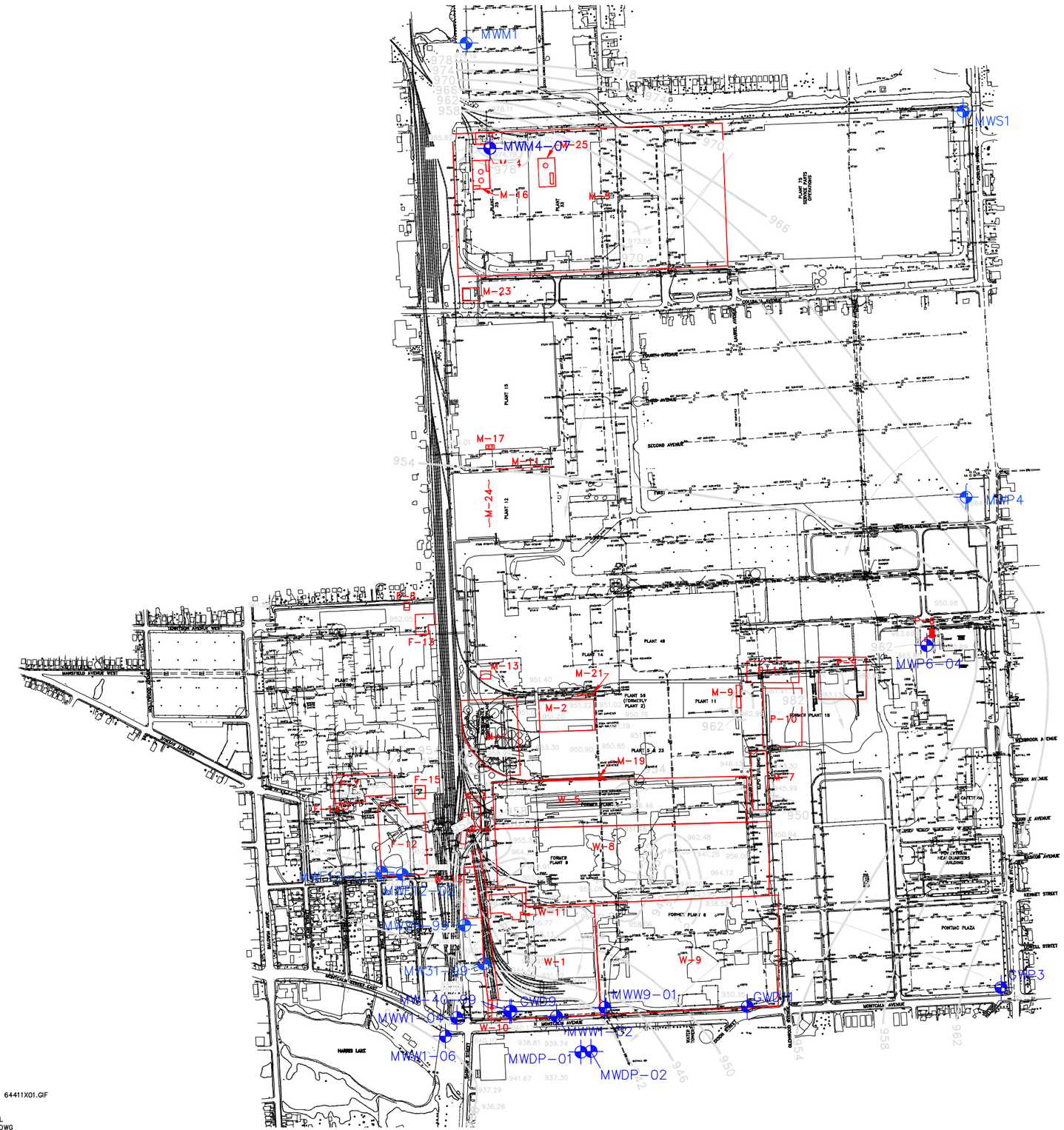
PONTIAC NORTH CAMPUS CMP

POTENTIOMETRIC SURFACE UPPER OUTWASH DEPOSITS

ENCORE

FIGURE
6-1

11/06/03 SYR-85 EIB TBR
PNC - CMP Report
PNC\CMP_Nov03\mxd\PontiacDeep_CMP_FIG6-1.mxd



LEGEND:

- MWM1 — GROUNDWATER MONITORING WELL LOCATION
- FENCED AREA
- APPROXIMATE AOI AREA
- 951.29 — GROUNDWATER ELEVATION IN FEET
- 974 — GROUNDWATER ELEVATION CONTOUR LINE IN FEET (4-FOOT INTERVAL UNLESS OTHERWISE INDICATED)
- GROUNDWATER FLOW DIRECTION

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED MAY 2003.

0 400' 800'
GRAPHIC SCALE

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

SEMI-ANNUAL GROUND WATER MONITORING PLAN

ENCORE

FIGURE
6-2

X: 64411x00, X01.DWG, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-RCB GMS SDL
64411300/CMP-REPT/64411W02.DWG

MATCHLINE
SEE DWG 9-1B FOR CONTINUATION

LEGEND:

MWM1-◇ GROUNDWATER MONITORING WELL LOCATION

FENCED AREA

APPROXIMATE AOI AREA

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

AREA OF PROPOSED DEED RESTRICTION FOR ON-SITE GROUNDWATER CORRECTIVE MEASURES

0 300' 600'
GRAPHIC SCALE

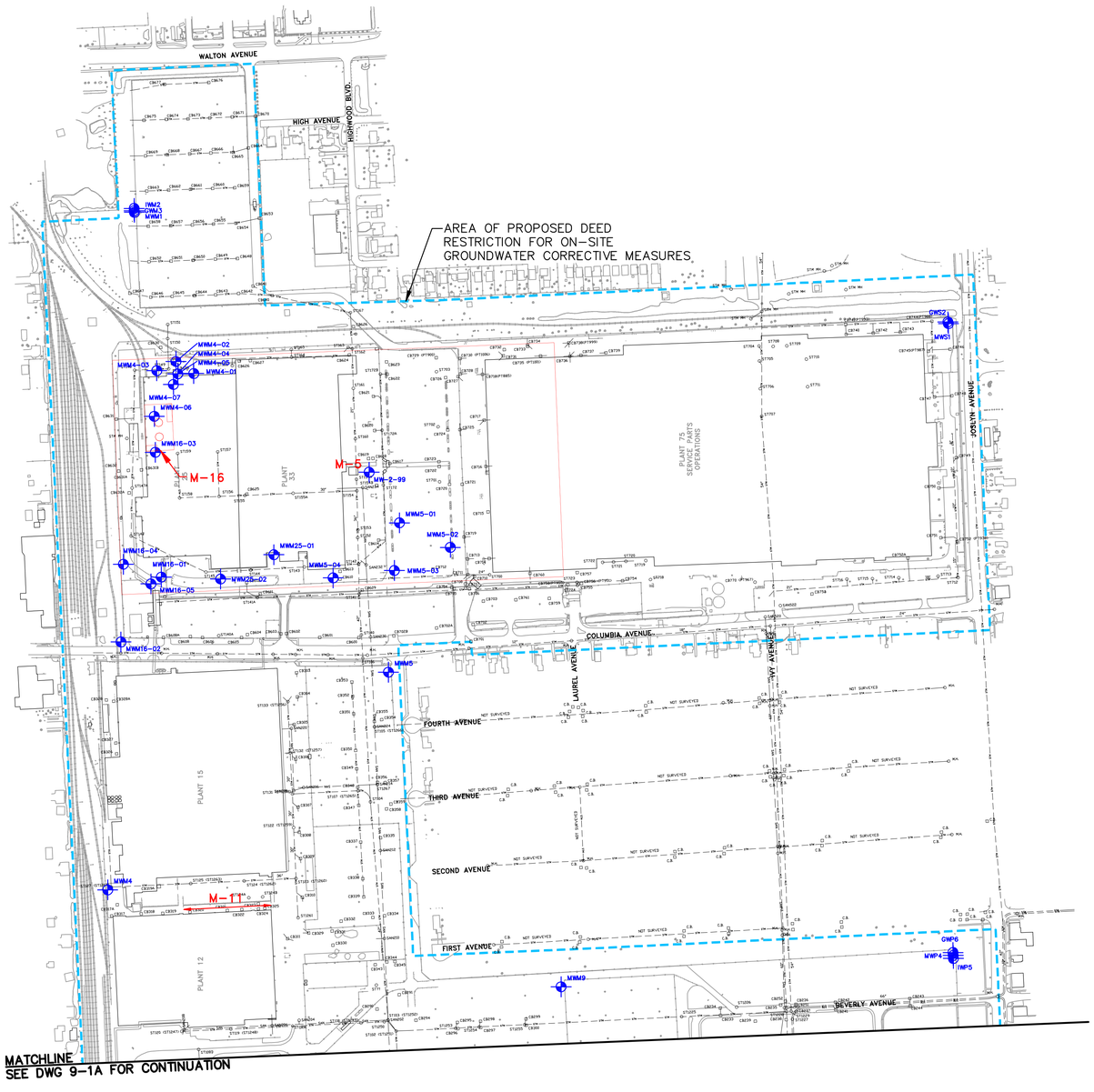
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

ON-SITE GROUNDWATER MONITORING AND INSTITUTIONAL CONTROLS

ENCORE

FIGURE
9-1A

X: 64411x00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/24/03 SYR-BS-NES DJP GMS
64411300/CMP-REPT/64411G03.DWG



LEGEND:

MWM1 GROUNDWATER MONITORING WELL LOCATION

FENCED AREA

APPROXIMATE AOI AREA

NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED MAY 2003.

0 300' 600'

GRAPHIC SCALE

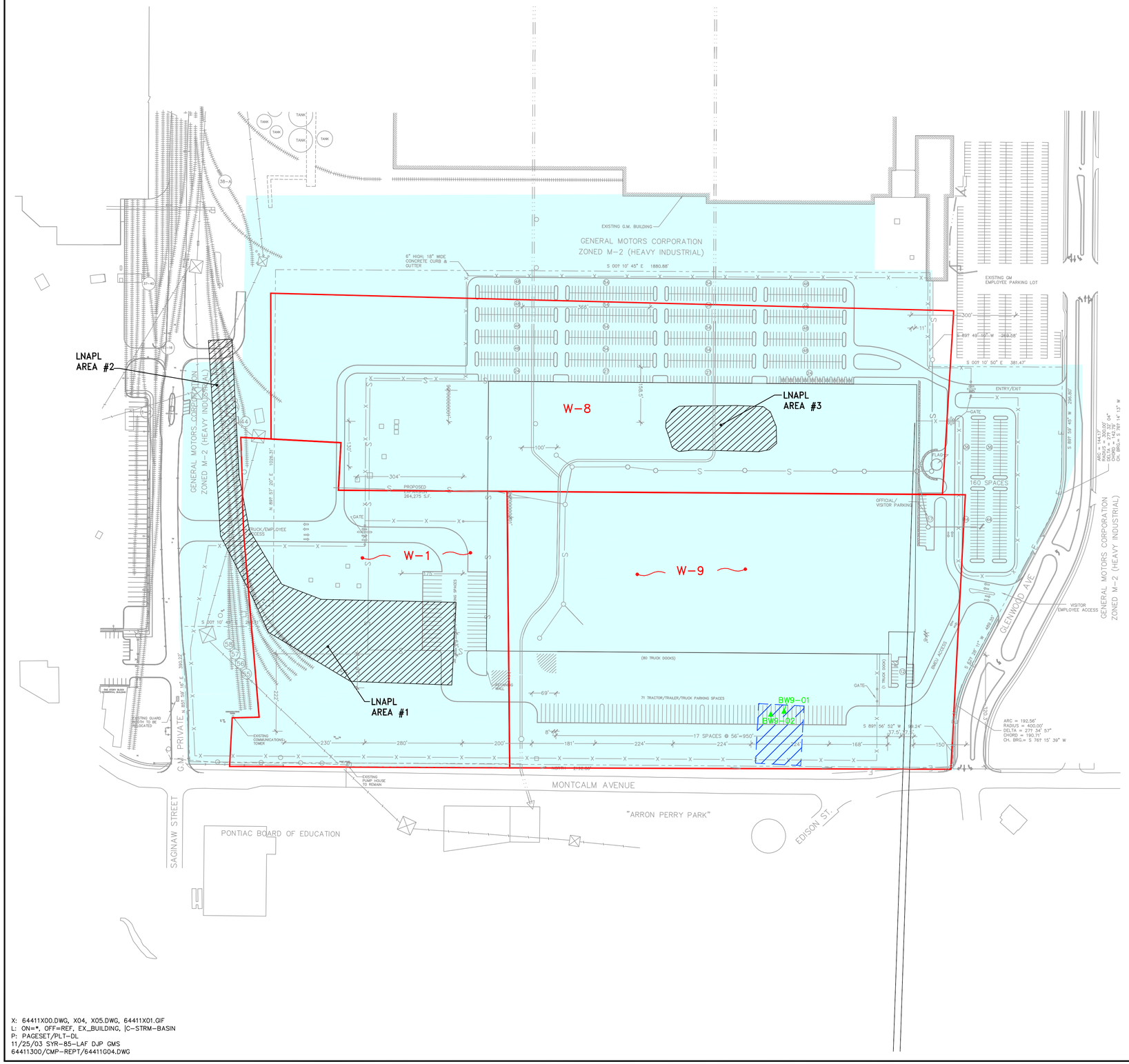
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

ON-SITE GROUNDWATER MONITORING AND INSTITUTIONAL CONTROLS

ENCORE

FIGURE 9-1B

X: 64411x00, X01, X06.DWG, 64411X01.GIF
L: ON=* OFF=REF
P: PAGESET/PLT-DL
11/26/03 SYR-85-NES GMS SDL
64411300/CMP-REPT/64411G08.DWG



LEGEND:

- PROPERTY LINE
- EXISTING BUILDING
- EXISTING SEWER
- EXISTING ELECTRIC
- EXISTING STORM SEWER
- PROPOSED ELECTRIC
- APPROXIMATE LNAPL AREA
- W-9 — AOI AREA
- AREA TO BE EVALUATED FOR CAPPING
- APPROXIMATE AREA TO BE ADDRESSED BY INSTITUTIONAL CONTROLS AND CAP
- BW9-01 ▲ — SOIL BORING LOCATION

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM THE CONFIDENTIAL SOURCE MAP ENTITLED "NORTHEAST METRO P&DC, PONTIAC, MICHIGAN" AT A SCALE OF 1"=50'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 150' 300'
GRAPHIC SCALE

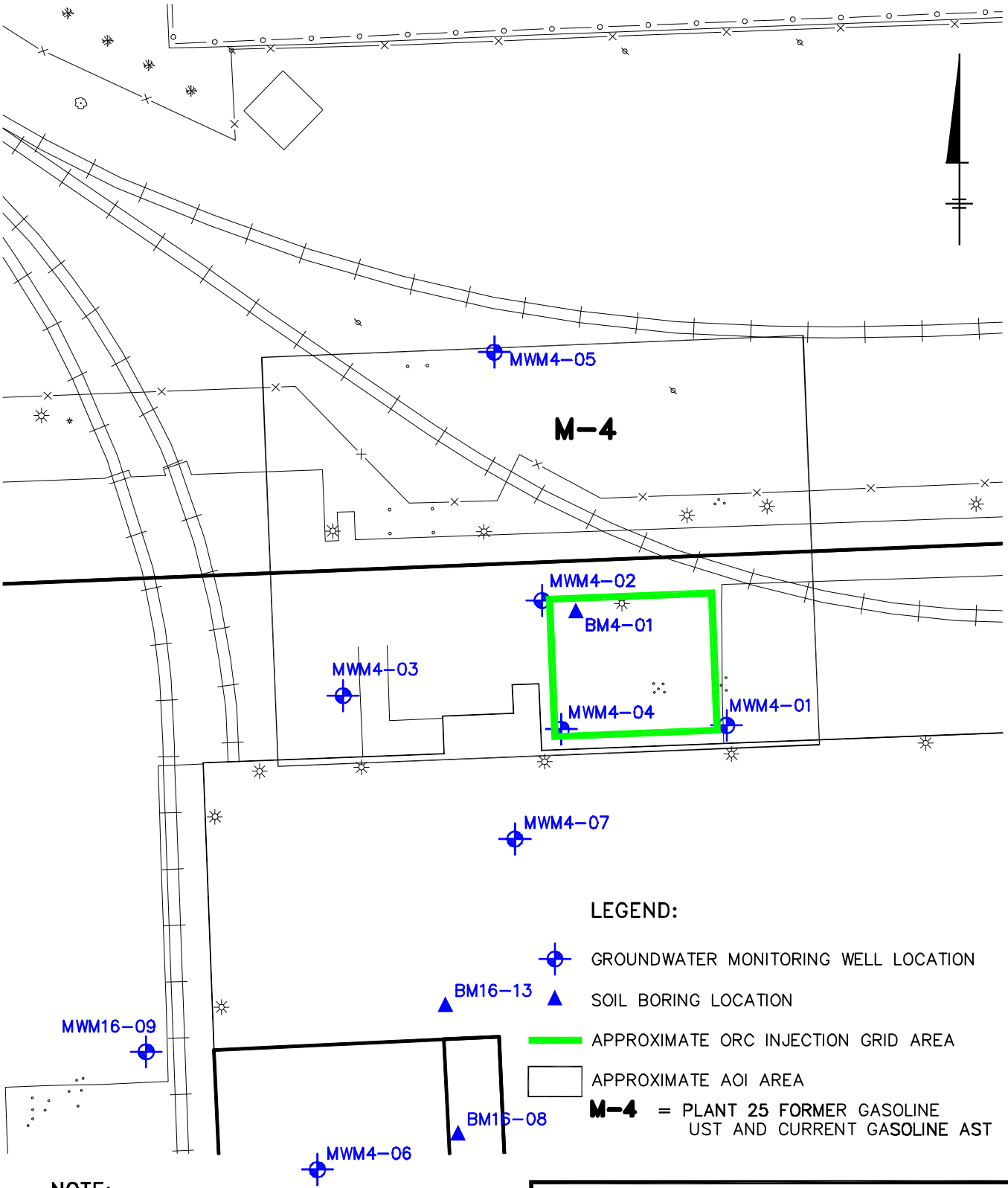
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L: ON=*, OFF=REF, EX_BUILDING, |C-STRM-BASIN
P: PAGESET/PLT-DL
11/25/03 SYR-85-LAF DJP GMS
64411300/CMP-REPT/64411G04.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI W-9 - SOIL CAP AND INSTITUTIONAL CONTROLS

ENCORE

FIGURE 9-2



NOTE:

ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 60' 120'

GRAPHIC SCALE

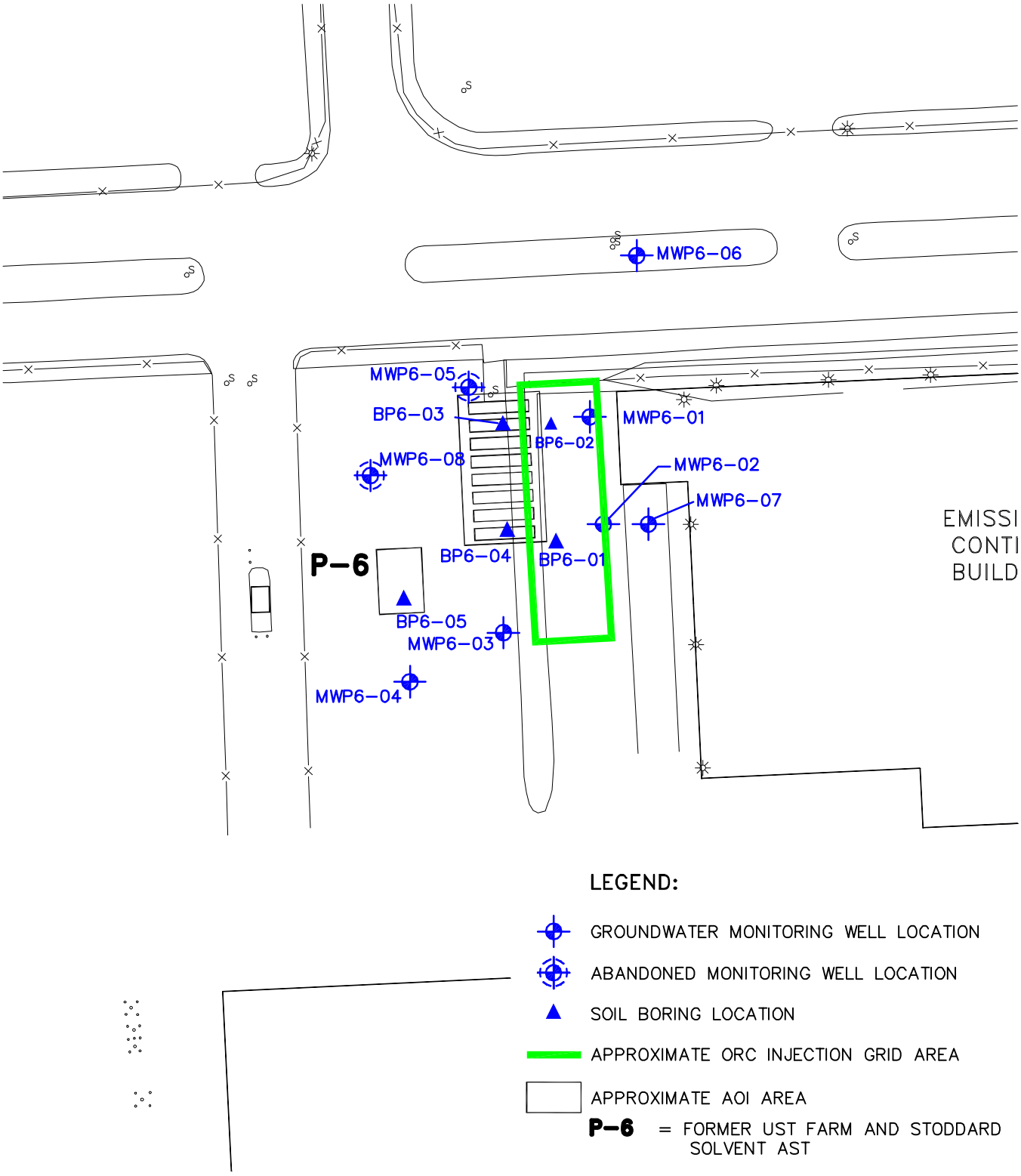
X: 64411X01, X06.DWG, 64411X01.GIF
L: ON=*, OFF=REF
P: PAGESET/PLT-AP
11/25/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411G05.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI M-4 - ORC INJECTION AREA

ENCORE

FIGURE
9-3



LEGEND:

- GROUNDWATER MONITORING WELL LOCATION
- ABANDONED MONITORING WELL LOCATION
- SOIL BORING LOCATION
- APPROXIMATE ORC INJECTION GRID AREA
- APPROXIMATE AOI AREA
- **P-6** = FORMER UST FARM AND STODDARD SOLVENT AST

NOTES:

ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 60' 120'

GRAPHIC SCALE

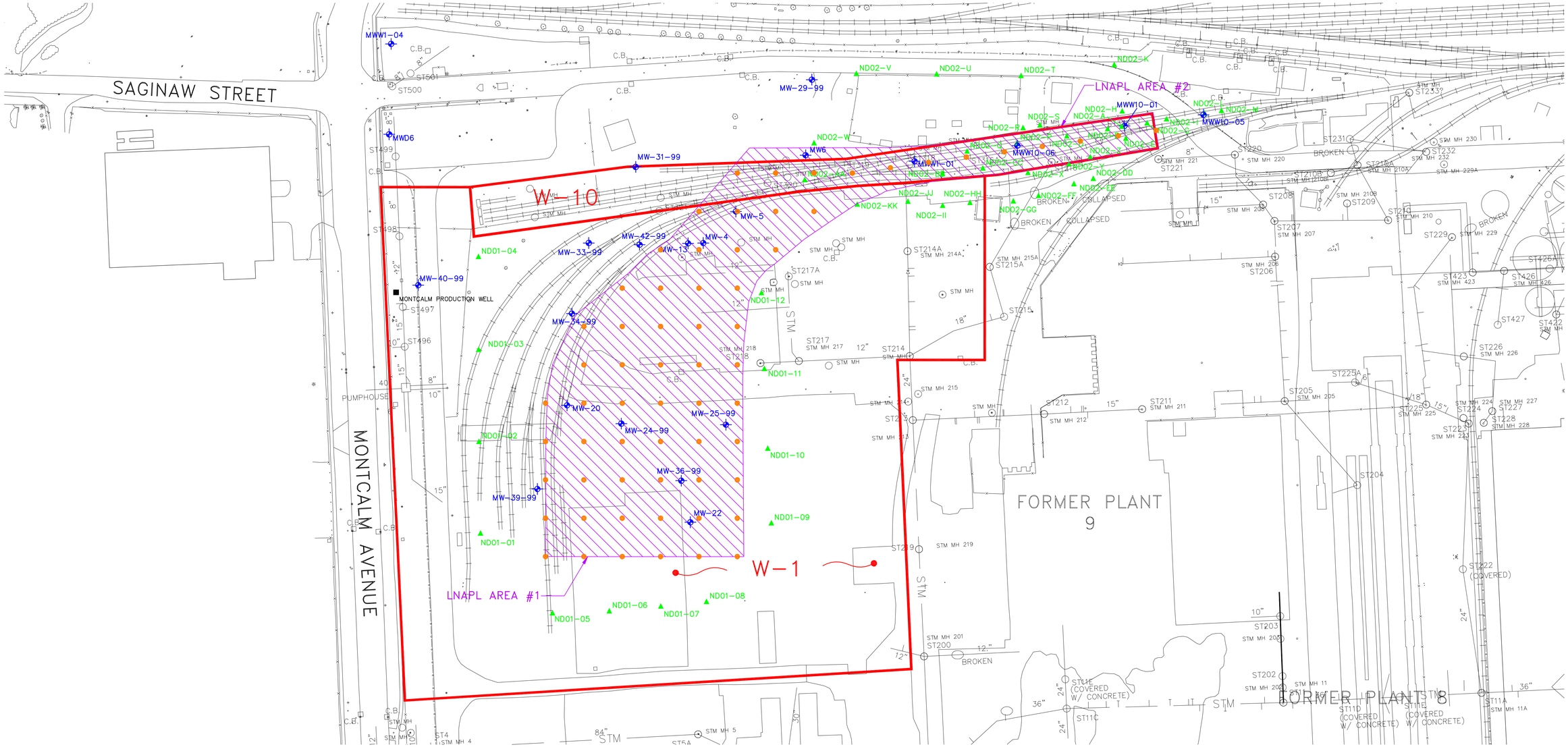
X: 64411X01, X06.DWG, 64411X01.GIF
L: ON=*, OFF=REF
P: PAGESET/PLT-AP
11/25/03 SYR-85-GMS GMS DJP
64411300/CMP-REPT/64411G06.DWG

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

AOI P-6 - ORC INJECTION AREA

ENCORE

FIGURE
9-4



NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

LEGEND:

- MWM1 — EXISTING GROUNDWATER MONITORING WELL
- ND01-08 — SOIL BORING COMPLETED FOR LNAPL SCREENING
- APPROXIMATE AOI AREA
- W-1 = WEST YARD
- W-10 = RAILROAD MARSHALLING AREA
- LNAPL AREA
- PROPOSED EXTRACTION WELL

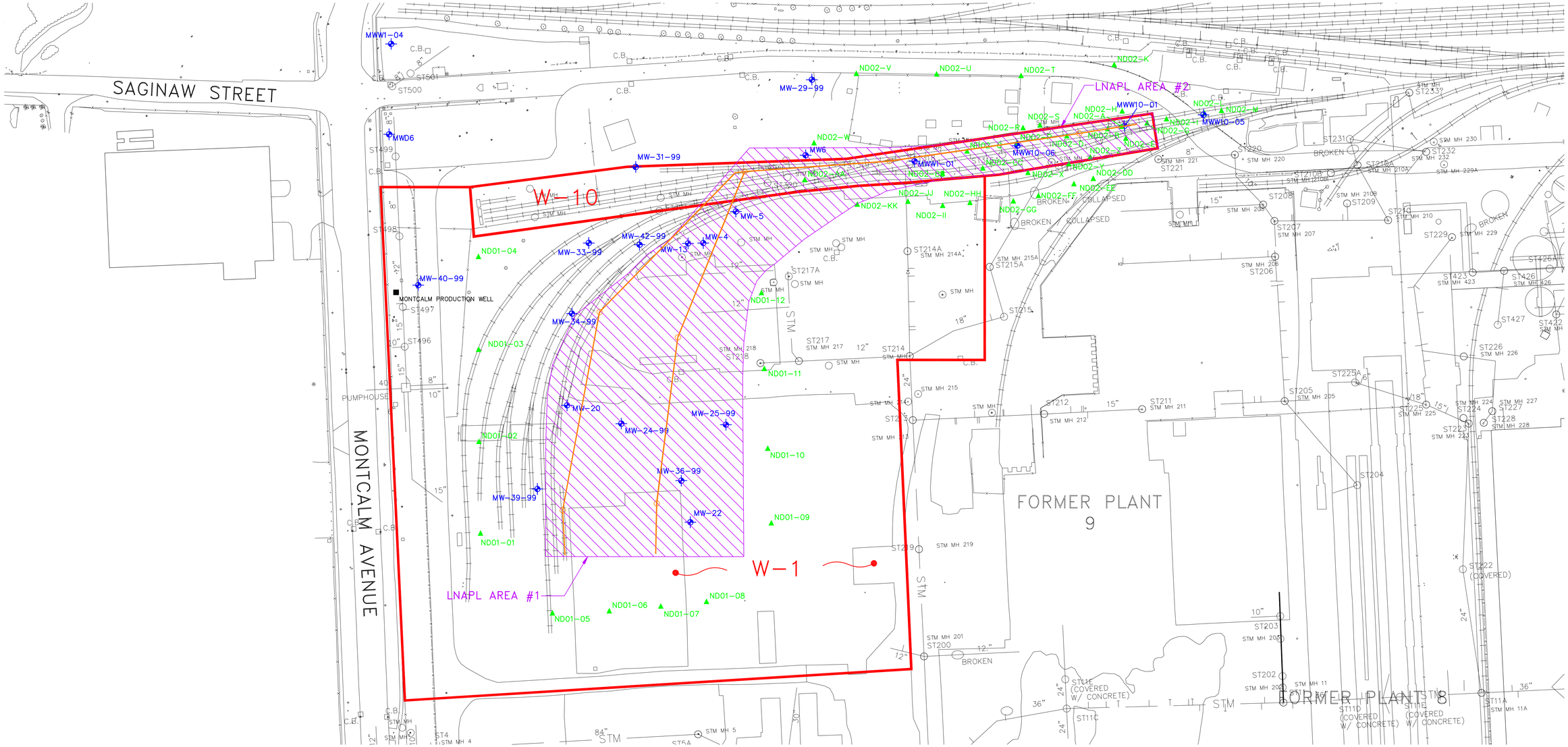
GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

LNAPL AREAS NO. 1 AND NO. 2 - EXTRACTION WELL SYSTEM LAYOUT

ENCORE

FIGURE 9-5

X: 64411X00, X02.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
11/25/03 SYR-BS-GMS GMS DJP
64411300/CMP-REPT/64411G07.DWG



NOTES:

1. ALL SAMPLE LOCATIONS ARE APPROXIMATE.

0 80' 160'
GRAPHIC SCALE

LEGEND:

- MWM1 — EXISTING GROUNDWATER MONITORING WELL
- ND01-08 — SOIL BORING COMPLETED FOR LNAPL SCREENING
- APPROXIMATE AOI AREA
- W-1 = WEST YARD
- W-10 = RAILROAD MARSHALLING AREA
- LNAPL AREA
- PROPOSED EXTRACTION WELL
- PROPOSED COLLECTION TRENCH

GENERAL MOTORS
PONTIAC, MICHIGAN
PONTIAC NORTH CAMPUS CMP

LNAPL AREAS NO. 1 AND NO. 2 - COLLECTION TRENCH SYSTEM LAYOUT

ENCORE

FIGURE 9-6

X: 64411X00, X02.DWG, 64411X01.GIF
L: ON=* OFF=*REF*
P: PAGESET/PLT-DL
11/25/03 SYR-BS-GMS GMS DJP
64411300/CMP-REPT/64411G09.DWG

Appendix A

Storm Sewer Feasibility Analysis Report

ENCORE
Environmental Corporate Remediation

EXECUTIVE SUMMARY

The Storm Sewer Feasibility Analysis was created to propose alternatives to address a storm sewer system rehabilitation and modification of the General Motors (GM) Pontiac North Campus (PNC) storm sewers conveying stormwater runoff to Outfall 001.

Investigations of the storm sewer system were performed following the detection of polychlorinated biphenyls (PCBs) in the Outfall 001 storm sewer system in June 1999. Findings for the Outfall 001 storm sewer system included the following:

- The storm sewer system conveying stormwater to Outfall 001 contains pipe reaches that exhibit conditions ranging from offset and leaky joints to structural failure;
- Areas of interest (defined as storm sewer reaches containing sediments, water and/or oil with elevated levels of PCBs) were identified in the Metal Fabrication Division (MFD) and in the Demolition Area;
- PCB-impacted sediments were detected in the Outfall 001 system upstream of the Demolition Area;
- PCB-impacted oils were predominant at downstream locations in the Outfall 001 storm sewer system, indicating a contribution to the system via infiltration/inflow;
- Potential cross-connections involving process water and sanitary wastewater into the Outfall 001 storm sewers were identified; and
- Runoff simulation modeling calibrated with flow-rate monitoring values identified that a 25-year, 24-hour storm even would inundate the existing Outfall 001 storm sewer system, while rainfall events of 1.2 inches or more were observed to result in overflows at Outfall 001 (currently, rainfall events of 1.7 inches are observed to result in overflows, due to recent modifications to the Outfall 001 storm sewer system).

Investigations of the portions of the storm sewer system discharging to outfalls other than Outfall 001 are ongoing. Findings for the Site storm sewers excluding the Outfall 001 system included sporadic detections of PCB-impacted sediments and water in manholes and catch basins.

The five following Options have been considered for reducing the hydraulic loading to the SWDF:

1. Diverting the stormwater runoff from the Plant 14, 49, and 5 and 23 manufacturing complex via a new storm sewer reach and lift station to Outfall 002 or other suitable outfall;
2. Modifying the current Outfall 001 storm sewer system to convey and bypass the stormwater runoff from the Plant 14, 49, and 5 and 23

manufacturing complex around the SWDF, while collecting potentially contaminated water from the Demolition Area for treatment at the SWDF;
3. Constructing a 5-million gallon detention basin upstream of the existing SWDF for additional storage capacity and flow equalization;
4. Expanding the existing SWDF for adequate storage and treatment of stormwater runoff from a 25-year, 24-hour rain event; or
5. Diverting the stormwater runoff from the Plant 14, 49, and Plant 14-5 Truck Dock rooftop stormwater drainage system via overhead rerouting of the downspouts to the Outfall 002 storm sewer system.

