Technical Memorandum

Potential Wetland Mitigation Sites

For

Blue Water Bridge Plaza Study
St. Clair County, Michigan

MDOT Contract No. 2002-0512
JN 57779

Prepared by:

Wetland and Coastal Resources

Prepared for:

Wilbur Smith Associates, Inc.
and
Michigan Department of Transportation

August 2005

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SUMMARY

Wetlands are present within the Blue Water Bridge Plaza study area that may be impacted by any of three alternatives (Alternatives 1, 2, and 3) currently under review. State and Federal statutes typically require mitigation to replace the values and functions lost when wetland impacts are permitted. Wetland and Coastal Resources, Inc. (WCR) was therefore contracted by Wilbur Smith and Associates (WSA) to investigate properties suitable for wetland mitigation.

Based on impacts associated with Alternative 3, and agency requirements on wetland replacement ratios, a total of approximately 6.97 acres of wetland mitigation will be required for the project. WCR identified 7 potential wetland mitigation sites based on selection criteria designed to identify potential long term success of wetland construction, potential replacement of values and functions, cost, size, feasibility, and ecological value.

Each potential mitigation site was ranked in preference based on the established criteria. The preferred site, Area 1, includes 19.5 acres of potential mitigation area, has potential to provide wetland hydrology, and is adjacent to existing forested upland and wetland. The preferred site is also located adjacent to the project area associated with Alternative 3. Five of the remaining sites have varying degrees of mitigation potential and WCR identified one site not appropriate for mitigation.

Wetland and stream enhancement areas were also identified as potential locations to replace values and functions associated with Stocks Creek and adjacent wetlands. These enhancements could diversify habitats and improve stream quality adjacent to proposed impact area associated with Alternative 3.

Wetland impacts associated with Alternatives 1 and 2 are smaller in scope and would require less approximately 1 acre of mitigation. Each mitigation site identified by WCR could accommodate mitigation of this size. However, the preferred site for Alternative 3 is also the preferred site for Alternatives 1 and 2.

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1.0 INTRODUCTION

Three alternatives for redesign of the Blue Water Bridge Plaza are currently under review by the Michigan Department of Transportation (MDOT) and contracted consulting groups. Wilbur Smith Associates, Inc. (WSA) was chosen as the prime consultant to, in part, identify wetland impacts associated with each alternative and design wetland mitigation to compensate for impacts of the alternative chosen.

On August 22, 2003 Wilbur Smith Associates, Inc authorized Wetland and Coastal Resources, Inc. (WCR) to investigate properties suitable for potential wetland construction. The scope of work included review of in-house resource data, site investigation of specific properties, and preliminary analysis of those sites identified for potential mitigation.

Based on the State of Michigan wetland statute and discussions with both MDOT and the Michigan Department of Environmental Quality (MDEQ), current replacement ratios for impacted wetlands are 2 to 1 for forested wetlands, and 1.5 to 1 for most other wetland types. Alternatives 1 and 2 each require 1.0 acre of wetland creation as mitigation. A total of approximately 6.97 acres of new wetland creation will be required for Alternative 3. Since Alternative 3 requires the greatest amount of wetland mitigation, efforts sought to identify a minimum of approximately 6.97 acres of potential mitigation area.

It should be noted that the sites identified in this report are in the initial phases of investigation. Property owners have not been contacted to assess their interest in either selling or granting an easement for wetland creation on their property. These sites were deemed to be the best prospective sites available in close proximity to the project. If these sites become unavailable as the project moves forward, a search for sites located further from the project site will be necessary.

The information and analysis associated with this report represent the opinions and professional judgment of WCR. Both State and Federal regulatory agencies have the final authority in matters of wetland identification, wetland mitigation, and permitting issues.

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2.0 METHODS

The criteria for site selection are based on mitigation preferences typically required by the MDEQ, Land and Water Management Division (LWMD). These criteria focus on location, the potential for success, replacement values, and the expected or anticipated long-term viability of the wetland to be created.

Alternatives 1 and 2 each require approximately 1.0 acre of wetland mitigation based on current project concepts and typical wetland mitigation replacement ratios of 2 to 1 for Palustrine forested wetlands and 1.5 to 1 for most other wetland types. Alternative 3 requires 6.97 acres of mitigation based on these concepts and ratios. Due to the comparatively small amount of mitigation required for Alternatives 1 and 2, identification of potential mitigation sites focused on areas sufficient to accommodate mitigation for the impacts associated with Alternative 3.

Potential wetland mitigation sites were initially identified inside and adjacent to the project study area using aerial photography and visual inspection conducted during site inspections for wetlands and threatened and endangered species. Additional sites outside the project study area were also identified using aerial photographs. All potential mitigation sites were identified on a map, and later field inspected.

Sites within or directly adjacent to the project area were inspected first, followed by sites within the same watershed and in close proximity to the project area. Each site was viewed in the field by a wetland mitigation and design specialist and rated based on a set of site selection criteria.

2.1 Site Selection Criteria

Site selection criteria were established to provide recommendations regarding acceptable wetland mitigation sites. The following criteria were used:

- Size
- Proximity to project
- Location within watershed
- Apparent water source (hydrology)
- Soils
- Elevation in landscape
- Access
- Surrounding land use
- Presence/absence of buffers (Adjacent undeveloped lands such as wetland and forests) and/or invasive plant species

Site selections focused on identifying mitigation areas within the same watershed as the proposed impacts. Replacement of impacted wetlands within the same watershed is intended to replace the values and functions within the same drainage basin. In addition, mitigation sites located in close proximity to the project were preferred in order to maintain wetland functions and values within the same sub-watershed.

Hydrology is a primary component for successful wetland creation. Stable and/or dependable water sources, combined with appropriate soils, provide a sound base for developing a viable

wetland complex. Those areas containing altered or drained hydric soils typically have a high potential for hydrologic restoration and establishing vegetation from historic seed banks. Sites

with hydric soils and apparent water sources (groundwater, surface and/or stream runoff, etc.) were given highest priority. However, review of available hydrology was preliminary and limited in scope. Monitoring wells, soil borings, and development of a water budget is required for each site to specifically define availability of wetland hydrology and capacities of the soils to hold water.

Elevation of the potential mitigation site was generally identified in relation to nearby surface water sources. Amount and cost of excavations to establish wetland grades are typically lower on sites with ground elevations close to groundwater or adjacent surfacewater elevations. Therefore, sites that were lower in the landscape were considered more desirable.

