RCRA FACILITY INVESTIGATION (RFI)
WORK PLAN ADDENDUM NO. 8

GM POWERTRAIN BEDFORD FACILITY
105 GM DRIVE
BEDFORD, INDIANA

EPA ID# IND006036099

MARCH 11, 2005
REF. NO. 13968 (121)
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LIST OF ACRONYMS

Agreement	Performance Based RCRA Corrective Action Agreement
AOI	Area of Interest
bgs	below ground surface
cfs	Cubic Feet per Second
cm/s	centimeters per second
CRA	Conestoga-Rovers and Associates
Facility	GM Powertrain Bedford Facility
GM	General Motors Corporation
ID	inside diameter
ml	milliliters
MSDS	Material Safety Data Sheet
ppt	parts per trillion
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SOW	Scope of Work
U.S. EPA	United States Environmental Protection Agency
Work Plan	RFI Work Plan: Addendum No. 8

1.0 INTRODUCTION

This document presents Addendum No. 8 to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan (RFI Work Plan (CRA, October 2001)) for the General Motors Corporation (GM) Powertrain Bedford Facility (Facility) located in Bedford, Indiana (U.S. EPA ID# IND006036099).

1.1 GENERAL

The Facility is located at 105 GM Drive, Bedford, Lawrence County, Indiana, 47421 (Figure 1.1). The Facility produces aluminum casting products, such as transmission cases, pistons, and engine blocks. Major aluminum production processes include die casting and permanent molding. The Facility has been operating as an aluminum foundry since 1942, with major facility modifications completed in 1950, 1953, 1966, 1971, 1974, 1977, 1979, and 1980.

The Facility, located on 152.5 acres, contains approximately 915,000 square feet of floor space and employs approximately 1,000 people.

1.2 RFI APPROACH

GM signed a Performance-Based RCRA Corrective Action Agreement (Agreement) with the United States Environmental Protection Agency (U.S. EPA) for the Facility on March 20, 2001, as amended on October 1, 2002. The signed Agreement states that GM will work with the U.S. EPA to identify and define the nature and extent of releases of hazardous waste and/or hazardous constituents at or from the Facility.

1.3 PURPOSE

The purpose of RFI Work Plan Addendum No. 8 (Work Plan) is to propose two separate dye tracer tests to be conducted on the Facility property. These additional areas located to the east of GM Drive have been identified through historical research and through recent implementation of the RFI at the Facility. The first area to be tested is the Former North Disposal Area, Area of Interest (AOI) 4; and the second area to be tested will be the Former Fire Training and Sludge Disposal Area, AOI 6. The historical operations at each of these AOIs can be found in the Current Conditions Report (CRA, May 2001). Figure 1.2 shows the locations of all AOIs at the Facility.

2.0 SCOPE OF WORK

The following presents the details of the proposed Scope of Work (SOW).

2.1 AOI 4: NORTH DISPOSAL AREA

This area consists of groundwater within both the overburden/fill and the shallow bedrock, therefore two dyes will be utilized simultaneously to investigate the groundwater flow within each of these units. The two dyes will be Rhodamine WT and Fluoroscein, which fluoresce at significantly different wavelengths so that potential interference will be minimized.

2.1.1 DYE INJECTION

Up to 1,000 milliliters (mL) of Fluoroscein (approximately 450 grams) will be injected at the overburden monitoring well TMW-X193Y251. The dye will be flushed after injection with up to 75 gallons of water. The Fluoroscein dye fluoresces at an approximate wavelength of 510 (+/-5) nanometers. This injection well is a two-inch inside diameter (ID), polyvinyl chloride (PVC) well that is screened from 26 feet below ground surface (bgs) to 31 feet bgs within the fill materials. The minimum depth to groundwater, during the monitoring period between June 24, 2002, and September 23, 2004, was 25.7 feet bgs; the maximum depth to water was 29.2; and the average is 26.6 feet bgs. Hydraulic conductivity testing (slug test) at this well was completed on October 3, 2002, yielding an approximate value of 1.8×10^{-4} centimeters per second (cm/s).

Up to 1,000 mL of Rhodamine WT (approximately 450 grams) will be simultaneously injected at a location hydraulically upgradient of first injection point. The dye will be flushed after injection with up to 75 gallons water. Rhodamine WT dye fluoresces at an approximate wavelength of 570 (+/-5) nanometers. This second site will be at the shallow bedrock monitoring well MW-X143Y245S, which is an open bedrock well from 10 to 20 feet bgs. The minimum depth to groundwater at this location, during the monitoring period between June 24, 2002, and September 23, 2004, was 8.77 feet bgs; the maximum depth to water was 23.94 feet bgs; and the average is 14.96 feet bgs. Figure 2.1 presents the hydrograph for this monitoring well. Hydraulic conductivity testing (straddle-packer test) at this well was completed on July 30, 2002, yielding an average value of $<1.5 \times 10^{-7}$ cm/s (the limit of testing). However, this was the only interval at this monitoring well that was selected for testing, and review of the Figure 2.1 suggests that there are fractures intersecting this well which transmit groundwater (i.e., the

degree of fluctuation of the groundwater levels suggests a connection with groundwater).

2.1.2 DYE RECOVERY MONITORING

2.1.2.1 MONITORING LOCATIONS

Figure 2.2 presents the proposed dye recovery monitoring locations for the dye trace test which will be conducted at AOI 4. These locations were selected based on known monitoring well performance, spring locations, property access, Removal Action activity status, and to some extent the results of the previous dye tracer testing completed at the Facility. A new monitoring location will also be installed at the base and within the footprint of the former quarry, in the northeastern portion of AOI 4.

Three methods of sample collection will be used during the dye trace testing: water grab samples, passive detectors, and ISCO continuous water samples. A passive detector is a material such as activated charcoal that allows the dye to accumulate on its surface over time. This method allows dye detection for very low concentrations in water. The charcoal samples are washed and covered with a mixture of ammonium hydroxide, ethanol, and distilled water for three hours. After the three-hour period, the resulting solution is analyzed for the presence of the dye. Charcoal packages are best used to establish either the absence or presence of dye at a monitoring location, while grab samples are best used to establish a dye concentration in water. Both types of sampling will be utilized in this study, along with automated water sample collection using ISCO devices.