It is recommended that the rehabilitation of the Outfall 001 storm sewer system, and the reduction of the hydraulic loading to the Stormwater Detention Facility (SWDF), involve Option #5, diverting the stormwater runoff from the Plant 14, 49, and Plant 14-5 Truck Dock rooftop stormwater drainage system via overhead rerouting of the downspouts to the Outfall 002 storm sewer system.

Diverting the stormwater runoff from the Plant 14, Plant 49, and Plant 14-5 Truck Dock via overhead rerouting of downspouts to Outfall 002 would include the following benefits: economically, the approach would be the best case scenario when comparing with other options; overhead rerouting would involve gravity flow, reducing the complexity of the system; overhead rerouting would significantly reduce hydraulic loading to the SWDF, thereby reducing operation and maintenance costs at the SWDF; the water quality of the Plant 14, 49, and Plant 14-5 Truck Dock rooftop stormwater runoff is not expected to be impacted by contaminants due to the age and materials used on the rooftops; and overhead rerouting of the rooftop stormwater runoff would avoid contact of the runoff with potentially contaminated groundwater that has infiltrated into the storm sewers.

Modeling results indicate that removing the stormwater runoff from the Plant 14, Plant 49, and Plant 14-5 Truck Dock via overhead rerouting of downspouts to Outfall 002 would eliminate overflows at the SWDF during a 10-year, 24-hour rain event of 3.0 inches.

Potential implications of adopting the approach of diverting the stormwater runoff from the Plant 14, 49, and Plant 14-5 Truck Dock via overhead rerouting of downspouts to Outfall 002 includes the possibility that Outfall 002 cannot be utilized due to capacity restrictions of the receiving sewer system, namely the City of Pontiac Joslyn Drain. In that event, the construction of a new storm sewer reach that would convey stormwater to other areas (i.e. Harris Lake) would incur significant capital investment, unless plans

for future Site development includes such a proposition. Additionally, the excavation of a new storm sewer would involve the subsurface uncertainties expected to be encountered in a manufacturing facility containing numerous subsurface features such as basements, footings, piers, slabs, pipelines, contaminant issues, etc. It should be noted that a detailed and calibrated model for the Outfall 002 storm sewer system, including those storm sewers extending from the Outfall 002 compliance point to Diverter Chamber #1 and the Joslyn Drain beyond, should be completed to determine the effect of contributing drainage areas and the associated storm sewer systems.

Ultimately, the corrective measures proposed for the Outfall 001 storm sewer system are dependent upon factors including the future fate of existing buildings and future land development in the Demolition Area. Decisions on infrastructure planning typically involve Facilities Management and Capital Projects personnel. Infrastructure issues involving an environmental component should be coordinated between Facilities Management, Capital Projects, and ENCORE. The long-term planning with respect to environmental corrective measures for the Outfall 001 storm sewer system will thus remain tentative pending such coordinated efforts.

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LIST OF ACRONYMS / SHORT FORMS

CPI	Corrugated Plate Interceptor
CSO	Combined Sewer Overflow
DA	Demolition Area
DWF	Dry Weather Flow
ELPO	Electrolytic Plating Operation
ENCORE	Environmental Corporate Remediation
GAC	Granular Activated Carbon
GM	General Motors Corporation
gpm	Gallons Per Minute
GRP	Glass Fibre Reinforced Plastic
HQ	Headquarters
IM	Interim Measures
IWTP	Industrial Wastewater Treatment Plant
MDOT	Michigan Department of Transportation
MFD	Metal Fabrication Division
mgd	Million Gallons Per Day
NAD 83	North American Datum, 1983
NAVD 88	North American Vertical Datum, 1988
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
Report	Storm Sewer Feasibility Analysis Report
RFI	RCRA Facility Investigation
RII	Rainfall Induced Infiltration
SCS	Soil Conservation Service
Site	GM Pontiac North Campus
SPC	State Plane Coordinate System
SPO	Service Parts Operations
SWDF	Stormwater Detention Facility
SWMM	Stormwater Management Model
SWPPP	Stormwater Pollution Prevention Plan
U.S. EPA	United States Environmental Protection Agency
WWF	Wet Weather Flow

1.0 INTRODUCTION

This Storm Sewer Feasibility Analysis (Report) has been prepared by the Encore Environmental Consortium, L.L.C. on behalf of Environmental Corporate Remediation (ENCORE) to propose alternatives to address a storm sewer system rehabilitation and modification of the GM Pontiac North Campus storm sewers conveying stormwater runoff to Outfall 001. The Outfall 001 storm sewer system conveys stormwater to the Stormwater Detention Facility (SWDF) for the removal of free oil, sediment, and PCBs. During long duration or intense rain events, the SWDF basin and related equipment are susceptible to overcapacity conditions, resulting in contraventions to the National Pollutant Discharge Elimination System (NPDES) permit limitations and direct overflows to the City of Pontiac storm sewer system. The goal of this report is to both describe the environmental and infrastructure issues with respect to Site storm sewers, and to present and assess the feasibility of available options for corrective measures.

1.1 REPORT ORGANIZATION

This Report is organized and structured into the following sections:

- Section 1.0 presents an introduction to and the organization of the Report;
- Section 2.0 presents a general description of the GM Pontiac North Campus storm sewer system;
- Section 3.0 presents a discussion of the Outfall 001 storm sewer system runoff simulation modeling performed;
- Section 4.0 introduces the storm sewer rehabilitation methods referenced in the Report;
- Section 5.0 presents a discussion proposing alternatives to address storm sewer system rehabilitation and modification;
- Section 6.0 presents a summary of the Report and conclusions; and
- Section 7.0 presents a list of references cited and utilized in the Report.

2.0 GM PONTIAC NORTH CAMPUS SEWER SYSTEM

2.1 GENERAL

The majority of Site stormwater runoff is discharged to the City of Pontiac storm sewer system via stormwater outfalls, with the exception of three stormwater outfalls that discharge from Plant 17 to Harris and Osmun Lakes. The Site sanitary and treated process water (industrial wastewater) discharge to the City of Pontiac sanitary sewer system via sanitary outfalls. Drawing 1 presents the Site storm sewer system. Figure 2.1 presents the Site storm sewer outfalls and the drainage basin serviced by each outfall.

Historical drawings indicate that a combined sewer system, consisting of planned municipal sewers constructed prior to the land acquisition and development by GM in the 1920s, serviced the oldest portions of the Site. The combined sewer system was characterized by a north-south parallel pipe configuration that collected and transported both sanitary wastewater and stormwater runoff. Combined sewers were placed at greater depths than is typical for storm sewers, in order to service basements by gravity flow.

Currently, separate storm sewer systems convey the Site's stormwater runoff to the City of Pontiac storm sewer systems via ten stormwater outfalls. The Site discharges stormwater from Outfall 001 under NPDES Permit No. MI0056031, issued on December 6, 2002 by the State of Michigan. The balance of the Site outfalls is addressed under General Stormwater Permit No. MID010000 and the Stormwater Pollution Prevention Plan (SWPPP) (GM, 2003).

Historically, on the main portion of the Site, the storm sewer system conveyed stormwater from the Central Foundry (Plant 6), West Yard, Plant 2, Plant 8, Plant 14, Plants 5 and 23, the Industrial Wastewater Treatment Plant (IWTP), portions of the Powertrain parking areas, and areas of the Metal Fabrication Division north to Walton Avenue. In general, plants constructed by GM on the main Site were designed with separate stormwater and sanitary sewer systems, which conveyed stormwater runoff and wastewater to the pre-existing combined sewer system. In the 1970s, separation activities at the Site were aimed at reducing or eliminating the combined sewer system. The Stormwater Detention Facility (SWDF), constructed as a treatment facility for oil separation at Outfall 001, became operational in May 1982. Recently, the drainage basin serviced by the SWDF was reduced in areal extent to reduce hydraulic loading to the SWDF, accomplished by conveying stormwater from areas north of Plant 14 to Outfall 002. Laterals from the West Yard, Powertrain parking areas, and other nonessential areas have also been isolated from the Outfall 001 storm sewer system by the use of

mechanical plugs and the construction of bulkheads. More recently, the stormwater runoff from the parking area located to the east of the ELPO Building was diverted from the Outfall 001 system to the MDOT storm sewer along the extension of Glenwood Avenue.

The Fiero (Plant 17) portion of the Site is serviced by storm and sanitary sewer systems that were constructed and modified as the plant expanded.

2.2 DESCRIPTION OF OUTFALLS

The GM Pontiac North Campus sanitary, treated process water (industrial wastewater), and stormwater runoff discharge to City of Pontiac storm and sanitary sewer systems via stormwater and sanitary outfalls.

2.2.1 STORMWATER OUTFALLS

Site stormwater is conveyed to the following outfalls (listed with corresponding storm sewer systems):

- Outfall 001 — Montcalm Storm Sewer (84" diameter);
- Outfall 002 — Joslyn Storm Sewer (78" diameter);
- Outfall 010 — Powertrain HQ Building Storm Sewer;
- Outfall 011 — Powertrain Engineering Building Storm Sewer;
- Fiero Outfall 001 — Building 17 South Side Storm Sewer; and
- Fiero Outfall 002 — Building 17 North Side Storm Sewer;
- Fiero Outfall 003 — Fiero Southwest Yard Storm Sewer
- Glenwood Avenue Outfall — Powertrain HQ Building Parking Storm Sewer
- ELPO Parking Outfall — ELPO Parking Storm Sewer
- Powertrain Engineering Outfall — Powertrain Engineering Storm Sewer

As previously discussed, the Site discharges stormwater from Outfall 001 under NPDES Permit No. MI0056031, issued on December 6, 2002 by the State of Michigan. The balance of the Site outfalls is addressed under General Stormwater Permit No. MID010000 and the Stormwater Pollution Prevention Plan (SWPPP) (GM, 2003x).

The collection system conveying stormwater to Outfall 001 is located in the oldest portion of the Site. The stormwater system was constructed in the early 1900s, and

originally conveyed stormwater from the Central Foundry (Plant 6), West Yard, Plant 2, Plant 8, Plant 14, Plants 5 and 23, the IWTP, portions of the Powertrain parking areas, and areas of the Metal Fabrication Division north to Walton Avenue. Stormwater discharges to Outfall 001 are routed through the SWDF for oil separation by inclined Corrugated Plate Interceptors (CPIs), off-line temporary storage (i.e., detention), and filtration by granular activated carbon (GAC) units. The effluent from Outfall 001 is then combined Off-Site with the Joslyn Drain prior to being discharged to the Clinton River. Outfalls 002, 010, and 011 discharge to the Joslyn Drain and ultimately to the Clinton River. During dry weather flows, Fiero Outfall 001 discharges to the Site's Industrial Wastewater Treatment Plant (IWTP) via a pumped diversion system, and to Harris Lake during wet weather flows. Fiero Outfall 002 discharges to the Augusta drain during dry weather flows, and to Osmun Lake during wet weather flows, both of which ultimately discharge to the Clinton River. Fiero Outfall 003 discharges to Harris Lake. The Glenwood Avenue Outfall ultimately discharges to the Clinton River. The ELPO Parking Area Outfall and the Powertrain Engineering Outfall discharge to the Glenwood Roadway Extension storm sewer and ultimately the Clinton River.

Corrective measures for outfalls other than Outfall 001 are not addressed in this Report due to ongoing investigations.

2.3 DIVERTER CHAMBERS #1 AND #2

To reduce the area of the Outfall 001 drainage basin, and thus the hydraulic loading contributing to the SWDF, storm sewer flows have been diverted from the SWDF by implementing the use of two subsurface structures referred to on historical drawings as Diverter Chambers #1 and #2 (refer to Drawing 1).

2.4 STORMWATER DETENTION FACILITY (SWDF)

The SWDF for the Site is located on the south side of Montcalm Avenue, between Saginaw Street and Glenwood Avenue. The SWDF became operational in May 1982, intercepting and treating the Site stormwater discharged to Outfall 001.

The SWDF is composed of two elements: a stormwater treatment facility and a 2,000,000-gallon stormwater detention basin. The SWDF was originally designed to eliminate free oil and reduce the amount of solids present in the effluent originating from dry weather flows, and to minimize free oils and solids concentrations in the effluents originating from wet weather flows. In June 1999, the SWDF was retrofitted with GAC units to include a treatment process for the removal of PCBs that may be present in the stormwater.

2.5 REDUCTION OF HYDRAULIC LOADING TO THE SWDF

Contraventions to the Outfall 001 permit limitations are the result of excessive hydraulic loading to the SWDF occurring due to deficits associated with the pumping capacity, storage volume of the basin, and treatment rate of the existing SWDF. The SWDF was originally designed as a facility to provide offline stormwater storage (i.e. detention) and to separate oils and solids from the stormwater conveyed to Outfall 001 prior to discharging to the City storm sewer system. With a 2,000,000-gallon detention basin and a dry weather treatment rate of approximately 2,400 gpm through the CPIs, it was calculated by the design firm at the time of construction that the basin would overflow approximately 12 times per year. The retrofitting of the SWDF with GAC units for PCB removal, capable of a 700 to 800 gpm treatment rate, has resulted in longer detention times and consequently a decrease in the availability of storage volume during wet weather events.

Historical measures performed at the GM Pontiac North Campus to reduce hydraulic loading to the SWDF have included the following: the construction of Diverter Chambers #1 and #2 and the combined sewer separation activities performed in the 1970s. More recently, GM has investigated the available possibilities for reducing the stormwater volume reaching the SWDF, thereby eliminating the occurrence of untreated stormwater discharges to the Clinton River, in accordance with the National Pollutant Discharge Elimination System (NPDES) permit requirements. Available options included stormwater system modifications that could be instituted with a minimum of disruption, which would significantly reduce the quantity of stormwater conveyed to Outfall 001. Recent measures aimed at reducing the hydraulic loading to the SWDF basin have consisted of the following: isolating out-of-service from in-service storm sewer lines by plugging and abandoning the out-of-service storm sewers in areas where surface drainage is no longer required; modifying a SWDF sump and controls to increase storage capacity in the detention basin; and diverting flows from the ELPO Building parking area to a new MDOT storm sewer servicing the Glenwood Extension. Site personnel have indicated that the implementation of these measures has reduced the frequency of overflows from the SWDF. The frequency of overflows from 2000 until the present is as follows:

- 19 overflows in 2000;
- 12 overflows in 2001;
- 2 overflows in 2002; and

- 3 overflows to date in 2003.

It should be noted that in 2002, the overflows occurred while the SWDF detention basin was not in service due to a scheduled cleaning and maintenance event.

It has been observed that in 2000, precipitation events of ¾ of an inch over a 24-hour period resulted in overflows from the SWDF basin. In 2001 and 2002, precipitation events of 1.3 inches over a 24-hour period resulted in overflows. Currently, a precipitation event of 1.7 inches over a 24-hour period will result in overflows.

2.5.1 MANDATORY TASKS RELATED REROUTING OUTFALL 001 FLOWS TO ALTERNATE OUTFALLS

2.5.1.2 CAPACITY ANALYSIS OF WEST-EAST 78-INCH STORM SEWER (OUTFALL 002) AND 108-INCH JOSLYN DRAIN

Prior to considering feasible options for reducing stormwater flows to the SWDF that involve rerouting these flows to Outfall 002 and the Joslyn Drain, a determination of the conveyance capacities of the impacted storm sewers would be mandatory. In addition, permitting requirements for stormwater discharges as required by municipal by-laws and State and Federal authorities shall also be researched.

2.5.1.3 REHABILITATION AND UPGRADING OF EXISTING SOUTH-NORTH STORM SEWER EAST OF PLANT 49

Interviews and a historical drawing review have identified that the south-north storm sewer reach, situated to the east of Plant 49, may be a candidate for stormwater runoff that is diverted from the Outfall 001 storm sewer system. The storm sewer reach commences at its upstream end to the north of the ELPO building, and terminates to the south at manhole ST328. Videotaped inspections of the pipe reach have been performed to verify structural integrity and pipe sizes. Based on the results of the videotaped inspections and recent sampling events, sections of the storm sewer would require rehabilitation and upgrading prior to diverting additional flows to this sewer reach.

3.0 STORM SEWER RUNOFF SIMULATION MODELING

3.1 GENERAL

A study and evaluation of the runoff characteristics for the Site storm sewer system conveying stormwater to Outfall 001 was performed in the Storm Runoff Simulation Modeling (EEC 2002) and further revised in 2003. The objective of the study was to provide an engineering analysis, with recommendations, of the Outfall 001 storm sewer system by employing stormwater numerical modeling. The focus of the study was to define the hydraulic capabilities of the main storm sewer reaches conveying stormwater to Outfall 001.

Information regarding rates and volumes of flow at points of interest along a storm sewer is necessary for the analysis and design of new sewers, or the rehabilitation of existing sewers. Runoff simulation is a tool used to generate artificial flow sequences for use in rationalizing decisions regarding structure sizes, the effect of land use, and water quality. In modeling the Outfall 001 storm sewer system, Stormwater Management Model (SWMM) software was employed. The simulation model is calibrated by adjusting parameters consistent with actual conditions (pipe sizes, invert elevations of pipes and manholes, drainage areas, surface conditions, and time of concentration). The SWMM is a widely accepted and applied storm runoff simulation model jointly developed by Metcalf and Eddy, Inc., the University of Florida, and the Water Resources Engineers for use by the U.S. EPA. The model is designed to simulate drainage basin runoff for any defined rainfall pattern.

3.2 NUMERICAL MODELING OF SITE STORM SEWER SYSTEM CONVEYING TO OUTFALL 001

Modeling of the Outfall 001 storm sewer system was accomplished to determine the following: the response of the system to known and theoretical storm events; to deduce whether any of the flows were a result of infiltration and/or cross- connections between the Outfall 001 system and the closely parallel sanitary sewer system in the Demolition Area; and to examine alternatives for eliminating overflows from the SWDF.

Hydrologic and hydraulic modeling was performed to supplement field-monitoring activities in an effort to identify the optimum methods in reducing overflows from the SWDF. The existing stormwater conditions were modeled, and model was calibrated using field measurements of actual discharges at various nodes in the Outfall 001 storm sewer system.

3.2.1 METHODOLOGY

The approach taken to generate computer models for stormwater sewer systems consists of model construction, calibration, testing, and implementation of the model to develop and test various design alternatives.

The software program used to create the model was PCSWMM 2000, which uses the EPA SWMM engine, Version 4.4h. For this study, the RUNOFF and EXTRAN modules were used. RUNOFF converts rainfall into runoff discharge from each catchment area within the Site. The EXTRAN module calculates discharges, depths, and velocities, with respect to time, along the piping network.

The site was delineated into a minimum number of catchments, each of which is hydrologically homogeneous (e.g., slope, drainage path, etc.). The delineation was based on aerial photographs of the study area and stormwater drainage and sewer plans for the Site. The Site was initially subdivided into 17 sub-catchments, of which only 12 were ultimately used for modeling purposes. The other five catchments, and a portion of the Plant 49 roof, were found to drain to outfalls other than Outfall 001. Values for initial abstraction and surface roughness were assumed based on previous modeling of similar facilities, then adjusted as part of the calibration phase. The total area of the site contributing to flow at the SWDF was determined to be approximately 67.8 acres, the greater portion of which was impervious surfaces such as paved areas and steel roofs. The outlets for these catchments consist of storm sewer manholes and catch basins.

Calibration employed real time flow data coupled with measured rainfall to act as a comparative analysis, allowing field parameters such as infiltration, surface storage, and roughness to be modified to reflect the conditions of the Site. The parameters were modified and the model output was verified to be within acceptable limits of the real-time flow data (i.e. within 5 to 10 percent).

3.2.2 RAINFALL DATA

Rainfall data can be either in continuous form, such as that recorded on a rain gauge for the duration of the flow-monitoring period, or the rainfall can be based on synthetic design storms. For this study both approaches were used. For calibration the hyetograph of the continuous rainfall data for the flow-monitoring study period was utilized. To evaluate the system under various future scenarios, a number of synthetic design storms were utilized. All design storms use the Soil Conservation Service (SCS) Type II, 24-hour distribution, using rainfall depths taken from Bulletin 71.

3.2.3 CALIBRATION

3.2.3.1 FLOW MONITORING LOCATIONS

A number of storm sewer flow-monitoring stations were set-up to record flow data at 5-minute intervals for a period of approximately 5 weeks during September 2002. A rain gauging station was situated on-Site to record precipitation during this period. The monitoring locations were selected to best represent all areas contributing to stormwater runoff. A number of medium to high intensity rain events were recorded during the monitoring period, which were used during the model calibration phase. The storm event from September 19 and 20, 2002 was chosen as the calibration event, as appreciable flow data existed for several locations.

3.2.3.2 BASEFLOW DETERMINATION

The recorded sewer flow data included baseflow and wet weather flow, where baseflow is defined as all flows in the storm sewer system not directly attributed to runoff from a storm. An adjustment was made to the recorded flow data in order to obtain the wet weather sewer flows, which were then used to calibrate the model. In order to account for the continuous flow in the storm sewers, from either infiltration or process flow, the average flow during dry-weather conditions was determined. This value was subtracted from the total recorded flow for the period. This revised the discharge values so as to represent only the wet-weather portion of the storm sewer response. These adjusted hydrographs were used to calibrate the model by determining the actual volume of runoff generated by each upstream catchment area, as discussed in Section 3.2.3.3.

3.2.3.3 VOLUME OF STORMWATER

As part of the calibration process, stormwater runoff volumes are compared, in addition to hydrograph characteristics, to verify the model results. Analysis for each flow-monitoring station was completed and total volumes were determined for each storm occurring within the study period. These volumes were calculated by subtracting the determined baseflows for each station and graphing the results cumulatively for the calibration storm event.

3.2.3.4 CALIBRATION

The calibration phase included both visual and numerical comparisons of the output generated by the model to actual flows recorded in the field. This entailed comparing the model results to the flow data (minus baseflow) for the September 19 to 20 rain event and matching up the peak flows, total flow volumes, and the general shape of each runoff hydrograph.

During the calibration analysis, five sub-catchments in the northeast portion of the Plants 14, 49, and 5 and 23 manufacturing complex were determined to drain eastward to Outfall 002. In addition to this, a portion of the Plant 49 rooftop had been dye-tested and was also discovered to drain to Outfall 002 and not Outfall 001 as originally anticipated (EEC 2002).

The model was compared at monitoring stations located at manholes ST16, ST8, and ST11 to achieve a calibration at three major points within the model. The hydrographs revealed that the model closely followed actual conditions. Based on this analysis, the northern portion of the model was considered properly calibrated.

The runoff from the model was checked using a second method, consisting of determining approximate runoff volumes from directly connected impervious areas (rooftops). This was accomplished to verify the calibrated model results, and to determine whether or not there were any contributing catchments in the Demolition Area. A theoretical runoff volume of 216,815 ft^3 was calculated for the September 19 to 20, 2002 rain event for the upstream area using this method. The total measured runoff for this storm at manhole ST5 was approximately 200,000 ft^3. The calibrated model output was 219,760 ft^3. The difference between the theoretical volume and model volume is likely a function of the assumed catchment area, however the differences are within 10 percent, thus validating the model output on a total volume basis regarding contributing drainage area.

When all the sub-catchments were calibrated successfully, the final model was regenerated, and the hydrology and hydraulics finalized.

3.3 STORM RUNOFF SIMULATION MODEL - CONCLUSIONS

Modeling determined that the stormwater runoff could be accounted for from the rooftops of the manufacturing complex and immediately adjacent areas. Peak flows were observed to occur in the storm sewer system shortly after a rainfall peak, indicating that the contributing basin lag time is relatively short, likely due to a high

percentage of impervious surfaces in the 67.8-acre Outfall 001 drainage basin. The storm runoff simulation model predicts that for a 25-year, 24-hour storm event , temporary storage must be provided for an additional 3.3 million to 4.5 million gallons of stormwater for a period of 4 to 5 days (taking into account the current GAC treatment rate of 700 to 800 gpm), for a total storage capacity of approximately 6.7 million gallons, or 2.5 to 3.0 times greater than the detention capacity of the existing SWDF detention basin.

Presently, a 25-year storm event would result in stormwater flows bypassing the existing screw pumps of the SWDF and overflowing directly to the City of Pontiac storm sewer system. The storage capacity of the detention basin would also be exceeded, resulting in direct discharges to the City of Pontiac storm sewer system.

A process layout of the SWDF is presented on Figure 3.1

4.0 STORM SEWER SYSTEM REHABILITATION TECHNIQUES AND TECHNOLOGIES

Rehabilitation methods for sewer pipelines are generally divided into the following categories: replacement by conventional and trenchless techniques; and rehabilitation by grouting and lining techniques. Lining techniques include glass fibre reinforced plastic (GRP) and cured-in-place liners. The following discussion describes the storm sewer rehabilitation techniques and technologies presented in the subsequent sections of this Report.

4.1 EXCAVATION AND REPLACEMENT

Excavation and replacement of pipe segments has been considered in the Report for pipe reaches that require a change in flow direction. Replacement of entire manhole-to-manhole reaches provides a new, leak free pipe. Sewer pipe rehabilitation through pipeline replacement can take two general forms, consisting of excavation or replacement, and abandonment and parallel replacement. In abandonment and parallel replacement, a new sewer alignment physically parallel to the existing line may be considered.

Problems that may be encountered during removal and replacement activities include maintaining the flows during construction, removal and disposal of old pipes, properly abandoning pipes with structurally sound fill material to prevent collapse, trench dewatering in areas with elevated groundwater levels, working in close proximity to existing utilities, and the disposal of contaminated soils.

4.2 CHEMICAL GROUTING

Chemical grouting involves pumping grout into open storm sewer pipe joints, cracks, or holes. Chemical grouting of sewer lines is most effective in sealing leaking joints and circumferential cracks. Chemical grouting is undertaken to control groundwater infiltration in non-pressure pipe reaches. Chemical grouting is applied internally within a pipe, thus avoiding excavation and utility clearance problems.

Chemical grouting does not improve the structural strength of pipelines, nor does it add external structural properties to the pipe where open joints or circumferential cracking are exhibited due to ongoing settlement issues. It is not effective to use chemical grout to seal longitudinal cracks or to seal pipe joints where the pipe also exhibits longitudinal cracks. Chemical grouting should not be considered for pipe reaches that are severely broken, cracked, or deteriorated.

4.3 CHANNELINE SYSTEM – GRP LINERS

Rehabilitation techniques implementing liners include the installation of prefabricated panels in existing storm sewer pipes using mechanical anchors. GRP liners are manufactured from thermosetting resins and reinforced with a glass fibre chopped strand mat. A glass surfacing tissue inner layer provides additional corrosion protection and abrasion resistance. These liners can be manufactured to a wide variety of shapes and are typically applicable to sewers over 42 inches in diameter.

With the exception of the construction of an access trench, the installation of GRP liners do not cause disruptions to surface conditions, as the installation is performed entirely within the storm sewer. GRP liners are suitable for effluents containing alkaline solutions, dilute acids, fats, and oils. The liners are also resistant to soils containing acid, sulphate, and hydrocarbon contamination, however, the liners are typically surrounded with a cementitious grout, which ensures the isolation of the liners from the surrounding soil.

4.4 CURED-IN-PLACE LINING

Cured-in-place liners are formed by inserting a resin impregnated felt tube into a sewer reach, which is then inverted against the inner wall of the pipe and allowed to cure by thermal means. Service connections are reopened after the lining system has cured.

Cured-in-place liners can be installed without excavation and are well suited for repairing pipelines located under parking areas and existing structures. Cured-in-place liners are effective in correcting corrosion problems and can be used for pipelines with bends. After installation, the liner is of a slightly smaller diameter of the original pipe, but the hydraulic capacity may increase due to the smooth inner surface of the lining.

5.0 STORM SEWER FEASIBILITY ANALYSIS – REMEDIAL ALTERNATIVES

5.1 STORM SEWER CORRECTIVE MEASURES CONSTRUCTS

The following Section proposes alternatives to address rehabilitation and modification of the storm sewers conveying stormwater runoff to Outfall 001. The goal of the proposed rehabilitation and modifications is to minimize or eliminate overcapacity conditions at the SWDF due to prolonged or intense rain events, which result in contraventions to the NPDES permit limitations and direct overflows to the City of Pontiac storm sewer system.

The main objective of the proposed correctives measures is to reduce hydraulic loading to the SWDF. The corrective measures can be separated into the following three constructs:

- Reduction of the hydraulic loading to the SWDF by diverting portions of the stormwater runoff from the Outfall 001 drainage basin to outfalls other than Outfall 001 (i.e., Outfall 002, Michigan Department of Transportation [MDOT] storm sewer);
- Detaining and treating a substantially greater volume of stormwater at the SWDF; or
- Bypassing those portions of the stormwater runoff deemed to be uncontaminated around the SWDF while detaining and treating those portions deemed to be contaminated.

Corrective measures presented in the following discussion do not include operation and maintenance costs.

The remedial alternatives presented herein consist of a series of tasks that are required to be performed for the full implementation of that alternative. Individual tasks may occur in more than one distinct remedial alternative.

5.1.1 ORGANIZATION OF CORRECTIVE MEASURES ALTERNATIVES

The storm sewer corrective measures alternatives are organized as follows:

- Section 5.2 presents Alternatives #1 to #7, which discuss alternatives for rerouting stormwater runoff from the Outfall 001 drainage basin to alternate outfalls; and
- Section 5.3 presents alternatives #8 to #16, which discusses alternatives for either detaining and treating a greater volume of stormwater at the SWDF or bypassing those portions of the stormwater runoff deemed to be uncontaminated around the SWDF while detaining and treating those portions deemed to be contaminated.

The alternatives presented in Sections 5.2 and 5.3 of the following discussion consist of the following:

1. Alternative #1 - Rerouting Plant 14 rooftop stormwater drainage system to Outfall 002 – flow reversal in north-south 66-inch storm sewer;
2. Alternative #2 - Rerouting Plant 14 truck dock 14-5 rooftop stormwater drainage system to Outfall 002;
3. Alternative #3 - Overhead rerouting of Plant 14 and Plant 14 truck dock 14-5 rooftop stormwater drainage system downspouts to outfall 002;
4. Alternative #4 - Rerouting northwest quadrant of Plant 49 rooftop stormwater drainage system to Outfall 002;
5. Alternative #5 - Rerouting south section of Plant 49 rooftop stormwater drainage system to Outfall 002;
6. Alternative #6 - Rerouting Plants 5 and 23 rooftop stormwater drainage system downspouts to new or existing storm sewer and Outfall 002;
7. Alternative #7 - Rerouting Plants 14, 49, and 5 and 23 rooftop stormwater drainage system to Outfall 002;
8. Alternative #8 - Plant 14, Plant 14 truck dock 14-5, Plant 49, and Plants 5 and 23 rooftop stormwater drainage systems – bypassing the SWDF;
9. Alternative #9 - Rehabilitation of north-south 36-inch to 42-inch and 66-inch to 90-inch storm sewers – Demolition Area;
10. Alternative #10 - Rerouting detained stormwater from the SWDF basin through upgraded corrugated plate interceptor and granular activated carbon systems;
11. Alternative #11 - Diversion of peak flows to bypass the SWDF;
12. Alternative #12 - Construction of a stormwater detention basin - Demolition Area;
13. Alternative #13 - Construction of a groundwater control detention pond - Demolition Area;
14. Alternative #14 - Construction of a flow rate control structure upstream of the SWDF;
15. Alternative #15 - Construction of an underground detention chamber - Demolition Area; and
16. Alternative #16 - Stormwater detention / retention implementing Plant 49 rooftop.

5.2 ALTERNATIVES FOR REROUTING STORMWATER RUNOFF FROM THE OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS

Rerouting stormwater runoff from the Outfall 001 drainage basin to alternate outfalls primarily involves diverting the rooftop stormwater drainage from the Plants 14, 49, and 5 and 23 manufacturing complex to Outfall 002. The remedial alternatives presented in Section 5.2 do not address the infiltration, inflow, and rainfall induced infiltration contributed from the Demolition Area. A remedy for the situation in the Demolition Area would be accompanied by an increase in the capital cost, which has not been accounted for in the construction cost estimates presented for these alternatives.

5.2.1 ALTERNATIVE #1 - REROUTING PLANT 14 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002 – FLOW REVERSAL IN NORTH-SOUTH 66-INCH STORM SEWER

A dye tracing study of the Plant 14 rooftop stormwater drainage system conducted in 2001 confirmed that the stormwater drainage system for this section of the Plants 14, 49, and 5 and 23 manufacturing complex rooftop conveys stormwater to Outfall 001 of the storm sewer system. The Plant 14 section of rooftop occupies an area of approximately 477,000 square feet, or 11 acres. The Plant 14-5 Truck Dock rooftop occupies an area of approximately 130,000 square feet, or 3.0 acres. The following discussion involves reversing the flow in the north-south 66-inch storm sewer between manholes ST19 and Diverter Chamber #2, with the objective of reducing the hydraulic loading to the SWDF, imposed by the stormwater runoff from the Plant 14 and Truck Dock 14-5 rooftops. Figure 5.1 illustrates the areas and storm sewers affected by rerouting the Plant 14 rooftop stormwater drainage system to the Outfall 002 drainage basin, accomplished by reversing the flow in the north-south 66-inch storm sewer.

5.2.1.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #1

Identification and Elimination of Storm Sewer Infiltration/Cross-Connections Beneath Plants 14, 49, and 5 and 23

The Outfall 001 Flow Rate Study (EEC 2002) identified an average daily dry weather flow rate of 50.1 gpm originating from the Plant 14, 49, and 5 and 23 manufacturing complex. It was concluded that the flow rate of 50.1 gpm during dry weather flow may be attributable to inflow from cross-connections from within Plant 14, Plant 49, or Plants 5 and 23, or due to excessive infiltration. Evidence of infiltration was observed at the invert of the north-south 66-inch pipe at manhole ST16, and in the 24-inch west-east lateral located under Plant 14. Evidence of water-soluble oil and grease was also

observed during the videotaped inspection of the 24-inch west-east lateral located under Plant 14, suggesting a possible process cross-connection. Prior to implementing any measures to reduce hydraulic loading from Plant 14 to the SWDF, ongoing investigations would be required to identify and remediate the sources of the infiltration / inflow.

Stormwater Quality Issues - Plant 14 Rooftop Stormwater Drainage System – Elimination of PCBS

PCBs were detected in 2001 in a Plant 14 rooftop stormwater downspout located adjacent to electrical Substation V, at a concentration of 0.56 micrograms per liter (µg / L). Prior to implementing any measures to reduce hydraulic loading to the SWDF, ongoing investigations are addressing the sources of the PCB-contamination to be eliminated.

Construction of a Bulkhead in 66-Inch North-South Storm Sewer

A review of historical drawings and video inspection tapes indicates that the rooftop stormwater drainage system for Plant 14 drains to the north-south 66-inch storm sewer. A junction between the west-east 24-inch storm sewer located under Plant 14 and the north-south 66-inch sewer occurs in the proximity of manhole ST19 (covered), upstream (north) of manhole ST18, as shown on Drawing 1. The invert elevation at the junction is approximately 948.0 feet, while the invert elevation at Diverter Chamber #2 is approximately 949.3 feet

Diverting stormwater runoff from the Plant 14 rooftop from Outfall 001 and the SWDF involves reversing the flow in the north-south 66-inch pipe, from south of manhole ST19 to Diverter Chamber #2. Flow reversal would be implemented by constructing a bulkhead south of the manhole. Modifications of Diverter Chamber #2 would permit stormwater flows to be diverted to the 78-inch west-east storm sewer conveying stormwater to Outfall 002.