Review of surrounding land use and buffers were also considered to determine the long-term viability and value of wetland mitigation at each site. Wetland creation adjacent to existing wetland habitats (or other natural, undeveloped areas) can be designed to enhance the overall ecological diversity of the site. Conversely, those sites directly adjacent, to or isolated by, urbanization may provide less ecological value and will be influenced to a greater degree by adjacent human activity.

Control of invasive plant species within newly constructed wetlands is performance factor that is typically required by the MDEQ. The presence or absence of invasive plant species within adjacent lands was considered when rating potential mitigation sites. Sites with invasive species present were rated lower than sites where invasive plants were absent.

Finally, consideration was given to the ability to access a site. Access for mitigation construction can be difficult and may require additional expenditures for temporary roadwork resulting in temporary impacts to existing resources.

The criteria were rated for each potential mitigation site in one of 3 general categories. Ranking for the sites were then established based on criteria ratings. The 3 ratings for each criterion are briefly described below.

CRITERIA	RATING CATEGORIES		
	Meets Requirements	**Partially or Potentially Meets Requirements**	**Unknown or Does Not Meet Requirements**
Size	9 Acres or larger	7 to 9 acres	Less than 7 acres
Proximity to Project	Within/Adjacent to Project	Within 2 Miles of Project Area	Beyond 2 Miles from Project area
Location within Watershed	Stocks Creek Watershed	Black River Watershed	Outside Black River Watershed

CRITERIA	RATING CATEGORIES

	Meets Requirements	Partially or Potentially Meets Requirements	Unknown or Does Not Meet Requirements
Hydrology	Source of Surface Hydrology Present	Potential Groundwater or Perched Hydrology	No Apparent Source Present
Soils	Poorly Drained	Somewhat Poorly Drained or Alluvial Land	Unknown or well drained soil
Elevation	Low	Moderately Low or High	High
Access	Access Apparent	Access Difficult	No Apparent Access
Surrounding Land Use	Undeveloped	Residential Development (Low Density)	Commercial/Industrial, High Density Residential
Buffer	Large Areas of Adjacent Vacant Land/ No Invasive Plant Species	Moderate Amount of Adjacent Vacant Land/ Minimal Amount of Invasive Plant Species Present	Surrounded by Developed Land/ Significant Amount of Invasive Species Present

3.0 RESULTS AND DISCUSSION

The Blue Water Bridge Plaza Project lies within the Black River watershed; near it's confluence with the St. Clair River (**Figure 3.1 of Attachment A-1 of Appendix A**). The majority of the project area consists of residential and commercial development, active upland farm fields and upland fallow fields.

Review efforts identified a total of 7 potential wetland mitigation sites with varying degrees of wetland creation potential. **Figure 3.2 (Attachment A-1** of **Appendix A)** identifies the general location of the 7 potential wetland mitigation sites and **Appendix B** includes photographs of each potential wetland mitigation site.

The 7 sites were ranked based on review criteria ratings. **Table 3.1** (**Appendix C-1 of Attachment C**) provides shows the criteria ratings and site ranking for the 7 potential mitigation sites. A brief description of each site is provided below.

3.1 Potential Wetland Mitigation Area 1

Area 1 is located north of I-94 at the location of proposed Alternative 3 (**Figure 3.3 Attachment A-2** of **Appendix A**). The area contains approximately 90 acres of upland, of which portions appear to have potential for wetland creation. Since this area is part of the properties associated with Alternative #3, purchase and access issues could be included as part of the plaza construction project.

Figure 3.3 identifies an area available for mitigation based on current conceptual plans for Alternative 3. This area includes approximately 19 acres of upland and is identified as buffer in Alternative 3 project plans. The Soil Survey of St. Clair County, Michigan (1974) classifies the soils within this area as Londo complex, Avoca loamy sand, and Wianola-Deford fine sands, which include somewhat poorly drained to very poorly drained soil types. The area is actively farmed and produced a crop of soybeans in 2003 and corn in 2004.

Hydrology for wetland creation appears to be available within this area. Drainage is present within the northern portion of the area and immediately west, within adjacent woods. A detention pond is also present immediately east of this area, with water levels 3 to 4 feet below surrounding grade.

Stormwater from new plaza construction could be used to supply hydrology to the mitigation area. Use of stormwater could minimize the amount of excavation necessary and reduce costs of wetland construction. However, water quality issues must be addressed by utilizing non-contact water only (drainage from roofs) and/or providing treatment of stormwater (removal of sediment, oils, greases, and potentially nutrients) prior to discharge into the new wetlands.

Mitigation potential is also present within the far southwest corner of Area 1, where a loop road is planned under Alternative 3. The elevation at this location appears to be lower than the previously discussed mitigation area, and existing wetlands are presently adjacent to this area. If re-design of the road system is feasible, this area could also provide mitigation potential.

Use of either site within Area 1 provides the potential to create wetlands that complement nearby existing wetlands and adjacent wooded upland. Hydric soils, existing wetland, and sources of hydrology appear sufficient for creation of an acceptable wetland system. In

addition, the sites are part of Alternative 3 plans, within the project area, and have available access.

3.2 Potential Wetland Mitigation Area 2

Area 2 is located south of I-94, immediately south of the road system proposed for Alternative 3 (**Figure 3.3**). Approximately 9 acres of upland are available for mitigation based on current project plans. This area is also part of properties associated with Alternative 3 and purchase/access issues could be addressed as part of project construction.

The Soil Survey of St. Clair County, Michigan classifies the soils within this area as Allendale-Hoytville complex, which include somewhat poorly drained loamy fine sands and very poorly drained silty clay loams. The area is dominated by an old field, which appears to have been historically farmed.

Hydrology for wetland creation appears to be available within this area. Numerous ditches are present that appear to have been created for drainage to facilitate farming. Wetland pockets, most of which contain seasonal standing water, also exist adjacent to and throughout this area.

Stormwater from road runoff could be used to supplement hydrology to the mitigation area. Use of stormwater could minimize the amount of excavation necessary and reduce costs of wetland construction. However, water quality issues must be addressed as identified for Area 1.

