

*June 6, 2001*

**STREAM INVESTIGATION WORK PLAN**

**GM POWERTRAIN – BEDFORD PLANT  
105 GM DRIVE  
BEDFORD, INDIANA**

**EPA ID# IND 006036099**

**Prepared For:  
GENERAL MOTORS CORPORATION**

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## **Exponent**

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# Contents

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	<u>Page</u>
<b>List of Figures</b>	<b>iii</b>
<b>Acronyms and Abbreviations</b>	<b>iv</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Objectives	1
1.2 Geographic Extent of the Study Area	1
<b>2 Technical Approach</b>	<b>3</b>
2.1 Characterization of Stream Habitat and Geomorphology	3
2.2 Sampling for Chemical Analysis	4
<b>3 Schedule and Deliverables</b>	<b>7</b>
<b>4 Reference</b>	<b>8</b>

## List of Figures

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- Figure 1. Stream investigation Study Area
- Figure 2. Anticipated sampling areas
- Figure 3. Detail of Eastern Drainage unnamed tributaries

*Figures are presented following the main text.*

## Acronyms and Abbreviations

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CSM	Conceptual Site Model
FSP	Field Sampling Plan
GPS	global positioning system
in.	inches
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
the Facility	the GM Powertrain – Bedford Plant
TOC	total organic carbon
U.S. EPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
Work Plan	Stream Investigation Work Plan

# 1 Introduction

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This Stream Investigation Work Plan (Work Plan) describes tasks to be performed in support of an investigation of the surface drainages downstream of the GM Powertrain – Bedford Plant (the Facility). The primary drainage of interest is the eastern drainage, comprised of unnamed tributaries leading from the Facility boundary to Bailey’s Branch of Pleasant Run Creek and eventually to Pleasant Run Creek and then Salt Creek (Figure 1). The Current Conditions Report for the Facility presents a summary of historical stream-related issues and stream investigations in the eastern drainage (CRA 2001). The smaller western drainage will also be evaluated, although no Facility-related issues are known to exist in the western drainage. This stream investigation proposed as part of the Facility Resource Conservation and Recovery Act Facility Investigation will build upon information generated during past investigations. The objectives and approach that will be used are described in this Work Plan.

## 1.1 Objectives

The objectives of the stream investigation include the following:

- Characterize ecological habitats and ecological and human receptor populations located downstream of the Facility that may potentially be exposed to residual hazardous constituents,
- Measure and characterize hazardous constituents and conventional parameters in surface water, sediments, and floodbank soils,
- Measure and characterize bioaccumulative hazardous constituents in fish tissue,
- Characterize stream geomorphology and sedimentation to develop an understanding of the transport and fate of residual hazardous constituents,
- Identify ecological and human health exposure pathways for hazardous constituents identified in the stream, and
- Identify and fill data gaps to support the assessment of exposure, potential effects, and ecological and human health risk from residual hazardous constituents in the stream drainages.

## 1.2 Geographic Extent of the Study Area

The Study Area consists of the following streams, which comprise the primary receiving drainage of surface runoff and historical discharges from the Facility (see Figure 2):

- The three unnamed tributaries on the east side of the Facility (see Figure 3), downstream of current and historical plant discharges (outfalls 002 and 003, and former outfall 001), to the confluence with Bailey's Branch of Pleasant Run Creek (Bailey's Branch). This area will also include seeps along the GM property boundary that discharge to the unnamed tributary,
- Bailey's Branch, from the confluence with the unnamed tributaries leading from the Facility to the confluence with Pleasant Run Creek,
- Pleasant Run Creek, from the confluence with Bailey's Branch to the confluence with Salt Creek,
- Salt Creek, near the confluence with Pleasant Run Creek, and
- The headwaters area of the small surface drainage located immediately west of the Facility, including seeps adjacent to the GM property boundary which feed this western drainage.

The eastern drainage Study Area was defined consistent with the focus of previous investigations. The western drainage has not been previously sampled. Sampling will be conducted in the headwaters near the Facility.

Reference locations will also be sampled. These may include upstream reaches of Bailey's Branch, Pleasant Run Creek, and Salt Creek. Additional reference streams may also be identified following initial field observations of stream habitat and geomorphology.

## 2 Technical Approach

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The field effort will be conducted in two stages:

1. Characterization and mapping of stream and riparian habitat and geomorphology, and identification of candidate sampling locations, and
2. Sampling and analysis of surface water, sediment, floodbank soils, and fish.