Modification of Diverter Chamber #2

Reversing the flow in the north-south 66-inch pipe from the junction south of manhole ST19 to Diverter Chamber #2 would involve the demolition of the 6-foot high cast-in-place concrete wall currently dividing Diverter Chamber #2. Demolition of the wall would allow the reversed flows to be conveyed to the 78-inch west-east storm sewer, thus conveying flows to Outfall 002.

Hydraulic transitions occur in uniform flow sewers due to changes in diameter, changes in grade, or changes in direction. Hydraulic transitions may result in energy losses, which may adversely affect upstream conditions. Reconstruction of a channel to direct stormwater flows from the reversed north-south 66-inch storm sewer, the west-east 30-inch storm sewer, and the north-south 48-inch storm sewer into the 78-inch storm sewer would be required to minimize energy losses from transitions within Diverter Chamber #2.

Rehabilitation of West-East 30-Inch Storm Sewer and Laterals North of Plant 14

The parking/equipment staging area north of Plant 14 has been identified from interviews with plant personnel as a former press/die storage area. Manhole inspections and storm sewer water, sediment, and oil sampling (EEC 2002) have identified the presence of PCB-containing subsurface oils and sediments in this area, particularly at manholes ST112 and ST108. Additionally, a review of the inspection videotapes for the west-east 27-inch to 30-inch diameter reinforced concrete storm sewer line (EEC 2002) have identified various pipe conditions (i.e., leaking joints and deteriorated manholes) that require rehabilitation, although the storm sewer has been preliminarily evaluated as structurally sound. The combination of these factors has resulted in the west-east storm sewer and associated laterals as being candidates for rehabilitation prior to diverting the stormwater runoff to Outfall 002.

5.2.1.2 EFFECTIVENESS

The rerouting of the Plant 14 rooftop stormwater drainage system to Outfall 002 by flow reversal in north-south 66-inch storm sewer would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 11 acres, or approximately 16% of its total area. Except for bulkhead overflows, this alternative would also mitigate the detention and treatment of stormwater at the SWDF. Periodic cleaning of the storm sewer line would be required to control sedimentation and the possible obstruction of flow.

5.2.1.3 IMPLEMENTABILITY

The rerouting of the Plant 14 rooftop stormwater drainage system to Outfall 002 by flow reversal in north-south 66-inch storm sewer is a technically and economically feasible alternative to reduce hydraulic loading to the SWDF. Periodic maintenance in the form of cleaning and vacuuming would be required to preclude sedimentation in the areas of the pipe where stagnation will occur. Additionally, availability to the parking area

north of Plant 14 will be restricted during the rehabilitation of the west-east storm sewer line situated beneath it.

Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

5.2.1.4 SUMMARY

The rerouting of the Plant 14 rooftop stormwater drainage system to Outfall 002 by flow reversal in north-south 66-inch storm sewer is an effective, technically and economically feasible approach to reduce hydraulic loading to the SWDF. Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

The construction cost estimates associated with implementing the rerouting of the Plant 14 rooftop stormwater drainage system to Outfall 002 by flow reversal in north-south 66-inch storm sewer are presented in Table 5.1.

5.2.2 ALTERNATIVE #2 - REROUTING PLANT 14 TRUCK DOCK 14-5 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002

5.2.2.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #2

Flow Reversal in North-South 400-Series Storm Sewer Located West of Plant 14 Truck Dock 14-5

The 400-series north-south storm sewer located west of, and servicing, Plant 14 Truck Dock 14-5 consists of a storm sewer reach serviced by a series of precast manholes. With the exception of one manhole, the system is situated in a gravel median located between two single lane roadways. Reversing the flow in the north-south storm sewer from ST405 (invert elevation 956.2) to ST401 (invert elevation 962.0) would involve the excavation of the existing storm sewer and reconstruction of a new storm sewer line to facilitate flow in the opposite direction. In order to convey flows to the west-east 27-inch to 30-inch storm sewer located north of Plant 14, which ultimately conveys to Outfall 002, a new storm sewer would have to be constructed from manhole ST401 to manhole ST108B (invert elevation 963.0). Figure 5.2 illustrates the areas and storm sewers affected by rerouting the Plant 14 Truck Dock 14-5 rooftop stormwater drainage system to the Outfall 002 drainage basin, by reversing the flow in the north-south 400-series storm sewer.

The existing section of storm sewer between ST405 and ST401 has been identified by previous investigations (EEC 2002) as being in poor condition, thus allowing for this section of storm sewer to be a suitable candidate for reconstruction.

Rehabilitation of West-East 30-Inch Storm Sewer North of Plant 14

The parking/equipment staging area north of Plant 14 has been identified from interviews with plant personnel as a former press/die storage area. Manhole inspections and storm sewer water, sediment, and oil sampling (EEC 2002) have identified the presence of PCB-containing subsurface oils and sediments in this area, particularly at manholes ST112 and ST108. Additionally, a review of the inspection videotapes for the west-east 27-inch to 30-inch diameter reinforced concrete storm sewer line (EEC 2002) has identified various pipe conditions (i.e. leaking joints and deteriorated manholes) that require rehabilitation, although the storm sewer has been preliminarily evaluated as structurally sound. The combination of these factors has resulted in the west-east storm sewer and associated laterals as being candidates for rehabilitation prior to diverting the stormwater runoff to Outfall 002.

Modification of Diverter Chamber #2

Reversing the flow in the north-south 400-series storm sewers to Diverter Chamber #2 would involve the demolition of the 6-foot high cast-in-place concrete wall currently dividing Diverter Chamber #2. Demolition of the wall would allow the reversed flows to be conveyed to the 78-inch west-east storm sewer conveying flows to Outfall 002.

Hydraulic transitions occur in uniform flow sewers due to changes in diameter, changes in grade, or changes in direction. Hydraulic transitions may result in energy losses, which may adversely affect upstream conditions. Reconstruction of a channel to direct stormwater flows from the west-east 30-inch storm sewer and the north-south 48-inch storm sewer into the 78-inch storm sewer would be required to minimize energy losses from transitions within Diverter Chamber #2.

5.2.2.2 EFFECTIVENESS

The rerouting of the Plant 14 Truck Dock 14-5 rooftop stormwater drainage system to Outfall 002 by flow reversal in the existing north-south 400-series storm sewer would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 3.0 acres, or approximately 4.5% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF. In addition, as the condition of the storm sewer reach from ST405 to ST401 has been

identified from videotaped inspections as being poor, this alternative would also provide an effective means to address and correct the current status of the line.

5.2.2.3 IMPLEMENTABILITY

The rerouting of the Plant 14 Truck Dock 14-5 rooftop stormwater drainage system to Outfall 002 by flow reversal in the existing north-south 400-series storm sewer is an economically and technically feasible alternative to reduce hydraulic loading to the SWDF.

Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative. Construction activities would require scheduling and coordination to diminish the impact to transport loading activities occurring at Truck Dock 14-5.

5.2.2.4 SUMMARY

The rerouting of the Plant 14 Truck Dock 14-5 rooftop stormwater drainage system to Outfall 002 by flow reversal in the existing north-south 400-series storm sewer is an effective, economical, and technically feasible approach to reduce hydraulic loading to the SWDF. Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

The construction cost estimates associated with implementing the rerouting of the Plant 14 Truck Dock 14-5 rooftop stormwater drainage system to Outfall 002 by flow reversal in the existing north-south 400-series storm sewer are presented in Table 5.1.

5.2.3 ALTERNATIVE #3 - OVERHEAD REROUTING OF PLANT 14 AND PLANT 14 TRUCK DOCK 14-5 ROOFTOP STORMWATER DRAINAGE SYSTEM DOWNSPOUTS TO OUTFALL 002

5.2.3.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #3

Overhead Rerouting of Plant 14 Rooftop Stormwater Drainage System Downspouts to Outfall 002

The rooftop stormwater drainage system for Plant 14 is consists in part of a series of gabled rooftops. Stormwater runoff is conveyed to roof sumps located in the valleys of the pitched rooftops. From the roof sumps, the stormwater is conveyed to downspouts located inside Plant 14, to a subsurface conveyance system, and eventually to the 66-inch north-south storm sewer. A mapping of the rooftop stormwater drainage system (EEC

2002), illustrated in Figure 5.3, has identified that the downspouts located within Plant 14 are arranged in a manner such that groups of downspouts connect to main downspouts at overhead locations throughout the plant. Overhead rerouting of the main downspouts to main trunk lines, which would convey stormwater to the north wall of Plant 14 and ultimately the west-east storm sewer located in the parking/equipment staging area north of Plant 14, would reduce the contributing drainage basin to Outfall 001. Figure 5.4 illustrates the areas and storm sewers affected by overhead rerouting of the Plant 14 and Plant 14 Truck Dock 14-5 rooftop stormwater drainage system to the Outfall 002 drainage basin.

Overhead Rerouting of Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System Downspouts to Outfall 002

Truck Dock 14-5 is located at the west end of Plant 14. The rooftop stormwater drainage system for Truck Dock 14-5 is comprised in part of a flat roof, pitched to the west. Stormwater runoff is conveyed through scupper drains to the downspouts. The stormwater downspouts are located on the exterior west wall of the structure. The downspouts travel vertically down the wall, and ultimately convey stormwater to the 400-series manholes located to the west of the truck dock.

Overhead rerouting of the downspouts would involve cutting the downspouts and tying them into a new south-north/west-east polyvinyl chloride (PVC) pipe mounted directly to the west and north walls of the truck dock, respectively. The new pipe would tie into manhole ST108, allowing the stormwater to be conveyed through the west-east storm sewer located north of Plant 14, and ultimately Outfall 002.

Rehabilitation of West-East Storm Sewer and Laterals from Manhole ST108 to Diverter Chamber #2

The existing section of west-east 27-inch to 30-inch diameter reinforced concrete storm sewer between ST108 and Diverter Chamber #2 has been identified by previous investigations (EEC 2002) as having some leaky joints, but being structurally sound. Additionally, storm sewer sampling and analyses (EEC 2002) in this section of the storm sewer and its related laterals has identified areas of interest at manholes ST108A and ST112, primarily due to elevated PCB concentrations in the sediments collected from those manholes. Prior to rerouting stormwater runoff from the Plant 14 and Truck Dock 14-5 rooftops to the west-east storm sewer, remedial measures would be required to correct the leaky joints and to address the contaminant issues at manholes ST108 and ST112. A cured-in-place liner is recommended for the storm sewer line and its related laterals and manholes.

Modification of Diverter Chamber #2

Overhead rerouting of the Plant 14 and Plant 14-5 rooftop stormwater drainage system downspouts to Diverter Chamber #2 and ultimately Outfall 002 would involve the demolition of the 6-foot high cast-in-place concrete wall currently dividing Diverter Chamber #2. Demolition of the wall would allow the reversed flows to be conveyed to the 78-inch west-east storm sewer conveying flows to Outfall 002.

Hydraulic transitions occur in uniform flow sewers due to changes in diameter, changes in grade, or changes in direction. Hydraulic transitions may result in energy losses, which may adversely affect upstream conditions. Reconstruction of a channel to direct stormwater flows from the west-east 30-inch storm sewer and the north-south 48-inch storm sewer into the 78-inch storm sewer would be required to minimize energy losses from transitions within Diverter Chamber #2.

5.2.3.1 EFFECTIVENESS

The overhead rerouting of the Plant 14 and Plant 14 Truck Dock 14-5 rooftop stormwater drainage system downspouts to Outfall 002 would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 14.0 acres, or approximately 21% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.2.3.2 IMPLEMENTABILITY

The overhead rerouting of the Plant 14 and Plant 14 Truck Dock 14-5 rooftop stormwater drainage system downspouts to Outfall 002 is a technically feasible alternative to reduce hydraulic loading to the SWDF. From an economical perspective, the costs for implementing this alternative may be prohibitive as Plant 14 and Truck Dock 14-5 house active manufacturing and shipping operations. To avoid disruptions to these activities, modifications may have to be executed during periods of downtime occurring during the third shift.

Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

5.2.3.3 SUMMARY

The overhead rerouting of the Plant 14 and Plant 14 Truck Dock 14-5 rooftop stormwater drainage system downspouts to Outfall 002 is an effective and technically feasible approach to reduce hydraulic loading to the SWDF, although the costs associated with the modifications may be prohibitive. Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

The construction cost estimates associated with implementing the overhead rerouting of the Plant 14 and Plant 14 Truck Dock 14-5 rooftop stormwater drainage system downspouts to Outfall 002 by flow reversal in the existing north-south 400-series storm sewer are presented in Table 5.1.

5.2.4 ALTERNATIVE #4 - REROUTING NORTHWEST QUADRANT OF PLANT 49 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002

5.2.4.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #4

Excavation and Pipe Installation from CB220 to 78-Inch West-East Storm Sewer

The stormwater runoff from the west portion and southeast quadrant of the Plant 49 rooftop currently drains north to CB220, located adjacent to the north wall of Plant 49, then west to manhole ST16. To divert the north section of the Plant 49 rooftop (i.e., north of column line 'R') stormwater drainage system to Outfall 002, the present drainage system can be reconstructed to convey flows from CB220 to the west-east 78-inch storm sewer line. The invert elevation at the base of CB220 is approximately 961.81 feet, and the invert elevation of the 78-inch storm sewer at this location is approximately 949.0 feet. The construction of a drop manhole at the junction with the upstream pipe would minimize energy losses and thus the deposition of solids in the manhole and downstream pipe. Figure 5.5 illustrates the areas and storm sewers affected by rerouting the Plant 49 (excluding the northeast quadrant) rooftop stormwater drainage system to the Outfall 002 drainage basin, by installing a pipe from CB220 to the 78-inch main line.

5.2.4.2 EFFECTIVENESS

The excavation and pipe installation from CB220 to the 78-inch west-east storm sewer conveying stormwater to Outfall 002 would be effective in reducing hydraulic loading to

the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 3.0 acres, or approximately 4.5% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.2.4.3 IMPLEMENTABILITY

The excavation and pipe installation from CB220 to the 78-inch west-east storm sewer conveying stormwater to Outfall 002 is a technically feasible and economical alternative to reduce hydraulic loading to the SWDF. This alternative would result in minimal disruptions to manufacturing operations, as a majority of the construction activities would occur in the parking area north of Plant 49.

Conventional construction techniques, materials, and equipment are available for the implementation of this alternative.

5.2.4.4 SUMMARY

The excavation and pipe installation from CB220 to the 78-inch west-east storm sewer conveying stormwater to Outfall 002 would be effective in reducing hydraulic loading to the SWDF, and is a technically feasible and economical alternative. Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

The construction cost estimates associated with implementing the excavation and pipe installation from CB220 to the 78-inch west-east storm sewer conveying stormwater to Outfall 002 are presented in Table 5.1.

5.2.5 ALTERNATIVE #5 - REROUTING SOUTH SECTION OF PLANT 49 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002

5.2.5.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #5

Evaluation of Existing South-North Storm Sewer East of Plant 49

Interviews and a historical drawing review have identified that the south-north storm sewer reach, situated to the east of Plant 49, may be a candidate for stormwater runoff that is diverted from the Outfall 001 storm sewer system. The storm sewer reach commences upstream to the north of the ELPO building, and terminates to the south at manhole ST328. It is recommended that videotaped inspections of the pipe reach be performed to verify structural integrity and pipe sizes.

Overhead Rerouting of Southern Portion of Plant 49 Rooftop Stormwater Drainage System Downspouts to New or Existing Sewer and Outfall 002

The rooftop stormwater drainage system for the southern portion (i.e., south of column line 'R') of Plant 49 is comprised of a flat rooftop. Stormwater runoff is conveyed by gravity to roof sumps. From the roof sumps, the stormwater is conveyed to downspouts located inside Plant 49, to a subsurface conveyance system, and eventually to the 66-inch north-south storm sewer. A mapping of the rooftop stormwater drainage system (EEC 2002) has identified that the downspouts located within Plant 49 are arranged in a manner such that individual downspouts travel vertically alongside columns and penetrate the floor slab to the subsurface conveyance system. Overhead rerouting of the main downspouts to main trunk lines would convey stormwater to the east wall of Plant 49 and ultimately a new or existing south-north storm sewer located in the paved area east of Plant 49, which would convey stormwater to ST328 and Outfall 002. Figure 5.6 illustrates the areas and storm sewer reaches affected by rerouting the southern portion of the Plant 49 rooftop stormwater drainage system to Outfall 002.

5.2.5.2 EFFECTIVENESS

The overhead rerouting of southern portion of the Plant 49 rooftop stormwater drainage system downspouts to a new storm sewer and Outfall 002 would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 7.2 acres, or approximately 10.5% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.2.5.3 IMPLEMENTABILITY

The overhead rerouting of southern portion of the Plant 49 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 is a technically feasible alternative to reduce hydraulic loading to the SWDF. From an economical perspective, the costs for implementing this alternative may be prohibitive as Plant 49 houses active manufacturing and shipping operations. To avoid disruptions to these activities, modifications may have to be executed during periods of downtime occurring during the third shift. Additionally, the condition of the existing south-north storm sewer reach east of Plant 49 is unknown and has been identified for further investigation.

Conventional construction and trenchless rehabilitation techniques, materials, and equipment are available for the implementation of this alternative.

5.2.5.4 SUMMARY

The overhead rerouting of southern portion of the Plant 49 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 is an effective and technically feasible approach to reduce hydraulic loading to the SWDF, although the costs associated with the modifications may be prohibitive.

The construction cost estimates associated with implementing the overhead rerouting of southern portion of the Plant 49 rooftop stormwater drainage system downspouts to a new storm sewer and Outfall 002 are presented in Table 5.1. The construction cost associated with potential modifications to the existing storm sewer reach located to the east of Plant 49 have not been determined due to incomplete data, to be rectified by further investigations. Should the existing storm sewer reach be adequate with respect to structural integrity, capacity, and invert elevations, it is expected that the construction costs for the alternative under consideration will be reduced.

5.2.6 ALTERNATIVE #6 - REROUTING PLANTS 5 AND 23 ROOFTOP STORMWATER DRAINAGE SYSTEM DOWNSPOUTS TO NEW OR EXISTING STORM SEWER AND OUTFALL 002

5.2.6.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #6

Evaluation of Existing South-North Storm Sewer East of Plant 49

Interviews and a historical drawing review have identified that the south-north storm sewer reach, situated to the east of Plant 49, may be a candidate for stormwater runoff that is diverted from the Outfall 001 storm sewer system. The storm sewer reach commences upstream to the north of the ELPO building, and terminates to the south at manhole ST328. It is recommended that videotaped inspections of the pipe reach be performed to verify structural integrity and pipe sizes.

Overhead Rerouting of Plants 5 and 23 Rooftop Stormwater Drainage System Downspouts to New or Existing Storm Sewer and Outfall 002

The rooftop stormwater drainage system for Plants 5 and 23 consists in part of a series of gabled rooftops. Stormwater runoff is conveyed to roof sumps located in the valleys of the pitched rooftops. From the roof sumps, the stormwater is conveyed to downspouts located inside Plants 5 and 23, to a subsurface conveyance system, and eventually to the 36-inch and 66-inch north-south storm sewers conveying stormwater to Outfall 001. A mapping of the rooftop stormwater drainage system (EEC 2002) has identified that the downspouts located within the western section of Plants 5 and 23 are arranged in a manner such that individual downspouts travel vertically from the roof down through the concrete floor slab. In the eastern section of Plants 5 and 23, the majority of the downspouts are situated in groups of two to three downspouts that tie into main downspouts at overhead locations throughout the plant.

In the western section of Plants 5 and 23, overhead rerouting of the individual downspouts to a centrally located (i.e., column line 40) main line would convey stormwater towards the south wall of the plant. From the south wall of the plant, an exterior mounted main stormwater conductor would convey stormwater to a new or existing south-north storm sewer located in the paved area east of Plants 5 and 23, which would convey stormwater to manhole ST328 and Outfall 002.

In the eastern section of Plants 5 and 23, overhead rerouting of the main downspouts to main lines would convey stormwater towards the east wall of the plant. From the east wall of the plant, the stormwater runoff would be conveyed to a new or existing south-north storm sewer located in the paved area east of Plants 5 and 23, which would convey stormwater to manhole ST328 and Outfall 002.

Figure 5.7 illustrates the areas and storm sewers affected by rerouting the Plants 5 and 23 rooftop stormwater drainage system downspouts to a new or existing storm sewer and the Outfall 002 drainage basin.

5.2.6.2 EFFECTIVENESS

The overhead rerouting of the Plants 5 and 23 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 20 acres, or approximately 30% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.2.6.3 IMPLEMENTABILITY

The overhead rerouting of the Plants 5 and 23 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 may be a technically complex alternative to reduce hydraulic loading to the SWDF, due to the multi-level configuration of the structures involved. From an economical perspective, the costs for implementing this alternative may be prohibitive as Plants 5 and 23 houses active manufacturing operations. To avoid disruptions to these activities, modifications may have to be executed during periods of downtime occurring during the third shift, potentially resulting in cost overruns due to reduced installation rates. Additionally, the capacity of the existing south-north storm sewer reach east of Plant 49 is unknown.

5.2.6.4 SUMMARY

The overhead rerouting of the Plants 5 and 23 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 is an effective yet technically complex approach to reduce hydraulic loading to the SWDF. Additionally, the costs associated with the modifications may be prohibitive.

The construction cost estimates associated with implementing the overhead rerouting of the Plants 5 and 23 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 are presented in Table 5.1. The construction cost associated with potential modifications to the existing storm sewer reach located to the east of Plant 49 have not been determined due to ongoing investigations of the subsurface of the former Plant 18. Plant 18 is located to the east of the storm sewer reach.

5.2.7 ALTERNATIVE #7 - REROUTING PLANTS 14, 49, AND 5 AND 23 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002

5.2.7.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #7

Construction of New Storm Sewer Line and Lift Station from Manholes ST11A and ST8 to Outfall 002

As stated previously, water sampling and analyses performed for the PCB Filtration and Infiltration Study and the Verification of Plant Inputs investigation (EEC 2002) has indicated that the rooftop stormwater drainage system runoff from the Plants 14, 49, and 5 and 23 manufacturing complex is relatively free of contaminants, when sampled from

manholes ST11A and ST8. Thus, rerouting the stormwater runoff from the Plants 14, 49 (excluding the northeast quadrant), and 5 and 23 rooftops to Outfall 002 has been considered to be a feasible option. Rerouting the flows would involve the installation of a new connecting sewer, from ST11A to ST8, to bifurcate the flows to Outfall 002. A new storm sewer line would be constructed from manhole ST11A (invert elevation 948.4) to manhole ST8 (invert elevation 944.5), to the southeast corner of Plants 5 and 23, then north to the 78-inch storm sewer located at manhole ST328 (invert elevation 960.0). A lift station would be required to pump the stormwater flows to ST328 due to the difference in elevation. Figure 5.8 illustrates the areas and storm sewers affected by rerouting the Plants 14, 49 (excluding the northeast quadrant), and 5 and 23 rooftop stormwater drainage system to the Outfall 002 drainage basin, by constructing a new storm sewer line and lift station.

Rehabilitation of Storm Sewer from Manhole ST13H to Manhole ST13

The reach of storm sewer from manhole ST13H to manhole ST13 has not been cleaned or videotaped due to electrical Substation 'O' being situated directly over the pipe reach. It is recommended that this reach of storm sewer be investigated prior to rerouting the 36-inch to 42-inch north-south storm sewer from ST11A to Outfall 002.

Investigation and Rehabilitation of Storm Sewer from Manhole ST400 to Manhole ST13A

A videotaped inspection review of the storm sewer line extending from ST400 to ST13A (EEC 2002) has identified that the sewer is characterized mainly by separated and offset joints. A pipe break also exists south of manhole ST404. In general, the storm sewer is in poor condition. Additionally, at manhole ST410, the presence of suspended oil and grease in the stormwater suggests a cross-connection between a plant process or machinery and the storm sewer system. Prior to constructing a new storm sewer from manholes ST11A to ST8, the section of storm sewer from manholes ST400 to ST13A would require an investigation to eliminate the potential cross-connections. Rehabilitation with a cured-in-place liner or by excavation and replacement of the north-south storm sewer between ST400 and ST405 is recommended due to the shallow depths and pipe diameters associated with the sewer in this reach. Installation of a cured-in-place liner from manholes ST405 to ST13A is recommended, which would eliminate infiltration and its associated chemical constituents.

Rehabilitation of West-East Storm Sewer from Manhole ST108 to Diverter Chamber #2

The existing section of west-east 27-inch to 30-inch diameter reinforced concrete storm sewer between ST108 and Diverter Chamber #2 has been identified by previous investigations (EEC 2002) as having some leaky joints, but being structurally sound. Additionally, storm sewer sampling and analyses (EEC 2002) in this section of the storm sewer and its related laterals has identified areas of interest at manholes ST108A and ST112, primarily due to elevated PCB concentrations in the sediments collected from those manholes. Prior to connecting manholes ST11A to ST8 with a new storm sewer, remedial measures would be required to correct the leaky joints and to address the contaminant issues at manholes ST108 and ST112, as manhole ST8 conveys the stormwater originating from these manholes. A cured-in-place liner is recommended for the storm sewer line and its related laterals and manholes.

5.2.7.2 EFFECTIVENESS

Rerouting the Plants 14, 49, and 5 and 23 rooftop stormwater drainage system to Outfall 002 via a new storm sewer and lift station would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 45.5 acres, or approximately 67% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.2.7.3 IMPLEMENTABILITY

Rerouting the Plants 14, 49, and 5 and 23 rooftop stormwater drainage system to Outfall 002 via a new storm sewer and lift station is a technically feasible alternative to reduce hydraulic loading to the SWDF, although the costs associated with the excavation of a trench may be prohibitive. The area between the north-south storm sewers requiring excavation is located in the Demolition Area, which contains many subsurface building remnants such as basement walls, footings, piers, and reinforced concrete slabs.

This alternative would result in minimal disruptions to in-plant activities. Construction activities to the south of the manufacturing complex (i.e., in the Demolition Area) would result in minimal disruptions to plant operations. Construction activities to the east of the manufacturing complex would require scheduling and coordination to provide minimal disruptions to manufacturing and shipping operations.

5.2.7.4 SUMMARY

Rerouting the Plants 14, 49, and 5 and 23 rooftop stormwater drainage system to Outfall 002 via a new storm sewer and lift station would be effective in providing a long-term solution to reduce hydraulic loading to the SWDF. The alternative is technically feasible, but excavation costs may be prohibitive. Additionally, the implementation of this alternative would require scheduling and coordination to avoid disruptions to manufacturing and shipping operations.

The construction cost estimates associated with implementing the rerouting of the Plants 14, 49, and 5 and 23 rooftop stormwater drainage system to Outfall 002 via a new storm sewer and lift station are presented in Table 5.1.

5.3 MODIFICATIONS TO OUTFALL 001 STORM SEWER SYSTEM

5.3.1 ALTERNATIVE #8 - PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 ROOFTOP STORMWATER DRAINAGE SYSTEMS – BYPASSING THE SWDF

5.3.1.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #8

Collection/Conveyance System (Pipe-in-Pipe) from Manholes ST11A/ST8 to the SWDF

Water sampling and analyses performed during the PCB Filtration and Infiltration Study and the Verification of Plant Inputs investigation (EEC 2002) has indicated that the rooftop stormwater drainage system runoff from the Plants 14, 49 (excluding the northeast quadrant), and 5 and 23 (east section) manufacturing complex is relatively free of contaminants, when sampled from manholes ST11A and ST8. Diverting the rooftop stormwater runoff directly to the City of Pontiac storm sewer system, while continuing to treat the groundwater, which infiltrates throughout the Demolition Area, has been considered as an option. The existing storm sewer system would thus be utilized, namely the north-south storm sewer main lines extending from manhole ST11A / ST8 to the SWDF.

A collection / conveyance system consisting of a pipe within the existing main storm sewer pipes would be employed, as illustrated on Figure 5.9. Between the bottom of the inner pipe and the invert of the existing pipe, a collection system consisting of a drainage tile system, surrounded by a permeable gravel layer, and capped with a layer of concrete, would be constructed. The collection system would deliver deliberate

groundwater infiltration to the SWDF, while the inner pipe system would convey stormwater to the City of Pontiac storm sewer, on the discharge side of the SWDF.

Figure 5.10 illustrates the areas and storm sewers affected through bypassing the Plant 14, Plant 14 Truck Dock 14-5, Plant 49 (excluding the northeast quadrant), and Plants 5 and 23 rooftop stormwater drainage system around the SWDF.

Rehabilitation of West-East Storm Sewer from Manhole ST108 to Diverter Chamber #2

The existing section of west-east 27-inch to 30-inch diameter reinforced concrete storm sewer between ST108 and Diverter Chamber #2 has been identified by previous investigations (EEC 2002) as having some leaky joints, but being structurally sound. Additionally, storm sewer sampling and analyses (EEC 2002) in this section of the storm sewer and its related laterals has identified areas of interest at manholes ST108A and ST112, primarily due to elevated PCB concentrations in the sediments collected from those manholes. Prior to rerouting stormwater runoff from the Plant 14 and Truck Dock 14-5 rooftops to the west-east storm sewer, remedial measures would be required to correct the leaky joints and to address the contaminant issues at manholes ST108 and ST112. A cured-in-place liner is recommended for the storm sewer line and its related laterals and manholes.

Rehabilitation of Storm Sewer from Manhole ST13H to Manhole ST13

The reach of storm sewer from manhole ST13H to manhole ST13 has not been cleaned or videotaped due to electrical Substation 'O' being situated directly over the pipe reach. It is recommended that this reach of storm sewer be investigated prior to implementing a collection/conveyance system in the 36-inch to 42-inch north-south storm sewer.

Investigation and Rehabilitation of Storm Sewer from Manhole ST400 to Manhole ST13A

A videotaped inspection review of the storm sewer line extending from ST400 to ST13A (EEC 2002) has identified that the sewer is characterized mainly by separated and offset joints. A pipe break also exists south of manhole ST404. In general, the storm sewer is in poor condition. Additionally, at manhole ST410, the presence of suspended oil and grease in the stormwater suggests a cross-connection between a plant process or machinery and the storm sewer system. Prior to implementing a collection/conveyance system from ST11A to partially bypass the SWDF, the section of storm sewer from manholes ST400 to ST13A would require an investigation to eliminate the potential

cross-connections. Rehabilitation with a cured-in-place liner or by excavation and replacement of the north-south storm sewer between ST400 and ST405 is recommended due to the shallow depths and pipe diameters associated with the sewer in this reach. Installation of a cured-in-place liner from manholes ST405 to ST13A is recommended, which would eliminate infiltration and its associated chemical constituents.

Fill Basements and Flow Fill of Out-of-Service Laterals to Reduce Infiltration/Inflow and Rainfall Induced Infiltration

Demolition activities south of the Plants 14, 49, and 5 and 23 manufacturing complex have resulted in open basements that detain stormwater runoff and groundwater during and following rain events. The Outfall 001 Flow Rate Study (EEC 2002) has identified that the stored volume of water potentially surcharges unplugged laterals that connect the basements to the Outfall 001 storm sewers, resulting in delayed inflow to the storm sewer system. To remedy the situation, Alternative #8 assumes that the basements will be properly filled by others.

Laterals typically represent approximately 50 percent or more of the total length of the collection system piping. Infiltration, inflow, and RII in laterals may thus contribute a significant quantity of water to the total stormwater runoff. Proper abandonment of the out-of-service laterals in the Demolition Area using flowable fill would eliminate sources of infiltration, inflow, and rainfall induced infiltration.

Construction of a SWDF Bypass Culvert

The conversion of the 36-inch to 42-inch north-south storm sewer to a collection/conveyance system throughout the Demolition Area would require the construction of a bypass culvert to reroute stormwater flows around the SWDF to the City of Pontiac storm sewer system, thus bypassing the treatment stages of the SWDF.

5.3.1.2 EFFECTIVENESS

The combined effects of a collection/conveyance system and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 45.5 acres, or approximately 67% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.3.1.3 IMPLEMENTABILITY

The implementation of a collection/conveyance system and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF is a technically and economically feasible alternative to significantly reduce hydraulic loading to the SWDF. Trenchless rehabilitation of storm sewer reaches located beneath the active manufacturing complex would not disrupt production. Pipe rehabilitation of areas outside of the manufacturing complex would result in minimal to no impact on plant operations. Furthermore, the Site conditions in the Demolition Area would be amenable to the construction of access pits, which would facilitate the installation of the liner systems.

5.3.1.4 SUMMARY

The combined effects of a collection/conveyance system and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF, while collecting potentially contaminated water for treatment, would be effective in reducing hydraulic loading to the SWDF.

The construction cost estimates associated with implementing a collection/conveyance system and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF are presented in Table 5.2.

5.3.2 ALTERNATIVE #9 - REHABILITATION OF NORTH-SOUTH 36-INCH TO 42-INCH AND 66-INCH TO 90-INCH STORM SEWERS – DEMOLITION AREA

Rehabilitation, by trenchless techniques, of the 36-inch to 42-inch and 66-inch to 90-inch north-south storm sewers from manholes ST11A/ST8 to the SWDF has been considered as a feasible option due to the absence of active lateral connections in this area and the length of the storm sewer. The lack of active laterals, as well as long reaches of pipe, tend to increase the cost effectiveness of trenchless rehabilitative methods. In addition, a review of inspection videotapes and confined space entries has indicated that the storm sewer extending from ST8 to the SWDF is structurally sound (EEC 2002). Figure 5.11 illustrates the areas and storm sewers affected by the rehabilitation of the north-south 36-inch to 42-inch and 66-inch to 90-inch storm sewers in the Demolition Area.

5.3.2.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #9

Cured-in-Place Liner for 36-Inch to 42-InchNorth-South Storm Sewer – Demolition Area

Rehabilitation of the north-south 36-inch to 42-inch storm sewer from manhole ST11A to the manhole ST6 would involve chemical grouting to seal the numerous leaking joints, and the installation of a cured-in-place liner system. Cured-in-place liners are successful in dealing with structural problems, produces minor reductions in pipe cross-sections, and is applicable to noncircular pipes and pipes having irregular cross-sections.

Directional Drilling and Placement of a Collection System Adjacent to 36-Inch to 42-Inch North-South Storm Sewer – Demolition Area

The rehabilitation of the north-south 36-inch to 42-inch storm sewer to watertight conditions would require provisions for the collection of and discharge of groundwater and its associated chemical constituents. The installation of a collection tile adjacent to the 36-inch to 42-inch storm sewer by directional drilling would provide a means for collection to occur. Directional drilling utilizes a steerable system for the installation of pipes, conduits and cables in a shallow arc using a surface launched drilling rig.

GRP Liner System in North-South 66-Inch to 90-Inch Storm Sewer – Demolition Area

Rehabilitation of the north-south 66-inch to 90-inch storm sewer from manhole ST8 to the SWDF would involve chemical grouting to seal the numerous leaking joints, and the installation of a prefabricated liner system. Liner systems typically do not provide structural support, and are recommended for structurally sound sewers, as is the case for the storm sewer reach from manhole ST8 to the SWDF.

