DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO ATTENTION OF:

20 January 2012

Regional Planning and Environmental Division North
Environmental Compliance Section

Dear Sir or Madam:

The St. Louis District, Corps of Engineers has prepared an Environmental Assessment (EA) with Draft Finding of No Significant Impact (FONSI) for a plan proposed by the Southwestern Illinois Flood Prevention District Council to make improvements to three existing Federal levee projects, namely the Wood River, Metro East St. Louis, and Prairie du Pont / Fish Lake levee systems, in order to obtain accreditation from the Federal Emergency Management Agency. These levee systems are located in southwestern Illinois in Madison, St. Clair, and Monroe counties. This document serves to notify the public of the proposed project and requests assistance in identifying the probable environmental impacts.

You are receiving this letter because you may be interested in the project. The 30-day public review period runs from 20 January to 20 February 2012. The EA with FONSI is available for public review. The electronic version of the EA is available online at http://www.mvs.usace.army.mil/pm/pm-reports.html or you may request a copy be mailed to you.

This document is provided to you for your information and review. We invite your comments related to the content of this document. If you would like to submit comments, please address your comments or questions to Timothy George of the Environmental Compliance Section (CEMVP-PD-C), at telephone number (314) 331-8459, facsimile number (314) 331-8606, or e-mail at Timothy.K.George@usace.army.mil, by noon on 20 February 2012.

Sincerely,

Thomas Keevin

Thomas Keevin, Ph.D.
Chief, Planning and Environmental Branch

ENVIRONMENTAL ASSESSMENT
WITH
UNSIGNED FINDING OF NO SIGNIFICANT IMPACT

SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT
MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

Prepared for:

Southwestern Illinois Flood Prevention District Council
104 United Drive
Collinsville, IL 62234

and

AMEC Earth and Environmental, Inc. (Consultant)
3199 Riverport Tech Center Drive
St. Louis, MO
63043

By

U.S. Army Corps of Engineers, St. Louis District
Regional Planning and Environmental Division North
Environmental Compliance Section
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JANUARY 2012

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SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT
MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

1. INTRODUCTION

The United States Army Corps of Engineers, St. Louis District (USACE) and associated non-federal sponsors have constructed numerous flood control projects within the USACE St. Louis District boundaries in the States of Missouri and Illinois. Typically, USACE flood control projects encompass large areas located within floodplain drainages in increasing urban environments. The completed flood control projects are operated and maintained by the associated non-federal sponsor; however, USACE is responsible for ensuring the integrity and primary functions of projects are maintained at all times. Exhibit EA-1 depicts the USACE St. Louis District Civil Works Boundary.

Due to the size and location of these projects, there are increasing requests by non-federal entities to traverse or modify the existing Federal flood control projects by various construction activities, which require Federal approval. Specifically, 33 USC Section 408 states:

> *"It shall not be lawful for any person or persons to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct by fastening vessels thereto or otherwise, or in any manner whatever impair the usefulness of any sea wall, bulkhead, jetty, dike,* ***levee,*** *wharf, pier, or other work built by the United States, or any piece of plant, floating or otherwise, used in the construction of such work under the control of the United States, in whole or in part, for the preservation and improvement of any of its navigable waters or to prevent floods, or as boundary marks, tide gauges, surveying stations, buoys, or other established marks, nor remove for ballast or other purposes any stone or other material composing such works: Provided, That the Secretary of the Army may, on the recommendation of the Chief of Engineers, grant permission for the temporary occupation or use of any of the aforementioned public works when in his judgment such occupation or use will not be injurious to the public interest: Provided further, That the Secretary may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any of the aforementioned public works when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work."*

In accordance with 33 USC Section 408, any modification to a Federal project requires that the USACE review and approve plans to ensure that the modification does not adversely impact the Federal Project.

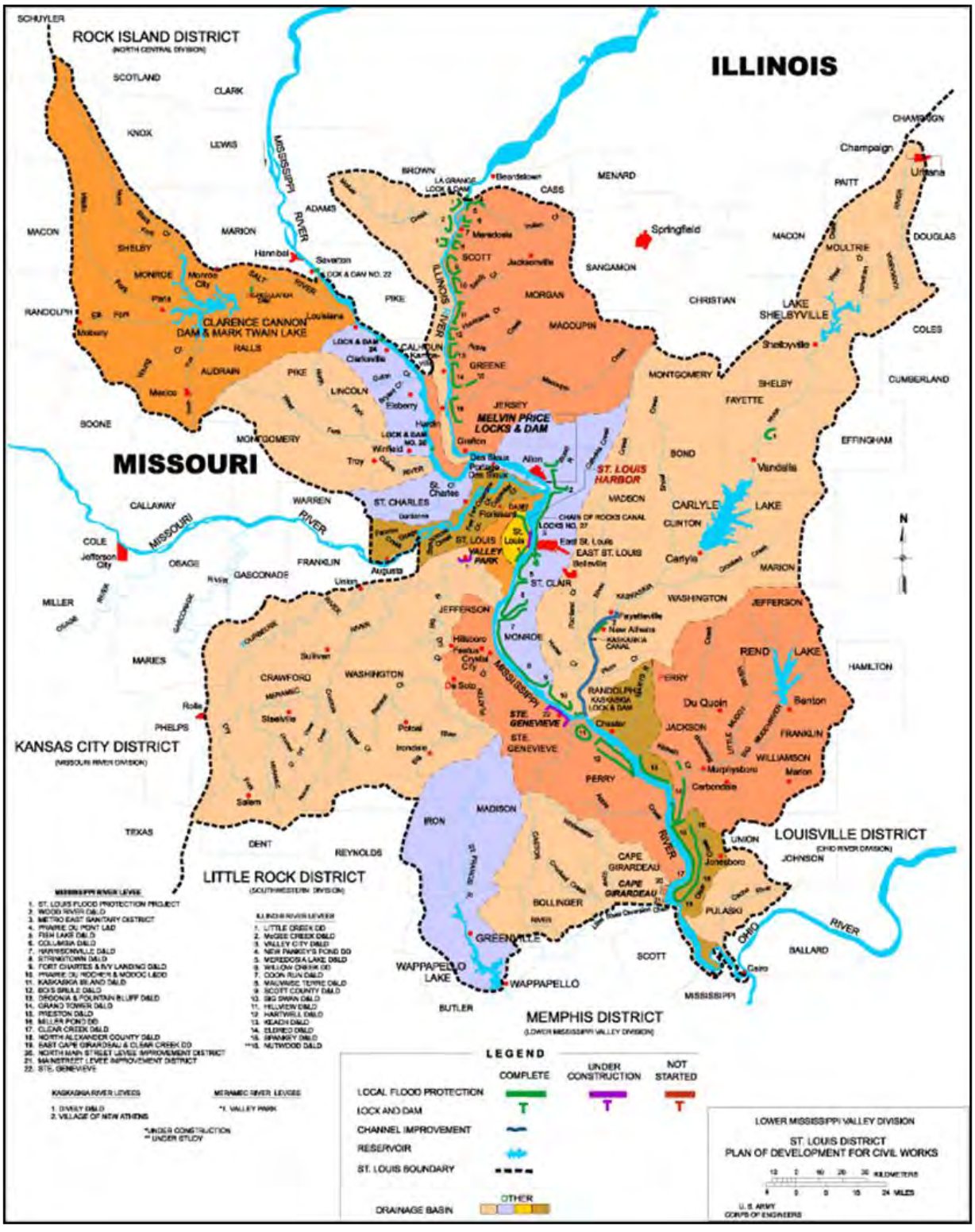

Exhibit EA-1. United States Army Corps of Engineers, St. Louis District Civil Works boundary.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's Regulations (40 Code of Federal Regulations §1500-1508), as reflected in the USACE Engineering Regulation 200-2-2.

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, Regional Planning and Environmental Division North, Environmental Compliance Section at the St. Louis District, has prepared this Environmental Assessment (EA) to evaluate the potential impacts associated with the proposed levee improvement project.

Impacts on environmental resources are discussed in the Environmental Assessment (EA) and summarized in the unsigned Finding of No Significant Impact (FONSI).

1.1. Project Location and Scope

The American Bottoms (aka Metro East) in St. Clair, Madison, and Monroe counties, Illinois, is a broad floodplain area situated along the east bank of the Mississippi River across from the City of St. Louis, Missouri, between river miles (RM) 203 and 166. It is protected from Mississippi River flooding by a system of levees which are operated and maintained by four separate locally owned levee districts: the Wood River Drainage and Levee District (Wood River), the Metro East Sanitary District (MESD), the Prairie du Pont Sanitary and Levee District, and the Fish Lake Drainage and Levee District (Prairie du Pont/Fish Lake; PDPFL) Exhibit EA-2. These levee systems, in addition to the Federally owned Chain of Rocks levees (not included in this study), comprise the Metro East levee system (Exhibit EA-3).

The Southwestern Illinois Flood Prevention District Council (SIFPDC) was formed by the three county flood prevention districts (FPDs) as a joint venture to oversee the improvement of the Metro East levee systems so they can continue to protect the lives, property and the economic vitality of the St. Louis Metro East region.

1.2. Project Description and Need

The proposed project is designed to make improvements to Federal projects, namely the Wood River, Metro East St. Louis, and Prairie du Pont / Fish Lake levee systems in order to obtain accreditation in accordance with 44 CFR 65.10.

Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44 CFR 65.10) is titled, "Mapping of areas protected by levee systems." (FEMA 2011). It provides the minimum design, operation, and maintenance standards levees must meet and continue to meet in order to be recognized as providing protection from the base flood (also known as one-percent-annual-chance flood) on Flood Insurance Rate Maps (FIRMs) (FEMA 2011). In order for a levee to be accredited by FEMA and shown on a FIRM as providing protection from the base flood, a levee must first be certified by a Professional Engineer or a Federal Agency that designs levees (FEMA 2011). Levees are accredited when levee owners, communities, or other interested

Exhibit EA-2. Location of the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems.

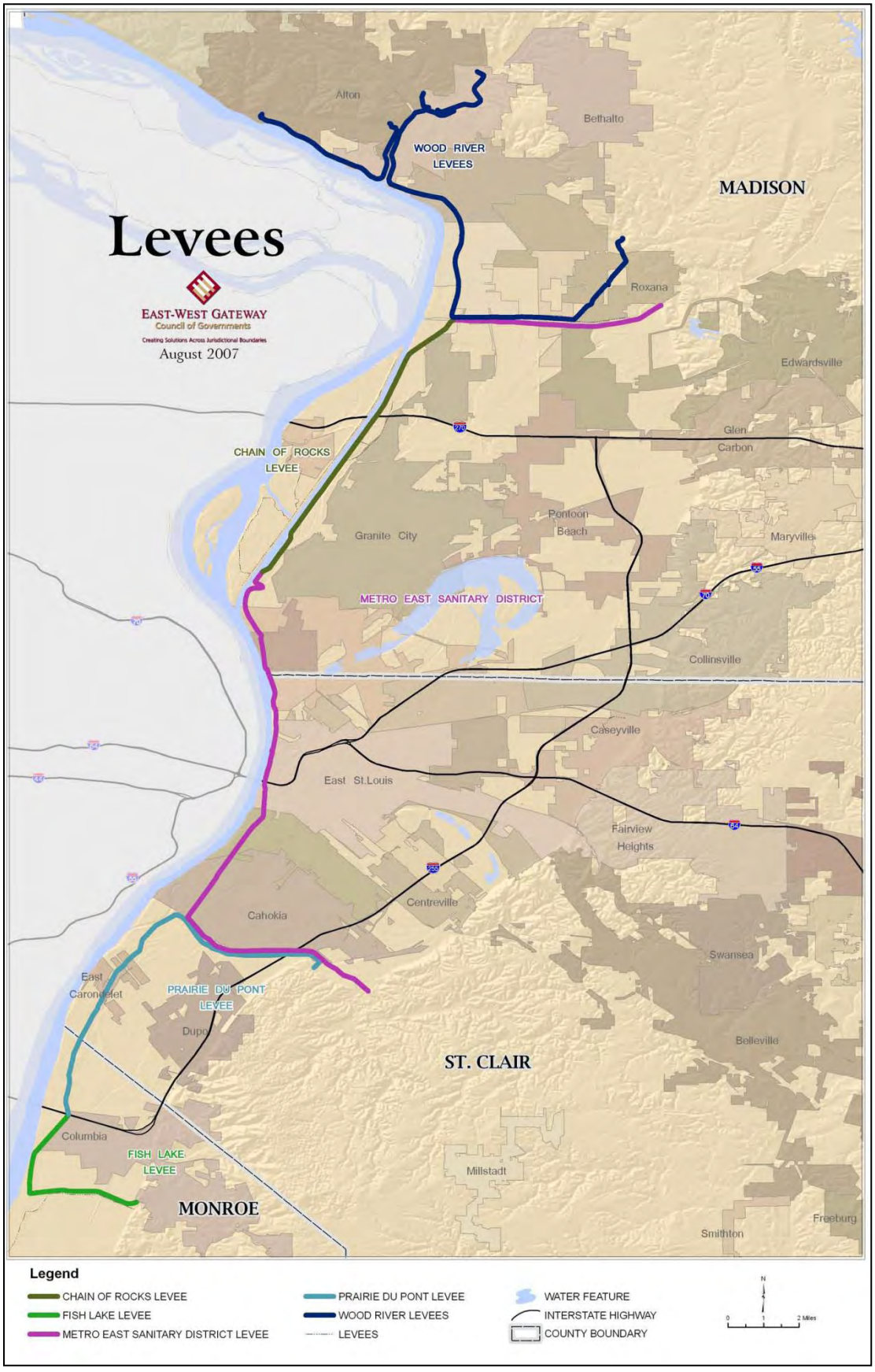

Exhibit EA-3. Relative locations of the Metro East levee systems.

parties provide appropriate data and documentation demonstrating compliance with 44 CFR 65.10 in the following five areas: General Criteria, Design Criteria, Operation Plans and Criteria, Maintenance Plans and Criteria, and Certification Requirements (FEMA 2011). FEMA review is solely for establishing flood hazard zones and does not constitute a determination as to how a levee will perform during a flood event (FEMA 2011). If a levee is accredited, FEMA will reflect the levee as providing protection from the base flood on the FIRM (FEMA 2011). Communities with levees are not required to demonstrate compliance with 44 CFR 65.10, but must do so for any levee they wish to have recognized on a FIRM (FEMA 2011).

