SITE SOURCE CONTROL (SSC) WORK PLAN

GM BEDFORD REMOVAL ACTION
BEDFORD, INDIANA

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LIST OF ACRONYMS

AOC	Administrative Order by Consent
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CA	Corrective Action
DNAPL	Dense Non-Aqueous Phase Liquid
Facility	General Motors Powertrain Bedford Facility
GM	General Motors Corporation
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
NAPL	Non-Aqueous Phase Liquid
PCBs	Polychlorinated Biphenyls
RA	Removal Action
SAP	Sampling and Analysis Plan
SSC Work Plan	Site Source Control Work Plan
QAPP	Quality Assurance Project Plan
U.S. EPA	United States Environmental Protection Agency
WWTP	Wastewater Treatment Plant
RCRA	Resource Conservation and Recovery Act
NPDES	National Pollutant Discharge Elimination System

1.0 INTRODUCTION

The Site Source Control Work Plan (SSC Work Plan) has been developed by General Motors Corporation (GM) to identify, characterize, and present a strategy to address seeps and springs which could potentially re-contaminate the surface water features in the vicinity of the GM Powertrain Bedford Facility with polychlorinated biphenyls (PCBs) following remediation of the surface water features. This SSC Work Plan will be implemented, following United States Environmental Protection Agency (U.S. EPA) approval, in accordance with the requirements of the Administrative Order on Consent (Docket Number V-W-03-C-747, effective July 31, 2003) (AOC). A more thorough assessment of the local groundwater conditions in both the overburden and bedrock is being conducted as part of the Resource Conservation Recovery Act (RCRA) Corrective Action (CA). The purpose of the SSC Work Plan is limited to identifying and controlling seeps and springs either currently known or identified during the Removal Action (RA), which could re-contaminate remediated areas outside of the GM Powertrain Bedford Plant. Seeps and springs with PCBs at levels which could cause re-contamination will be controlled and impacted water collected, treated, and discharged. A monitoring program will also be initiated for seeps and springs identified at the Site. The term "Site", as referred to in this SSC Work Plan, is defined in Section I of the AOC.

Identified seep and spring locations are presented on Figure 1.1.

The SSC Work Plan includes the following sections:

1.0 Introduction

2.0 PCB Detections in Seeps/Springs

3.0 Description of Proposed Controls

4.0 Additional Monitoring of Seeps/Springs not Known to Currently Contain PCBs

5.0 Identification of Additional Seeps/Springs During the Removal Action

The SSC Work Plan also includes the following support plans:

Appendix A – Health and Safety Plan

Appendix B – Typical Seep/Spring Control Measures

Appendix C – Photographic Log

The applicable requirements of the project Quality Assurance Project Plan (QAPP) are incorporated by reference.

2.0 PCB DETECTIONS IN SEEPS/SPRINGS

2.1 DESCRIPTION OF SEEPS/SPRINGS IDENTIFIED TO CONTAIN PCBs

An initial program of sampling was completed for seeps and springs as part of the RCRA Corrective Action for the Facility. All sampling and analyses were completed in accordance with the Quality Assurance Project Plan prepared in support of the RCRA Corrective Action (RCRA QAPP). A total of 29 seeps and springs were sampled. Seep/Spring locations are presented on Figure 1.1. Table 2.1 summarizes the results of the seep/spring sampling completed through June 2003. The locations of the seeps/springs identified to contain PCBs in the water phase are presented on Figure 2.1.

Of those seeps and springs sampled, five seeps/springs in the vicinity of AOI 4 were identified to contain PCBs, and each of these five seep/spring locations show the potential to drain into the adjacent tributary of Bailey's Branch creek. PCBs were also detected at low concentrations at three additional locations, two adjacent to Bailey's Branch (Spring 018 and Spring 1469), and one at the upstream end of the Northern Tributary (Seep 5013). The detections at these locations were in the unfiltered samples, and not the filtered samples, indicating that the PCBs may not be associated with the water phase (i.e., PCBs were in sediments at the spring's entrance to the surface). These locations do not pose a significant risk of recontamination of the creek, however, at a minimum require additional monitoring to determine the presence of absence of PCBs in the seep/spring water. These locations will be included as part of the monitoring program described in Section 4.0.

One additional spring (Spring 3-002 identified on Figure 2.1), located downstream of National Pollutant Discharge Elimination System (NPDES) Outfall 002, was identified to contain PCBs in a non-aqueous phase during a high flow event in May 2002. This spring was controlled through installation of a collection sump to separate and collect dense non-aqueous phase liquid (DNAPL). DNAPL was not been observed at this location since the initial high flow event in May 2002 through July 2002, after which access for observation was denied by the property owner. After July 2002, additional interception measures were placed downstream of that property as an additional precaution.

The release of the NAPL from the Spring 3-002 is believed to have been due to the high hydraulic gradient in the bedrock which was created by a series of precipitation events, culminating in a large storm event in May 2002. Once the hydraulic gradient in the bedrock subsided, NAPL was no longer observed to be present in the discharge from the spring.

2.2 CURRENT SEEP/SPRING DNAPL CONTROL MEASURES

Spring 3-002, located on Parcel 3, downstream of Outfall 002, has been identified to contain DNAPL. Upon discovery of the DNAPL, an Immediate Response Action was commenced to control and collect the DNAPL. The Immediate Response Action included the following components:

- Observed DNAPL was contained and collected during the Immediate Response Action. The small volume of DNAPL was collected, containerized, transported to the drum storage area, characterized, and properly disposed;
- The spring was isolated from the creek flow utilizing sand bags to control migration of the DNAPL during implementation of additional controls;
- Dikes were constructed upstream and downstream of the spring, and the stream flow diverted around the spring to prevent DNAPL from being transported downstream; and
- Once the hydraulic gradient had subsided, and DNAPL was no longer observed to be emanating from Spring 3-002, a sump, which acts as an oil/water separator, was installed to provide additional control. The sump consists of a high density polyethylene (HDPE) pipe section grouted into the rock around Spring 3-002. An outlet was installed from the sump at an elevation approximately six inches above the Spring elevation to allow the sump to collect any DNAPL (which is heavier than water and which could potentially discharge from the Spring during future high flow events). The sump was monitored following installation, however, no DNAPL was observed in the sump between its installation and loss of access to Parcel 3.

Due to denial of access by the property owners, the sump installed as part of the Immediate Response Action can not currently be monitored. Therefore, additional controls including a dike and oil collection booms were installed downstream of the seep on Parcel 205. The dike was constructed of sand bags and lined with plastic sheeting to cause stream flow to back up. The resulting reduction in stream velocity would allow DNAPL, if present, to settle out of the creek flow. Creek flow then passes through a series of oil absorbent booms before continuing downstream. These additional controls are observed on a periodic basis, including during or after storm events. No DNAPL has been observed at this location.

3.0 DESCRIPTION OF PROPOSED CONTROLS

Controls will be installed for any seeps or springs identified to contain PCBs, and which have the potential to impact the remediated areas in a significant manner following the Removal Action. For each seep/spring identified to require controls, the SSC Work Plan will identify procedures necessary to provide:

- Pre-design information including geology and anticipated water flow rates;
- Develop a design to reliably and effectively control the seep/spring;
- Implement the designed control measures;
- Operate and monitor the control system; and
- Collect and properly treat or dispose the collected water or NAPL.

It is anticipated that the control measures will generally consist of the installation of a collection sump, extraction well, or trench from which collected water would be pumped to a collection tank. Appendix B presents typical details for the types of seep/spring control measures anticipated to be implemented. Specific designs for each seep/spring requiring controls will be prepared based on these typical details, as described in Section 3.1. A photographic log for the seeps/springs which are currently accessible is provided in Appendix C.

All collected water is currently planned to be transported to the Facility wastewater treatment plant (WWTP) for treatment. Any non-aqueous phase liquid (NAPL) collected would be stored in accordance with applicable laws and regulations, and periodically removed from the Site for disposal at a properly licensed off-Site facility. At some locations, GM may elect to either install permanent piping to the Facility WWTP, or install a treatment system for the collected water at the collection point, subject to approval by U.S. EPA. Samples of water to be treated by the Facility WWTP will undergo analysis for an expanded parameter list consistent with the Facility WWTP NPDES Permit requirements prior to sending the water to the WWTP for treatment.

3.1 CONTROL MEASURES FOR CURRENTLY IDENTIFIED SEEPS/SPRINGS

The following subsections discuss the conceptual design of proposed controls to be implemented at each seep/spring known to contain PCBs. For each of the seeps/springs identified below, as well as for any additional seeps/springs identified to require controls, the following design procedure will be implemented as access allows:

- A detailed survey of the area surrounding the seep/spring will be completed to support the design of the seep/spring controls;
- The volume of impacted water required to be handled will be determined based on observations and measurements of flow rates under high and low flow conditions;
- The geology of the area will be determined including the depth of overburden materials;
- A detailed design of a control system will be prepared for review;
- The design will be modified, as necessary, based on comments received; and
- The control system will be constructed based on the detailed design.

Necessary information to prepare designs for the seeps and springs adjacent to AOI 4 and Spring 3-002 is available. Designs for these locations are therefore included herein.

Initial control measures are intended to prevent re-contamination of the remediated areas of the Site. Therefore, the control measures designed consistent with this SSC Work Plan may be temporary in nature and may be upgraded or replaced in the future should long-term operation be required. These upgrades could include items such as automated control systems, larger storage tanks, more efficient collection devices, etc. In some cases, where longer term operation of the control measures is anticipated, a permanent system may be designed and installed as part of this SSC Work Plan. During initial operation, the sumps will be inspected, visually and with an oil/water interface probe, for the presence of NAPL on a weekly basis and after each major precipitation event. Based on the observed accumulation rate of NAPL (if present), the inspection frequency is anticipated to be reduced to monthly after 6 weeks of inspection and the frequency of inspection will be re-evaluated again after 6 months to determine if less frequent monitoring is acceptable.

All activities under the SSC Work Plan will be completed in accordance with the requirements of the Health and Safety Plan included as Appendix A.

3.1.1 CONTROL MEASURES FOR SPRING 3-002

Following obtaining access and completion of clearing activities in the Upstream Parcels as part of the Removal Action, additional and more permanent controls will be installed for Spring 3-002. The installed sump will be enlarged to allow installation of a pumping and piping system to remove collected NAPL (if any) and water to an oil/water

separator. Any oil will be collected and properly disposed of at an appropriately permitted commercial facility As the spring flows continuously and is located near the Facility WWTP, it is planned that the water collected after the oil/water separator will be taken to the Facility WWTP. Spring 3-002 is estimated to flow at rates which vary from 1 to 10 gallons per minute (based on observations made during low and high flow events). The stream channel will also be permanently diverted around the sump.

Figure 3.1 presents the layout of the current controls for Spring 3-002. Figure 3.1 also identifies the conceptual design of the long-term controls. Figure 3.2 presents the detailed design for the proposed sump configuration. Once access is obtained to this area and necessary pre-design information is obtained, a detailed design will be submitted to U.S. EPA for review and approval.

3.1.2 CONTROL MEASURES FOR SEEPS/SPRINGS ADJACENT TO AOI 4

The seeps/springs located in the vicinity of AOI 4 which contain PCBs (as shown of Figure 3.3) appear to flow on a relatively continuous basis at a low flow rate (2-4 gallons per minute). The flow rates of these seeps and springs do not appear to be significantly affected by high groundwater flow conditions. An appropriate collection system has been designed for each location based on the information obtained during previous investigations. It is currently anticipated that overburden trenches will be utilized to intercept potentially impacted water, except at locations where the seep/spring emanates from bedrock. Bedrock seeps/springs will be controlled using a sump to collect the water from the seep/spring. The trench will be lined on the downgradient side with a polyethylene liner to minimize pumping rates necessary to collect the water from the seeps/springs. Figures 3.4 through 3.10 present the designs or the control measures proposed for the seeps/springs adjacent to AOI 4.

Once the collection systems are in place, it is anticipated that a temporary tank will be utilized to store collected water for transfer to the Facility WWTP pending installation of a permanent forcemain to the Facility WWTP.

3.1.3 CONTROL MEASURES FOR SEEP 5013

Seep 5013 is located on Parcel 386 and is originating from a suspected fill area. Due to the isolated nature of Seep 5013 (i.e., the seep originates from the surficial fill, and based on topography, is not connected to groundwater originating from the plant and is not

immediately adjacent to the creek), and the relatively low flow rate, this seep will be temporarily controlled by the placement of sorbent booms around the seep. The sorbent booms will be monitored on a weekly basis and changed, as necessary. The proposed layout of the sorbent booms is identified on Figure 3.11.

Evaluation of Seep 5013 will then be further addressed as part of the fill area investigation being conducted as part of the RCRA Corrective Action for the Bedford Powertrain Facility.

3.1.4 CONTROL MEASURES FOR SPRING 1469 AND SPRING 018

Spring 1469 and Spring 018 are located in areas which do not appear to be hydraulically connected to groundwater in the vicinity of the Facility. Spring 1469 is located approximately 1 mile from the Facility. A valley is present between the Facility and Spring 1469 (adjacent to AOI 4), which is believed to act as a discharge point for shallow groundwater flow on both sides of the valley, such that impacted groundwater from the Facility would not travel to Spring 1469. Additional water level measurements will be collected to verify the function of a valley as a discharge point.

Spring 018 is located approximately 2,500 feet from the Facility. Spring 018 is located near the creek but on the opposite side of the creek from the Facility. Similar to Spring 1469, the creek would be expected to act as a discharge point for shallow groundwater on both sides of the creek, preventing flow from the Facility from reaching the location of Spring 018. Additional measurements will also be completed to confirm the creek as a discharge point for groundwater on both sides. As there is no likely source of PCBs from the groundwater at these locations, it is possible that the PCB detections in these locations resulted from contamination of the water sample by a small amount of impacted surficial soil during sampling. These locations will therefore be included as part of the monitoring program identified in Section 4.0. If PCBS are not found in subsequent monitoring events, a review of information on the spring will be performed. Data will be developed to identify groundwater flow directions, elevations and features such as groundwater discharge zones (which would isolate seeps/springs from the Facility), etc. This information will be organized and submitted to U.S. EPA for review in support of a request to delete these locations from additional controls/monitoring, as appropriate.

If PCBs are verified to be present in these springs, control measures will be designed and implemented at these locations following U.S. EPA approval of proposed control measure designs.

Sampling of the springs at these locations will be completed in accordance with the requirements of the QAPP prepared in accordance with the AOC.

4.0 ADDITIONAL MONITORING OF SEEPS/SPRINGS NOT KNOWN TO CURRENTLY CONTAIN PCBS

The Monitoring Program includes the following components:

- The program for the SSC utilizes a phased approach roughly paralleling the phasing of the creek cleanup;
- Phase I includes seeps and springs along the creek system located south of Broomsage Road. As creek cleanup progresses to downstream parcels, Phase II will also include monitoring of seeps and springs north of Broomsage Road;
- In Phase I of sampling, seeps/springs south of Broomsage Road for which control measures are not being implemented because PCBs were not detected during RFI sampling (as well as Spring 1469 and Spring 018), will be placed into a monitoring program. The monitoring program designed to identify the potential for the seeps/springs to contain PCBs that could re-contaminate the creek(Monitoring Program). The monitoring program will include Spring 3-001, Spring East side of Creek, Spring 020, Spring 40-007, and Spring 021 which could not be sampled previously as they were dry or submerged during high flow events;
- Any seep/spring proposed to be excluded from the Monitoring Program will be evaluated to determine its potential to be hydraulically connected to a source of contamination. Based upon this evaluation, U.S. EPA may exclude seeps/springs from the Monitoring Program. The evaluation will include relevant available information which may include information obtained through the RCRA Corrective Action groundwater investigation as well as information gathered specifically for this SSC on each seep/spring:
  - Assessment of surface water and groundwater flow directions,
  - Assessment of the topography of the area to identify seep/springs which are not likely to be hydraulically connected to contaminated source areas due to relative elevation differences between the seep/springs and hydraulic barriers/discharge point,
  - Evaluation of the geology of the area including geologic cross-sections showing the location of the seeps/springs in relation to sources of contamination, and evaluation of the locations and extent of weathered and fractured bedrock,
  - Evaluation of potential loading, distance to the creek, and adsorptive capacity of the soils adjacent to the seep to assess the potential to recontaminate the creek following remediation;
- Field measurements - Each seep/spring included in the Monitoring Program will be sampled a total of 8 times (four samples under high flow conditions and four

samples under low flow conditions), in the first year. One low flow and one high flow sample will be collected each quarter (approximately) in the first year. Low flow conditions will be defined as a minimum of 7 calendar days without precipitation prior to the sampling event. High flow conditions will be defined as a minimum of 2 inches of rain in a 24-hour period. Based on weather records for Bedford, there are typically 5 or 6 storm events exceeding 2 inches of rain in 24-hours each year. In the event that a high flow sample cannot be collected in a quarter due to the lack of a suitable storm event, the quarter will be extended until a sample can be collected (i.e. a quarter will not be skipped due to unsuitable weather events). After the first year of monitoring, the frequency of monitoring will be reduced to one sample per quarter during a high flow event. This sampling and analysis will include field measurements of pH, specific conductance, dissolved oxygen, temperature, and turbidity at each seep/spring, as well as estimation of discharge volume from the seep/spring. These measurements will be repeated during each subsequent sampling event to provide information on the consistency of field conditions during sampling events;

- PCB Monitoring - Each seep/spring included in the Monitoring Program will be sampled a total of 8 times (four samples under high flow conditions and four samples under low flow conditions), in the first year. One low flow and one high flow sample will be collected each quarter (approximately) in the first year. After the first year of monitoring, the frequency of monitoring will be reduced to one sample per quarter during a high flow event;
- During the first year, should weather conditions (e.g., prolonged precipitation events, large storm event) result in unusually high discharge conditions from the seep/springs, and the 4 high flow sampling events have been completed, one additional round of sampling will be completed during that event;
- Sampling may be completed by active grab sampling or passive sampling/detection equipment; and
- All samples collected for PCB analysis will include collection and analysis of both filtered and unfiltered samples.

Figure 4.2 provides a flowchart identifying the decision logic for the seep/spring monitoring program.

Following completion of the first year of monitoring, or as new information becomes available, seeps/springs which do not contain detectable PCBs (or PCBs at levels which could cause re-contamination of the creek) will be identified and proposed for removal from the SSC Monitoring Program. Upon U.S. EPA approval, these locations will be

removed from the SSC Monitoring Program. The SSC Work Plan implementation will continue until one year following completion of Removal Action activities at the Site. Any seeps or springs requiring continued evaluation or control after this time will continue as part of the ongoing RCRA Corrective Action.

If it is determined, at any time during the implementation of the SSC Monitoring Program, that PCBs are present in a seep/spring which has the potential to re-contaminate the Site, or if at any time the presence of NAPL is observed, seep/spring controls will be implemented in accordance with Section 3.0.

Once cleanup of the creek has progressed up to Broomsage Road, the remaining springs north of Broomsage, along the creek, will be added to the Monitoring Program.

4.1 PHASE I MONITORING OF SEEPS/SPRINGS

The seeps and springs currently identified to be included in the Phase I Monitoring Program include:

- Spring_Well 1
- Seep_001
- Seep_002
- Spring_3_001
- Spring_3_003
- Spring_004
- Spring_009
- Spring_018
- Spring_020
- Spring_021
- Eastern Seep Area 01
- Eastern Seep Area 02
- Spring East of Storm Pond
- Spring East of Storm Pond 2
- Spring East Side of Creek
- Spring 1452/1453
- Spring 1469

- Spring 1590
- Spring 4007
- SW-X216Y274
- SW-X243Y232
- SW-X256Y260

This list may be modified through the addition of newly identified seeps/springs, or deletion of seeps/springs, with U.S. EPA approval, based on evidence that the seep/spring does not have the potential to re-contaminate the Site based on the location of the seep/spring or evidence that it is not connected to potentially impacted groundwater.

4.2 SEEP/SPRING SAMPLING PROCEDURES

Seeps and Springs which emanate directly from bedrock will be sampled in accordance with the procedures in the approved Corrective Action RFI SAP (CRA, 2001) with the additional measures described in the following subsections.

Sample handling and chain of custody procedures established in the SAP and QAPP will be followed at all times.

4.2.1 BEDROCK SEEP/SPRING SAMPLING PROCEDURES

The location to be sampled will be surveyed, photographed, and given a unique identification number if not previously completed. The flow rate at the time of sampling will be determined.

The seep/spring location will be isolated from surrounding surface water flows, as necessary, by temporary berming, swale construction, sand bag dykes, plastic sheeting to isolate the seep from any adjacent soils, etc. Any loose soil will be removed from the immediate area of the seep to prevent incidental soil from contaminating the sample.

Sufficient sample will be collected to allow a portion of the sample to be laboratory filtered utilizing a 0.45 micron filter. Both filtered and unfiltered samples will be analyzed in accordance with the QAPP.

4.2.2 OVERBURDEN SEEP/SPRING SAMPLING PROCEDURES

The location to be sampled will be surveyed, photographed, and given a unique identification number if not previously completed. The flow rate at the time of sampling will be determined.

The seep/spring location will be isolated from surrounding surface water flows, as necessary, by temporary berming, swale construction, sand bag dykes, plastic sheeting to isolate the seep from adjacent soils, etc. Overburden materials below the seep/spring will be removed, as necessary, to allow sample containers to be positioned to collect samples with minimum potential to disturb/re-suspend sediment or soils.

Sufficient sample will be collected to allow a portion of the sample to be laboratory filtered utilizing a 0.45 micron filter. Both filtered and unfiltered samples will be analyzed in accordance with the QAPP.

5.0 IDENTIFICATION OF ADDITIONAL SEEPS/SPRINGS DURING THE REMOVAL ACTION

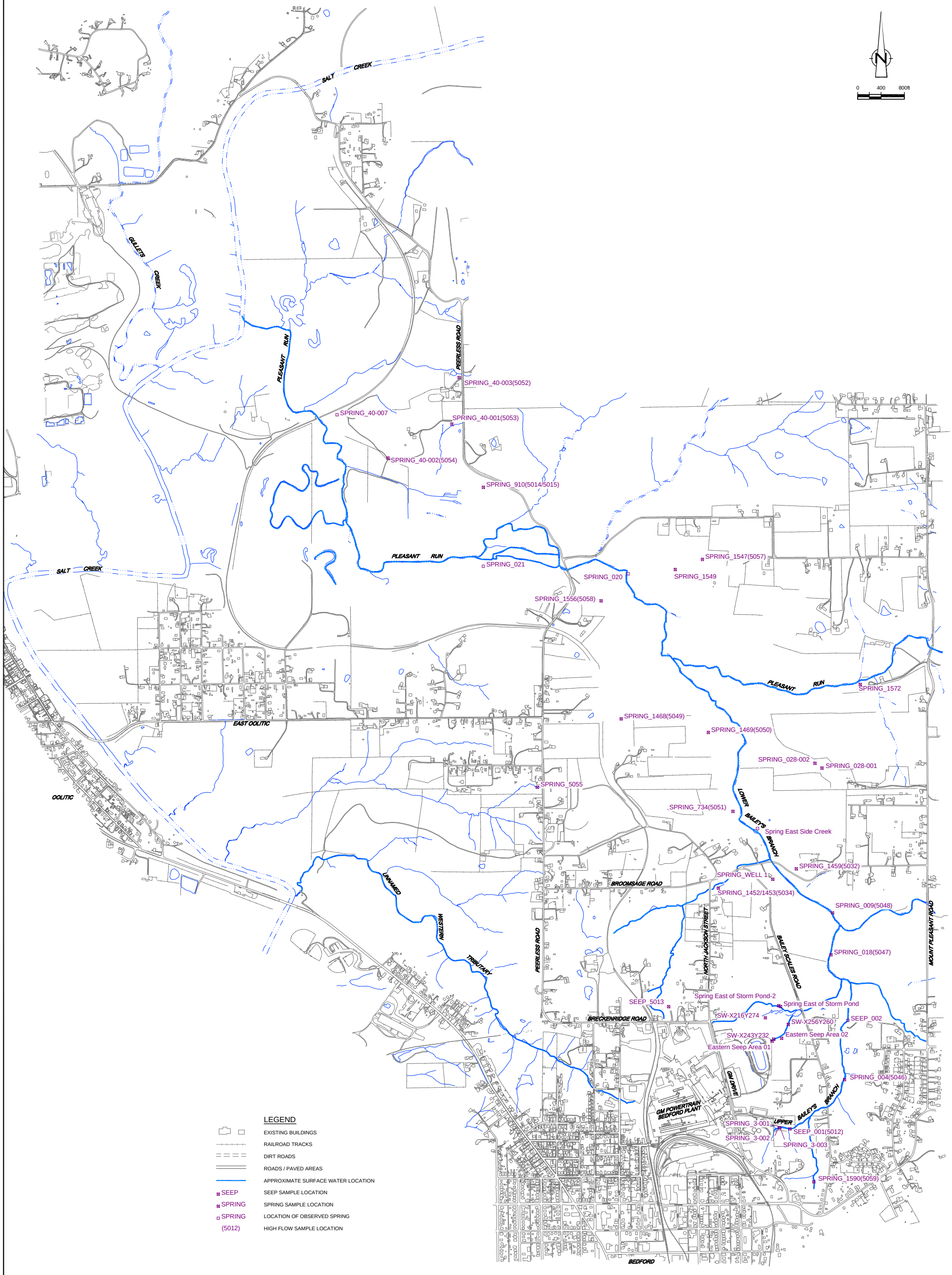
The following program will be implemented to identify, locate, and characterize additional seeps/springs at, or adjacent to the Site. In general, the following procedures will be included in the identification program:

- Once access to necessary properties is obtained, the Site will be re-inspected to identify any additional seeps or springs;
- The location and elevation of each seep and spring will be surveyed, a unique seep/spring identification number will be assigned, and initial filtered and unfiltered samples of the water phase will be collected and analyzed for PCBs;
- The potential for the seep/spring flow to discharge onto areas of the Site which are subject to remediation will be determined based upon an evaluation of the flow-path of the water emanating from the seep/spring;
- The potential for seep/spring flow to be hydraulically connected to a source of contamination will be determined; and
- During the implementation of Removal Action, the oversight engineer will visually inspect the Site and adjacent slopes in the vicinity of the current work area to identify seeps and springs on an ongoing basis, during low flow conditions. During wet weather events (high flow conditions) the oversight engineer will complete additional visual inspections to identify additional seeps/springs in the vicinity of the current work area which flow only during high flow conditions. The areas inspected under both high and low flow conditions will be documented to provide complete coverage of inspections. Additional seeps/springs identified will be surveyed and sampled under high and low flow conditions.

If the seep/spring is identified to contain PCBs, or NAPL is identified, control measures consistent with Section 3.0 will be implemented. If PCBs are not detected, the seep/spring will be added to the Monitoring Program described in Section 4.0, unless U.S. EPA approves exclusion of the seep/spring from the Monitoring Program.

6.0 REPORTING

Progress of the SSC Work Plan implementation will be documented in the monthly Progress Reports submitted pursuant to the AOC. These reports will include a summary of all activities completed pursuant to the SSC Work Plan.



Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

GM BEDFORD REMOVAL ACTION

SITE SOURCE CONTROL WORK PLAN

IDENTIFIED SEEP/ SPRING LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	JULY 2003	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 053	Drawing Nº: figure 1.1

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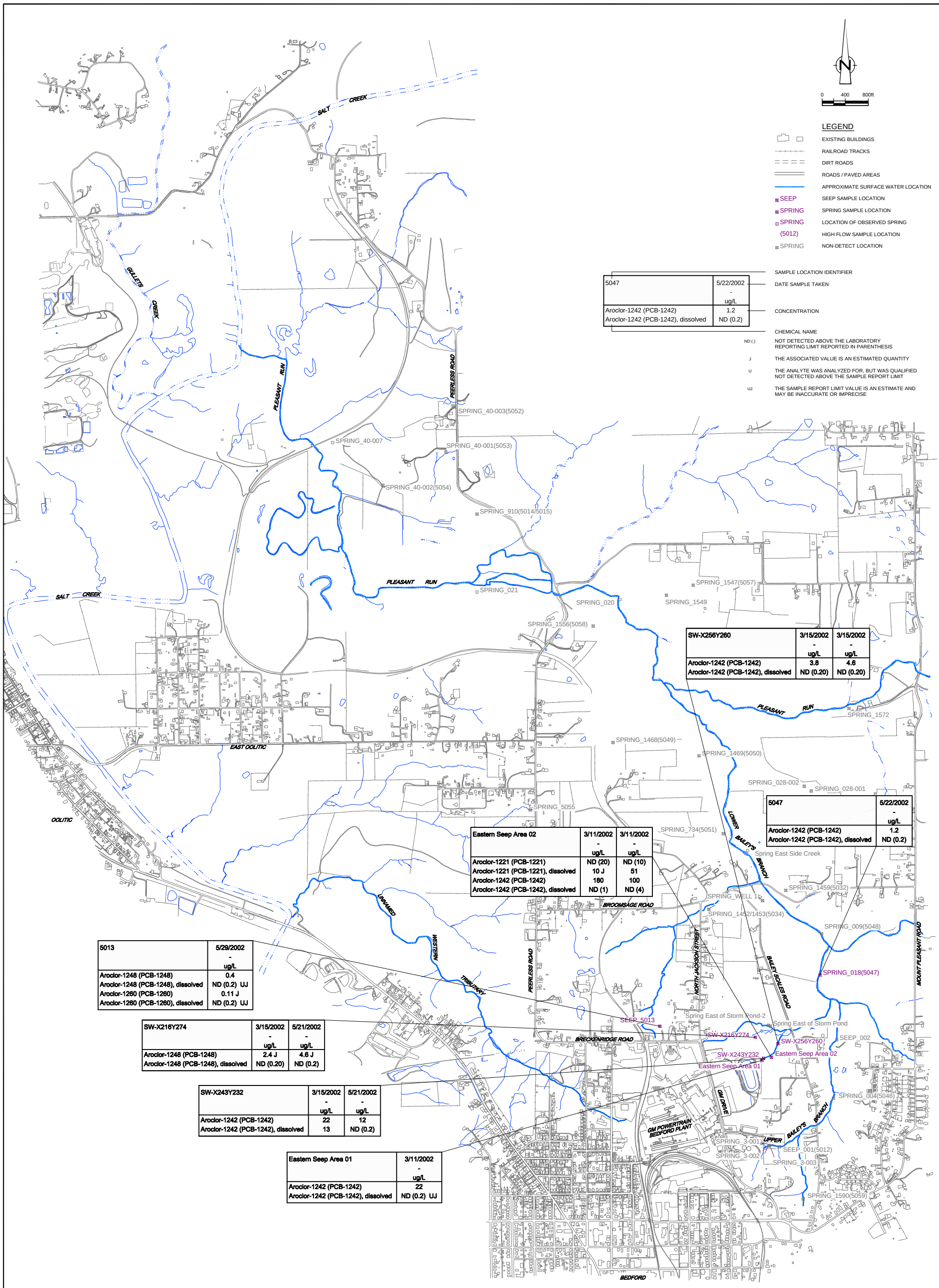


LEGEND

- EXISTING BUILDINGS
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- SEEP — SEEP SAMPLE LOCATION
- SPRING — SPRING SAMPLE LOCATION
- SPRING — LOCATION OF OBSERVED SPRING
- (5012) — HIGH FLOW SAMPLE LOCATION
- SPRING — NON-DETECT LOCATION

5047	5/22/2002 - ug/L
Aroclor-1242 (PCB-1242)	1.2
Aroclor-1242 (PCB-1242), dissolved	ND (0.2)

- SAMPLE LOCATION IDENTIFIER
- DATE SAMPLE TAKEN
- CONCENTRATION
- CHEMICAL NAME

- ND ( ) — NOT DETECTED ABOVE THE LABORATORY REPORTING LIMIT REPORTED IN PARENTHESIS
- J — THE ASSOCIATED VALUE IS AN ESTIMATED QUANTITY
- U — THE ANALYTE WAS ANALYZED FOR, BUT WAS QUALIFIED NOT DETECTED ABOVE THE SAMPLE REPORT LIMIT
- UJ — THE SAMPLE REPORT LIMIT VALUE IS AN ESTIMATE AND MAY BE INACCURATE OR IMPRECISE

SW-X256Y260	3/15/2002 - ug/L	3/15/2002 - ug/L
Aroclor-1242 (PCB-1242)	3.8	4.6
Aroclor-1242 (PCB-1242), dissolved	ND (0.20)	ND (0.20)

5047	5/22/2002 - ug/L
Aroclor-1242 (PCB-1242)	1.2
Aroclor-1242 (PCB-1242), dissolved	ND (0.2)

Eastern Seep Area 02	3/11/2002 - ug/L	3/11/2002 - ug/L
Aroclor-1221 (PCB-1221)	ND (20)	ND (10)
Aroclor-1221 (PCB-1221), dissolved	10 J	51
Aroclor-1242 (PCB-1242)	180	100
Aroclor-1242 (PCB-1242), dissolved	ND (1)	ND (4)

5013	5/29/2002 - ug/L
Aroclor-1248 (PCB-1248)	0.4
Aroclor-1248 (PCB-1248), dissolved	ND (0.2) UJ
Aroclor-1260 (PCB-1260)	0.11 J
Aroclor-1260 (PCB-1260), dissolved	ND (0.2) UJ

SW-X216Y274	3/15/2002 - ug/L	5/21/2002 - ug/L
Aroclor-1248 (PCB-1248)	2.4 J	4.6 J
Aroclor-1248 (PCB-1248), dissolved	ND (0.20)	ND (0.2)

SW-X243Y232	3/15/2002 - ug/L	5/21/2002 - ug/L
Aroclor-1242 (PCB-1242)	22	12
Aroclor-1242 (PCB-1242), dissolved	13	ND (0.2)

Eastern Seep Area 01	3/11/2002 - ug/L
Aroclor-1242 (PCB-1242)	22
Aroclor-1242 (PCB-1242), dissolved	ND (0.2) UJ

Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

GM BEDFORD REMOVAL ACTION

SITE SOURCE CONTROL WORK PLAN

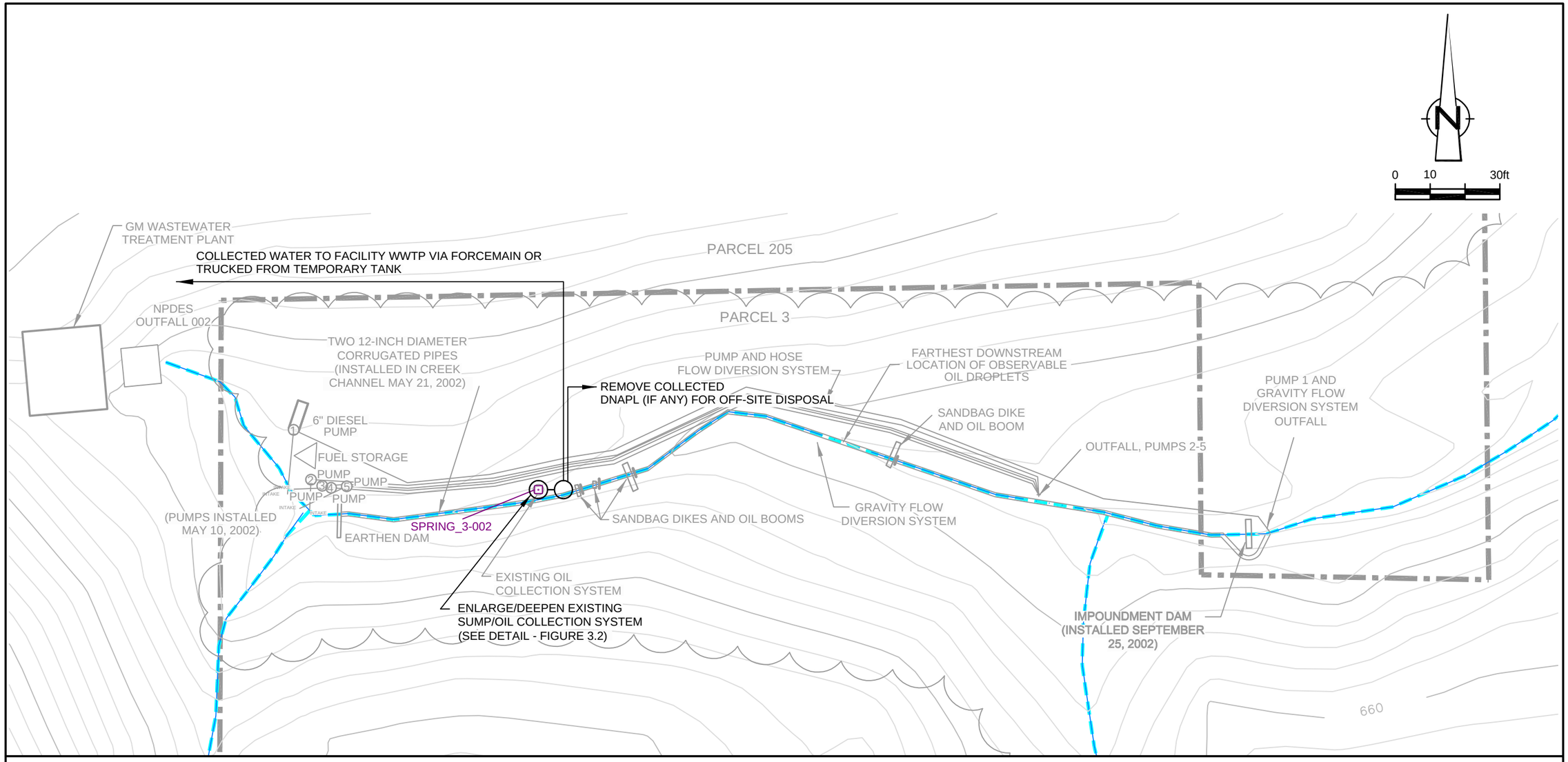
DETECTED PCB CONCENTRATIONS IN SEEPS/SPRINGS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	JULY 2003	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 053	Drawing Nº: figure 2.1

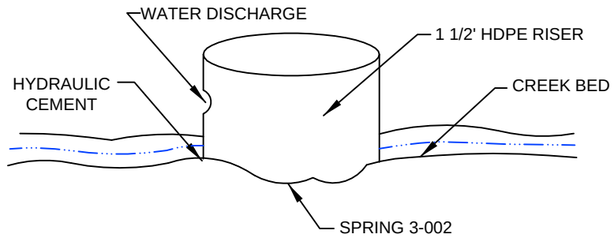
13968-00(053)GN-WA027 NOV 05/2003



LEGEND

- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- SPRING (5012) — LOCATION OF OBSERVED SPRING
- HIGH FLOW SAMPLE LOCATION

CURRENT OIL COLLECTION SYSTEM

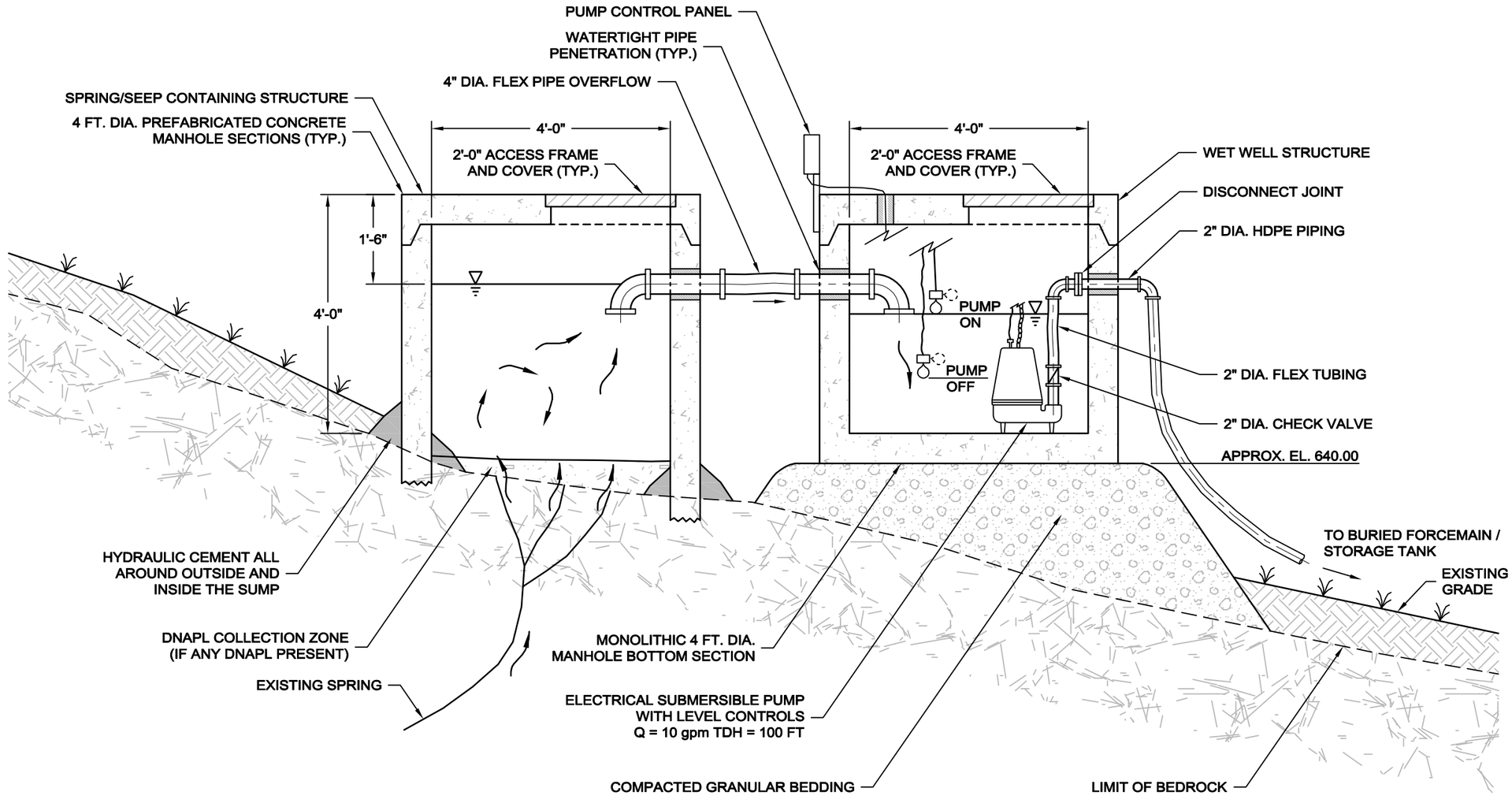


NOTE:

THE OIL (HEAVIER THAN WATER) SINKS TO THE BOTTOM OF THE RISER WHILE WATER GOES TO THE TOP.

figure 3.1

CONTROL MEASURES FOR SPRING_3-002
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

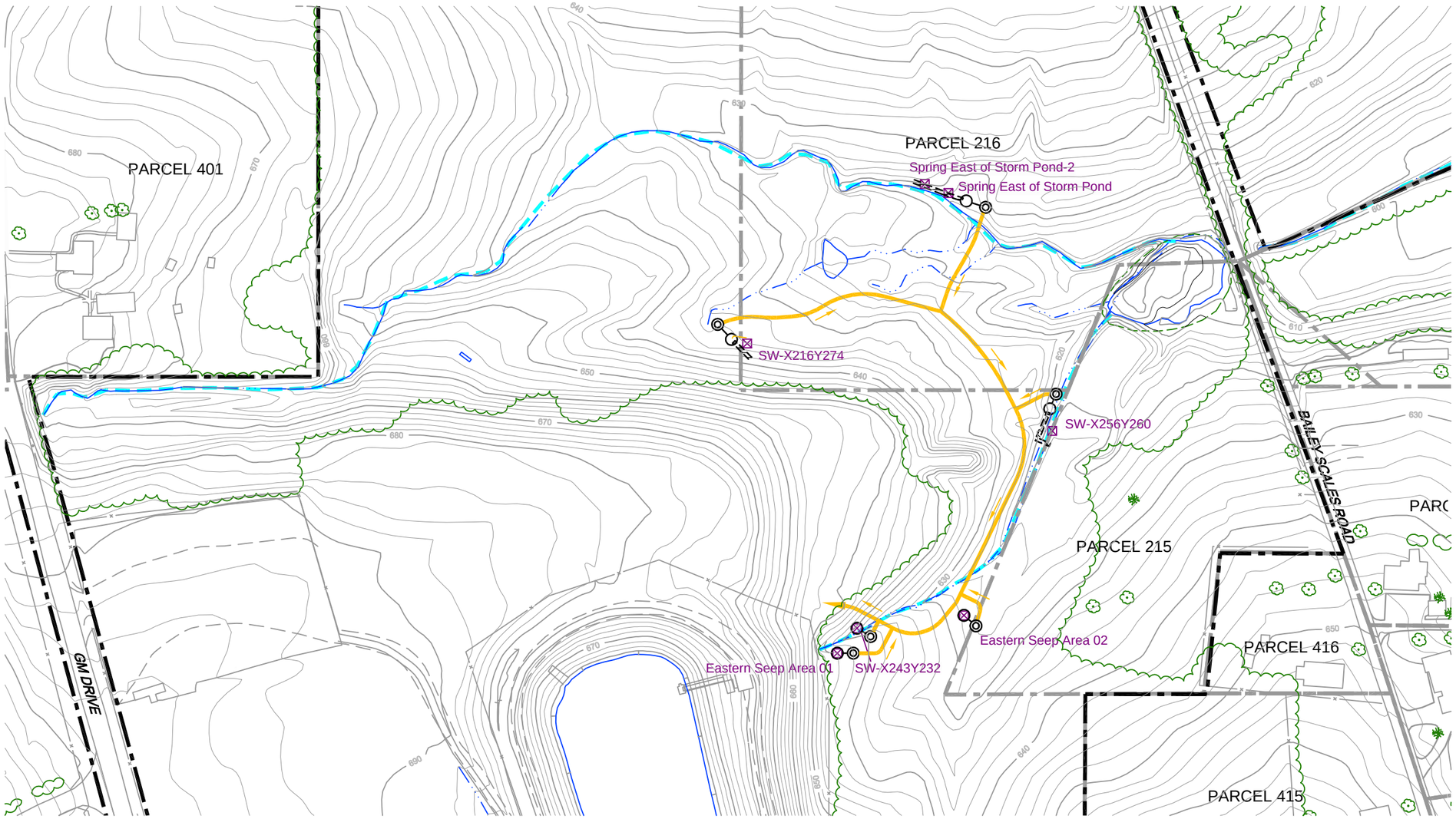


NOTE: FLOATS WILL BE SET TO PREVENT PREVENT LNAPL (IF PRESENT) FROM BEING PUMPED FROM MANHOLE

SCALE: 1" = 2'

figure 3.2

BEDROCK SEEP / SPRING CONTROL SUMP DETAIL
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana



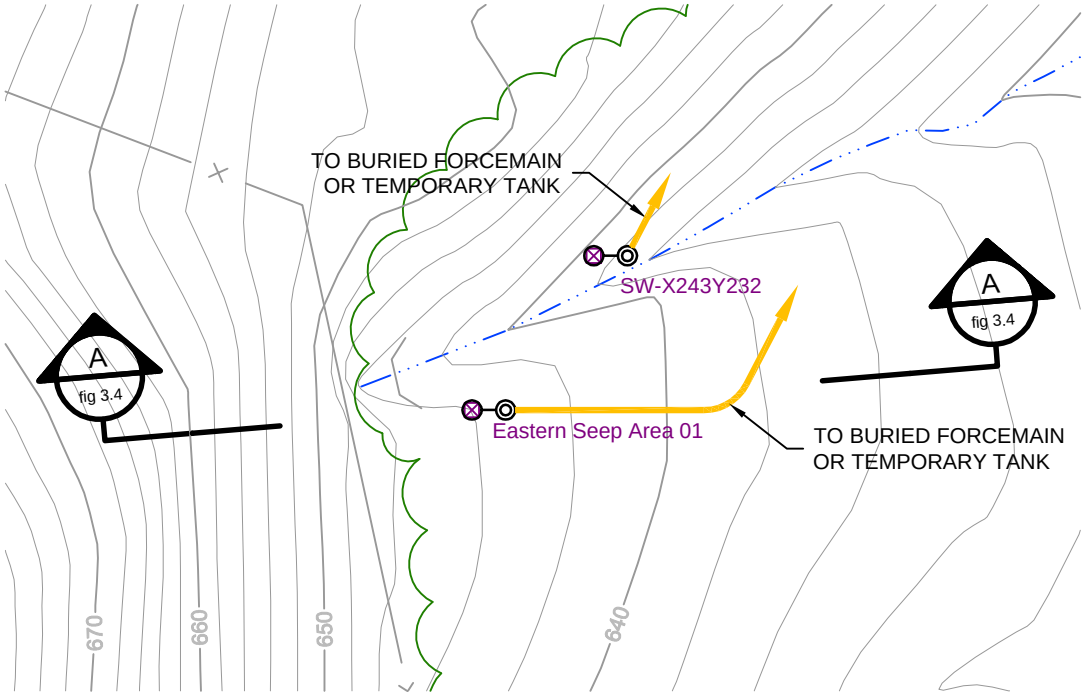
LEGEND

- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE GM PROPERTY BOUNDARY
- SEEP — SEEP SAMPLE LOCATION
- SPRING — SPRING SAMPLE LOCATION
- SPRING (5012) — LOCATION OF OBSERVED SPRING
- HIGH FLOW SAMPLE LOCATION
- PROPOSED OVERBURDEN EXTRACTION TRENCH
- PROPOSED HDPE FORCEMAIN TO CONVEY COLLECTED WATER TO FACILITY WWTP / TEMPORARY STORAGE TANKS
- PROPOSED SPRING CONTAINING WET WELL STRUCTURE

figure 3.3

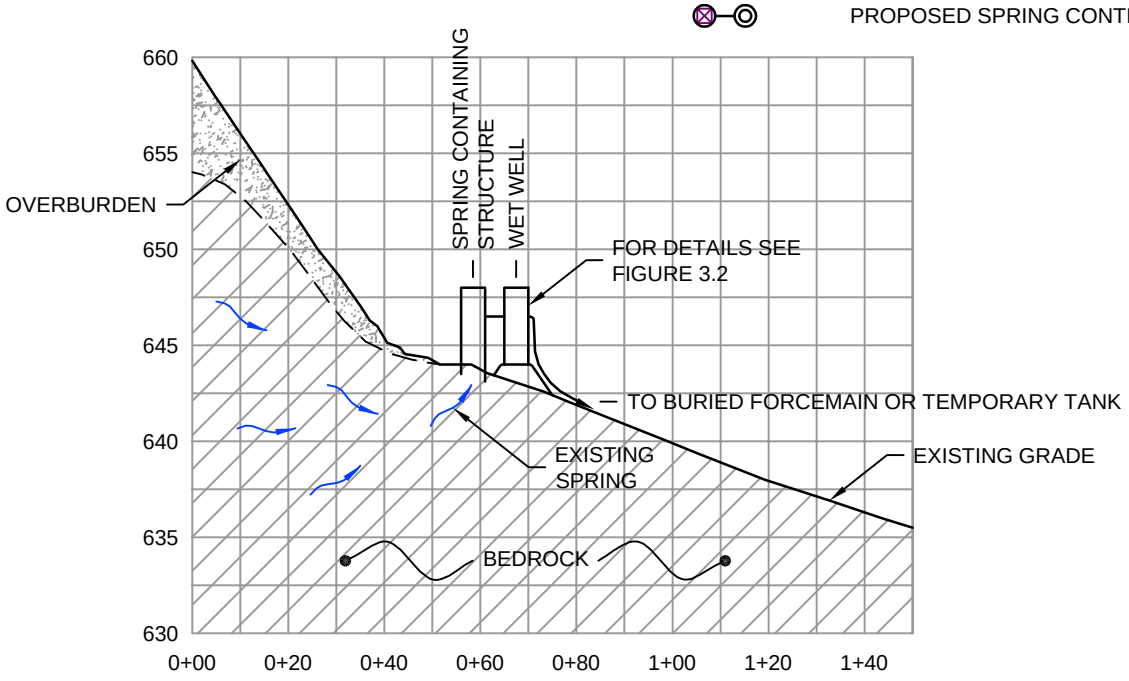
CONTROL MEASURES FOR SEEPS/SPRINGS ADJACENT TO AOI 4
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

13968-00(053)GN-WA029 AUG 20/2003



LEGEND

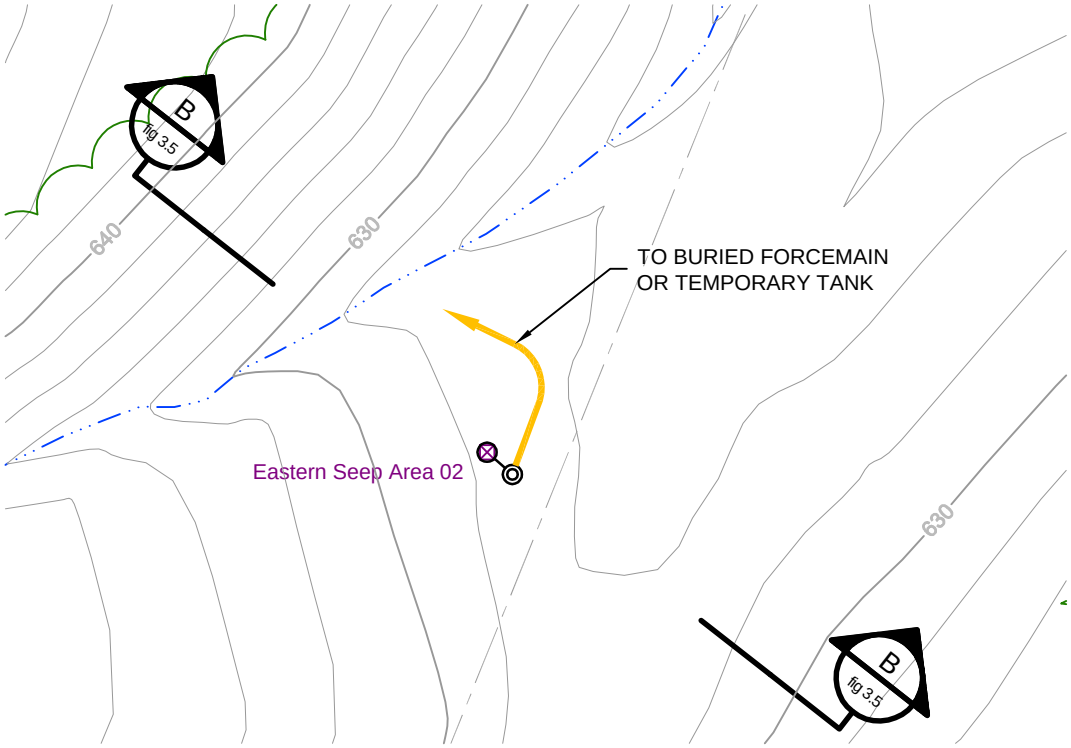
- APPROX. SURFACE WATER LOCATION
- EXISTING FENCE
- EXISTING VEGETATION
- SEEP
- SEEP/SPRING SAMPLE LOCATION
- PROPOSED HDPE FORCEMAIN TO CONVEY COLLECTED WATER TO FACILITY WWTP OR TEMPORARY TANK
- PROPOSED SPRING CONTROL STRUCTURE