Directional Drilling and Placement of a Collection System Adjacent to the 66-Inch to 90-Inch North-South Storm Sewer – Demolition Area

The rehabilitation of the north-south 66-inch to 90-inch storm sewer to watertight conditions would require provisions for the collection of and discharge of groundwater and its associated chemical constituents. The installation of collection tile adjacent to the 66-inch to 90-inch storm sewer by directional drilling would provide a means for collection to occur. Directional drilling utilizes a steerable system for the installation of pipes, conduits and cables in a shallow arc using a surface launched drilling rig.

Rehabilitation of West-East 30-Inch Storm Sewer and Laterals North of Plant 14

The existing section of west-east 27-inch to 30-inch diameter reinforced concrete storm sewer between ST108 and Diverter Chamber #2 has been identified by previous investigations (EEC 2002) as having some leaky joints, but being structurally sound. Additionally, storm sewer sampling and analyses (EEC 2002) in this section of the storm sewer and its related laterals has identified areas of interest at manholes ST108A and ST112, primarily due to elevated PCB concentrations in the sediments collected from those manholes. Prior to rehabilitating the north-south 66-inch storm sewer, remedial measures would be required to correct the leaky joints in the west-east 30-inch storm sewer and to address the contaminant issues at manholes ST108 and ST112. A cured-in-place liner is recommended for the storm sewer line and its related laterals and manholes.

Identification and Elimination of Storm Sewer Cross-Connections Beneath Plants 14, 49, and 5 and 23

The Outfall 001 Flow Rate Study (EEC 2002) identified an average daily dry weather flow rate of 50.1 gpm originating from the Plant 14, 49, and 5 and 23 manufacturing complex. It was concluded that the flow rate of 50.1 gpm during dry weather flow may be attributable to inflow from cross-connections from within Plant 14, Plant 49, or Plants 5 and 23, or due to excessive infiltration. Evidence of infiltration which would contribute dry weather flows to manhole ST8 was observed at the invert of the north-south 66-inch pipe at manhole ST16, and in the 24-inch west-east lateral located under Plant 14. Evidence of water-soluble oil and grease was also observed during the videotaped inspection of the 24-inch west-east lateral located under Plant 14, suggesting a possible cross-connection. Prior to rehabilitating the north-south 66-inch storm sewer conveying stormwater to Outfall 001, the sources of the infiltration/inflow would have to be identified and eliminated.

Investigation of Storm Sewer from Manhole ST13H to Manhole ST13

The reach of storm sewer from manhole ST13H to manhole ST13 has not been cleaned or videotaped due to electrical Substation 'O' being situated directly over the line. It is recommended that this reach of storm sewer be investigated prior to rehabilitating the 36-inch to 42-inch north-south storm sewer.

Rehabilitation of Storm Sewer from Manhole ST400 to Manhole ST13A

A videotaped inspection review of the storm sewer line extending from ST400 to ST13A (EEC 2002) has identified that the sewer is characterized mainly by separated and offset joints. A pipe break also exists south of manhole ST404. In general, the storm sewer is in poor condition. Additionally, at manhole ST410, the presence of suspended oil and grease in the stormwater suggests a cross-connection between a plant process or machinery and the storm sewer system. Prior to implementing a rehabilitation of the 36-inch to 42-inch storm sewer from ST11A to the SWDF, the section of storm sewer from manholes ST400 to ST13A would require an investigation to eliminate the potential cross-connections. Rehabilitation by excavation and replacement of the north-south storm sewer between ST400 and ST405 is recommended due to the shallow depths and pipe diameters associated with the sewer in this reach. Installation of a cured in place liner from manholes ST405 to ST13A is recommended, which would eliminate infiltration and its associated chemical constituents.

Manhole Abandonment/Rehabilitation

Rainfall induced infiltration can occur through manhole defects, including frame, chimney, wall and base defects. Walls are particularly susceptible to rainfall induced infiltration if their construction consists of brick walls with deteriorated mortar, as is the case for the main line storm sewer manholes in the Demolition Area, with the exception of ST6.

Alternatives for addressing the Demolition Area manholes include abandonment, rehabilitation, or reconstruction. Abandonment is suggested for those manholes that are currently covered, are in close proximity to an accessible manhole, and thus do not service the storm sewer line on which it is located (e.g. manhole ST11D). Rehabilitation is recommended for those manholes, both accessible and inaccessible (e.g. manhole ST11C), which are located at a change in size, direction, or gradient. Rehabilitation may consist of internal repairs, external repairs, or excavation and reconstruction. Internal repairs are typically less effective for infiltration control but remain economical and less intrusive than exterior repairs. Hydrostatic forces from the groundwater table and rainfall induced infiltration remain the largest hindrance to performing interior repairs. Exterior repairs require excavation and are thus more costly than interior repairs, but are more effective in controlling infiltration. Similarly, reconstruction would involve excavation, and are thus more costly than interior repairs, but are more effective in controlling infiltration. As excavation in the Demolition Area would not disrupt vehicular traffic or plant operations, and would pose minimal damage or interruption to utilities, the more effective exterior repairs or reconstruction are recommended as alternatives for manhole rehabilitation.

Elimination of Infiltration/Inflow Through Demolition Area

The Outfall 001 Flow Rate Study (EEC 2002) identified an average daily dry weather flow rate of 56.2 gpm between the combined flows of manholes ST11A and ST8 to ST5, originating from the Demolition Area. During wet weather flow periods, the peak infiltration / inflow / RII between the combined flows of manholes ST11A and ST8 to ST5 was 334.1 gpm. A review of the storm sewer inspection videotapes (EEC 2002), has also indicated that numerous unplugged laterals are present in the reach of storm sewer pipe from manhole ST6 to manhole ST11A. Plugging of the laterals is recommended to eliminate the inflow sources.

Fill Basements and Flow Fill of Out-of-Service Laterals to Reduce Infiltration/Inflow and Rainfall Induced Infiltration

Demolition activities south of the Plants 14, 49, and 5 and 23 manufacturing complex have resulted in open basements that detain stormwater runoff and groundwater during and following rain events. The Outfall 001 Flow Rate Study (EEC 2002) has identified that the stored volume of water potentially surcharges unplugged laterals that connect the basements to the Outfall 001 storm sewers, resulting in delayed inflow to the storm sewer system. To remedy the situation, Alternative #9 assumes that the basements will be properly filled by others.

Laterals typically represent approximately 50 percent or more of the total length of the collection system piping. Infiltration, inflow, and RII in laterals may thus contribute a significant quantity of water to the total stormwater runoff. Proper abandonment of the out-of-service laterals in the Demolition Area using flowable fill would eliminate sources of infiltration, inflow, and rainfall induced infiltration.

Installation of Trench Cut-Off Walls (Trench Plugs)

The PCB Filtration and Infiltration Study (EEC 2002) has identified that elevated concentrations of sediments, and oil and grease were detected at manhole ST4, the lowermost manhole in the system prior to the SWDF. The results are likely due to the chemical and geotechnical influences found in the Demolition Area. A Limited Subsurface Investigation (EEC 2002) has also concluded that the hydrogeologic conditions characteristic of the storm sewer service areas in the Demolition Area are conducive to the rapid transport of water to sewer defects. In addition, granular backfill in pipe trenches can dewater surrounding soils, resulting in an increase in the potential for pipe settlement. Pipe settlement usually results in infiltration entry points along the storm sewer, due to the development of offset joints. The granular backfill also provides

for the creation of a hydraulic conduit, or French drain, along the exterior of the pipeline, providing a means for large quantities of water and its associated chemical constituents to become migratory.

The migration of groundwater can be alleviated by the addition of impermeable trench cut-off walls, or trench plugs, consisting of concrete, grout, or bentonite clay. The trench plugs would create an impermeable dam along the linear axis of the pipe reach, which would also prevent the migration of fines from being carried downstream.

5.3.2.2 EFFECTIVENESS

The combined effects of directional drilling and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF would be effective in reducing hydraulic loading to the SWDF. The 67.8-acre Outfall 001 drainage basin would be reduced by 45.5 acres, or approximately 67% of its total area. This alternative would also mitigate the detention and treatment of stormwater at the SWDF.

5.3.2.3 IMPLEMENTABILITY

The implementation of directional drilling and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF is a technically feasible alternative to reduce hydraulic loading to the SWDF. From an economical perspective, the potential for escalating costs for implementing this alternative would render this alternative to be uneconomical due to the costs associated with the directional drilling techniques. The area between the north-south storm sewers requiring excavation is located in the Demolition Area, which contains many subsurface building remnants such as basement walls, footings, piers, and reinforced concrete slabs. In addition, significant operation and maintenance costs for continued operation of the SWDF would be a consideration due to the equipment inherent to this type of operation.

5.3.2.4 SUMMARY

The combined effects of directional drilling and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF would be effective in reducing hydraulic loading to the SWDF, although the potential for cost overruns associated with this alternative would render it to be uneconomical.

The construction cost estimates associated with implementing the directional drilling and storm sewer rehabilitation to bypass the rooftop stormwater drainage system from Plants 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 around the SWDF are presented in Table 5.2.

5.3.3 ALTERNATIVE #10 - MODIFICATIONS TO THE SWDF

5.3.3.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #10

Rerouting Detained Stormwater from the SWDF Basin Through Upgraded Corrugated Plate Interceptor and Granular Activated Carbon Systems

Under wet weather conditions, during periods of high intensity or long duration precipitation events, stormwater flows to the SWDF of up to 23,500 gpm are pumped by two wet weather Archimedes screw pumps, which discharge to the 2,000,000 gallon capacity SWDF basin for temporary storage. As a final step prior to being discharged to the City of Pontiac storm sewer system, approximately 100 to 200 gpm of the water that was discharged to the SWDF basin for storage is recirculated through existing corrugated plate interceptor (CPI) units for oil removal, with subsequent treatment through granular activated carbon (GAC) units for PCB removal. The remainder of the detained stormwater is pumped directly through the GAC units. Currently, the maximum treatment capacities of the CPI and GAC units are approximately 2,400 gpm and 700 to 800 gpm, respectively. The CPI treatment system consists of four CPI units, each containing six packs of corrugated plates. The GAC treatment system consists of a four-stage process. Stages 1 and 2 reduce the possibility of plugging the GAC units of Stages 3 and 4 with suspended solids.

Currently, drawdown of the detention basin when at full capacity via the GAC units requires approximately 2 to 3 days, if there are no concurrent precipitation events. An increase in the treatment capacity of the detained stormwater would involve installing additional CPI and GAC units. Rerouting all detained stormwater through CPI units would achieve the following objectives: minimize the backwash cycles of the GAC units (currently 3 hours / day), thus increasing the daily volumetric treatment capacity of the detained stormwater; and a reduction in the oil concentration of the detained stormwater prior to treatment through the GAC units, reducing the probability of fouling the prefilters and the GAC units. Detained stormwater would be routed to the CPI units via the existing detention basin drain channel.

Expansion of Existing SWDF Basin and Pumping Capacity

The Storm Runoff Simulation Model identified that the present 2,000,000 gallon capacity of the SWDF basin can provide storage for approximately 33 percent of a 6,600,000 gallon, 25-year, 24-hour rainfall event, when the existing contributing area is taken into account.

Expansion of the existing SWDF basin and the dry weather flow pumping capacity has thus been considered as a feasible alternative, contingent on the approaches taken to reduce stormwater flows to the SWDF. Construction of a new detention basin and structure to house equipment upstream of the existing detention basin would allow for the temporary storage of stormwater until treatment capacity becomes available. During periods of dry weather flow, stored stormwater would be routed for subsequent treatment through the CPI and GAC units. Figure 5.12 illustrates the areas and storm sewers affected by the expansion of the SWDF basin and pumping capacity.

5.3.3.2 EFFECTIVENESS

Rerouting detained stormwater from the SWDF basin through upgraded CPI and GAC systems, with the construction of an additional SWDF basin and pumping capacity would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain and treat a significant portion of the stormwater conveyed to Outfall 001. The 67.8-acre Outfall 001 drainage basin would not be reduced. Implicit in this alternative are the operation and maintenance costs associated with the detention and treatment of stormwater at the SWDF.

5.3.3.3 IMPLEMENTABILITY

The implementation of rerouting detained stormwater from the SWDF basin through upgraded CPI and GAC systems, with the construction of a detention basin and pumping facility, is a technically feasible alternative to detain and treat stormwater runoff from a 25-year, 24-hour storm event. From an economical perspective, the costs for implementing this alternative may be prohibitive due to the costs associated with excavation of soils, construction, and long-term operation and maintenance.

5.3.3.4 SUMMARY

Rerouting detained stormwater from the SWDF basin through upgraded CPI and GAC systems, with an expansion of SWDF basin and pumping capacity would not be effective in reducing hydraulic loading to the SWDF, but is a technically feasible

alternative to detain and treat stormwater runoff from a 25-year, 24-hour storm event. From an economical perspective, the costs for implementing this alternative may be prohibitive due to the costs associated with land acquisition, construction, and long-term operation and maintenance. Although the construction costs appear to present this alternative as an economically sound approach, it can be predicted that a realistic assessment of yearly operation and maintenance costs will result in the costs being unmanageably high.

The construction cost estimates associated with implementing an expansion of the SWDF basin and pumping capacity are presented in Table 5.2.

5.3.4 ALTERNATIVE #11 - DIVERSION OF PEAK FLOWS TO BYPASS THE SWDF

Diverting the peak flows of storm events to bypass the SWDF has been considered as a feasible option, contingent on providing demonstrable supporting documentation to the respective regulatory agencies that no PCB concentrations are detected in stormwater during the center of mass of runoff.

Analytical results from the PCB Filtration and Infiltration Study (EEC 2002) and interviews with SWDF personnel have indicated that contaminant loadings in stormwater runoff to Outfall 001 are highest during the rising limb of a storm event, often referred to as the "first flush" effect. Following the first flush phenomena, a decrease in contaminant loading was observed during the center of mass of runoff. During the trailing limb of the storm event, contaminant loadings were observed to increase, possibly due to a time lag effect resulting from delayed infiltration and inflow.

5.3.4.1 ACTIVITY REQUIRED TO IMPLEMENT ALTERNATIVE #11

Construction of a Flow Control Structure

Diverting peak flows would involve constructing a control structure equipped with metering equipment located immediately north of the SWDF. During storm events of a prescribed intensity and duration, peak flows would bypass the SWDF directly to the City of Pontiac storm sewer system. During dry weather flow periods, and for the rising and trailing limb periods of a storm event, infiltration and stormwater runoff treatment would be provided by the SWDF and an additional 500,000 gallon detention basin.

5.3.4.2 EFFECTIVENESS

The diversion of peak flows to bypass the SWDF would be effective in reducing hydraulic loading to the SWDF during peak flow periods. The 67.8-acre Outfall 001 drainage basin would be reduced by 45.5 acres, or approximately 67% of its total area. Implicit in this alternative are the operation and maintenance costs associated with the detention and treatment of stormwater at the SWDF.

5.3.4.3 IMPLEMENTABILITY

The implementation of diversion of peak flows to bypass the SWDF is a technically feasible alternative, but would not be administratively feasible. Due to the NPDES permit limitations at Outfall 001, long-term sampling and documentation would be required to demonstrate that PCB concentrations are non-detectable in the diverted portion of the stormwater runoff.

5.3.4.4 SUMMARY

The diversion of peak flows to bypass the SWDF would be effective in reducing hydraulic loading to the SWDF during peak flow periods, but would not be administratively feasible.

The construction cost estimates associated with implementing the diversion of peak flows to bypass the SWDF are presented in Table 5.2.

5.3.5 ALTERNATIVE #12 - CONSTRUCTION OF A STORMWATER DETENTION POND - DEMOLITION AREA

5.3.5.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #12

Construction of a New Stormwater Detention Pond and Pump Station

The Storm Runoff Simulation Model identified that the present 2,000,000 gallon capacity of the SWDF basin can provide storage for approximately 33 percent of a 6,600,000 gallon, 25-year, 24-hour rainfall event, when the existing contributing area is taken into account. The construction of a new stormwater detention pond has been considered as a feasible option to provide the additional storage capacity required.

The detention pond would attenuate flows to the SWDF and provide additional storage capacity during wet weather flow periods. Due to the difference in elevation of approximately 29-feet between the ground surface in this area in relation to the storm

sewer pipe invert elevation, a pump station will be required to lift the stormwater into the detention pond. The water level within the basin would be controlled by an overflow weir or adjustable control structure allowing for the conveyance of the detained water to the SWDF. The detention pond would require an impermeable liner to prohibit surrounding groundwater from infiltrating and also to prevent exfiltration. Figure 5.13 illustrates the Outfall 001 drainage basin areas affected by the construction of a stormwater detention pond in the Demolition Area.

Excavation activities in the Demolition Area will raise issues regarding the proper handling and disposal of the excavated soil.

Alternate - Modification of Former Plant 9 Basement into a Stormwater Detention Basin and Pump Station

The revised Storm Runoff Simulation Model identified that the present 2,000,000 gallon capacity of the SWDF basin can provide storage for approximately 33 percent of a 6,600,000 gallon, 25-year, 24-hour rainfall event, when the existing contributing area is taken into account.

The former Plant 9 basement can be utilized for the temporary storage of stormwater. The basement has an area of approximately 55,000 square feet and the elevation of the base is approximately 953 feet. The invert elevations of manholes ST8 and ST11A are approximately 944.5 and 947.4 feet, respectively. Numerical modeling indicates that a 3-foot diameter diversion pipe can be constructed from manhole ST8 west to manhole ST11. To utilize the full volume of the basement, the head difference would be overcome by constructing a pump station with high capacity screw pumps. The pumps would lift intercepted stormwater from a new wetwell constructed at manhole ST11. A new 2-foot diameter sewer pipe can be constructed from manhole ST11 to the SWDF, thereby allowing for the abandonment of the existing parallel pipe configuration through the Demolition Area.

It should be noted that excavation activities in the Demolition Area would likely involve issues regarding the proper handling and disposal of the excavated soils.

5.3.5.2 EFFECTIVENESS

The construction of a stormwater detention pond and pump station would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain and attenuate for subsequent treatment a significant portion of the stormwater conveyed to

Outfall 001. Implicit in this alternative are the operation and maintenance costs associated with the pumping, detention and treatment of stormwater at the SWDF.

5.3.5.3 IMPLEMENTABILITY

The implementation of a stormwater detention pond and pump station is a technically feasible alternative to detain stormwater runoff from a 25-year, 24-hour storm event. From an economical perspective, the costs for implementing this alternative may be prohibitive due to the costs associated with the excavation and disposal of soils from the Demolition Area, and the operation and maintenance of the pumping facility and detention pond.

5.3.5.4 SUMMARY

The construction of a stormwater detention pond and pump station would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain and attenuate for subsequent treatment a significant portion of the stormwater conveyed to Outfall 001. From an economical perspective, the costs for implementing this alternative may be prohibitive.

The construction cost estimates associated with implementing the construction of a stormwater detention pond and pump station are presented in Table 5.1. The construction cost estimate associated with implementing the Plant 9 basement as a detention basin has not been prepared in lieu of the more conservative cost estimate of constructing a new detention pond. It should be noted that construction costs do not include characterization analyses and disposal costs for excavated material. Additional construction costs incurred during the excavation and handling of contaminated materials (i.e. personal protective equipment, decontamination, etc.) have not been accounted for.

5.3.6 ALTERNATIVE #13 - CONSTRUCTION OF A GROUNDWATER CONTROL DETENTION POND - DEMOLITION AREA

5.3.6.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #13

Construction of a Groundwater Control Detention Pond

The construction of a detention pond / wetland in the Demolition Area along the perimeter of the GM property line from Glenwood Avenue to Saginaw Street, parallel to Montcalm Avenue, has been considered as a feasible option for storing groundwater infiltration and controlling groundwater movement. Due to the maximum difference in elevation of approximately 21 feet between the ground surface in the Demolition Area in relation to Montcalm Avenue, seeps often result at the toe of the embankment on Montcalm. The construction of a detention pond would require the removal of the embankment, which is composed of historically placed foundry fill, placed to a depth of the approximate elevation of Montcalm Avenue, and the further excavation of the detention pond itself. The depth and length of the detention pond would allow groundwater control through infiltration by becoming a sink for the groundwater located north of the pond. The free surface of the detained groundwater, located approximately 4-feet below the elevation of Montcalm Avenue, would be controlled by an overflow weir or adjustable control structure allowing for the conveyance of the detained water to the SWDF. Figure 5.14 illustrates the Outfall 001 drainage basin areas affected by the construction of a groundwater control detention pond in the Demolition Area.

Excavation activities in the Demolition Area will raise issues regarding the proper handling and disposal of the excavated soils. Additionally, the north-south 66-inch to 90-inch storm sewer pipe and its tributaries would require rehabilitation to watertight conditions so that stormwater runoff originating to the north of the Demolition Area will bypass the SWDF.

Rehabilitation of West-East 30-Inch Storm Sewer North of Plant 14

The existing section of west-east 27-inch to 30-inch diameter reinforced concrete storm sewer between ST108 and Diverter Chamber #2 has been identified by previous investigations (EEC 2002) as having some leaky joints, but being structurally sound. Additionally, storm sewer sampling and analyses (EEC 2002) in this section of the storm sewer and its related laterals has identified areas of interest at manholes ST108A and ST112, primarily due to elevated PCB concentrations in the sediments collected from

those manholes. Prior to rehabilitating the north-south 66-inch storm sewer, remedial measures would be required to correct the leaky joints in the west-east 30-inch storm sewer and to address the contaminant issues at manholes ST108 and ST112. A cured-in-place liner is recommended for the storm sewer line and its related laterals and manholes.

Identification and Elimination of Storm Sewer Cross-Connections Beneath Plants 14, 49, and 5 and 23

The Outfall 001 Flow Rate Study (EEC 2002) identified an average daily dry weather flow rate of 50.1 gpm originating from the Plant 14, 49, and 5 and 13 manufacturing complex. It was concluded that the flow rate of 50.1 gpm during dry weather flow may be attributable to inflow from cross-connections from within Plant 14, Plant 49, or Plants 5 and 23, or due to excessive infiltration. Evidence of infiltration which would contribute dry weather flows to manhole ST8 was observed at the invert of the north-south 66-inch pipe at manhole ST16, and in the 24-inch west-east lateral located under Plant 14. Evidence of water soluble oil and grease was also observed during the videotaped inspection of the 24-inch west-east lateral located under Plant 14, suggesting a possible cross-connection. Prior to rehabilitating the north-south 66-inch storm sewer conveying stormwater to Outfall 001, the sources of the infiltration/inflow would have to be identified and eliminated.

Elimination of Infiltration/Inflow and RII Through the Demolition Area

The Outfall 001 Flow Rate Study (EEC 2002) identified an average daily dry weather flow rate of 56.2 gpm between the combined flows of manholes ST11A and ST8 to ST5, originating from the Demolition Area. During wet weather flow periods, the peak infiltration/inflow/RII between the combined flows of manholes ST11A and ST8 to ST5 was 334.1 gpm.

Flow Fill of Out-of-Service Laterals to Reduce Infiltration/Inflow and Rainfall Induced Infiltration

Laterals typically represent approximately 50 percent or more of the total length of the collection system piping. Infiltration, inflow, and RII in laterals may thus contribute a significant quantity of water to the total stormwater runoff. Proper abandonment of the out-of-service laterals in the Demolition Area using flowable fill would eliminate sources of infiltration, inflow, and rainfall induced infiltration.

Channeline North-South 66-Inch to 90-Inch Storm Sewer – Demolition Area

Rehabilitation of the north-south 66-inch to 90-inch storm sewer from manhole ST8 to the SWDF would involve chemical grouting to seal the numerous leaking joints, and the installation of a prefabricated liner system. Liner systems typically do not provide structural support, and are recommended for structurally sound sewers, as is the case for the storm sewer reach from manhole ST8 to the SWDF.

Manhole Rehabilitation

RII can occur through manhole defects, including frame, chimney, wall and base defects. Walls are particularly susceptible to RII if their construction consists of brick walls with deteriorated mortar, as is the case for the main line storm sewer manholes in the Demolition Area, with the exception of manhole ST6.

Alternatives for addressing the Demolition Area manholes include rehabilitation or reconstruction. Rehabilitation may consist of internal repairs or external repairs. Internal repairs are typically less effective for infiltration control but remain economical and less intrusive than exterior repairs. Hydrostatic forces from the groundwater table and RII remain the largest hindrance to performing interior repairs. Exterior repairs require excavation and are thus more costly than interior repairs, but are more effective in controlling infiltration. Similarly, reconstruction would involve excavation, and are thus more costly than interior repairs, but are more effective in controlling infiltration. As excavation in the Demolition Area would not disrupt vehicular traffic or plant operations, and would pose minimal damage or interruption to utilities, the more effective exterior repairs or reconstruction are recommended as alternatives for manhole rehabilitation.

Installation of Trench Cut-Off Walls (Trench Plugs)

The PCB Filtration and Infiltration Study (EEC 2002) has identified that elevated concentrations of sediments, and oil and grease were detected at manhole ST4, the lowermost manhole in the system prior to the SWDF. The results are likely due to the chemical and geotechnical influences found in the Demolition Area. A Limited Subsurface Investigation (EEC 2002) has also concluded that the hydrogeologic conditions characteristic of the storm sewer service areas in the Demolition Area are conducive to the rapid transport of water to sewer defects. In addition, granular backfill in pipe trenches can dewater surrounding soils, resulting in an increase in the potential for pipe settlement. Pipe settlement usually results in infiltration entry points along the storm sewer, due to the development of offset joints. The granular backfill also provides for the creation of a hydraulic conduit, or French drain, along the exterior of the

pipeline, providing a means for large quantities of water and its associated chemical constituents to become migratory.

The migration of groundwater can be alleviated by the addition of impermeable trench cut-off walls, or trench plugs, consisting of concrete, grout, or bentonite clay. The trench plugs would create an impermeable dam along the linear axis of the pipe reach, which would also prevent the migration of fines from being carried downstream.

Construction of a SWDF Bypass Culvert

The rehabilitation of the 66-inch to 90-inch north-south storm sewer to watertight conditions throughout the Demolition Area would require the construction of a bypass culvert to reroute stormwater flows around the SWDF to the City of Pontiac storm sewer system, thus bypassing the treatment stages of the SWDF.

5.3.6.2 EFFECTIVENESS

The construction of groundwater control detention pond and the rehabilitation of the north-south storm sewers to watertight conditions would be minimally effective in reducing hydraulic loading to the SWDF, while detaining for subsequent treatment a significant portion of the groundwater in the Demolition Area. Implicit in this alternative are the operation and maintenance costs associated with the detention and treatment of stormwater at the SWDF.

5.3.6.3 IMPLEMENTABILITY

The implementation of a groundwater control detention pond is a technically feasible alternative to control and detain groundwater. From an economical perspective, the costs for implementing this alternative would be prohibitive due to the costs associated with the excavation and disposal of soils from the Demolition Area, and the maintenance of the detention pond.

5.3.6.4 SUMMARY

The construction of groundwater control detention pond and the rehabilitation of the north-south storm sewers to watertight conditions would be minimally effective in reducing hydraulic loading to the SWDF and would detain a significant portion of the groundwater in the Demolition Area for subsequent treatment. From an economical perspective, the costs for implementing this alternative would be prohibitive.

The construction cost estimates associated with implementing the construction of a groundwater control detention pond and the rehabilitation of the north-south storm sewers to watertight conditions are presented in Table 5.2. It should be noted that construction costs do not include characterization analyses and disposal costs for excavated material. Additional construction costs incurred during the excavation and handling of contaminated materials (i.e. personal protective equipment, decontamination, etc.) have not been accounted for.

5.3.7 ALTERNATIVE #14 - CONSTRUCTION OF A FLOW RATE CONTROL STRUCTURE UPSTREAM OF THE SWDF

5.3.7.1 ACTIVITY REQUIRED TO IMPLEMENT ALTERNATIVE #14

The construction of a control structure upstream of the SWDF would limit the stormwater flows to the pumping rate of the screw pumps (23,500 gpm) until the detention basin reaches capacity. This approach is feasible for precipitation events that do not result in stormwater quantities that exceed the storage capacity of the SWDF basin. Limiting the flows would result in surcharging of the sewer system, which would require an evaluation of potential upstream impacts. Manhole ST4 is located on the public sidewalk north of Montcalm Avenue. Reconstruction of the manhole would be necessary to provide reinforcement against surcharging. Thus this approach would have limited feasibility for short duration, low intensity precipitation events that do not result in prolonged surcharging and its adverse upstream conditions, and for those storm events that do not exceed the storage capacity of the SWDF basin.

5.3.7.2 EFFECTIVENESS

Construction of a flow rate control structure upstream of the SWDF would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain for subsequent treatment a portion of the stormwater conveyed to Outfall 001. Implicit in this alternative are the operation and maintenance costs associated with the detention and treatment of stormwater at the SWDF.

5.3.7.3 IMPLEMENTABILITY

The implementation of a flow rate control structure upstream of the SWDF is a technically feasible alternative to detain for subsequent treatment stormwater runoff. From an economical perspective, the costs for implementing this alternative would be prohibitive due to the limited benefits gained from the limited volume of storm pipe available for storage.

5.3.7.4 SUMMARY

Construction of a flow rate control structure upstream of the SWDF would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain for subsequent treatment a portion of the stormwater conveyed to Outfall 001. While this alternative is a technically feasible alternative, from an economical perspective, the costs would be prohibitive due to the limited benefits gained from the limited volume of storm pipe available for storage.

The construction cost estimates associated with implementing a flow rate control structure upstream of the SWDF are presented in Table 5.2.

5.3.8 ALTERNATIVE #15 - CONSTRUCTION OF AN UNDERGROUND DETENTION CHAMBER - DEMOLITION AREA

5.3.8.1 ACTIVITY REQUIRED TO IMPLEMENT ALTERNATIVE #15

In the interest of conserving aboveground land area for future development, the construction of an underground stormwater retention chamber in the Demolition Area has been considered. Stormwater chambers are typically placed below parking areas or recreational areas. Using a control structure, the chamber would be used to divert and detain wet weather stormwater flows that exceed the design capacity of the screw pumps or the detention basin storage volume. During dry weather flow periods, the detained stormwater would be pumped to the SWDF for treatment. Figure 5.15 illustrates the Outfall 001 drainage basin areas affected by the construction of an underground detention chamber in the Demolition Area.

5.3.8.2 EFFECTIVENESS

The construction of an underground detention chamber would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain and attenuate for subsequent treatment a significant portion of the stormwater conveyed to Outfall 001. Implicit in this alternative are the operation and maintenance costs associated with the detention and treatment of stormwater at the SWDF.

5.3.8.3 IMPLEMENTABILITY

The implementation of an underground detention chamber is a technically feasible alternative to detain stormwater runoff from a 25-year, 24-hour storm event. From an economical perspective, the costs for implementing this alternative would be prohibitive

due to the costs associated with the excavation and disposal of soils from the Demolition Area, and the operation and maintenance costs associated with this type of facility.

5.3.8.4 SUMMARY

The construction of an underground detention chamber would not be effective in reducing hydraulic loading to the SWDF, but alternately, would detain and attenuate for subsequent treatment a significant portion of the stormwater conveyed to Outfall 001. From an economical perspective, the costs for implementing this alternative would be prohibitive.

The construction cost estimates associated with implementing an underground detention chamber in the Demolition Area are presented in Table 5.2. It should be noted that construction costs do not include characterization analyses and disposal costs for excavated material. Additional construction costs incurred during the excavation and handling of contaminated materials (i.e., personal protective equipment, decontamination, etc.) have not been accounted for.

5.3.9 ALTERNATIVE #16 - STORMWATER DETENTION/ RETENTION IMPLEMENTING PLANT 49 ROOFTOP

5.3.9.1 ACTIVITIES REQUIRED TO IMPLEMENT ALTERNATIVE #16

Stormwater Detention on Plant 49 Rooftop

Rooftop stormwater detention (storage) are incorporated to reduce the peak rate of discharge of stormwater to the storm sewer system. Excess flow resulting from the most intense portion of the storm event is stored, and subsequently released as the conveyance capacity of the storm sewer system becomes available. Rooftop storage involves the use of perforated weirs placed around the rooftop inlets of the stormwater downspouts. The weirs cause water to pond on the roof and be released at a reduced rate until a maximum design depth is reached. Once the design depth is exceeded, the weirs overflow, allowing the downspouts to function at their peak capacity. During most storm events, stormwater will not be stored, as the weirs are designed to allow the runoff from these events to drain to the downspouts. During larger storm events, stormwater will accumulate.

The Plant 49 rooftop is amenable to rooftop storage, as it is a flat roof that ultimately conveys stormwater to Outfall 001 (excluding the northeast quadrant).

Stormwater Retention on Plant 49 Rooftop - Vegetated Roof Cover (Green Roof)

Vegetated roof covers are typically composed of growth media and vegetation situated on a high quality waterproof membrane. The vegetated cover captures, retains, and filters stormwater runoff. Green roofs conserve energy by keeping rooftops cool in the summer and insulated in the winter. Factors to be considered are the load bearing capacity of the roof deck, the moisture and root penetration resistance of the roof membrane, roof slope and shape, hydraulics, and wind shear.

The Plant 49 rooftop is amenable to a vegetated roof cover, as it is a flat roof that ultimately conveys stormwater to Outfall 001 (excluding the northeast quadrant).

5.3.9.2 EFFECTIVENESS

Stormwater detention/retention implementing the Plant 49 rooftop would not be effective in reducing the volume of hydraulic loading to the SWDF, but would detain/retain a portion of the peak stormwater flows conveyed to Outfall 001 for subsequent treatment. Implicit in this alternative are the operation and maintenance costs associated with the detention and treatment of stormwater at the SWDF.

5.3.9.3 IMPLEMENTABILITY

The implementation of stormwater detention using the Plant 49 rooftop is a technically feasible alternative to detain stormwater runoff. From an economical perspective, the costs for implementing this alternative may be prohibitive due to the limited benefits associated with this approach.

The implementation of stormwater retention using a vegetative roof cover on the Plant 49 rooftop may not be a technically feasible alternative to detain stormwater runoff due to the relatively short growing season in Michigan. From an economical perspective, the costs for implementing this alternative may be prohibitive due to the limited benefits associated with this approach.

5.3.9.4 SUMMARY

Stormwater detention/retention implementing the Plant 49 rooftop would not be effective in reducing the volume of hydraulic loading to the SWDF, but would detain/retain a portion of the peak stormwater flows conveyed to Outfall 001 for subsequent treatment. From an economical perspective, the costs for implementing these alternatives may be prohibitive due to the limited benefits associated with either approach.

The construction cost associated with implementing stormwater detention/retention on the Plant 49 rooftop were not developed due to the limited benefit of this alternative.

5.4 EFFECTIVENESS OF ALTERNATIVES

The effectiveness of each Alternative in terms of reducing the areal extent of, or hydraulic loading to the Outfall 001 drainage basin is presented in Table 5.3. Alternatives #1 to #7 reduce the stormwater volumes conveyed to the SWDF through rerouting stormwater to an alternate outfall. Alternatives #8, #9, #11, and #14 reduce a significant portion of stormwater volumes conveyed to the SWDF through bypassing the SWDF. Alternative #13, the construction of a groundwater control detention pond, has no impact on reducing stormwater volumes conveyed to the SWDF, but is a measure to be used in conjunction with other Alternatives. Alternatives #10, #12, #15, and #16 do not reduce stormwater volumes conveyed to the SWDF, but provide additional storage capacity resulting in a decrease in overflows and attenuated flows at the SWDF.