2.1.2.2 MONITORING FREQUENCY

Table 2.1 presents the proposed dye recovery monitoring points and type of sampling to be conducted during this dye trace test.

The dye recovery sampling frequency will be as follows: at a minimum, samples will be collected at the two ISCO auto-samplers every 30 minutes (beginning at the time of injection), for the first 24-hour period, then every hour until dye is visibly, or analytically, detected at that sampling location. The frequency of sample collection will then be reduced based on the performance of the overall testing. Grab samples will be collected every six hours (beginning at the time of injection) for the first three days (or less, depending upon the performance of the testing). Grab sample frequency will then

be decreased to every twelve hours for the next two days; daily for the following two days; then weekly until the end of the testing period. Charcoal packets, at a minimum, will be collected and analyzed twice per week for the first two weeks, then weekly until the test completion (anticipated to be a maximum of six weeks for total test duration).

2.2 AOI 6: FORMER FIRE TRAINING AND SLUDGE DISPOSAL AREA

Another dye trace test will be conducted following completion of the testing at AOI 4. This second dye trace test will be conducted through injection of Fluorscein dye at a newly installed injection point. A new injection point is required at this AOI as an existing location does not currently exist. This injection point will be installed within the shallow bedrock aquifer at the proposed location MW-X200Y131 (presented on Figure 2.3). The details of this installation are provided below.

2.2.1 DYE INJECTION WELL INSTALLATION

A new well will be installed at AOI 6, at the location presented on Figure 2.3, for the purpose of use as a dye injection point. This dye injection well will be installed similarly to previously installed bedrock monitoring wells across the Facility (e.g., the overburden material will be cased with a large diameter steel casing, grouted into place prior to further advancement into the bedrock). The bedrock at this location will be core using the HQ wireline coring barrel to a maximum depth that correlates to competent rock. Competent rock will be determined based on two consecutive, five feet long core runs of 100% rock quality index. Upon reaching the total depth, the borehole will be thoroughly flushed and the entire length of bedrock will be tested for hydraulic properties using the straddle-packer method. The test intervals will be ten feet long and each interval will overlap the previous interval by approximately one foot.

If, upon reaching the total intended depth and completion of the straddle-packer testing, no water-bearing, permeable fractures are encountered, the borehole will be properly abandoned. A new location will then be proposed to the U. S. EPA and advancement of a new potential dye injection well will commence.

All installation, completion, sampling, QA/QC, and testing procedures will follow the procedures set forth in the RFI Work Plan (CRA, October 2001). The dye injection well will be developed through flushing of the borehole upon completion of the drilling and the well will be sampled no sooner than two weeks after development (if sufficient water is available and parameter stabilization is achieved during purging).

2.2.2 DYE INJECTION

Up to 1,000 of Fluoroscein (approximately 450 grams) will be injected into the newly installed dye injection well (this amount may be adjusted depending upon the results of the testing completed at AOI 4). The dye will be flushed after injection with up to 75 gallons of water.

2.2.3 DYE RECOVERY MONITORING

2.2.3.1 MONITORING LOCATIONS

Figure 2.3 presents the proposed dye recovery monitoring locations for the dye trace test which will be conducted at AOI 6. These locations were selected based on known monitoring well performance, spring locations, property access, Removal Action activity status, and to some extent the results of the previous dye tracer testing completed at the Facility. Some locations may be altered depending upon the results of the testing completed at AOI 4 described above.

2.2.3.2 MONITORING FREQUENCY

Table 2.2 presents the proposed dye recovery monitoring points and type of sampling to be conducted during this dye trace test.

The dye recovery sampling frequency will be as follows: at a minimum, samples will be collected at the two ISCO auto-samplers every 30 minutes (beginning at the time of injection), for the first 24-hour period, then every hour until dye is visibly, or analytically, detected at that sampling location. The frequency of sample collection will then be reduced based on the performance of the overall testing. Grab samples will be collected every six hours (beginning at the time of injection) for the first three days (or less, depending upon the performance of the testing). Grab sample frequency will then be decreased to every twelve hours for the next two days; daily for the following two days; then weekly until the end of the testing period. Charcoal packets, at a minimum, will be collected and analyzed twice per week for the first two weeks, then weekly until the test completion (anticipated to be a maximum of six weeks for total test duration).

2.3 LABORATORY PROCEDURE

All samples (grab, charcoal, or ISCO) will be analyzed on a RF 5301 PC scanning spectrofluorophotometer. The instrument can detect dyes in the parts per trillion (ppt) ranges. It produces a fluorogram of intensity vs. wavelength (nanometers) for each sample analyzed. The intensity will be converted to concentration allowing for construction of a breakthrough curve of time vs. concentration. Water samples allow for construction of the breakthrough curve that can give an accurate time of arrival, apparent velocity and information concerning the mode of transport. If the breakthrough curve is a sharp peak of short duration it indicates rapid flow along a fracture. Broader peaks with a long duration indicate a more diffuse pathway of groundwater flow. A table of common dyes and the wavelength for fluorescence is given in Table 2.3. The dyes that will be used for these tests are described above.

A calibration curve will be constructed for aqueous dye solutions, for the elutant in equilibrium with charcoal samples, for the dye in elutant, and for the dye in water. The instrumentation parameters will be 5 x 5 for both water and charcoal. In addition, blanks will be employed for both water and charcoal as well as a daily mid-range dye standards