Use of this area would complement the existing wetlands and adjacent upland woods and provide a diversity of habitats within a relatively small area. Hydric soils, and sources of hydrology appear sufficient for creation of an acceptable wetland system. In addition, the site is part of Alternative 3 plans, within the project area, and has available access.

3.3 Potential Wetland Mitigation Area 3

Area 3 is located north of the project area adjacent to the Black River (**Figure 3.4**, **Attachment A-2** of **Appendix A**). This area is approximately 19 acres in size and located within the Township of Port Huron's Bakers Field Park. The vast majority of the site contains open field dominated by upland with herbaceous vegetation. An access road is present along the Black River that provides fishing access and access to a marina south of the property.

Soils within this area are classified by the Soil Survey of St. Clair County as Alluvial land, which occupies floodplain bottoms of major rivers and creeks throughout the county. These soils consist of stratified mineral soils with varying degrees of grain size and permeability.

Hydrology for wetland creation could be available from the Black River, depending on the specific mitigation area chosen (proximity to the river). However, maintaining road access to the park and marina would likely be a concern. Depth of excavation would depend on the elevation of frequent flooding in comparison to existing grades. It is also possible to supply

wetland hydrology from ground water and adjacent surface runoff, but soil borings, monitoring wells, and development of a water budget would be necessary to identify specific hydrology available. Use of this area would require agreements with the Township that could benefit both MDOT and the residents of the Township. The purchase of the property may not be required or desired by the Township. Wetland creation plans could incorporate nature trails and educational signage that could be used by local schools and Township residents.

3.4 Potential Wetland Mitigation Area 4

Area 4 is located north of I-94 and east of Area 1 (**Figure 3.5**, **Attachment A-2** of **Appendix A**) and includes open field areas that appear to have been historically farmed. Vegetation within this area is primarily herbaceous, with scattered shrubs and young trees. Approximately 8 acres of upland are available for mitigation at this site.

Soils within Area 4 are classified as Avoca loamy sands, which include somewhat poorly drained soils. The elevation of the property is over 10 feet above I-94. Wetland is present at the north end of the area and the east end is bordered by heavy woods and shrubs where the ground slopes east to the floodplain of Stocks Creek. A series of wetland swales are also present running north-south that appear to be old farm furrows and/or minor surface drains constructed to facilitate past farming. Wetland hydrology may be available from Stocks Creek and/or surface drainage, but additional site work will be required to determine if sufficient wetland hydrology is available.

Use of this area could complement the existing wetlands and adjacent upland woods and provide a diversity of habitats adjacent to Stocks Creek. However, due to existing elevations, extensive excavations may be required to create a viable system. In addition, the size of the area may not be sufficient to accommodate creation of 6.97 acres of wetland, due to potential slopes required to reach wetland grades. An additional site may have to be used in combination with Area 4 to meet mitigation requirements.

3.5 Potential Wetland Mitigation Area 5

Area 5 is located outside the project area, approximately 1 mile southeast of the I-94/I-69 interchange (**Figure 3.6, Attachment A-2** of **Appendix A**). Approximately 13 acres of upland are present on this site adjacent to an existing pond. The site includes an abandoned racetrack with lawn, bare ground and pioneer herbaceous plant species.

The Soil Survey of St. Clair County classifies the soils within this area as borrow pit, indicating that the area has been excavated and the upper part of the original soil removed. It is difficult, if not impossible to determine soil types present prior to pit excavations.

Water elevations of the pond are similar to elevations of surrounding land, indicating potential groundwater supply for wetland hydrology. However, the source of water in the pond is unknown. Installation of monitoring wells would be required to determine depth of excavation necessary to reach groundwater.

Use of this area provides the potential to incorporate an existing water feature and enhance habitat diversity. Existing forested wetland is present to the west of this area. However, the

southern and eastern borders of Area 5 are associated with developed lands used commercially and for storage of large items, suggesting potential long-term impacts from human activity.

3.6 Potential Wetland Mitigation Area 6

Area 6 is located south of I-94, east of the Lapeer Road Connector, and west of a self-storage business (**Figure 3.5, Attachment A-2** of **Appendix A**). This area consists of old field dominated by upland herbaceous vegetation with approximately 3.3 acres suitable for mitigation.

Soils within this area are classified as an Allendale-Hoytville complex, which includes somewhat poorly drained loamy fine sands and very poorly drained silty clay loams. A drainage ditch is present along the southern boundary of the property and forested wetland is present to the north, indicating that sufficient hydrology may be available for wetland mitigation.

The space available for mitigation at this location is insufficient to accommodate the total mitigation required under Alternative 3 and would require use of multiple sites to obtain required acreage. Regulatory agencies typically require single mitigation sites associated with regulated wetland systems or creation of wetlands that are regulated under statute. Suitability of this site for mitigation does not appear consistent with agency requirements.

3.7 Potential Wetland Mitigation Area 7

Mitigation Area 7 is located north of I-69 and approximately ½ mile north of Area 5 (**Figure 3.6, Attachment A-2** of **Appendix A**). The site consists of disturbed land (old filling and grading activity) and is surrounded by forested wetland and sparse upland woods. The area of land available for mitigation at this location is approximately 5 acres, which is not sufficient to compensate for impacts associated with Alternative 3. The property is currently for sale by Kramer Realty, Inc. as commercial property.

The disturbed soils on this site are shown on Soil Survey of St. Clair County as borrow pits. Additional soils shown on the site include Chelsea-Crosswell complex, which consists of well-drained and moderately well drained soils that are not typically suitable to maintain wetland hydrology.

Vegetation within area 7 includes reed grass (*Phragmites australis*), which is present in pockets on site and is dominant west of the potential mitigation area. This invasive plant is difficult to control and can establish large monotypic stands within short periods of time, out-competing desired plant species. Control of this plant is a typical condition of State wetland permits under wetland mitigation performance standards.

3.8 Wetland and Stream Enhancement

In addition to wetland creation, wetland enhancement can be included to assist in replacing values and functions of impacted wetland. Regulating agencies can consider enhancement as part of a mitigation plan, but typically do not accept enhancement as the sole measure for

replacement of values and functions. Prior to pursuing enhancement as part of a mitigation proposal, discussion should occur with regulating agencies to determine if enhancement is appropriate and what mitigation credit the enhancement may provide.