Based on the Southwestern Illinois Flood Prevention Initiative Status Report and Timeline produced by the East-West Gateway Council of Governments (2007), the potential social and economic impacts of losing levee accreditation would be substantial. After New Orleans, the American Bottoms region represents the second largest population concentration along the Mississippi River Corridor. More than 150,000 residents and 50,000 jobs are located within the levee protected area (Exhibits EA-4, EA-5).

While the first concern is public safety and the recognition of increased risk of catastrophic flooding, there are significant economic consequences that will affect the future fiscal health of Southwestern Illinois. Levee decertification will trigger massive cost increases to individuals and businesses and potentially harm economic growth and investment in the region. Federally regulated financial institutions will not be able to issue loans to homeowners or businesses that do not carry adequate flood insurance, and communities will need to adopt development ordinances that include strict requirements for building in flood zones. Many homeowners will not be able to afford flood insurance, even at the current favorable rate, putting them at future financial risk. A secondary impact to homeowners and small businesses is a potential decline in property values, since sales of property that require bank financing will be conditioned on the purchase of costly flood insurance.

This potential action will directly affect almost a third of the population of the Illinois portion of the metro St. Louis area and many critical businesses that are the foundation of the local economy. Inadequate levees threaten to disrupt all who travel on interstate highways 55, 64 and 70 through the American Bottoms. The consequences will be felt not only by areas that could be in jeopardy of flooding, but also by all communities that have a stake in the economic vitality of the region.

Description of Wood River Drainage and Levee District

The Wood River levee system (Exhibit EA-6) is an urban levee design that protects approximately 12,700 acres, 200,000 inhabitants and over $1 billion in property assets. The Wood River Drainage and Levee District operates and maintains 21 miles of riverfront and flank levees, 170 relief wells, 26 closure structures, and 41 gravity drains for flood protection. It also operates and maintains 7 pump stations with ponding areas for removal of interior drainage to the Mississippi River.

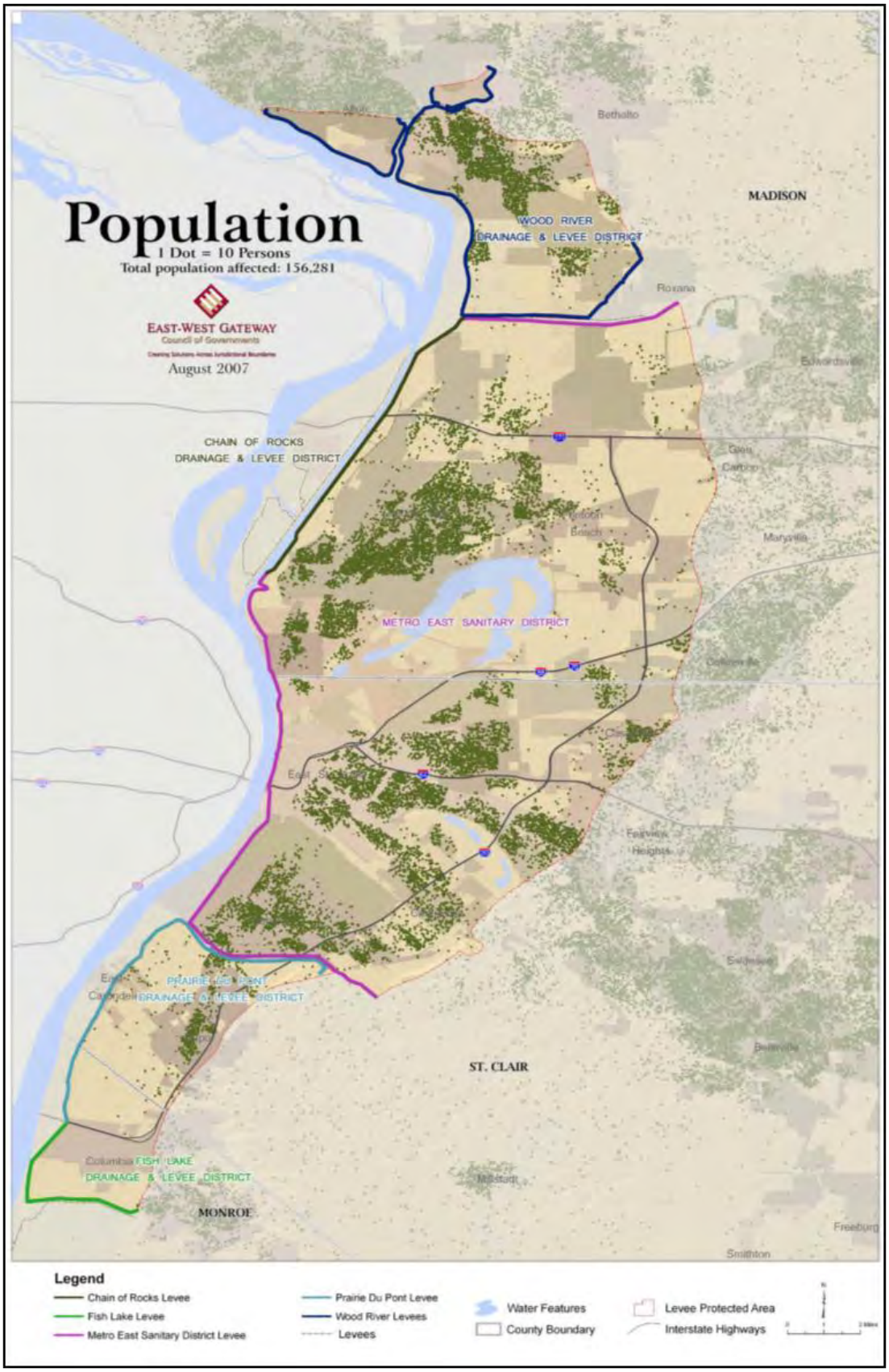

Exhibit EA-4. Relative locations of population concentrations within the Metro East levee systems.

Exhibit EA-5. Relative locations of major employers within the Metro East levee systems.

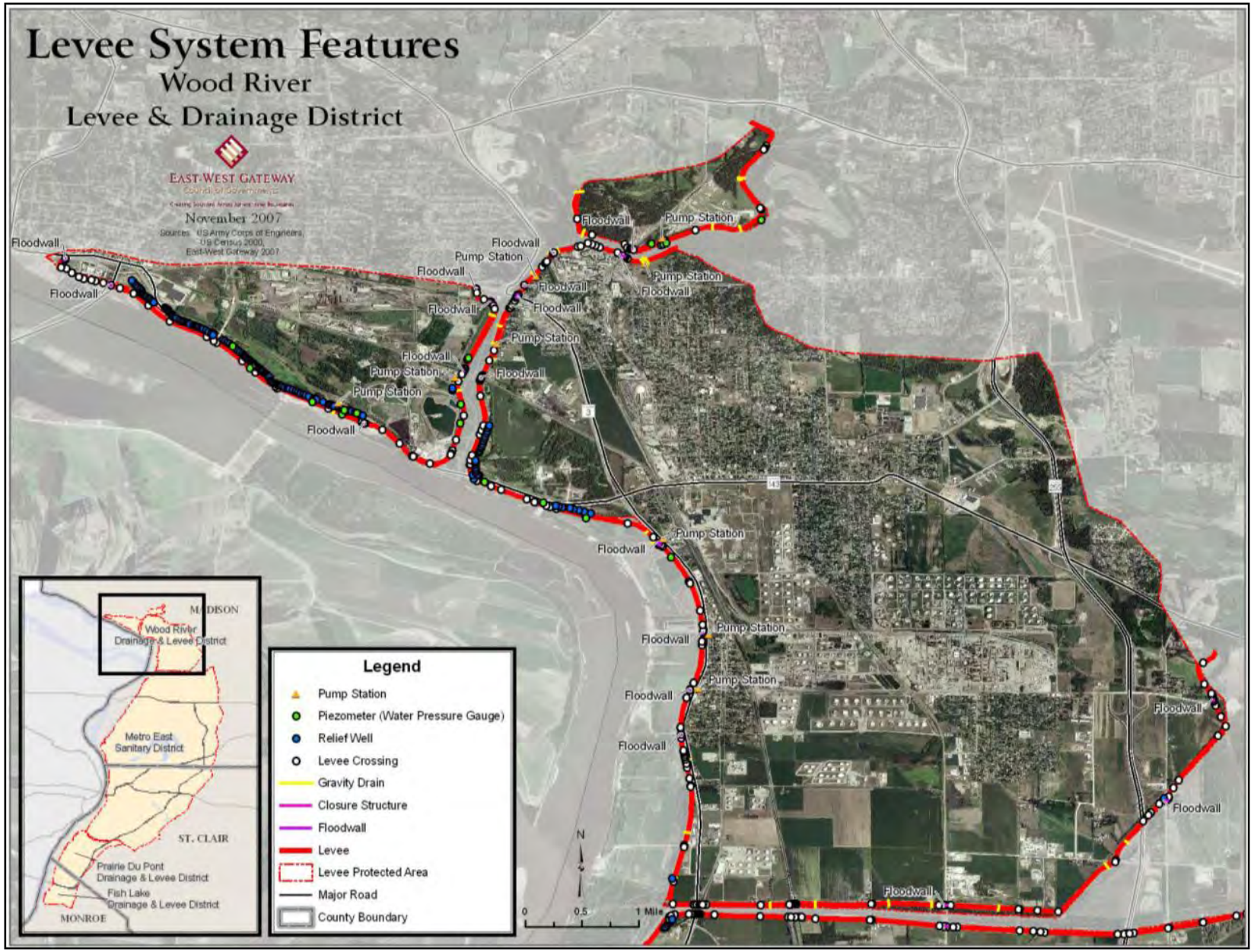

Exhibit EA-6. Location of the proposed AMEC Section 408 levee improvement project at the Wood River Levee System in Madison County, IL

The drainage and levee district consists of three separate protected areas – upper, lower, and East-West Forks.

The Upper Wood River Drainage and Levee District originates near the intersection of Langdon and Front Streets (US highway 67) in Alton, Illinois, at Mississippi River mile 203. From this point the riverfront levee extends downstream past the Melvin Price Locks and Dam to the mouth of Wood River Creek at river mile 199.4 for a distance of about 5.2 miles. At this point the levee turns and proceeds upstream as a flank levee along the right descending bank of the Wood River Creek for 1.6 miles to the project terminus. About 1,641 acres of Mississippi River floodplain are protected by this portion of the levee system.

The Lower Wood River Drainage and Levee District originates at high ground on the left descending bank of the West Fork of Wood River Creek, near Powder Mill Road in East Alton, Illinois. From this point the flank levee extends 1.7 miles to the confluence with the East Fork of Wood River Creek. The levee then continues downstream along the left descending bank of Wood River Creek for 2.3 miles to the mouth of Wood River Creek at Mississippi River mile 199.4. At this point the levee becomes a riverfront levee and continues along the left descending bank of the Mississippi for 4.76 miles to the mouth of the Cahokia Creek Diversion Channel at Mississippi River mile 195. There the levee turns and proceeds upstream as a flank levee along the right descending bank of the diversion channel for 2.6 miles and then turns and follows the obsolete New York Central railroad tracks for 3.0 miles in a north-easterly direction. The levee then veers north for 0.5 miles to its terminus in South Roxana, Illinois. About 10,687 acres of Mississippi River floodplain are protected by this portion of the levee system.

The flank levee of the East-West Forks portion of the Wood River Drainage and Levee District is 2.68 miles long and occurs on the north side of the East and West Forks of the Wood River. About 428 acres of Mississippi River floodplain are protected by this portion of the levee system.

Description of Metro East Sanitary District

The MESD levee, in addition to the 9-mile long Federally-owned Chain of Rocks levee, form a single levee system that provides flood protection for the cities of East St. Louis, Granite City and numerous other municipalities (Exhibits EA-7a,7b). The MESD levee system includes 28.6 miles of levee (4.8 miles north flank, 19.2 miles riverfront, and 4.6 miles south flank), 27 closure structures, 40 gravity drains, 17 pump stations, 300 relief wells, and 3.1 miles of floodwall on the levee. Numerous drainage channels are located within the area protected by the flood protection system. Together, the Wood River and Chain of Rocks levee systems protects approximately 85,000 acres, 200,000 inhabitants and over $1 billion in property assets.

