June 13, 2008

UPSTREAM PARCELS
INTERIM OPERATION, MAINTENANCE, AND MONITORING PLAN

BAILEY'S BRANCH AND PLEASANT RUN REMOVAL ACTION
BEDFORD, INDIANA

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LIST OF ACRONYMS AND TERMS

Agreement	Performance-Based Corrective Action Agreement
AOC	Administrative Order on Consent
AOI	Area of Interest
Bailey's Branch Creek	Bailey's Branch Creek at the upstream end of Pleasant Run Watershed
CA	Corrective Action
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CRA	Conestoga-Rovers & Associates Inc.
Facility	GM Powertrain Bedford Facility
GM	General Motors Corporation
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IM	Interim Measure
IOMMP	Interim Operation, Maintenance, and Monitoring Plan
OMP	Operation and Maintenance Plan
OMMP	Operation, Maintenance, and Monitoring Plan
N AOI 4	Area North of Area of Interest 4
RA	Removal Action
RCRA	Resource Conservation and Recovery Act
S.S.	Subsection
SSC	Site Source Control
Upstream Parcels	Parcels 3, 4, 5, 6, 8, 10, 11, 12, 205, 215, 216 (west of Bailey Scales Road), 401, and the area north of Area of Interest 4
U.S. C.	United States Code
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
Work Plan	Upstream Parcels Removal Action Work Plan

1.0 INTRODUCTION

This Interim Operation, Maintenance, and Monitoring Plan (IOMMP) for the Upstream Parcels (Upstream Parcels) at the General Motors Corporation (GM) Powertrain Bedford Facility (Facility) located in Bedford, Indiana has been prepared by Conestoga-Rovers & Associates, Inc. (CRA), on behalf of GM, and is submitted in accordance with the Administrative Order On Consent (AOC) For Removal Action (RA) Proceeding Under Sections 104, 106(a), 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. SS 9604, 9606(a), 9607, and 9622 [United States Environmental Protection Agency (U.S. EPA) Docket No.: V-W-'03-C-747] effective July 31, 2003 (Order), and the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) activities being conducted under the Performance-Based CA Agreement (Agreement) (effective March 20, 2001, and amended on October 1, 2002, and February 28, 2007) between the U.S. EPA and GM for the Facility.

The IOMMP for the Upstream Parcels presents the procedures and protocols to conduct routine monitoring and maintenance activities until such time that the overall RA is complete. At that time, a RA-wide Construction Certification Report and a final integrated Operation and Maintenance Plan (OMP) will be prepared. The locations of the Upstream Parcels (Parcels 3, 4, 5, 6, 8, 10, 11, 12, 205, 215, 216 (west of Bailey Scales Road), 401, and the area north of Area of Interest 4 (N AOI 4)) are presented on Figure 1.1.

2.0 AS-RECORDED

The RA for the Upstream Parcels included removal of impacted soil, rock, and sediment from the creek area for off-site disposal and restoration of the creek and adjacent habitats in the affected areas and is described more fully in the Construction Certification Report for the Upstream Parcels, dated October 1, 2007. Other aspects of the RA related to the Upstream Parcels, such as Site Source Controls (SSC), will be incorporated into a separate document. The restoration of the Upstream Parcels was completed by the end of March 2007, with the planting of an additional 100 bare root seedlings on Parcels 8 through 12. Figures 2.1 and 2.2 present the restoration for the Upstream Parcels. Parcel 215, Parcel 216 (West of Bailey Scales Road), and N AOI 4 have undergone additional construction as part of the East Plant Area Interim Measure (IM). Therefore, as-recorded information for those areas will be submitted with the East Plant Area Operation, Maintenance, and Monitoring Plan (OMMP) and no monitoring of these parcels will be completed until that time.

Restoration features of the Upstream Parcels include seed mixes applied, habitat features installed (e.g., vernal ponds), and locations of the shrubs and trees (diameter of 1 inch or greater) planted. Table 2.1 presents a summary of vegetation installed by parcel, including the specific seed mixes applied.