6.0 SUMMARY AND CONCLUSIONS

The objective of the Storm Sewer Feasibility Analysis is to provide a comparative analysis of remedial alternatives with a recommended approach to attain the Storm Sewer Supplemental IM (EEC 2002) objectives. Alternatives were evaluated on the basis of effectiveness and both technical and economical implementability.

The remedial alternatives can be separated into the following three constructs: reduction of the hydraulic loading to the SWDF by diverting stormwater runoff to Outfall 002, detaining and treating a substantially greater volume of stormwater at the SWDF, and bypassing those portions of the stormwater runoff deemed to be uncontaminated around the SWDF while detaining and treating those portions deemed to be contaminated.

The remedial alternatives that have been identified as meeting the criteria of effectiveness, and implementability from both a technical and economical perspective consist of the following:

i) rerouting (by flow reversal, overhead rerouting, and limited excavation (Plant 49 northwest portion)) of rooftop stormwater drainage systems to Outfall 002;

ii) a collection/conveyance system, designed to convey rooftop stormwater drainage to a point downstream of the SWDF, while potentially contaminated water is collected within the existing storm sewers and delivered to the SWDF for treatment; and

iii) modifying the SWDF by increasing storage and treatment capacity.

Table 6.1 and Table 6.2 present a summary of the remedial alternatives and the associated construction cost estimates for alternatives involving diverting portions of the Outfall 001 drainage basin to an alternate outfall, or modifying the Outfall 001 storm sewer system, respectively. It should be noted that the construction cost estimates do not include costs for the handling and disposal of contaminated materials, and operation and maintenance costs.

6.1 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

Combining selected remedial alternatives into groups, referred to as “Options”, facilitates a comparative analysis of the remedial alternatives deemed to exhibit effectiveness, and technical and economic implementability. Options, in turn, are then compared to one another in subsets based on the degree of effectiveness (i.e. drainage

areas affected) that is afforded. Tables 6.3 and 6.4 present a summary of the Options and the associated construction cost estimates for Options involving diverting portions of the Outfall 001 drainage basin to an alternate outfall, or modifying the Outfall 001 storm sewer system, respectively.

6.1.1 REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5 AND PLANT 49 TO OUTFALL 002

The diversion of the Plant 14, Truck Dock 14-5, and Plant 49 rooftop stormwater drainage systems to Outfall 002 is addressed in the 'A' group of Options, denoted as Option A1 and Option A2. Options A1 and A2 do not address the stormwater runoff contribution to the SWDF from the Plants 5 and 23 rooftop stormwater drainage systems, nor from the Demolition Area.

6.1.1.1 OPTION A1 – REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5 AND PLANT 49 TO OUTFALL 002

Option A1 is comprised of the combination of remedial alternatives that would divert the Plant 14, Truck Dock 14-5, and Plant 49 rooftop stormwater drainage systems to Outfall 002 via flow reversal, overhead rerouting of downspouts, and limited excavation. Figure 6.1 illustrates the areas affected and new storm sewer reaches to be installed when evaluating Option A1. Table 6.1 presents the construction cost estimates for implementing the option. It should be noted that the construction cost estimates do not include costs incurred for the modification of the NPDES or General Stormwater Permit.

Rerouting stormwater runoff from the Plant 14, Truck Dock 14-5, and Plant 49 rooftop stormwater drainage systems to Outfall 002 via flow reversal, overhead rerouting of downspouts, and limited excavation does not address the infiltration, inflow, and rainfall induced infiltration contributed from the Demolition Area. A remedy for the situation in the Demolition Area would be accompanied by an increase in the capital cost, which has not been accounted for in the construction cost estimate presented for the option. Additionally, as this option involves activities that are to be executed in an active manufacturing environment, it is predicted that cost overruns may be incurred due to limited working hours, inclemental weather (i.e. rain, snow, snow melt), labor issues, etc.

6.1.1.2 OPTION A2 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5 AND PLANT 49 TO OUTFALL 002

Option A2 is comprised of the combination of remedial alternatives that would divert the Plant 14, Truck Dock 14-5, and Plant 49 rooftop stormwater drainage systems to Outfall 002 via overhead rerouting of downspouts and limited excavation (i.e., Option A2 excludes flow reversal). Figure 6.2 illustrates the areas affected and new storm sewer reaches to be installed when evaluating Option A2. Table 6.1 presents the construction cost estimates for implementing the option.

Rerouting stormwater runoff from the Plant 14, Truck Dock 14-5, and Plant 49 rooftop stormwater drainage systems to Outfall 002 via overhead rerouting of downspouts and limited excavation does not address the potential infiltration, inflow, and rainfall induced infiltration contributed from the Demolition Area. A remedy for the situation in the Demolition Area would be accompanied by an increase in the capital cost, which has not been accounted for in the construction cost estimate presented for the option. Additionally, as this option involves activities that are to be executed in an active manufacturing environment, it is predicted that cost overruns may be incurred due to limited working hours, inclemental weather (i.e., rain, snow, snow melt), labor issues, etc.

6.1.2 REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 TO OUTFALL 002

The diversion of the Plant 14, Truck Dock 14-5, Plant 49, and Plants 5 and 23 rooftop stormwater drainage systems to Outfall 002 is addressed in the 'B' group of Options, denoted as Option B1 and Option B2.

6.1.2.1 OPTION B1 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 TO OUTFALL 002

Option B1 is comprised of the combination of remedial alternatives that would divert the Plant 14, Truck Dock 14-5, Plant 49, and the Plants 5 and 23 rooftop stormwater drainage systems to Outfall 002 via flow reversal, overhead rerouting of downspouts and limited excavation. Figure 6.3 illustrates the areas affected and new storm sewer reaches to be installed when evaluating Option B1. Table 6.1 presents the construction cost estimates for implementing Option B1.

Option B1 involves activities that are to be executed in an active manufacturing environment, increasing the potential for cost overruns that may be incurred due to

limited working hours, inclemental weather (i.e. rain, snow, snow melt), labor issues, etc.

6.1.2.2 OPTION B2 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 TO OUTFALL 002

Option B2 is comprised of the combination of remedial alternatives that would divert the Plant 14, Truck Dock 14-5, Plant 49, and the Plants 5 and 23 rooftop stormwater drainage systems to Outfall 002 via a new storm sewer and lift station. Figure 6.4 illustrates the areas affected and new storm sewer reaches to be installed when evaluating Option B2. Table 6.1 presents the construction cost estimates for implementing the option.

Option B2 involves activities that are to be executed in an active manufacturing environment, a large portion of which are aging structures (Plants 5 and 23) that were constructed in sections with elevational dissimilarities. Therefore, there is an increased probability that significant cost overruns may be incurred due to limited working hours, reduced installation rates, inclemental weather (i.e., rain, snow, snow melt), labor issues, etc.

6.1.3 MODIFICATIONS TO THE OUTFALL 001 STORM SEWER SYSTEM

The conveyance of the Plant 14, Truck Dock 14-5, Plant 49, and Plants 5 and 23 rooftop stormwater drainage systems to Outfall 001 is addressed in the 'C' group of Options, denoted as Options C1, C2, and C3.

6.1.3.1 OPTION C1 – PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 TO OUTFALL 001

Option C1 is comprised of the combination of remedial alternatives that would divert the Plant 14, Truck Dock 14-5, Plant 49, and the Plants 5 and 23 rooftop stormwater drainage systems to downstream of the SWDF via a bypass, while collecting potentially contaminated water for subsequent treatment at the SWDF. Figure 6.5 illustrates the areas affected and new storm sewer reaches to be installed when evaluating Option C1. Table 6.2 presents the construction cost estimates for implementing the option.

The option of rerouting stormwater runoff from the Plant 14, Truck Dock 14-5, Plant 49, and the Plants 5 and 23 rooftop stormwater drainage systems to downstream of the

SWDF via a bypass, while collecting potentially contaminated water for subsequent treatment at the SWDF, also addresses the infiltration, inflow, and rainfall induced infiltration contributed from the Demolition Area.

Option C1 involves activities that occur largely within the sewer pipe reaches to be rehabilitated, therefore disruptions to the production environment of the manufacturing complex are not expected.

6.1.3.2 OPTION C2 – MODIFICATIONS TO THE SWDF

Option C2 consists of modifying the existing SWDF, as presented in Section 5.3.3. The alternative is presented in this section to facilitate a comparative analysis with other Options. Figure 6.6 illustrates the areas affected when evaluating Option C2. Table 6.2 presents the construction cost estimates for implementing the option.

Option C2 involves activities that occur primarily at the southern end of the property boundary, therefore disruptions to the production environment of the manufacturing complex are not expected. The operation and maintenance costs for the upgraded facility, which are not included in Table 6.2, are expected to be significant.

6.1.3.3 OPTION C3 – CONSTRUCTION OF A STORMWATER DETENTION BASIN – DEMOLITION AREA

Option C3 consists of constructing a new detention basin in the Demolition Area, or utilizing the existing Plant 9 basement as a detention basin, as presented in Section 5.3.5. The alternative is presented in this section to facilitate a comparative analysis with other Options. Figure 6.7 illustrates the areas affected when evaluating Option C3. Table 6.2 presents the construction cost estimates for implementing the option.

Option C3 involves activities that occur primarily at the southern end of the Site property, therefore disruptions to the production environment of the manufacturing complex are not expected. The operation and maintenance costs, which are not included in Table 6.2, are expected to be significant.

6.2 OUTFALL 001 STORM SEWER CORRECTIVE MEASURES

The recommended Outfall 001 storm sewer corrective measures to meet the objectives of the Feasibility Analysis involves evaluating those Options that can be implemented economically, are technically sound, and afford a high degree of effectiveness. Following is a discussion of each Option with the rationale for either discounting or

further recommending the development of detailed construction costs. It should be noted that environmental investigations at the Site are ongoing, and that decisions regarding the storm sewer corrective measure to be implemented are contingent on the analysis and integration of data with the storm sewer system, as information becomes available.

A complete summary of the corrective measures alternatives, with associated construction cost estimates, is presented in Table 6.3. A complete summary of the Options, with associated construction cost estimates, is presented in Table 6.4. Table 6.5 presents each of the Options discussed and the associated design rainfall frequency capability at Outfall 001 upon the implementation of each Option.

Option A1 and Option A2 involve the diversion of the Plant 14, Truck Dock 14-5, and Plant 49 rooftop stormwater drainage systems to Outfall 002 via flow reversal and/or overhead rerouting of downspouts, and limited excavation. The 'A' group of Options were developed with the consideration that the reduction of hydraulic loading to the SWDF could be addressed in a series of phased steps. Option A1, involving flow reversal by creating flooded conditions within a storm sewer reach, is not recommended due to the operation and maintenance costs associated with cleaning to remove sedimentation. Option A2, involving the overhead rerouting of downspouts to convey rooftop stormwater runoff to Outfall 002, would be expected to involve minimal operation and maintenance costs once installed. Inherent to Option A1 and Option A2 is the possibility that Outfall 002 cannot be utilized due to capacity restrictions of the downstream 78-inch storm sewer or the City of Pontiac Joslyn Drain. In that event, the construction of a new storm sewer reach would incur significant capital investment.

Option B1 involves the combination of remedial alternatives that would divert the Plant 14, Truck Dock 14-5, Plant 49, and the Plants 5 and 23 rooftop stormwater drainage systems to a new or existing storm sewer Outfall 002 via flow reversal, overhead rerouting of downspouts and limited excavation. Inherent to Option B1 is the possibility that Outfall 002 cannot be utilized due to capacity restrictions of the downstream 78-inch storm sewer or the City of Pontiac Joslyn Drain. In that event, the creation of a new outfall would incur significant capital investment. Additionally, although the construction cost estimate of Option B1 is less than that of Option B2, it should be noted, as discussed in Alternative #6, the overhead rerouting of the Plants 5 and 23 rooftop stormwater drainage system downspouts to a new or existing storm sewer and Outfall 002 may be a technically complex alternative to reduce hydraulic loading to the SWDF, due to the multi-level configuration of the structures involved. Consequently, significant cost overruns may be expected.

Option B2 involves the approach of diverting the stormwater runoff from the Plant 14, 49, and 5 and 23 manufacturing complex via a new storm sewer reach and lift station to Outfall 002 or other suitable outfall. Inherent to Option B2 is the possibility that Outfall 002 cannot be utilized due to capacity restrictions of the downstream 78-inch storm sewer or the City of Pontiac Joslyn Drain. In that event, the construction of a new storm sewer reach would incur significant capital investment. Additionally, the excavation of either a new storm sewer to Outfall 002, or to a new outfall, would involve the subsurface uncertainties expected to be encountered in a manufacturing facility containing numerous subsurface features such as basements, footings, piers, slabs, pipelines, contaminant issues, etc.

Option C1 involves the approach of modifying the current Outfall 001 storm sewer system to convey and bypass the stormwater runoff from the Plant 14, 49, and 5 and 23 manufacturing complex around the SWDF, while collecting potentially contaminated water from the Demolition Area for treatment at the SWDF. Option C1 involves known current conditions and an existing outfall. Additionally, with Option C1, the operation and maintenance costs of the SWDF would remain similar to or less than (due to reduced volume of water for treatment) current costs. Furthermore, as the implementation of Option C1 is entirely of a subsurface nature, the potential for the future demolition of existing structures in the Outfall 001 drainage basin will not affect the performance of this option. Conversely, those Options that involve in-plant modifications may result in losses to capital investments upon future renovations or demolitions to those structures.

Option C2 involves upgrading the existing SWDF equipment and the construction of a new stormwater detention basin to provide the additional storage capacity required. The detention pond would attenuate flows to the SWDF and provide additional storage capacity during wet weather flow periods. Although the construction costs appear to present Option C2 as an economically sound approach, it can be predicted that a realistic assessment of the yearly operation and maintenance costs will result in the costs for implementing this option to be significant.

Option C3 involves the construction of a new detention basin in the Demolition Area, or the modification of the existing Plant 9 basement to serve as a detention basin to provide the additional storage capacity required during wet weather flow periods. The detention basin would also attenuate flows to the existing SWDF. As the implementation of Option C3 is entirely of a subsurface nature, the potential for the future demolition of existing structures in the Outfall 001 drainage basin will not affect the performance of this option. Although the construction costs appear to present Option C3 as an economically sound approach, it can be predicted that a realistic

assessment of the yearly operation and maintenance costs, and the associated excavation of environmentally impacted soils in the Demolition Area will result in the costs for implementing this option to be significant.

6.2.1 OUTFALL 001 STORM SEWER CORRECTIVE MEASURES – RECOMMENDED APPROACH

The recommended approach to meet the objectives of the Feasibility Analysis involves evaluating the option that can be implemented economically, is technically sound, and affords a high degree of effectiveness.

It is recommended that the rehabilitation of the Outfall 001 storm sewer system, and the reduction of the hydraulic loading to the Stormwater Detention Facility (SWDF), involve Option #5, diverting the stormwater runoff from the Plant 14, 49, and Plant 14-5 Truck Dock rooftop stormwater drainage system via overhead rerouting of the downspouts to the Outfall 002 storm sewer system.

Diverting the stormwater runoff from the Plant 14, Plant 49, and Plant 14-5 Truck Dock via overhead rerouting of downspouts to Outfall 002 would include the following benefits: economically, the approach would be the best case scenario when comparing with other options; overhead rerouting would involve gravity flow, reducing the complexity of the system; overhead rerouting would significantly reduce hydraulic loading to the SWDF, thereby reducing operation and maintenance costs at the SWDF; the water quality of the Plant 14, 49, and Plant 14-5 Truck Dock rooftop stormwater runoff is not expected to be impacted by contaminants due to the age and materials used on the rooftops; and overhead rerouting of the rooftop stormwater runoff would avoid contact of the runoff with potentially contaminated groundwater that has infiltrated into the storm sewers.

Modeling results indicate that removing the stormwater runoff from the Plant 14, Plant 49, and Plant 14-5 Truck Dock via overhead rerouting of downspouts to Outfall 002 would eliminate overflows at the SWDF during a 10-year, 24-hour rain event of 3.0 inches.

Potential implications of adopting the approach of diverting the stormwater runoff from the Plant 14, 49, and Plant 14-5 Truck Dock via overhead rerouting of downspouts to Outfall 002 includes the possibility that Outfall 002 cannot be utilized due to capacity restrictions of the receiving sewer system, namely the City of Pontiac Joslyn Drain. In that event, the construction of a new storm sewer reach that would convey stormwater

to other areas (i.e. Harris Lake) would incur significant capital investment, unless plans for future Site development includes such a proposition. Additionally, the excavation of a new storm sewer would involve the subsurface uncertainties expected to be encountered in a manufacturing facility containing numerous subsurface features such as basements, footings, piers, slabs, pipelines, contaminant issues, etc. It should be noted that a detailed and calibrated model for the Outfall 002 storm sewer system, including those storm sewers extending from the Outfall 002 compliance point to Diverter Chamber #1 and the Joslyn Drain beyond, should be completed to determine the effect of contributing drainage areas and the associated storm sewer systems.

In considering the implementation of corrective measures for the Outfall 001 storm sewer system, it should be noted that those Options that involve in-plant modifications may result in losses to capital investments upon future renovations to, or demolitions of those structures. The corrective action for the Outfall 001 storm sewer system is ultimately contingent upon a coordinated decision involving Capital Projects, Facilities Management, and ENCORE personnel in consideration of the intended future uses or redevelopment of the Site or portions of the Site.

7.0 REFERENCES

- ENCORE. 2002. Supplemental RCRA Facility Investigation (RFI) Report No. 1, Pontiac North Campus – Appendix M, Storm Sewer Supplemental IM Report. General Motors Corporation, Pontiac, Michigan.
- GM. 2003. Stormwater Pollution Prevention Plan (SWPPP), Pontiac North Campus. General Motors Corporation, Pontiac, Michigan.

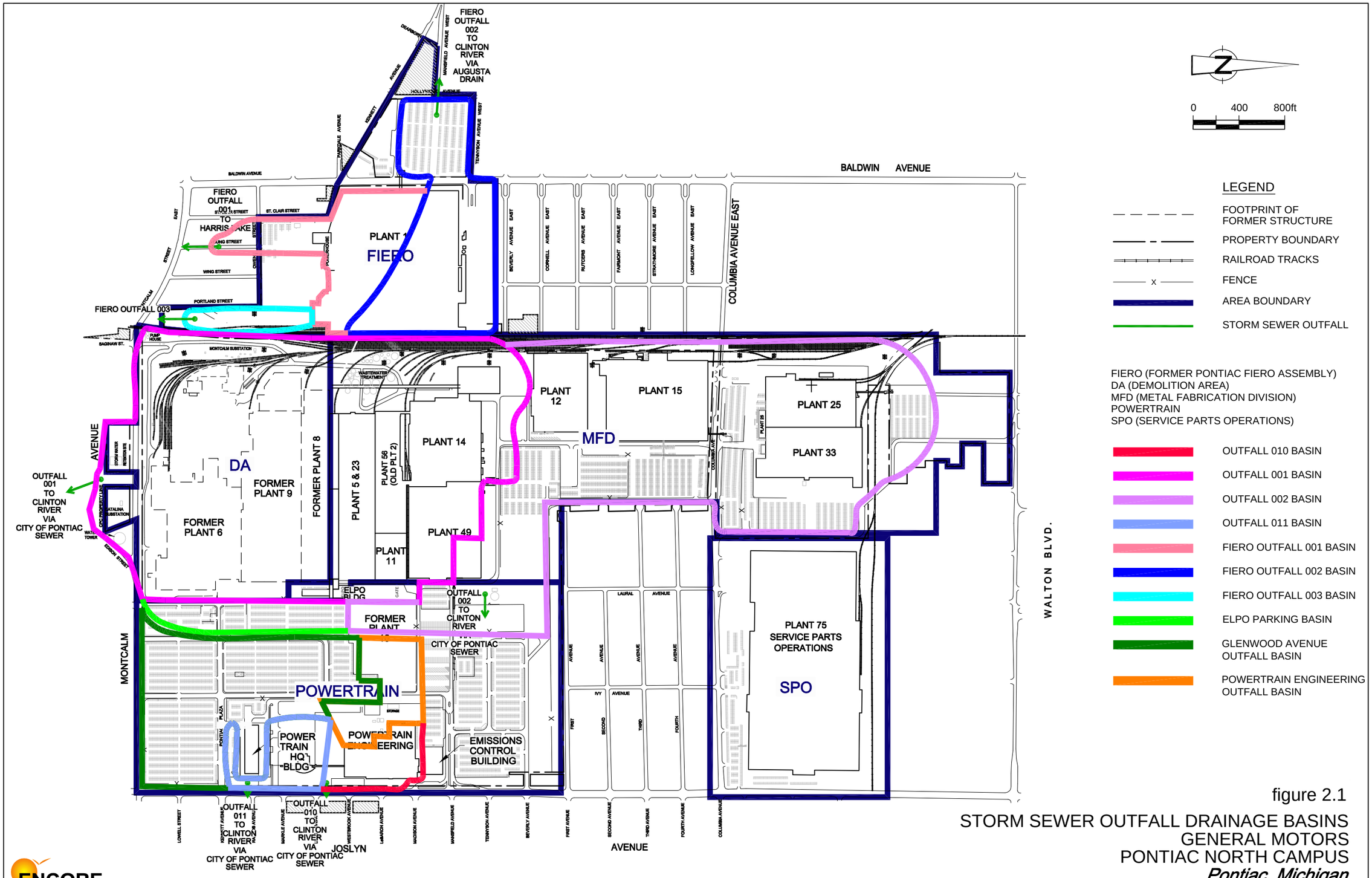


figure 2.1

STORM SEWER OUTFALL DRAINAGE BASINS
GENERAL MOTORS
PONTIAC NORTH CAMPUS
Pontiac, Michigan

ENCORE

17316-00(012)GN-NF001 NOV 20/2003

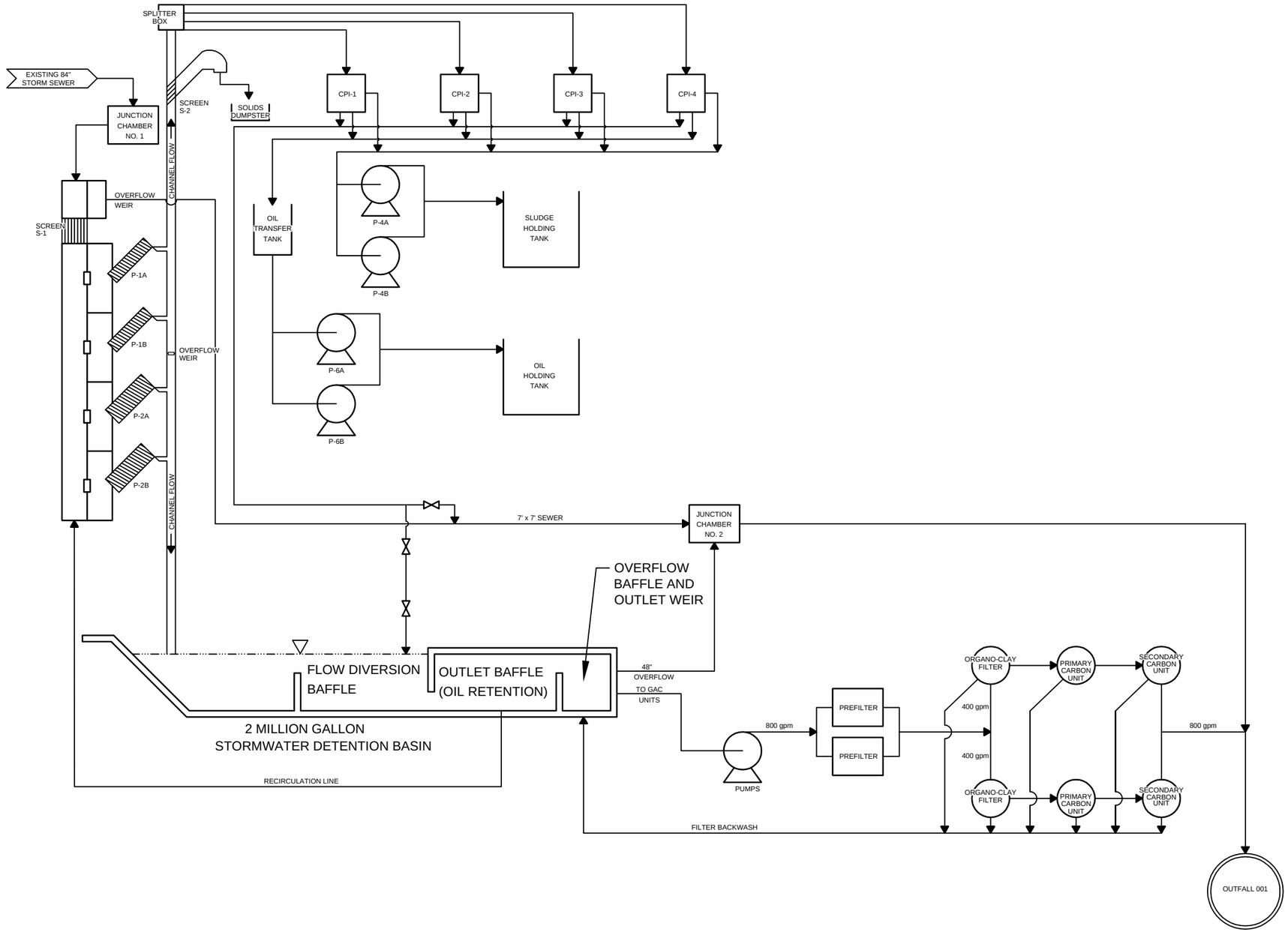
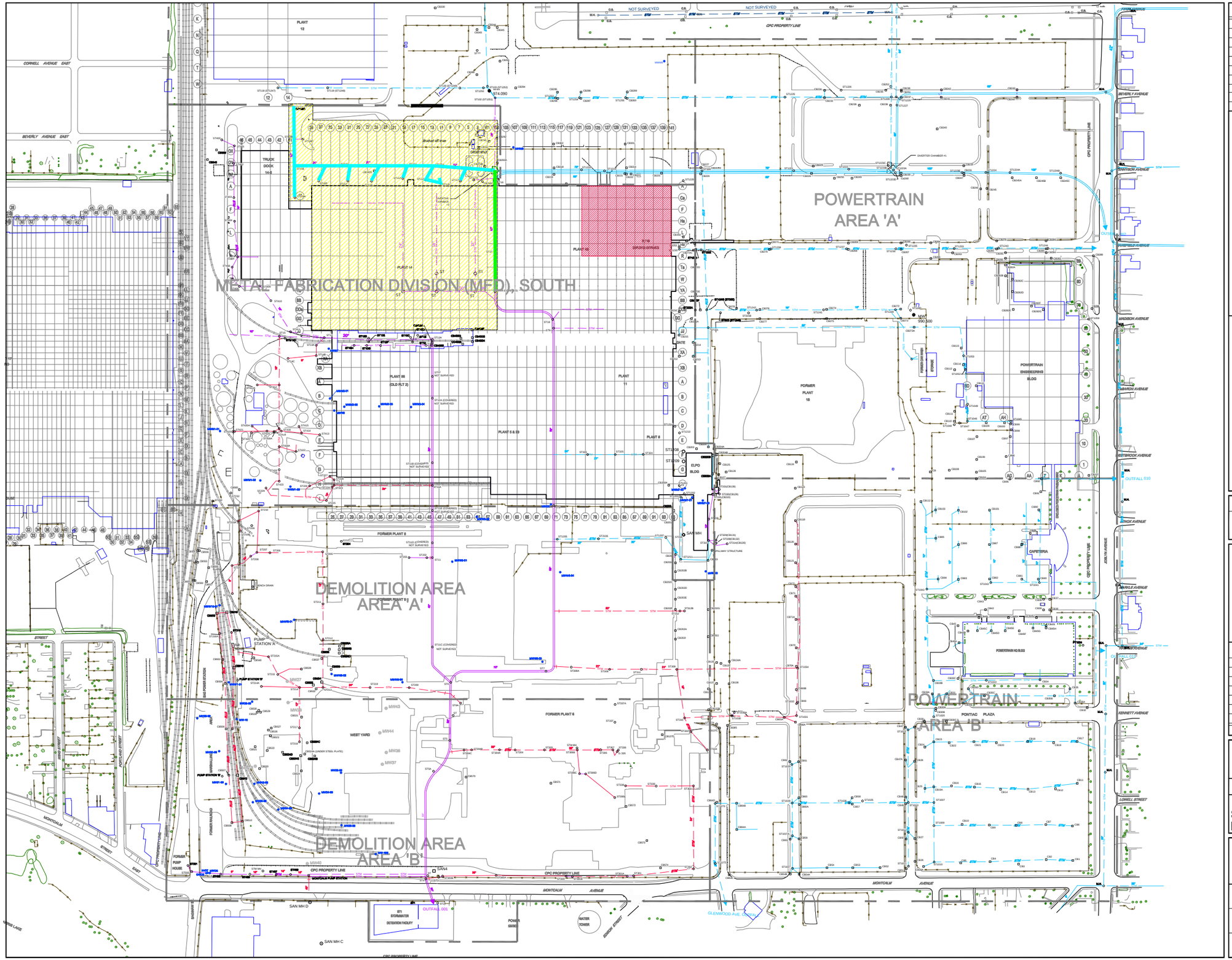
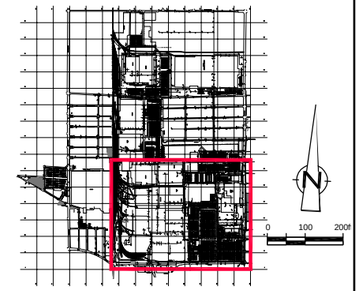


figure 3.1

STORMWATER DETENTION FACILITY PROCESS FLOW DIAGRAM
PONTIAC NORTH CAMPUS, PONTIAC, MICHIGAN
General Motors



N⁰	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

CIPP

REROUTED PIPE REACH

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

PLUG — STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

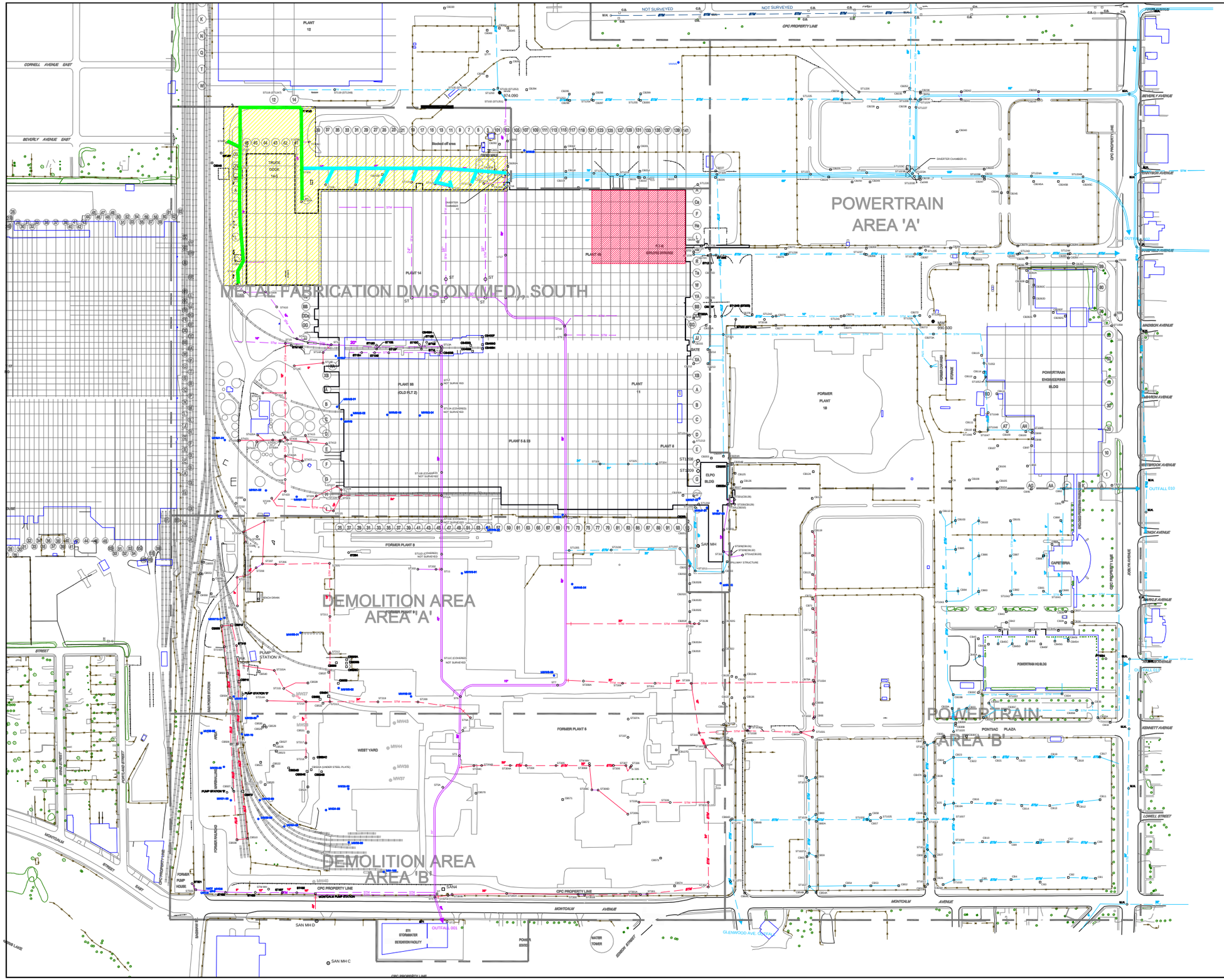
ALTERNATIVE #1 - REROUTING PLANT 14 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002 - FLOW REVERSAL IN NORTH-SOUTH 66-INCH STORM SEWER

ENCORE

Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N⁰: 17316-09	Report N⁰: 006	Drawing N⁰: 5.1

17316-09(006)GN-NF003 JUL 11/2002



NO	Revision	Date	Initial

KEY PLAN

	AREAS AFFECTED
	CIPP
	NEW STORM SEWER
	OUTFALL 002
ST102	STORM SEWER MANHOLE
C.B.	CATCH BASIN
STM	STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
PLUG STM	STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
MWM8	MONITORING WELL

SCALE VERIFICATION

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Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