Elements of the technical approach are described in detail below.

### 2.1 Characterization of Stream Habitat and Geomorphology

A thorough field reconnaissance will be conducted, during which qualified stream ecologists will walk the entire Study Area drainage and identify and characterize aquatic, riparian, and floodplain habitats where ecological receptors may be exposed to hazardous constituents. Fish will be collected and released to describe the fish communities present and determine the most effective collection methods for subsequent sampling. A photographic log will be maintained and global positioning system (GPS) coordinates will be recorded for each habitat area and sampling location. These data, along with detailed field notes, will be used to create habitat maps of the Study Area. Recent aerial photographs will also be used to supplement information collected on the ground. Habitat maps will subsequently support development of a preliminary Conceptual Site Model (CSM) and Field Sampling Plan (FSP). The field team will also document and describe areas where human activity is likely to result in contact with surface water, sediment, and flood bank soils; and areas where fishing activity might occur. The following types of information will be collected during the field reconnaissance:

- **Habitat Mapping**—Bank and floodplain habitat will be mapped and stream bank characteristics will be described. Major aquatic habitat features such as pools, riffles, and runs, and floodplain habitat types will be mapped in the field using differential GPS. Major plant communities will be identified and described, and signs of wildlife (e.g., tracks, scat, and bird songs) will be documented.
- **Fish Community Evaluation**—Fish will be captured by electrofishing and seining. Individuals will be enumerated and their species and size will be recorded at each sampling location. Any incidence of gross abnormalities or lesions will be recorded. Fish will not be retained for analysis. Captured fish will be released in the location of capture.
- **Benthic Community Evaluation**—Benthic macroinvertebrates will be collected using kick nets, seines, and other manual techniques. Major benthic community assemblages will be identified and qualitatively characterized in terms of relative abundances and densities. No specimens will be retained.



- **Stream Geomorphology Mapping**—Stream morphology, relative flow rates and volumes, sediment characteristics, and depositional areas will be noted and mapped using GPS.
- **Human Access and Use Evaluation**—The characteristics of likely human access points will be described in field notes, including documentation of any evidence of use. At the most likely access locations, GPS coordinates will be recorded and photographs will be taken.

A photograph log will be kept for all field activities and appropriate photographs will be cross-referenced to habitat maps and locations where human access was evident or is likely.

## 2.2 Sampling for Chemical Analysis

Following the initial field reconnaissance activities, a preliminary CSM for the Study Area will be developed which describes potentially completed exposure pathways for ecological and human receptors to hazardous constituents detected in water, sediments, flood bank soils, and aquatic biota. Based on this analysis of transport and exposure pathways, a FSP will be developed that describes specific sample stations and numbers of samples to be collected for chemical analysis, as well as collection methods. The various media, analyses to be performed, and anticipated number of samples are described below. The exact number and location of samples presented below is subject to revision based on the findings of the field reconnaissance. Based on the current knowledge of the Study Area stream from previous investigations, probable sample locations are shown in Figure 2.

**Sediment**—Based on preliminary and historical observations of the stream characteristics in the Study Area, local depositional regimes are expected to vary widely. Much of the drainage, especially the upper reaches of Bailey's Branch and the unnamed tributaries leading from the Facility, are high-gradient streams with narrow, confined banks, bedrock streambeds, and little sediment. Information collected on stream geomorphology during the ecological reconnaissance will be used to identify areas where sediment deposition is likely. This information will be integrated with the habitat map to select potential sediment sampling locations. Stable depositional areas will be targeted for sampling in each Study Area stream.

Approximately 24 sediment stations are anticipated in the primary Study Area drainage. Station locations will be field located following the ecological reconnaissance, but are expected to include locations in the shaded areas shown in Figure 2. Anticipated sediment sampling will include:

- Approximately 4 stations in seep areas located east of the Stormwater Lagoon,
- Approximately 4 stations in Bailey's Branch Creek upstream of the Route 200 bridge,

- Approximately 4 stations in Bailey's Branch Creek between the Route 200 bridge and the confluence with Pleasant Run Creek,
- Approximately 8 stations in Pleasant Run Creek between the confluence with Bailey's Branch Creek and Salt Creek,
- Approximately 4 stations in Salt Creek, two upstream and two downstream of the confluence with Pleasant Run,
- Approximately 4 stations in the seeps and channels associated with the headwaters of the western drainage, and
- Approximately 4 to 8 reference stations will be selected in reaches of the Study Area streams which are either upstream of the influence of the Facility or in other drainages.