3.0 RESTORATION MONITORING

The following sections outline monitoring guidelines for completing the IOMMP. Monitoring will be conducted twice annually for a period of two years and annually thereafter until the overall RA is complete and the RA-wide Construction Certification Report is approved by U.S. EPA. The first monitoring event was conducted in the spring of 2008. Appendix A presents an example of the monitoring inspection forms. The monitoring form for vegetation was developed cooperatively with the U.S. Fish and Wildlife Service (USFWS), Indiana Department of Natural Resources (IDNR), and Indiana Department of Environmental Management (IDEM) for monitoring of select areas in the Downstream Parcels and will be used for monitoring of the Upstream Parcels.

3.1 CREEK STABILIZATION

Stream stabilization is an important indicator of the success of the restoration. A walkthrough will be performed to visually inspect stability of the creek channel and banks along the length of the Upstream Parcels. Inspectors will look for signs of erosion on creek banks (e.g., collapsed creek banks) and in-creek substrate. The presence or lack of riffle/pool sequences and waterfalls (where installed during the restoration) will also be documented. It should be noted that natural processes are expected to modify the creek through time and the weirs (i.e., current deflectors) placed during restoration may also be changed, moved or even removed, once natural processes take over. Signs of de-stabilization will be documented photographically and marked on a plan for purposes of planning additional maintenance/restoration to the creek, as necessary.

3.2 VEGETATIVE COVERAGE

Areas adjacent to the restored creek channel (riparian zone) were re-vegetated by applying diverse mixes of native grasses and forbs and planting native shrubs and trees as described in the Construction Certification Report for the Upstream Parcels, to promote succession to re-establish native habitats. The approach for monitoring re-vegetation of the riparian zone is qualitative and similar to the approach developed cooperatively with the USFWS, IDNR, and IDEM for select areas in the Downstream Parcels. This qualitative approach consists of ground truthing designated areas for each cover type (e.g., floodplain forest, slope forest) on each parcel and identifying the vegetation present. Due to the relatively small size of the restored riparian zones for the

Upstream Parcels, ground truthing during the monitoring events will encompass the riparian area restored on each parcel.

For grasses and forbs, the relative abundance of each species observed on each parcel will be assigned a value between 1 and 6 based on the abundance categories of Simon et al. (2001). Table 3.1 identifies and defines the abundance categories described by Simon et al. (2001). Each species observed will be noted as either included in the specified seed mix or as a volunteer. Species identified by IDNR as invasive to southern Indiana will be noted. The percent aerial cover of grasses and forbs within each cover type will be estimated by visual inspection and recorded on the monitoring form.

For shrubs and trees, monitoring will consist of identifying species present and evaluating survival of seedlings and larger specimens planted in the Upstream Parcels. Survival of shrubs and trees will be assigned to one of four survival classes, as defined in Table 3.2. In addition to noting the survival of the specimens planted, shrubs and trees that have colonized each parcel (volunteers), including invasive species, will be identified and noted.

3.3 HABITAT FEATURES

Habitat features will be observed during ground truthing of the Upstream Parcels. Many of these features (e.g., logs placed on ground) are designed to degrade over time as the restored habitat is re-established. Notes will be made if an installed feature is damaged or if wildlife is observed using such features. These notes will be made in the comments section of the monitoring forms in Appendix A. No specific protocols for evaluating habitat features are required.

3.4 MONITORING FREQUENCY

Monitoring of the Upstream Parcels creek stability, vegetative coverage, and habitat features will be conducted twice a year, for a period of two years and annually thereafter until the overall RA for all Upstream and Downstream Parcels is complete and U.S. EPA has approved the RA-wide Construction Certification Report. For the first two years, monitoring will be conducted in May/June (spring) and August/September (summer). In subsequent years, monitoring will be conducted in August/September. This IOMMP will remain in place until the Final OMMP is approved for the project. Alternatively, if the progress of the restoration is satisfactory after two years, GM may prepare a formal request to the U.S. EPA and IDEM to suspend all, or part of, the Monitoring Program.

4.0 RESTORATION MAINTENANCE

This section discusses alternative maintenance measures to address performance issues observed during monitoring. However, maintenance measures will be necessarily dependent on the conditions encountered.

4.1 CREEK STABILIZATION

Three possible maintenance measures will be considered for locations where instability of the creek banks and/or channel has been observed:

i) allow the creek to continue to progress naturally;

ii) restore the creek according to the Upstream Parcels Restoration Plans and the as-recorded information collected; or

iii) restore the creek using alternative methods which may be more suitable to address the cause of the instability.

