



The Dow Chemical Company
Midland, MI 48674

January 3, 2011

Ms. Mary Logan
Remediation Project Manager
U.S. Environmental Protection Agency, Region 5
77 West Jackson
Chicago, IL 60604

**Re: Task 2.2 Monitoring Work Plan-Settlement Agreement No. V-W-10-C-942
for The Tittabawassee River/Saginaw River & Bay Site
Dow Submittal Number 2010-078**

Ms. Logan:

Attached please find the Task 2.2 Monitoring Work Plan. The work plan is being submitted under AOC CERCLA Docket No. V-W-10-C-942 and Appendix A, Statement of Work Schedule. Please feel free to contact me with any questions or concerns.

Sincerely,
The Dow Chemical Company

A handwritten signature in black ink that reads "Todd Konechne".

Todd Konechne
Project Coordinator

cc: Al Taylor, MDNRE
Diane Russell, U.S. EPA
Joseph Haas, U.S. Fish and Wildlife
Steve Lucas, Dow
Peter Wright, Dow
Greg Cochran, Dow



The Dow Chemical Company
Midland, MI 48674

**TASK 2.2 MONITORING WORK PLAN
THE TITTABAWASSEE RIVER/SAGINAW RIVER & BAY SITE**



**PREPARED BY:
TITTABAWASSEE & SAGINAW RIVER TEAM**

**PREPARED FOR AND SUBMITTED BY:
THE DOW CHEMICAL COMPANY**

**DECEMBER 31, 2010
DOW SUBMITTAL NUMBER 2010.078**



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Table 1	Summary of In-Channel Bed Pin Monitoring Locations
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1.0 INTRODUCTION

This Task 2.2 Monitoring Work Plan was prepared in accordance with the requirements contained in Section IX (“Work to be Performed”) of the Administrative Settlement Agreement and Order on Consent (AOC) for the Tittabawassee River/Saginaw River & Bay Site (“Site”), Settlement Agreement No. V-W-10-C-942) and the Statement of Work (SOW; Attachment A of AOC), effective January 21, 2010 (“Settlement Agreement”). The Task 2.1 Technical Memorandum dated July 16, 2010, which was approved by the U.S. Environmental Protection Agency (EPA) in a letter dated September 16, 2010, identified several areas where additional monitoring is needed to evaluate the potential for certain in-channel deposits, in-channel center islands, and bank areas to contribute to acute or near-term contaminant transport risk. Collecting additional sediment samples for chemical analysis (i.e., bank face sampling) in the areas associated with the in-channel center islands and bank areas were addressed in the Task 2.2 Work Plan, Revision 1, dated September 22, 2010, which was conditionally approved by EPA on November 8, 2010. This Monitoring Work Plan addresses additional monitoring for the remaining areas identified in the Task 2.1 Technical Memorandum, including:

- In-channel bed pin monitoring at transects located in Reaches L, Q, S, II, MM, QQ, RR, XX, and YY.
- Bathymetric surveying of the Sixth Street Turning Basin (SSTB).
- Topographic surveying of the in-channel center islands in Reaches MM and WW.

Note that topographic surveying of the Reach MM and Reach WW in-channel center islands was not specified in the Task 2.1 Technical Memorandum. However, this monitoring is being proposed to provide additional information to help inform the Task 2.4 and Task 2.3 assessments of these islands, respectively.

2.0 MONITORING OBJECTIVES

The objectives of the monitoring program described in this Work Plan are as follows:

- Continue to monitor the stability of the in-channel deposits previously identified under Task 2.1.
- Obtain additional bed elevation measurements from the SSTB to confirm the depositional patterns observed from prior surveying activities and evaluate its ability to serve as a sediment trap for solids leaving the Tittabawassee River.
- Monitor the topography of the Reach MM and Reach WW in-channel center islands for potential changes relative to prior surveying activities.

Data collected under this Monitoring Work Plan, in conjunction with data collected under the Task 2.2 Work Plan dated September 22, 2010, will be used to support the Task 2.3 and Task 2.4 evaluations.