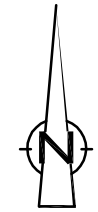


SECTION A-A

figure 3.4

CONTROL MEASURES FOR EASTERN SEEP AREA 01
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

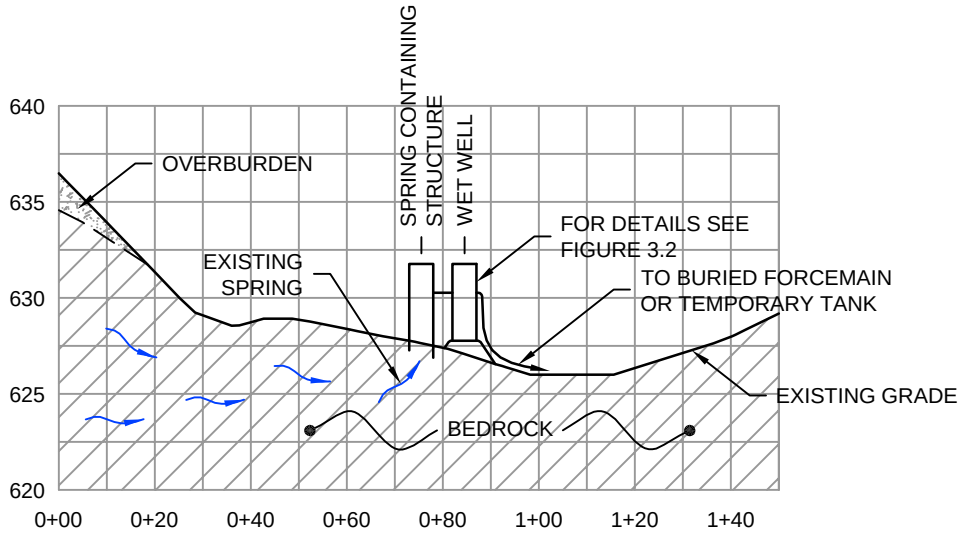




SCALE:
HOR. 1" = 40'
VER. 1" = 10'

LEGEND

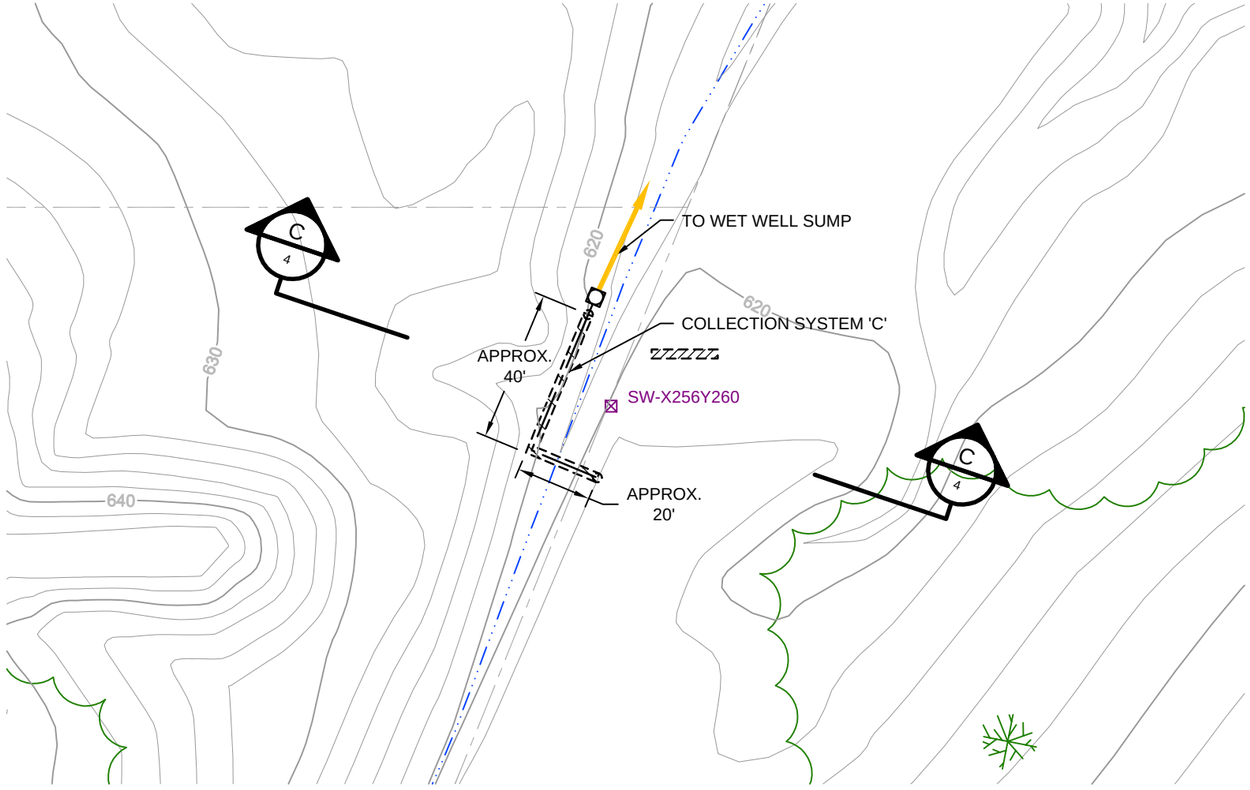
- APPROX. SURFACE WATER LOCATION
- APPROX. PROPERTY BOUNDARY
- EXISTING VEGETATION
- SEEP
- SEEP/SPRING SAMPLE LOCATION
- PROPOSED HDPE FORCEMAIN TO CONVEY COLLECTED WATER TO FACILITY WWTP OR TEMPORARY TANK
- PROPOSED SPRING CONTROL STRUCTURE

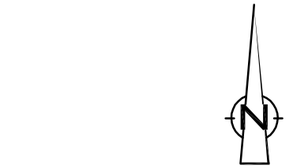


SECTION B-B

figure 3.5

CONTROL MEASURES FOR EASTERN SEEP AREA 02
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

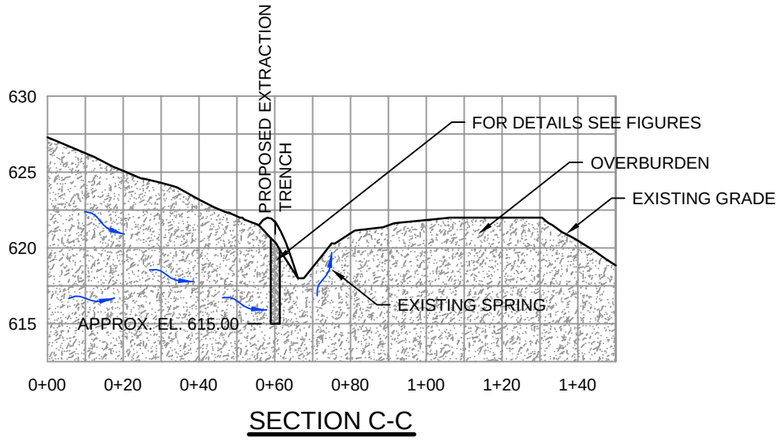




SCALE:
HOR. 1" = 40'
VER. 1" = 10'

LEGEND

- APPROX. SURFACE WATER LOCATION
- APPROX. PROPERTY BOUNDARY
- EXISTING VEGETATION
- ⊠ SEEP — SEEP/SPRING SAMPLE LOCATION
- PROPOSED OVERBURDEN EXTRACTION TRENCH
- PROPOSED 2" DIA. HDPE DRAIN TO CONVEY COLLECTED WATER TO WET WELL SUMP
- PROPOSED DNAPL SUMP STRUCTURE (SEE DETAIL DWG. 8)



SECTION C-C

No	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM BEDFORD REMOVAL ACTION
BEDFORD, INDIANA

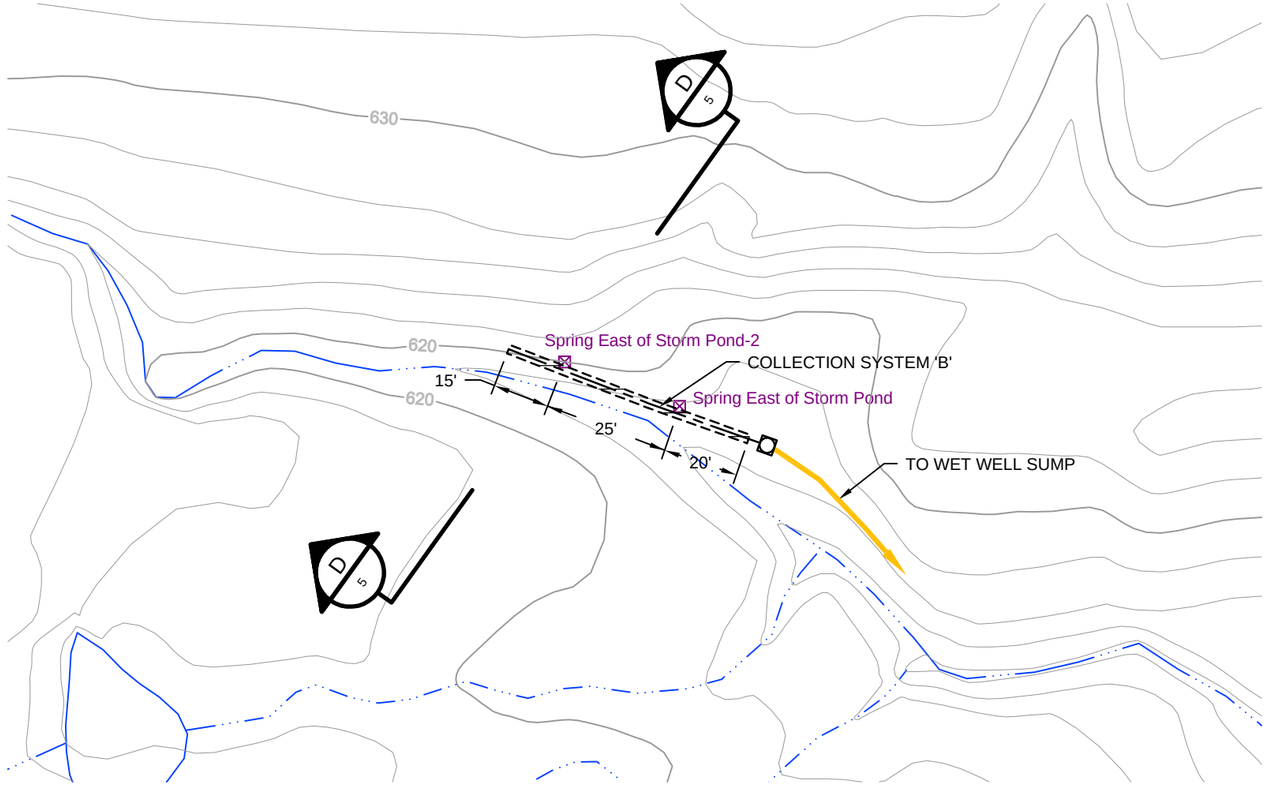
SITE SOURCE CONTROL PLAN

CONTROL MEASURES FOR
COLLECTION SYSTEM 'C'

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

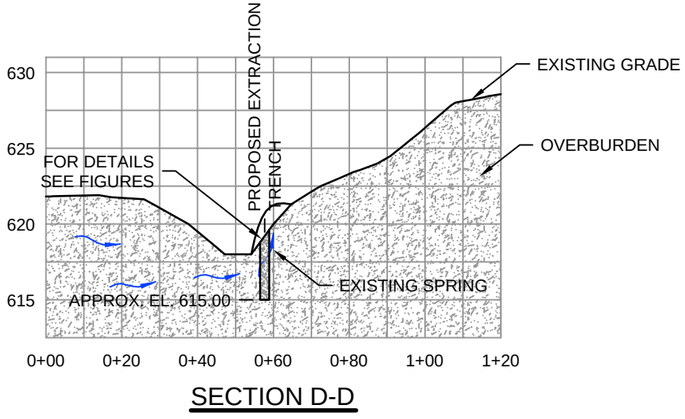
Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	SEPTEMBER 2003	
Scale: AS SHOWN	Project №: 13968-00	Report №: 053	Drawing №: figure 3.6



SCALE:
HOR. 1" = 40'
VER. 1" = 10'

LEGEND

- APPROX. SURFACE WATER LOCATION
- APPROX. PROPERTY BOUNDARY
- EXISTING VEGETATION
- ⊠ SEEP — SEEP/SPRING SAMPLE LOCATION
- PROPOSED OVERBURDEN EXTRACTION TRENCH
- PROPOSED 2" DIA. HDPE DRAIN TO CONVEY COLLECTED WATER TO WET WELL SUMP
- PROPOSED DNAPL SUMP STRUCTURE (SEE DETAIL DWG. 8)



SECTION D-D

No	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM BEDFORD REMOVAL ACTION
BEDFORD, INDIANA

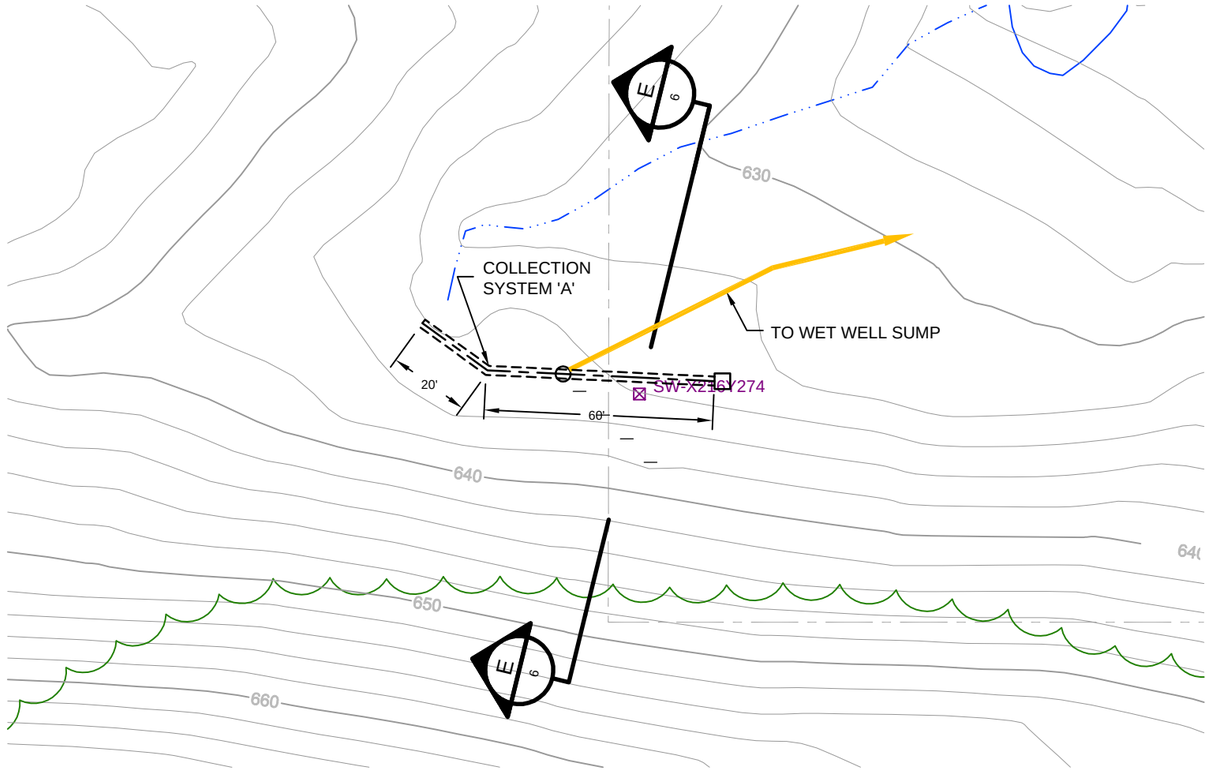
SITE SOURCE CONTROL PLAN

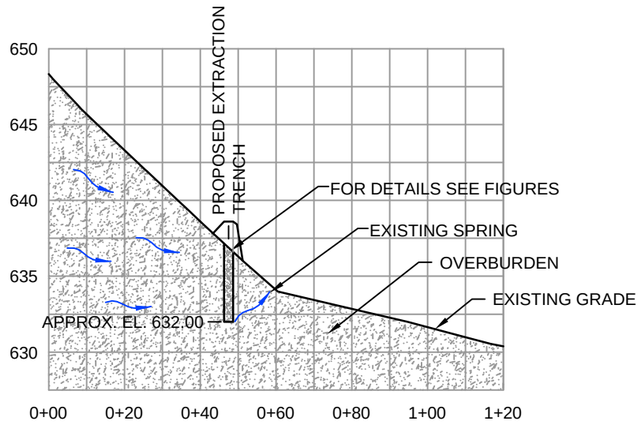
CONTROL MEASURES FOR
COLLECTION SYSTEM 'B'

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	SEPTEMBER 2003	
Scale: AS SHOWN	Project No: 13968-00	Report No: 053	Drawing No: figure 3.7





SECTION E-E

SCALE:
HOR. 1" = 40'
VER. 1" = 10'

LEGEND

- APPROX. SURFACE WATER LOCATION
- APPROX. PROPERTY BOUNDARY
- EXISTING VEGETATION
- ⊠ SEEP — SEEP/SPRING SAMPLE LOCATION
- PROPOSED OVERBURDEN EXTRACTION TRENCH
- PROPOSED 2" DIA. HDPE DRAIN TO CONVEY COLLECTED WATER TO WET WELL SUMP
- PROPOSED DNAPL SUMP STRUCTURE (SEE DETAIL DWG. 8)

No	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM BEDFORD REMOVAL ACTION
BEDFORD, INDIANA

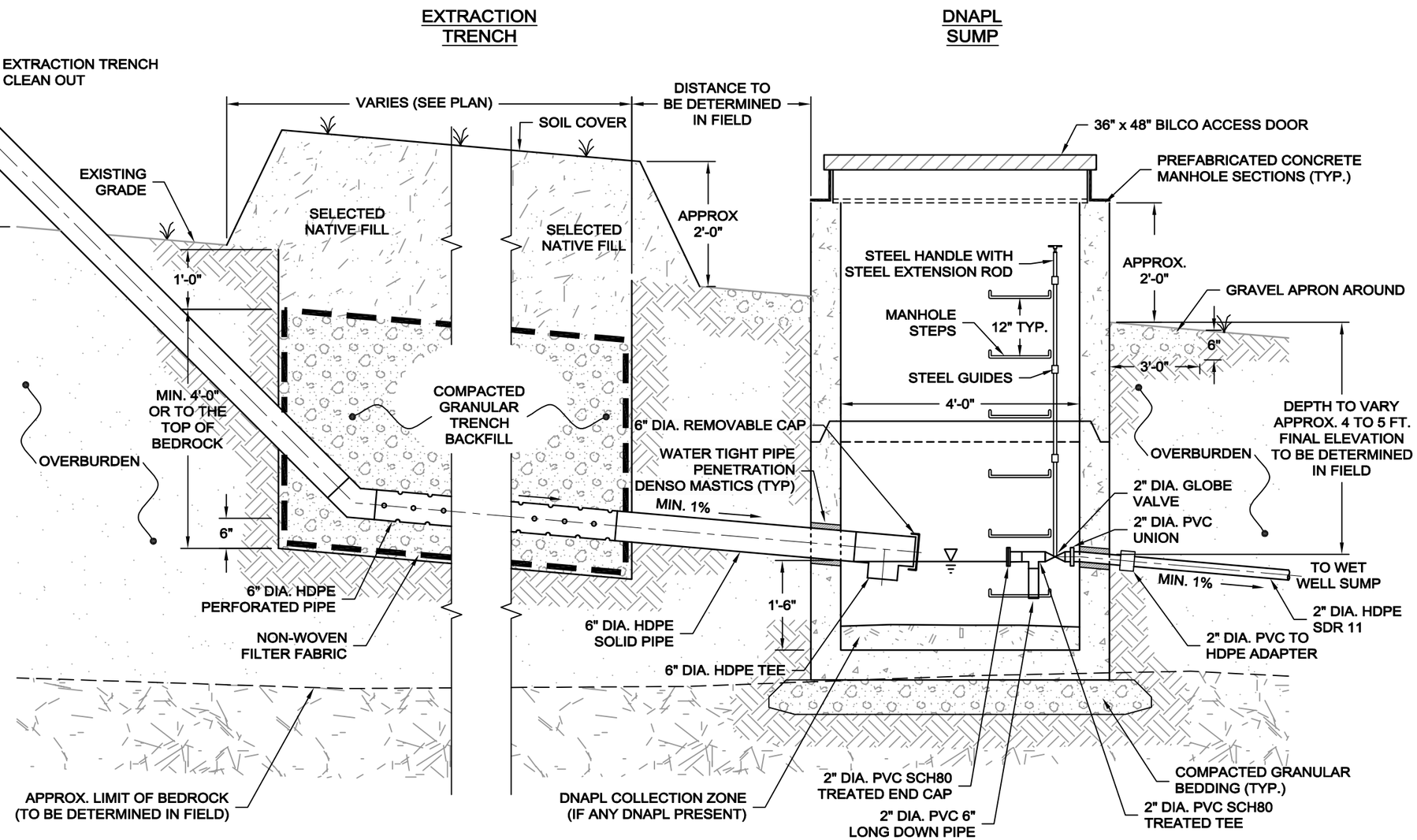
SITE SOURCE CONTROL PLAN

CONTROL MEASURES FOR
SW-X216Y274

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	SEPTEMBER 2003	
Scale: AS SHOWN	**Project Nº:** 13968-00	**Report Nº:** 053	**Drawing Nº:** figure 3.8



N♯	Revision	Date	Initial

NOTE:

ALL PIPE INVERT ELEVATIONS, DEPTH OF COVER, TRENCH / SUMP CONFIGURATION AND ENGINEERING DETAILS WILL BE FINALIZED IN FIELD

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM BEDFORD REMOVAL ACTION
BEDFORD, INDIANA

SITE SOURCE CONTROL PLAN

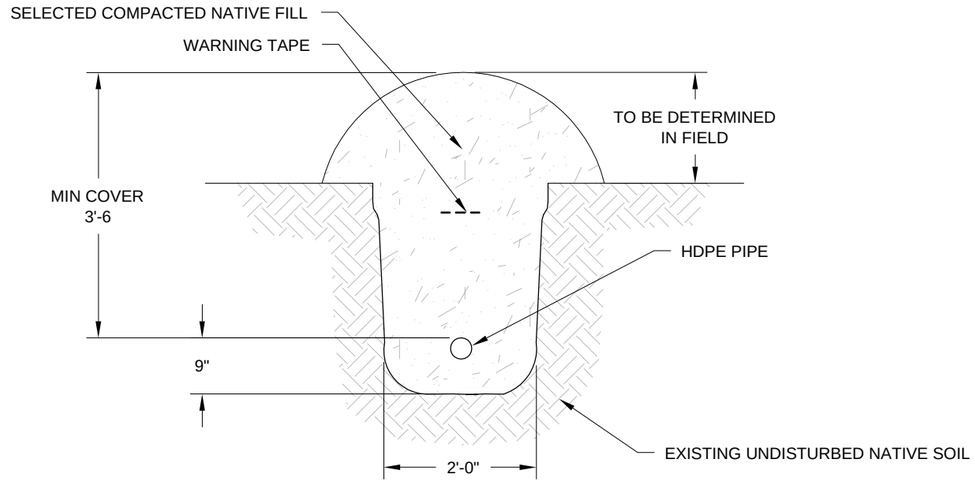
OVERBURDEN SEEP / SPRING CONTROL TRENCH SUMP DETAIL

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

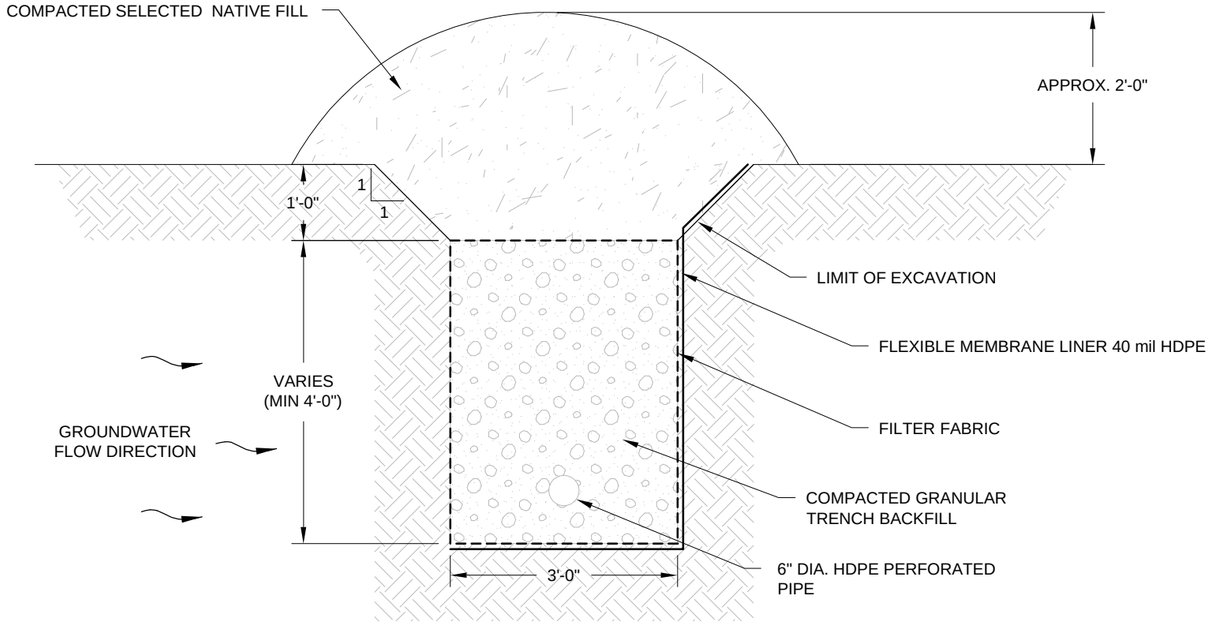
Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	SEPTEMBER 2003	
Scale: 1" = 2'	Project N♯: 13968-00	Report N♯: 053	Drawing N♯: figure 3.9

13968-00(053)GN-WA047 NOV 05/2003



TYPICAL FORCEMAIN / GRAVITY DRAIN

N.T.S.



TYPICAL GROUNDWATER COLLECTION TRENCH

N.T.S.