Selection of the most appropriate maintenance measure will be made on a case-by-case basis and will consider the probability that further degradation will occur, possible negative impacts to creek, and possible cause(s) leading to the instability of the creek. Locations requiring additional restoration work will be monitored during the following monitoring period.

4.2 VEGETATIVE COVERAGE

Where it is determined that vegetative coverage is not adequate, additional re-seeding or planting may be required. This could include replacement of shrubs or trees or re-seeding with or without a combination of creek stabilization controls to promote the "grow-in" (e.g., erosion controls, bank stabilizers).

Trees and shrubs that die will be examined on a case-by-case basis to determine factors causing the death and whether replacement is required/warranted.

4.3 HABITAT FEATURES

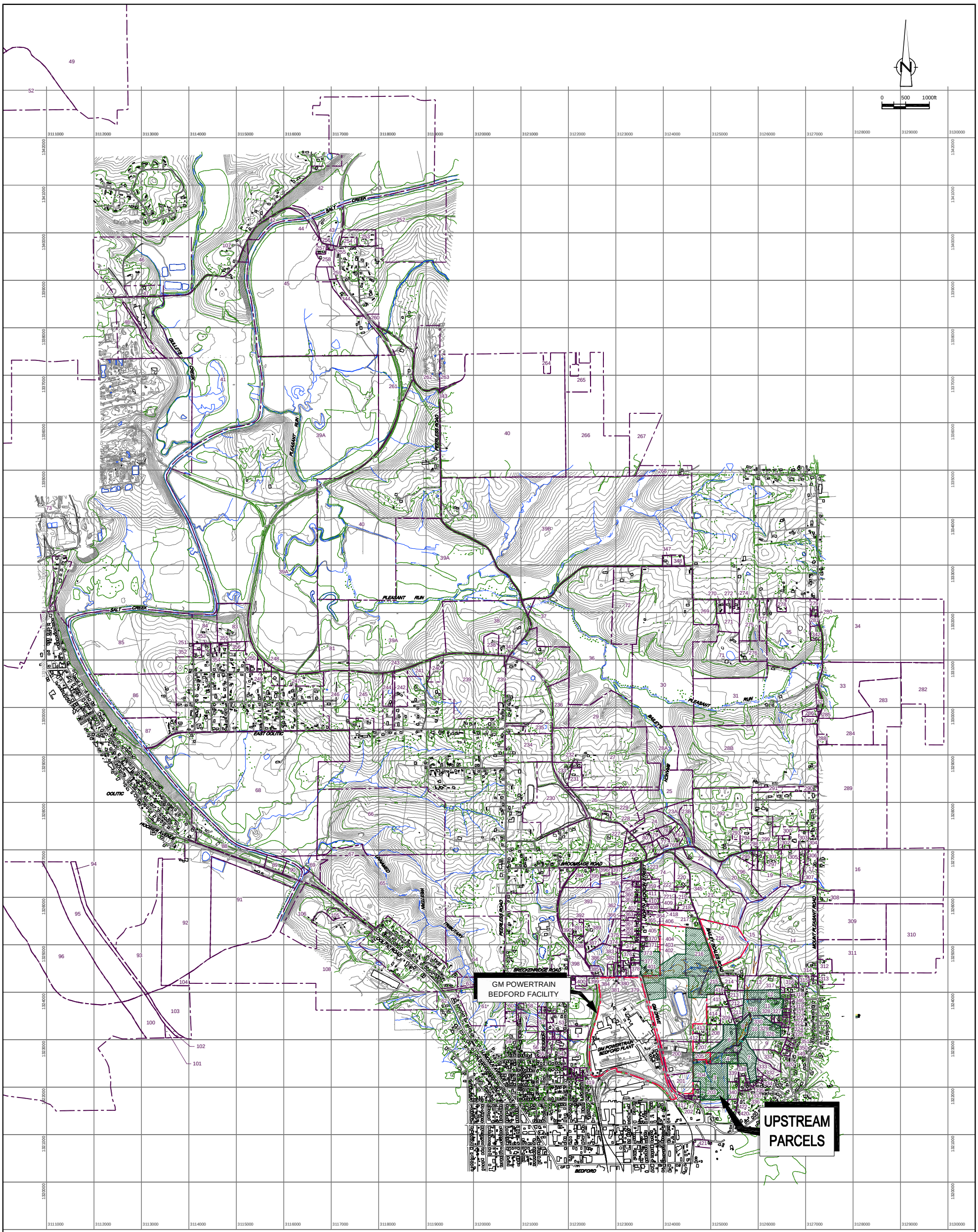
Replacement or addition of habitat features will be considered on a case-by-case basis. As the grow-in phase of the restoration progresses, it is expected that habitat features will decompose or become altered over time and eventually be replaced by natural features in the long-term.