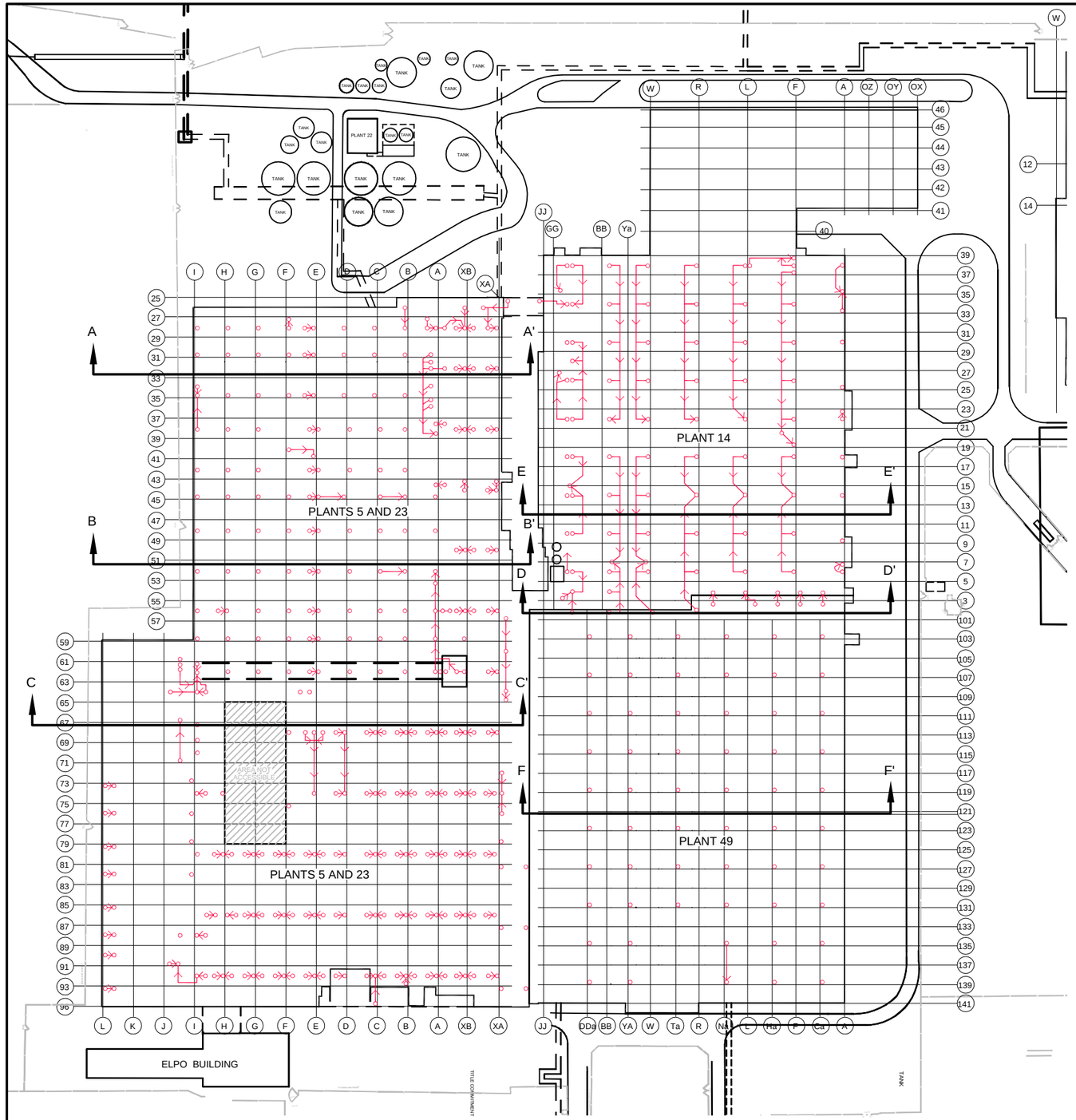
ALTERNATIVE #2 - REROUTING PLANT 14
TRUCK DOCK 14-5 ROOFTOP STORMWATER
DRAINAGE SYSTEM TO OUTFALL 002

ENCORE

Source Reference:

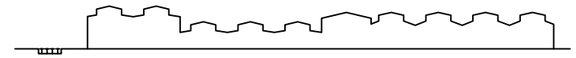
Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 5.2

17316-09(006)GN-NF003 JUL 11/2002

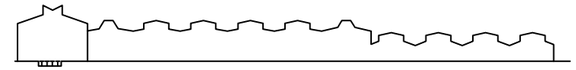




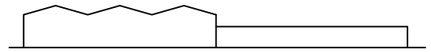
PLANTS 5 AND 23 - SECTION A-A'



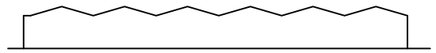
PLANTS 5 AND 23 - SECTION B-B'



PLANTS 5 AND 23 - SECTION C-C'



PLANT 14 - SECTION D-D'



PLANT 49 - SECTION E-E'



PLANT 49 - SECTION F-F'



LEGEND

- BUILDING
- FENCE
- STORMWATER CONDUCTOR

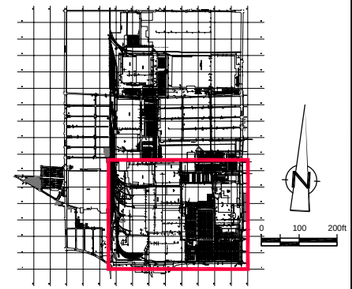
figure 5.3

ROOFTOP STORMWATER CONDUCTOR SURVEY
PLANTS 14, 49, 5 & 23
GM PONTIAC NORTH CAMPUS
Pontiac, Michigan

ENCORE

17316-09(006)GN-NF008 JUL 11/2002

N⊇	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

CIPP

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

ALTERNATIVE #3 - OVERHEAD REROUTING OF PLANT 14 AND PLANT 14 TRUCK DOCK 14-5 ROOFTOP STORMWATER DRAINAGE SYSTEM DOWNSPOUTS TO OUTFALL 002

ENCORE

Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N⊇: 17316-09	Report N⊇: 006	Drawing N⊇: 5.4

17316-09(006)GN-NF003 JUL 11/2002

POWERTRAIN AREA 'A'

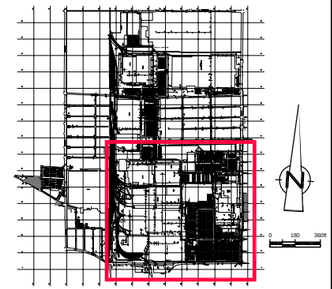
METAL FABRICATION DIVISION (MFD), SOUTH

DEMOLITION AREA 'A'

DEMOLITION AREA 'B'

POWERTRAIN AREA 'B'

NO	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

NEW STORM SEWER

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

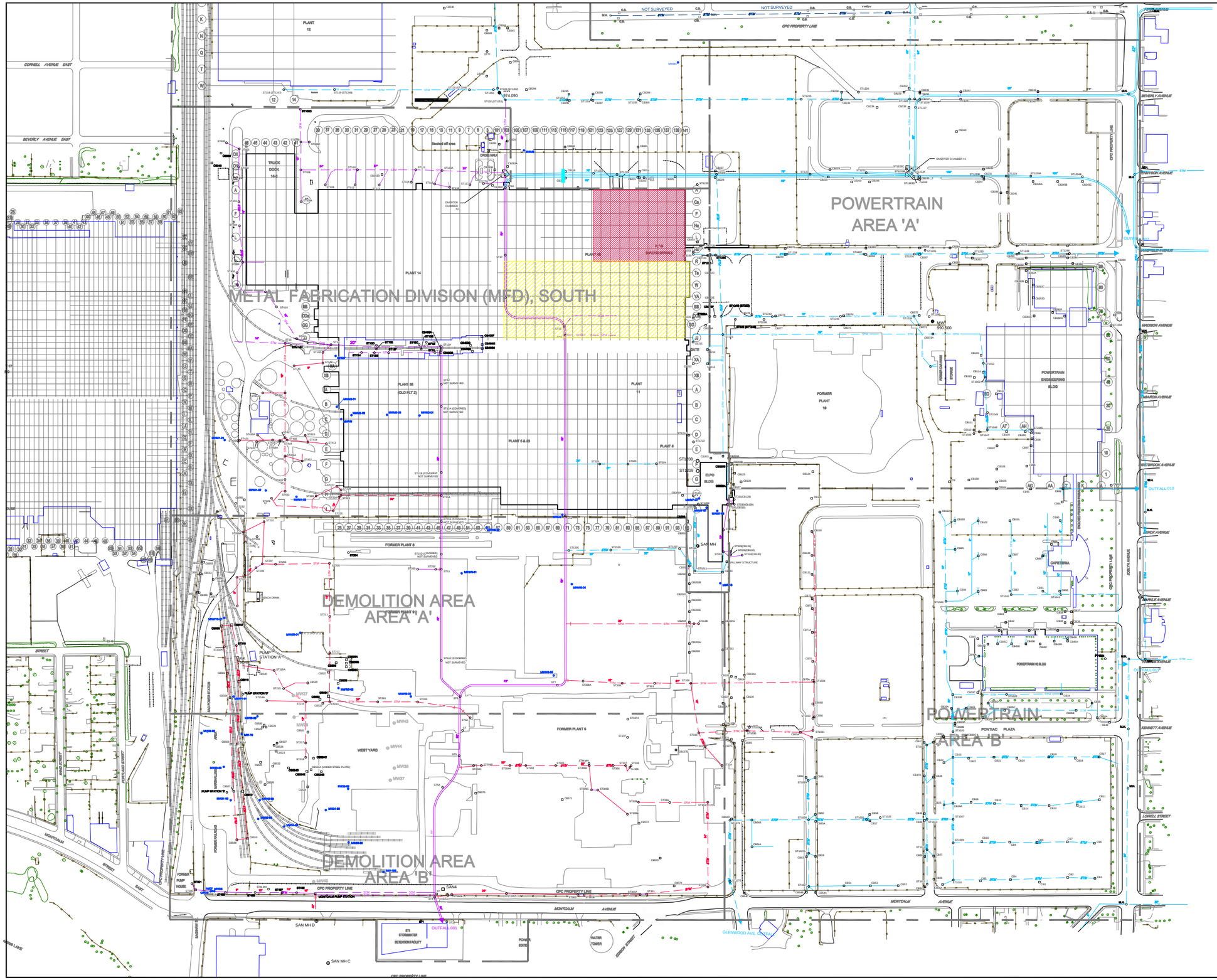
FEASIBILITY ANALYSIS

ALTERNATIVE #4 - REROUTING NORTHWEST QUADRANT OF PLANT 49 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002

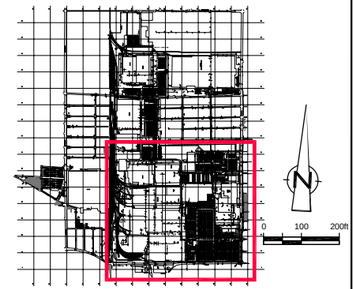
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Source Reference:			
Project Manager: K. MALINOWSKI	Reviewed By: A. PERFETTO	Date: FEBRUARY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 5.5

17316-09(006)GN-NF004 JUL 11/2002



NO	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- NEW STORM SEWER
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

SCALE VERIFICATION

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DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

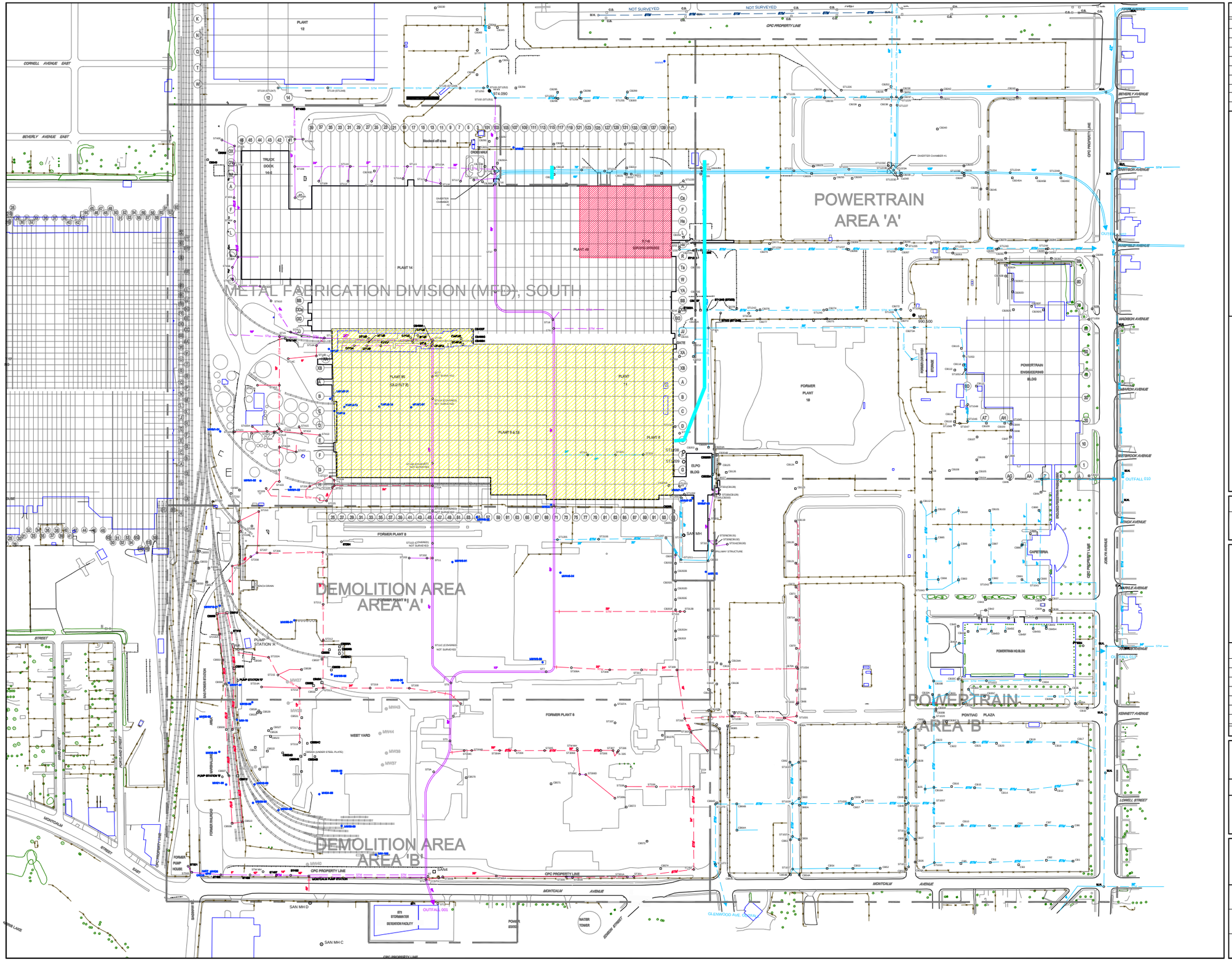
FEASIBILITY ANALYSIS

ALTERNATIVE #5 - REROUTING SOUTH SECTION
OF PLANT 49 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002

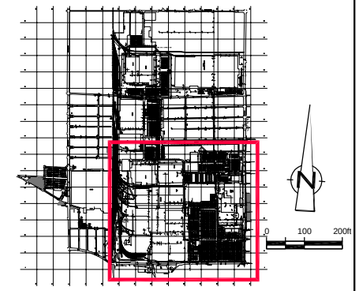
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Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 5.6



NO	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- NEW STORM SEWER
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

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DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

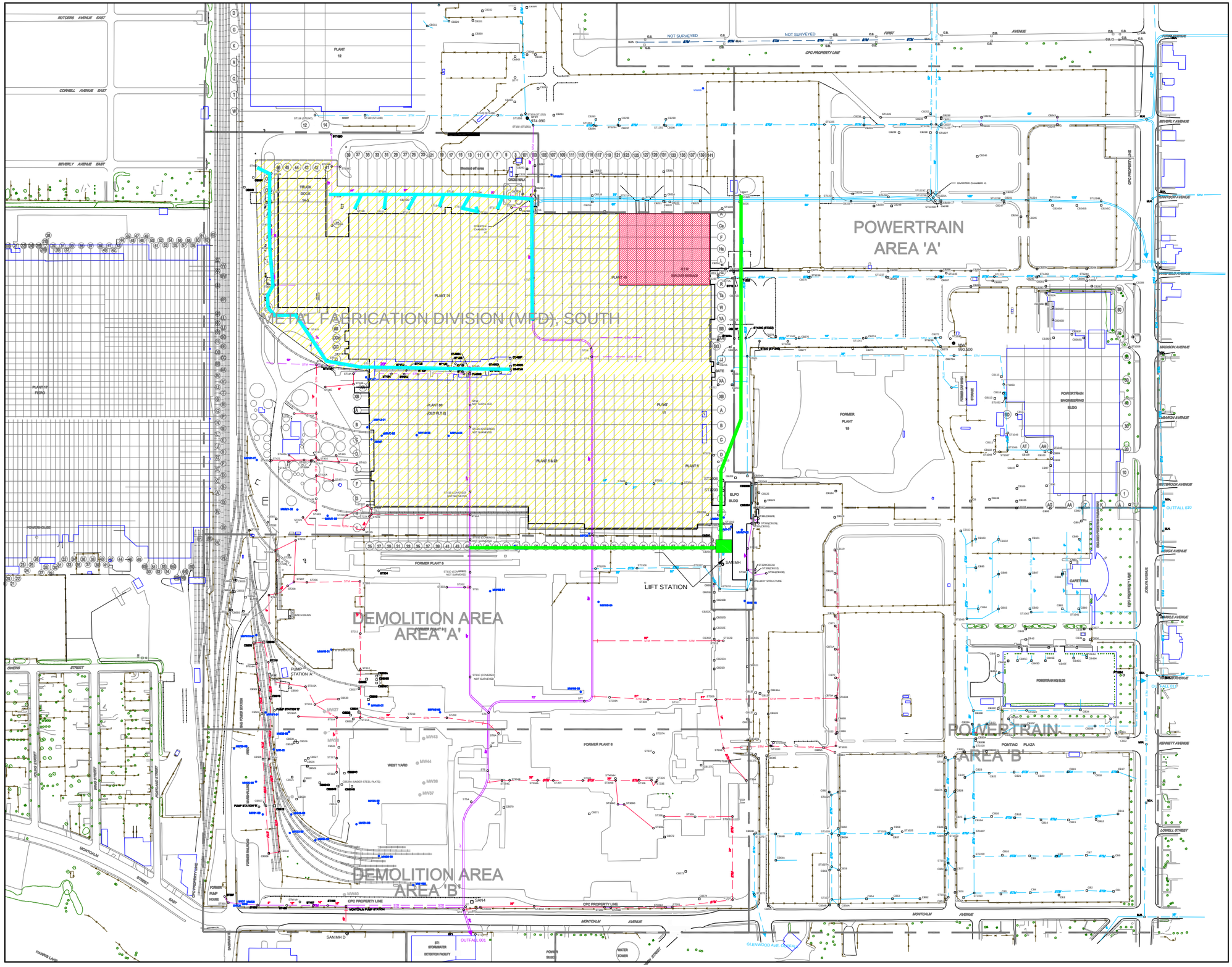
ALTERNATIVE #6 - REROUTING PLANTS 5 AND 23 ROOFTOP STORMWATER DRAINAGE SYSTEM DOWNSPOUTS TO NEW STORM SEWER AND OUTFALL 002

ENCORE

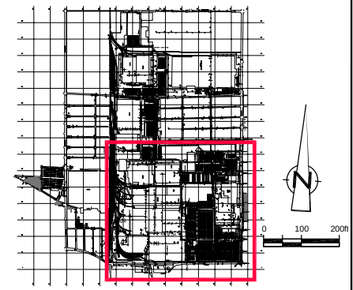
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Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 5.7

17316-09(006)GN-NF004 JUL 11/2002



No	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- CIPP/LINER
- NEW STORM SEWER & LIFT STATION
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- PLUG / STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

SCALE VERIFICATION

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Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

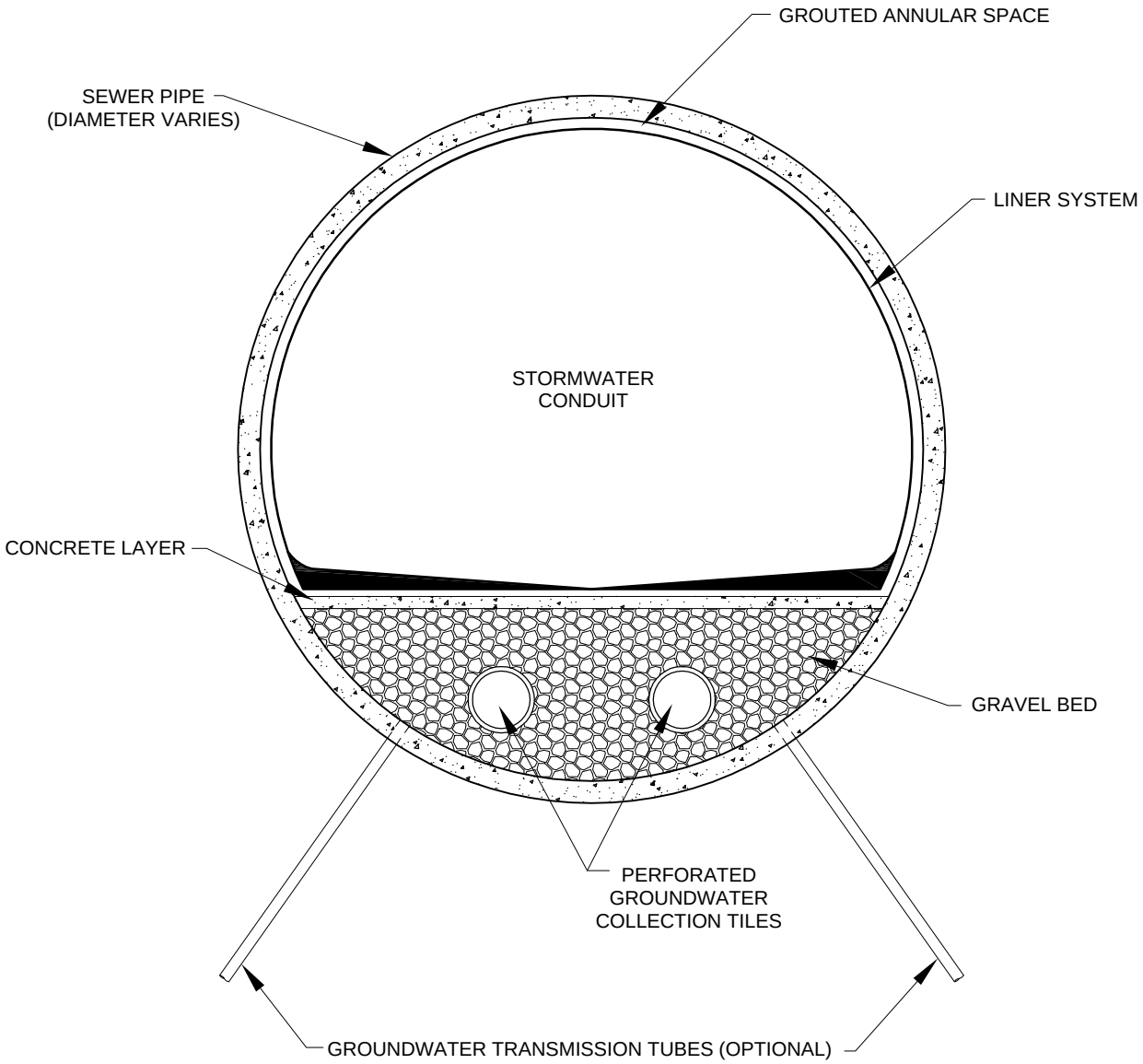
FEASIBILITY ANALYSIS

ALTERNATIVE #9 - REROUTING PLANTS 14,49, AND 5 AND 23 ROOFTOP STORMWATER DRAINAGE SYSTEM TO OUTFALL 002 - LIFT STATION

ENCORE

Source Reference:			
Project Manager: K. MALINOWSKI	Reviewed By: A. PERFETTO	Date: FEBRUARY 2002	
Scale: AS SHOWN	Project No: 17316-09	Report No: 006	Drawing No: 5.8

17316-09(006)GN-NF004 JUL 11/2002



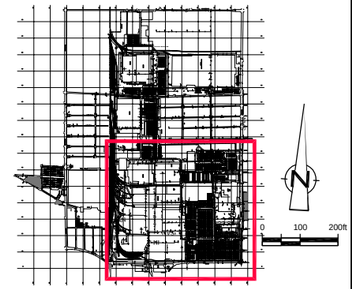
N.T.S.

figure 5.9

CONCEPTUAL COLLECTION/CONVEYANCE SYSTEM (PIPE - IN - PIPE)
GM PONTIAC NORTH CAMPUS
Pontiac, Michigan

ENCORE

N2	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

CIPP

DUAL COLLECTION SYSTEM (PIPE - IN - PIPE)

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

PLUG — STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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

PCB
O & G

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

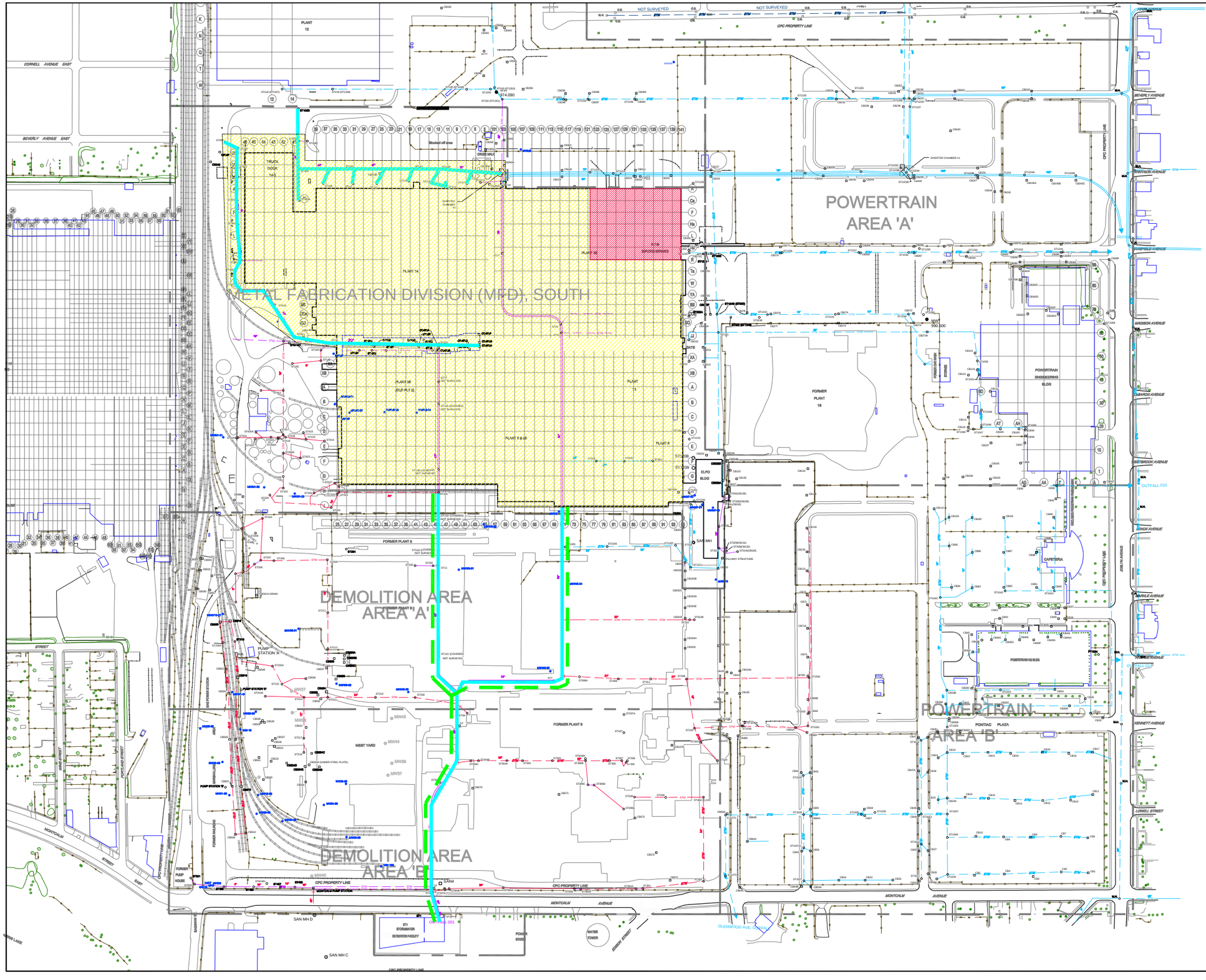
ALTERNATIVE #10 - PLANT 14, PLANT 14 TRUCK DOC 14-5, PLANT 49, AND PLANTS 5 AND 23 ROOFTOP STORMWATER DRAINAGE SYSTEM - BYPASSING THE SWDF

ENCORE

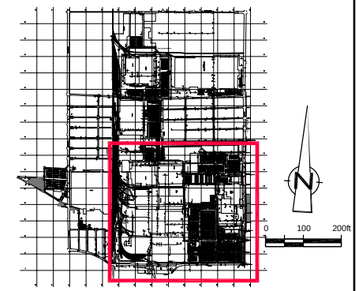
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Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N^{R}: 17316-09	Report N^{R}: 006	Drawing N^{R}: 5.10

17316-09/006/SN-NF003 JUL 11/2002



NO	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- CIPP/LINER
- DIRECTIONAL DRILLING
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG / STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- PLUG / STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

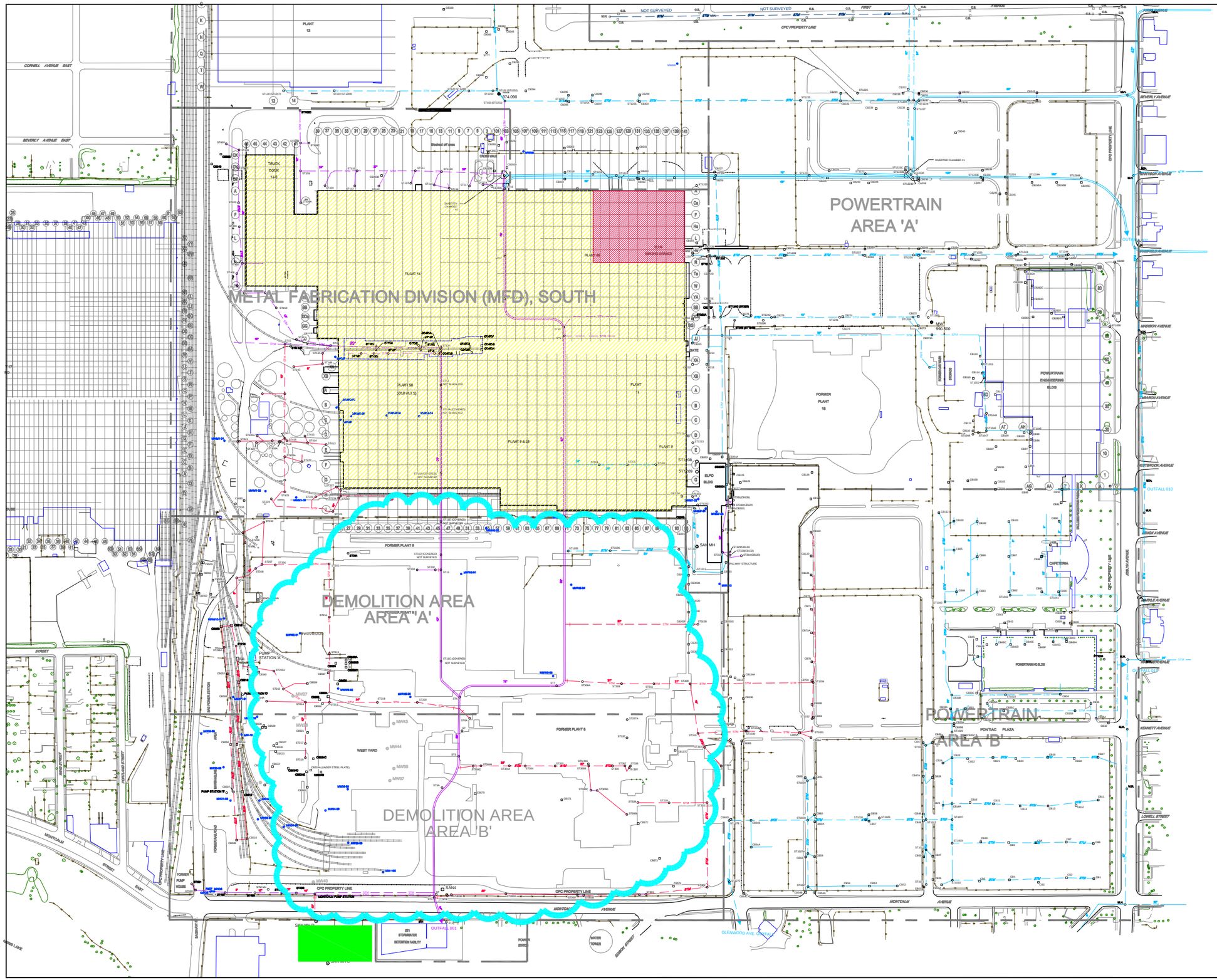
FEASIBILITY ANALYSIS

ALTERNATIVE #11 - REHABILITATION OF NORTH-SOUTH 36-INCH TO 42-INCH AND 66-INCH TO 90-INCH STORM SEWERS - DEMOLITION AREA

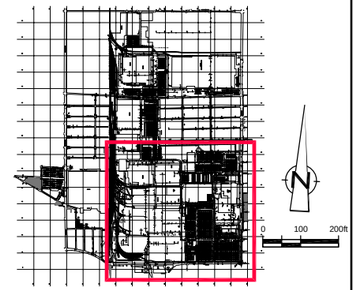
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Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project NO: 17316-09	Report NO: 006	Drawing NO: 5.11



N_	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- EXPANSION OF SWDF
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL
- CONTRIBUTING AREA UNDER INVESTIGATION