3.0 IN-CHANNEL BED PIN MONITORING

In-channel bed pin monitoring will be conducted at the 27 in-channel transect locations identified in the Task 2.1 Technical Memorandum (July 2010). The bed pin monitoring locations are summarized in Table 1 and are depicted in Figures 1 through 11.

The in-channel bed pin monitoring will be conducted twice during the 2011 field season: once in late spring/early summer (post-high flow survey) and once in late summer/early fall (low flow survey). Monitoring procedures employed during this survey will follow those outlined in the *Tittabawassee River/Saginaw River/Saginaw Bay Quality Assurance Project Plan* (March 2010, as amended).

4.0 BATHYMETRIC SURVEYING

In the late spring/early summer of 2011, a bathymetric survey will be performed for the SSTB utilizing single beam technology as flow rates in the Saginaw River permit. The survey area will extend from approximately 1,300-feet upstream of the SSTB (just upstream of the railway crossing) to approximately 900-feet downstream of the SSTB, as indicated in Figure 12. The survey equipment and protocols will follow those outlined in the Standard Operating Procedure (SOP) for conducting a bathymetric survey, which will be developed prior to conducting the survey.

5.0 TOPOGRAPHIC SURVEYING

Topographic surveys will be conducted for the Reach MM and Reach WW in-channel center islands during lower flow conditions in late summer/early fall. Elevation measurements will be collected at the 14 locations on the Reach MM island and the 12 locations on the Reach WW island that were previously surveyed in 2010 (see Figures 13 and 14). The survey equipment and protocols will follow those outlined in the *Tittabawassee River/Saginaw River/Saginaw Bay Quality Assurance Project Plan* (March 2010, as amended).

6.0 SCHEDULE

As discussed above, it is anticipated that the first round of in-channel bed pin monitoring and the bathymetric surveying of the SSTB will be conducted in late spring/early summer of 2011. The second round of in-channel bed pin monitoring and the topographic surveying will be conducted in late summer/early fall to coincide with low-flow conditions. Consistent with the proposed data submittal schedule for the Task 4 Site-Wide Monitoring Plan, the Task 2.3 evaluation report which will include the data collected under this work plan will be submitted within 60 days after the end of the quarter in which the samples were analyzed (including quality control and data validation).



FIGURES

Figure 1: Approximate In-Channel Bed Pin Monitoring Locations - Reach L (Upper)

Figure 2: Approximate In-Channel Bed Pin Monitoring Locations - Reach L (Lower)

Figure 3: Approximate In-Channel Bed Pin Monitoring Locations - Reach Q

Figure 4: Approximate In-Channel Bed Pin Monitoring Locations - Reach S

Figure 5: Approximate In-Channel Bed Pin Monitoring Locations - Reach II (Upper)

Figure 6: Approximate In-Channel Bed Pin Monitoring Locations - Reach II (Lower)

Figure 7: Approximate In-Channel Bed Pin Monitoring Locations - Reach MM

Figure 8: Approximate In-Channel Bed Pin Monitoring Locations - Reach QQ

Figure 9: Approximate In-Channel Bed Pin Monitoring Locations - Reach RR

Figure 10: Approximate In-Channel Bed Pin Monitoring Locations - Reach XX

Figure 11: Approximate In-Channel Bed Pin Monitoring Locations - Reach YY

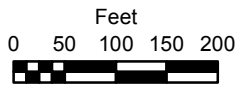
Figure 12: Approximate Bathymetric Surveying Location for Sixth Street Turning Basin

Figure 13: Approximate Topographic Surveying Locations for Reach MM In-Channel Center
Island

Figure 14: Approximate Topographic Surveying Locations for Reach WW In-Channel Center
Island