Discrete samples of surface sediment will be collected at each station using a grab sampler and/or push corer, as appropriate to the local conditions. The top 2 inches (in.) of sediment will be removed and submitted for analysis. Samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals (less the earth metals), as well as total organic carbon (TOC), and grain size.

**Surface Water**—Stream or seep water will be sampled at approximately 8 stations. Surface water stations will be located so as to be representative of the entire Study Area. Two rounds of water sampling will be conducted, one under low flow conditions and one under high flow conditions. Rainfall records for the Bedford area indicate that the highest average rainfall occurs during the months of May and July, though the stream flows may be expected to be high after any significant rainfall event. The lowest average rainfall occurs during the months of January and February, though low flow conditions may also occur at any time of the year during dry weather.

Unfiltered surface water samples will be collected and submitted for analysis of TCL VOCs, TCL SVOCs, TCL PCBs, and TAL metals (less the earth metals). Filtered samples will also be collected and submitted for analysis of TCL PCBs and TAL metals (less the earth metals). Water will also be analyzed for total Kjeldahl nitrogen, ammonia, pH, total suspended solids, total dissolved solids, and hardness (as calcium carbonate).

**Flood Bank Soils**—Areas of over-bank flow where fine-grained sediments may become deposited during flood events will be identified and targeted for sampling. Obvious areas where significant flood plains exist include the lower portion of Bailey's Branch, below the Route 200 crossing, and several reaches of Pleasant Run Creek, especially the area immediately downstream of the Peerless Road bridge. In flood plain areas, discrete stations will be sampled

along a line perpendicular to the stream channel (a transect). Along each transect, stations on each bank of the creek, and in the flood plain on each side of the creek will be sampled, as well as sediments from the stream channel (sediment samples are included in the totals described above). Each transect will thus consist of 4 to 6 flood bank and flood plain stations and one sediment station. It is anticipated that a total of 5 flood plain transects will be sampled.

At each flood plain sample station, the top 6 in. of soil will be sampled using a hand corer or hand auger. Samples will be analyzed for TCL VOCs, TCL SVOCs, TCL PCBs, TAL metals (less the earth metals), TOC, and grain size.

**Fish Tissue**—Fish will be collected using a backpack electroshocker or seine and a boat electroshocker (Salt Creek only). Collection methods will be selected in part based on the success experienced during the ecological reconnaissance sampling. Selected species of forage fishes will be targeted to be representative of the fish community present. When present, game fish of a size that is suitable for human consumption will also be collected.

Approximately 10 fish sampling locations will be identified in the primary Study Area, based on the ecological reconnaissance findings. Fish sampling locations are expected to include:

- Approximately 3 locations in Bailey's Branch,
- Approximately 5 locations in Pleasant Run Creek (including at least one upstream of the confluence with Bailey's Branch), and
- Two locations in Salt Creek, one upstream, and one downstream of the confluence with Pleasant Run Creek.

At least three reference locations will also be sampled in areas upstream of the influence of the Facility discharge and/or in other drainages.

Individual whole fish and (when present) game fish fillets will be analyzed for TCL PCBs, mercury, lipid, and moisture content.

### 3 Schedule and Deliverables

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The ecological reconnaissance survey will be completed in summer 2001 and will be initiated as soon as access agreements are obtained from private property owners in the Study Area.

Following completion of the ecological reconnaissance survey, a summary report will be developed which will include the following:

- Summary of observations on habitat and stream geomorphology,
- Characterization of aquatic communities present in the Study Area,
- Preliminary CSM for completed ecological and human exposure pathways which are potentially present in the Study Area,
- Habitat and stream geomorphology maps of the Study Area, and
- Supporting documentation, including field notes and photograph log.