3.0 REPORTING AND SCHEDULE

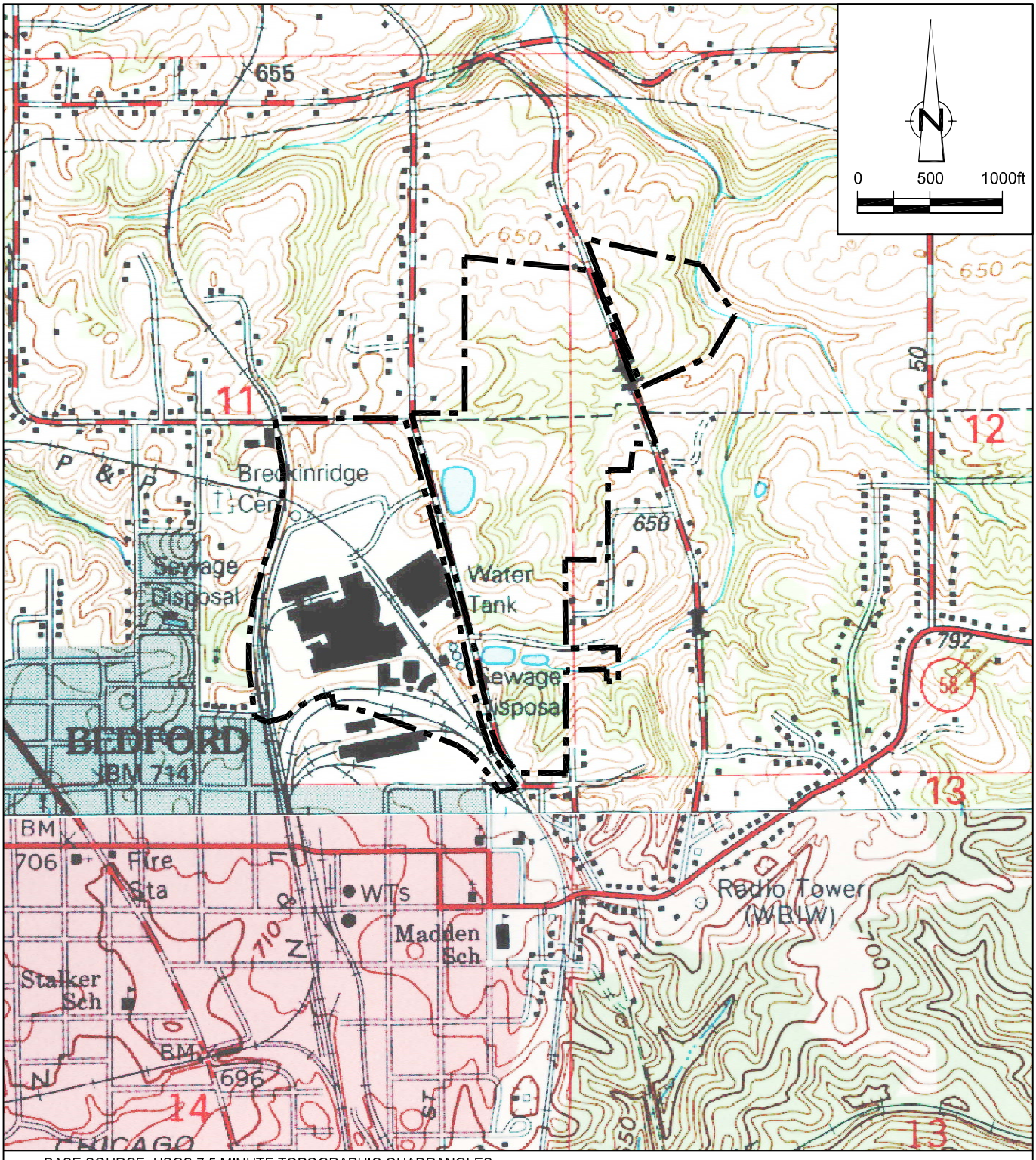
The dye trace test at AOI 4 will be initiated in January 2005. Persistent freezing weather conditions prior to, or during the anticipated test date, may delay the testing until a prolonged thaw takes place (freezing weather may affect the recovery sampling equipment and may affect the proposed seep and spring sampling locations). The installation of the dye injection well at AOI 6 will begin within three weeks of approval of this Work Plan. A minimum of a one-month time span between the completion of the test at AOI 4 and the beginning of the test at AOI 6 will be required to ensure that the first injected dyes have had a chance to clear of the overburden and shallow bedrock system.

Upon completion of all field activities and upon receipt of all final, validated analytical data, the information will be submitted to U.S. EPA.

4.0 REFERENCE

CRA, May 2001, Current Conditions Report, GM Powertrain Bedford Facility, Bedford, Indiana.

CRA, October 2001, RFI Work Plan, GM Powertrain Bedford Facility, Bedford, Indiana.



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES;
BARTLETTSVILLE, INDIANA 1994
BEDFORD EAST, INDIANA 1978
BEDFORD WEST, INDIANA 1993
OOLITIC, INDIANA 1987