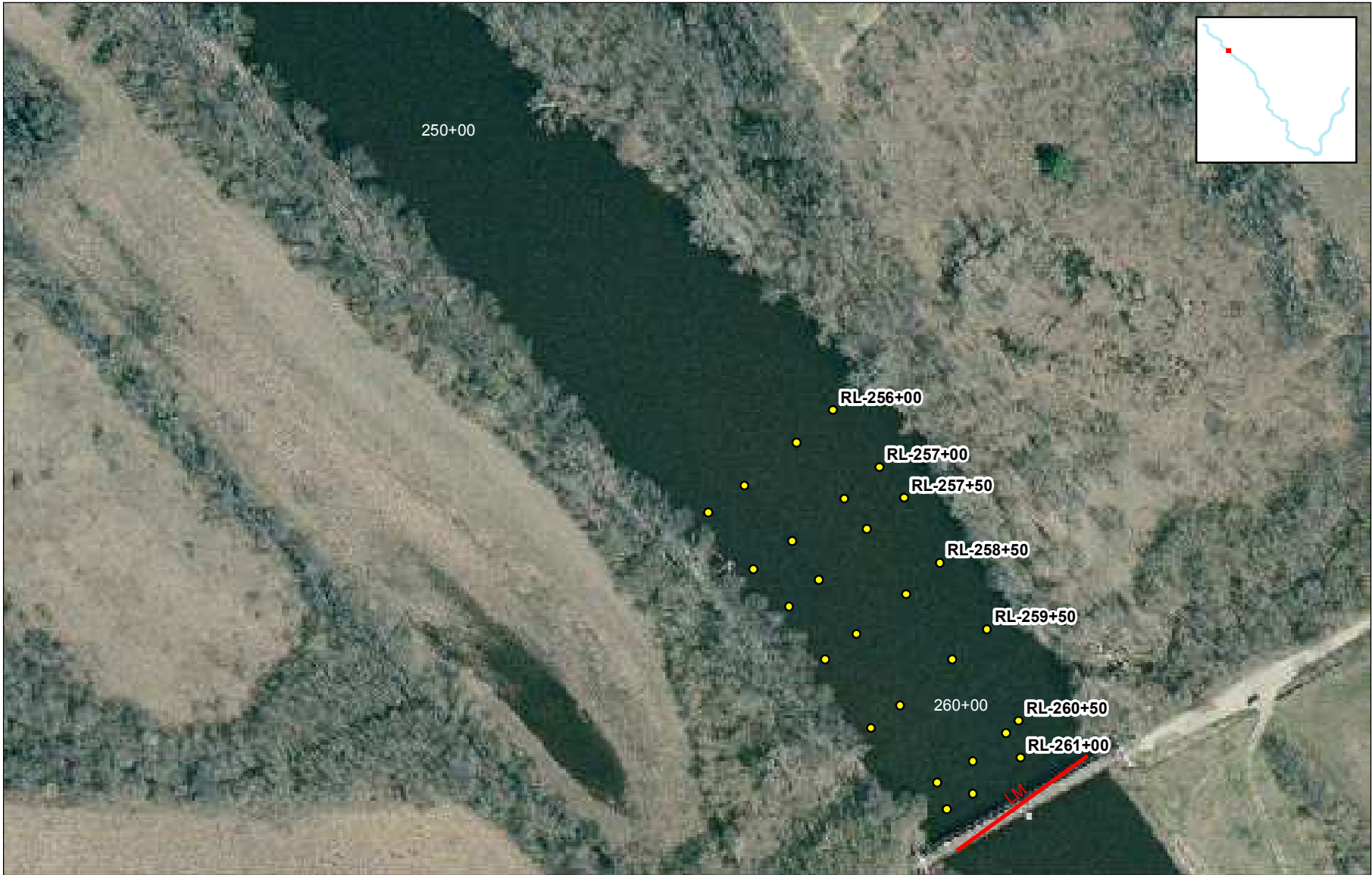


- Bed Pin Monitoring Location
- Reach

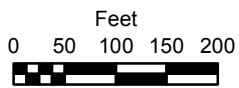


**Approximate In-Channel Bed Pin Monitoring Locations
Reach L (Upper)**

**Figure
1**



- Bed Pin Monitoring Location
- Reach

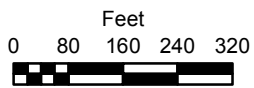


**Approximate In-Channel Bed Pin Monitoring Locations
Reach L (Lower)**

**Figure
2**



- Bed Pin Monitoring Location
- Reach

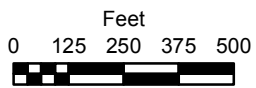


**Approximate In-Channel Bed Pin Monitoring Locations
Reach Q**

**Figure
3**



- Bed Pin Monitoring Location
- Reach

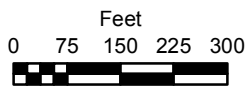


**Approximate In-Channel Bed Pin Monitoring Locations
Reach S**

**Figure
4**

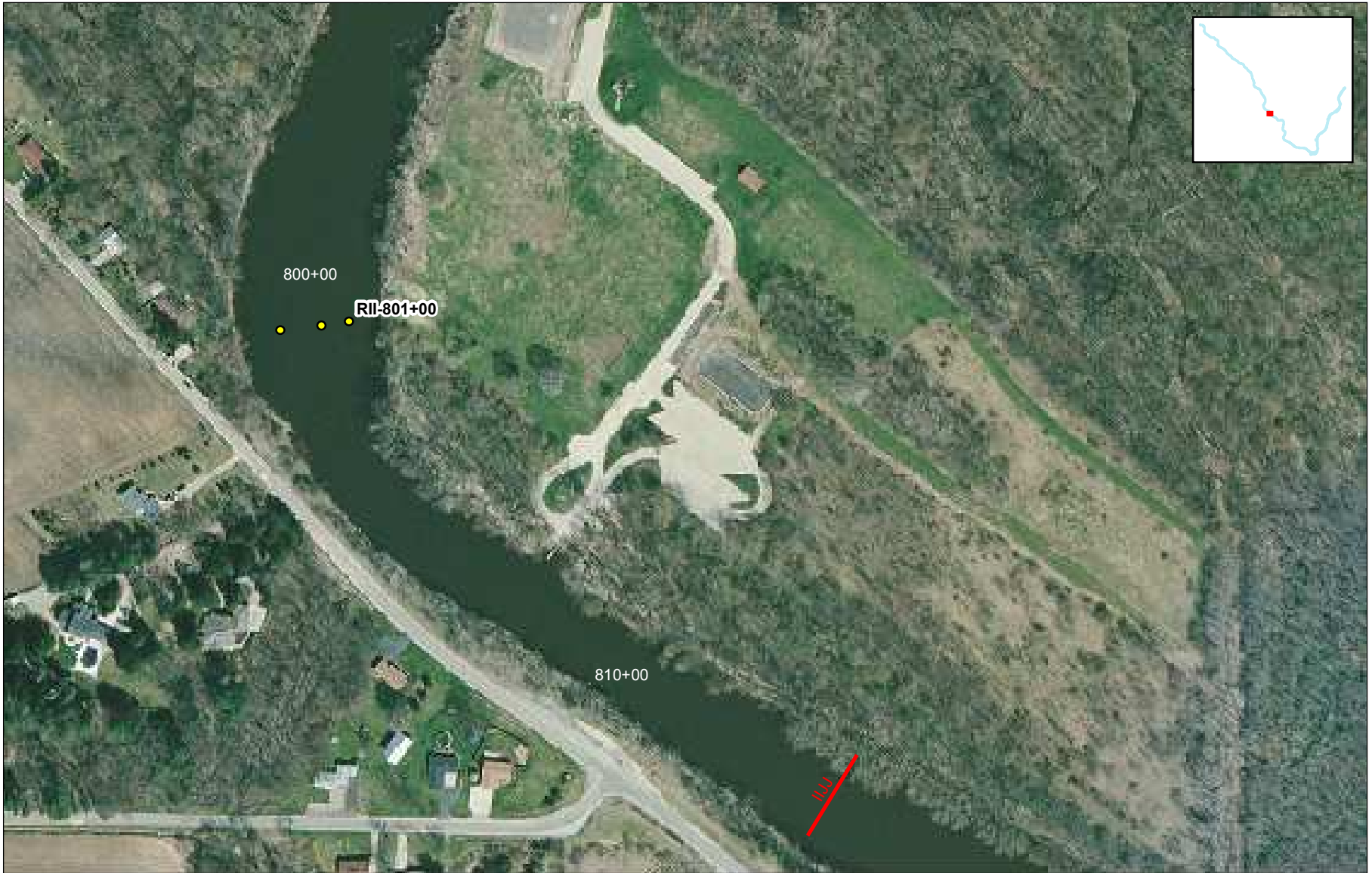