SCALE VERIFICATION

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

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

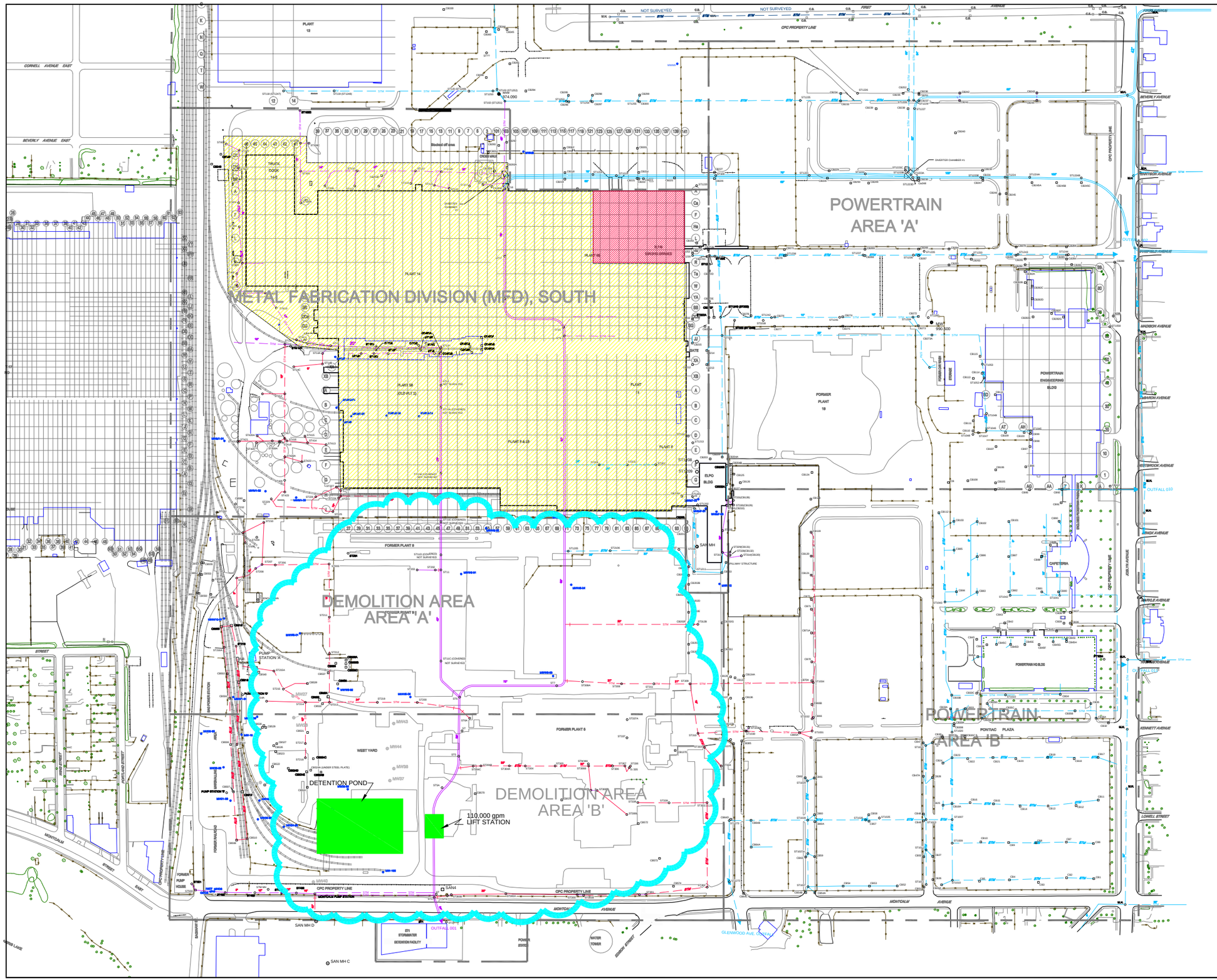
ALTERNATIVE #11 - MODIFICATIONS TO THE SWDF

ENCORE

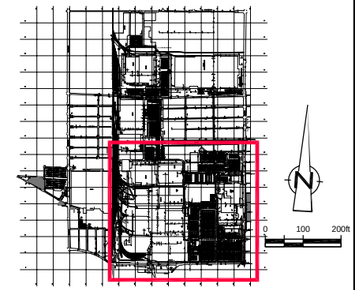
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Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N^{R}: 17316-09	Report N^{R}: 006	Drawing N^{R}: 5.12

17316-09/006/GN-NF005 JUL 11/2002



NO	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- LIFT STATION & DETENTION PAD
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL
- CONTRIBUTING AREA UNDER INVESTIGATION

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

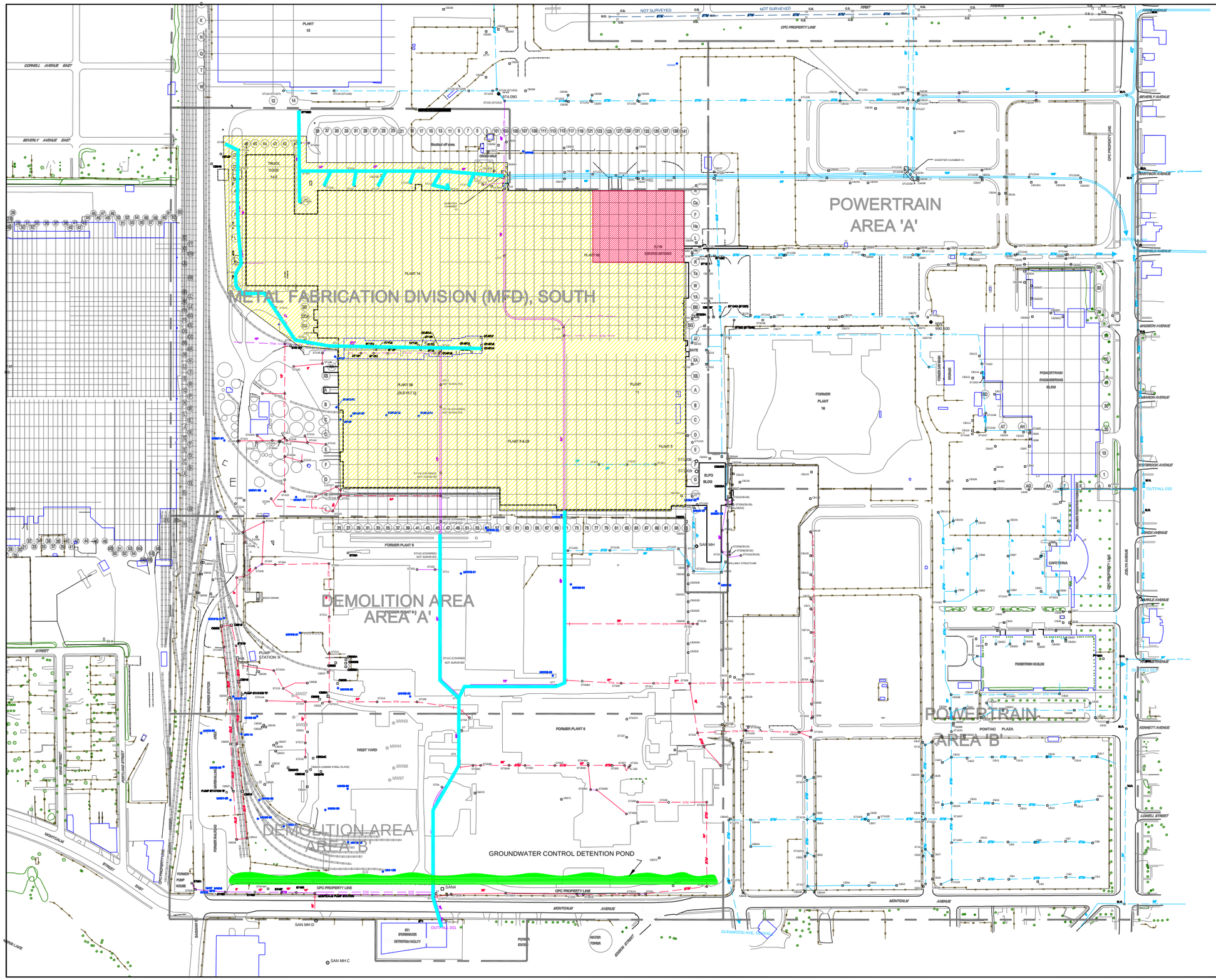
ALTERNATIVE #14 - CONSTRUCTION OF A STORMWATER DETENTION POND - DEMOLITION AREA

ENCORE

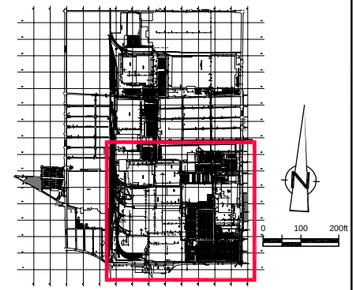
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Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N°: 17316-09	Report N°: 006	Drawing N°: 5.13

17316-09/006/GN-NE005 JUL 11/2002



N⁰	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- CIPP/LINER
- GROUNDWATER CONTROL DETENTION POND
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- PLUG — STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

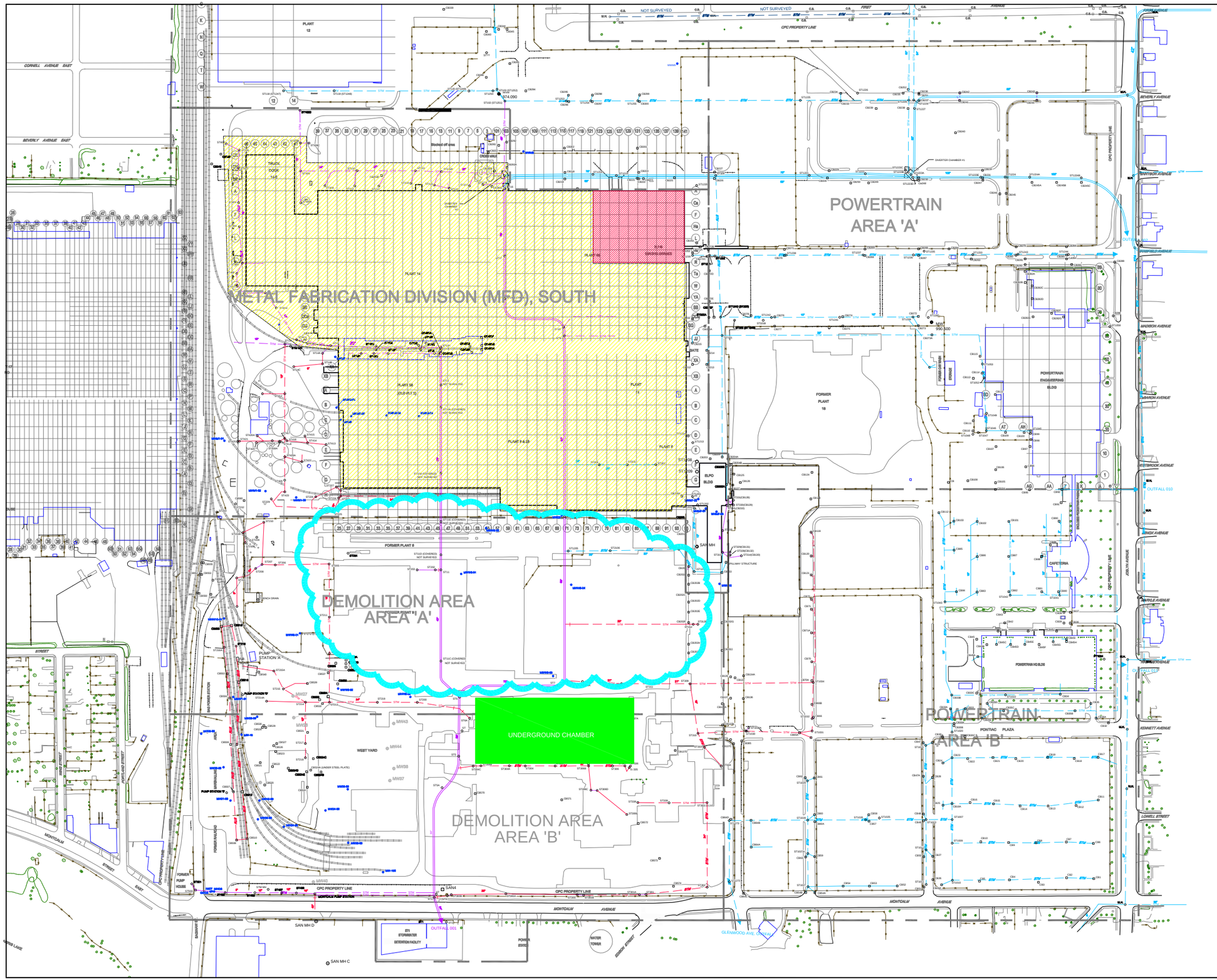
ALTERNATIVE #15 - CONSTRUCTION OF A GROUNDWATER CONTROL DETENTION POND - DEMOLITION AREA

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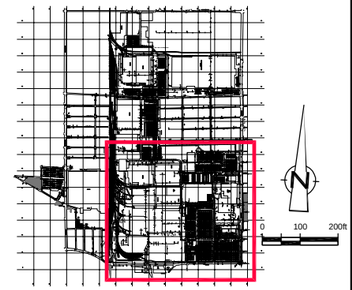
Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N⁰: 17316-09	Report N⁰: 006	Drawing N⁰: 5.14

17316-09(006)GN-NF005.ai 11/2002



No.	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- UNDERGROUND CHAMBER
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL
- CONTRIBUTING AREA UNDER INVESTIGATION

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

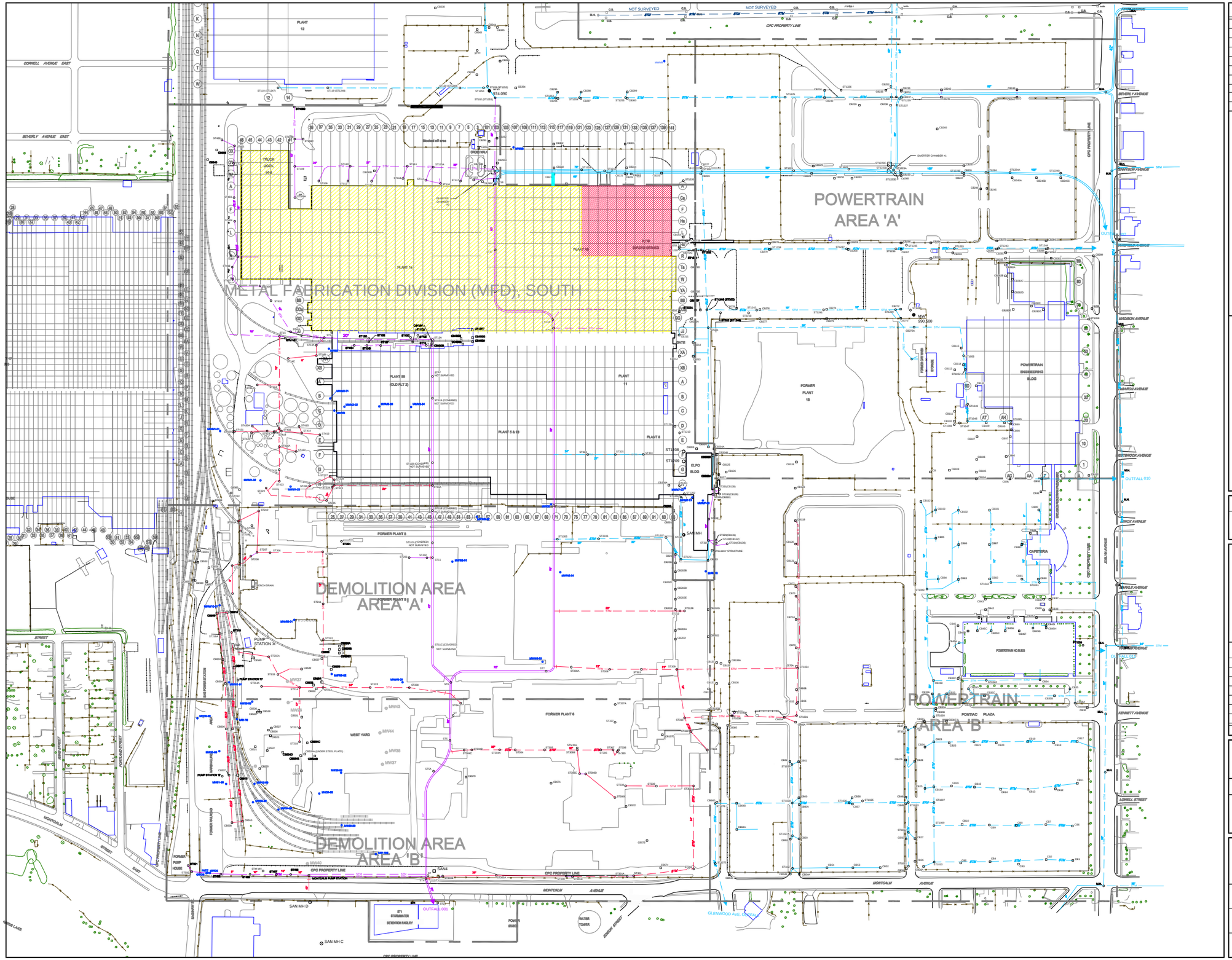
ALTERNATIVE #17 - CONSTRUCTION OF AN UNDERGROUND DETENTION CHAMBER - DEMOLITION AREA

ENCORE

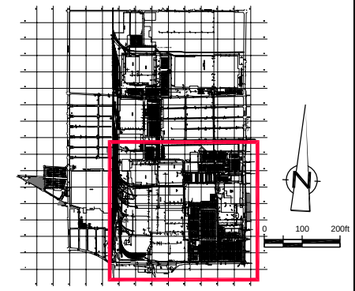
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Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N^{o}: 17316-09	Report N^{o}: 006	Drawing N^{o}: 5.15

17316-09/006/SN-NF005 JUL 11/2002



Nº	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- NEW STORM SEWER
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

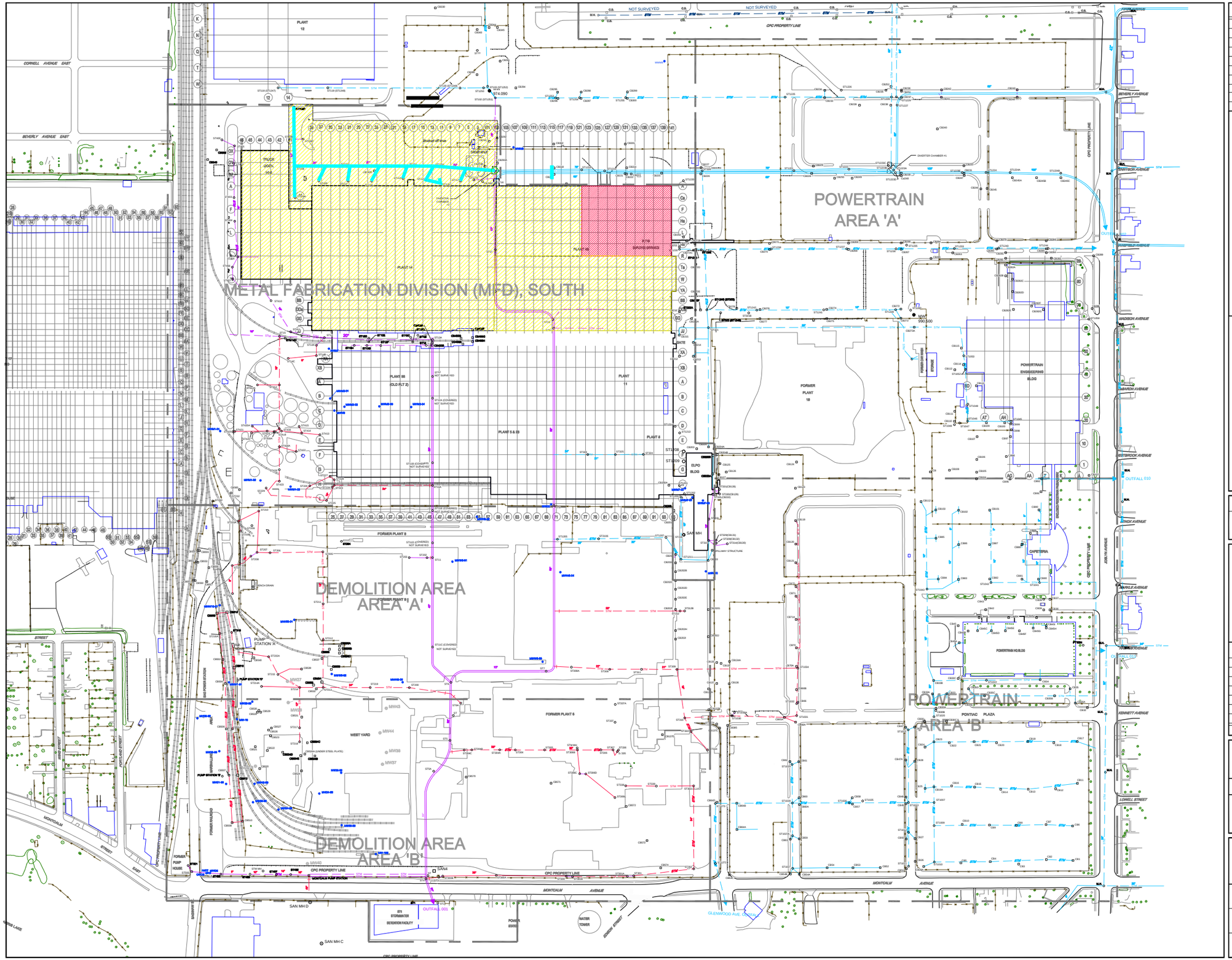
OPTION A1 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5 AND PLANT 49 TO OUTFALL 002

ENCORE

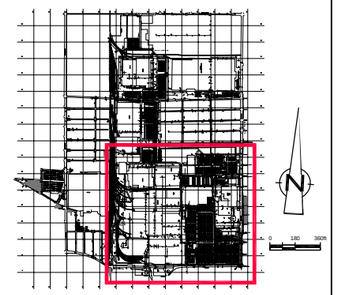
Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 6.1

17316-09(006)GN-NF004 JUL 11/2002



NO	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

NEW STORM SEWER

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

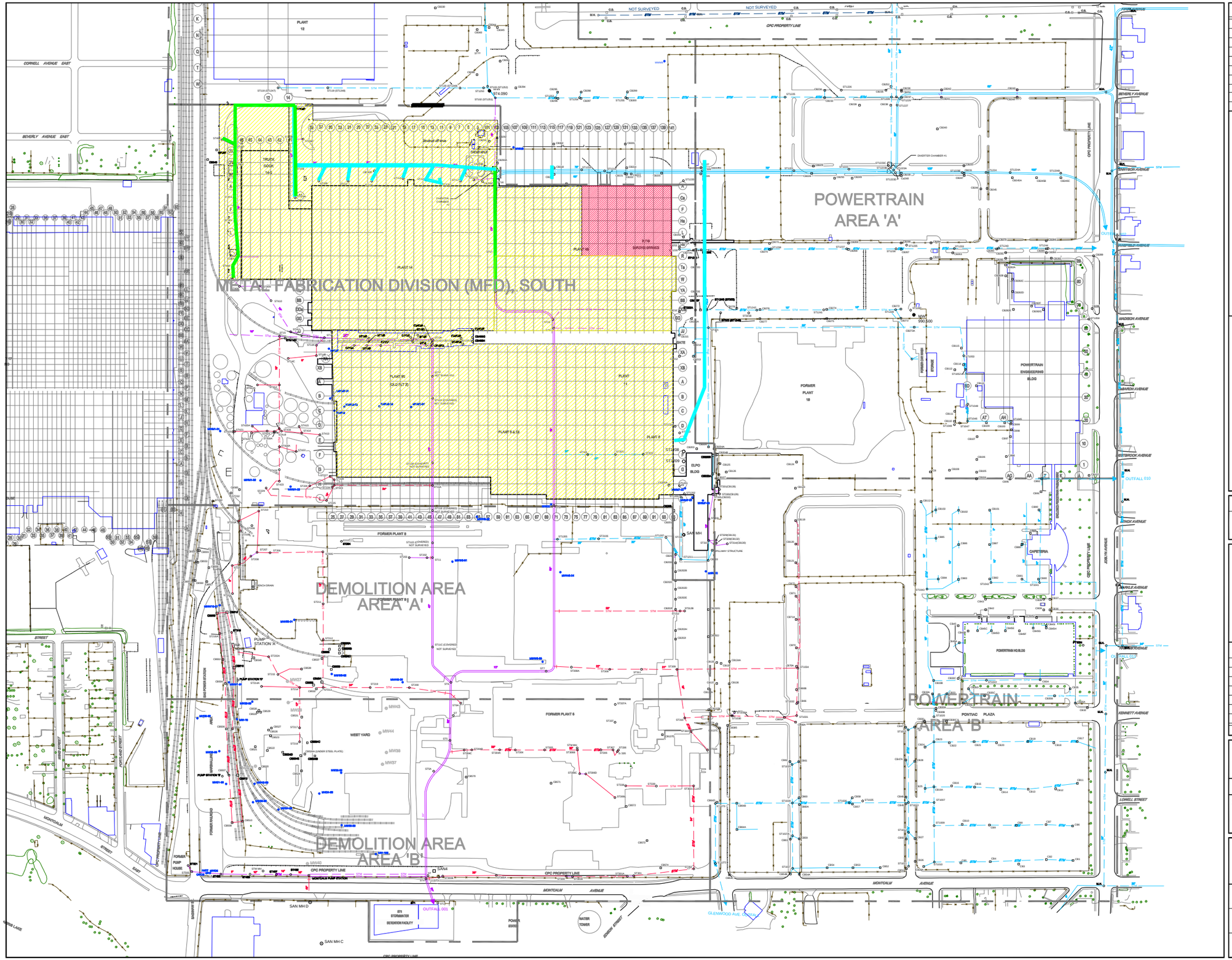
FEASIBILITY ANALYSIS

OPTION A2 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5 AND PLANT 49 TO OUTFALL 002

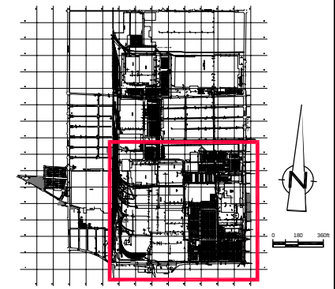
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Source Reference:			
Project Manager: K. MALINOWSKI	Reviewed By: A. PERFETTO	Date: JULY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 6.2

17316-09(006)GN-NF012 JUL 11/2002



Nº	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

NEW STORM SEWER

REROUTED PIPE REACH

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

PLUG — STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

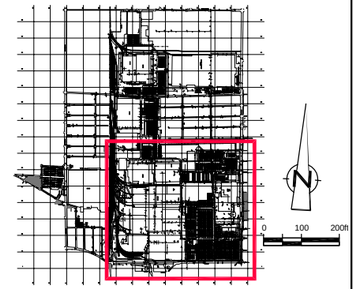
OPTION B1 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 TO OUTFALL 002 - FLOW REVERSAL AND OVERHEAD REROUTING

ENCORE

Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	JULY 2002	
Scale: AS SHOWN	Project Nº: 17316-09	Report Nº: 006	Drawing Nº: 6.3

No	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- CIPP/LINER
- NEW STORM SEWER & LIFT STATION
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- PLUG / STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

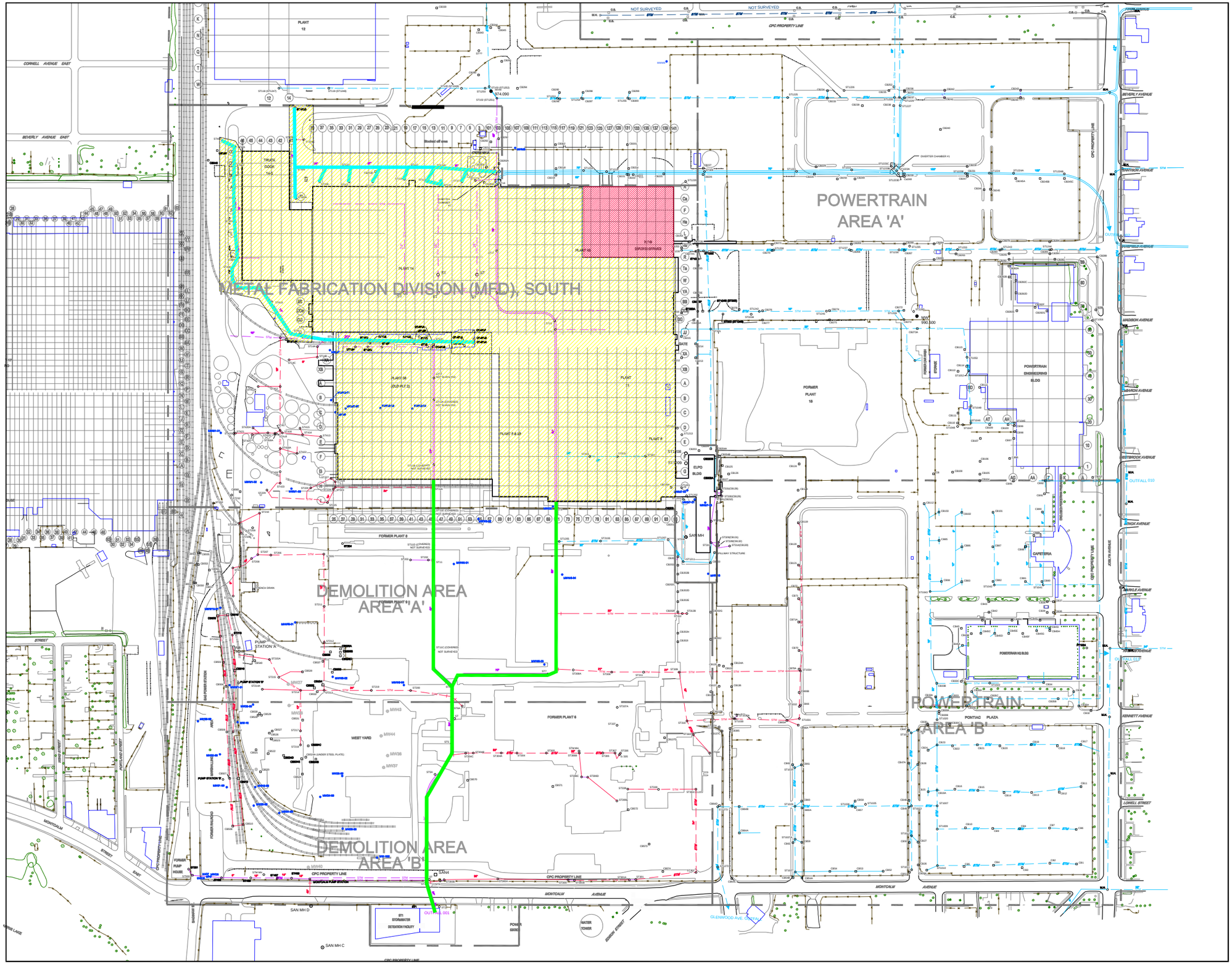
FEASIBILITY ANALYSIS

OPTION B2 - REROUTING PLANT 14, PLANT 14 TRUCK DOCK 14-5, PLANT49, AND PLANTS 5 AND 23 TO OUTFALL 002 - NEW SEWER AND LIFT STATION

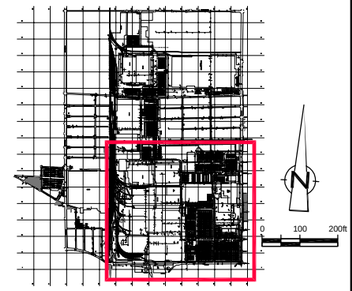
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Source Reference:			
Project Manager: K. MALINOWSKI	Reviewed By: A. PERFETTO	Date: FEBRUARY 2002	
Scale: AS SHOWN	Project No: 17316-09	Report No: 006	Drawing No: 6.4

17316-09(006)GN-NF013 JUL 11/2002



No	Revision	Date	Initial



KEY PLAN

AREAS AFFECTED

CIPP

DUAL COLLECTION SYSTEM (PIPE - IN - PIPE)

OUTFALL 002

ST102 — STORM SEWER MANHOLE

C.B. — CATCH BASIN

STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

PLUG / STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG

MWM8 — MONITORING WELL

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

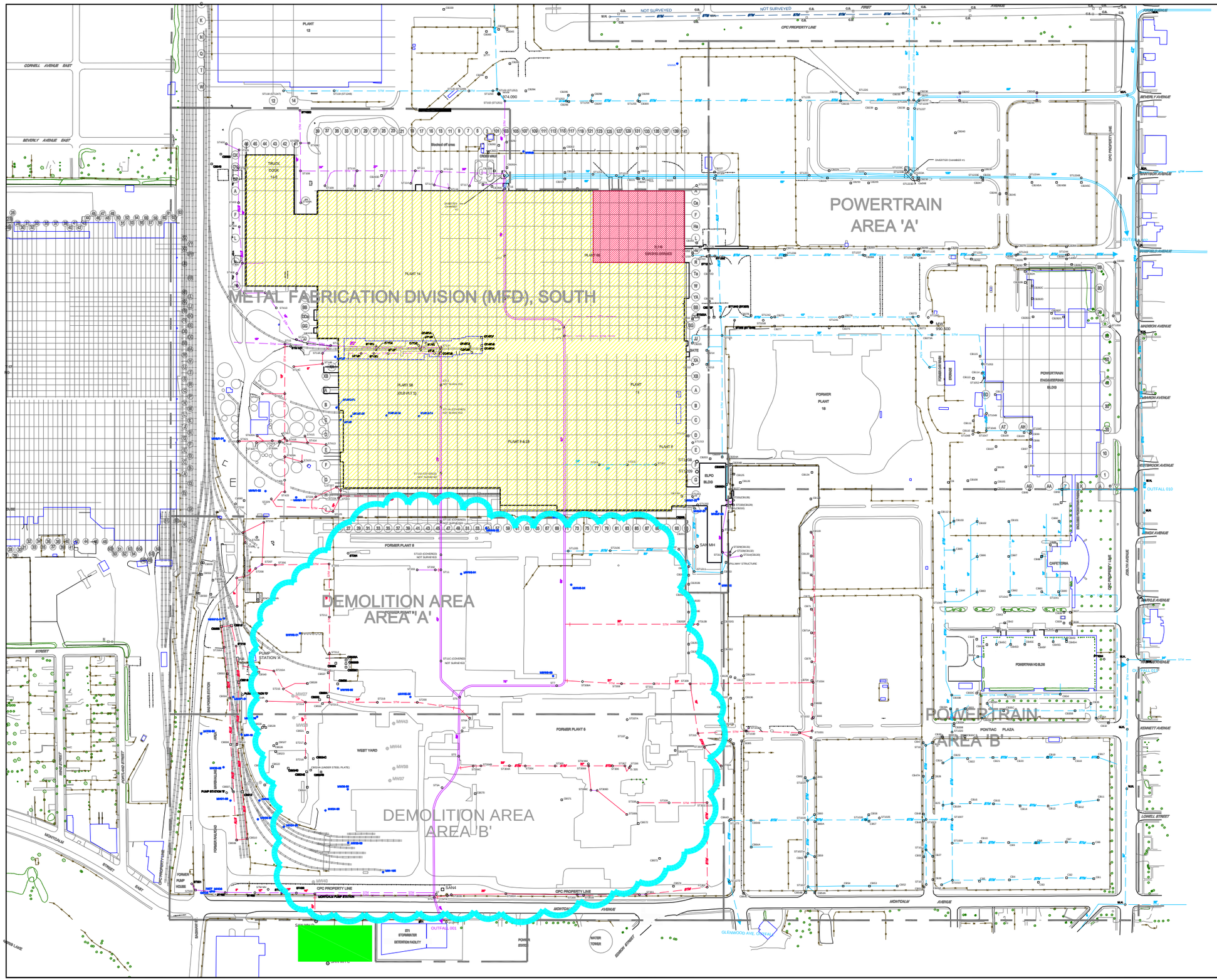
OPTION C1 - PLANT 14, PLANT 14 TRUCK **DOCK 14-5, PLANT 49, AND PLANTS 5 AND 23 TO** OUTFALL 001 - BYPASSING THE SWDF

ENCORE

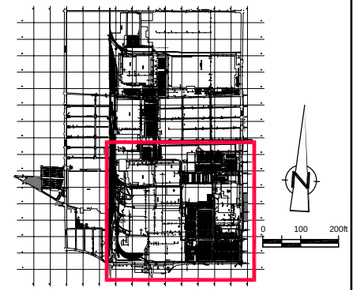
Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project No: 17316-09	Report No: 006	Drawing No: 6.5

17316-09(006)GN-NF003 JUL 11/2002



N_	o	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- EXPANSION OF SWDF
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL
- CONTRIBUTING AREA UNDER INVESTIGATION