Description of Prairie du Pont and Fish Lake Levee Districts

This system is comprised of two independent Levee Districts. The northern portion of the levee in St. Clair County is administered by the Prairie du Pont Sanitary and Levee District, while the southern portion of the levee is administered by the Fish Lake Drainage and Levee District (Exhibit EA-8). This levee system protects approximately 19 square miles of bottomland within the levee districts. Together, the Prairie du Pont and Fish Lake Levee Districts consist of a 15.2

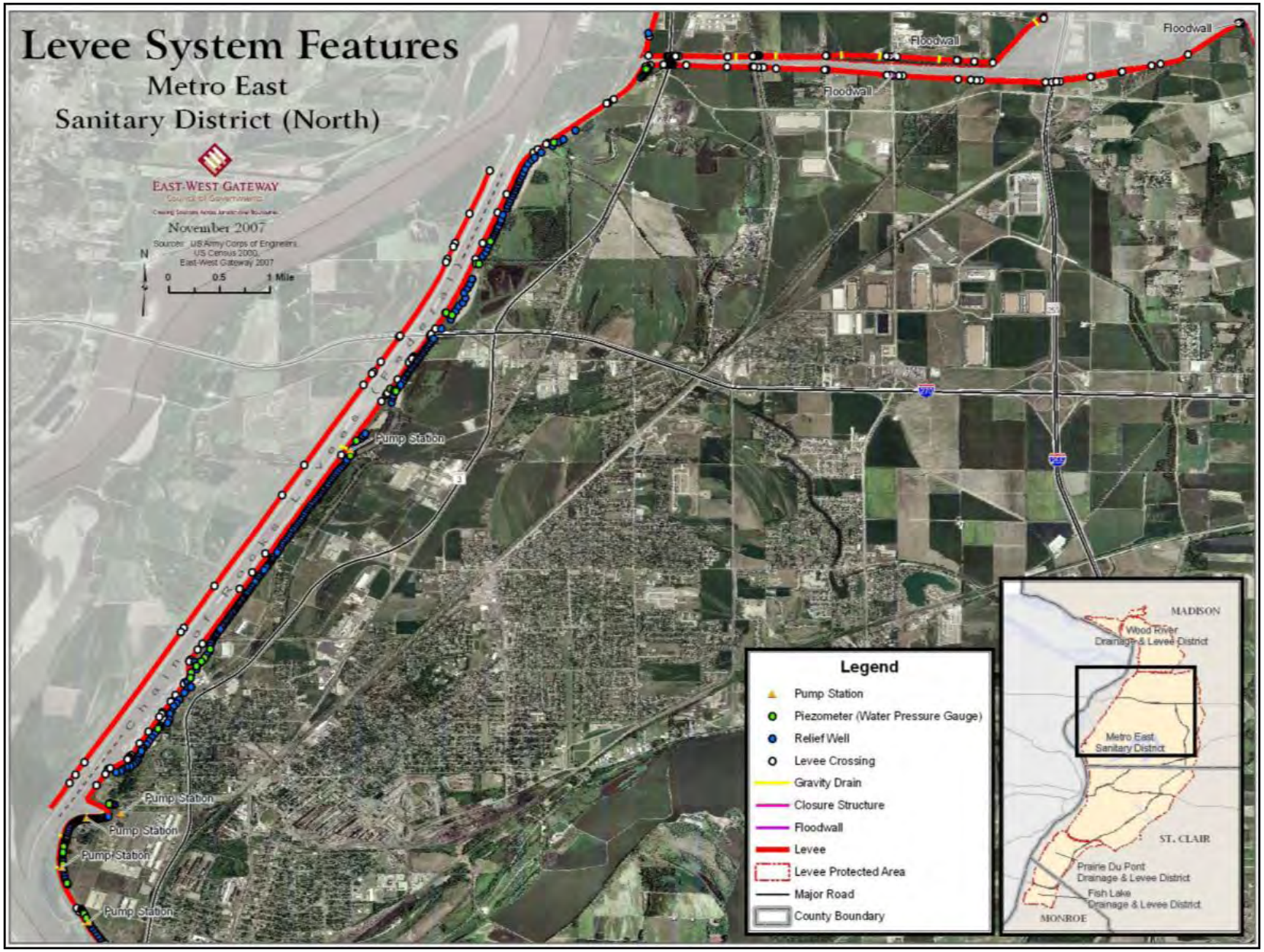

Exhibit EA-7a. Location of the Proposed AMEC Section 408 Levee Improvement Project at the MESD Levee System in Madison and St. Clair Counties, IL.

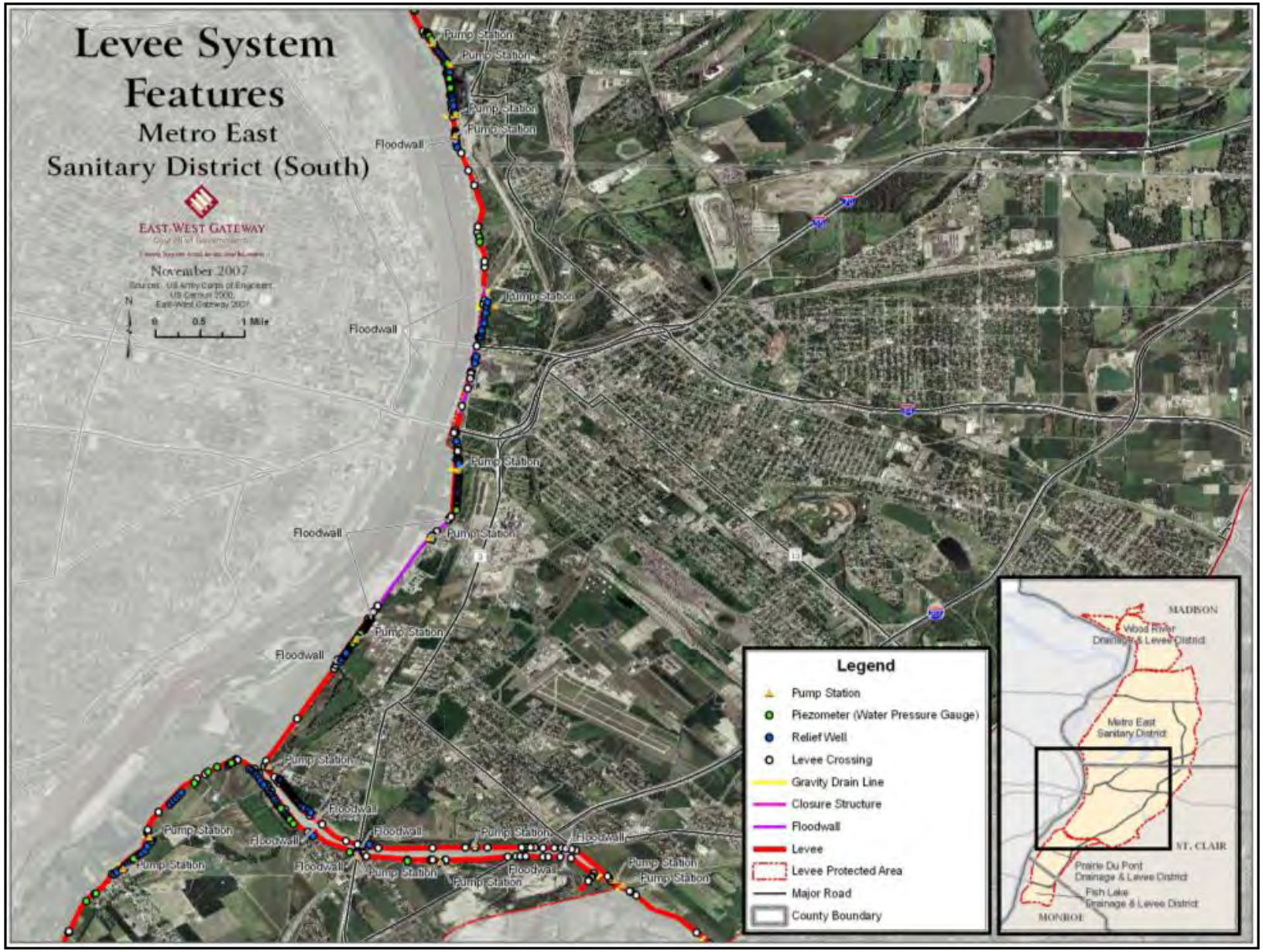

Exhibit EA-7b. Location of the Proposed AMEC Section 408 Levee Improvement Project at the MESD Levee System in Madison and St. Clair Counties, IL (continued)

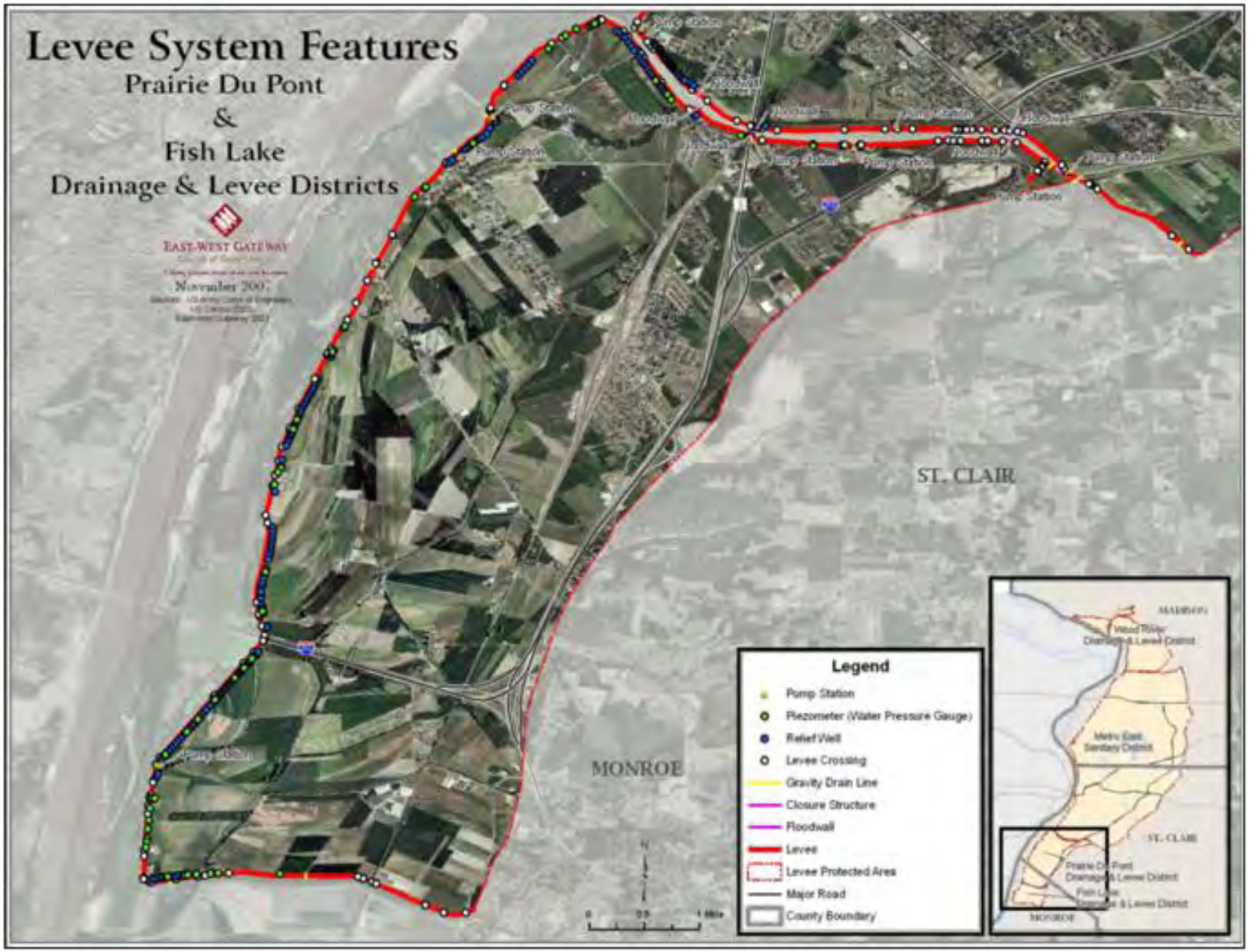

Exhibit EA-8. Location of the Proposed AMEC Section 408 Levee Improvement Project at the Prairie du Pont / Fish Lake Levee System in St. Clair and Monroe Counties, IL

mile urban design levee system, completed in 1951, with 151 relief wells, 81 open system piezometers, four transportation closure structures (two for railroads and two for highways), 17 gravity drains, and four pump stations (with another pump station belonging to the town of East Carondelet) to evacuate interior drainage. There are approximately 12,890 acres of bottomland within the levee districts and 6380 acres of high ground that drain into the levee district with a total drainage area of 19,270 acres. The project area consists of urban, industrial, and agricultural development, with several farmsteads flanking the levee. The levee system serves the Villages of Dupo and East Carondelet, protecting a population of about 14,936 (2000 Census). The levee system also protects the Jefferson Barracks Bridge Approach, which crosses the Mississippi River and carries traffic for Interstate 255 (part of the St. Louis Beltway) and U.S. Highway 50. Approximately 68,000 commuters use Interstate 255 and other roadways protected by the levee system on a daily basis. Development along I-255 is expected to continue according to St. Clair County and Monroe County, Illinois, future land use and zoning plans.

2. ALTERNATIVES CONSIDERED

Alternative plans were developed by identifying measures which may be used, where needed, to control seepage under a levee. The measures include: landside relief wells, seepage berms (generally landside), cutoff walls (generally near the riverside levee toe), riverside clay caps, toe drains, graded filters, blanket drains, and/or trench drains. A no action and an action alternative consisting of individual or a combination of measures were developed for each levee area needing seepage control.

2.1. Alternative 1 - No Action (Future without Project)

The “No Action” alternative assumes that the proposed project would not be realized. Under this scenario, the levee district would continue to perform its operation and maintenance responsibilities, but no new action would be taken. The “No Action” alternative would result in no action being taken to correct the deficiencies required to bring the levees to the level required for FEMA accreditation. Components would function ineffectively, and would continue to compromise the effectiveness of the levee system. A significant failure could occur under the no action alternative.

If no action is taken, public safety would continue to be jeopardized. The Metro East levee systems collectively protect over 300,000 people. The levee systems also provide protection for several major roadways, including Interstate 255, U.S. Highway 50, and Illinois Routes 3, 111, and 143, as well as several railways. In the event of levee failure under the design level flood condition, the risk depth of flooding is estimated at 20+ feet across most of the project area, placing many project area inhabitants at risk of serious injury or loss of life. Additionally, petrochemical and commercial industrial complexes valued in excess of 4.3 billion dollars are located throughout the interior portion of the levee systems. This includes the producer of one-quarter of the Nation's military jet fuel. The petrochemical industries are a significant National Security interest. If their operations were to be shut down, costs would be large and widespread. Furthermore, the loss of the Metro East levee systems would have the added implication of

creating an environmental contamination scenario not experienced on any inland waterway system to date. The U.S. EPA likened such an occurrence to that experienced as a result of the Exxon Valdez. Not only would the land protected by the levee experience significant contamination from oil, oil byproducts and chemicals used in the refining process, but also the Mississippi River system itself would be impacted. Potential spread of hazardous and toxic contaminates from nearby Superfund sites could also greatly impact the life-risk safety of the project area population. At a conservative estimate of $125,000 per acre of clean up costs, a loss of these levees would result in environmental damages exceeding $2,000,000,000 (two billion dollars), not including the relocation costs of residents and future loss of agriculturally productive land.

2.2. Alternative 2 – Levee Improvement Project (Proposed Action)

The levee improvement alternative sought to identify measures that would make the improvements necessary to the levee systems in order to obtain FEMA accreditation in accordance with 44 CFR 65.10. Such measures would include the installation of landside relief wells, seepage berms (generally landside), cutoff walls (generally near the riverside levee toe), riverside clay caps, toe drains, graded filters, blanket drains, and/or trench drains. Measures in each area requiring seepage control may be used alone, or in combination with other measures.