Figure 3.7 (**Attachment A-3** of **Appendix A**) identifies a potential enhancement area adjacent to Stocks Creek. This area is currently dominated by monotypic stands of reed canary grass

(*Phalaris arundinacea*) and reed grass. Creation of shallow, open water features within this area would increase the diversity of habitats, plant species, and wildlife.

In addition to wetland impacts, regulating agencies may require compensation for impacts to streams. Alternative 3 requires impacts to Stocks Creek from proposed road and highway construction. Incorporating habitat enhancement structures, reducing erosion and sediment loading, and developing conditions for a stable stream channel are appropriate projects to compensate for proposed stream impacts.

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4.0 CONCLUSIONS/RECOMMENDATIONS

Vacant lands within and near the project area for the Blue Water Bridge Plaza Study were assessed for potential mitigation sites. Area 1 is recommended as the preferred site for potential wetland mitigation given its size, location, available hydrology, surrounding land use, soils, and access. **Table 3.1** of (**Attachment C-1** of **Appendix C**) shows the ranks assigned to each of the 7 mitigation sites identified, based on the review criteria.

Should Area 1 be deemed unsuitable for mitigation, the remaining mitigation sites should be assessed and utilized where appropriate. These remaining sites are identified below in order of preference:

1. Area 2. This area includes 9 aces of potential wetland mitigation and is adjacent to the proposed roadwork and wetland impacts for Alternative 3. Surrounding areas include wetland and upland habitats.

2. Area 3. This area includes 19 aces of potential wetland mitigation and is adjacent to the Black River. The site is part of a park owned by the Township of Port Huron and has potential to incorporate environmental education opportunities.

3. Area 4. This area includes approximately 8 aces of potential wetland mitigation and includes hydric soils. However Area 4 may require significant earthwork and may not be of sufficient size to accommodate mitigation requirements for Alternative 3.

4. Area 5. This area includes 13 acres of potential wetland mitigation, has an existing water feature, and adjacent wetland areas. This area is adjacent to commercial developments that may result in persistent and frequent human intrusion with consequent impacts to the success of the mitigation.

5. Areas 6. This area includes 3.3 acres of potential wetland mitigation, and has apparent sources of hydrology from adjacent drainage. However, its size is not sufficient to accommodate the mitigation area required under Alternative 3.

6. Area 7. This area includes 5.4 acres of potential wetland mitigation and is currently for sale. However, due to its size and the presence of invasive wetland plants, consideration of this site is not recommended.

The reviews presented within this report are preliminary. Additional site-specific data are necessary to assess hydrologic regimes, excavation requirements, and the potential to create diverse, self-sustaining wetland systems. Soil borings and monitoring wells should be conducted and installed at the final site(s) chosen for mitigation. Topographic information and data gathered from borings and wells should be analyzed by an experienced hydro-geologist.

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5.0 LIST OF REFERENCES

United States Department of Agriculture. 1974. Soil Survey of St. Clair County, Michigan.