5.0 REPORTING

Documentation of the monitoring will be submitted annually in report format. The report will summarize findings of the monitoring events completed in that year and include all completed monitoring forms. Maintenance measures completed for the restoration and any additional follow-up required will also be described.

6.0 REFERENCES

Simon, T.P., Stewart, P.M., and Rothrock, P.E. 2001. Development of multimetric indices of biotic integrity of riverine and palustrine wetland plant communities along Southern Lake Michigan. Aquatic Ecosystem Health and Management 4: 293-309.



LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- EXISTING VEGETATION
- EXISTING BUILDINGS
- FENCE LINE
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE PARCEL BOUNDARY
- APPROXIMATE GM PROPERTY BOUNDARY
- UPSTREAM PARCELS

NOTE: PROPERTY BOUNDARY LOCATIONS APPROXIMATED FROM THE LAWRENCE COUNTY SURVEY PLATS. LOCATIONS MAY NOT ACCURATELY REPRESENT THE TRUE BOUNDARIES

No	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

GM POWERTRAIN
BEDFORD PLANT

UPSTREAM PARCELS INTERIM OMMP

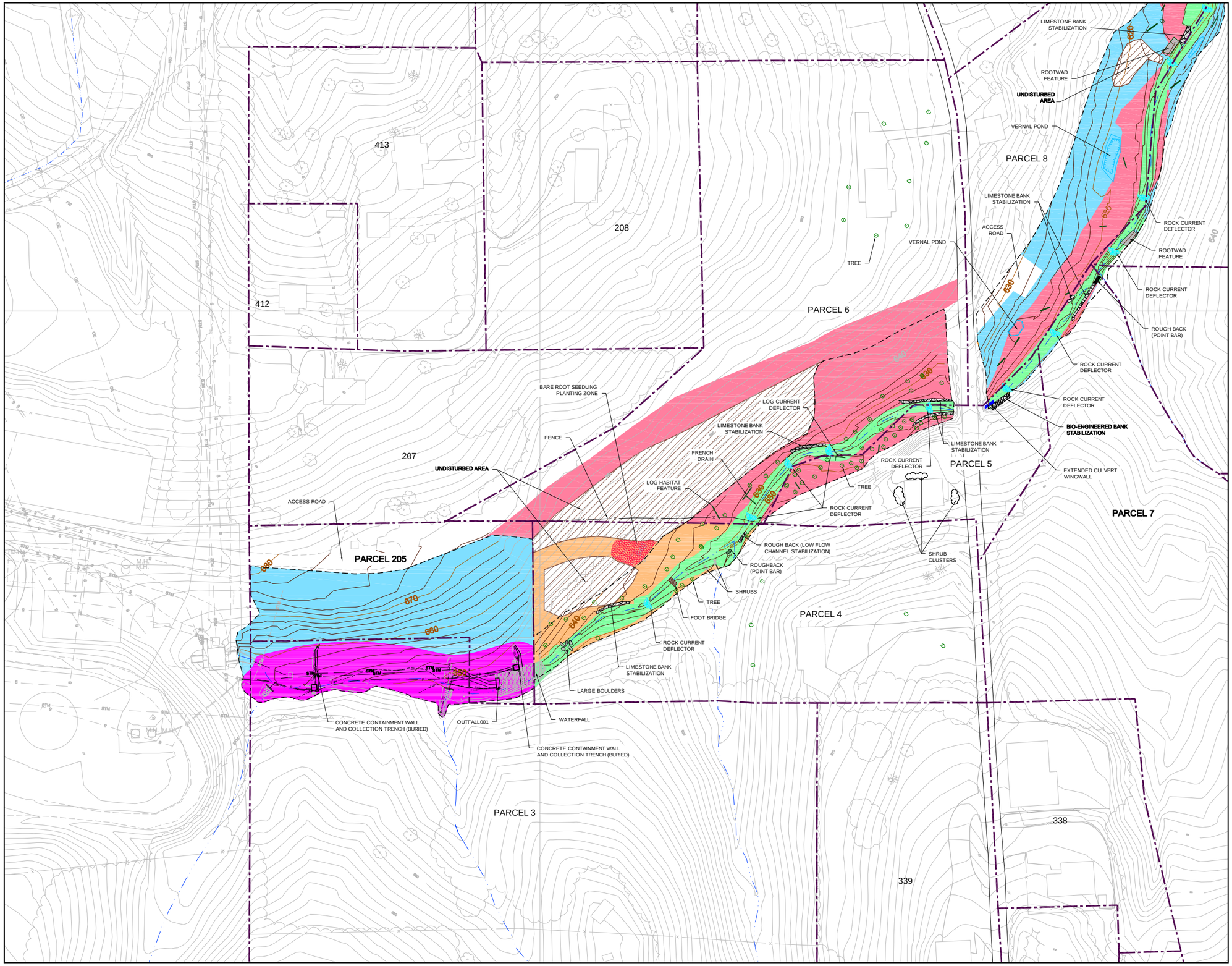
UPSTREAM PARCELS LOCATION

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL 2001
AND CRA SURVEYS 2002 TO 2005

Project Manager:	Reviewed By:	Date:	
J.M.	P.G.	FEBRUARY 2007	
Scale: AS SHOWN	Project No: 13968-00	Report No: 200	Drawing No: figure 1.1

13968-00(200)GN-WA007 JUN 12/2008



NO	Revision	Date	Initial

0 20 60ft

LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- SITE RESTORATION CONTOURS
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE SURFACE WATER LOCATION
- LIMIT OF DISTURBANCE
- FENCE
- LIMESTONE BANK STABILIZATION
- ROCK CURRENT DEFLECTOR
- TREE AND SHRUB
- LOG HABITAT FEATURE
- ROOTWAD FEATURE
- VERNAL POND
- BUILDING/STRUCTURE
- RIP RAP
- GRASSY FORB BENCH SEED MIX
- SLOPE FOREST SEED MIX
- LAWN SEED MIX
- RIPARIAN FOREST SEED MIX
- GRASS/WILDFLOWER SEED MIX
- UNDISTURBED AREA
- BARE ROOT SEEDLING