- *Relief Well Construction* - Relief wells would be constructed on the protected (dry) side of the levee to relieve excessive hydrostatic pressures beneath the levee during high water conditions. Relief well systems are used where pervious strata underlying a levee are too deep or too thick to be penetrated by cutoffs or toe drains. New relief wells will discharge to the surface with a check valve in the top of the casing. There will be a protective housing over the top of the casing.

- *Conversion of Relief Wells to T-type*: T-type wells discharge below ground surface into a collector system. T-type wells are typically protected by manhole covers. Underground pipes will be installed, but no permanent wetland impacts are anticipated.

- *Seepage Berm Construction* - Seepage berms are structures constructed of low permeability earthen material on the protected side of the levee. They act to hold seepage water, thereby counteracting the upward seepage forces resulting from high water conditions and convey seepage safely to the landside toe of the berm.

- *Riverside Cutoff Walls* - Cutoff walls are a low permeability physical barrier consisting of a mixture of soil, bentonite and/or cement and bentonite advanced to the bedrock or an appropriate confining layer, and are designed to impede seepage flows through and beneath a levee during high water conditions.

- *Riverside Clay Cap* - A clay cap is a layer of impermeable soil, which is placed on the riverside surface of the levee in order to minimize seepage through the levee and the potential for piping during high water conditions.

- *Piezometers* - Piezometers are instruments used to measure hydrostatic pressure and are proposed in several locations near proposed improvements.

- *Toe drains, graded filters, blanket drains, and trench drains* - These linear features are composed of pervious material and are constructed on the protected dry side of the levee to relieve excessive hydrostatic pressures beneath the levee during flood conditions. In general, drains and filters are used to help intercept and control underseepage and reduce uplift at areas where there is either a thin top stratum, a landside low area (such as a borrow area, interior drainage ditch, or relief well ditch), or both.

Additional project features may involve relief well collector systems, ditches, pump stations, borrow areas, and road and utility relocations.

2.3. Development and Evaluation of Alternative Plans

During the analysis, the following considerations were evaluated:

- Locations of existing explorations and relief wells
- Underseepage analysis
- Base flood elevations
- Required factors of safety
- Slope stability
- Settlement
- Through seepage

Required underseepage control along all three levee systems (Wood River, MESD, and PDP/FL) was evaluated and would be provided by relief wells, seepage berms, cutoff walls, clay caps, toe drains, filter blankets or combinations thereof. Most of these features are also currently used in various existing locations to address some of the historic underseepage issues. As AMEC completed analyses of the flood protection system, initial efforts were focused on reviewing analyses completed by the USACE (for the authorized level of protection), modifying it for the FEMA 100-year flood level and subsequently selecting appropriate input parameters from additional field investigations.

Underseepage analyses were conducted throughout the levee systems. The results of the initial analysis and modeling were completed to establish the reaches of the levee system for which an inadequate safety factor exists under the existing physical conditions with a 100-year storm applied to the wet side. If considered deficient based on AMEC's selected safety factor for FEMA 65.10 certification, a series of solutions were then evaluated to improve the safety factor.

Solutions were selected, where appropriate, to match the solutions identified by the USACE for the authorized level of protection for a specific reach. Because of their relatively low capital cost and small footprint, relief wells were generally recommended as the preferred control where they adequately reduce exit gradients. Where wells did not adequately reduce gradients, other

improvements (i.e., berms, clay caps, graded filters) were proposed. (Typically, a design relief well spacing of less than 50 feet was deemed too close.)

In areas where topographically low areas (ditches or artificially excavated areas) exist on the dry side of the levee, seepage analyses were used to identify excessive hydraulic gradients. In these areas seepage berms were thickened to fill in low area, or where seepage berms were not required, soil fill was modeled to fill in the low areas thereby providing a counter weight to the underseepage forces. In some cases, the low areas were stormwater ditches that could not be filled; therefore, solutions were selected in these cases to accommodate either relocation of the ditch or conversion of the ditch to a pipe/ culvert.

Cutoff walls were used as last resort solutions where seepage berms and/or relief wells were inadequate to sufficiently reduce the seepage gradients on the levee dry side or where space or other constraints make the installation of seepage berms impractical. Deep cutoff walls, where used, would extend to the underlying bedrock surface and would be designed to completely cutoff seepage that currently flows through and beneath the levee. In several cases, a shallower cutoff wall was proposed where an interval of low permeability material extending over a wide geographic area was identified. Because cutoff walls represent a significantly higher construction cost per lineal foot of levee as compared to the other underseepage control methods, their application was limited.

The "No Action" alternative is not recommended by AMEC since it would fail to bring the levees to the level required for FEMA accreditation.

2.4. Proposed Action

The proposed action to address the levee deficiencies is Alternative 2 - Levee Improvement project. The main components of the proposed action for each levee district(s) are summarized in Exhibits EA-9, EA-11, and EA-12. The beginning and end of each repair section are described by levee stations.

In addition to the improvements listed in Exhibit EA-9, the Southwestern Illinois Flood Prevention District Council (SIFPDC) plans to install an additional 56 piezometers along the Wood River levee system. The approximate location of the proposed piezometers is provided in Exhibit EA-10. Piezometers are used to measure hydrostatic pressure near the proposed improvements.

Exhibit EA-9. Main measures of the proposed action for the Wood River Drainage and Levee District.

Wood River Drainage and Levee District	
Approximate Location (Levee Station)	**Proposed Measure(s)**
Upper Wood River	
12+00	Slipline gravity drain, no land disturbance
20+00 – 33+00	Shallow cut-off wall and clay cap
34+00 – 39+00	Shallow cut-off wall with clay cap
38+30 – 51+80	Graded filter
121+00 – 129+00	Trench drain
127+00 – 134+30	Graded filter
143+00 – 153+00	Graded filter
216+00 – 221+00	Graded filter
Lower Wood River	
12+00 – 16+00	Convert 4 relief wells to T-type
14+00	New pump station and outfall
132+00 - 151+00	Graded filter
136+00-151+00	Trench drain at levee toe
150+00 – 159+75	Cutoff wall and clay cap
159+00	Pump station and outfall
162+20 – 170+10	Cut-off wall and clay cap
170+00 – 187+00	Graded filter
185+40 - 189+10	Graded filter at nitrogen plant
195+00 – 199+00	Graded filter
225+00 – 236+00	Graded filter at Wood River Pump Station Forebay
284+00	Slipline gravity drains
297+00 – 327+00	Convert 18 relief wells to T-type
309+00	New pump station and outfall

Wood River Drainage and Levee District	
Approximate Location (Levee Station)	**Proposed Measure(s)**
568+90-577+05	Graded filter
583+00-593+50	Seepage berms
578+00-584+00	3 new and two converted relief wells
581+50	Pump station and outfall
594+00 – 608+00	Graded filter
594+20	Pump station and outfall
614+00 - 630+00	Graded filters and French drain
631+00 – 661+00	Required fill
632+00 – 669+00	Required fill
677+31 - 684+02	Bank protection along 780 feet of Indian Creek – 24-inch riprap

Exhibit EA-10. Approximate location of piezometers proposed for installation by the Southwestern Illinois Flood Prevention District Council along the Wood River Drainage and Levee District .

Wood River Drainage and Levee District	
Approximate Location (Levee Station)	**Piezometers**
Upper Wood River	
27+30	Install 3 new piezometers
40+50	Install 1 new piezometer
40+60	Install 1 new piezometer
40+70	Install 1 new piezometer
46+30	Install 1 new piezometer
49+60	Install 1 new piezometer
52+90	Install 1 new piezometer
120+90	Install 1 new piezometer
121+10	Install 1 new piezometer
121+50	Install 1 new piezometer
128+50	Install 2 new piezometers
128+30	Install 1 new piezometer
141+90	Install 1 new piezometer
141+60	Install 1 new piezometer
145+90	Install 1 new piezometer
146+10	Install 1 new piezometer
218+65	Install 2 new piezometers
Lower Wood River	
13+50	Install 1 new piezometer
13+60	Install 1 new piezometer
143+20	Install 4 new piezometers
155+00	Install 3 new piezometers
165+00	Install 3 new piezometers

Wood River Drainage and Levee District	
Approximate Location (Levee Station)	**Piezometers**
175+00	Install 2 new piezometers
185+00	Install 2 new piezometers
187+30	Install 1 new piezometer
187+60	Install 1 new piezometer
208+80	Install 3 new piezometers
229+30	Install 1 new piezometer
232+10	Install 1 new piezometer
289+90	Install 2 new piezometers
324+50	Install 2 new piezometers
550+00	Install 2 new piezometers
571+10	Install 2 new piezometers
582+10	Install 1 new piezometer
584+50	Install 1 new piezometer
593+10	Install 1 new piezometer
594+00	Install 1 new piezometer

Exhibit EA-11. Main measures of the proposed action for the Metro-East Sanitary District.

Metro-East Sanitary District	
Approximate Location (Levee Station)	**Proposed Measure(s)**
255+74 - 262+74	2 new relief wells
258+00	2 new piezometers
258+75	Proposed pump station and outfall
774+00	Sleeve existing relief well
784+00	2 new piezometers
782+47 – 787+47	Graded filter
790+00 & 791+00	Sleeve existing relief wells
793+00	1 new relief well
803+00	2 new piezometers
825+50	2 new piezometers
827+75	Sleeve existing relief well
859+50, 865+00, 867+00, 874+50	Sleeve existing relief wells
875+00	1 new piezometer, 1 piezometer to retrofit
882+75	Repair or abandon relief well
888+00	1 new relief well
890+00	Proposed pump station and outfall
996+50	2 new piezometers
998+50	Slipline gravity drain
1001+00	Slipline gravity drain
1037+00	Slipline gravity drain
1061+25	Slipline gravity drain
1111+00	Proposed pump station
1113+00 – 1116+00	2 new relief wells
1133+00 – 1135+00	2 new relief wells
1210+00-1220+00	Protruding riverside clay cap

Metro-East Sanitary District	
Approximate Location (Levee Station)	**Proposed Measure(s)**
1210+00 to 1242+00	Toe drain
1225+50	Proposed pump station and outfall
1239+50	2 new piezometers
1268+00	2 new piezometers
1245+22 - 1273+53	Graded filter and protection berm
1243+00 – 1312+40	Hybrid riverside clay cap
1279+81 to 1314+93	Toe drain
1298+50	2 new piezometers
1308+00	2 new piezometers
1310+00 – 1321+00	2 graded filters
1311+00	Proposed pump station and outfall
1318+00	2 new piezometers
1323+60 to 1344+42	Graded filter
1326+88-1343+33	Another graded filter
1342+23-1344+96	Graded filter in wetland
1344+75	Proposed pump station and outfall
1479+75	2 new piezometers
1482+50 – 1501+00	Convert 11 wells to T-type
1499+50	2 new piezometers
1503+00	Proposed pump station and outfall
1561+30	Slipline gravity drain

Exhibit EA-12. Main measures of the proposed action for the Prairie du Pont Sanitary and Levee District / Fish Lake Drainage and Levee District.

Prairie du Pont Sanitary and Levee District / Fish Lake Drainage and Levee District	
Approximate Location (Levee Station)	**Proposed Measure(s)**
167+65 – 203+95	New seepage berms Convert 20 existing relief wells to T-type wells. Install 3 new relief wells Install 2 new piezometers
171+00 – 174+00	New clay cap
203+95 – 289+75	Install 40 new relief wells Install 4 new piezometers Retrofit 2 existing piezometers with transducers
289+75 – 293+05	New seepage berm Convert 2 existing relief wells to T-type wells
293+05 – 306+25	Install 11 new relief wells Install 1 new piezometer
325+00 – 330+00	New clay cap
366+00 – 370+00	New clay cap
380+00 – 385+00	New clay cap
382+15 – 438+25	Install 21 new relief wells
438+25– 442+00	New seepage berm Relocate existing road Convert 2 existing relief wells to T-type wells
444+85 – 448+15	Install 4 new relief wells
448+15 – 451+45	New seepage berm Convert 3 existing relief wells to T-type wells
451+45 – 487+75	Install 24 new relief wells Install 2 new piezometers
497+65 – 500+95	New seepage berm Convert 2 existing relief wells to T-type wells
500+95 – 504+25	Install 4 new relief wells
504+25 – 507+55	New seepage berm Convert 2 existing relief wells to T-type wells
507+55 – 510+85	Install 3 new relief wells
510+85 - 527+35	Install 4 new relief wells
527+35 – 530+65	New seepage berm Convert 3 existing relief wells to T-type wells

Prairie du Pont Sanitary and Levee District / Fish Lake Drainage and Levee District	
Approximate Location (Levee Station)	**Proposed Measure(s)**
530+65 – 533+95	New seepage berm
537+25 – 540+55	Install 2 new relief wells Install 1 new piezometer Retrofit a piezometer
563+65 – 586+75	Install 11 new relief wells
586+75 – 590+05	New seepage berm Convert 1 existing relief well to T-type well
593+35 – 695+65	Install 43 new relief wells

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes existing conditions in the project area, which are referred to under the NEPA process as the Affected Environment. The resources described in this section are those recognized as significant by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public.

3.1. Topography and Geology

Wood River

The geological and topographic setting of the Wood River Drainage and Levee District can be conveniently treated by considering the bluff area bordering the east side of the Mississippi Valley as separate from the valley flood plain. The bluffs are as high as 650 feet above sea level. The floodplain is characterized by ridge and swale topography, with a maximum natural relief of approximately 35 feet (elevations ranging from 440 to 405).

The line of bluffs that more or less define the eastern boundary of the levee district consists of relatively soft shales and sandstones. However, bedrock is not exposed as the bluffs are mantled with deposits of glacial drift overlain with loess. The drift is commonly an unsorted deposit of pebbly clay, very plastic clay, sandy clay, and occasional lenses of sand or gravelly sand. The loess that blankets the summit and faces of the bluffs consists of windblown silts and lean clays locally 50 feet or more thick. Adjacent to the bluffs, a series of sand and gravel deposits form terraces which stand an average of 30 feet above the level of the surrounding plain. These terraces are remnants of an aggraded fill resulting from glacial meltwater deposits.