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APPENDICES

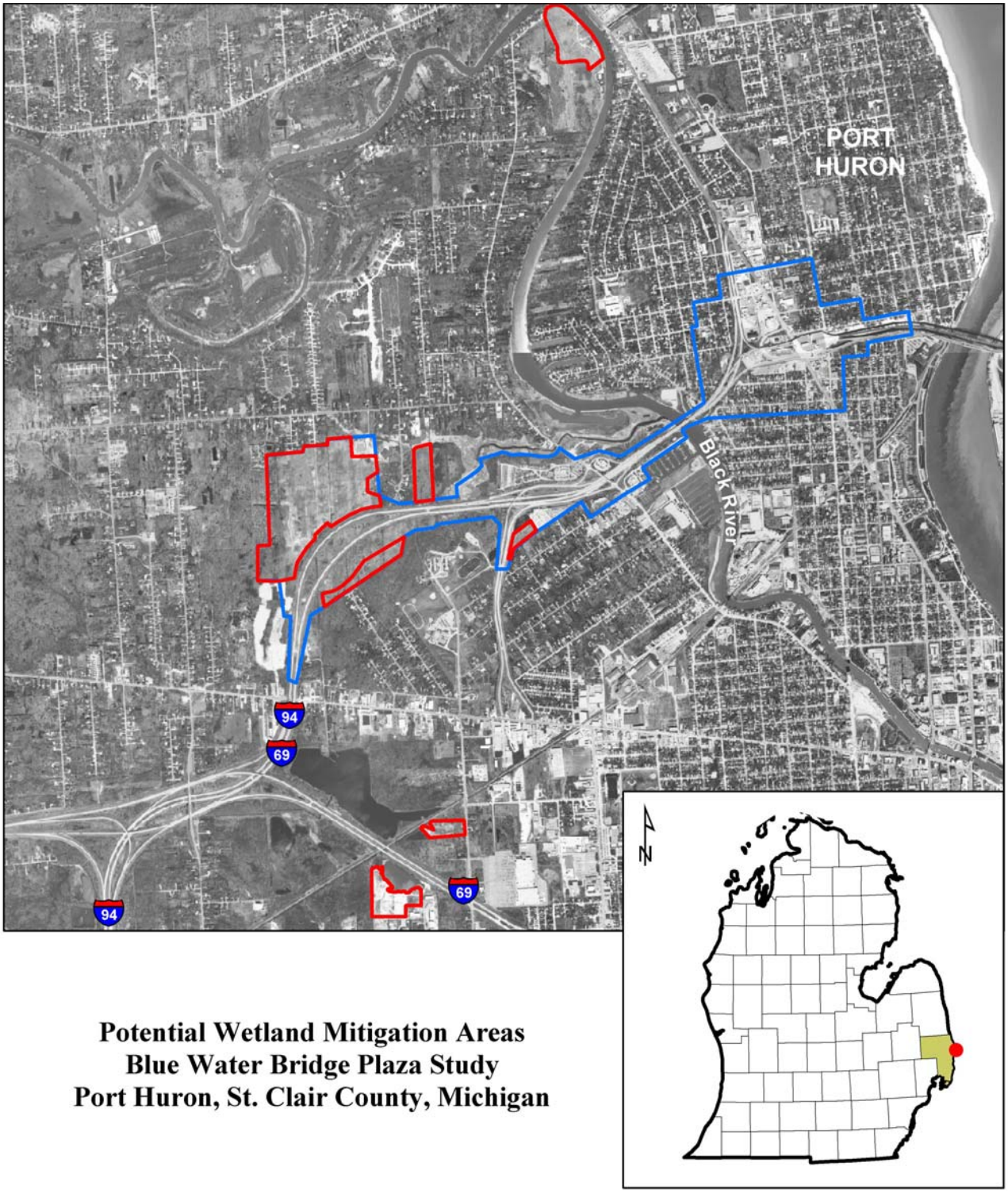
APPENDIX A

FIGURES

ATTACHMENT A-1

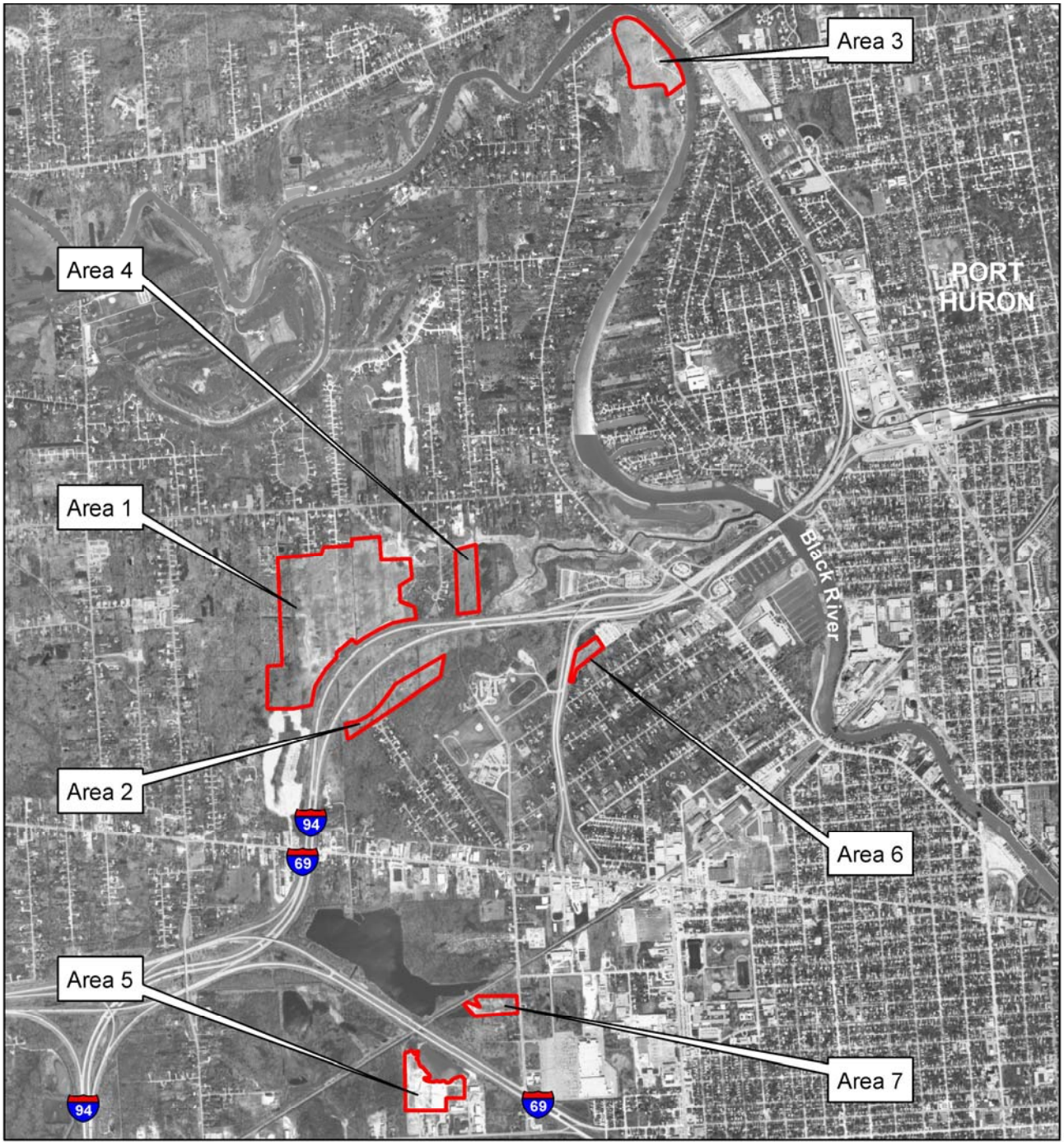
Figure 3.1 and 3.2

Location of Potential Wetland Mitigation Sites



Potential Wetland Mitigation Areas
Blue Water Bridge Plaza Study
Port Huron, St. Clair County, Michigan

Wetland and Coastal Resources, Inc 5801 W. Michigan Ave. Lansing, MI 48917	Wibur Smith Associates	AJS	FIGURE NO.
	Blue Water Bridge Plaza Study	08/27/04	3.1



Aerial Photograph Showing Potential Wetland Mitigation Sites.