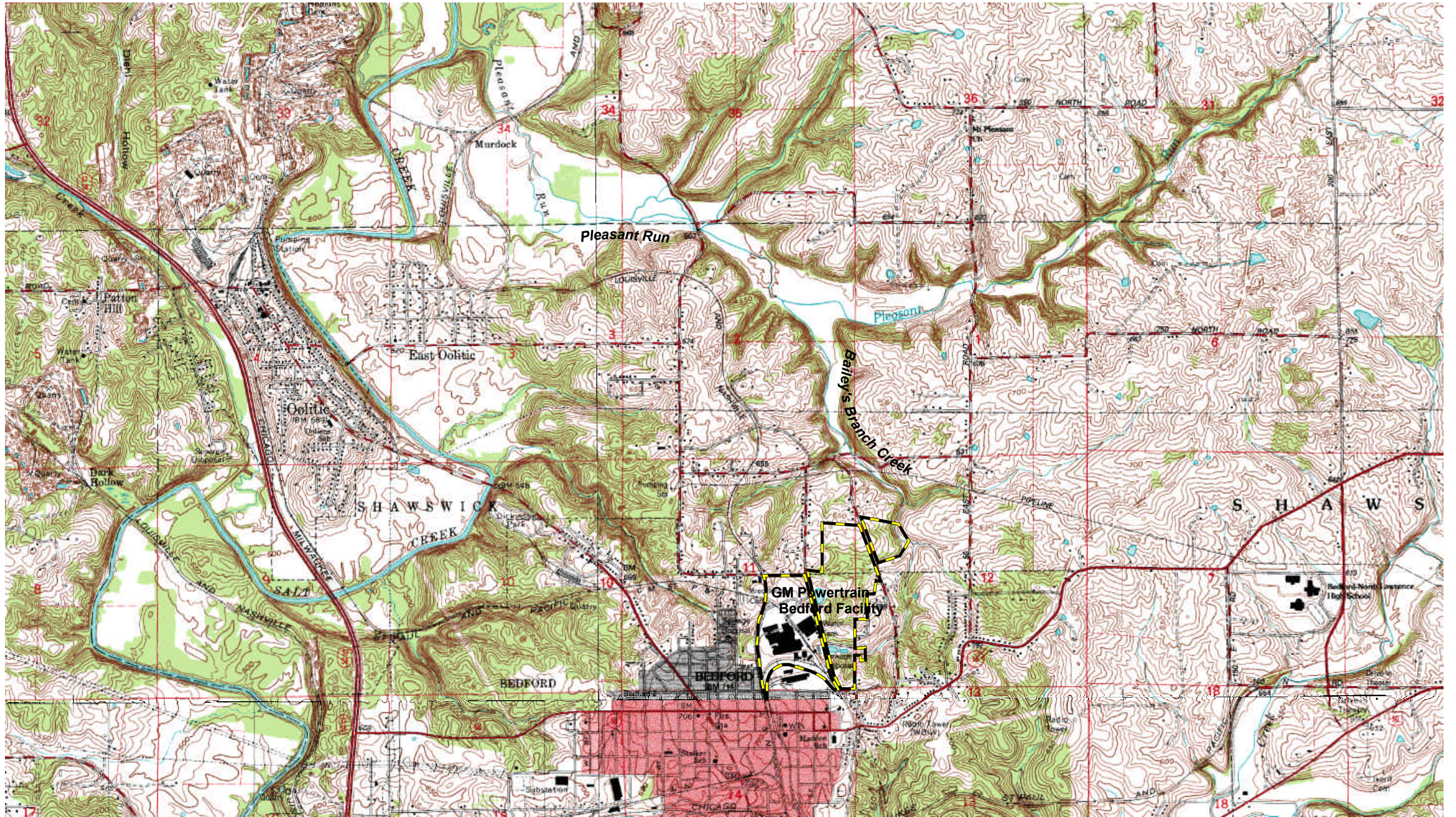
In addition to the results described above, a detailed FSP will be prepared within 60 days of completion of the reconnaissance survey. Field sampling will last approximately 2 weeks. Flow conditions in the streams may be low or high at the time of the initial sampling, depending on local weather conditions. Therefore, a second field effort may be required to characterize water quality during both low- and high-flow conditions. Unexpected conditions or developments during field sampling will be communicated immediately to the U.S. Environmental Protection Agency (U.S. EPA). A conference call may then be scheduled with U.S. EPA and the field team to discuss potential changes to the FSP if necessary.

Following completion of sampling, approximately 60 days will be required for sample analysis and data validation. Following receipt of validated data, a data summary will be prepared and discussed with U.S. EPA. Any additional data collection requirements will be developed at that time.