No	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM BEDFORD REMOVAL ACTION
BEDFORD, INDIANA

SITE SOURCE CONTROL PLAN

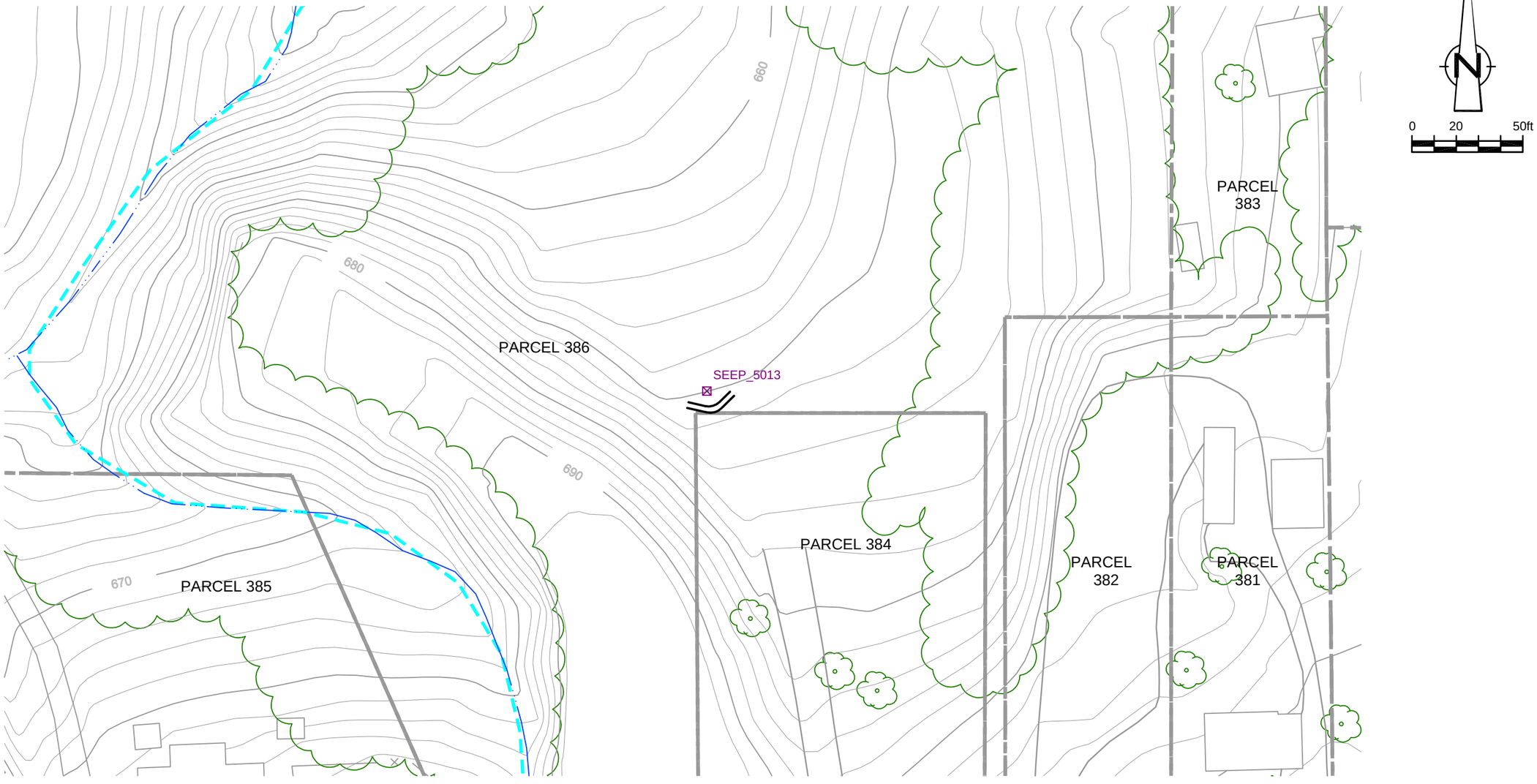
TYPICAL
DETAILS I

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	SEPTEMBER 2003	
Scale: 1" = 2'	Project No: 13968-00	Report No: 053	Drawing No: figure 3.10

13968\00\053\DWG\13968_NOV 05/2003



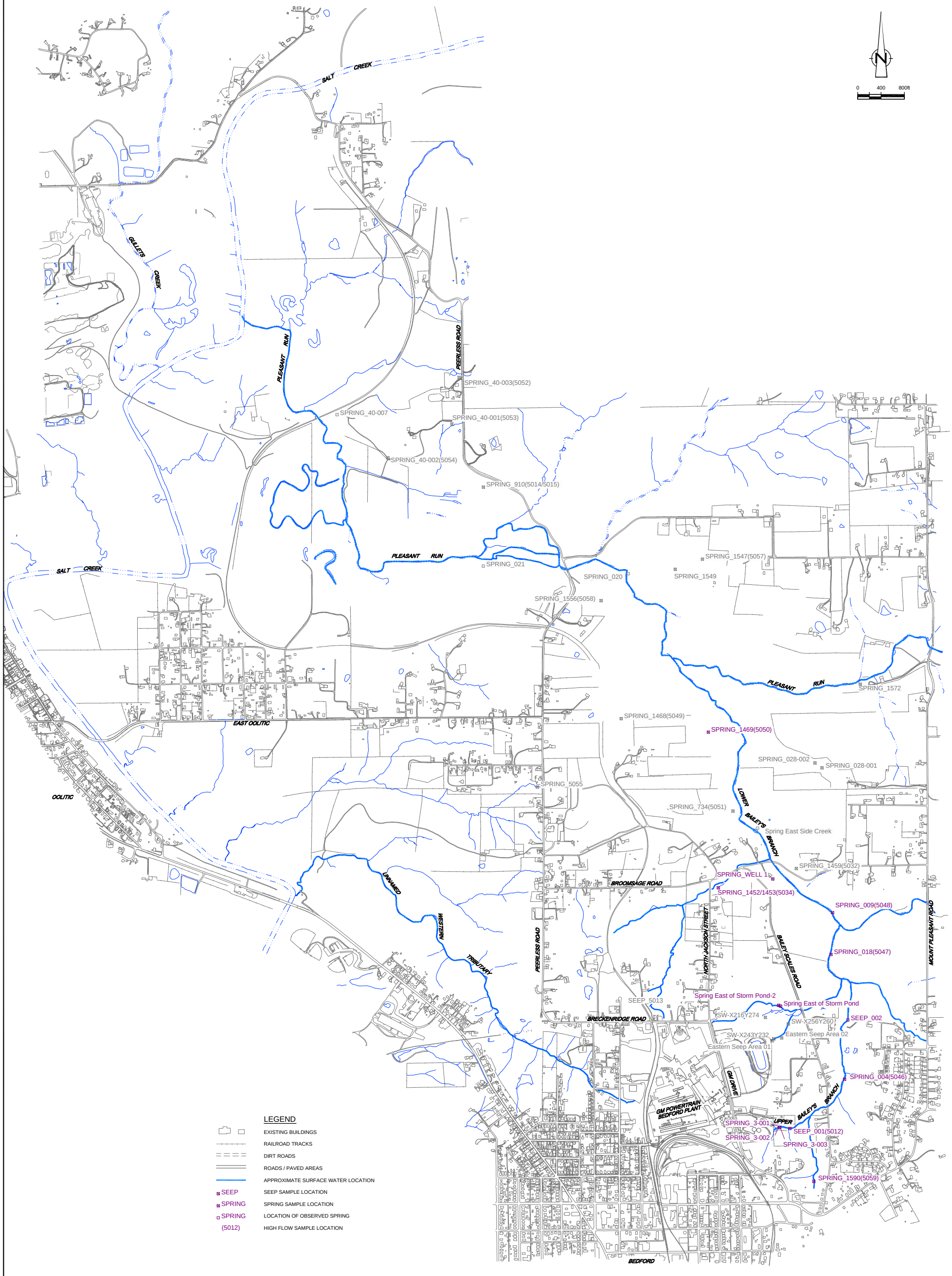
LEGEND

- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- SEEP_5013 — SEEP SAMPLE LOCATION
- ABSORBENT BOOMS

figure 3.11

CONTROL MEASURES FOR SEEP_5013
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

13968-00(053)GN-WA030 NOV 05/2003



Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

GM BEDFORD REMOVAL ACTION

SITE SOURCE CONTROL WORK PLAN

SEEP/SPRING INCLUDED IN PHASE I MONITORING PROGRAM

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J.M.	J.D.	JULY 2003	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 053	Drawing Nº: figure 4.1

13968-00(053)GN-WA031 NOV 05/2003

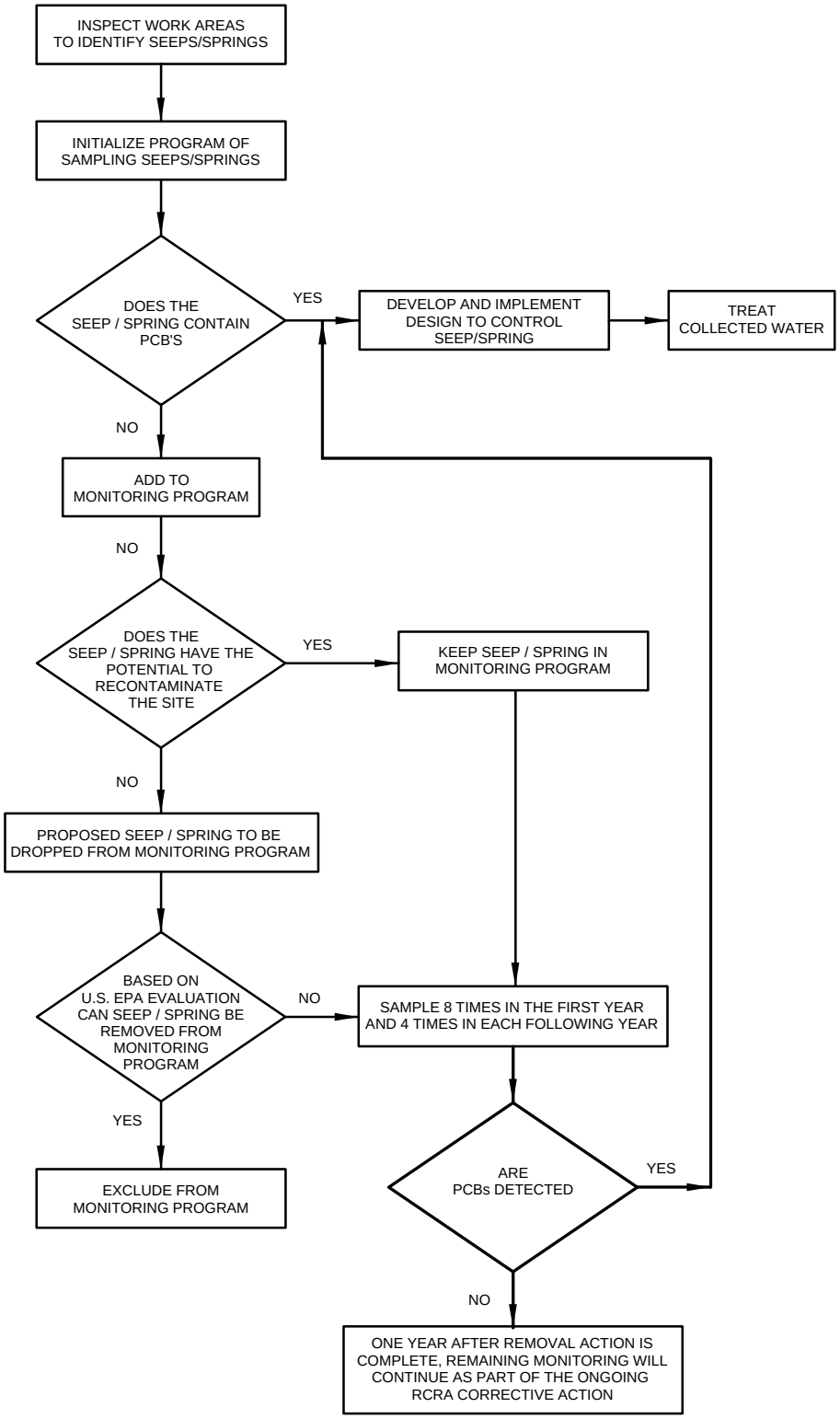


figure 4.2

SITE SOURCE CONTROL DECISION MAKING PROCESS
SITE SOURCE CONTROL WORKPLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Spring*	*Spring*
Sample Location:		*Spring_004 (5046)*	*Spring_009 (5048)*	*Spring_018 (5047)*	*SPRING_028-001*	*SPRING_028-002*	*SPRING_40-001 (5053)*
Sample ID:		*SW-052202-JW-5046*	*SW-052202-JW-5048*	*SW-052202-JW-5047*	*SW-28-040302-JW-001*	*SW-28-040302-JW-002*	*SW-052302-JW-5053*
Sample Date:		*5/22/2002*	*5/22/2002*	*5/22/2002*	*4/3/2002*	*4/3/2002*	*5/23/2002*
Sample Depth:							
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.2) UJ	ND (0.2) UJ	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1221 (PCB-1221)	ug/L	ND (0.2) UJ	ND (0.2) UJ	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1232 (PCB-1232)	ug/L	ND (0.4) UJ	ND (0.4) UJ	ND (0.4)	ND (0.40)	ND (0.40)	ND (0.4)
Aroclor-1242 (PCB-1242)	ug/L	ND (0.2) UJ	ND (0.2) UJ	1.2	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1248 (PCB-1248)	ug/L	ND (0.2) UJ	ND (0.2) UJ	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1254 (PCB-1254)	ug/L	ND (0.2) UJ	ND (0.2) UJ	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1260 (PCB-1260)	ug/L	ND (0.2) UJ	ND (0.2) UJ	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	1.2	0	0	0
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.40)	ND (0.40)	ND (0.4)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Spring*	*Spring*
Sample Location:		*SPRING_40-001 (5053)*	*SPRING_40-001 (5053)*	*SPRING_40-002 (5054)*	*SPRING_40-002 (5054)*	*SPRING_40-003 (5052)*	*SPRING_40-003 (5052)*
Sample ID:		*GW-40-022702-LM-001*	*GW-40-022702-LM-001A*	*GW-40-022702-LM-002*	*SW-052302-JW-5054*	*GW-40-022702-LM-003*	*SW-052302-JW-5052*
Sample Date:		*2/27/2002*	*2/27/2002*	*2/27/2002*	*5/23/2002*	*2/27/2002*	*5/23/2002*
Sample Depth:							
			Duplicate				
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1221 (PCB-1221)	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1232 (PCB-1232)	ug/L	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Aroclor-1242 (PCB-1242)	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1248 (PCB-1248)	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1254 (PCB-1254)	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1260 (PCB-1260)	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Spring*	*Spring*
Sample Location:		*SPRING_734 (5051)*	*SPRING_734 (5051)*	*Spring_910 (5014/5015)*	*Spring_910 (5014/5015)*	*SPRING_1452/1453 (5034)*	*SPRING_1452/1453 (5034)*
Sample ID:		*GW-00-020102-JW-734*	*SW-052302-JW-5051*	*SW-052902-GS-5014*	*SW-052902-GS-5015*	*SW-00-031902-JW-1453*	*SW-052002-JW-5034*
Sample Date:		*2/1/2002*	*5/23/2002*	*5/29/2002*	*5/29/2002*	*3/19/2002*	*5/20/2002*
Sample Depth:							
					Duplicate		
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.2)	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2) UJ
Aroclor-1221 (PCB-1221)	ug/L	ND (0.2)	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2) UJ
Aroclor-1232 (PCB-1232)	ug/L	ND (0.4)	ND (0.4)	ND (0.40) UJ	ND (0.40) UJ	ND (0.40)	ND (0.4) UJ
Aroclor-1242 (PCB-1242)	ug/L	ND (0.2)	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2) UJ
Aroclor-1248 (PCB-1248)	ug/L	ND (0.2)	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2) UJ
Aroclor-1254 (PCB-1254)	ug/L	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.2) UJ
Aroclor-1260 (PCB-1260)	ug/L	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.2) UJ
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	-	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2)
Aroclor-1221 (PCB-1221), dissolved	ug/L	-	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2)
Aroclor-1232 (PCB-1232), dissolved	ug/L	-	ND (0.4)	ND (0.40) UJ	ND (0.40) UJ	ND (0.40)	ND (0.4)
Aroclor-1242 (PCB-1242), dissolved	ug/L	-	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2)
Aroclor-1248 (PCB-1248), dissolved	ug/L	-	ND (0.2)	ND (0.20) UJ	ND (0.20) UJ	ND (0.20)	ND (0.2)
Aroclor-1254 (PCB-1254), dissolved	ug/L	-	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.2)
Aroclor-1260 (PCB-1260), dissolved	ug/L	-	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	N/A	0	0	0	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Spring*	*Spring*
Sample Location:		*SPRING_1459 (5032)*	*SPRING_1459 (5032)*	*SPRING_1459 (5032)*	*SPRING_1459 (5032)*	*SPRING_1468 (5049)*	*SPRING_1468 (5049)*
Sample ID:		*SW-00-032102-LM-1459*	*SW-00-032102-LM-1459A*	*SW-051702-JW-5032*	*SW-051702-JW-5032A*	*SW-27-032102-JW-1468*	*SW-052302-JW-5049*
Sample Date:		*3/21/2002*	*3/21/2002*	*5/17/2002*	*5/17/2002*	*3/21/2002*	*5/23/2002*
Sample Depth:							
			Duplicate		*Duplicate*		
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.20)	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1221 (PCB-1221)	ug/L	ND (0.20)	ND (0.20)	ND (0.2) UJ	ND (0.2) UJ	ND (0.20)	ND (0.2)
Aroclor-1232 (PCB-1232)	ug/L	ND (0.40)	ND (0.40)	ND (0.4)	ND (0.4)	ND (0.40)	ND (0.4)
Aroclor-1242 (PCB-1242)	ug/L	ND (0.20)	ND (0.20)	ND (0.2) UJ	ND (0.2) UJ	ND (0.20)	ND (0.2)
Aroclor-1248 (PCB-1248)	ug/L	ND (0.20)	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1254 (PCB-1254)	ug/L	ND (0.20)	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20) UJ	ND (0.2)
Aroclor-1260 (PCB-1260)	ug/L	ND (0.20)	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20) UJ	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.20) UJ	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.20) UJ	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.40) UJ	ND (0.40)	ND (0.4)	ND (0.4)	ND (0.40)	ND (0.4)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.20) UJ	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.20) UJ	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.20) UJ	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.20) UJ	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Spring*	*Spring*
Sample Location:		*SPRING_1469 (5050)*	*SPRING_1469 (5050)*	*SPRING_1469 (5050)*	*1547 (5057)*	*1547 (5057)*	*1549*
Sample ID:		*SW-27-032102-JW-1469*	*SW-052302-JW-5050*	*SW-052302-JW-5050A*	*SW-36-032702-JW-1547*	*SW-052802-GS-5057*	*SW-36-032702-JW-1549*
Sample Date:		*3/21/2002*	*5/23/2002*	*5/23/2002*	*3/27/2002*	*5/28/2002*	*3/27/2002*
Sample Depth:							
				Duplicate			
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1221 (PCB-1221)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1232 (PCB-1232)	ug/L	ND (0.40)	ND (0.4)	ND (0.4)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor-1242 (PCB-1242)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1248 (PCB-1248)	ug/L	1.0	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1254 (PCB-1254)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1260 (PCB-1260)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Sum of Detected PCBs (ND=0)	ug/L	1	0	0	0	0	0
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.40)	ND (0.4)	ND (0.4)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.20)	ND (0.20)	ND (0.20)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Spring*	*Spring*
Sample Location:		*SPRING_1556 (5058)*	*SPRING_1556A*	*SPRING_1556 (5058)*	*SPRING_1572*	*1590 (5059)*	*1590 (5059)*
Sample ID:		*SW-36-032702-JW-1556*	*SW-36-032702-JW-1556A*	*SW-052802-GS-5058*	*SW-31-040202-JW-1572*	*SW-03-040302-JW-1590*	*SW-052802-GS-5059*
Sample Date:		*3/27/2002*	*3/27/2002*	*5/28/2002*	*4/2/2002*	*4/3/2002*	*5/28/2002*
Sample Depth:							
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1221 (PCB-1221)	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1232 (PCB-1232)	ug/L	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor-1242 (PCB-1242)	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1248 (PCB-1248)	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1254 (PCB-1254)	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1260 (PCB-1260)	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Spring*	*Spring*	*Spring*	*Spring*	*Seep*	*Seep*
Sample Location:		*5055*	*Spring East of Storm Pond*	*Spring East of Storm Pond-2*	*SPRING WELL1*	*Seep_001 (5012)*	*Eastern Seep Area 01*
Sample ID:		*SW-052802-GS-5055*	*GW-00-031202-JW-004*	*GW-00-031202-JW-003*	*GW-22-010902-LM-001*	*SW-051702-SK-5012*	*GW-00-031102-GS-001*
Sample Date:		*5/28/2002*	*3/12/2002*	*3/12/2002*	*1/9/2002*	*5/17/2002*	*3/11/2002*
Sample Depth:							
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.2)	R	ND (2)
Aroclor-1221 (PCB-1221)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.2)	R	ND (2)
Aroclor-1232 (PCB-1232)	ug/L	ND (0.40)	ND (0.4)	ND (0.4)	ND (0.4)	R	ND (4)
Aroclor-1242 (PCB-1242)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.2)	R	22
Aroclor-1248 (PCB-1248)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.2)	R	ND (2)
Aroclor-1254 (PCB-1254)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.2)	R	ND (2)
Aroclor-1260 (PCB-1260)	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	ND (0.2)	R	ND (2)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	0	N/A	22
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	-	ND (0.2) UJ	ND (0.2) UJ
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	-	ND (0.2) UJ	ND (0.2) UJ
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.40)	ND (0.4)	ND (0.4)	-	ND (0.4) UJ	ND (0.4) UJ
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	-	ND (0.2) UJ	ND (0.2) UJ
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	-	ND (0.2) UJ	ND (0.2) UJ
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	-	ND (0.2) UJ	ND (0.2) UJ
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.20)	ND (0.2)	ND (0.2)	-	ND (0.2) UJ	ND (0.2) UJ
Sum of Detected PCBs (ND=0)	ug/L	0	0	0	N/A	0	0

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Seep*	*Seep*	*Seep*	*Seep*	*Seep*	*Seep*
Sample Location:		*Eastern Seep Area 02*	*Eastern Seep Area 02*	*5013*	*SW-X216Y274*	*SW-X216Y274*	*SW-X243Y232*
Sample ID:		*GW-00-031102-GS-002*	*GW-00-031102-GS-002A*	*SW-052902-JW-5013*	*SW-031502-JW-1428*	*SW-052102-JW-5042*	*SW-031502-JW-1426*
Sample Date:		*3/11/2002*	*3/11/2002*	*5/29/2002*	*3/15/2002*	*5/21/2002*	*3/15/2002*
Sample Depth:							
			Duplicate				
Parameter	*Unit*						
PCBs (Unfiltered Sample)							
Aroclor-1016 (PCB-1016)	ug/L	ND (20)	ND (10)	ND (0.2)	ND (0.20) UJ	ND (1) UJ	ND (2.0)
Aroclor-1221 (PCB-1221)	ug/L	ND (20)	ND (10)	ND (0.2)	ND (0.20) UJ	ND (1) UJ	ND (2.0)
Aroclor-1232 (PCB-1232)	ug/L	ND (40)	ND (20)	ND (0.4)	ND (0.40) UJ	ND (1) UJ	ND (4.0)
Aroclor-1242 (PCB-1242)	ug/L	180	100	ND (0.2)	ND (0.20) UJ	ND (1) UJ	22
Aroclor-1248 (PCB-1248)	ug/L	ND (20)	ND (10)	0.4	2.4 J	4.6 J	ND (2.0)
Aroclor-1254 (PCB-1254)	ug/L	ND (20)	ND (10)	ND (0.2)	ND (0.20) UJ	ND (1) UJ	ND (2.0)
Aroclor-1260 (PCB-1260)	ug/L	ND (20)	ND (10)	0.11 J	ND (0.20) UJ	ND (1) UJ	ND (2.0)
Sum of Detected PCBs (ND=0)	ug/L	180	100	0.51 J	2.4 J	4.6 J	22
PCBs (Filtered Sample)							
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (1)	ND (4)	ND (0.2) UJ	ND (0.20)	ND (0.2)	ND (1.0)
Aroclor-1221 (PCB-1221), dissolved	ug/L	10 J	51	ND (0.2) UJ	ND (0.20)	ND (0.2)	ND (1.0)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (2)	ND (8)	ND (0.4) UJ	ND (0.40)	ND (0.4)	ND (2.0)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (1)	ND (4)	ND (0.2) UJ	ND (0.20)	ND (0.2)	13
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (1)	ND (4)	ND (0.2) UJ	ND (0.20)	ND (0.2)	ND (1.0)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (1)	ND (4)	ND (0.2) UJ	ND (0.20)	ND (0.2)	ND (1.0)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (1)	ND (4)	ND (0.2) UJ	ND (0.20)	ND (0.2)	ND (1.0)
Sum of Detected PCBs (ND=0)	ug/L	10 J	51	0	0	0	13

TABLE 2.1

ANALYTICAL RESULTS SUMMARY
SPRING/SEEP SAMPLES - PCB ANALYSIS
SITE SOURCE CONTROL WORK PLAN SCOPE OF WORK
BEDFORD, INDIANA

Sample Type:		*Seep*	*Seep*	*Seep*
Sample Location:		*SW-X243Y232*	*SW-X256Y260*	*SW-X256Y260*
Sample ID:		*SW-052102-JW-5041*	*SW-031502-JW-1427*	*SW-031502-JW-1427A*
Sample Date:		*5/21/2002*	*3/15/2002*	*3/15/2002*
Sample Depth:				*Duplicate*
Parameter	***Unit***			
PCBs (Unfiltered Sample)				
Aroclor-1016 (PCB-1016)	ug/L	ND (1)	ND (0.40)	ND (0.40)
Aroclor-1221 (PCB-1221)	ug/L	ND (1)	ND (0.40)	ND (0.40)
Aroclor-1232 (PCB-1232)	ug/L	ND (2)	ND (0.80)	ND (0.80)
Aroclor-1242 (PCB-1242)	ug/L	12	3.8	4.6
Aroclor-1248 (PCB-1248)	ug/L	ND (1)	ND (0.40)	ND (0.40)
Aroclor-1254 (PCB-1254)	ug/L	ND (1)	ND (0.40)	ND (0.40)
Aroclor-1260 (PCB-1260)	ug/L	ND (1)	ND (0.40)	ND (0.40)
Sum of Detected PCBs (ND=0)	ug/L	12	3.8	4.6
PCBs (Filtered Sample)				
Aroclor-1016 (PCB-1016), dissolved	ug/L	ND (0.2)	ND (0.20)	ND (0.20)
Aroclor-1221 (PCB-1221), dissolved	ug/L	ND (0.2)	ND (0.20)	ND (0.20)
Aroclor-1232 (PCB-1232), dissolved	ug/L	ND (0.4)	ND (0.40)	ND (0.40)
Aroclor-1242 (PCB-1242), dissolved	ug/L	ND (0.2)	ND (0.20)	ND (0.20)
Aroclor-1248 (PCB-1248), dissolved	ug/L	ND (0.2)	ND (0.20)	ND (0.20)
Aroclor-1254 (PCB-1254), dissolved	ug/L	ND (0.2)	ND (0.20)	ND (0.20)
Aroclor-1260 (PCB-1260), dissolved	ug/L	ND (0.2)	ND (0.20)	ND (0.20)
Sum of Detected PCBs (ND=0)	ug/L	0	0	0

APPENDIX A

HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN (HASP)

BAILEY'S BRANCH AND PLEASANT RUN REMOVAL ACTION

BEDFORD, INDIANA

NOVEMBER 2003
REF. NO. 13968 (53) APP A
This report is printed on recycled paper.