Wood River creek, a tributary of the Mississippi River, divides just west of East Alton and the valleys of the two forks are coincident with the Mississippi flood plain for several miles upstream. The deepest part of the bedrock surface ranges in depth from 160 to 170 feet beneath the valley fill with an average thickness of 130 feet of overlying alluvial deposits. Immediately above the bedrock surface is a stratum consisting of coarse gravels and sands with occasional boulders. Overlying this stratum is a thick section of medium to fine sands. The surface deposits are complex and varied as they result from filled lakes and swamps, abandoned meander loops, and flood water deposition. The surface materials range from heavy plastic clays to fine sands. In addition, industrial waste and artificial deposits are also found as part of the surface deposits.

MESD

The MESD levee system is located within the Mississippi River floodplain area known locally as the "American Bottom". The American Bottom extends beyond this levee system north to Alton and south into Monroe County near Dupo. Within the MESD levee system, the American Bottom is approximately 11 miles wide at its widest point.

This floodplain generally slopes to the south and drops in elevation approximately 0.5-foot per mile mirroring the Mississippi River surface profile. The floodplain exhibits river meander scars, abandoned channel oxbow lakes, low-relief ridges, and swales. Ancient Indian mounds rise above the bottoms with the largest being Monks Mound, which rises 85 feet above the adjacent floodplain.

In the northern portion of the MESD levee protected area, the floodplain is typically higher with elevations between 420 and 435 feet. The topography near the Illinois bluff on the eastern edge of the floodplain is generally higher than the adjacent floodplain with elevations between 435 and 465 feet. The bluff rises steeply between 150 to 200 feet above the floodplain. The bluff has a rather rugged topography with the creek channels forming valleys with steep slopes. Beyond the bluff line the topography consists of rolling hills and valleys with elevations ranging between 500 and 600 feet.

The geologic history of the American Bottom and adjacent bluffs may be divided into three distinct geologic time periods. The first period was the creation of the bedrock formations during the Paleozoic Era. The second period was the deposition of the unconsolidated glacial materials during the Pleistocene Epoch. The third period was the erosion and deposition of the unconsolidated materials and the creation of modern soils during the Recent/Holocene Epoch.

The surficial alluvial soils that cover the American Bottoms are related to their mode of river deposition. The alluvial soils are underlying glacial deposits from the Pleistocene Epoch. The alluvial soils vary in thickness from a few feet to 50+ feet. Alluvial soil types that comprise the majority of the unconsolidated deposits include abandoned channel, backswamp, point bar, chutes and bar deposits.

Prairie du Pont / Fish Lake

The elevation of the study area is approximately 400 to 430 feet above mean sea level (msl) based on a review of the United States Geological Survey (USGS) Topographic Maps for the

Columbia, Missouri-Illinois (USGS 1989a) and Cahokia, Illinois (USGS 1989b) quadrangles dated 1989 (photorevised 1991) and the Oakville, Missouri-Illinois (USGS 1993a) and Webster Groves, Missouri-Illinois (USGS 1993b) quadrangles dated 1993 (photorevised 1998). The study area is situated in a relatively level area known as the American Bottoms with the highest elevations located along the centerline of the levee. The study area sloped away from the centerline of the levee with the remainder of the study area relatively level.

According to the Illinois State Geological Survey (ISGS), *Bedrock Geology of Illinois*, 2005, bedrock in the vicinity of the study area is composed of the St. Genevieve limestone, St. Louis limestone, Warsaw limestone, and Salem limestone of the Mississippian System. The St. Louis formation, which is part of the Valmeyeran series, includes the Westfield and Martinsville beds. In the study area, the Valmeyeran is predominantly carbonate formations. Because the carbonate materials are susceptible to solution, karst topography may exist in the study area. The Ste. Genevieve formation, which is part of the Chesterian series, includes the Aux Vases lime, Karnak limestone, Spar Mountain sandstone, and Fredonia limestone.

According to the ISGS, *Buried Bedrock Surface of Illinois*, 1994, the depth to bedrock in the vicinity of the study area ranged from approximately 100 to 150 feet below ground surface. According to the ISGS *Directory of Coal Mines in Illinois* for Monroe County (2008) and St. Clair County (2008), the study area contains no undermining.

3.2. Socioeconomics and Land Cover

Wood River

The Wood River levee protects major industrial and commercial businesses as well as residential and agricultural lands. The area has a population of approximately 23,106, of which some 9,930 are employed. The property value of the levee-protected area is estimated at approximately $1.8 billion. The Wood River levee is also an integral part of a larger levee system in southwestern Illinois, including the Chain of Rocks and Alton to Gale levee systems, collectively providing protection to over 300,000 people both residing and employed behind these levees. Municipalities that are protected by the Wood River levee include Alton, East Alton, Wood River, Hartford, Roxana, South Roxana, and Bethalto. The flood-protected area is traversed by several railroads that service industrial development. Illinois Routes 3, 111, and 143 provide highway access, and Interstate 255 is on the eastern boundary of the flood-protected area.

The most recent land cover data available for the area protected by the Wood River levee system was obtained about 10 years ago in 2000 (Exhibit EA-13). This data is based on interpretation of satellite imagery that has 30 by 30 meter (98.4 by 98.4 feet) ground spatial resolution (INHS, 2010).

Nearly two-thirds of the levee protected area is urbanized, and consists of a mix of industrial, commercial, and residential areas (Exhibit EA-14). Over 25 percent of the bottomland is agricultural, and is represented by various row crops. Less than 10 percent of the protected area is undeveloped, and consists of various wetlands, open water, and upland forest (Exhibit EA-14). Forested and herbaceous wetlands and open water are located along the inside of the main levee

in some areas, especially in the upper portion of the drainage and levee district. In the adjacent uplands residential areas border the bottomland. Cropland is the chief land cover further up in the upland watersheds.

The project area has long supported the oil refinery industry with all of the major companies having had a presence in the area. Currently Conoco-Phillips, American Refining, Clark-Hartford, Piasa Motors Fuels and Shell have facilities in the area. On a daily basis Conoco-Philips alone produces about 6.3 million gallons of gasoline, 1.3 million gallons of diesel fuel, 1.6 million gallons of defense grade jet fuel and about 1.4 million gallons of asphalt. They have recently invested some $160,000,000 to expand this capability. BOC Gases has a state of the art air separation plant in Hartford and their liquid and gaseous products are used by a wide variety of industries including oil refining, chemicals, fabrication, welding, food, electronics, glass, iron and steel. As with many other communities in the nation this region is undergoing economic shifts from such industries as steel manufacturing. Laclede Steel closed in 2000 to service related industries such as Schiber Truck Company that transports waste in 38 states and National

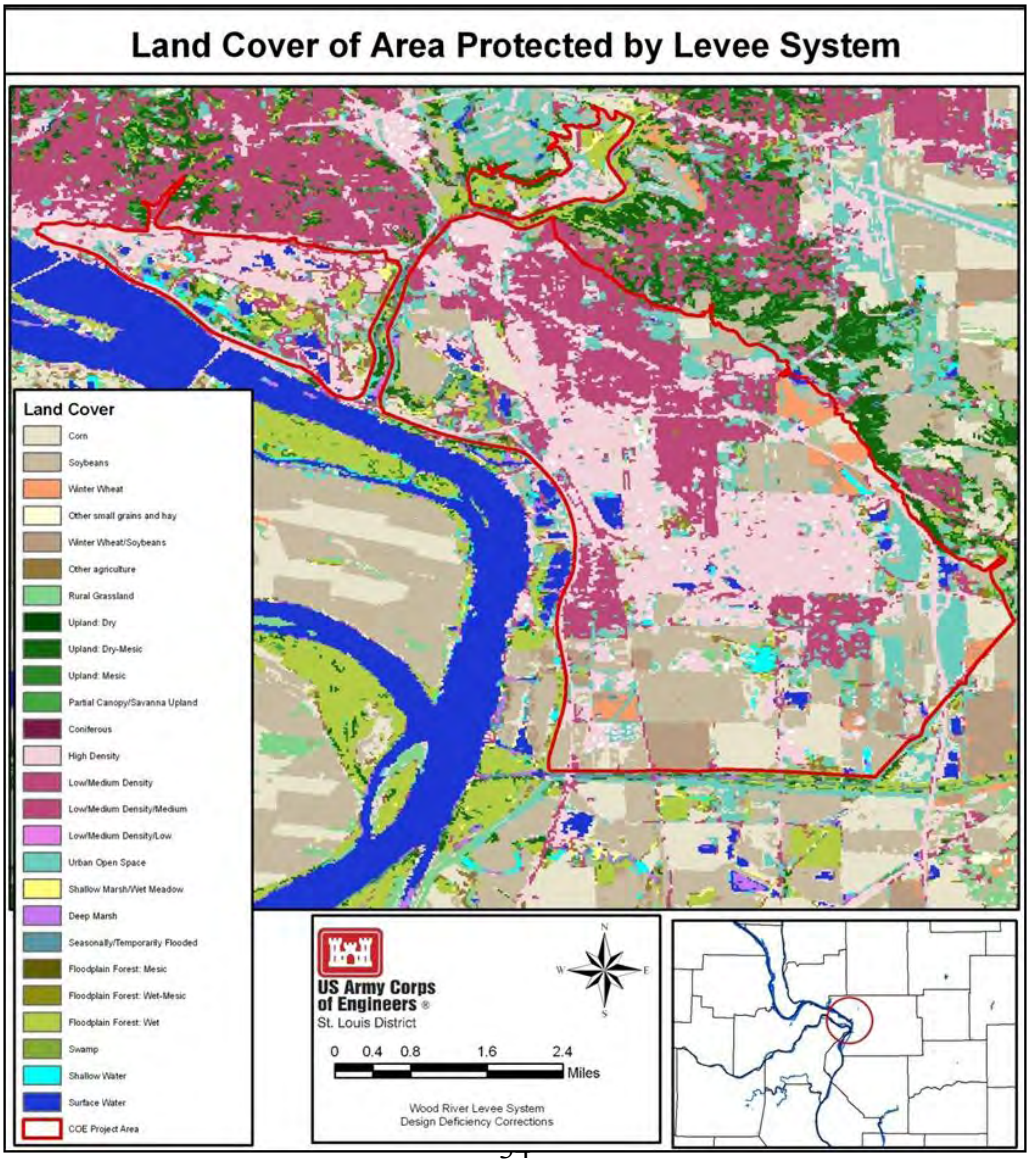

Exhibit EA-13. Land cover of area protected by the Wood River levee system.

Exhibit EA-14. Land cover (acres and percent) of area protected by the Wood River levee system..

Major Category	Area (acres)	% Area	Minor Category	Area (acres)	% Area
Agricultural Land	3,637	28.5	Corn	1,052	8.2
			Soybeans	1,738	13.6
			Winter Wheat	244	1.9
			Other Small Grains and Hay	15	0.1
			Winter Wheat / Soybeans	368	2.9
			Other Agriculture	142	1.1
			Rural Grassland	77	0.6
Forested Land	228	1.8	Upland: Dry-Mesic	109	0.9
			Upland: Mesic	8	0.1
			Partial Canopy / Savanna Uplands	111	0.9
Urban Land	7,862	61.6	High Density	3,892	30.5
			Low / Medium Density	2,675	21.0
			Urban Open Space	1,295	10.1
Wetland	723	5.7	Shallow Marsh / Wet Meadow	65	0.5
			Deep Marsh	43	0.3
			Seasonally / Temporarily Flooded	74	0.6
			Floodplain Forest: Wet Meadow	16	0.1
			Floodplain Forest: Wet	404	3.2
			Shallow Water	121	0.9
Other	318	2.5	Surface Water	221	1.7
			Barren and Exposed Land	97	0.8
TOTAL	**12,768**	**100.0**		**12,768**	**100.0**

*Source: Illinois Gap Analysis Program Land Cover Classification (INHS 2010).

Maintenance and Repair that repairs barges and marine and other motors. Olin Corporation has both their Brass and Winchester Ammunition Divisions located in the project area.

The following three tables (Exhibits EA-15 through EA-17) taken from the 2000 U.S. Bureau of Census (U.S. Census Bureau, 2010) provide an overview of the area's economic character.

Exhibit EA-15. Major occupations within the Wood River levee system.

Occupation	Number	Percentage
Management, professional	2,140	22
Service occupation	1,953	20
Sales and office occupation	2,731	28
Farming, fishing and forestry	11	---
Construction, extraction, and maintenance	1,054	10
Production, transportation and material moving	2,041	20
Total	**9,930**	**100**

The project area average median household income (Exhibit EA-16) is below that of both Madison County and the State by 20% and 28% respectively.

Exhibit EA-16. Average median household income within the Wood River levee system.

Community	Median Household Income
Wood River	$33,875
Hartford	$33,828
Roxana	$38,800
South Roxana	$33,295
East Alton	$28,404
Madison County	$41,541
State of Illinois	$46,590

Approximately 16% of the project area's population is over 65 years of age compared to the State average of 12% and Madison County average of 14%. The following (Exhibit EA-17) are retirement mean incomes as reported by the U.S. Bureau of Census. The average for the project area of $15,126 is 7% and 10% below the mean for Madison County and the State respectively.

Exhibit EA-17. Retirement mean incomes within the Wood River levee system.

Community	Mean Retirement Income
Wood River	$17,051
Hartford	$10,532
Roxana	$14,916
South Roxana	$21,574
East Alton	$11,560
Madison County	$16,117
State of Illinois	$16,770

A risk based economic analysis was completed for the study area in accordance with Engineering Regulation (ER) 1105-2-100, Planning Guidance, using the National Economic Development Procedures Manual for Urban Flood Damage, prepared by the Water Resources Support Center, Institute for Water Resources, as a reference. Exhibit EA-18 provides a graphic representation of inventory results showing a total structural value of residential, commercial and industrial buildings inventoried for both the Lower and Upper Wood River Levee areas. The total structural value of residential, commercial, and industrial buildings inventoried in the study area is approximately $1.48 billion.

Exhibit EA-18. Structure inventory by area within the Wood River levee system.