## 4 Reference

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CRA. 2001. Current conditions report, GM Powertrain Bedford Facility, Bedford, Indiana. Volume I: Text, figures, and tables. EPA ID# IND006036099. Prepared for GM/ENCORE. Conestoga-Rovers & Associates, Chicago, IL.



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Source: USGS 7.5 minute quadrangles (4 total)

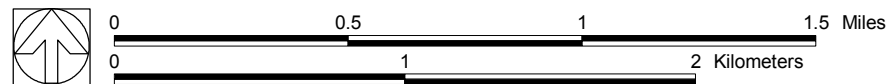
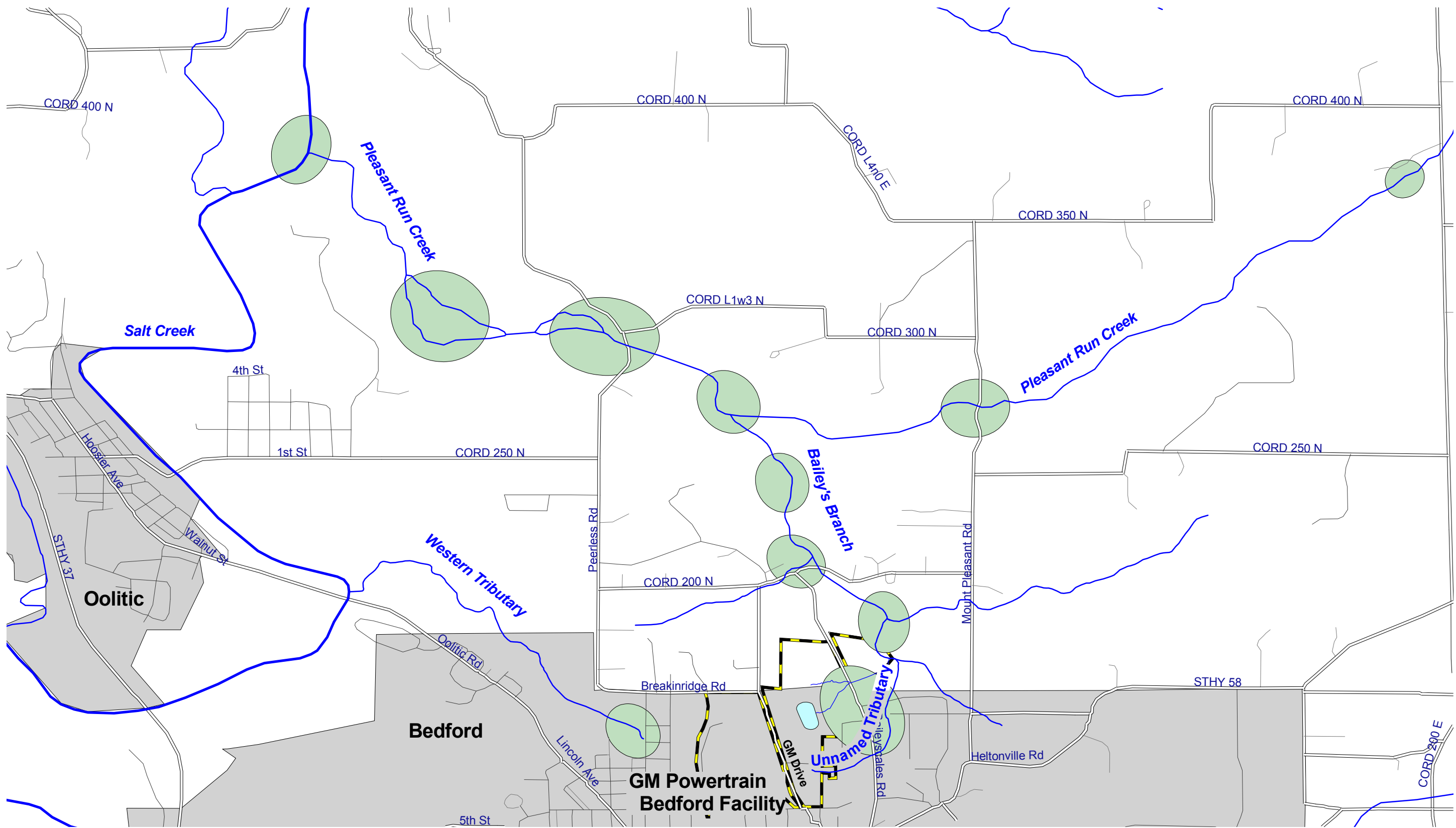