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LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AOC	Administrative Order by Consent
APR	Air Purifying Respirator
CRA	Conestoga-Rovers & Associates
Creek Areas	Portions of the creek and floodplains on Pleasant Run and its tributaries
CRZ	Contaminant Reduction Zone
EZ	Exclusion Zone
Facility	General Motors Corporation Powertrain Bedford Facility
GM	General Motors Corporation
HASP	Site Health and Safety Plan
HSO	Health and Safety Officer
IDLH	Immediate Danger to Life and Health
IH	Industrial Hygienist
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PELs	Permissible Exposure Limits
PPE	Personal Protective Equipment
RA	Removal Action
RCRA	Resource Conservation and Recovery Act
RELs	Recommended Exposure Limits
SOW	Scope of Work
SZ	Support Zone
U.S. EPA	United States Environmental Protection Agency
USCG	United States Coast Guard

1.0 GENERAL

A Removal Action (RA) will be implemented on portions of the creek and floodplains associated with Bailey's Branch Creek, Pleasant Run and its tributaries (Creek Areas), under an Administrative Order by Consent (AOC) authorized by the U.S. Environmental Protection Agency and General Motors Corporation (GM). The activities outlined in the Scope of Work (SOW) will involve oversight of construction activities and verification sampling within and outside the limits of the GM Powertrain Bedford Facility (Facility) located in Bedford, Indiana. Other activities to be completed as part of the RA include the construction and operation of a temporary soil staging area at the Facility for contaminated material excavated from the Creek Areas. During this program, personnel may come in contact with soil, sediment, groundwater, surface water, and other materials/debris that may contain hazardous materials. This Health & Safety Plan (HASP) has been developed to minimize the potential for exposures to field personnel involved in the oversight of the RA for the Creek Areas.

All Project activities at the Site will be conducted in accordance with provisions of an approved Site-specific HASP. The applicability of this HASP extends to personnel who will be on Site, including, Conestoga-Rovers & Associates (CRA) employees, and visitors to the Site. Certain activities at this Site where personnel will not have the potential for contact with contamination and no potential for exposure exists will be exempt from all provisions of the standard (29CFR1926.65 or 29CFR1910.120), including the medical and training requirements. Contractors and subcontractors who will be working at the Site will be required to develop a HASP based on their specific scope of work. The contractor's HASP must meet the applicable requirements of this HASP, which has been prepared by CRA. A contractor or subcontractor may adopt the provisions contained in this HASP as part of its own HASP, but must still provide a written SOW that details their activities and health and safety procedures that will be implemented as part of their activities

A copy of this HASP and employer specific Standard Operating Procedures (SOP) will be maintained on Site whenever activities are in progress. Contractor SOPs for similar activities must meet or exceed any referenced CRA SOP.

This HASP is designed to ensure the following:

i) that field personnel are not adversely exposed to the constituents of concern as well as the physical and biological hazards present;

ii) that public welfare or the environment are not adversely impacted by migration of contaminated materials due to work activities; and

iii) that operations, procedures, and equipment will meet the requirements of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and the applicable subparts of 29 CFR 1926 and 29 CFR 1910.

For the purpose of this HASP, all activities carried out in the Creek Areas involving contact with potentially contaminated materials will be considered contaminated operations requiring personal protective equipment (PPE).

RA operations at the Creek Areas will be conducted in accordance with the provisions of the HASP. Cost and/or scheduling considerations will not be considered as justification for modifying this plan.

1.1 PROJECT ORGANIZATION

There is the potential for several contractor(s) to be working on Site. The selected contractor(s) will be responsible for providing both a Site Superintendent and a Health and Safety Officer (HSO) to direct their activities. These individuals will be responsible for ensuring that all contract specifications are met, including those related to Site health and safety. The names of these individuals will be presented in the HASPs of each contractor. This may be the same individual if so qualified. All contractor personnel working at the Site will report to the CRA Site Representative, and in keeping with OSHA requirements, are required to comply with all procedures referenced in this HASP, the contractor HASP, the CRA Health and Safety Program.

CRA will have an individual on Site acting as their Site Representative. This individual will be responsible for overseeing other contractors and for ensuring that all contract specifications are met, including those related to Site health and safety.

2.0 FACILITY CHARACTERIZATION AND HAZARD ANALYSIS

The Creek Areas are located in Bedford and Lawrence County, Indiana. The location of the Creek Areas is identified on Figure B.1 of this HASP. The properties which make up the Creek Areas include residential, agricultural, vacant land, and industrial uses. The Bedford Facility is located at 105 GM Drive, in Bedford, Indiana as depicted on Figure B.1. The Facility is located in a commercial and industrial setting. A Facility plan is included as Figure B.2 of this HASP.

The Bedford Facility is an active facility and has been operating as an aluminum foundry since 1942. Current products include transmission cases, engine blocks, and pistons.

Based on previous sampling, the constituent of concern at the Creek Areas is polychlorinated biphenyls (PCBs). The health effects related to PCBs are presented in Table B.1 of this HASP.

The activities to be performed as part of the SOW may include:

- oversight of staging area construction at the Bedford Facility, and placement of designated materials excavated from the Creek Areas;
- oversight of RA activities at the Creek Areas including mobilization and set-up, site clearing (removal of trees), temporary fencing, survey layout of excavation areas, construction of stormwater controls (berms, swales, and culverts), excavation of contaminated materials, transportation of materials to the staging area, backfilling, and restoration;
- perimeter air monitoring at the Creek Areas and at the soil staging area; and
- sampling activities.

Risks associated with these activities will be minimized by implementing engineering controls, safe work practices, and the proper use of PPE. Table B.3 summarizes the potential hazards associated with activities at the Creek Areas and the Facility covered by this HASP.

3.0 ACTIVITY HAZARD/RISK ANALYSIS AND GENERAL SAFETY PRACTICES

This section identifies the general hazards associated with specific Site activities and presents the documented or potential health and safety hazards that exist at the Site. Every effort will be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against by use of engineering controls and/or PPE. Table B.3 presents the anticipated hazards/risks and appropriate precautions.

In addition to the chemical hazards presented in Section 2 of this HASP, physical and biological hazards including potential heat and cold stress, hazards presented by the use of heavy equipment, tree cutting, overhead and underground utility hazards, hazards presented by confined spaces and excavations, snakes, poison ivy, poison oak, mosquitoes, bees, wasps, uneven terrain, slippery surfaces, and the use of decontamination equipment, exist at the Site. It will be the responsibility of the HSO and Site personnel to identify the physical and/or biological hazards posed by the various Site activities and implement preventative and corrective action.

3.1 CHEMICAL EXPOSURE

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact. The chemical constituents of concern at the Site are outlined in Table 1.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a contaminant. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure, and the number of exposures. For a given contaminant, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause

health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become evident for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work site atmosphere may contain such hazardous substances. Chemicals can also enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Skin absorption is enhanced by abrasions, cuts, heat, and moisture. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely, however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.

3.2 GENERAL PRACTICES

Additional general safety practices to be implemented are as follows:

i) at least one copy of this HASP and the contractor HASP must be at the project Site, in a location readily available to all personnel, and reviewed by all project personnel prior to starting work;

ii) all Site personnel must use the buddy system (working in pairs or teams) when performing work within an EZ;

iii) food, beverages, or tobacco products must not be present or consumed in the EZ and CRZ. Cosmetics must not be applied within these zones;

iv) emergency equipment such as eyewash, fire extinguishers, etc., must be removed from storage areas and staged in readily accessible locations;

v) contaminated waste, debris, and clothing must be properly contained and legible and understandable precautionary labels must be affixed to the containers;

vi) removing contaminated soil from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited;

vii) containers must be moved only with the proper equipment, and must be secured to prevent dropping or loss of control during transport; and

viii) visitors to the Site must be instructed to stay outside the EZ and CRZ and remain within the SZ during the extent of their stay. Visitors must be cautioned to avoid skin contact with surfaces that are contaminated or suspected to be contaminated.

3.2.1 BUDDY SYSTEM

All on-Site personnel must use the buddy system while performing work within the EZ. Visual contact must be maintained between crew members at all times, and crew

members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

i) changes in complexion and skin coloration;

ii) changes in coordination;

iii) excessive salivation and papillary response; and

iv) changes in speech pattern.

Team members must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Employees must inform their partners or fellow team members of non-visible effects of exposure to toxic materials. The symptoms of such exposure may include:

i) headaches;

ii) dizziness;

iii) nausea;

iv) blurred vision;

v) cramps; and

vi) irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, pre-arranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

3.3 HEAT STRESS

Heat stress is caused by a number of interacting factors including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat Rashes: Are one of the most common problems in hot work environments. Commonly known as prickly heat , a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat Cramps: Are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much and too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3 percent NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat Exhaustion: Occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache; vertigo; weakness; thirst; and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat Stroke: Is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

Heat Stress Safety Precautions: Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described below.

Adjusted Temperature[1]	*Work-Rest Regimen Normal Work Ensemble*[2]	*Work-Rest Regimen Impermeable Ensemble*
90°F (32.°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5° to 90°F (30.8°C to 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° to 87.5°F (28.1° to 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° to 82.5°F (25.3° to 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° to 77.5°F (30.8° to 32.2°C)	After each 150 minutes of work	After each 120 minutes of work

Notes:

(1) Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F=ta °F + (13 x percent sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulk shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).

(2) A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

In order to determine if the work rest cycles are adequate for the personnel and specific Site conditions, additional monitoring of individual's heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one-third and maintain the same rest period.

Additional one or more of the following control measures can be used to help control heat stress and are mandatory if any Site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

i) Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day;

ii) on-Site drinking water will be kept cool (50 to 60°F);

iii) a work regimen that will provide adequate rest periods for cooling down will be established, as required;

iv) all personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps;

v) cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat;

vi) employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary;

vii) a shaded rest area must be provided. All breaks should take place in the shaded rest area;

viii) employees must not be assigned to other tasks during breaks;

ix) employees must remove impermeable garments during rest periods. This includes Tyvek® garments; and

x) all employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

Note: Additional information can be referenced in the CRA Health and Safety SOP for Heat Stress.

3.4 COLD STRESS

Cold stress is similar to heat stress in that it is caused by a number of interacting factors including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind-chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of accidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

3.4.1 PRE-DISPOSING FACTORS FOR COLD STRESS

There are certain pre-disposing factors that make an individual more susceptible to cold stress. It is the responsibility of the project team members to inform the HSO to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

Pre-disposing factors that will increase an individual's susceptibility to cold stress are listed below:

- Dehydration: The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- Fatigue During Physical Activity: Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.
- Age: Some older and very young individuals may have an impaired ability to sense cold.
- Alcohol Consumption: Alcohol dilates the blood vessels near the skin surface resulting in excessive body heat loss.
- Sedative Drugs: Sedatives may interfere with the transmission of impulses to the brain, thereby interfering with the body's physiological defense against cold. Some prescription drugs may react the same way.
- Poor Circulation: Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.

- Heavy Work Load: Heavy workloads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- The Use of PPE: PPE usage that traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- Lack of Acclimatization: Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.
- History of Cold Injury: Previous injury from cold exposures may result in increased cold sensitivity.

3.4.2 PREVENTION OF COLD STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- Acclimatization: Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiological changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- Fluid and Electrolyte Replenishment: Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.
- Eating a Well Balanced Diet: Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high energy foods throughout the day.
- Warm Clothing: It is beneficial to maintain air space between the body and outer layers of clothing in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

Recommended clothing includes:

- Inner layers (t-shirts, shorts, socks) should be of a thin, thermal insulating material.
- Wool or thermal trousers. Denim is not a good protective fabric.
- Felt-lined, rubber-bottomed, leather-upper boots with a removable felt insole is preferred. Change socks when wet.
- Wool shirts/sweaters should be worn over inner layer.
- A wool cap is good head protection. Use a liner under a hard hat.
- Mittens are better insulators than gloves.
- Face masks or scarves are good protection against wind.
- Tyvek/poly-coated Tyvek provides good wind protection.
- Wear loose fitting clothing, especially footwear.
- Carry extra clothing in your vehicle.
- Shelters with heaters should be provided for the employees' rest periods if possible. Sitting in a heated vehicle is a viable option. Care should be taken that the exhaust is not blocked and that windows are partially open to provide ventilation.
- At temperatures of 30°F (-1°C) or lower, cover metal tool handles with thermal insulating material if possible.
- Schedule work during the warmest part of the day if possible, rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

It may not be practically feasible to implement all the above prevention measures. Follow the guidelines given below when the ambient air temperature is below 0°F (-18°C):

- dress warmly;
- replenish fluids and electrolytes at regular intervals;
- provide shelter from the cold; and
- adjust work/rest schedules.

3.4.3 FIRST AID GUIDELINES FOR COLD STRESS

The following describes symptoms of different stages in cold stress and the related first aid treatment guidelines.

FROSTBITE

Stages

Incipient (frost nip)	May be painless. Tips of ears, nose, cheeks, fingers, toes, chin affected. Skin blanched white.
Superficial	Affects skin/tissue just beneath skin; turns purple as it thaws. Skin is firm, waxy; tissue beneath is soft, numb.
Deep	Tissue beneath skin is solid, waxy, white with purplish tinge. Entire tissue depth is affected.

First Aid

Incipient	Warm by applying firm pressure - blow warm breath on spot or submerge in warm water (102°F to 110°F) (39°C to 43°C). Do not rub the area.
Superficial	Provide dry coverage, steady warmth; submerge in warm water.
Deep	Hospital care is needed. Do not thaw frostbitten part if needed to walk on. Do not thaw if there is danger of refreezing. Apply dry clothing over frostbite. Submerge in water; do not rub.

GENERAL HYPOTHERMIA

Stages

- Shivering.
- Indifference.
- Decreased consciousness.
- Unconsciousness.
- Death.

Symptoms

- Muscle tension.
- Uncontrollable shivering.
- Glassy stare.
- Decreased muscle function.
- Speech distortion.
- Blue, puffy skin.
- Slow pulse.
- Shallow breathing.
- Coordination loss.
- Stumbling.
- Forgetfulness.
- Freezing extremities.
- Dilated pupils.
- Fatigue.

Emergency Response

- Keep person dry; replace wet clothing.
- Apply external heat to both sides of patient using available heat sources, including other bodies.
- Give warm liquids - not coffee or alcohol - after shivering stops and if conscious.
- Handle gently.
- Transport to medical facility as soon as possible.
- If more than 30 minutes from a medical facility, warm person with other bodies.

Note: Additional information on cold stress can be found within the CRA Health and Safety SOP for Cold Stress.

3.5 EXCAVATION AND TRENCHING

Site activities may involve excavation and trenching of impacted material. It is the responsibility of the Site Representative and Site Supervisor to implement the following

components of the CRA Excavation and Trenching Activities as they relate to project activities:

i) that all excavations are completed in accordance with an approved contractor's SOP;

ii) that the proper protective materials and equipment are available to complete the excavation and/or trenching procedures;

iii) complete all inspections of the excavation as required; and

iv) submit any contractor's Excavation and Trenching SOP to CRA's Industrial Hygiene Group for review prior to initiating excavation activities.

Excavation and trenching operations require pre-planning to determine whether sloping or shoring systems are required, and to develop appropriate designs for such systems. Also, the estimated location of all underground installations must be determined before digging/drilling begins.

If there are any nearby buildings, walls, sidewalks, tress, or roads that may be threatened or undermined by the excavation, where the stability of any of these items may be endangered by the excavation, they must be removed or supported by adequate shoring, bracing, or underpinning.

Excavations may not go below the base of footings, foundations, or retaining walls, unless they are adequately supported or a person who is registered as a Professional Engineer (PE) has determined that they will not be affected by the soil removal. OSHA recommends using civil engineers or those with licenses in a related discipline and experience in the design and use of slopping and shoring systems. PE qualifications must be documented in writing.

Personnel required to enter or work in the excavation at any time must be protected from the hazards of cave-ins. This requires the use of sloping and/or shoring systems that comply with State and Federal OSHA standards.

An approved contractor's Excavation and Trenching SOP will be followed during all excavation activities and provides detailed information regarding such activities.

3.6 DRILLING ACTIVITIES

Drilling operations taking place may include the drilling of boreholes and the installation of monitoring wells. Drilling and sampling activities present several potential hazards. Minimizing these hazards requires strict adherence to safe operating procedures.

Drillers will be responsible for the safe operation of the drill rig as well as adhering to the Site-specific HASP and employer-specific SOPs. These are to be maintained at the Site whenever drilling activities are in progress. The driller must ensure that all safety and drilling equipment is found to be in good condition and is used properly. Each day prior to the start of work, the drill rig and associated equipment will be inspected by the driller.

Physical hazards associated with drilling activities include: slips, trips and falls; noise, lifting of heavy objects; pinch points and sharp objects; caught between/against hazards; overhead hazards; underground/above ground utilities; wire rope/alloy chain failure; moving or backing vehicles; hazards associated with heavy equipment operation; hazards associated decontamination equipment; and the improper use of hand tools.

3.7 SAMPLING AND INSPECTION ACTIVITIES

Activities associated with the sample collection and inspection tasks include collection of soil, groundwater, surface water, and sediment samples at the Creek Areas. Physical hazards associated with sampling/inspection activities may include: severe weather; working from an elevated surface; slips, trips and falls; sharp objects; confined spaces; lifting heavy objects; noise; electrical safety; heat/cold stress; moving or backing vehicles; and use of hand tools.

Sediment and surface water sampling will involve sampling in/near Creek Areas. Life vests and/or tie-lines will be required when performing these sampling activities as footing may be treacherous at times. Additional caution must be observed when performing these tasks after/during a rain event and/or during a warm period in the winter/early spring.

3.8 CONFINED SPACES

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, oxygen deficient atmospheres, limited visibility, and restricted movement. This section establishes requirements for safe entry into, continued work in, and safe exit from confined spaces. Additional information regarding confined space entry can be found in 29 CFR 1926.21, 29 CFR 1910.146, and NIOSH-106. Entry into a confined space will only be undertaken after remote methods have been tried and found not to be successful. Such work will follow the guidelines presented in the CRA Health and Safety Confined Space SOP or an approved contractor's Confined Space Entry SOP. The contractor's SOP must minimally meet the requirements set forth in the CRA Confined Space SOP.

3.9 FALL HAZARDS

Site personnel may be exposed to fall hazards greater than six feet above another surface and where there are no barriers in place to protect them. These hazards may be found in the following activities: working from elevated surfaces, near excavations, or on equipment, etc.

It is the contractor's responsibility to identify and control all fall hazards posed by the various Site activities. This information will be included in the Contractor's Site-specific HASP and will include procedures to implement preventative and corrective actions. The contractor will provide and document the necessary training on fall protection to affected employees.

3.10 BIOLOGICAL HAZARDS

Biological hazards may include poison ivy, poison oak, snakes, thorny bushes and trees, ticks, mosquitoes, and other pests.

3.10.1 TICK-BORNE DISEASES

Lyme Disease, Erlichiosis, and Rocky Mountain Spotted Fever (RMSF) are diseases transmitted by ticks and occur throughout the United States during spring, summer, and fall.

Lyme Disease: The disease commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin. Few cases have been identified in other states.

Erlichiosis: The disease also commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin. Few cases have been identified in other states.

These diseases are transmitted primarily by the Deer Tick, which is smaller and redder than the common Wood Tick. The disease may be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page.

Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have headache, weakness, fever, a stiff neck, swelling and pain in the joints, and eventually, arthritis. Symptoms of Erlichiosis include muscle and joint aches, flu-like symptoms, but there is typically no skin rash.

Rocky Mountain Spotted Fever: This disease is transmitted via the bite of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (*Rickettsia rickettsii*) becomes reactivated and can infect humans. The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The victim may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death if untreated, but if identified and treated promptly, death is uncommon.

Control: Tick repellent containing diethyltoluamide (DEET) should be used in tick-infested areas, and pants legs should be tucked into boots. In addition, workers should search the entire body every three or four hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

3.10.2 POISONOUS PLANTS

Poison ivy, poison sumac and poison oak may be present in the work area. Personnel should be alerted to its presence, and instructed on methods to prevent exposure.

Control: The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water, and observed for signs of reddening.

3.10.3 POISONOUS SNAKES

The possibility of encountering snakes (cottonmouths and rattlesnakes) exists, specifically for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

Control: To minimize the threat of snake bites and insect hazards, all personnel walking through vegetated areas must be aware of the potential for encountering snakes, and the need to avoid actions promoting encounters, such as turning over logs, etc. In areas where snakes may be encountered, affected personnel are required to wear leather work gloves and snakeproof chaps and/or snakeproof boots. Additionally, a snake bite kit is to be readily available at all times. If a snake bite occurs, an attempt should be made to kill the snake for identification. The victim must be transported to the nearest hospital within 30 minutes; first aid consists of applying a constriction band and washing the area around the wound to remove any unabsorbed venom.

3.11 NOISE

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing.

The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on Site.

Control: All personnel must wear hearing protection with a Noise Reduction Rating (NRR) of at least 20 when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All Site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

3.12 SANITARY FACILITIES

Site sanitation will be maintained according to OSHA and Department of Health requirements.

3.12.1 BREAK AREA

Breaks must be taken in the SZ, away from the active work area after Site personnel go through decontamination procedures. There will be no eating, drinking, or chewing gum or tobacco in the area other than the SZ. Smoking is not permitted anywhere within the Facility.

3.12.2 POTABLE WATER

The following rules apply for all project field operations:

i) an adequate supply of potable water will be provided at each work Site. Potable water must be kept away from hazardous materials, contaminated clothing, and contaminated equipment;

ii) portable containers used to dispense drinking water must be capable of being tightly closed, and must be equipped with a tap dispenser. Water must not be drunk directly from the container, nor dipped from the container;

iii) containers used for drinking water must be clearly marked and not used for any other purpose; and

iv) disposable cups must be supplied, and both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided.

3.12.3 TRASH COLLECTION

Trash collected from the CRZ will be separated as potentially contaminated waste. Trash collected in the support and break areas will be disposed of as non-hazardous waste. Trash receptacles will be set up in the CRZ and in the SZ.

3.13 ELECTRICAL HAZARDS

Electricity may pose a particular hazard to Site workers due to the use of portable electrical equipment. When electrical work is needed, it must be performed by a qualified electrician in accordance with the CRA Health and Safety SOP for Electrical Safety.

General electrical safety requirements include:

a) all electrical wiring and equipment must be a type listed by Underwriters Laboratory (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency;

ii) all installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or United States Coast Guard regulations;

iii) portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle;

iv) tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM;

v) live parts of wiring or equipment must be guarded to prevent persons or objects from touching them;

vi) electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching;

vii) all circuits must be protected from overload;

viii) temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage;

ix) plugs and receptacles must be kept out of water unless of an approved submersible construction;

x) all extension outlets must be equipped with ground fault circuit interrupters (GFCIs);

xi) attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment;

xii) extension cords or cables must be inspected prior to each use, and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire; and

xiii) flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

3.14 LIFTING HAZARDS

Back strain or injury may be prevented by using proper lifting techniques. The fundamentals of proper lifting include:

i) consider the size, shape, and weight of the object to be lifted. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone;

ii) the hands and the object should be free of dirt or grease that could prevent a firm grip;

iii) gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces;

iv) fingers must be kept away from points, which could crush or pinch them, especially when putting an object down;

v) feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear;

vi) the load should be kept as low as possible, close to the body with the knees bent;

vii) to lift the load, grip firmly and lift with the legs, keeping the back as straight as possible;

viii) a worker should not carry a load that he or she cannot see around or over; and

ix) when putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

3.15 CLEARING

Site personnel engaged in site clearing (tree cutting, etc.) will be trained in the identification and protective measures pertaining to poisonous plants, harmful insects and animals. All equipment used in site clearing operations will be provided with the proper safety features and personal protective equipment as per OSHA regulations and the CRA Health and Safety SOP for Light Equipment. Prior to initiating clearing activities, Attachment B3 – Safety Inspection Checklist for Clearing/Grubbing should be completed by the competent person.

4.0 BASIS

The Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, CFR, Parts 1910 and 1926 (29 CFR 1910 and 1926) including the amended sections in 29 CFR 1910.120 and current Recommended Exposure Limits (RELs) as provided by the National Institute for Occupational Safety and Health (NIOSH) provide the basis for this HASP. Some of the specifications within this section are in addition to OSHA regulations and reflect the positions of the United States Environmental Protection Agency (USEPA), the American Conference of Governmental Industrial Hygienists (ACGIH) and the United States Coast Guard (USCG) regarding procedures required to ensure safe operations at potential hazardous waste sites.

The safety and health of the public and field personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work.

5.0 RESPONSIBILITIES AND ADMINISTRATION

The following individuals are designated to carry out stated job responsibilities for the onsite engineer, CRA, related to this project.

CRA Project Manager:	James McGuigan
Construction Manager:	Ashley Valentine
Project Industrial Hygienist:	Jeff Maranciak
Oversight Personnel	TBD

A field individual will be designated as the Health and Safety Officer (HSO). The HSO will supervise the implementation of the HASP and will be responsible for all decisions regarding operations and work stoppages due to health and safety considerations. The HSO will have prior experience in working at hazardous waste sites.

The responsibilities of the HSO are as follows:

i) be responsible for controlling and maintaining access to the work area;

ii) be responsible for implementation of the HASP at the initiation of field work;

iii) conduct the pre-entry safety briefing for all field personnel with regard to the HASP and other safety requirements to be observed during field sampling, including:

   a) potential hazards,

   b) personal hygiene principles,

   c) PPE,

   d) respiratory protection equipment usage, and

   e) emergency response procedures.

iv) review and modify the HASP as more information becomes available concerning the hazardous materials involved;

v) supervision and enforcement of safety equipment usage;

vi) supervision and inspection of equipment cleaning;

vii) personnel training in safety equipment usage and emergency procedures;

viii) monitoring of the health and safety program under direction of an industrial hygienist;

ix) suspend work activity if unsafe working conditions develop;

x) inform employees, nearby workers, and visitors of the nature of chemical exposure risk as required by the "Right-to-Know" Law;

xi) recommend a medical examination when required for an employee;

xii) coordination of the Emergency Response Plan (Section 16.0);

xiii) assure that safety equipment is provided, maintained and accessible to field personnel;

xiv) maintain a log with a sign in/out sheet for personnel performing activities and visitors entering the work areas;

xv) assure that employees comply with the "buddy system" while working at the Facility and in the Creek Areas;

xvi) investigate all accidents, injuries, illnesses, spills, fires, incidents, and near misses; and

xvii) ensure all contractors and subcontractors have an adequate Health and Safety Plan in place prior to commencement of work.

6.0 MEDICAL SURVEILLANCE

In accordance with the requirements detailed in 29 CFR 1926.65 and 29 CFR 1910.134, all Site personnel who will come in contact with potentially contaminated materials will have received, within one year prior to starting field activities, medical surveillance by a licensed physician or physician's group.