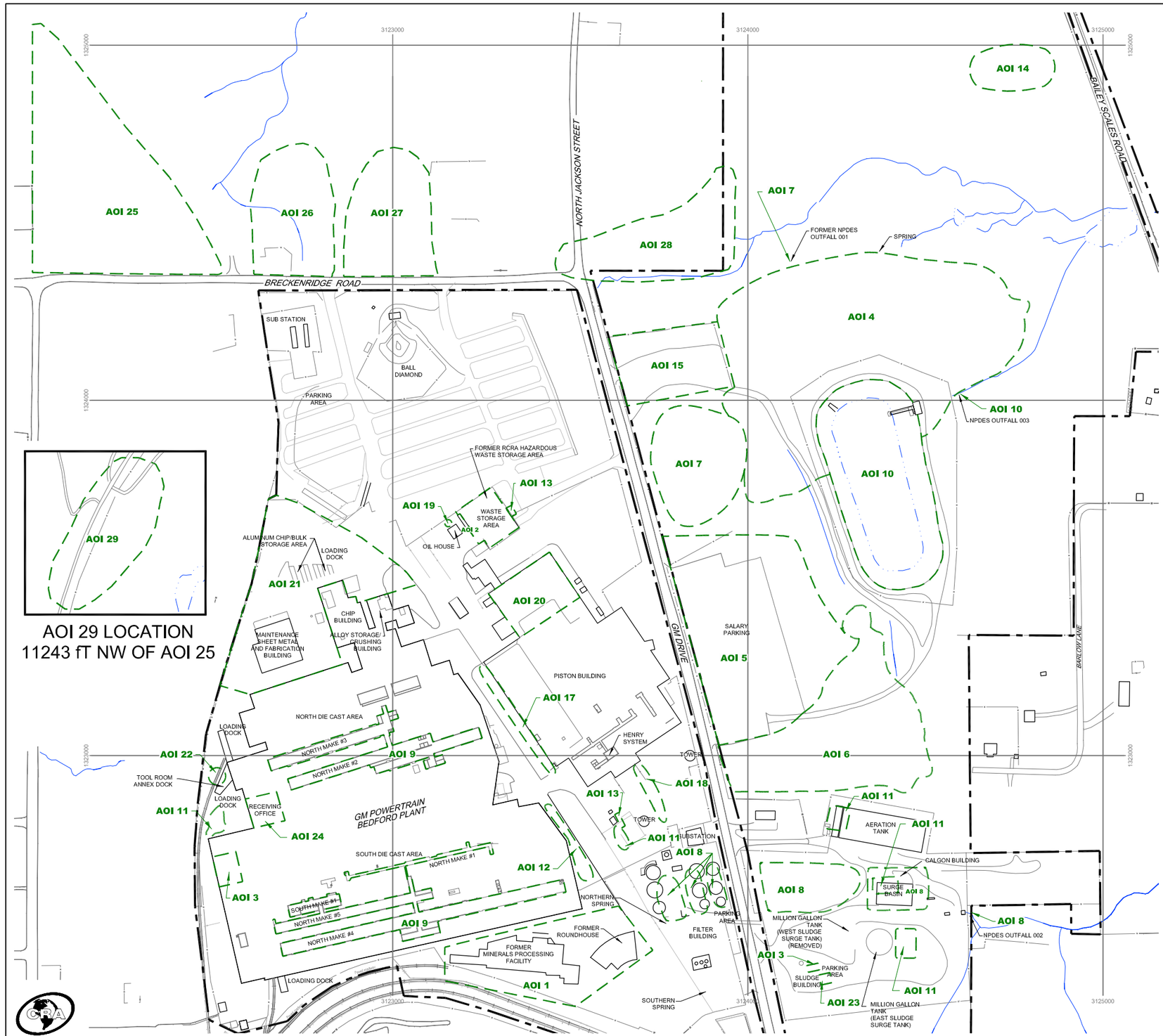
LEGEND

FACILITY BOUNDARY

figure 1.1

SITE LOCATION
GM POWERTRAIN BEDFORD FACILITY
Bedford, Indiana

13968-00(121)GN-WA006 MAR 11/2005



AOI 29 LOCATION
11243 fT NW OF AOI 25

LEGEND

- AOI BOUNDARY
- APPROXIMATE GM PROPERTY BOUNDARY
- STREAMS
- FENCE LINE
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS

AOI SUMMARY

AOI ID Description

AOI 1 Former Railroad Operations and Minerals Processing Facility
AOI 2 Waste Storage Area
AOI 3 PCB Storage Areas
AOI 4 Former North Disposal Area
AOI 5 Former East Sand Disposal Area
AOI 6 Former Sludge Disposal and Fire Training Area
AOI 7 Former North Lagoon and Outfall 001
AOI 8 Former South Lagoons and Outfall 002
AOI 9 Service Tunnels
AOI 10 Existing Stormwater Lagoon and Outfall 003
AOI 11 Aboveground Storage Tanks
AOI 12 Area Affected by the Reclaimed Hydraulic Fluid Release
AOI 13 Underground Storage Tanks
AOI 14 McBride Cows Disposal Area
AOI 15 Former Equipment Storage Area
AOI 17 Piston Building Oil Accumulations
AOI 18 Area Affected by the Henry System Discharge
AOI 19 Area Affected by Paint and Thinner Spill
AOI 20 Northern Portion of the Piston Building
AOI 21 Filled Ravine North of Die Cast Building
AOI 22 Tool Room Annex Dock Release
AOI 23 Area Affected by the 1996 Wastewater Treatment Filter Cake Release
AOI 24 Area Affected by the June 2000 Die Lube 5150 Release
AOI 25 Off-Site Fill Area - Parcel 398
AOI 26 Off-Site Fill Area - Parcels 384 & 386
AOI 27 Off-Site Fill Area - Parcels 381 & 382
AOI 28 Off-Site Fill Area - Parcel 401
AOI 29 Off-Site Fill Area - Parcel 39