NOTE: BARE ROOT SEEDLINGS AND SHRUBS WERE PLANTED WITHIN THE LIMIT OF DISTURBANCE ON PARCELS 8, 10, 11 AND 12

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM POWERTRAIN BEDFORD FACILITY
BWDFORD, INDIANA

UPSTREAM PARCELS INTERIM OMMP

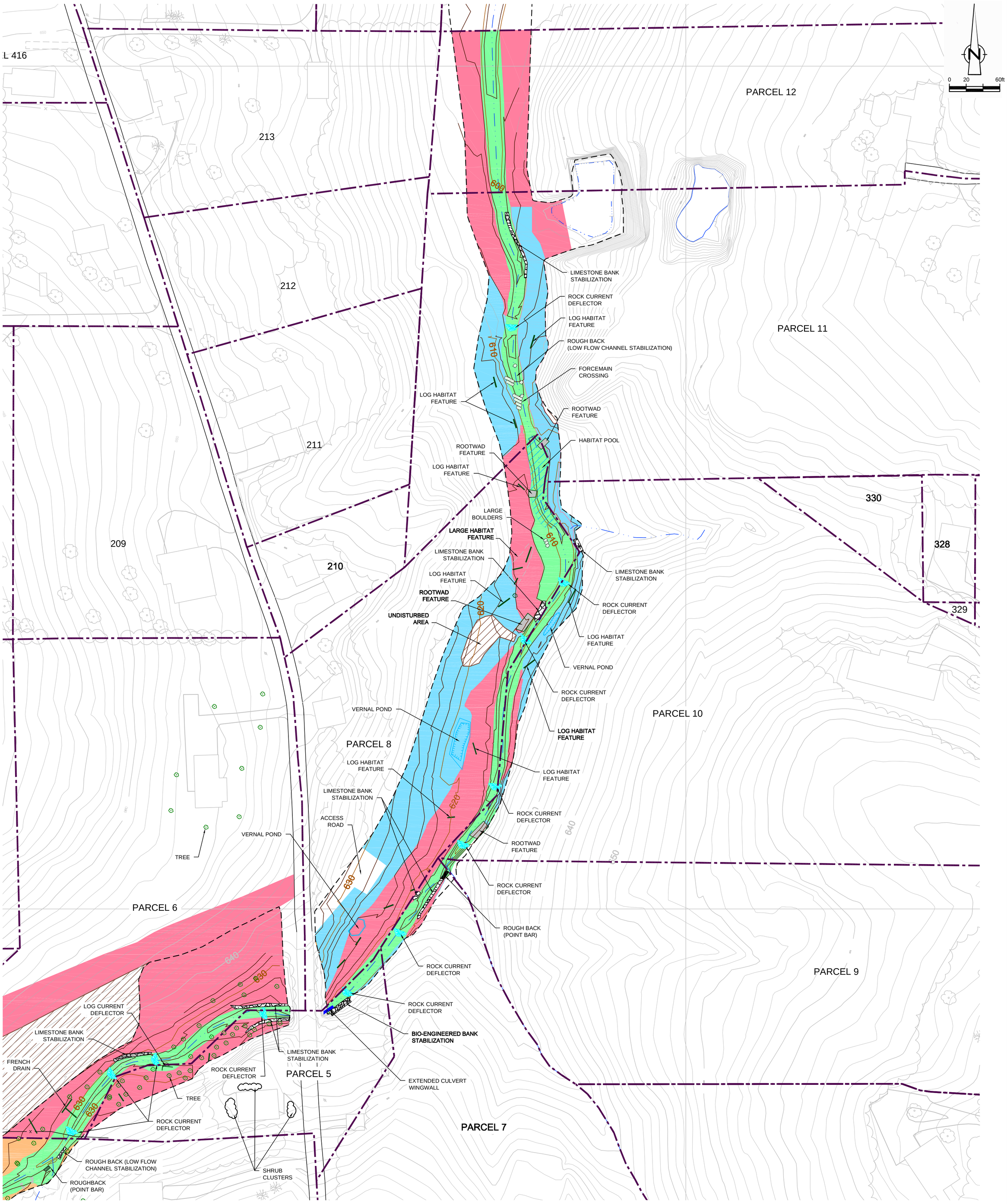
AS-RECORDED RESTORATION
PARCELS 3, 4, 5, 6, AND 205

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL, 2001 AND CRA SURVEYS, 2002 TO 2005

Project Manager:	Reviewed By:	Date:	
J.M.	P.G.	FEBRUARY 2007	
Scale: AS SHOWN	Project N°: 13968-00	Report N°: 200	Drawing N°: figure 2.1

13968-00(200)GN-WA001 JUN 12/2008



LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- SITE RESTORATION CONTOURS
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE SURFACE WATER LOCATION
- LIMIT OF DISTURBANCE
- FENCE
- LIMESTONE BANK STABILIZATION
- ROCK CURRENT DEFLECTOR
- TREE AND SHRUB
- LOG HABITAT FEATURE
- ROOTWAD FEATURE
- VERNAL POND
- BUILDING/STRUCTURE
- GRASSY FORB BENCH SEED MIX
- SLOPE FOREST SEED MIX
- LAWN SEED MIX
- RIPARIAN FOREST SEED MIX
- UNDISTURBED AREA
- BARE ROOT SEEDLING