Medical records for all on-Site personnel will be maintained by their respective employers. The medical records will detail the tests that were taken and will include a copy of the consulting physician's statement regarding the tests and the employee's suitability for work.

The medical records will be available to the employee or his designated representative upon written request, as outlined in 29 CFR 1910.1020.

Each employer will provide certifications to their on-Site HSO that their personnel involved in Site activities will have all necessary medical examinations prior to commencing work which requires respiratory protection or potential exposure to hazardous materials. Personnel not obtaining medical certification will not perform work within contaminated areas.

Interim medical surveillance will be completed if an individual exhibits poor health or high stress responses due to any Site activity or when accidental exposure to elevated concentrations of contaminants occur.

7.0 TRAINING

All field personnel shall complete training sessions in accordance with 29 CFR 1910.120(e). This training shall consist of a minimum of 40 hours of instruction and three days of actual field experience under the direct supervision of a trained, experienced supervisor. Documentation will be maintained in the Site trailer stating that all field personnel have complied with this regulation.

Prior to commencing work activities, a pre-entry safety briefing will be conducted. Topics covered during the pre-entry safety briefing will include:

i) health and safety hazards;

ii) level of PPE required;

iii) safe use of equipment;

iv) decontamination procedures; and

v) emergency response procedures.

CRA personnel who attend this briefing will sign the HASP Acknowledgment Form presented as Attachment B1. Any visitors to the Facility entering the exclusion zone will be required to undergo the same training program discussed above and will be required to sign a Visitor's Signoff Sheet (Attachment B1) certifying they have completed the appropriate training and have read this HASP.

All personnel working on the RA at the Creek Areas shall attend daily safety ("tailgate") meetings during RA implementation. These meetings will be conducted by the HSO, and will cover specific health and safety issues, field activities, changes in field conditions, and a review of topics covered in the pre-entry briefing. Topics discussed in the safety meetings will be documented along with the signatures of personnel who attend.

8.0 WORK AREAS

As required, specific work areas (defined below) will be delineated by temporary fencing or a flagged line.

a) Exclusion Zone (EZ) - This zone will include all areas where potentially contaminated soil or materials are to be handled and all areas where contaminated equipment or personnel travel.

b) Contaminant Reduction Zone (CRZ) - This zone will occur at the interface of the EZ and Support Zone (SZ) and will provide access for the transfer of construction materials and field equipment to the EZ, the decontamination of vehicles prior to leaving the EZ, the decontamination of personnel and clothing prior to entering the SZ, and for the physical segregation of the SZ and EZ.

c) Support Zone (SZ) - This area is the portion of the work area defined as the area outside the zone of significant air and soil contamination. The SZ will be clearly delineated and procedures implemented to prevent active or passive migration of contamination from the work area.

9.0 PERSONAL PROTECTIVE EQUIPMENT

Engineering controls and work practices designed to reduce and maintain employee exposure at or below the Permissable Exposure Limits (PELs) for the constituents of concern (Table B.1) will be implemented. Whenever engineering controls and work practices are not feasible, a reasonable combination of engineering controls, work practices, and PPE shall be used to reduce and maintain employee exposure at or below the PELs for the contaminants of concern.

All field personnel shall be equipped with PPE appropriate for the nature of work being completed. All safety equipment and protective clothing shall be kept clean, well-maintained, and their integrity intact.

Safety equipment and apparel as required will be Level D, Modified Level D and Level C PPE (as determined by the action levels set forth in Section 10.0) within the Exclusion Zone. Any decision regarding the adjustment of PPE levels will be made by the Project Manager, in conjunction with the Project Industrial Hygienist (IH).

Level D PPE

Type	*Properties*	*Item*
Foot protection	Steel-toe/reinforced shank	Boots
Head protection	Meets ANSI Z89.1 standard	Hard hat
Hand protection	Puncture/tear resistant	Leather/cotton gloves
Eye protection	Meets ANSI Z87.1 standard	Glasses/goggles with side shields

Modified Level D PPE

Type	*Properties*	*Item*
Foot protection	Steel-toe/reinforced shank	Boots
Foot protection	Chemical resistant (latex)	Overboots
Head protection	Meets ANSI Z89.1 standard	Hard hat
Hand protection	Chemical resistant (nitrile)	Inner gloves
Hand protection	Chemical resistant, puncture/ tear resistant (nitrile)	Outer gloves
Eye protection	Meets ANSI Z87.1 standard	Glasses/goggles with side shields
Body protection	Chemical resistant (tyvek)	Coverall

Level C PPE

Type	*Properties*	*Item*
Foot protection	Steel-toe/reinforced shank	Boots
Foot protection	Chemical resistant (latex)	Overboots
Head protection	Meets ANSI Z89.1 standard	Hard hat
Hand protection	Chemical resistant (nitrile)	Inner gloves
Hand protection	Chemical resistant, puncture/ tear resistant (nitrile)	Outer gloves
Eye protection	Meets ANSI Z87.1 standard	Glasses/goggles with side shields
Body protection	Chemical resistant (tyvek)	Coverall
Respiratory protection	NIOSH approved	Full-face/half-face air-purifying respirator with organic vapor/ acid gas/HEPA filter

Additional PPE guidelines to be implemented include:

i) prescription eyeglasses in use at the Bedford Facility will be safety glasses with side shields;

ii) protective gloves (leather palm) will be worn over nitrile gloves by field personnel involved in drilling activities;

iii) during periods of respirator usage, respirator cartridges and filters will be changed daily, or upon breakthrough, whichever occurs first;

iv) field personnel who have not passed a respirator fit test will not be permitted to enter or work in the EZ;

v) personnel required to wear a respirator will not be permitted to have beards, long sideburns, or mustaches that interfere with the proper fit of the respirator;

vi) all used PPE will be decontaminated or discarded at the end of each work day; and

vii) duct tape will be used to ensure that disposable coveralls and gloves are tightly secured when personnel are working within the EZ.

10.0 RESPIRATOR PROGRAM

Prior to arriving at the Creek Areas or the Facility, all field personnel will have received training in the use of, and have been fit tested for a full-facepiece respirator. The written respiratory program that complies with 29 CFR 1910.134 is included as Attachment B2 to this HASP (copies of the certifications will be kept on file at the field trailer).

During intrusive activities (i.e. excavating), a photo-ionization detector (PID) will be used to monitor for organic vapors and some inorganic gases and a particulate monitor will be used to monitor particulate concentrations present in the breathing space. Background concentrations will be established prior to commencing work activities at each work location.

Sustained (greater than 5 minutes) air monitoring action levels to determine the level of respiratory protection necessary during field activities will be:

Sustained Photoionization Organic Vapor Reading Above Background	***Protection Level***
0 – 10 ppm	Level D, Modified Level D
10 – 125 ppm	full-facepiece air purifying respirator (Level C)
>125 ppm	shut down activities

Sustained Particulate Reading Above Background	***Protection Level***
0 – 0.5 mg/m^3	Level D, Modified Level D
0.5 – 2.5 mg/m^3	full-facepiece air purifying respirator (Level C)
>2.5 mg/m^3	shut down activities

Work will be stopped and the work area will be allowed to vent if monitoring indicates that organic vapors are present at concentrations which present Immediate Danger to Life and Health (IDLH) conditions, or in excess of the protection factor afforded by the air purifying respirator (whichever is lower). The action level to shut down activities has been decreased to a reasonable level for the work being conducted.

Air monitoring should continue, at a safe distance, if operations are stopped due to action level exceedences, to determine if a threat to the surrounding community exists.

11.0 JUSTIFICATION

The activities associated with the SOW are not expected to cause field personnel to be exposed to the constituents of concern in concentrations exceeding their respective PELs or RELs. The action levels have been calculated low enough so that the accuracy and sensitivity of the air monitoring equipment would not cause the field personnel to be inadvertently overexposed to the constituents of concern, even in a worst case scenario.

These action levels assume that all NIOSH criteria for using an air purifying respirator (APR) have been met. An APR can typically be worn in concentrations of up to 10 times the PEL for a given contaminant. Because of differences in sensitivities with direct reading instruments, a 50 percent safety factor is included when determining action levels. Therefore, the calculation to determine when a respirator should no longer be used is presented below (for a constituents of concern with PELs of 25 ppm and 0.5 mg/m^3):

- 25 ppm (PEL) x 10 (protection factor) x 0.5 (50% safety factor) = 125 ppm; and
- 0.5 mg/m^3 (PEL) x 10 (protection factor) x 0.5 (50% safety factor) = 2.5 ppm.

The primary routes of exposure of contaminants to individuals performing field remediation tasks include direct contact, ingestion, and inhalation. The risk of exposure due to direct contact and ingestion will be minimized through the proper use of PPE as described in Section 9.0 and by exercising ordinary caution during sampling activities. In order to minimize exposure by the inhalation pathway, the respirator and air monitoring programs discussed in Sections 10.0 and 13.0 will be undertaken.

12.0 PERSONAL HYGIENE

All personnel performing or supervising work within the EZ shall observe and adhere to the personal hygiene-related provisions of this section.

Personnel found to be disregarding the personal hygiene-related provisions of this HASP will, at the discretion of the HSO, be barred from the Parcel/Facility.

The following equipment/facilities are available for the personal hygiene of CRA personnel:

i) suitable disposable outerwear, gloves, respiratory protection and footwear on a daily basis for the use of field personnel;

ii) disposal containers for used disposable outerwear; and

iii) potable water and a suitable sanitation facility.

The following regulations will be enforced for all personnel actively participating in the RA implementation:

i) personnel will wear appropriate PPE when in the EZ;

ii) used disposable outerwear will not be reused if deemed to be unsuitable to provide the necessary protection, and when removed, will be placed inside disposal containers provided for that purpose;

iii) smoking, eating, and drinking will be prohibited within the EZ. These activities will be permitted only within designated areas; and

iv) personnel will thoroughly cleanse their hands, face, neck area, and other exposed areas before smoking, eating, or drinking, and before leaving the CRZ.

13.0 AIR MONITORING

This section of the HASP presents the requirements for conducting air monitoring at the Site. The air monitoring program is designed to ensure protection for both personnel working on Site and the surrounding community. The on-Site monitoring program will be conducted by the contractor who is performing work on Site and will consist of monitoring Site personnel exposures.

Air quality will be monitored at the initiation of each work activity and periodically thereafter.

The air monitoring program will consist of monitoring with a PID and a particulate monitor. Operation and calibration procedures will be according to manufacturers' instructions. Calibration and maintenance records will be kept in the field log.

Identification of volatile organic vapor or particulate levels in excess of the action levels cited in Section 10.0 shall be reported to the HSO who, in conjunction with the Project IH, will determine when PPE should be upgraded or operations be shut down and restarted.

If work is stopped because action levels have been exceeded, air monitoring will continue from a safe distance to determine if there is a threat to the surrounding community.

The contractor shall also implement a personnel air monitoring program for those employees who have the highest risk of potential for exposure to chemicals present on Site. This monitoring will be done in compliance with 1926.65(h). Samples will be collected during startup of intrusive activities, where personnel would face potential exposure, for the purpose of verifying the adequacy of personal protection and to document the actual exposure level to the selected chemical compound. The number and frequency of sampling events will be determined by the HSO. Appropriate NIOSH methodology will be followed and all samples are to be sent to an American Industrial Hygiene Association (AIHA) accredited laboratory. Results for all personnel air sampling will be posted for all project personnel to review.

Perimeter air monitoring will be completed as identified in the Ambient Air Quality Monitoring Plan.

14.0 COMMUNICATIONS

Emergency numbers including the police department, fire department, ambulance, hospital, and appropriate regulatory agencies (Table B.3) will be prominently posted near the site office telephone(s).

To ensure familiarity with the hospital route, all personnel covered under this HASP will drive the route to the hospital, prior to the initiation of field activities.

15.0 EMERGENCY AND FIRST AID EQUIPMENT

Safety equipment will be available for use by field personnel and will be located and maintained in the SZ. The safety equipment will include, but is not limited to, the following:

i) a portable emergency eye wash;

i) two 20- pound ABC type dry chemical fire extinguishers;

ii) fire blanket;

iii) two SCBA units (as necessary for excavation activities);

iv) portable air horn; and

vi) a first-aid kit for a minimum of 20 personnel.

16.0 EMERGENCY RESPONSE PLAN

Prior to commencing work activities, CRA will ensure that all of field personnel are briefed on emergency procedures. The emergency procedures are intended to provide immediate response to a serious occurrence such as injury, explosion or fire. A list of emergency contact numbers is presented as Table B.3 of this HASP.

In the event of injury to field personnel, the HSO is responsible for the following:

i) evacuate all personnel upwind;

ii) exit work area;

iii) contact the designated hospital and describe the injury;

iv) decontaminate personnel if possible, and administer appropriate first aid. If personnel cannot be decontaminated, alert hospital to possible problems of contamination;

v) transport personnel to the medical facility along a pre-defined route (Figure B.3); and

vi) notify GM personnel.

If a spill occurs related to the jobsite activities, the following procedure will be followed:

i) notify the HSO, Site Superintendent, and Site Representative;

ii) evacuate immediate area of spill;

iii) determine the needed level of PPE;

iv) don required level of PPE and prepare to make entry to apply spill containment and control procedures;

v) no entry will be made until atmosphere is less than 20 percent of the LEL; and

vi) absorb or otherwise clean up the spill and containerize the material, sorbent, and affected soils.

The Site Superintendent and Site Representative have the authority to commit resources as needed to contain and control released material and to prevent its spread to off-Site areas.

Releases from drums containing solid wastes will be placed into approved containers and covered. Each container will be labeled as to its contents. Solid spills from haulage units will be placed back into haulage units.

In the event that a drum or container of liquid is spilled on Site outside of the EZ, a drum handling team will immediately respond to the spill. The spilled liquids will be confined to the immediate area of the spill and the liquids will be pumped, with the use of a portable hand pump, into a repack drum. The spilled liquids will be confined by diking around the spill with native material or with an inert absorbent. Any residual liquids, which cannot be pumped, will be absorbed with a sufficient quantity of inert absorbent to ensure that no free liquids remain. If the spill occurred on soil, the visibly affected soil will be excavated to limits based on a visual determination of spill contamination with the concurrence of the on-Site Client Representative. The absorbent and excavated material will be drummed or otherwise appropriately contained.

17.0 EQUIPMENT AND PERSONNEL DECONTAMINATION

In general, everything that enters the EZ at this Site must either be decontaminated or properly discarded upon exit from the EZ. All personnel, including any State and local officials must enter and exit the EZ through the CRZ. Prior to demobilization, potentially contaminated equipment will be decontaminated on a wash pad (decontamination pad) which has a built in sump and the equipment will be inspected by the HSO and Site Representative before it is moved into the clean zone. Any material that is generated by decontamination procedures will be stored in a designated area in the EZ until disposal arrangements are made.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for heavy equipment and for any reusable PPE is Liqui-nox soap. The Material Safety Data Sheets (MSDSs) for Liqui-nox and any other chemical containing products brought to the Site will be maintained on Site by the HSO. Tap water may be used from any municipal water treatment system. The use of an untreated water supply is not an acceptable substitute.

17.1 EQUIPMENT DECONTAMINATION PROCEDURES

All equipment that comes in contact with potentially impacted material must be decontaminated within the CRZ by a pressure water cleaner upon exit from the EZ. Decontamination procedures should include: knocking soil/mud from machines; water brush scrubbing using a solution of water and Liqui-nox; and a final water rinse. Personnel shall wear Level C or Modified Level D protection, as determined by the HSO, when decontaminating equipment. Runoff and sediments will be collected and stored until proper disposal arrangements have been made. Following decontamination and prior to exit from the EZ, the HSO shall be responsible for ensuring that the item has been sufficiently decontaminated. This inspection shall be included in the Site log. Additionally, sampling and monitoring equipment are to be sufficiently decontaminated.

All equipment used for the collection of samples for chemical analysis will be cleaned according to the procedures identified in the RA Work Plan.

17.2 PERSONNEL DECONTAMINATION PROCEDURES

Personnel decontamination will be completed in accordance with the CRA Health and Safety SOP or an approved contractor's SOP for personnel decontamination. The selected contractor(s) will provide and implement their SOP for going through personnel decontamination. The general guidelines for a typical Level C decontamination line are described below:

i) upon entering the CRZ, rinse contaminated materials from boots or remove contaminated boot covers;

ii) clean reusable protective equipment;

iii) remove protective garments, equipment, and respirator. All disposable clothing should be placed in a covered container which is labeled;

iv) wash hands, face, and neck or shower (if necessary);

v) proceed to clean area and dress in clean clothing; and

vi) clean and disinfect respirator for next use.

18.0 RECORDKEEPING

The HSO shall establish and maintain records of all necessary and prudent monitoring activities as described below:

i) name and job classification of the employees involved on specific tasks;

ii) records of fit testing and medical surveillance results for Site personnel;

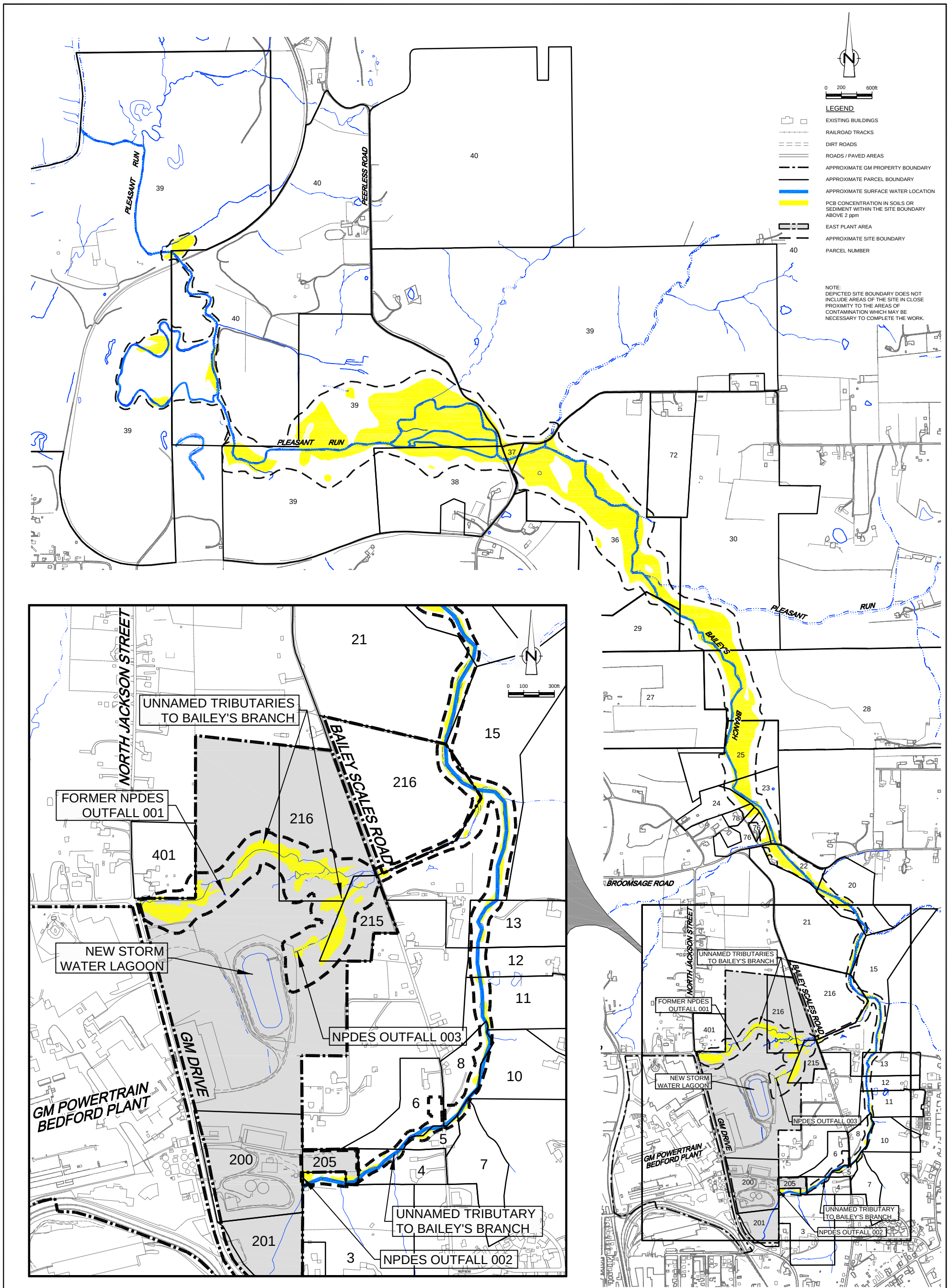
iii) records of all OSHA training certification for Site personnel;

iv) records of training acknowledgment forms and daily safety meetings;

v) emergency report sheets describing any incidents or accidents;

vi) air monitoring equipment calibrations; and

vii) air monitoring data.



NO	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

CREEK AREA
REMOVAL ACTION

REMOVAL ACTION WORK PLAN

FACILITY LOCATION MAP

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001

Project Manager:	Reviewed By:	Date:	
J. McGUIGAN	J. DANIEL	NOVEMBER 2003	
Scale: AS SHOWN	Project NO: 13968-00	Report NO: 053	Drawing NO: figure A-1

13968-00(053)GN-WA035 NOV 05/2003

COORDINATE SYSTEM: INDIANA STATE PLANE COORDINATE (NAD 27)

ADAPTED FROM: GENERAL MOTORS POWERTRAIN
PLANT ENGINEERING DEPARTMENT
PLOT PLAN, 12/03/99

N⁰	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY
- BEDFORD CITY LIMIT
- FENCE LINE
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- STREAM
- CONTOUR LINE

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

CREEK AREA REMOVAL ACTION
BEDFORD, INDIANA

REMOVAL ACTION WORK PLAN

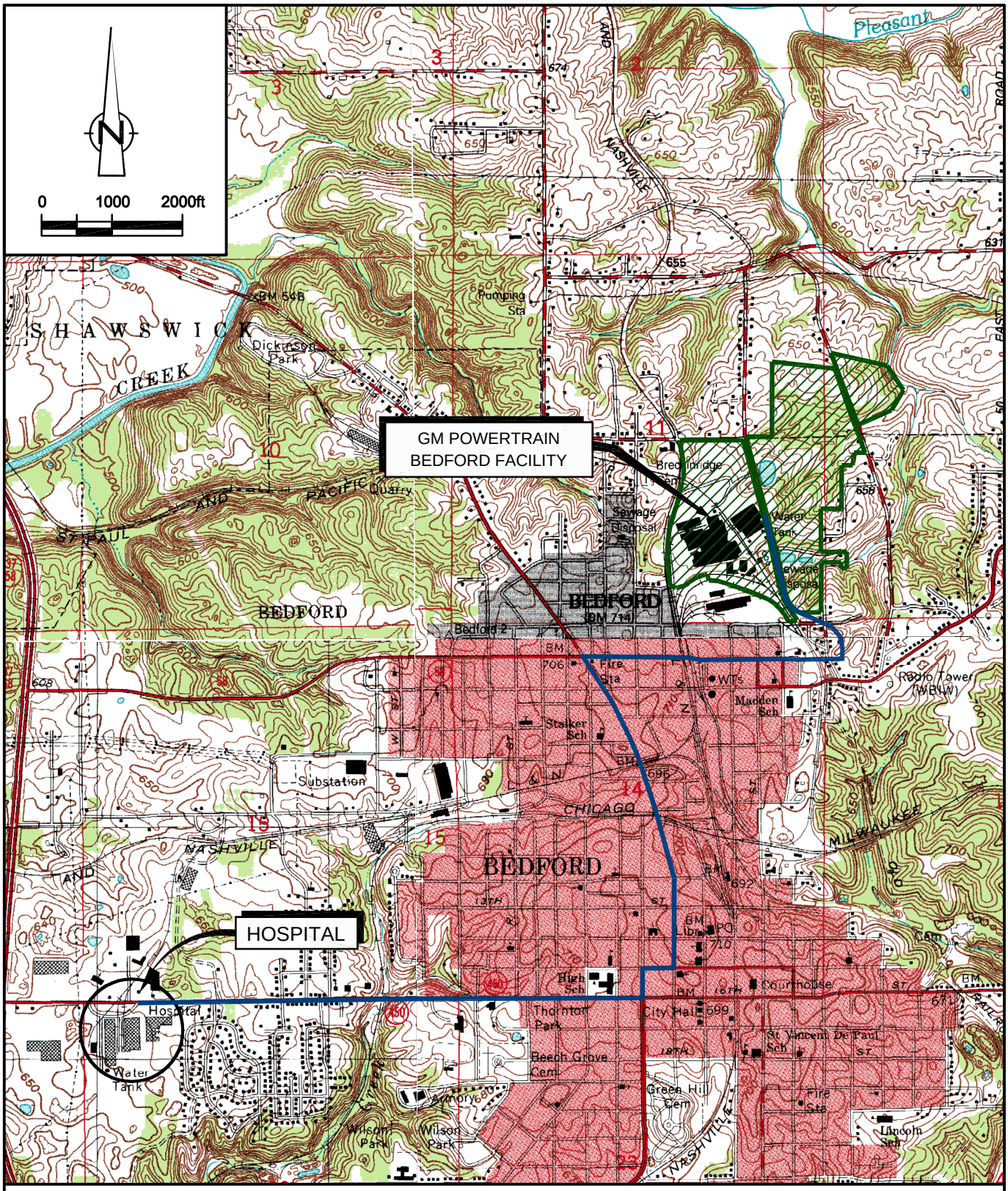
SITE PLAN - BEDFORD FACILITY

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. McGUIGAN	J. DANIEL	NOVEMBER 2003	
Scale: 1"=200'	Project N⁰: 13968-00	Report N⁰: 053	Drawing N⁰: figure A-2

13968-00(053)GN-WA036 NOV 05/2003



SOURCE: USGS QUADRANGLE MAPS;
BEDFORD EAST, BEDFORD WEST,
BARTLETTSVILLE, AND OOLITIC, INDIANA

figure A-3

ROUTE TO HOSPITAL
REMOVAL ACTION WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

13968-00(053)GN-WA037 NOV 05/2003

TABLE A.1

POTENTIAL CONSTITUENTS OF CONCERN (Currently known)
PLEASANT RUN REMOVAL ACTION
BEDFORD, INDIANA

Contaminant	REL	PEL	IDLH	IP (eV)	Flammability Range	Routes of Exposure	Symptoms of Exposure	Other
Polychlorinated biphenyls	0.001 mg/m^3	0.5 mg/m^3	5 mg/m^3	NL	NA	Inhalation, Ingestion, Contact	Eye irritant; chloracne; liver damage; reproductive effects	Skin Absorptive

Notes: NA - Not Applicable
NL - Not Listed
REL - Recommended Exposure Limit (NIOSH)
PEL - Permissible Exposure Limit (OSHA)
IDLH - Immediate Danger to Life and Health (OSHA)
IP - Ionization Potential
ppm - parts per million
mg/m^3 - milligrams per cubic meter
eV - electron volts

TABLE A.2

HAZARD ANALYSIS
PLEASANT RUN REMOVAL ACTION
BEDFORD, INDIANA

Field Activities	*Hazards*	*Prevention*
Construction Oversight	Chemical hazards due to inhalation and dermal contact	Proper use of PPE
	Exposure to temperature extremes	Monitor for heat or cold stress
	Physical hazards associated with operation of excavation equipment	Maintain a safe distance from equipment
		Avoid overhead power lines (20 feet)
		Check for and mark underground utilities
	Biological Hazards	Proper PPE, exercising ordinary caution, use of "buddy system"
	High noise level	Use hearing protection
	Slip, trip, fall	Clean mud, snow or grease from shoes and equipment
Sampling Activities	Exposure to temperature extremes	Monitor for heat or cold stress
	Chemical hazards due to inhalation and dermal contact	Proper use of PPE
	Biological Hazards	Proper PPE, exercising ordinary caution, use of "buddy system"
Perimeter Air Monitoring	Exposure to temperature extremes	Monitor for heat or cold stress
	Chemical hazards due to inhalation and dermal contact	Proper use of PPE
	Biological Hazards	Proper PPE, exercising ordinary caution, use of "buddy system"
	Slip, trip, fall	Clean mud, snow or grease from shoes and equipment

TABLE A.3

EMERGENCY CONTACTS
PLEASANT RUN REMOVAL ACTION
BEDFORD, INDIANA

Agency/Firm	*Emergency Telephone Number*	*Business Telephone Number*
Local Emergency Services		
Fire Department	911	
Police Department	911	
Ambulance	911	
Hospital (Regional Medical Center) 2900 16th Street Bedford, IN 47421		(812) 275-1200
National Poison Center		(800) 942-5969
National Response Center		(800) 424-8802
CRA Industrial Hygienist - Jeff Maranciak		(412) 963-7313 mobile (412) 225-6375
CRA Project Manager - James McGuigan		(773) 380-9933 mobile (708) 476-4793
CRA Construction Manager - Ashley Valentine		(513) 942-4750 mobile (513) 604-3946
On-Site Contacts - Jeff Nichols		(812) 277-8960/8970 mobile (630) 215-6319
- Kimberly Dobosenski		(812) 279-7404
GM Emergency Contacts - Cheryl Hiatt		(248) 680-5219 mobile (313) 510-4328
- Ed Peterson		(248) 680-5726 mobile (313) 506-9465
- Laura Fitzpatrick		(313) 665-4881

Directions to the Hospital: **(REFER TO FIGURE B.3)**

Total Distance: 3.1 miles (from Bedford Faciltiy)
3.9 miles (from Parcel 22)

Travel Time: 7-9 minutes

ATTACHMENT A1

HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

ATTACHMENT A1

HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

The following employees have read and understood the attached Health and Safety Plan:

Name	*Employer*	*Date*

VISITOR REVIEW

Each visitor to the Facility pertaining to the specified SOW shall sign this form after the pre-entry briefing is completed and before being permitted access to the Facility. A copy of this signed form shall be kept at the Facility, and the original sent to the HSO.