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

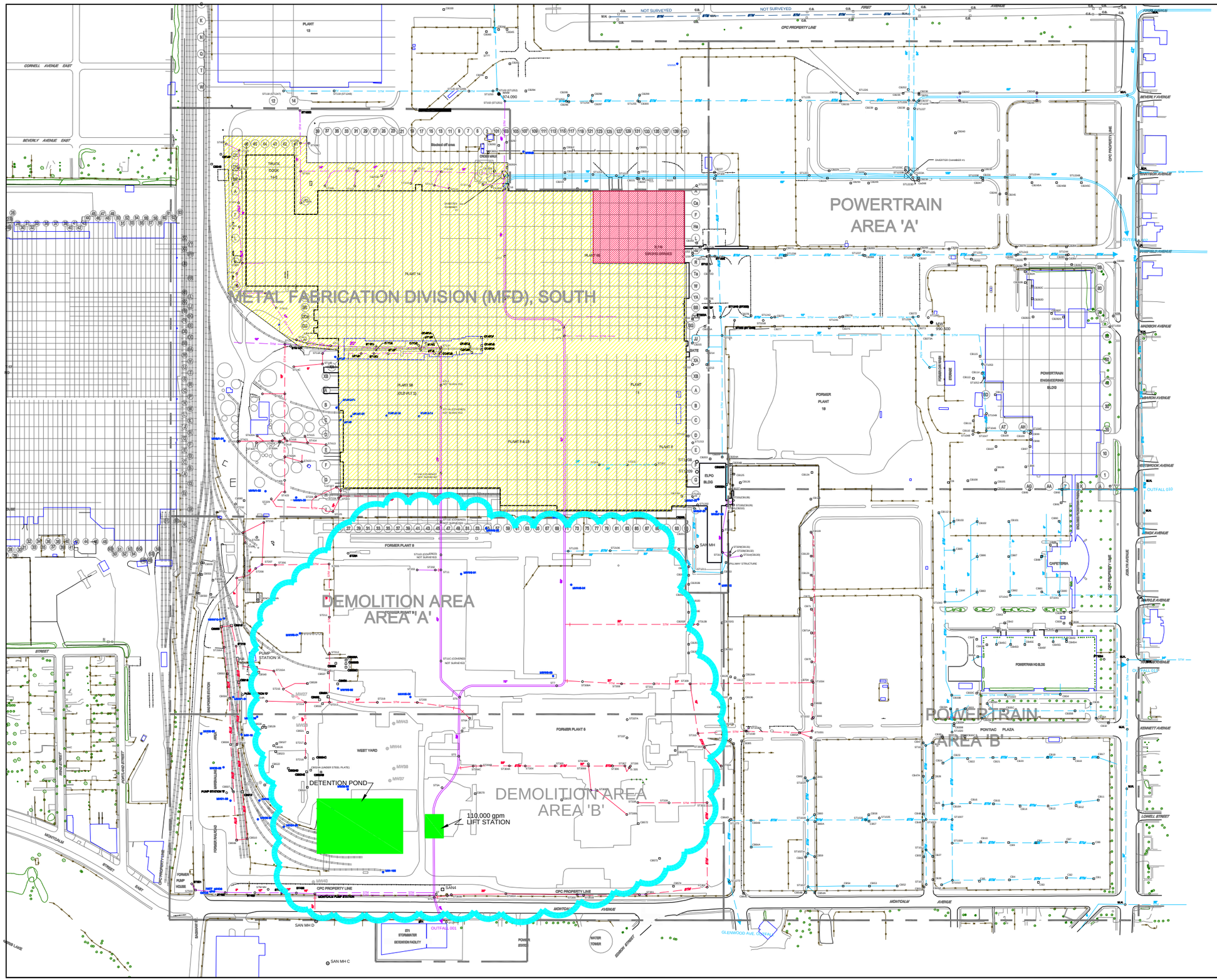
OPTION C2 - MODIFICATIONS TO THE SWDF

ENCORE

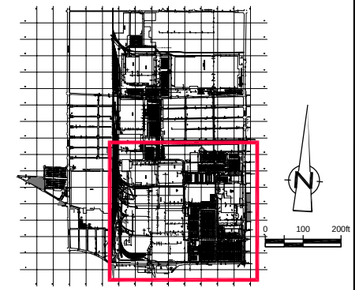
Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	FEBRUARY 2002	
Scale: AS SHOWN	Project N^{R}: 17316-09	Report N^{R}: 006	Drawing N^{R}: 6.6

17316-09/006/GN-NE005 JUL 11/2002



NO	Revision	Date	Initial



KEY PLAN

- AREAS AFFECTED
- LIFT STATION & DETENTION PAD
- OUTFALL 002
- ST102 — STORM SEWER MANHOLE
- C.B. — CATCH BASIN
- PLUG — STM — STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STM — STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG
- MWM8 — MONITORING WELL
- CONTRIBUTING AREA UNDER INVESTIGATION

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

FEASIBILITY ANALYSIS

OPTION C3 - CONSTRUCTION OF A STORMWATER DETENTION BASIN - DEMOLITION AREA

ENCORE

Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A. PERFETTO	NOVEMBER 2003	
Scale: AS SHOWN	Project N°: 17316-09	Report N°: 006	Drawing N°: 6.7

17316-09/006/GN-NF005 JUL 11/2003



N/2	Revision	Date	Initial

0 100 300ft

LEGEND

- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING MANHOLE - NOT SURVEYED
- EXISTING CATCH BASIN - NOT SURVEYED
- STORM SEWER - LOCATION NOT SURVEYED
- STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM
- STORM SEWER - LOCATION BASED ON ACTUAL FIELD VERIFICATION: CLEANED AND TELEVISED
- STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG: CLEANED AND TELEVISED
- STORM SEWER - ABANDONED IN-PLACE VIA USE OF MECHANICAL PLUG/CONCRETE PLUG: NOT CLEANED, NOT TELEVISED
- STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM. TELEVISED ONLY
- FENCELINE
- TREE / VEGETATION
- STORM SEWER - LOCATION BASED ON INFORMATION SUPPLIED BY GM

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS
PONTIAC NORTH CAMPUS

PHOTOGRAMMETRIC MAPPING
and STORM SEWER BASE MAP

ENCORE

Source Reference:

Project Manager:	Reviewed By:	Date:	
K. MALINOWSKI	A.PERFETTO	NOVEMBER 2003	
Scale: 1" = 300'	Project N°: 17316-09	Report N°: 006	Drawing N°: 1

17316-09(012)GN-NF016 NOV 21/2003

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #1 - Rerouting Plant 14 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in 66-Inch Storm Sewer

Stormwater Quality Issues - Elimination of PCBs from Plant 14 Rooftop Stormwater Drainage System					$40,000
Installation of Bulkhead in 66" N-S Sewer South of Manhole ST19					$12,000
Installation of Bulkhead in 66" E-W Sewer at Manhole ST16					$12,000
Demolition of 6' High Wall in Diverter Chamber #2					$15,000
Reconstruction of Channel in Diverter Chamber #2					$3,000
CIPP Rehabilitation of W-E 27-Inch to 30-Inch Storm Sewer and Laterals North of Plant 14					
	Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
	8	490	1,026	$41,049	
	12	400	1,257	$50,264	
	24	240	1,508	$60,317	
	27	350	2,474	$98,957	
	30	270	2,121	$84,821	$335,407
Lining of Manholes 7 manholes @ $7,000/each					$49,000
Lining of Catch Basins 7 manholes @ $4,000/each					$16,000
Miscellaneous Costs - Confined Space Entry					$15,000
TOTAL					**$497,407**

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #2 - Rerouting Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in N-S Storm Sewer

Flow Reversal in North-South 400-Series Storm Sewer Located West of Plant 14 Truck Dock 14-5

Replacement of Sewers - HDPE Pipe and Backfill with On-Site Soil

Pipe - Inch	Length - ft	Cost $/ft		
15	1,400	60		$84,000
Trench - D	**Length - ft**	**Width - ft**	**Cost $/cy**	
5	1,400	3	27	$21,000

CIPP Rehabilitation of W-E 27-Inch 30-Inch Storm Sewer and Laterals North of Plant 14

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
8	490	1,026	$41,049	
12	400	1,257	$50,264	
24	240	1,508	$60,317	
27	350	2,474	$98,957	
30	270	2,121	$84,821	$335,407

Lining of Manholes 7 manholes @ $7,000/each	$49,000
Lining of Catch Basins 7 manholes @ $4,000/each	$16,000
Demolition of 6' High Wall in Diverter Chamber #2	$15,000
Reconstruction of Channel in Diverter Chamber #2	$3,000
Restorations	$15,000
Miscellaneous Costs - Confined Space Entry	$15,000
TOTAL	**$553,407**

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #3 - Overhead Rerouting of Plant 14 and Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System Downspouts to Outfall 002

Overhead Rerouting of Plant 14 Rooftop Stormwater Drainage System Downspouts to Outfall 002

Pipe - Inch	Length - ft	Cost $/ft		
8	2,000	100		$200,000
Trench - D	Length - ft	Width - ft	Cost $/cy	
5	50	3	27	$750

Overhead Rerouting of Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System Downspouts to Outfall 002

Wall Mounted Roof Drains - HDPE Pipe and Backfill On-Site Soil

Pipe - Inch	Length - ft	Cost $/ft		
8	825	50		$41,250
Trench - D	Length - ft	Width - ft	Cost $/cy	
5	30	3	27	$450

CIPP Rehabilitation of W-E 27-Inch to 30-Inch Storm Sewer and Laterals North of Plant 14

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
8	490	1,026	$41,049	
12	400	1,257	$50,264	
24	240	1,508	$60,317	
27	350	2,474	$98,957	
30	270	2,121	$84,821	$335,407

Lining of Manholes 7 manholes @ $7,000/each	$49,000
Lining of Catch Basins 7 manholes @ $4,000/each	$16,000
Demolition of 6' High Wall in Diverter Chamber #2	$15,000
Reconstruction of Channel in Diverter Chamber #2	$3,000
Restorations	$10,000
Miscellaneous Costs - Confined Space Entry	$15,000
TOTAL	**$685,857**

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #4 - Rerouting Northwest Quadrant of Plant 49 Stormwater Drainage System to Outfall 002

Excavation and Pipe Installation from CB220 to 78-Inch West-East Storm Sewer

Catch basin 220 changes and forcemain	$20,000
New manhole at 78" sewer	$40,000
Restorations	$5,000
Miscellaneous costs - confined space entry	$5,000
TOTAL	**$70,000**

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #5 - Overhead Rerouting of South Section of Plant 49 Rooftop Stormwater Drainage System Downspouts to Outfall 002

	Pipe - Inch	Length - ft	Cost $/ft		
	8	6,000	100		$600,000
	Trench - D	Length - ft	Width - ft	Cost $/cy	
	5	50	3	27	$750
New Storm Sewer - Excavation and Pipe Installation to 78-Inch West-East Storm Sewer					
New Manhole at 78" sewer					$40,000
Restorations					$5,000
Miscellaneous Costs - Confined Space Entry					$5,000
TOTAL					**$650,750**

Note:
Construction costs may be lower if existing south-north storm sewer reach located to the east of Plant 49 can be utilized.

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #6 - Overhead Rerouting of Plants 5 and 23 Rooftop Stormwater Drainage System Downspouts to New or Existing Storm Sewer and Outfall 002

Catch Basin CB220 Changes and Forcemain					$20,000
New manhole at 78" sewer					$40,000
Overhead Rerouting of Plants 5 and 23 Rooftop Stormwater Drainage System Downspouts to New Sewer and Outfall 002					
	Pipe - Inch	Length - ft	Cost $/ft		
	6	3,000	100		$300,000
Installation of new 24"/30" sewers - HDPE pipe & backfill on-site soil					
	Pipe - Inch	Length - ft	Cost $/ft		
	24	1,000	100		$100,000
	30	1,400	120		$168,000
	Trench - D	Length - ft	Width - ft	Cost $/cy	
	8	1,000	12	22	$78,222
	10	1,400	15	22	$171,111
Changes to manhole structures ST328					$10,000
Restorations					$5,000
Miscellaneous costs - confined space entry					$5,000
TOTAL					**$897,333**

Note:
Construction costs may be lower if existing south-north storm sewer reach located to the east of Plant 49 can be utilized.

TABLE 5.1

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
REROUTING STORMWATER RUNOFF from OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #7 - Rerouting Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System to Outfall 002 via New Sewer and Lift Station

Construction of New Storm Sewer Line and Lift Station from Manholes ST11A and ST8 to Outfall 002					
Installation of new 60" sewers - HDPE pipe & backfill on-site soil					
	Pipe - Inch	Length - ft	Cost $/ft		
	60	2,650	375		$993,750
	Trench - D	Length - ft	Width - ft	Cost $/cy	
	12	1,500	18	22	$264,000
	22	1,150	28	17	$446,030
Lift Station and Changes to Manhole Structures					$150,000
Replacement of Sewers from ST400 to ST405 - HDPE Pipe and Backfill On-Site Soil					
	Pipe - Inch	Length - ft	Cost $/ft		
	15	550	60		$33,000
	Trench - D	Length - ft	Width - ft	Cost $/cy	
	5	550	3	27	$8,250
CIPP Rehabilitation of Storm Sewer from Manhole ST405 to Manhole ST13A					
	Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
	10	400	1,047	$62,830	
	15	250	982	$58,903	
	18	420	1,979	$118,749	
	20	470	2,461	$147,651	
	20	400	2,094	$125,660	$513,792
Lining of manholes					
10 manholes @ $4,000/each					$40,000
CIPP Rehabilitation of W-E 27-Inch to 30-Inch Storm Sewer and Laterals North of Plant 14					
	Dia - Inch				
	8	Length - ft	Area - sf	Cost $40/sf	
	12	490	1,539	$61,573	
	24	400	2,513	$100,528	
	27	240	1,696	$67,856	
	30	350	2,749	$109,953	
		270	0	$0	$339,910
Lining of Manholes					
7 manholes @ $7,000/each					$105,000
Lining of Catch Basins					
7 manholes @ $4,000/each					$40,000
Restorations					$40,000
Miscellaneous costs - confined space entry					$20,000
TOTAL					**$2,993,732**

General Notes for all Alternatives:
1. The conceptual cost estimate is intended only for evaluating various feasibility analyses options.
2. The cost estimate is based on assumed design parameters of sewer system.
3. The actual costs may vary significantly depending on detailed design parameters of sewer system.

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #8 - Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System - Bypassing the SWDF

Collection/Conveyance System (Pipe-in-Pipe) from Manhole ST8 to the SWDF

Installation of 30" pipe, 12" tile & gravel in existing sewer

Pipe - Inch	Length - ft	Cost $/ft		
30	3,000	1,000		$3,000,000

CIPP Rehabilitation of W-E 27-Inch to 30-Inch Storm Sewer and Laterals North of Plant 14

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
8	490	1,026	$41,049	
12	400	1,257	$50,264	
24	240	1,508	$60,317	
27	350	2,474	$98,957	
30	270	2,121	$84,821	$335,407

Lining of Manholes
7 manholes @ $7,000/each — $49,000

Lining of Catch Basins
7 manholes @ $4,000/each — $16,000

Restorations — $40,000

Miscellaneous Costs - Confined Space Entry — $20,000

Collection/Conveyance System (Pipe-in-Pipe) from Manhole ST11A to the SWDF

Installation of 12/30" pipe, 6/12" tile & gravel in existing sewer

Pipe - Inch	Length - ft	Cost $/ft		
12	1,500	800		$1,200,000
30	1,000	1,500		$1,500,000

CIPP Rehabilitation of Storm Sewer from Manhole ST405 to Manhole ST13A

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
10	400	1,047	$41,887	
15	250	982	$39,269	
18	420	1,979	$79,166	
20	470	2,461	$98,434	
20	400	2,094	$83,773	$342,528

Flow Fill of Abandoned Storm Sewers, Laterals and Restoration of Collection Tiles

Flow Fill of Abandoned Storm Sewers (Approx. 13,000 l.f. of 8" to 36" Pipe) — $525,000

Plugging Laterals in 36-Inch to 42-Inch Storm Sewer — $30,000

Restoration of Montcalm Avenue Pump Station Collection Tiles — $25,000

Construction of a SWDF Bypass Culvert

Pipe - Inch	Length - ft	Cost $/ft	
90	250	600	$150,000

Replacement of Sewers from ST400 to ST405- HDPE Pipe and Backfill with On-Site Soil

Pipe - Inch	Length - ft	Cost $/ft	
15	550	60	$33,000
Trench - D	**Length - ft**	**Width - ft**	**Cost $/cy**
5	550	3	27 $8,250

Lining of manholes
20 manholes @ $4,000/each — $80,000

Restorations — $40,000

Miscellaneous costs - confined space entry — $20,000

TOTAL — **$7,414,186**

Note:
Basements in the Demolition Area to be filled by others.

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #9 - Rehabilitation of North-South 66-Inch to 90-Inch and 36-Inch to 42-Inch Storm Sewers - Demolition Area

Rehabilitation of North-South 66-Inch to 90-Inch Storm Sewer

CIPP Rehabilitation of W-E 27-Inch to 30-Inch Storm Sewer and Laterals North of Plant 14

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
8	490	1,026	$41,049	
12	400	1,257	$50,264	
24	240	1,508	$60,317	
27	350	2,474	$98,957	
30	270	2,121	$84,821	$335,407

Lining of Manholes
7 manholes @ $7,000/each — $49,000

Lining of Catch Basins
7 manholes @ $4,000/each — $16,000

Channeline North-South 66-Inch to 90-Inch Storm Sewer - Demolition Area

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
66	700	12,095	$483,791	
72	450	8,482	$339,282	
84	750	16,493	$659,715	
90	300	7,068	$282,735	$1,765,523

Lining of manholes 66"-90" north-south sewers
8 manholes @ $7,000/each — $56,000

Installation of Trench Cut-Off Walls (Trench Plugs)
8 plugs @ $3,000/each — $24,000

Flow Fill of Abandoned Storm Sewers, Laterals and Restoration of Collection Tiles

Flow Fill of Abandoned Storm Sewers (Approx. 13,000 l.f. of 8" to 36" Pipe) — $525,000

Plugging Laterals in 36-Inch to 42-Inch Storm Sewer — $30,000

Restoration of Montcalm Avenue Pump Station Collection Tiles — $25,000

Directional Drilling and Placement of a HDPE Collection System Adjacent to the 66-Inch to 90-Inch North-South Storm Sewer

Pipe - Inch	Length - ft	Cost $/ft	
24	2,200	150	$330,000

Changes to manhole structures — $50,000

Restorations — $20,000

Miscellaneous costs - confined space entry — $20,000

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #9 - Rehabilitation of North-South 66-Inch to 90-Inch and 36-Inch to 42-Inch Storm Sewers - Demolition Area (cont.'d)

Rehabilitation of North-South 36-Inch to 42-Inch Storm Sewer

Rehabilitation of Storm Sewer from Manhole ST400 to Manhole ST13A

Replacement of sewers from manhole ST400 to ST405 - HDPE pipe & backfill on-site soil

Pipe - Inch	Length - ft	Cost $/ft		
15	550	60		$33,000
Trench - D	**Length - ft**	**Width - ft**	**Cost $/cy**	
5	550	3	27	$8,250

CIPP Rehabilitation of Storm Sewer from Manhole ST405 to Manhole ST13A

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
10	400	1,047	$62,830	
15	250	982	$58,903	
18	420	1,979	$118,749	
20	470	2,461	$147,651	
20	400	2,094	$125,660	$513,792

Lining of manholes
20 manholes @ $4,000/each $80,000

CIPP for 36-Inch to 42-Inch North-South Storm Sewer - Demolition Area

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
36	350	3,299	$131,943	
42	575	6,322	$252,891	$384,834

Lining of manholes 36"-42" and 66"-90" north-south sewers
4 manholes @ $7,000/each $28,000

Trench cut-off walls - exterior trench plugs
4 plugs @ $3,000/each $12,000

Directional Drilling and Placement of aHDPE Collection System Adjacent to the 36-Inch to 66-Inch North-South Storm Sewer

Pipe - Inch	Length - ft	Cost $/ft	
24	925	150	$138,750

Changes to manhole structures	$25,000
Restorations	$20,000
Miscellaneous costs - confined space entry	$20,000
TOTAL	**$4,509,557**

Note:
Basements in the Demolition Area to be filled by others.

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative 10 - Modifications to the SWDF

Expansion of SWDF Basin and Pumping Capacity	
Excavation	$300,000
Stormwater Channels	$200,000
Screens, Comminutors, Grit Removal, Flow Measurement Equipment	$750,000
Stormwater Pumps/Screws (110,000 gpm)	$800,000
5-Million Gallon Capacity Concrete Detention Basin (excluding land acquisition costs)	$750,000
CPI Treatment System and Sludge Removal	$300,000
Granular Activated Carbon (GAC) System - 10 X 20,000 lb. Units (3000 gpm total)	$300,000
Instrumentation and Process Piping	$750,000
Block and Steel Frame Structure	$500,000
TOTAL	**$4,650,000**

Notes:
1. Costs do not include land acquisition.
2. Costs do not include operation and maintenance.

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #11 - Diversion of Peak Flows to Bypass the SWDF

Construction of 500,000 gallon basin and control structure to capture first flush	$1,500,000
TOTAL	**$1,500,000**

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #12 - Construction of a Stormwater Detention Pond - Demolition Area

Construction of Stormwater Detention Pond and Pump Station (off-site soil disposal) 5 million gallon capacity	$5,000,000
TOTAL	**$5,000,000**

Notes:

1. Construction costs do not include characterization analyses and disposal costs for excavated material.
2. Additional construction costs incurred during the excavation and handling of contaminated materials (i.e. personal protective equipment, decontamination, etc.) have not been accounted for.

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #13 - Construction of a Groundwater Control Detention Pond - Demolition Area

Rehabilitation of West-East 30-Inch Storm Sewer North of Plant 14

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
8	490	1,026	$41,049	
12	400	1,257	$50,264	
24	240	1,508	$60,317	
27	350	2,474	$98,957	
30	270	2,121	$84,821	$335,407
12	310	974	$38,955	
18	870	4,100	$163,986	
24	530	3,330	$133,200	
30	270	2,121	$84,821	$420,961

Identification and Elimination of Storm Sewer Cross-Connections Beneath Plants 14, 49 and 5 and 23

Investigation of Infiltration/Inflow Through the Demolition Area

Channeline North-South 66-Inch to 90-Inch Storm Sewer - Demolition Area

Dia - Inch	Length - ft	Area - sf	Cost $40/sf	
66	700	12,095	$483,791	
72	450	8,482	$339,282	
84	750	16,493	$659,715	
90	300	7,068	$282,735	$1,765,523

Lining of manholes
20 manholes @ $7,000/each — $140,000

Lining of manholes 66"-90" north-south sewers
8 manholes @ $7,000/each — $56,000

Installation of Trench Cut-Off Walls (Trench Plugs)
8 plugs @ $3,000/each — $24,000

Construction of SWDF Bypass Culvert

Pipe - Inch	Length - ft	Cost $/ft	
90	250	600	$150,000

Changes to manhole structures — $50,000

GW Control Detention Pond 200x1200x10 ft deep

Area - sf	Volume - cf	Cost $3/sf	Cost $1/cf	
240,000	2,400,000	720,000	2,400,000	3,120,000

Detention Pond/Wetland 40x2000x4 ft deep

Area - sf	Volume - cf	Cost $3/sf	Cost $1/cf	
80,000	320,000	240,000	320,000	560,000

Restorations — $40,000

Miscellaneous costs - confined space entry — $25,000

TOTAL — **$6,686,891**

Notes:
1. Construction costs do not include characterization analyses and disposal costs for excavated material.
2. Additional construction costs incurred during the excavation and handling of contaminated materials (i.e. personal protective equipment, decontamination, etc.) have not been accounted for.

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #14 - Construction of a Flow Rate Control Structure Upstream of the SWDF

Manhole ST4 Reconstruction	$200,000
TOTAL	**$200,000**

TABLE 5.2

CONSTRUCTION COST ESTIMATES for REMEDIAL ALTERNATIVES
MODIFICATIONS to OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative #15 - Construction of an Underground Detention Chamber - Demolition Area

1	Chamber with covered top 5 million gallon capacity	$6,000,000
	TOTAL	**$6,000,000**

Notes:
1. Construction costs do not include characterization analyses and disposal costs for excavated material.
2. Additional construction costs incurred during the excavation and handling of contaminated materials (i.e. personal protective equipment, decontamination, etc.) have not been accounted for.

General Notes for all Alternatives:
1. The conceptual cost estimate is intended only for evaluating various feasibility analyses options.
2. The cost estimate is based on assumed design parameters of sewer system.
3. The actual costs may vary significantly depending on detailed design parameters of sewer system.

TABLE 5.3

SUMMARY of THE EFFECTIVENESS of REMEDIAL ALTERNATIVES
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative No.	*Remedial Alternative*	*Reduction of Outfall 001 Drainage Basin [%]*	*Construction Cost Estimate*
1	Rerouting Plant 14 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in 66-Inch Storm Sewer	16	$ 497,407
2	Rerouting Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in N-S Storm Sewer	4.5	$ 553,407
3	Overhead Rerouting of Plant 14 and Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System Downspouts to Outfall 002	20.5	$ 685,857
4	Rerouting Northwest Quadrant of Plant 49 Stormwater Drainage System to Outfall 002	4.5	$ 70,000
5	Overhead Rerouting of South Section of Plant 49 Rooftop Stormwater Drainage System Downspouts to Outfall 002	10.5	$ 650,750
6	Overhead Rerouting of Plants 5 and 23 Rooftop Stormwater Drainage System Downspouts to New or Existing Storm Sewer and Outfall 002	30	$ 897,333
7	Rerouting Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System to Outfall 002 via New Sewer and Lift Station	67	$ 2,993,732
8	Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System - Bypassing the SWDF	67	$ 7,414,186
9	Rehabilitation of North-South 66-Inch to 90-Inch and 36-Inch to 42-Inch Storm Sewers - Demolition Area	67	$ 4,509,557
10	Modifications to the SWDF	0	$ 4,650,000
11	Diversion of Peak Flows to Bypass the SWDF	67	$ 1,500,000
12	Construction of a Stormwater Detention Pond - Demolition Area	0	$ 5,000,000
13	Construction of a Groundwater Control Detention Pond - Demolition Area	Minimal	$ 6,686,891
14	Construction of a Flow Rate Control Structure Upstream of the SWDF	0	$ 200,000
15	Construction of an Underground Detention Chamber - Demolition Area	0	$ 6,000,000
16	Stormwater Detention/Retention Implementing Plant 49 Rooftop	0	N/C

Notes:
N/C = Not calculated due to incomplete information.

TABLE 6.1

COMPARATIVE ANALYSIS - REMEDIAL ALTERNATIVES and OPTIONS
REROUTING STORMWATER RUNOFF FROM OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative No.	*Options*	*Costs*
	OPTION A1 **Rerouting Plant 14, Plant 14 Truck Dock 14-5, and Plant 49 to Outfall 002 - Flow Reversal and Overhead Rerouting**	
1	Rerouting Plant 14 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in 66-Inch Storm Sewer	$497,407
2	Rerouting Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in N-S Storm Sewer	$553,407
4	Rerouting Northwest Quadrant of Plant 49 Rooftop Stormwater Drainage System to Outfall 002	$70,000
5	Overhead Rerouting of South Section of Plant 49 Rooftop Stormwater Drainage System Downspouts to Outfall 002	$650,750
	Total Costs for Option A1 - Flow Reversal	**$1,771,565**
	OPTION A2 **Rerouting Plant 14, Plant 14 Truck Dock 14-5, and Plant 49 to Outfall 002 - Overhead Rerouting of Downspouts**	
3	Overhead Rerouting of Plant 14 and Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System Downspouts to Outfall 002	$685,857
4	Rerouting Northwest Quadrant of Plant 49 Rooftop Stormwater Drainage System to Outfall 002	$70,000
5	Overhead Rerouting of South Section of Plant 49 Rooftop Stormwater Drainage System Downspouts to Outfall 002	$650,750
	Total Costs for Option A2 - Overhead Rerouting of Downspouts	**$1,406,607**

TABLE 6.1

COMPARATIVE ANALYSIS - REMEDIAL ALTERNATIVES and OPTIONS
REROUTING STORMWATER RUNOFF FROM OUTFALL 001 DRAINAGE BASIN TO ALTERNATE OUTFALLS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative No.	*Options*	*Costs*
	OPTION B1 **Rerouting Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 002 - Flow Reversal & Overhead Rerouting**	
1	Rerouting Plant 14 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in 66-Inch Storm Sewer	$497,407
2	Rerouting Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in N-S Storm Sewer	$553,407
4	Rerouting Northwest Section of Plant 49 Rooftop Stormwater Drainage System to Outfall 002	$70,000
5	Overhead Rerouting of South Section of Plant 49 Rooftop Stormwater Drainage System Downspouts to Outfall 002	$650,750
6	Overhead Rerouting of Plants 5 and 23 Rooftop Stormwater Drainage System Downspouts to New or Existing Storm Sewer and Outfall 002	$897,333
	Total Costs for Option B1 - Flow Reversal and Overhead Rerouting	**$2,668,898**
	Grand Total Costs for Option B1 - Flow Reversal and Overhead Rerouting	**$2,668,898**
	OPTION B2 **Rerouting Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 002 - New Sewer and Lift Station**	
7	Rerouting Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System to Outfall 002 via New Sewer and Lift Station	$2,993,732
	Total Costs for Option B2 - New Sewer and Lift Station	**$2,993,732**
	Grand Total Costs for Option B2 - New Sewer and Lift Station	**$2,993,732**

TABLE 6.2

COMPARATIVE ANALYSIS - REMEDIAL ALTERNATIVES and OPTIONS
MODIFICATIONS TO OUTFALL 001 STORM SEWER SYSTEM
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative No.	*Options*	*Costs*
	OPTION C1 **Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 001**	
8	Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System - Bypassing the SWDF (Collection/Conveyance System)	$ 7,414,186
	Total Costs for Option C1 - Collection/Conveyance System	**$7,414,186**
	OPTION C2 **Modifications to the SWDF - Expansion of Basin**	
10	Expansion of SWDF Basin to Additional 5 Million Gallons and Upgraded Pumping Capacity	$4,509,557
	Total Costs for Option C2 - Expansion of Basin	**$4,509,557**
	Note: Approximate Yearly O&M Cost for Existing SWDF	$634,000
12	**OPTION C3** **Construction of a Stormwater Detention Pond - Demolition Area**	
	Construction of Stormwater Detention Pond	$5,000,000
	Total Costs for Option C3 - Construction of a Stormwater Detention Pond	**$5,000,000**
	Note: Approximate Yearly O&M Cost for Existing SWDF	$634,000

TABLE 6.3

SUMMARY of REMEDIAL ALTERNATIVES and CONSTRUCTION COST ESTIMATES
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Alternative No.	*Remedial Alternative*	*Construction Cost Estimate*
1	Rerouting Plant 14 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in 66-Inch Storm Sewer	$ 497,407
2	Rerouting Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System to Outfall 002 - Flow Reversal in N-S Storm Sewer	$ 553,407
3	Overhead Rerouting of Plant 14 and Plant 14 Truck Dock 14-5 Rooftop Stormwater Drainage System Downspouts to Outfall 002	$ 685,857
4	Rerouting Northwest Quadrant of Plant 49 Stormwater Drainage System to Outfall 002	$ 70,000
5	Overhead Rerouting of South Section of Plant 49 Rooftop Stormwater Drainage System Downspouts to Outfall 002	$ 650,750
6	Overhead Rerouting of Plants 5 and 23 Rooftop Stormwater Drainage System Downspouts to New or Existing Storm Sewer and Outfall 002	$ 897,333
7	Rerouting Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System to Outfall 002 via New Sewer and Lift Station	$ 2,993,732
8	Plants 14, 49, and 5 and 23 Rooftop Stormwater Drainage System - Bypassing the SWDF	$ 7,414,186
9	Rehabilitation of North-South 66-Inch to 90-Inch and 36-Inch to 42-Inch Storm Sewers - Demolition Area	$ 4,509,557
10	Modifications to the SWDF	$ 4,650,000
11	Diversion of Peak Flows to Bypass the SWDF	$ 1,500,000
12	Construction of a Stormwater Detention Pond - Demolition Area	$ 5,000,000
13	Construction of a Groundwater Control Detention Pond - Demolition Area	$ 6,686,891
14	Construction of a Flow Rate Control Structure Upstream of the SWDF	$ 200,000
15	Construction of an Underground Detention Chamber - Demolition Area	$ 6,000,000
16	Stormwater Detention/Retention Implementing Plant 49 Rooftop	N/C

Notes:
N/C = Not calculated due to incomplete information.

TABLE 6.4

SUMMARY of OPTIONS and CONSTRUCTION COSTS
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Option ID	*Option*	*Construction Cost Estimate*
A1	Rerouting Plant 14, Plant 14 Truck Dock 14-5, and Plant 49 to Outfall 002 - Flow Reversal and Overhead Rerouting	**$ 1,771,565**
A2	Rerouting Plant 14, Plant 14 Truck Dock 14-5, and Plant 49 to Outfall 002 - Overhead Rerouting of Downspouts	**$ 1,406,607**
B1	Rerouting Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 002 - Flow Reversal & Overhead Rerouting	**$ 2,668,898**
B2	Rerouting Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 002 - New Sewer and Lift Station	**$ 2,993,732**
C1	Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 001 - Collection/Conveyance System	**$ 7,414,186**
C2	Modifications to the SWDF - Expansion of Basin	**$ 4,509,557**
C3	Construction of a Stormwater Detention Pond - Demolition Area	**$ 5,000,000**
	Optional: Flow Fill of Abandoned Storm Sewers and Plug Laterals in 36-Inch to 42-Inch Storm Sewer - Demolition Area	**$ 560,000**

TABLE 6.5

SUMMARY of OPTIONS, CONSTRUCTION COSTS, and DESIGN RAINFALL CAPABILITY
STORM SEWER FEASIBILITY ANALYSIS
GM PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

Option ID	*Option*	*Construction Cost Estimate*	*Area Removed from Outfall 001 Drainage Basin [acres]*	*Design Rainfall Frequency Capability Upon Implementation [years, 24-hour event]*
A1	Rerouting Plant 14, Plant 14 Truck Dock 14-5, and Plant 49 to Outfall 002 - Flow Reversal and Overhead Rerouting	**$ 1,771,565**	**25.7**	**10**
A2	Rerouting Plant 14, Plant 14 Truck Dock 14-5, and Plant 49 to Outfall 002 - Overhead Rerouting of Downspouts	**$ 1,406,607**	**25.7**	**10**
B1	Rerouting Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 002 - Flow Reversal & Overhead Rerouting	**$ 2,668,898**	**50**	**25+**
B2	Rerouting Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 002 - New Sewer and Lift Station	**$ 2,993,732**	**50**	**25+**
C1	Plant 14, Plant 14 Truck Dock 14-5, Plant 49, and Plants 5 and 23 to Outfall 001 - Collection/Conveyance System	**$ 7,414,186**	**50+**	**25+**
C2	Modifications to the SWDF - Expansion of Basin	**$ 4,509,557**	**--**	**25+**
C3	Construction of a Stormwater Detention Pond - Demolition Area	**$ 5,000,000**	**--**	**25+**