0 0.375 0.75 1.5 Miles

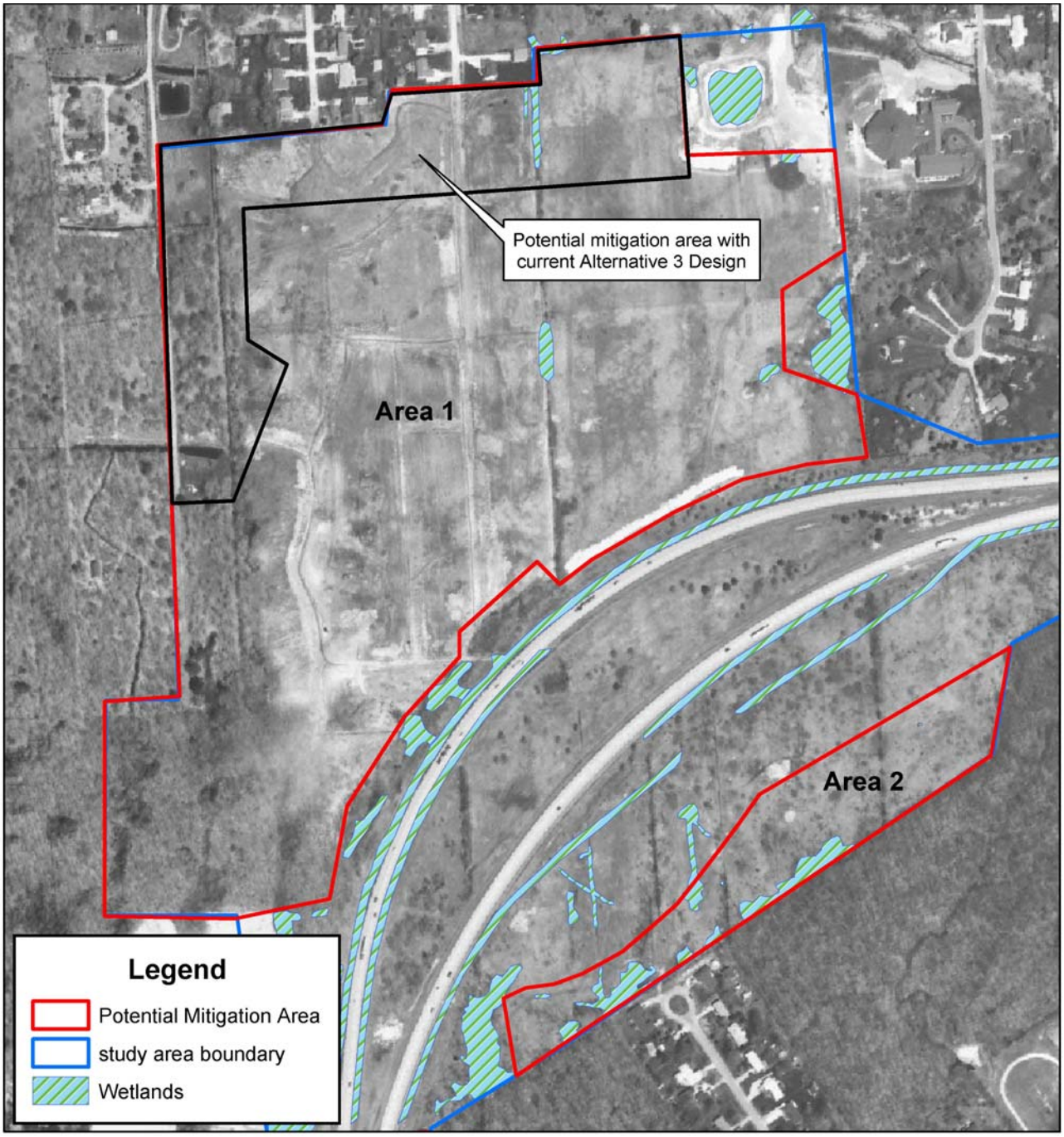
N

Wetland and Coastal Resources, Inc 5801 W. Michigan Ave. Lansing, MI 48917	Wibur Smith Associates Blue Water Bridge Plaza Study	AJS 08/27/04	FIGURE NO. 3.2

ATTACHMENT A-2

Figure 3.3 through 3.6

Potential Wetland Mitigation Sites 1 Through 7

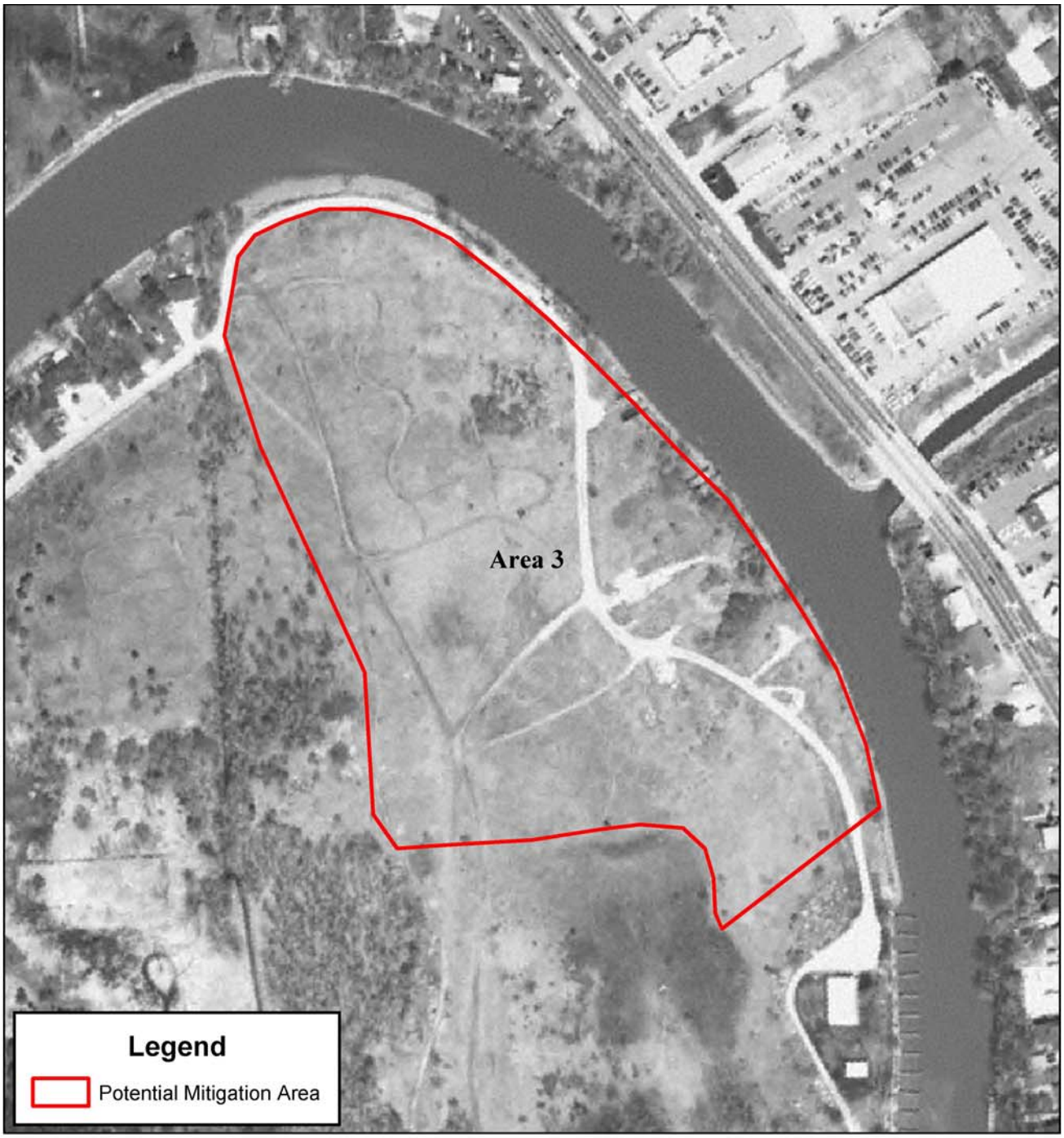


Potential Wetland Mitigation Sites 1 and 2.