VISITOR SIGNOFF

I have attended a pre-entry briefing outlining the specific health and safety provisions for the SOW.

I have received a copy of the Health and Safety Plan. I have read the Plan, and will comply with the provisions contained therein.

_____	_____	_____
Name (printed)	Signature	Date

Witness:

_____	_____	_____
Name (printed)	Signature	Date

ACTING SAFETY OFFICER:

This person has provided verification of current OSHA 40-Hour hazardous waste site worker training.

_____	_____	_____
Name (printed)	Signature	Date

ATTACHMENT A2

RESPIRATORY PROTECTION PROGRAM

TABLE OF CONTENTS

1.0 RESPIRATORY PROTECTION

1.1 PRACTICE

The primary control of respiratory hazards shall be accomplished, whenever feasible, through the use of engineering controls, hazard substitution, revised work practices or other administrative controls. However, when such controls are not feasible, appropriate respiratory protection shall be used in accordance with the procedures established in this Standard Operating Procedure (SOP). Any deviation from the requirements set forth must have approval from an Industrial Hygienist (IH).

1.1.1 AUTHORIZATION

CRA employees requiring respiratory protection must have authorization from an IH. Office management shall notify an IH of respirator needs. The work situation will then be assessed and a respirator will be issued based on the hazard(s) the individual is exposed to. Reassessment of the hazard and the individual's needs will be repeated periodically.

1.1.2 MEDICAL SURVEILLANCE

All personnel designated to use respirators must successfully complete a physical exam as part of the medical requirements placed on persons exposed to hazardous substances and for users of respiratory protection (29 CFR 1910.134 and 1910.120). The medical exam will be repeated annually. All medical data will be reviewed by a consulting occupational physician. The physician will generate a written opinion on the suitability of the employee to wear a respirator.

1.1.3 AIR QUALITY

When air supplied respirators are used, the breathing air shall meet the Compressed Gas Association (CGA-CG7.1) Standards for Grade D breathing air or better.

1.1.4 AIR CYLINDERS

Cylinders used to supply breathing air are tested and maintained as prescribed in Shipping Container Specifications (49 CFR 178). Self-Contained Breathing Apparatus (SCBA) cylinders have approximately 2400-psi of pressure when full. Compressed air cylinders are visually inspected annually and hydrostatically tested once every five years for steel cylinders and once every three years for composite cylinders. These test dates are stamped on the cylinder for future reference.

1.2 FIT TESTING

1.2.1 QUALITATIVE OR QUANTITATIVE FIT TESTING

Fit testing of the respirator will be conducted by an IH or other designated, trained personnel following the medical evaluation. All users of respirators must be fit tested to ensure proper protection. Only the brand and size a person is fitted for is allowed to be used in the field. DO NOT SUBSTITUTE RESPIRATORS FOR A BRAND AND SIZE THAT YOU HAVE NOT BEEN PROPERLY FITTED FOR. The fit test will be accomplished quantitatively for full face APRs. Records will be maintained by the Corporate IH with copies available in CRA field offices for audit purposes. After fit testing, the employee will be issued an authorization card. This card serves as a reference for the proper type of respirator to use as well as prima facie proof of proper medical and training clearance for regulatory purposes. The user shall have the card available at any time when on CRA business where respiratory protection is used or hazardous waste cleanup sites are being entered.

1.2.2 POSITIVE & NEGATIVE FIT TESTING

All personnel will be instructed in the proper method of testing respirator fit by use of the **Positive & Negative** pressure test. This test is to be done by the user each and every time a respirator is donned. This test is performed to help the wearer assess respirator function and find gross leaks between the face and facepiece. This positive-negative pressure test checks the presence and functioning of the respirator valves as well as leakage that may occur due to improper cartridge seal or respirator face fit.

1.2.2.1 POSITIVE PRESSURE

1) Block off the exhalation valve cover openings.

   MSA: Exhalation valve cover can be blocked with the palm of the hand.

   Scott: Exhalation valve covers have front openings as well as four small side openings. These openings are difficult to block off with the hands. However, a small piece of flexible material such as Saran wrap or latex can be used.

   North: Exhalation valve cover has long narrow openings around its perimeter. These can be blocked by encircling the fingers around the valve cover.

2) The person exhales gently, creating a slight positive pressure within the facepiece. The positive pressure should be maintained for at least 10 seconds.

3) If no outward leakage is detected, the person has passed the test.

4) If leakage is detected (usually felt as a cool sensation against the skin or a loss of pressure), the respirator is either malfunctioning or a gross leak between the face and facepiece is present. The following should be done when a failure occurs: Re-don or readjust the respirator.

   If the facepiece continues to lose pressure, although previous positive or negative pressure tests performed with that respirator had passed, it is probably malfunctioning. Consult Industrial Hygiene. It is also possible that there are new scars or wrinkles, beard growth, missing teeth or dentures, significant weight gain or loss, etc. to cause gross leakage into the facepiece. When such new conditions exist, reevaluation of the respirator in a test atmosphere is necessary.

1.2.2.2 NEGATIVE PRESSURE

1) Block off the respirator cartridge inlet openings.

   MSA: Cartridges can be blocked with the palms of the hands or with disposable latex gloves.

   Scott: Cartridges can be blocked by using the palms of the hands or with gloves.

   North: Cartridges can be blocked only with gloves.

2) Inhale gently, holding the negative pressure for at least 10 seconds.

3) If no inward leakage of air is detected, the person has passed the test.

4) If leakage is detected, see 4 above.

1.2.3 EXCEPTIONS

1.2.3.1 FACIAL HAIR

Any individual with facial hair which protrudes into the sealing surface of the masks will be refused fitting. Fitting, issuance, and use will be based on clean-shaven faces only. Employees with facial hair which interferes with respirator fit will not be permitted to work where respiratory protection must be worn.

1.2.3.2 GLASSES

Employees who wear prescription glasses and must wear a full-face respirator shall be fitted with special eyeglass adapters. Contact lenses will not be permitted when worn with any type of respiratory protection.

1.3 TRAINING

Proper training of respirator users is required to insure that all respirators will provide adequate protection against respiratory hazards and so that the user will understand the device's limitations. The training will include the following elements:

1) An explanation of the nature of respiratory hazards and what may happen if the respirator is not used properly.

2) A description of what engineering and administrative controls may be utilized to reduce the effects of the respiratory hazard and why respirators are required.

3) An explanation of the various types of respirators and why specific types have been selected.

4) A discussion of the function, capabilities, and limitations of respirator cartridges.

5) Instruction in the inspection, fit, and maintenance of the respirator.

6) Instructions in recognizing and handling emergency situations.

1.4 MAINTENANCE AND CARE OF RESPIRATORS

A program for the maintenance and care of respirators will include the following:

1) Inspection for defects;
2) Cleaning and disinfecting;
3) Repair/miscellaneous maintenance; and
4) Storage.

1.4.1 INSPECTION FOR DEFECTS

Employees shall inspect their respirators before each use. A respirator that is not routinely used but is kept ready for emergency use shall be inspected after each use and at least monthly to ensure that it is in satisfactory condition. SCBA shall be inspected monthly if kept for emergency response (i.e., long duration site remediation).

Inspection shall include a check of the tightness of the connections and the condition of the face piece, headbands, valves, breathing tubes and canisters. Rubber or elastic parts shall be inspected for pliability and signs of deterioration. Any respirator with worn or defective parts will be immediately taken out of service.

Before and after each use, respirators will be inspected for the following:

1) Tightness of connections and condition of the facepiece;
2) The headstraps or head harness should be examined for: breaks, loss of elasticity, broken or malfunctioning buckles and attachments, and excessively worn head-harness serrations that might permit slippage;
3) Valves and valve seats;
4) Connecting tube and canisters, air or oxygen cylinders;
5) Rubber or elastomer parts for pliability and deterioration; and
6) Regulators, fittings and gauges.

The following contains inspection information for various types of respirators.

Air Purifying Respirators

1) Check rubber facepiece for dirt, pliability of rubber, deterioration and cracks, tears, holes or distortion from improper storage.
2) Check straps for breaks, tears, loss of elasticity, broken snaps and proper tightness.
3) Check valves (exhalation and inhalation) for holes, warpage, cracks, etc. After removing its cover, the exhalation valve should be examined for: foreign material, distortion, defective or missing valve cover, or improper installation of valve into the valve seat.
4) Check filters or cartridges for dents, corrosion, etc. (loose or missing gaskets, improperly seated cartridges).
5) Check for cracked or badly scratched lenses in full facepieces; incorrectly mounted lens, broken or missing mounting clips.

Atmosphere-Supplying Respirators

1) Check appropriate items above.
2) Check air supply system for breaks or kinks in supply hoses and detachable coupling attachments.
3) Follow manufacturer's recommendations for the specific equipment.
4) Check air supply level and warning devices.

1.4.2 CLEANING AND DISINFECTING

The respirator must be washed after each day's use. If the respirator is shared it must be disinfected according to the manufacturer's instructions. Organic solvents of any kind must not be used for cleaning. Air purifying filters must not be wetted.

1.4.2.1 CLEANING

1) Remove any filters, cartridges or canisters and, if required by the manufacturer, straps and speaking diaphragms from the facepiece. Remove regulators on airline or SCBA.
2) Wash respirator parts excluding cartridges and canisters in warm (not to exceed 140°F), soapy water or in a product specifically designed by respirator

manufacturers for this purpose. A plastic bristle hand brush may be helpful in removing dirt from respirator parts.

3) Rinse all parts thoroughly in warm water.

4) Air dry all parts.

5) Reassemble the respirator and insert new cartridges if needed.

6) Place the respirator in a plastic bag or container and seal it for storage. The respirator facepiece should be stored in its normal position so as not to distort the elastomer.

1.4.2.2 DISINFECTION

1) Disinfection should be done with a cleaner/disinfection agent purchased from the respirator vendor. If that material is not available the following NIOSH procedures can be followed:

   a) Immerse the respirator body for two minutes in a 50 ppm chlorine solution (about 2 ml bleach to 1 liter of water). Rinse thoroughly in clean water and air dry.

   b) Immerse the respirator body for two minutes in an aqueous solution of iodine (add 0.8 ml of iodine in 1 liter water). The iodine is about 7% ammonium and potassium iodide, 45% alcohol and 48% water. Rinse thoroughly in clean water and air dry.

2) Immersion times have to be limited to minimize damage to the respirator. The solutions can age rubber and rust metal parts.

NOTE: The air-purifying elements must be removed from the respirator prior to cleaning and sanitizing the respirator. Never allow the air-purifying elements to come in contact with water or cleaning/sanitizing solution.

1.4.3 STORAGE

Respirators must be stored to protect them from contamination and mechanical damage at all times when not in use. New, cleaned or reconditioned respirators are to be kept in a clean, sealed plastic bag or container, stored in a normal position. The plastic bag should be labeled with the users name. A suitable cabinet or drawer should be used to protect respirators and supplies from dirt, extremes of temperature or bright sunlight. They are not to be left in vehicles or on perimeter fences, in change sheds, etc.

ATTACHMENT A3

HEAT STRESS AND COLD STRESS PROCEDURES

TABLE OF CONTENTS

1.0 COLD STRESS

1.1 OVERVIEW

Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6 degrees Fahrenheit (°F), can be life threatening. A drop in core temperature to 95°F or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind-chill must be considered as it contributes to the effective temperature. The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of accidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

There are certain predisposing factors that make an individual more susceptible to cold stress. It is the responsibility of the project team members to inform the Health and Safety Officer to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

1.2 PREDISPOSING FACTORS

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- Dehydration: The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.
- Fatigue During Physical Activity: Exhaustion reduces the body's ability to constrict blood vessels resulting in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.

- Age: Some older and very young individuals may have an impaired ability to sense cold.
- Alcohol Consumption: Alcohol dilates the blood vessels near the skin surface resulting in excessive body heat loss.
- Sedative Drugs: Sedatives may interfere with the transmission of impulses to the brain, thereby interfering with the body's physiological defense against cold. Some prescription drugs may react the same way.
- Poor Circulation: Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.
- Heavy Work Load: Heavy work loads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.
- The Use of PPE: PPE usage which traps sweat inside the PPE may increase an individual's susceptibility to cold stress.
- Lack of Acclimatization: Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.
- History of Cold Injury: Previous injury from cold exposures may result in increased cold sensitivity.

1.3 PREVENTION OF COLD STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- Acclimatization: Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiologic changes are usually minor and require repeated uncomfortably cold exposures to induce them.
- Fluid and Electrolyte Replenishment: Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm,

sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.

- Eating a Well-Balanced Diet: Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high energy foods throughout the day.
- Warm Clothing: It is beneficial to maintain air space between the body and outer layers of clothing in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.

The parts of the body most important to keep warm are the feet, hands, head and face. As much as 40 percent of body heat can be lost when the head is exposed.

Recommended clothing includes:

- Inner layers (t-shirts, shorts, socks) should be of a thin, thermal insulating material.
- Wool or thermal trousers. Denim is not a good protective fabric.
- Felt-lined, rubber-bottomed, leather-upper boots with a removable felt insole is preferred. Change socks when wet.
- Wool shirts/sweaters should be worn over inner layer.
- A wool cap is good head protection. Use a liner under a hard hat.
- Mittens are better insulators than gloves.
- Face masks or scarves are good protection against wind.
- Tyvek/poly-coated Tyvek provides good wind protection.
- Wear loose fitting clothing, especially footwear.
- Carry extra clothing in your vehicle.
- Shelters with heaters should be provided for the employees' rest periods if possible. Sitting in a heated vehicle is a viable option. Care should be taken that the exhaust is not blocked and that windows are partially open to provide ventilation.
- At temperatures of 30°F (-1°C) or lower, cover metal tool handles with thermal insulating material if possible.
- Schedule work during the warmest part of the day if possible, rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

1.3.1 EMPLOYEE EDUCATION

Employees have already been trained to recognize and treat the effects of cold stress during their 40-hour training. Signs, symptoms, and treatment of cold stress should be reviewed in project safety meetings where applicable. The buddy system will help in preventing cold stress once the employees are trained to recognize the signs and symptoms of cold stress.

1.3.2 COLD STRESS PREVENTION GUIDELINES

It may not be practically feasible to implement all the above prevention measures. Follow the guidelines given below when the ambient air temperature is -5°F (-20°C) or lower:

- Contact the Project Manager (PM) or the industrial hygienest to determine if the project team should be working in such temperatures;
- Dress warm;
- Replenish fluids and electrolytes at regular intervals;
- Provide shelter from the cold; and
- Adjust work/rest schedules.

1.3.3 ADJUST WORK-REST SCHEDULES

Follow the work/rest schedule on Table C.1. It is based on the cooling power of air that is a function of wind speed and ambient air temperature.

1.4 FIRST-AID TREATMENT GUIDELINES

The following describes symptoms of different stages in cold stress and the related first-aid treatment guidelines.

1.4.1 FROSTBITE

Stages

Incipient (frost nip)	May be painless. Tips of ears, nose, cheeks, fingers, toes, chin affected. Skin blanched white.
Superficial	Affects skin/tissue just beneath skin; turns purple as it thaws. Skin is firm, waxy; tissue beneath is soft, numb.
Deep	Tissue beneath skin is solid, waxy, white with purplish tinge. Entire tissue depth is affected.

First-Aid

Incipient	Warm by applying firm pressure - blow warm breath on spot or submerge in warm water (102°F to 110°F) (39°C to 43°C). Do not rub the area.
Superficial	Provide dry coverage, steady warmth; submerge in warm water.
Deep	Hospital care is needed. Do not thaw frostbitten part if needed to walk on. Do not thaw if there is danger of refreezing. Apply dry clothing over frostbite. Submerge in water; do not rub.

1.4.2 GENERAL HYPOTHERMIA

Stages

- Shivering
- Indifference
- Decreased Consciousness
- Unconsciousness
- Death

Symptoms

- Muscle Tension
- Uncontrollable Shivering
- Glassy Stare
- Decreased Muscle Function
- Speech Distortion
- Blue, Puffy Skin
- Slow Pulse
- Shallow Breathing
- Coordination Loss
- Stumbling
- Forgetfulness
- Freezing Extremities
- Dilated Pupils
- Fatigue

Emergency Response

- Keep person dry; replace wet clothing;
- Apply external heat to both sides of patient using available heat sources, including other bodies;
- Give warm liquids - not coffee or alcohol - after shivering stops and if conscious;
- Handle gently;
- Transport to medical facility as soon as possible; and
- If more than 30 minutes from a medical facility, warm person with other bodies.

2.0 HEAT STRESS

2.1 OVERVIEW

Heat induced occupational illnesses, injuries and reduced productivity occur in situations in which the total heat load (environmental plus metabolic) exceeds the body's capacities to maintain normal body functions without excessive strain. Heat stress is the sum of the heat generated in the body plus the heat gained from the environment minus the heat lost from the body to the environment. The body's response to heat stress is called heat strain. The level of heat stress at which excessive heat strain will result depends on the heat tolerance of the individual. Certain predisposing factors may reduce an individual's ability to tolerate heat stress.

Using PPE may put a hazardous waste worker at an increased risk of developing heat stress. Health effects may range from heat rash or heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors, including environmental conditions such as temperature and relative humidity, protective clothing which limits natural heat loss through perspiration, workload and the individual characteristics of the worker.

It is the responsibility of the project team members to inform the HSO or industrial hygienest if any of the predisposing factors listed below apply to them. This enables the HSO to monitor the individual if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a heat related illness or disorder.

2.2 PREDISPOSING

Predisposing factors that will increase the individual's susceptibility to heat stress are listed below:

- Lack of Physical Fitness: Such individuals experience more physiological strain including a higher heart rate, a higher body temperature, less efficient sweating and slightly higher oxygen consumption as compared to fit individuals.
- Obesity: Overweight individuals produce more heat per unit surface area than thin individuals and have a lowered ability to dissipate heat.
- Age: Older individuals may have a decreased ability to cope with heat stress.
- Dehydration: Dehydrated individuals will have a decreased ability to cool the body by sweating. Diarrhea can cause dehydration.

- Alcohol, Medications and Drug Use: Alcohol consumption may dehydrate individuals and certain medications/drugs may act as diuretics. Hence, the individual may have a decreased ability to lose heat by sweating.
- Infection, Sunburn, Illness and Certain Chronic Diseases: These factors may interfere with the body's normal mechanisms to lose heat.
- Heart Conditions or Circulatory Problems: Heat stress may place an additional strain on the heart and circulatory system that could harm the individual as well as decrease the individual's physiologic response.
- Low Salt Diet: Could affect the individual's electrolyte balance.
- Pregnancy
- Previous History of Heat Stroke or Heat Exhaustion: May increase the individual's susceptibility to heat stress.
- Heavy Work Load: Will generate metabolic heat thereby increasing the heat stress placed on the individual
- The Use of PPE Over Light Summer Clothing: This will decrease the ability of an individual to lose heat by sweating, as evaporative cooling can no longer occur.
- Lack of Acclimatization: Acclimatization is the gradual introduction of workers into a hot environment to allow their bodies to physiologically adjust to hot working conditions. Acclimatized individuals generally have lower heart rates and lower body temperatures. In addition, they sweat sooner and more profusely and even have more dilute sweat (thereby losing less electrolytes) than non-acclimatized individuals.

2.3 PREVENTION OF HEAT STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing heat stress related disorders. These include fluid and electrolyte replenishment, the provision of shelter from the sun and heat, work schedule adjustment, the use of cooling devices, acclimatization, heat stress monitoring and employee education, as discussed below:

- Fluid and Electrolyte Replenishment: Personnel should drink about 16 ounces of water before starting work and drink water at every break. To encourage water consumption, cool water and disposable cups should be made available. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, personnel should be encouraged to drink more. Replacing body fluids with Gatorade is an option. It is advisable to

have Gatorade available if the air temperature is 70°F (21°C) or more and the workers are performing tasks with a moderate to heavy work load in chemical resistant clothing.

- Shelter From the Sun and Heat: Air-conditioned (if possible) or shaded areas should be made available for rest periods. Sitting in an air-conditioned truck is an acceptable option.
- Work Schedule Adjustment: Scheduling work for early mornings and/or late afternoons will avoid the hottest parts of the day and reduce the heat stress placed on personnel. Rotation of personnel will help reduce overexertion of workers and adjusting the work-rest schedule will help personnel recover from the effects of heat stress periodically.
- Use of Cooling Devices: The use of cooling devices like field showers, hose-down areas or cooling vests should be considered for project tasks that involve heavy work loads in chemical resistant clothing.
- Acclimatization: Acclimatization is the gradual introduction of workers into a hot environment to allow their body to physiologically adjust to hot working conditions. Acclimatized individuals generally have lower heart rates and lower body temperatures. In addition, they sweat sooner and more profusely and even have more dilute sweat (thereby losing less electrolytes) than non-acclimatized individuals.
- Heat Stress Monitoring: Monitoring hot environments for potential heat stress should be initiated when the ambient air temperature is in excess of 70°F (21°C). There are several ways to monitor heat stress: measuring heart rate, oral temperature, loss of body weight, and the Wet Bulb Globe Temperature using a Reuter-Stokes or Quest Electronics heat stress monitor.
- Employee Education: Workers have already been trained to recognize and treat the effects of heat stress during the 40-hour training course. Signs, symptoms, and treatment of heat stress should be discussed in safety meetings. The buddy system will help in preventing heat stress once the employees are trained to recognize the signs and symptoms of heat stress.

2.3.1 PREVENTION PRACTICES

It may not be practically feasible to implement all of the above prevention measures. The following has been developed as a field guide for use in actual field situations.

Ambient air temperature is 70°F (21°C) or more:

- Replenish fluids and electrolytes. Drink cool (50°F to 60°F/10°C to 15°C) fluids hourly. The fluids should be caffeine-free and non-alcoholic. Do not wait until you are thirsty. Your normal thirst mechanism is not sufficient to overcome the effects of dehydration. If you feel thirsty, you are already becoming dehydrated; and
- Provide shelter from the sun and heat.

Ambient air temperature is 70°F (21°C) or more and chemical-resistant clothing is being used:

- Same as above;
- Adjust work schedules if feasible; and
- Initiate heat stress monitoring and/or the use of cooling devices.

2.3.2 HEAT STRESS MONITORING

Heat stress monitoring may be performed by monitoring the heart rate. Heart rate should be measured at the beginning of the work shift, at regular intervals and at the start of each rest period.

1) If the heart rate is <110 beats per minute (bpm), personnel may continue the current work/rest schedule.
2) If the heart rate is >110 bpm, take a 10 minute break. Monitor heart rate at the end of the rest period. If not <110 bpm, rest until the heart rate is <110 bpm. Reduce the current work time between breaks by approximately one hour. If the next scheduled monitoring session shows a heart rate of >110 bpm once again, reduce the work time between breaks by one hour.

2.4 HEAT STRESS FIRST AID

2.4.1 HEAT CRAMPS

Cause: Excessive water loss/electrolyte imbalance.

Symptoms	First-Aid Guidelines
Muscular pain in arms, legs, abdomen Faintness, dizziness, exhaustion Normal temp, cool moist skin person	Administer sips of Gatorade (1/2 glass every 15 minutes) Do not massage cramping muscles Relax

2.4.2 HEAT EXHAUSTION

Cause: Large amount of water loss; blood circulation diminishes.

Symptoms	First-Aid Guidelines
Moist, clammy, skin, usually pale Dilated pupils Weak, dizzy, nauseous, headache Normal or low body temperature	Move to a cool place Apply cold, wet compresses to skin Raise feet 8 to 12 inches Administer sips of Gatorade (1/2 glass every 15 minutes) Get medical attention

2.4.3 HEAT STROKE

Cause: Body overheats; temperature rises; no sweating occurs

Symptoms	First-Aid Guidelines
No sweating occurs	Get emergency medical assistance ASAP
Dry, hot skin, usually red	Remove from sunlight
Constricted pupils	Wet down body with cool water or rubbing alcohol
Hot body temperature (105°F to 110°F/40.5°C to 43.5°C)	Elevate head/shoulders
Strong, rapid pulse	Wrap in wet, cold wrapping
Unconsciousness may occur	Once cooled to 102°F (38.9°C), stop cooling measures
Muscular twitching	

ADDENDUM NO. 1

FOR THE SITE HEALTH AND SAFETY PLAN

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MEMORANDUM

TO:	Jim McGuigan Jeff Nichols	REF. NO.:	13968/rcc/85
FROM:	Jeffrey Maranciak, OHST (Project Industrial Hygienist)	DATE:	May 21, 2003
C.C.:	Peter Ramanauskis, U.S. EPA Brad Stimple, U.S. EPA John Gunter, IDEM Ed Peterson, GM Cheryl Hiatt, GM Laura Fitzpatrick, GM Legal		
RE:	**ADDENDUM No. 1 for the Site Health and Safety Plan (HASP) at the General Motors Powertrain Bedford Plant located in Bedford, Indiana**		

This memorandum serves as an ADDENDUM to the Health and Safety Plan (HASP) (Conestoga-Rovers & Associates) for remedial and investigative activities being conducted at the General Motors Powertrain (GM) Bedford Plant (Facility) and surrounding areas (Site) located in Bedford, Indiana. This Addendum should be used in conjunction with the Site-Specific HASP. The applicability of this emergency protocol extends to all CRA personnel including CRA contractors and subcontractors. The following text presents additions to the health and safety requirements of the current HASP(s).