Area	Building Category	Number of Buildings	Average Value of Buildings ($)
Upper Wood River	Residential	0	$0
	Commercial	59	$1,913,531
	Industrial	29	$8,713,615
	Total	**88**	**$10,627,146**
Lower Wood River	Residential	8,640	$77,917
	Commercial	960	$247,562
	Industrial	50	$4,159,060
	Total	**9,650**	**$4,484,539**
TOTAL	Residential	8,640	$77,917
	Commercial	1,019	$2,161,093
	Industrial	79	$12,872,675
	Total	**9,738**	**$15,111,685**

Within the upper drainage and levee district, Illinois Highway 143 is located on the landside levee slope. In addition to affording protection to the highway, the levee also protects the Alton Sewage Treatment Plant, portions of the City of Alton, Illinois Power Company, Laclede Steel Company, Owens-Illinois, Inc., and the Alton Packaging Company from flooding during high river stages.

MESD

The East St. Louis (MESD) levee is located on the left descending bank of the Mississippi River between River Miles 175 and 195, above the confluence with the Ohio River. The levee currently protects about 86,000 acres of residential and agricultural lands, as well as major industrial and commercial businesses. The population protected by the levee system is approximately 250,000, consisting of about 143,000 residents and 110,000 employees. The property value of the project area is estimated at over $2.5 billion. The MESD levee is also an integral part of a larger levee system including Wood River, Chain of Rocks, and Alton to Gale levee systems, collectively providing protection to over 300,000 people both residing and employed behind these levees.

The most recent land cover data available for the area protected by the East St. Louis Levee System was obtained about 10 years ago (in 2000), and it reveals that about 70 percent is either developed or in agriculture (Exhibit EA-19). This data is based on interpretation of satellite imagery that has 30 by 30 meter (98.4 by 98.4 feet) ground spatial resolution (INHS, 2010). The remaining 30 percent of the protected area has been classified as various kinds of forested land or wetlands. Open water is also present, but it comprises a very small portion of the protected area (Exhibit EA-19). Land cover of the project area is displayed in Exhibit EA-20; a red line highlights the levee protected area.

Exhibit EA-19. Land cover within area protected by Metro East St. Louis levee system.

Major Category	Area (acres)	% Area	Minor Category	Area (acres)	% Area
Agricultural Land	31,627.0	0.37	Corn	11,361.5	0.13
			Soybeans	13,540.3	0.16
			Winter Wheat	1,389.5	0.02
			Other small grains and hay	165.5	<0.01
			Winter Wheat/Soybeans	2,325.6	0.03
			Other Agriculture	1,749.8	0.02
			Rural Grassland	1,094.8	0.01
Forested Land	13,156.0	0.16	Upland: Dry	615.4	0.01
			Upland: Dry-Mesic	147.0	<0.01
			Upland: Mesic	1,498.7	0.02
			Partial Canopy/Savanna Uplands	10,894.9	0.13
Urban and Built-Up Land	27,770.0	0.32	High Density	18,227.5	0.21
			Low/Medium Density	8,943.2	0.10
			Urban Open Space	599.4	0.01
Wetland	13,020.1	0.15	Shallow Marsh/Wet Meadow	1,021.7	0.01
			Deep Marsh	686.8	0.01
			Seasonally/Temporarily Flooded	286.2	<0.01
			Floodplain Forest:Wet-Mesic	5,221.2	0.06
			Floodplain Forest: Wet	1,806.5	0.02
			Shallow Water	3,997.8	0.05
Open Water	393.9	<.01	Surface Water	393.9	<0.01
TOTAL	**85,966.9**	**1.00**		**85,966.9**	**0.99**

Source: Illinois Gap Analysis Program Land Cover Classification (IDOA, 2010)..

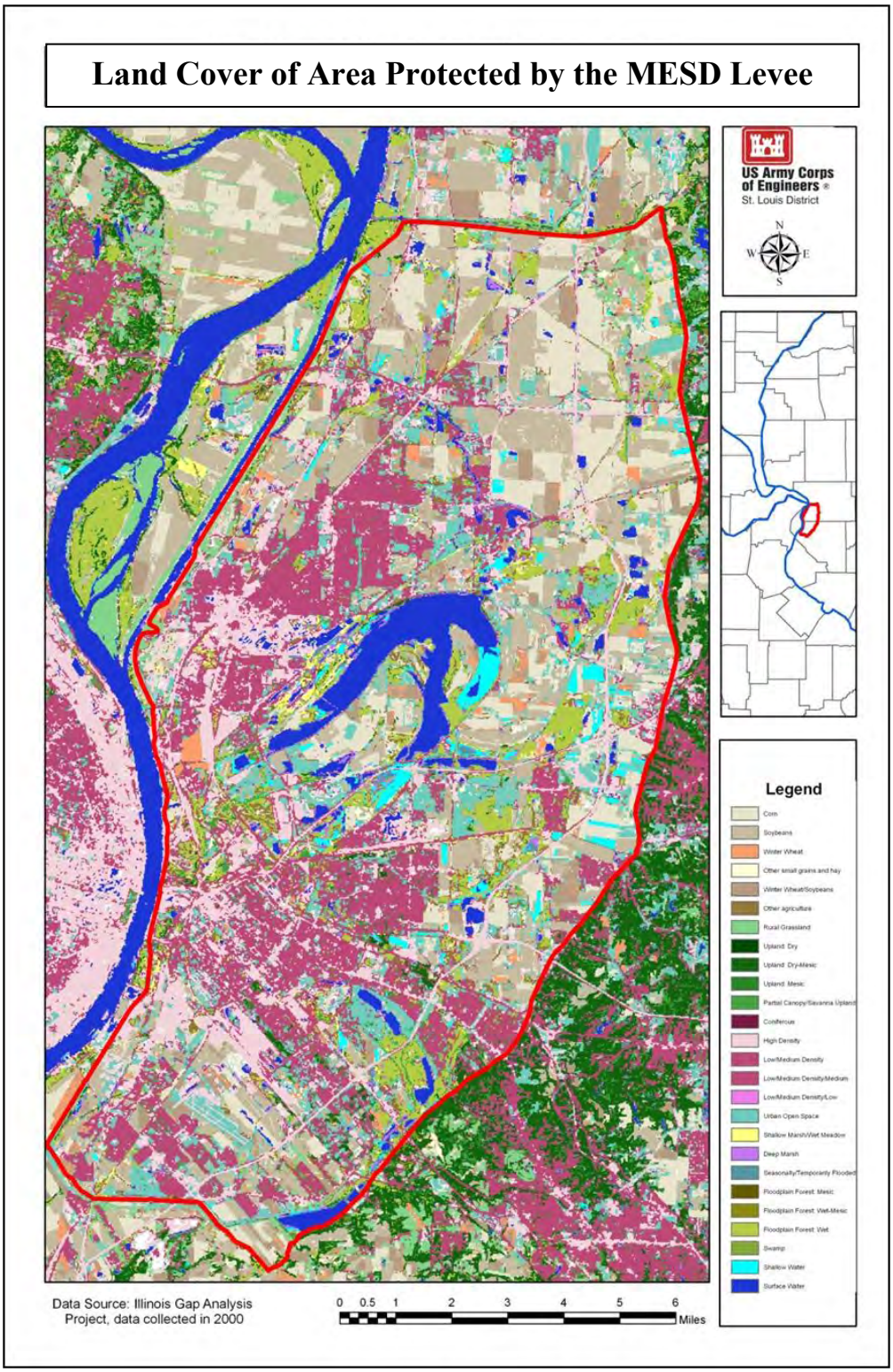

Exhibit EA-20. Land cover of area protected by the MESD levee system

Prairie du Pont / Fish Lake

The project area comprises approximately 13,350 acres and includes portions of the following municipalities: Dupo and East Carondelet. Interstate 255 runs east-west and separates the Prairie du Pont and Fish Lake Levee Districts. Interstate 255 then turns north and bisects the flank levee along the northern portion of the Prairie du Pont Levee. The main stretches of the two levees border the site to the west beyond which is the Mississippi River. Prairie du Pont Creek borders the study area to the north beyond which is residential development. Carr Creek borders the study area to the south beyond which is agricultural fields. The majority of the study area is undeveloped, agricultural land. Agricultural land comprises approximately 9439 acres of the area while developed areas comprise approximately 4591 acres. Numerous farms and residential structures are scattered along the interior portion of both the Prairie du Pont and Fish Lake Levees. Old Prairie du Pont Creek and Palmer Creek are located within the area, in addition to five other unnamed tributaries (113 acres open water). Other areas include several small deciduous forest areas (1301 acres), forest wetland areas (677 acres), and non-forest wetland sites (222 acres) were also identified within the study area (Exhibit EA-21).

Municipalities within the Prairie du Pont / Fish Lake area include Dupo and East Carondelet. The populations of these municipalities, as derived from the 2000 census, are 3933 and 267 respectively. Approximately 14,936 individuals reside within the proposed Prairie du Pont / Fish Lake project area. Additional socioeconomic indicators are provided in Exhibit EA-22.

The ecological study area ranged in width from 100 to 700 feet inward from the centerline of the levee. The majority of the population within Dupo and East Carondelet lives outside of these study limits. However, there are approximately 25 residential properties included within the study area. The study area is traversed by several railroads and pipelines. Illinois Route 3 and Interstate 255 provide highway access. No community facilities such as churches, schools, or hospitals are located within the ecological study area.

3.3. Air Quality

Wood River

The project area is located to the east of St. Louis, within the Metropolitan St. Louis Interstate Air Quality Control Region (AQCR). This AQCR covers part of Missouri and Illinois. Areas within the AQCR are further defined according to the attainment status of criteria pollutants. The Metropolitan St. Louis AQCR includes the Illinois counties of Jersey, Madison, Monroe, and St. Clair, which are referred to as the Metro-East Nonattainment Area (EWGCG, 2010a). The Metropolitan St. Louis AQCR is in attainment for most of the criteria pollutants, including sulfur dioxide, carbon monoxide, nitrogen dioxide, and lead. The Metro-East Nonattainment Area is a moderate nonattainment area for ozone (8-hr), and a nonattainment area for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). A small area in Granite City, Illinois, is classified as nonattainment for lead 2008 (USEPA, 2010).

Ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on nitrogen oxides (NOx) and volatile organic compounds (VOC's) in the air. There are many

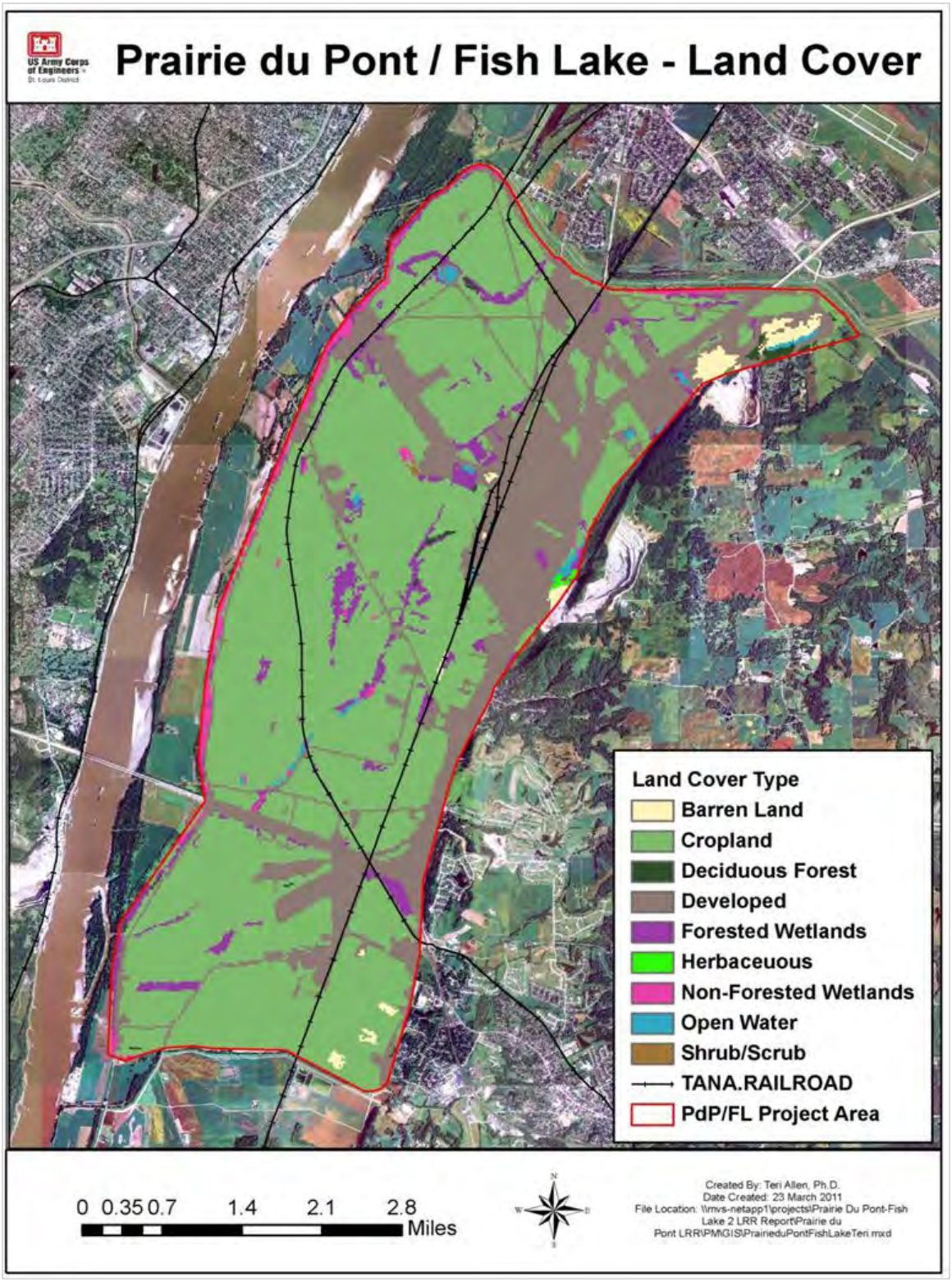

Exhibit EA-21. Land cover for the Prairie du Pont / Fish Lake project location, St. Clair and Monroe counties, Illinois.

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Exhibit EA-22. Socioeconomic indicators for communities located within the proposed Prairie du Pont / Fish Lake project area.