0 385 770 1,540 Feet

N

Wetland and Coastal Resources, Inc. 5801 W. Michigan Ave. Lansing, MI 48917	Wilbur Smith Associates	AJS	FIGURE NO.
	Blue Water Bridge Plaza Study	08/27/04	3.3

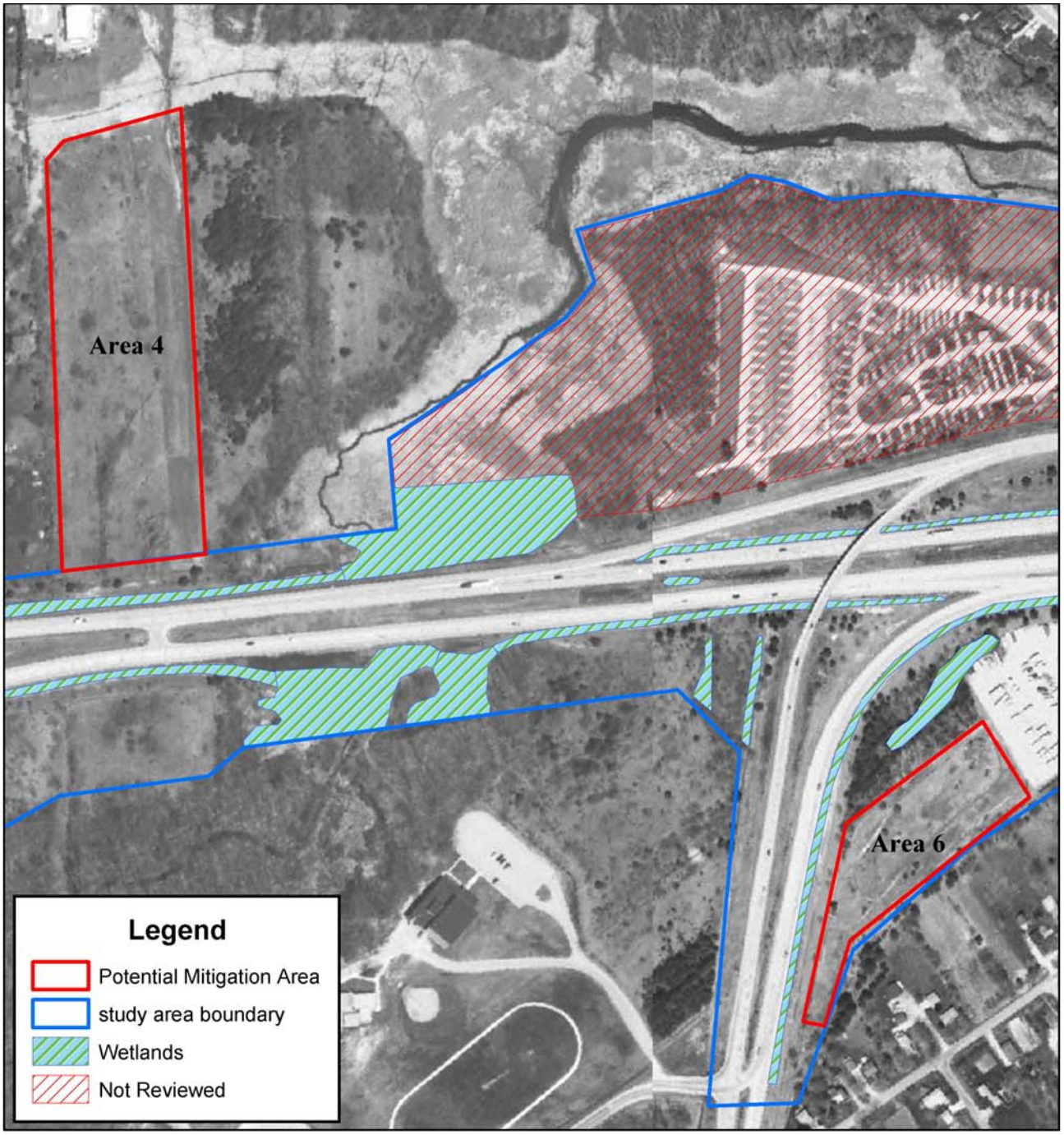


Potential Wetland Mitigation Site 3.

0 212.5 425 850 Feet

N

Wetland and Coastal Resources, Inc. 5801 W. Michigan Ave. Lansing, MI 48917	**Wilbur Smith Associates** **Blue Water Bridge Plaza Study**	AJS 08/27/04	FIGURE NO. **3.4**



Potential Wetland Mitigation Sites 4 and 6.

0 300 600 1,200 Feet

N

Wetland and Coastal Resources, Inc. 5801 W. Michigan Ave. Lansing, MI 48917	Wilbur Smith Associates Blue Water Bridge Plaza Study	AJS 08/27/04	FIGURE NO. 3.5

Potential Wetland Mitigation Sites 5 and 7.