- Bed Pin Monitoring Location
- Reach

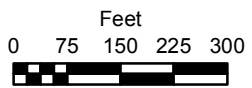


**Approximate In-Channel Bed Pin Monitoring Locations
Reach II (Upper)**

**Figure
5**

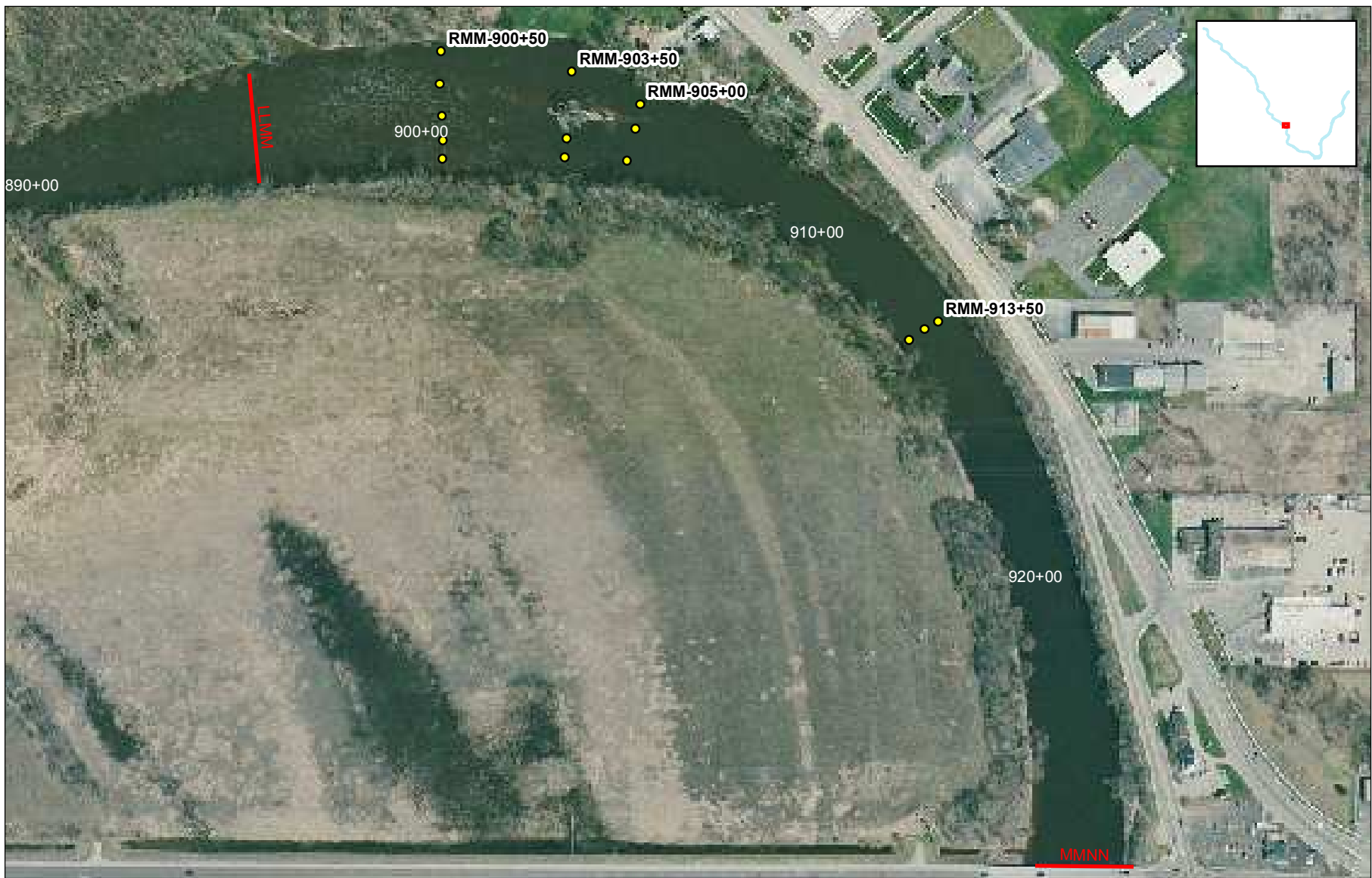


- Bed Pin Monitoring Location
- Reach

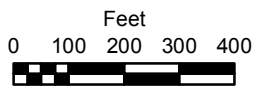


**Approximate In-Channel Bed Pin Monitoring Locations
Reach II (Lower)**

**Figure
6**



- Bed Pin Monitoring Location
- Reach

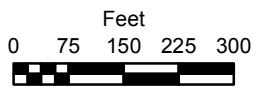


**Approximate In-Channel Bed Pin Monitoring Locations
Reach MM**

**Figure
7**



- Bed Pin Monitoring Location
- Reach

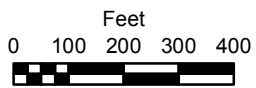


**Approximate In-Channel Bed Pin Monitoring Locations
Reach QQ**

**Figure
8**



- Bed Pin Monitoring Location
- Reach

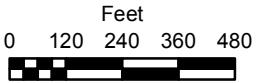