figure 1.2

AOI LOCATIONS
GM POWERTRAIN BEDFORD FACILITY
Bedford, Indiana

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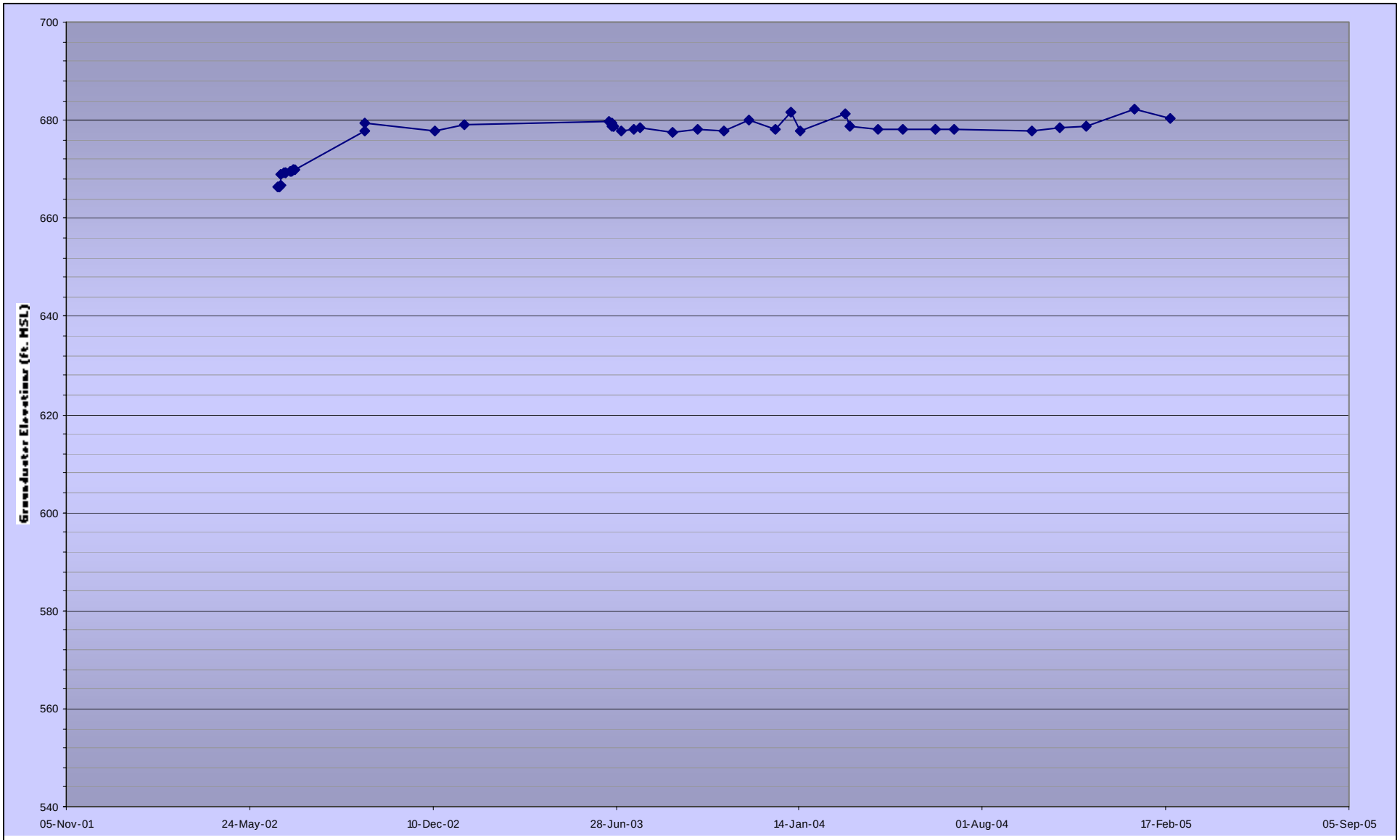
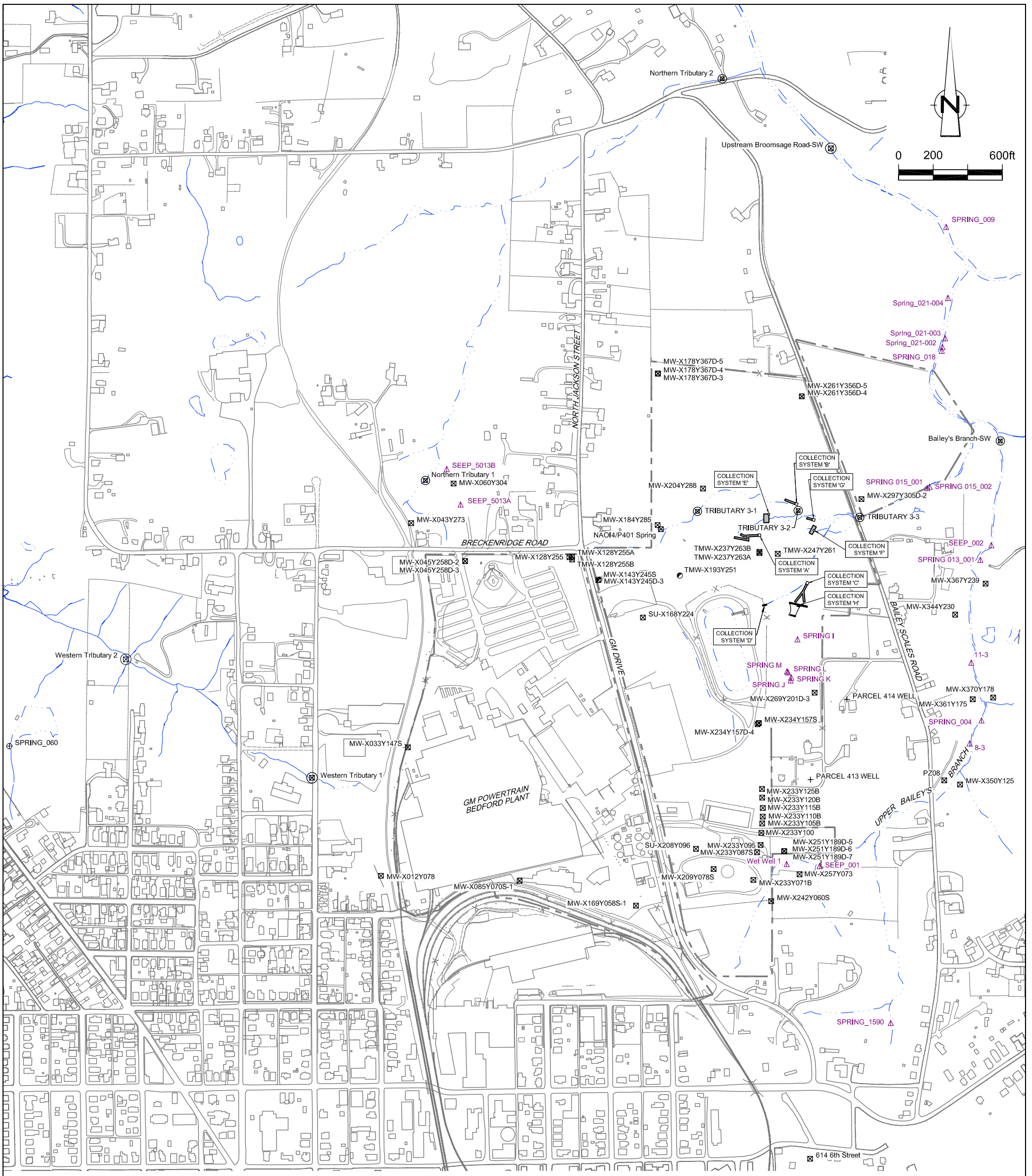


figure 2.1

GROUNDWATER ELEVATION HYDROGRAPH: MW-X143Y245S
GM POWERTRAIN BEDFORD FACILITY
Bedford, Indiana



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

LEGEND

- EXISTING BUILDINGS
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- SSC COLLECTION/EXTRACTION TRENCH
- SSC SUMP STRUCTURE
- SPRING SAMPLE LOCATION
- GRAB AND PORT SAMPLE LOCATIONS
- SURFACE WATER SAMPLE LOCATION
- INJECTION WELL LOCATION