0 265 530 1,060 Feet

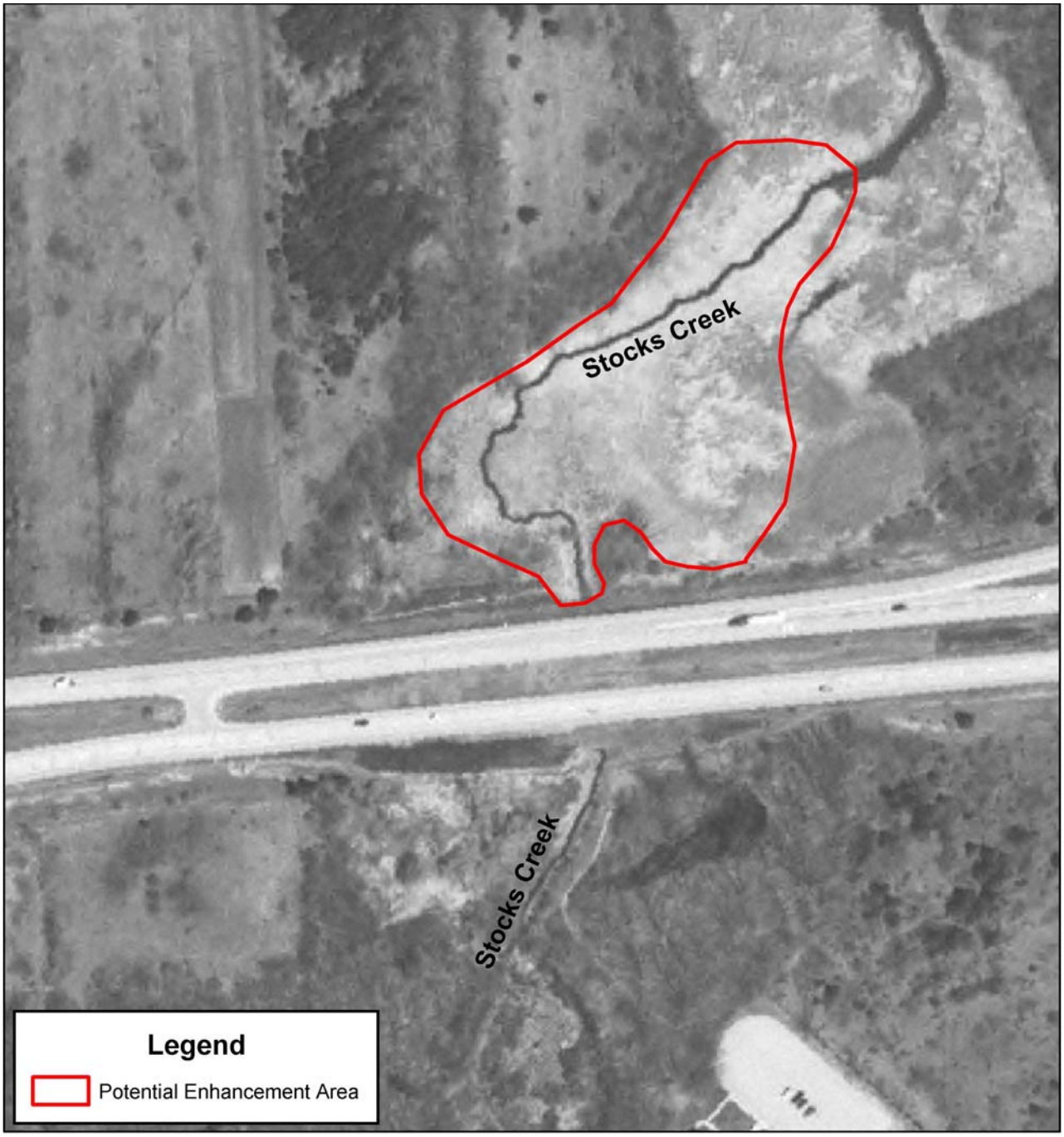
N

Wetland and Coastal Resources, Inc. 5801 W. Michigan Ave. Lansing, MI 48917	Wilbur Smith Associates Blue Water Bridge Plaza Study	AJS 08/27/04	FIGURE NO. 3.6

ATTACHMENT A-3

Figure 3.7

Potential Wetland Enhancement and Stream Improvement Areas



Potential Wetland Enhancement and Stream Habitat Improvement Areas.

0 170 340 680 Feet

N

Wetland and Coastal Resources, Inc. 5801 W. Michigan Ave. Lansing, MI 48917	Wilbur Smith Associates Blue Water Bridge Plaza Study	AJS 08/27/04	FIGURE NO. 3.7

APPENDIX B

PHOTOGRAPHS


AREA 1


AREA 1


AREA 2


AREA 3


AREA 4


AREA 5


AREA 6


AREA 7

APPENDIX C

TABLES

ATTACHMENT C-1

Table 3.1

Ranking and Criteria for Potential Wetland Mitigation Sites

Table 3.1 Ranking and Criteria Ratings for Potential Wetland Mitigation Sites

Meets Mitigation Requirements | **Partially/Potentially Meets Mitigation Requirements** | **Unknown and/or Does Not Meet Mitigation Requirements**

Mitigation Area	1	2	3	4	5	6	7
Ranking	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th (Not Recommended)**
Site Size (acres)	19.0	9.7	19.5	8.9	13.3	**3.3**	**5.4**
Proximity to Project	Within/Adjacent to Project	Within/Adjacent to Project	1.5 Miles North of Project Area	Adjacent	1 Mile South of Project Area	Within/Adjacent To Project	1 Mile South of Project Area
Location Within the Watershed	Stocks Creek Black River	Stocks Creek Black River	Black River	Stocks Creek Black River	Stocks Creek Black River	Stocks Creek Black River	Stocks Creek Black River
Apparent Source of Hydrology	Existing Drain Stormwater Potential Groundwater	Existing Drain Stormwater Potential Groundwater	Black River Groundwater Runoff	Unknown. Potential Perched System or Excavation To Groundwater	Ground Water, Existing Pond Present	Drain And Adjacent Wetlands	Ground Water, Existing Wetland/Pond Present
Soils	Somewhat Poorly Drained/Poorly Drained	Somewhat Poorly Drained/Poorly Drained	Alluvial Land	Somewhat Poorly Drained	Old Borrow Pit, Unknown Soil Profiles/Classifications	Somewhat Poorly Drained To Poorly Drained	Old Borrow Pit, Unknown Soil Profiles/Classifications
Elevation in landscape	Low	Low	Moderately Low	High	Moderately Low	Moderately Low	Moderately Low
Access	Yes Part of Plaza Area	Yes Part of Plaza Area	Yes, Local Surface Streets	Difficult, High Elevation Approach From I-94	Yes, Local Surface Streets	Yes	Yes, Local Surface Streets
Surround land Use	Forested and Large Lot Residential	Forested and Large Lot Residential	Undeveloped. Parkland And Marina	Large Lot Residential	Commercial and Industrial Storage	Commercial And Undeveloped	Large Lot Residential and Undeveloped
Buffers	Large Forested Area West	Large Forested Area South	Undeveloped Parkland	Wetlands and Upland Scrub East and North.	Minimal, Forested Area Present to the West	Minimal, Forested Wetland North	Wooded areas present. Phragmites prominent