**Approximate In-Channel Bed Pin Monitoring Locations
Reach RR**

**Figure
9**



- Bed Pin Monitoring Location
- Reach

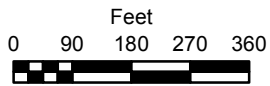


**Approximate In-Channel Bed Pin Monitoring Locations
Reach XX**

**Figure
10**

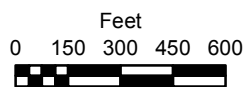


- Bed Pin Monitoring Location
- Reach



**Approximate In-Channel Bed Pin Monitoring Locations
Reach YY**

**Figure
11**

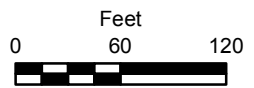


Approximate Bathymetric Surveying Locations for Sixth Street Turning Basin

Figure 12



● Topographic Survey Location

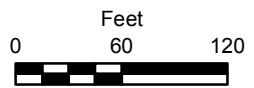


Approximate Topographic Surveying Locations for Reach MM In-Channel Center Island

Figure 13



● Topographic Survey Location



Approximate Topographic Surveying Locations for Reach WW In-Channel Center Island

Figure 14



TABLES

Table 1: Summary of In-Channel Bed Pin Monitoring Locations



Table 1: Summary of In-Channel Bed Pin Monitoring Locations

Reach	Transect ID
Reach L	RL-236+50
Reach L	RL-237+50
Reach L	RL-239+00
Reach L	RL-256+00
Reach L	RL-257+00
Reach L	RL-257+50
Reach L	RL-258+50
Reach L	RL-259+50
Reach L	RL-260+50
Reach L	RL-261+00
Reach Q	RQ-359+00
Reach S	RS-416+00
Reach S	RS417+50
Reach S	RS-418+50
Reach II	RII-772+00
Reach II	RII-783+00
Reach II	RII-785+00
Reach II	RII-801+00
Reach MM	RMM-900+50
Reach MM	RMM-903+50
Reach MM	RMM-905+00
Reach MM	RMM-913+50
Reach QQ	RQQ-1023+50
Reach RR	RRR-1041+50
Reach XX	RXX-1242+00
Reach YY	RYY-1257+50
Reach YY	RYY-1276+00