NOTE:

(1) PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. LOCATIONS MAY NOT ACCURATELY REPRESENT THE TRUE BOUNDARIES.

figure 2.2

PROPOSED INJECTION AND MONITORING LOCATIONS - AOI 4
GM POWERTRAIN BEDFORD FACILITY
Bedford, Indiana

CRA

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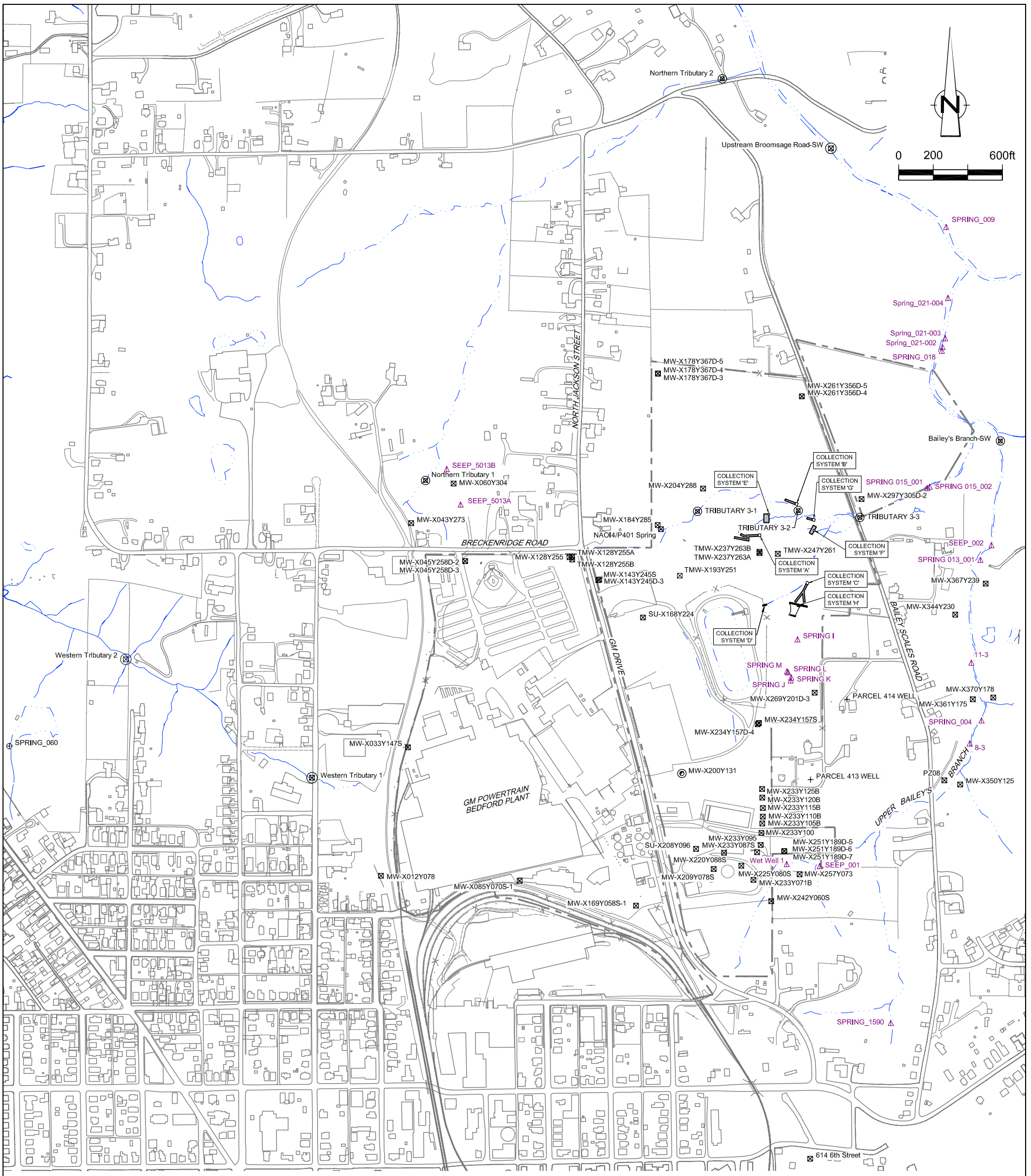

SOURCE: BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001.

LEGEND

- EXISTING BUILDINGS
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- SSC COLLECTION/EXTRACTION TRENCH
- SSC SUMP STRUCTURE
- SPRING SAMPLE LOCATION
- GRAB AND PORT SAMPLE LOCATIONS
- SURFACE WATER SAMPLE LOCATION
- PROPOSED INJECTION WELL

NOTE:

(1) PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. LOCATIONS MAY NOT ACCURATELY REPRESENT THE TRUE BOUNDARIES.