Socioeconomic Indicator	Dupo, IL	East Carondelet, IL	Census Block Groups
Total Population	3933	267	14,936
% White	97.2	92.5	98.0
% Black	1.2	3.4	0.6
% American Indian / Alaska Native	0.3	1.9	0.3
% Asian	0.3	0.0	0.3
% Native Hawaiian/ Pacific Islander	0.0	0.0	0.0
% Other	0.4	0.4	0.2
% Multiple	0.7	1.9	0.7
% Hispanic	0.7	0.0	0.8
Median Age	34.8	36.3	36.5
Average Household Size	2.53	2.84	2.6
Average Family Size	3.04	3.28	3.1
Total Housing Units	1668	105	6132
Median Home Value	$71,900	$67,500	N/A
% High School Graduate or Higher	75.1	68.2	N/A
% Bachelor's Degree or Higher	10.3	0.0	N/A
% in Labor Force	70.7	67.3	N/A
Median Household Income	$43,036	$36,071	N/A
Median Family Income	$47,000	$39,583	N/A
Per Capita Income	$18,505	$13,402	N/A
% Families Below Poverty Level	2.9	3.8	N/A
% Individuals Below Poverty Level	4.3	2.9	5.7

sources of these gases. Some common sources include gasoline vapors, chemical solvents, fuel combustion products, and some consumer products (USACE, 2003).

MESD

The project area is located to the east of St. Louis, within the Metropolitan St. Louis Interstate Air Quality Control Region (AQCR). This AQCR covers part of Missouri and Illinois. Areas within the AQCR are further defined according to the attainment status of criteria pollutants. The Metropolitan St. Louis AQCR includes the Illinois counties of Jersey, Madison, Monroe, and St. Clair, which are referred to as the Metro-East Nonattainment Area (IEPA, 1995). The Metropolitan St. Louis AQCR is in attainment for most of the criteria pollutants, including sulfur dioxide, particulate matter, carbon monoxide, nitrogen dioxide, and lead. The Metro-East Nonattainment Area is a moderate nonattainment area for ozone. The Metro-East Nonattainment Area is a moderate nonattainment area for ozone (8-hr), and a nonattainment area for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).

Ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on nitrogen oxides (NOx) and volatile organic compounds (VOC's) in the air. There are many sources of these gases. Some common sources include gasoline vapors, chemical solvents, fuel combustion products, and some consumer products (USACE, 2003).

Prairie du Pont / Fish Lake

Six criteria pollutants are addressed in the National Ambient Air Quality Standards (NAAQS) and they include particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide, ozone, carbon monoxide, lead, and nitrogen dioxide. Air quality trends during the period 1998-2007 for the State of Illinois include a downward trend in the concentration of carbon monoxide and lead and a flat trend in the levels of ozone, particulate matter, sulfur dioxide, and nitrogen dioxide (IEPA 2007). The region is in attainment for all pollutants with the exception of ozone and particulate matter. The metro St. Louis area including both St. Clair and Monroe Counties, Illinois, is considered a "moderate" nonattainment area for the 8-hour ozone standard and a nonattainment area for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).

3.4. Surface Water and Surface Water Quality

Wood River

The project area is within the watershed referred to as the Mississippi South Central River Watershed by the Illinois Environmental Protection Agency (IEPA, 2008). Tributaries draining upland watersheds into the bottomland include Wood River Creek and its west and east branches. The bottomland portion of its channel was straightened long ago to create a more direct connection with the Mississippi River. Wood River Creek discharges into the river near the midpoint of the levee district's riverfront levee. The Cahokia Creek Diversion Channel bounds the south side of the Levee District (Exhibit EA-6). The Mississippi River borders the riverfront levee for its entire length. Small man-made impoundments are scattered in the uplands, and a number of lake-like water bodies occur in the bottomland, most of which are clustered along the riverside or protected side of the main levee.

According to the IEPA (2008, 2010a), impaired uses and causes for impairment (within parentheses) for these waterways include: Mississippi River - fish consumption (mercury, polychlorinated biphenyls), primary contact recreation (fecal coliform), and public water supplies (manganese); Cahokia Creek Diversion Channel – aquatic life (phosphorus total); and Wood River Creek and its two forks – aquatic life (manganese, total suspended solids, sedimentation/siltation), and primary contact recreation (fecal coliform).

MESD

According to USACE (2003), surface waters in the vicinity of the MESD levee are not pristine and exhibit varying degrees of impairments depending on specific conditions surrounding each water body. The most common surface water quality impairments and sources of impairments for the Mississippi River and floodplain streams and surface lakes in this area are presented below.

Water quality data have been collected for surface waters on the Mississippi River floodplain, and these sites include Cahokia Canal, Canal #1, Prairie Du Pont Creek, Harding Ditch, Canteen Creek, and Judy's Branch, as well as Horseshoe Lake and the three lakes at Frank Holten State Park. Causes of impairments for these surface waters include priority organic contaminants; metals contaminants; nutrient enrichment (i.e., phosphorus, nitrogen, nitrates); siltation; organic enrichment/low dissolved oxygen; habitat alteration; suspended solids; ammonia (unionized); pH outside accepted standard range of 6.5 to 9.0; excessive algae; and noxious aquatic plants. Sources of impairment for these surface waters include industrial point sources; municipal point sources; combined sewer overflows; agricultural runoff from non-irrigated crop production and livestock production; urban stormwater runoff; hydrologic/habitat modification (i.e., channelization, dredging, upstream impoundments, flow regulation or modification, removal of riparian vegetation, streambank modification, draining or filling of wetlands); construction, land development, commercialization, urbanization, land disposal, and septic tanks; and contaminated sediments.

The segment of the Mississippi River along the Riverfront levee accepts discharges from the project area, and also has historical water quality data. This portion of the river is designated for "full use" as a water supply, general use and aquatic life water body. Causes of impairments for this segment of the Mississippi River include priority organic contaminants; siltation; habitat alteration, and suspended solids. Source of impairments include industrial point sources; municipal point sources; combined sewer overflows; agriculture runoff from non-irrigated crop production; urban stormwater runoff; and hydrologic/habitat modification (i.e., channelization, dredging, upstream impoundments, flow regulation/modification, removal of riparian vegetation, streambank modification, draining/filling of wetlands).

Additional details about surface water quality are presented in Section 3.4 Hazardous, Toxic, and Radioactive Wastes; treated groundwater from a Superfund Site located in the project area is discharged into the Mississippi River.

Prairie du Pont / Fish Lake

The study area is identified within the watershed referred to as the Mississippi South Central River Watershed by the Illinois Environmental Protection Agency (IEPA). Palmer Creek is

located within the study area and drains the upland reaches of the watershed into the bottomland. Old Prairie du Pont Creek, which exists as a channel scar, bisects the study area in two separate locations It is sited towards the northern portion of the Prairie du Pont Levee. A total of seven tributaries including Palmer Creek and Old Prairie du Pont Creek were identified within the study area during field surveys. Prairie du Pont Creek is located directly north of the study area and drains along the northern flank levee of the Prairie du Pont levee system, while Carr Creek drains just south of the study area, adjacent to the flank levee of the Fish Lake levee system. Both tributaries are primary tributaries of the Mississippi River and drain a significant portion of the watershed. However, neither tributary is located within the study area and, therefore, were not thoroughly examined during the study.

In an attempt to create a more direct connection with the Mississippi River, Prairie du Pont Creek was historically modified. This created a channel scar located on the landside of the levee now known as Old Prairie du Pont Creek. The creek drains within the northernmost portion of the Prairie du Pont Levee and exits the site under the levee through a pump station.

Palmer Creek drains across the central portion of the area within the Fish Lake Levee District and drains under the levee through the only pump station located along the Fish Lake levee system. The creek has been modified and channelized over time to provide a more direct flow to the river. Both Fish Lake and Hill Lake Creek, located beyond the limits of the study area, are secondary tributaries of the Mississippi River and drain into Palmer Creek directly east of where the creek enters the study area.

According to the IEPA report entitled *Illinois Water Quality Report 2004 (Clean Water Act, Section 305(b)), Water Resource Assessment Information* (IEPA 2004), no designated uses for either Old Prairie du Pont Creek or Palmer Creek were assessed, and their overall assessment was evaluated but was not fully monitored, meaning minimal information is presently available on their overall condition.

3.5. Groundwater and Groundwater Quality

Wood River

The bottomland portion of the study area is underlain by a sand and gravel aquifer that has historically supplied groundwater for industrial purposes. The municipalities of East Alton, Bethalto, Wood River, and Hartford have community water supply facilities that currently withdraw from these groundwater sources. In order to protect groundwater quality in this area, the Southern Groundwater Protection Planning Region was established by the Illinois Environmental Protection Agency in Madison County and three adjacent counties to the south. In the vicinity of the East Alton community water supply, there is a plume of groundwater contamination coming from two sites that consist of leaking underground storage tanks, and the contaminants include various volatile organic compounds (IEPA, 2010b). The Illinois EPA's Bureau of Land is implementing a groundwater contamination response strategy for East Alton (IEPA, 2010b). There is also dissolved and free phase hydrocarbon contamination under portions of the northern part of the Village of Hartford. The dissolved plume is under investigation by the IEPA.

MESD

The historic floodplain or valley of the Mississippi River in the Metro-East area consists of fill that lies over bedrock. This fill is composed of glacial and alluvial materials. Glacial materials consist of sands and gravels, and sands, gravels, silts, and clays comprise alluvial materials. The valley fill is generally about 120 feet thick, and it contains a large aquifer. Groundwater movement and groundwater table elevation in the aquifer are dynamic and change in response to a combination of factors. These factors include annual or seasonal fluctuations in the surface level of the Mississippi River, periodic infiltration by rainfall falling in the bottoms and adjacent uplands, and pumping or removal of groundwater for industrial or municipal purposes. Others include periodic recharge or discharge due to the Metro-East's interior storage and drainage system for surface water, and localized lowering of groundwater levels in the vicinity of the East St. Louis levee system's pump stations.

Because of the composition and structure of the valley fill, groundwater flow in this aquifer is a relatively slow process. Thus, groundwater level changes are most closely associated with seasonal and long-term variations in river levels, rainfall infiltration, and removal from industrial or municipal pumping. Most of the rainfall infiltration naturally flowing into the aquifer comes from rainfall directly on the bottoms, whereas about one fifth of the infiltration comes from groundwater and surface runoff from the adjacent bluffs. Under normal circumstances, the overall groundwater gradient in the bottoms slopes from the bluff toward the Mississippi River, during which groundwater discharges into the Mississippi River. However, during high river levels groundwater movement can reverse direction, away from the river and toward the interior. The highest groundwater levels typically occur during periods of above-average rainfall and high river levels of long duration. Under normal conditions, existing groundwater levels are generally a few feet to about 12 feet below the ground surface (USACE, 2003).

Within the project area there is one existing barrier designed to control groundwater movement in the vicinity of the Mississippi River. It consists of a 3,500-foot long soil-bentonite wall barrier constructed in 2006 as part of an effort to remediate groundwater contamination at the Sauget Area 2 Superfund site. This site is about 300 feet riverward of the Riverfront levee centerline between Stations 1155+00 to 1175+00. This wall was designed to intercept contaminated groundwater during non-flood times originating from a hazardous substance disposal landfill located landside of the levee. The wall is founded in bedrock at a depth of about 140 feet, and is three-sided.

With regard to groundwater quality, the project area lies within the Southern Region, one of four priority groundwater protection planning regions in Illinois. This region is comprised of Madison, St. Clair, Monroe, and Randolph counties (IEPA, 2010c). Within the project area, natural levels of iron, manganese, and dissolved solids concentrations in groundwater can be relatively high. Industrial contamination of the groundwater aquifer has occurred at specific locations in the area. The contamination consists of organics and heavy metals (USACE, 2003).

Prairie du Pont / Fish Lake

According to the USGS, *National Water Summary 1986* (USGS 1988), the study area is located in the sand and gravel aquifer (alluvium). This aquifer is the largest source of water for domestic supplies in Illinois. The largest yields generally are obtained from outwash sand and

gravel in major glacial valleys. Water in these aquifers is of generally good quality for most uses.

According to the ISGS *Groundwater Geology in South-Central Illinois* (ISGS 1957), the study area is identified as an area underlain by thick deposits of unconsolidated material containing sand and gravel with the exception of a narrow band at the base of the bluff, where sand and gravel deposits are discontinuous. In this area groundwater for domestic and farm supplies may be obtained easily with small-diameter drilled wells. The probabilities for construction of high-capacity wells for industries and municipalities are good, although test drilling is necessary to located suitable sand and gravel deposits.

3.6. Hazardous, Toxic, and Radioactive Wastes

Areas of known or potential contamination were identified by AMEC Earth & Environmental, Inc. (AMEC) prior to subsurface exploration and preliminary design in order to plan the balance of the project in a manner that avoids these areas to the extent possible. For areas that cannot be avoided, this evaluation provided information for development of worker protections, preparation of appropriate investigative programs, evaluation of the impact and cost of design alternatives, and coordination with agencies with a stake in environmental site controls.

AMEC (2011b) reviewed existing environmental databases to determine potential sites of interest along the levee systems. The database tools used were the U.S. Environmental Protection Agency (USEPA) EnviroFacts web site and a database search conducted by Environmental Data Resources, Inc. (EDR). A search distance of 0.25 miles from the levee systems was used for the database searches. Sites were flagged based on their listing on databases pertaining to potential soil and groundwater impacts (i.e., landfills, underground storage tanks, spills or releases, areas of documented soil or groundwater impacts).

AMEC also obtained and reviewed available pertinent documents from regulatory agencies (including the Corps) and design team consultant members; contacted regulatory agencies to obtain information on sites not previously documented or additional information on documented sites where current information was deemed insufficient, as appropriate; and performed interviews with regulators, sub-consultants, and other parties to identify and obtain specialized knowledge regarding portions of the levees with known or suspected environmental issues.

<u>Wood River</u>
Within the lower Wood River drainage and levee district, some industrial sites in the riverfront area are contaminated with wastes. Those in the State Site Remediation Program include Explorer Pipeline Company, Koch Pipeline Company, The Premcor Refining Group, Inc., Clark Oil Refinery, and Shell Oil Company. Sites under the Resource Conservation and Recovery Act (RCRA) program include BP, Conoco-Phillips, and Olin Corporation. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as Superfund) sites in the area include Laclede Steel Company, Clark Oil Refinery, Owens Illinois Inc., and Chemetco. These combined sites occupy thousands of acres of the floodplain, with Shell Oil being the largest with 2,220 acres. At some of these sites, groundwater contamination

is known and consists of a plume of dissolved and free phase hydrocarbons (USACE, 2009, 2011b).