NOTE: BARE ROOT SEEDLINGS AND SHRUBS WERE PLANTED WITHIN THE LIMIT OF DISTURBANCE ON PARCELS 8, 10, 11 AND 12

Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

GM POWERTRAIN BEDFORD FACILITY
BEDFORD, INDIANA

UPSTREAM PARCELS INTERIM OMMP

AS-RECORDED RESTORATION
PARCELS 5, 7, 8, 10, 11, AND 12

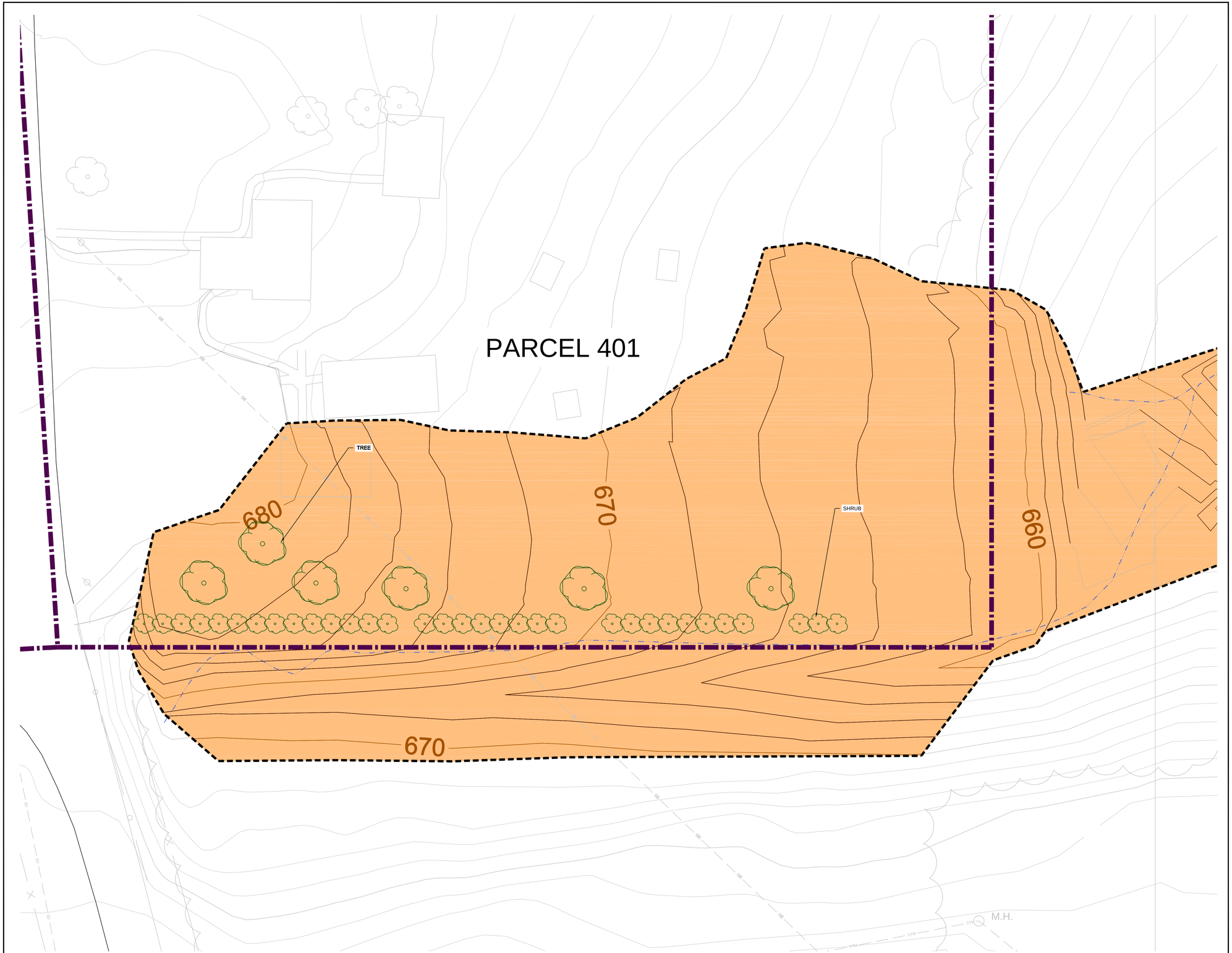
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL, 2001
AND CRA SURVEYS, 2002 TO 2005

Project Manager:	Reviewed By:	Date:	
J.M.	P.G.	FEBRUARY 2007	
Scale: AS SHOWN	Project Nº: 13968-00	Report Nº: 200	Drawing Nº: figure 2.2

13968-00(200)GN-WA002 JUN 12/2008



NO	Revision	Date	Initial

0 10 20ft

LEGEND

- EXISTING GROUND SURFACE ELEVATION CONTOURS (feet AMSL)
- SITE RESTORATION CONTOURS
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE SURFACE WATER LOCATION
- LIMIT OF DISTURBANCE
- TREE AND SHRUB
- STORM LINE
- BUILDING/STRUCTURE
- LAWN FOREST SEED MIX

NOTES:

(1) CONSTRUCTION ACTIVITIES ARE ON-GOING. THEREFORE CHANGES TO THE SITE GRADING AND RESTORATION ARE ANTICIPATED.