figure 2.3

PROPOSED INJECTION AND MONITORING LOCATIONS - AOI 6
GM POWERTRAIN BEDFORD FACILITY
Bedford, Indiana

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TABLE 2.1

PROPOSED DYE RECOVERY MONITORING LOCATIONS – AOI 4
GM POWERTRAIN BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location	*Sample Type*	*Backup*	*Comment*
Monitoring Well Locations (Open)			
TMW-X193Y251	**Injection Well** - Fluoroscein		Overburden Monitoring Well
MW-X143Y245S	**Injection Well** - Rhodamine WT		Shallow Bedrock Monitoring Well
MW-X012Y078	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
MW-X033Y147S	Grab (bailer)	Charcoal	
MW-X043Y273	Grab (bailer)	Charcoal	
MW-X060Y304	Grab (bailer)	Charcoal	
MW-X128Y255	Grab (bailer)	Charcoal	
TMW-X128Y255A	Grab (bailer)	Charcoal	
TMW-X128Y255B	Grab (bailer)	Charcoal	
MW-X184Y285	Grab (bailer)	Charcoal	
MW-X204Y288	Grab (bailer)	Charcoal	
MW-X209Y078S	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
MW-X233Y071B	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
MW-X233Y087S	Grab (bailer)	Charcoal	
MW-X233Y095	Grab (bailer)	Charcoal	
MW-X233Y100	Grab (bailer)	Charcoal	
MW-X233Y105B	Grab (bailer)	Charcoal	
MW-X233Y110B	Grab (bailer)	Charcoal	
MW-X233Y115B	Grab (bailer)	Charcoal	
MW-X233Y120B	Grab (bailer)	Charcoal	
MW-X233Y125B	Grab (bailer)	Charcoal	
MW-X234Y157S	Grab (bailer)	Charcoal	
TMW-X237Y263A	Grab (bailer)	Charcoal	
TMW-X237Y263B	Grab (bailer)	Charcoal	
MW-X242Y060S	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
TMW-X247Y261	Grab (bailer)	Charcoal	
MW-X257Y073	Grab (bailer)	Charcoal	
MW-X344Y230	Grab (bailer)	Charcoal	
MW-X350Y125	Grab (bailer)	Charcoal	
MW-X361Y175	Grab (bailer)	Charcoal	
MW-X367Y239	Grab (bailer)	Charcoal	
MW-X370Y178	Grab (bailer)	Charcoal	
Parcel 413 Well	Grab (bailer)	Charcoal	
Parcel 414 Well	Grab (bailer)	Charcoal	Converted Residential Well
PZ08	Grab (bailer)	Charcoal	Piezometer Location
Monitoring Well Locations (Waterloo System)			
MW-X045Y258D-2	Port Sample	None	
MW-X045Y258D-3	Port Sample	None	
MW-X085Y070S-1	Port Sample	None	from RFI Work Plan Addendum No. 5
MW-X143Y245D-3	Port Sample	None	
MW-X169Y058S-1	Port Sample	None	from RFI Work Plan Addendum No. 5
MW-X234Y157D-4	Port Sample	None	
MW-X269Y201D-3	Port Sample	None	
MW-X297Y305D-2	Port Sample	None	
MW-X178Y367D-3	Port Sample	None	
MW-X178Y367D-4	Port Sample	None	
MW-X178Y367D-5	Port Sample	None	
MW-X251Y189D-5	Port Sample	None	
MW-X251Y189D-6	Port Sample	None	
MW-X251Y189D-7	Port Sample	None	
MW-X261Y356D-4	Port Sample	None	
MW-X261Y356D-5	Port Sample	None	
Sumps			
SU-X168Y224	Grab (bailer)	None	
SU-X208Y096	Grab (bailer)	None	from RFI Work Plan Addendum No. 5, if no product is present
Individual Springs			
Seep_001	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
Seep_002	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
Spring_1590	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
Seep_5013A	Grab Sample	Charcoal	Dependent upon actual flow
Seep_5013B	Grab Sample	Charcoal	Dependent upon actual flow
NAOI4/P401 Spring	Grab Sample	Charcoal	Dependent upon actual flow
Spring_004	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
Spring_009	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
Spring_013-001	Grab Sample	Charcoal	Dependent upon actual flow
Sping_015-001	Grab Sample	Charcoal	Dependent upon actual flow
Sping_015-002	Grab Sample	Charcoal	Dependent upon actual flow
SPRING_018	Grab Sample	Charcoal	Dependent upon actual flow
Spring_021-002	Grab Sample	Charcoal	Dependent upon actual flow
Spring_021-003	Grab Sample	Charcoal	Dependent upon actual flow
Spring_021-004	Grab Sample	Charcoal	Dependent upon actual flow
Spring_060	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
Spring_I	Grab Sample	Charcoal	Dependent upon actual flow
Spring_J	Grab Sample	Charcoal	Dependent upon actual flow
Spring_K	Grab Sample	Charcoal	Dependent upon actual flow
Spring_L	Grab Sample	Charcoal	Dependent upon actual flow
Spring_M	Grab Sample	Charcoal	Dependent upon actual flow
614 6th Street	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5, Dependent upon actual flow
8-3	Grab Sample	Charcoal	Dependent upon actual flow
11-3	Grab Sample	Charcoal	Dependent upon actual flow
Site Source Control Collection Points (NAOI4)			
Collector System A (vault)	ISCO	Charcoal	
Collector System B (vault)	Grab Sample	Charcoal	
Collector System C (vault with Collector System D)	ISCO	Charcoal	Individual pipes from each Collector System will be sampled
Collector System D (vault with Collector System C)	Grab Sample	Charcoal	Individual pipes from each Collector System will be sampled
Collector System E (vertical pipe)	Grab (bailer)	Charcoal	
Collector System F (vertical pipe)	Grab (bailer)	Charcoal	
Collector System G (vault)	Grab Sample	Charcoal	
Collector System H	Grab Sample	Charcoal	
Wet Well 1	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5
Surface Water Grab Samples			
Tributary 3-1	Grab Sample	Charcoal	
Tributary 3-2	Grab Sample	Charcoal	
Tributary 3-3	Grab Sample	Charcoal	
Bailey's Branch-SW	Grab Sample	Charcoal	Upstream of Confluence with Tributary 3
Northern Tributary 1	Grab Sample	Charcoal	
Northern Tributary 2	Grab Sample	Charcoal	
Western Tributary 1	Grab Sample	Charcoal	
Western Tributary 2	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5
Upstream Broomsage Road-SW	Grab Sample	Charcoal	