Figure 1. Stream investigation study area



Source: Base map from TIGER line and boundary files

**LEGEND**

Anticipated sampling areas

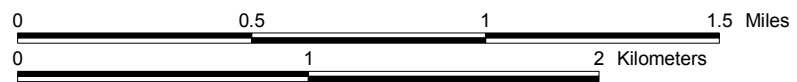


Figure 2. Anticipated sampling areas

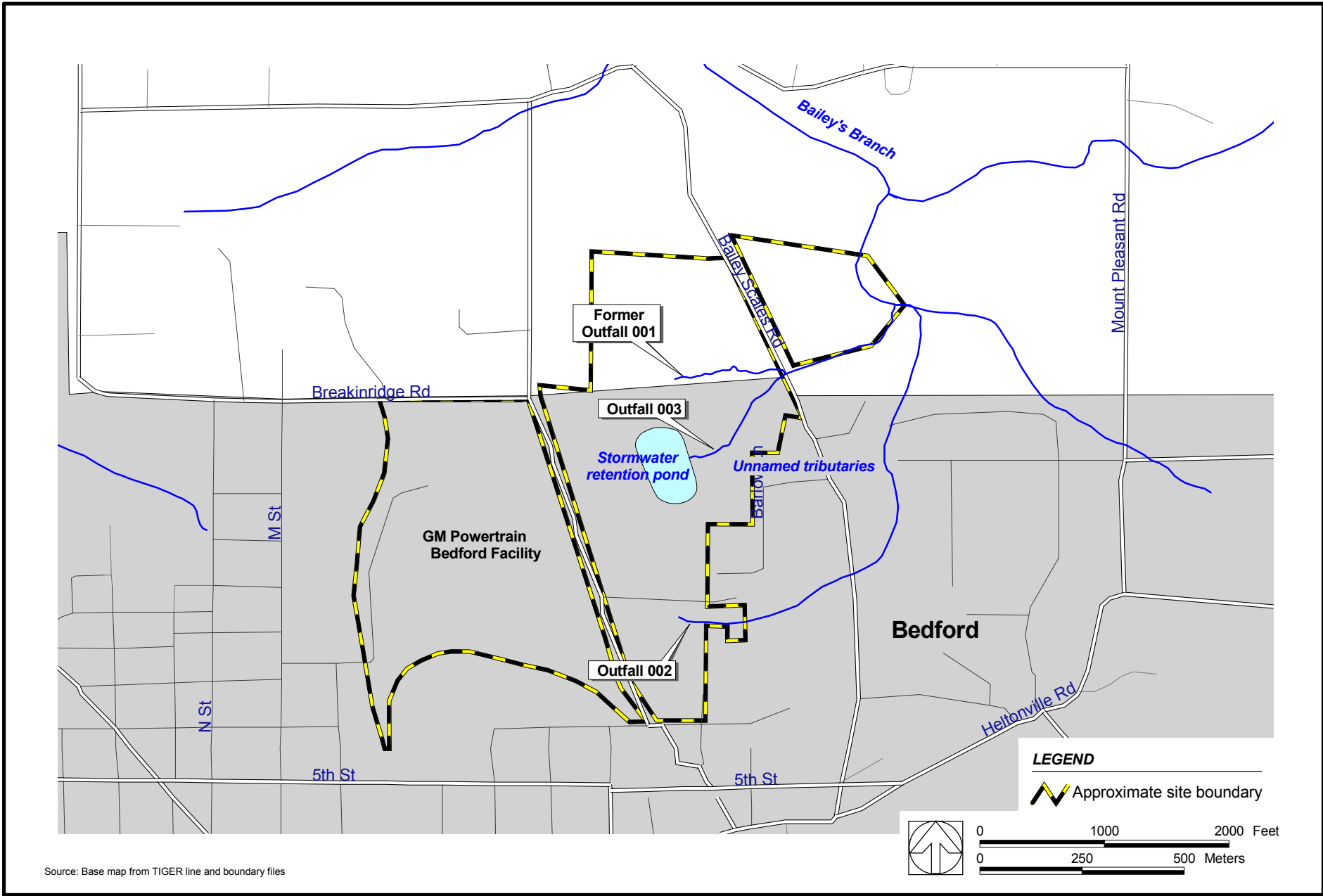


Figure 3. Detail of Eastern Drainage unnamed tributaries