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

(3) PARCEL 216 EAST OF BAILEY SCALES ROAD WAS PART OF THE DOWNSTREAM PARCELS REMOVAL ACTION WORK PLAN AND THE PORTION OF THE PARCEL EAST OF BAILEY SCALES ROAD WILL BE DISCUSSED IN THE FINAL CONSTRUCTION CERTIFICATION REPORT FOR THE DOWNSTREAM PARCELS WORK PLAN

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

GM POWERTRAIN BEDFORD FACILITY
BWDFORD, INDIANA

UPSTREAM PARCELS INTERIM OMMP

AS-RECORDED RESTORATION PARCELS 215, 216, 401, AND NORTH OF AOI 4

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

BASE MAP COMPLETED BY AIR-LAND SURVEYS, FLINT, MI. APRIL, 2001 AND CRA SURVEYS 2002 TO 2005

Project Manager:	Reviewed By:	Date:	
J.M.	P.G.	FEBRUARY 2007	
Scale: AS SHOWN	Project NO.: 13968-00	Report NO.: 200	Drawing NO.: figure 2.3

13968-00(200)GN-WA003 JUN 12/2008

TABLE 2.1

TREE/VEGETATION SUMMARY
GM POWERTRAIN BEDFORD FACILITY
BEDFORD, INDIANA

Upstream Parcels	*Number of trees/seedlings installed*	*Number of shrubs installed*	*Other*
3	-	-	grass/wildflower seed mix and slope forest seed mix
4	173	20	lawn area seed mix and dry to mesic prairie seed mix
5	62	16	riparian corridor forest seed mix and dry to mesic prairie seed mix
6	8	-	riparian corridor forest seed mix and dry to mesic prairie seed mix
7	-	-	-
8 thru 12	248	44	slope forest seed mix, riparian forest seed mix and grassy/forb bench seed mix
205	-	-	grass/wildflower seed mix and slope forest seed mix
215	-	-	lawn seed
216 (West of Bailey Scales Road)	-	-	lawn seed
401	6	33	lawn seed
Area North of AOI 4	-	-	lawn seed

TABLE 3.1

**SPECIES ABUNDANCE CATEGORIES FOR GRASSES AND FORBS
UPSTREAM PARCELS IOMMP
BEDFORD, INDIANA**

Abundance Rating	*Abundance Category*	*Description*
1	Observed	1 individual of a species present
2	Rare	2-4 individuals of a species present
3	Rare/Common	>4 individuals of a species, but not enough to be categorized as "common"
4	Common	Species is easily located
5	Very Common	Species is slightly dominant; up to 25% of the plant community
6	Abundant	Species accounts for 25-100% of the plant community

Source: Simon et al., 2001

TABLE 3.2

SURVIVAL CLASSES FOR TREES AND SHRUBS
UPSTREAM PARCELS IOMMP
BEDFORD, INDIANA

Survival Class	*Range of Percent Survival*
1	0 – 25%
2	26 – 50%
3	51 – 75%
4	76 – 100%

APPENDIX A

MONITORING FORMS

TABLE A.1

**VEGETATION MONITORING FORM
UPSTREAM PARCELS IOMMP
GM POWERTRAIN BEDFORD FACILITY
BEDFORD, INDIANA**

Inspector ______________________________

Date/Time ______________________________

Parcel/Cover Type ______________________________

I. GRASSES AND FORBS

Taxon	Abundance Category	Seeded		Volunteer		Invasive	
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No
		Yes	No	Yes	No	Yes	No

Percent Aerial Coverage of Grasses and Forbs ____________________

II. SHRUBS AND TREES

Taxon	Planted		Volunteer		Invasive	
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No
___________________	Yes	No	Yes	No	Yes	No

Survival Class (Shrubs and Trees)	$\leq$ 25%	26-50%	51-75%	> 75%

III. WILDLIFE OBSERVED

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IV. NOTES