TABLE 2.2

PROPOSED DYE RECOVERY MONITORING LOCATIONS – AOI 6
GM POWERTRAIN BEDFORD FACILITY
BEDFORD, INDIANA

Sample Location	*Sample Type*	*Backup*	*Comment*
Monitoring Well Locations (Open)			
MW-X200Y131	**Injection Well** - Fluoroscein		Shallow Bedrock Injection Well (To Be Installed)
MW-X012Y078	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
MW-X033Y147S	Grab (bailer)	Charcoal	
MW-X043Y273	Grab (bailer)	Charcoal	
MW-X060Y304	Grab (bailer)	Charcoal	
MW-X128Y255	Grab (bailer)	Charcoal	
TMW-X128Y255A	Grab (bailer)	Charcoal	
TMW-X128Y255B	Grab (bailer)	Charcoal	
MW-X143Y245S	Grab (bailer)	Charcoal	
MW-X184Y285	Grab (bailer)	Charcoal	
TMW-X193Y251	Grab (bailer)	Charcoal	
MW-X204Y288	Grab (bailer)	Charcoal	
MW-X209Y078S	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
MW-X220Y088S	Grab (bailer)	Charcoal	
MW-X225Y080S	Grab (bailer)	Charcoal	
MW-X233Y071B	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
MW-X233Y087S	Grab (bailer)	Charcoal	
MW-X233Y095	Grab (bailer)	Charcoal	
MW-X233Y100	Grab (bailer)	Charcoal	
MW-X233Y105B	Grab (bailer)	Charcoal	
MW-X233Y110B	Grab (bailer)	Charcoal	
MW-X233Y115B	Grab (bailer)	Charcoal	
MW-X233Y120B	Grab (bailer)	Charcoal	
MW-X233Y125B	Grab (bailer)	Charcoal	
MW-X234Y157S	Grab (bailer)	Charcoal	
TMW-X237Y263A	Grab (bailer)	Charcoal	
TMW-X237Y263B	Grab (bailer)	Charcoal	
MW-X242Y060S	Grab (bailer)	Charcoal	from RFI Work Plan Addendum No. 5
TMW-X247Y261	Grab (bailer)	Charcoal	
MW-X257Y073	Grab (bailer)	Charcoal	
MW-X344Y230	Grab (bailer)	Charcoal	
MW-X350Y125	Grab (bailer)	Charcoal	
MW-X361Y175	Grab (bailer)	Charcoal	
MW-X367Y239	Grab (bailer)	Charcoal	
MW-X370Y178	Grab (bailer)	Charcoal	
Parcel 413 Well	Grab (bailer)	Charcoal	
Parcel 414 Well	Grab (bailer)	Charcoal	Converted Residential Well
PZ08	Grab (bailer)	Charcoal	Piezometer Location
Monitoring Well Locations (Waterloo System)			
MW-X045Y258D-2	Port Sample	None	
MW-X045Y258D-3	Port Sample	None	
MW-X085Y070S-1	Port Sample	None	from RFI Work Plan Addendum No. 5
MW-X143Y245D-3	Port Sample	None	
MW-X169Y058S-1	Port Sample	None	from RFI Work Plan Addendum No. 5
MW-X234Y157D-4	Port Sample	None	
MW-X269Y201D-3	Port Sample	None	
MW-X297Y305D-2	Port Sample	None	
MW-X178Y367D-3	Port Sample	None	
MW-X178Y367D-4	Port Sample	None	
MW-X178Y367D-5	Port Sample	None	
MW-X251Y189D-5	Port Sample	None	
MW-X251Y189D-6	Port Sample	None	
MW-X251Y189D-7	Port Sample	None	
MW-X261Y356D-4	Port Sample	None	
MW-X261Y356D-5	Port Sample	None	
Sumps			
SU-X168Y224	Grab (bailer)	None	
SU-X208Y096	Grab (bailer)	None	from RFI Work Plan Addendum No. 5, if no product is present
Individual Springs			
Seep_001	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
Seep_002	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
Spring_1590	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
Seep_5013A	Grab Sample	Charcoal	Dependent upon actual flow
Seep_5013B	Grab Sample	Charcoal	Dependent upon actual flow
NAOI4/P401 Spring	Grab Sample	Charcoal	Dependent upon actual flow
Spring_004	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
Spring_009	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
Spring_013-001	Grab Sample	Charcoal	Dependent upon actual flow
Sping_015-001	Grab Sample	Charcoal	Dependent upon actual flow
Sping_015-002	Grab Sample	Charcoal	Dependent upon actual flow
SPRING_018	Grab Sample	Charcoal	Dependent upon actual flow
Spring_021-002	Grab Sample	Charcoal	Dependent upon actual flow
Spring_021-003	Grab Sample	Charcoal	Dependent upon actual flow
Spring_021-004	Grab Sample	Charcoal	Dependent upon actual flow
Spring_060	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
Spring_I	Grab Sample	Charcoal	Dependent upon actual flow
Spring_J	Grab Sample	Charcoal	Dependent upon actual flow
Spring_K	Grab Sample	Charcoal	Dependent upon actual flow
Spring_L	Grab Sample	Charcoal	Dependent upon actual flow
Spring_M	Grab Sample	Charcoal	Dependent upon actual flow
614 6th Street	Grab Sample	Charcoal	om RFI Work Plan Addendum No. 5, Dependent upon actual flo
8-3	Grab Sample	Charcoal	Dependent upon actual flow
11-3	Grab Sample	Charcoal	Dependent upon actual flow
Site Source Control Collection Points (NAOI4)			
Collector System A (vault)	ISCO	Charcoal	
Collector System B (vault)	Grab Sample	Charcoal	
Collector System C (vault with Collector System D)	ISCO	Charcoal	Individual pipes from each Collector System will be sampled
Collector System D (vault with Collector System C)	Grab Sample	Charcoal	Individual pipes from each Collector System will be sampled
Collector System E (vertical pipe)	Grab (bailer)	Charcoal	
Collector System F (vertical pipe)	Grab (bailer)	Charcoal	
Collector System G (vault)	Grab Sample	Charcoal	
Collector System H	Grab Sample	Charcoal	
Wet Well 1	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5
Surface Water Grab Samples			
Tributary 3-1	Grab Sample	Charcoal	
Tributary 3-2	Grab Sample	Charcoal	
Tributary 3-3	Grab Sample	Charcoal	
Bailey's Branch-SW	Grab Sample	Charcoal	Upstream of Confluence with Tributary 3
Northern Tributary 1	Grab Sample	Charcoal	
Northern Tributary 2	Grab Sample	Charcoal	
Western Tributary 1	Grab Sample	Charcoal	
Western Tributary 2	Grab Sample	Charcoal	from RFI Work Plan Addendum No. 5
Upstream Broomsage Road-SW	Grab Sample	Charcoal	

TABLE 2.3

COMMON DYES AND WAVELENGTHS
GM BEDFORD POWERTRAIN FACILITY
BEDFORD, INDIANA

COMMON DYES AND WAVELENGTHS	
Dye	***Wavelength (nanometers)***
Optical Brighteners	435±5 and 410±5
Direct Yellow	452±5
Fluorescein	510±518
Eosine	535±5
Rhodamine WT	577±5