CRA will implement an emergency action plan that will be utilized when there is the potential for severe weather and tornadoes. The CRA Project Manager will appoint a CRA Site Emergency Coordinator that will ensure compliance to the HASP and to this Addendum. Additionally, the Site Emergency Coordinator will ensure that human life and CRA resources are protected by the following:

i) training all Site personnel on tornado evacuation procedures during the Site Indoctrination/Orientation Training. Training will include the following items:
   - emergency escape procedures
   - escape route assignments and mustering point(s)
   - head count procedures
   - names of emergency contacts
   - location of nearest hospital/medical assistance
   - means of reporting emergencies
   - hazardous/severe weather procedures;

ii) auditing/inspecting the work area(s);

iii) planning for the evacuation of personnel away from lightweight modular offices, trailers and home-size buildings as these buildings offer no protection from tornadoes;

iv) procuring and maintaining the necessary equipment (e.g., two-way radios, hand-held and base NOAA weather radios with alarms, cellular phones, alarm system, disaster supplies, flashlights, first aid kit, etc.);
v) conducting the necessary emergency drills; and
vi) assigning certain responsibilities to CRA Site personnel (contacting field crew, monitoring weather forecasts and emergency notifications, communicating with GM Bedford Facility's Plant Security, provide warnings and evacuation notices, etc.). The Site Emergency Coordinator will ensure that CRA monitors the NOAA weather radio(s) and the Facility two-way radio any time severe weather threatens the Facility/Site.

Tornadoes occur most frequently between April and October from 3:00 to 7:00 P.M. but can occur any time. In most cases, tornadoes move from a west/southwest direction. A typical tornado is a swirling storm of short duration with winds up to 300 miles per hour and a near vacuum at its center. It appears as a rotating funnel-shaped cloud, from gray to black in color, extending towards the ground from the base of a thundercloud. Tornadoes usually only cover a limited geographical area and give off a roaring sound. A tornado is the most concentrated and destructive potential weather event at the Site. Tornadoes are usually the result of the interaction of a warm, moist air mass with a cool or cold air mass. Secondary effects of tornadoes include flash flooding, electric power outages, transportation-system and communication-system disruption, and fires.
Whenever weather conditions develop that indicate tornadoes are expected, the National Weather Service will issue a tornado watch to alert people in a designated area for a specific time period (normally six hours) to remain alert for approaching storms. The tornado watch is upgraded to a tornado warning when a funnel cloud (tornado) is actually sighted or indicated by weather radar.

When a tornado is approaching Site personnel will only have a short time to react. Therefore CRA personnel must be prepared to react during periods of severe weather. Memorize the following the tornado danger signs:

i) approaching clouds of debris can mark the location of a tornado even if a funnel cloud is not visible;
ii) before a tornado hits, the wind may die down and the air can become very still/calm; and
iii) it is not uncommon to see clear, sunlit skies behind a tornado as they usually occur at/near the trailing edge of thunderstorms.

1) **Tornado Evacuation Procedures (Tasks being conducted in close proximity of GM Facility)**

Plant Security continuously monitors weather related information provided by Weather Data Service. If Weather Data Service issues a tornado warning (an actual funnel cloud is heading in the direction of the GM Facility), Plant Security will activate the Facility emergency response plan. CRA will be notified verbally via the Facility two-way radio system by Plant Security. Note: Plant Security tornado notification will override all other radio transmissions.

The "take shelter" warning signal is a "slow wail" of the alarm system. This alarm will not be audible to all CRA personnel that are working near the plant. Therefore, two-way radios and cellular phones will be utilized to notify work crews of the need to take shelter. Check remote areas of the work zone(s) to ensure all personnel have reacted to the signal.

The tornado shelter most accessible to CRA personnel, and personnel occupying the adjacent trailer at GM Drive and 4th Street, is located at the wastewater treatment plant on the west side of GM Drive inside the building that is located immediately east of the primary clarifiers and west of the secondary clarifiers (see attached Location Figure). This shelter is not available if there is a power failure. In the case of a power failure the basement of the Oakland City University located on 4th Street in Bedford between I Street and J Street will be utilized. Personnel that occupy the trailer at GM Drive and Breckenridge Road will be directed to use the main security guard house at the north end of the GM plant building as their tornado shelter. Once inside the shelter, proceed to the basement and conduct a head count to ensure that all personnel are accounted for. In general, stay away from all windows and doors that lead to the outside. Remain in the shelter until the "all clear" signal is given by Plant Security. The "all clear" signal is a steady horn.

If unable to reach the designated shelter, refer to the emergency procedures listed in Section 2 of this addendum for personnel working in remote areas. The best protection in a tornado is usually an underground area. If an underground area is not available, consider small interior rooms on the lowest floor without windows, hallways on the lowest floor away from doors and windows, rooms constructed with reinforced concrete/brick/block with a heavy concrete floor and roof, and protected areas away from doors and windows.

2) **Tornado Evacuation Procedures (Tasks being conducted in areas further from the GM Facility)**

Personnel working in remote areas away from the GM Facility will need to implement additional safety and emergency response procedures. As personnel have the potential to work in areas away from the main trailer complex/GM Facility without adequate protective structures (creek/stream and floodplain areas) they will depend on having adequate warning of approaching tornadoes. Field personnel will utilize the following procedures when severe weather threatens:

i) monitor weather broadcasts via hand-held battery operated NOAA weather radios;
ii) communicate with base station at CRA trailer complex via hand-held two-way radios and/or cellular telephones in order to have current weather data from GM Plant Security, etc.;
iii) stay alert for tornado warning signs and evacuate to the trailer complex during thunderstorms; and
iv) be aware of the potential for flooding (do not drive through areas with high ponding water).

If outdoors during a tornado, personnel should attempt to get inside a safe building. However if shelter is unavailable or there is no time to get indoors, personnel should lie in a ditch or low-lying crouch near a strong building/structure or rock formation (try to stay on the east side). Use arms to protect the neck and head. If traveling in a car/truck, never try to out drive a tornado as tornadoes can change direction and lift a car or truck into the air. Get out of the car immediately and seek shelter.

ADDENDUM NO. 2

FOR THE SITE HEALTH AND SAFETY PLAN

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MEMORANDUM

TO:	Jim McGuigan; Jeffrey Nichols	REF. NO.:	13968/rcc/88
FROM:	Jeffrey Maranciak, OHST (Project Industrial Hygienist)	DATE:	05/14/03
C.C.:	Peter Ramanauskis, U.S. EPA Brad Stimple, U.S. EPA John Gunter, IDEM Ed Peterson - General Motors Cheryl Hiatt - General Motors Laura Fitzpatrick - General Motors		

RE: ADDENDUM No. 2 for the Site Health and Safety Plan (HASP) at the General Motors Powertrain Bedford Plant located in Bedford, Indiana

This memorandum serves as an ADDENDUM to the Health and Safety Plan (HASP) (Conestoga-Rovers & Associates) for remedial and investigative activities being conducted at the General Motors Powertrain (GM) Bedford Plant (Facility) and surrounding areas (Site) located in Bedford, Indiana. This Addendum should be used in conjunction with the Site-Specific HASP. The applicability of this emergency protocol extends to all CRA personnel including CRA contractors and subcontractors. The following text presents additions to the health and safety requirements of the current HASP(s).

CRA will implement a materials handling plan that will address ergonomic concerns (proper lifting techniques, etc.) and the usage and selection of personal protective equipment (PPE) for the manual handling of materials. The CRA Project Manager will appoint a CRA Site Health and Safety Officer (HSO) as per the project HASP. The HSO will ensure compliance to the HASP and to this Addendum by ensuring that the following practices are followed:

i) properly training and briefing Site personnel on job-related hazards. This will include hazard recognition, hazard evaluation and hazard control procedures;
ii) conducting a task safety analysis with affected personnel prior to initiating material handling task(s) or other non-routine tasks/activities to determine required PPE, safe handling procedures and associated hazards; and
iii) using proper record-keeping procedures. This includes incident/accident reporting, accident investigations and reporting and subsequent investigation of all "near misses".

1.0 ERGONOMIC CONCERNS DEALING WITH MATERIALS HANDLING

Ergonomics is the science of adapting project activities to the Site personnel that will actually be completing the activity/task. Ergonomics allows personnel to work safely and efficiently by considering the limitations, physical characteristics and other human factors involved during task activities. In this section we will address problems commonly associated with ergonomics, risk factors and preventing these ergonomic problems (commonly referred to as musculoskeletal disorders [MSDs]). An MSD is an injury/disorder of the muscles, tendons, joints,

spinal column, and ligaments. (NOTE: This does not include injuries caused by slips, trips and falls. These hazards should be addressed in the task safety analysis.)

1.1 BACK DISORDERS

Back disorders are frequently caused by repeated lifting, sudden movements, whole body vibration, lifting and twisting movements, bending over for extended periods, poor physical condition, and bad posture. Lifting heavy and/or awkward objects during a single lift can cause back problems. However, most back problems result from cumulative trauma caused by minor strains accumulating over a period of time. Repetitive movements can irritate and weaken muscle and/or ligaments eventually causing a more serious injury. Tasks involving the frequent lifting of heavy objects present the highest risks for CRA Site personnel.

1.2 OTHER MSD DISORDERS

MSDs from manual lifting in the construction field usually involve the hands, wrists, neck, shoulders, upper/lower back, hips, and knees. The following list presents some of the more common MSDs:

i) sprains – injury/tear to a ligament;
ii) strains – injury to muscles;
iii) degenerative discs – damage to the spine;
iv) tendinitis – inflammation/soreness of tendons due to repeated movement;
v) carpal tunnel syndrome;
vi) thoracic outlet syndrome – hand and wrist nerve disorder; and
vii) carpet layer's knee – knee pain and sprains.

1.3 PREVENTION

Work practice controls for the task should be developed during the safety analysis. Personnel should be instructed on the proper posture for the task in order to alleviate stress and strain to the body.

1.3.1 PROPER LIFTING PROCEDURES

Proper lifting techniques can help you lift safely. When you are preparing to lift a load, check the load by testing the weight at one of the corners. Get help or use a device/machine if the load is too heavy. Do not be afraid to ask for help if the load looks too heavy.

Make sure route of travel is clear of debris and trash. There should be no slip, trip or fall hazards present. Check to make sure that there is enough room/space and that there are no obstructions or overhead hazards.

Always wear proper footwear to protect your feet and to avoid losing your footing. If the object has rough and/or sharp corners and edges wear suitable work gloves. Gloves will assist by providing a good grip (coupling factor) and by protecting the hands.

When attempting the lift, stand close to the load and center yourself over the load. Squat down and get a firm footing and a good grip on the object with feet apart (one foot should be slightly behind the other foot for good balance). As you rise, lift with your legs and keep the load as close to the body as possible. Remember that your legs are stronger than your arms.

When the lift has been made, do not twist or turn the body. If the load must be moved to the left or right, move/change the position of your feet to change direction. Twisting and turning with your back creates out-of-neutral forces that could injure your back. Carry the load as close as possible to your body. Do not carry a load above your head or on your side and never carry a load that is too heavy. Get help or get a machine such as a handcart, forklift, crane, etc.

Set the load down properly by reversing the lifting procedure (i.e., bend at the knees, use your legs instead of your back and arms, do not turn or rotate, etc.) The load should be touching the ground before you release control of it. Always push an object rather than attempting to pull it. Pushing puts less strain on the back.

1.3.2 OTHER PREVENTATIVE MEASURES

MSDs can be prevented through proper techniques (i.e., lifting, etc.), proper diet, exercise, and PPE. Examples of proper techniques and planning include obtaining tools include acquiring tools that are ergonomically designed. These include tools that have full hand grips instead of pinch grips, knives and other cutting utensils with ergonomically designed handles, cutting and shearing tools with long handles to increase leverage and power and the distance between the person and the object being cut, and shovels with curved handles to alleviate back strain.

Exercise and the proper diet can assist in the prevention of MSDs by maintaining an overall health body. Personnel should drink 8 glasses of water a day to remain hydrated. This will reduce tearing injuries and prevent stiffness in the muscles, joints and ligaments. A well balanced diet is important to maintain optimal physical and mental function. Caffeine intake should be modified as caffeine increases muscle sensitivity to pain. Additionally, exercise will strengthen your body and increase the body's flexibility. A strong, flexible body is less apt to become injured.

Back belts are used mostly in general industry but are becoming common in the construction industry as well. Short-term studies indicate that the use of back belts provides a significant reduction in back injuries. Back belts are not considered PPE.

2.0 PERSONAL PROTECTIVE EQUIPMENT

The use of personal protective equipment (PPE) will complement the ergonomic solutions and other measures (engineering and administrative controls) implemented by CRA during manual material handling operations. PPE provides a barrier between the worker and the hazard source (sharp edge, hard surface, etc.). Safety shoes, gloves and hard hats are examples of required PPE when handling materials manually. However, for any given situation the proper PPE should be selected so that personnel are properly protected. Over-protection as well as under-protection should be avoided as both instances can be hazardous.

Training involving PPE should include the following: when PPE is necessary; what PPE is necessary; how to wear the required PPE; limitations of PPE; and the proper care/maintenance of PPE.

Hardhats are to be worn to protect against injuries caused by the impact and penetration of falling or flying objects and to prevent unprotected heads from bumping into fixed objects. Eye and face protection will be worn to protect against hazards from flying objects during material handling activities (i.e., cutting metal banding, straps, rope, etc.).

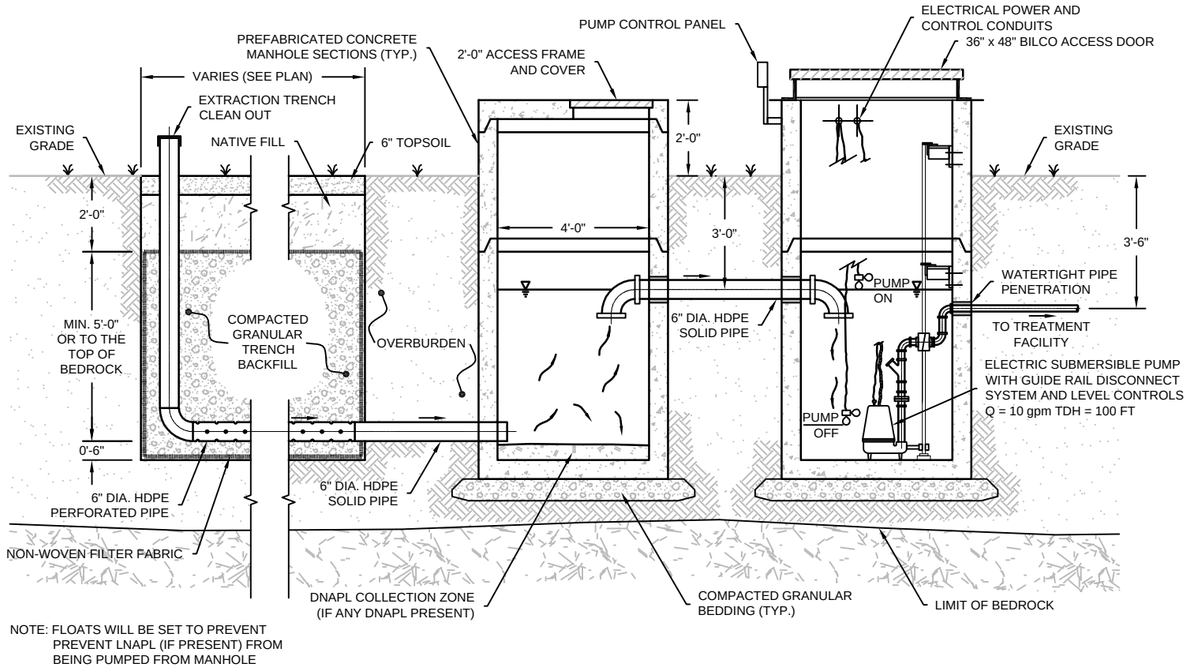
Hand protection is the most important form of PPE when handling materials manually. The Site HSO will select the appropriate hand protection for the task/activity. Gloves are often relied upon to prevent against abrasions, cuts and burns during material handling activities and many types of gloves actually improve your grip factor. Therefore, it is most important that the most appropriate glove (leather, cotton, kevlar, metal mesh, nitrile, etc.) is selected for the given situation. The following table presents protection factors for commonly used gloves.

Type of Glove	**Protection**
Rubber	Acids, bases, alcohol – moderate resistance to cuts.
Canvas or cloth	Dirt, wood slivers, sharp edges – some resistance to cuts.
Metal mesh or kevlar	Highly resistant to cuts and scratches and caught between hazards (crushing, etc.)
Insulated	Electrical charges
Cuffed	Protects against liquids trickling into glove and protects the wrist/forearm area from cuts and abrasions.
Leather	Moderate resistance to cuts and abrasions and caught between hazards.

It is important to wash hands frequently when wearing gloves to prevent the build-up of sweat and dirt on the hands. Check gloves regularly for cracks, holes and rips/tears. Keep gloves clean and dry as much as possible.

APPENDIX B

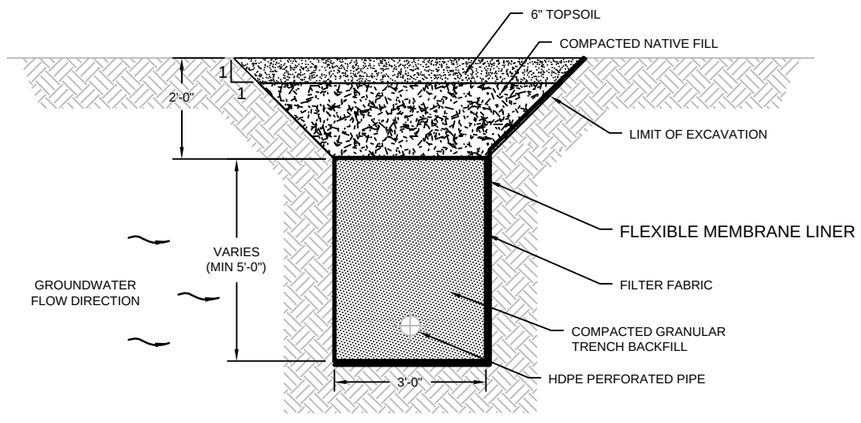
TYPICAL SEEP/SPRING CONTROL MEASURES



NOTE: FLOATS WILL BE SET TO PREVENT PREVENT LNAPL (IF PRESENT) FROM BEING PUMPED FROM MANHOLE

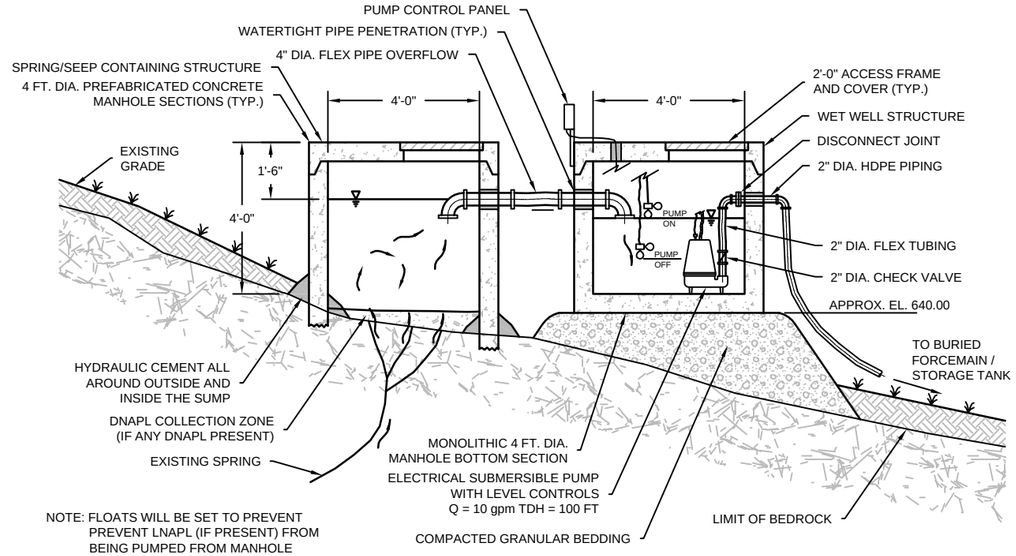
TYPICAL OVERBURDEN SEEP / SPRING CONTROL STRUCTURE DETAIL

SCALE: 1" = 4'



TYPICAL GROUNDWATER COLLECTION TRENCH

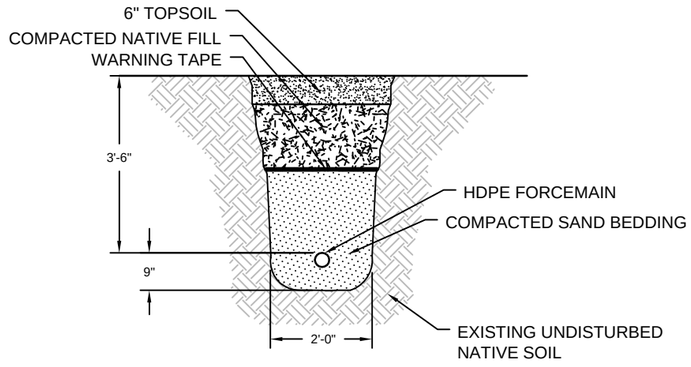
N.T.S.



NOTE: FLOATS WILL BE SET TO PREVENT PREVENT LNAPL (IF PRESENT) FROM BEING PUMPED FROM MANHOLE

TYPICAL BEDROCK SEEP / SPRING CONTROL STRUCTURE DETAIL

SCALE: 1" = 4'



TYPICAL FORCEMAIN

N.T.S.

figure B-1

TYPICAL DETAILS
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

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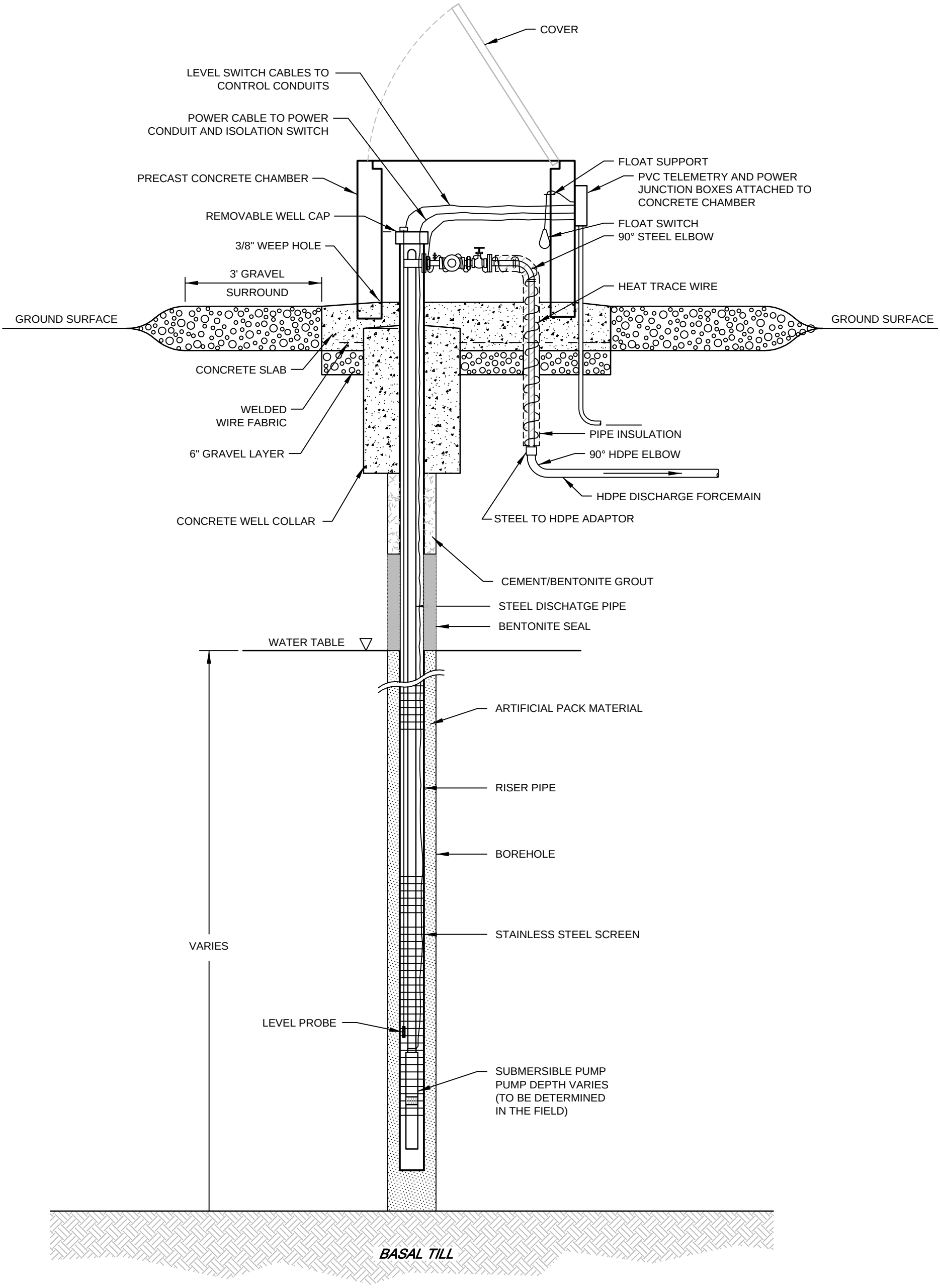

TYPICAL EXTRACTION WELL CHAMBER SECTION

N.T.S.

figure B-2

TYPICAL DETAIL
SITE SOURCE CONTROL WORK PLAN
GM BEDFORD REMOVAL ACTION
Bedford, Indiana

APPENDIX C

PHOTOGRAPHIC LOG

PHOTO 1: VIEW OF SPRING 3-002

PHOTO 2: VIEW OF SPRING 004 (5046)

PHOTOS 1 & 2
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 3: VIEW OF EASTERN SEEP AREA 01

PHOTO 3
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 4: VIEW OF SEEP 5013

PHOTO 4
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 5: VIEW OF SPRING -009 (5048)

PHOTO 5
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 6: VIEW OF SPRING 1459 (5032)

PHOTO 6
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 7: VIEW OF SPRING EAST SIDE OF CREEK

PHOTO 7
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 8: VIEW OF SPRING -734 (5051)

PHOTO 8
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 9: VIEW OF SPRING -5055

PHOTO 9
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 10: VIEW OF SPRING -028-001

PHOTO 10
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 11: VIEW OF SPRING -028-002

PHOTO 11
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 12: VIEW OF SPRING -1468 (5049)

PHOTO 12
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 13: VIEW OF SPRING -1572

PHOTO 13
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 14: VIEW OF SPRING -021

PHOTO 14
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana

PHOTO 15: VIEW OF SPRING -910 (5014/5015)

PHOTO 15
SITE SOURCE CONTROL WORK PLAN
CREEK AREA INTERIM MEASURES
Bedford, Indiana