Based on the USEPA database review, six sites of potential concern were listed in the USEPA Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) databases. These sites include (by facility name) Amoco Oil Company Wood River Refinery, Marathon Petroleum Co. LLC, City of Wood River STP, Conoco Phillips Co., Koch Nitrogen Co. LLC, and Amoco Riverfront Property. Five sites of potential concern were identified in the EDR database (AMEC 2011b).

MESD

HTRW areas of interest include sites both present and past used for manufacturing, waste disposal, power generation, iron reclamation, oil refining and storage, metal refining, organic chemical production, and other potentially hazardous facilities (USACE, 2008, 2010c, 2011a).

Based on the USEPA database review, 12 sites of potential concern were listed in the USEPA Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) databases. These sites include (by facility name) Veolia ES Technical Solutions LLC, Resource Recovery Group LLC, Union Electric Co., Center Point Terminals Co., Beelman River Terminals, Sauget & County Landfill (Site Q), Joint American Bottoms & Sauget Trt Fac, Owens Corning Roofing & Asphalt LLC, Illinois-American Water Co., US Greenfiber LLC, Oldcastle Lawn & Garden , Inc., and Gateway Terminals LLC. Nine sites of potential concern were identified in the EDR database (AMEC 2011b).

Prairie du Pont / Fish Lake

Based on the USEPA database review, no sites of potential concern were listed in the USEPA Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) databases. Similarly, no sites of potential concern were identified in the EDR database (AMEC 2011b).

3.7. Hydrologic Conditions

Wood River

The Wood River levee project is intended to provide protection against a 52 foot Mississippi River stage on the St. Louis gage, which has a current expected frequency of greater than 500 years. For the design flow of 1,300,000 cfs, the height of protection is based upon confinement by industrial and urban area projects with a design flood profile having a flow-line elevation of 443.4 feet msl at the upper end (opposite river-mile 202.7); elevation 442.7 feet, msl at the mouth of Wood River creek; and elevation 441.4 feet, msl at the lower end (Cahokia Creek Diversion Channel) of the levee district. Levee grade freeboard is 2 feet above water surface profile by design. The flood of record occurred during the summer of 1993 when the St. Louis gage recorded 49.58 ft. River elevations were above flood stage from 3 April to 7 October. Peak flow was estimated at 1,080,000 cfs. The frequency of that event was 175 years. The project endured two other significant flood events; 43.3 feet on the St. Louis gage in 1973, and

41.9 feet on the St. Louis gage in 1995. For the flank levees, a net grade equal to the main stem design flood elevation plus 2-foot freeboard was projected back along the tributaries.

The levee district relies on many pumping stations that discharge storm water, seepage, and sewage flow to the Mississippi River. The interior drainage system relies on two methods of conveyance, open drainage ditches and combined sewers. Open drainage ditches feed two of the levee and drainage district's seven pump stations, and these are Lakeside and Homegarden. Sewer fed pump stations must pump effluent irrespective of interior rainfall events whenever gravity flow is impeded by high river stages.

MESD

The East St. Louis Flood Protection System is designed to provide protection from a Mississippi River flood at 52 feet on the St. Louis gage plus 2 feet of freeboard (greater than 500-year protection). Interior drainage is handled by a series of natural drainage ways, ditches, and pump stations. As part of the levee system, relief wells are located landside of the levee to help relieve hydrostatic pressure by allowing ground water to flow to the surface. The area is also characterized by various features that affect hydraulics such as ponding areas, diversion ditches, railroads embankments, and urban drainage systems.

Prairie du Pont / Fish Lake

Stage-frequency and flood profile estimates for the subject reach of the Mississippi River have been completed on several occasions by the U.S. Army Corps of Engineers (USACE). Previous studies in the 1950s and 1970s have been superseded by the 2004 Upper Mississippi River System Flow Frequency Study (FFS) completed by USACE. Additionally, a physical model of the Mississippi River was developed at one time by USACE and was used to establish flood profiles for the river. The 2004 FFS is considered the best available information for flood discharges and elevations on the Mississippi River in the reach of river protected by the Prairie du Pont and Fish Lake levee systems.

As initially authorized by Congress, the project was designed to withstand a flood event with a 0.2 percent annual probability of occurrence ("a 500-year flood"). At the time of the authorization, the 500-year event was determined to equate to a reading of 52 on the St. Louis gage. However, the results of the FFS completed by USACE in 2004 indicate that the 500-year flood, approximately 1,120,000 cubic feet per second (cfs) in the reach of the Mississippi River adjacent to the Prairie du Pont and Fish Lake Levee Districts, is predicted as 50.6 on the St. Louis gage. Therefore, based on the 2004 FFS, the flood event commonly referred to as the "52 on the St. Louis gage" has a greater return interval than 500 years.

The existing riverfront levee system has a top of levee profile elevation (NAVD 88 datum) of 430.09 at the upstream end of the Prairie du Pont levee system adjacent to Prairie du Pont Canal, 427.37 at approximately the intersection of the riverfront levee with the Interstate 255 highway embankment and 425.22 at the downstream end of the Fish Lake levee system in the vicinity of Carr Creek. The top of levee elevation for the Prairie du Pont flank levee system varies from elevation 431.0 near Triple Lakes Road to elevation 430.09 at its tie in location with the riverfront levee. Likewise, the top of levee elevation for the Fish Lake flank levee system varies from elevation 432.1 near Bluff Road to 425.22 at its tie in location with the riverfront levee.

The original designed freeboard was stipulated as 2 feet above the flood event profile which created a "52" reading on the St. Louis gage; commonly referred to as "52 plus 2". There are several miles of the riverfront levee that do not provide 2 feet of freeboard. Similarly, the Prairie du Pont flank levee has a significant reach that does not provide the 2 foot of freeboard for the "52" flood.

The flood of record at the St. Louis gage, 49.58, was experienced on 1 August 1993, with a peak discharge estimated at 1,080,000 cfs. The return interval of that flood event was estimated at over 300 years. The levee system experienced and survived two other large flood events without major problems. The flood event of April 1973 was estimated to be 50-year event with a peak discharge of 852,000 (gage reading of 43.3) and the May 1995 flood event which was estimated to be a 40-year event with a peak discharge of 800,000 cfs (gage reading of 41.9).

During high water conditions on the Mississippi River, interior drainage within the levee districts is controlled by six pump stations. Four of these pump stations are owned and operated by the Prairie du Pont Levee District with the other two owned and operated by the City of East Carondelet. During low water conditions, the interior drainage is discharged through the levee via a series of 14 gravity drains.

3.8. Noise

Wood River

The Metro-East area includes industrial, transportation, recreational, residential, retail and agricultural zones. These areas are dispersed in pockets of varying sizes and density, and each makes its own contribution to the noise characteristics of the region. Agricultural and open space areas typically have noise levels in the range of 34-70 decibels (dB) depending on their proximity to transportation arteries. Noise associated with transportation arteries such as highways, railroads, etc., would be greater than those in rural areas. Other sources of noise include operations of commercial and industrial facilities, and operation of construction and landscaping equipment. In general, urban noise emissions do not typically exceed about 60 dB, but may attain 90 dB or greater in busier urban areas or near high volume transportation arteries.

In the upper drainage and levee district, most noise is generated by traffic using Illinois Highway 143 and other nearby routes in Alton and East Alton. Noise generated by tows passing through Melvin Price Locks and Dam intermittently is shielded to some degree by the levee. Industrial or commercial facilities are located adjacent to the Wood River levee in some areas, while others are in a rural setting where the only source of noise may be agricultural equipment. Areas sensitive to noise include some residential areas near the Riverfront levee at Wood River and Hartford, and a few scattered homes along the South Flank levee.

MESD

The Metro-East area includes industrial, transportation, recreational, residential, retail and agricultural zones. These areas are dispersed in pockets of varying sizes and density, and each makes its own contribution to the noise characteristics of the region. Agricultural and open space areas typically have noise levels in the range of 34-70 decibels (dB) depending on their

proximity to transportation arteries. Noise associated with transportation arteries such as highways, railroads, airports etc., would be greater than those in rural areas. Other sources of noise include operations of commercial and industrial facilities, and operation of construction and landscaping equipment. In general, urban noise emissions do not typically exceed about 60 dB, but may attain 90 dB or greater in busier urban areas or near high volume transportation arteries.

Many of the areas near the MESD levee are located directly adjacent to industrial or commercial facilities while others are in a rural setting where the only source of noise may be agricultural equipment. Areas sensitive to noise include residential areas located along the Riverfront levee near the Venice Pump Station and along the South Flank levee between stations 1327+00 and the South Pump Station.

Prairie du Pont / Fish Lake

Prairie du Pont / Fish Lake includes transportation, recreational, residential, and agricultural zones. Agricultural and open space areas typically have noise levels in the range of 34-70 decibels (dB; a measure of loudness) depending on their proximity to transportation arteries. Noise associated with transportation arteries such as highways, railroads, airports etc., would be greater than those in rural areas. Transportation-related noise, such as that created by railroads and major highways, is the main source of noise within the study area. In general, urban noise emissions do not typically exceed about 60 dB, but may attain 90 dB or greater in busier urban areas or near high volume transportation arteries. The Columbia Airport is located near the southeastern portion of the study area. The airport also contributes noise to the study area. Airport noise at 1 mile is estimated at 80 dB. Exhibit EA-23 illustrates the sound and decibel levels of a variety of sources.

3.9. Prime Farmland

Wood River

According to the digital soil survey of Madison County (NRCS, 2010), prime farmland soils of various kinds occur within the project area, but most are concentrated in the upland watersheds. Roughly 70 percent of the bottomland in the project area consists of soils that are “not prime farmland”, and developed or built-up areas are included in this category. About 20 percent of bottomland consists of soils for which “all areas are prime farmland”. The remaining soils in the bottomland consist of soils that are either “prime farmland if drained”, “prime farmland if drained and protected from flooding”, or “prime farmland if protected from flooding or not frequently flooded during the growing season”. Bottomland soils for which “all areas are prime farmland” occur inside the levee-protected area, and are concentrated in the southwest and southeast corners of the project area, as well as along the flank levees on either side of Wood River Creek. These soils include Landes very fine sandy loam, Shaffton clay loam, Onarga sandy loam, Tice silty clay loam, Ridgeway silt loam, and Geff silt loam. Soils that are classified as “important” by the soil survey occur in the adjacent uplands and rarely in the bottomlands.

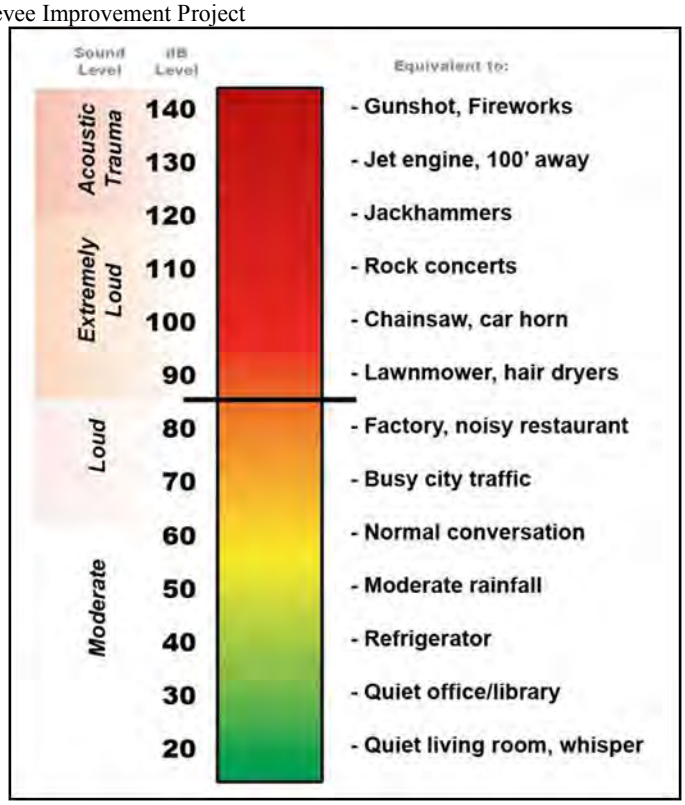

Exhibit EA-23. Examples of the sound level and decibel (dB) level of a variety of sources.

MESD

In the Metro East area, agricultural lands currently support row crops, small grains, orchards/nurseries, and rural grassland. Typically, row crops include corn and soybeans, and small grains consist of wheat and sorghum. A specialty crop is horseradish. Prime farmland is located along the MESD levee primarily along the North and South Flank levees, where it is distributed irregularly. There are scattered areas as well adjacent to the Riverfront levee (USACE, 2003).

Prairie du Pont / Fish Lake

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland. Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resource, and farming these soils results in the least damage to the environment. Prime farmland soils may presently be used as cropland, pasture, or forestland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings,

small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks. Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable, and the level of acidity or alkalinity and the content of salts and sodium are acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods, and they are not frequently flooded during the growing season or are protected from flooding. Slopes range mainly from 0 to 6 percent. Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland where these limitations are overcome by drainage measures, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information about the criteria for prime farmland can be obtained at the local office of the Natural Resources Conservation Service. A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

According to the Natural Resource Conservation Service (NRCS) Web Soil Survey (http://websoilsurvey.nrcs.usda.gov), various prime farmland soil types occur within the proposed PDP/FL project area (Exhibit EA-24). Approximately 7410.7 acres (55.9%) of the proposed project area consists of soils that are “not prime farmland”. Approximately 4202.5 acres (31.7%) consists of soils for which “all areas are prime farmland”. The remaining soils in the proposed project area consist of soils that are either “prime farmland if drained” (1438.5 acres; 10.9%), “prime farmland if drained and either protected from flooding or not frequently flooded during the growing season (126.0 acres; 1.0%), “prime farmland if protected from flooding or not frequently flooded during the growing season” (66.3 acres; 0.5%) or “farmland of statewide

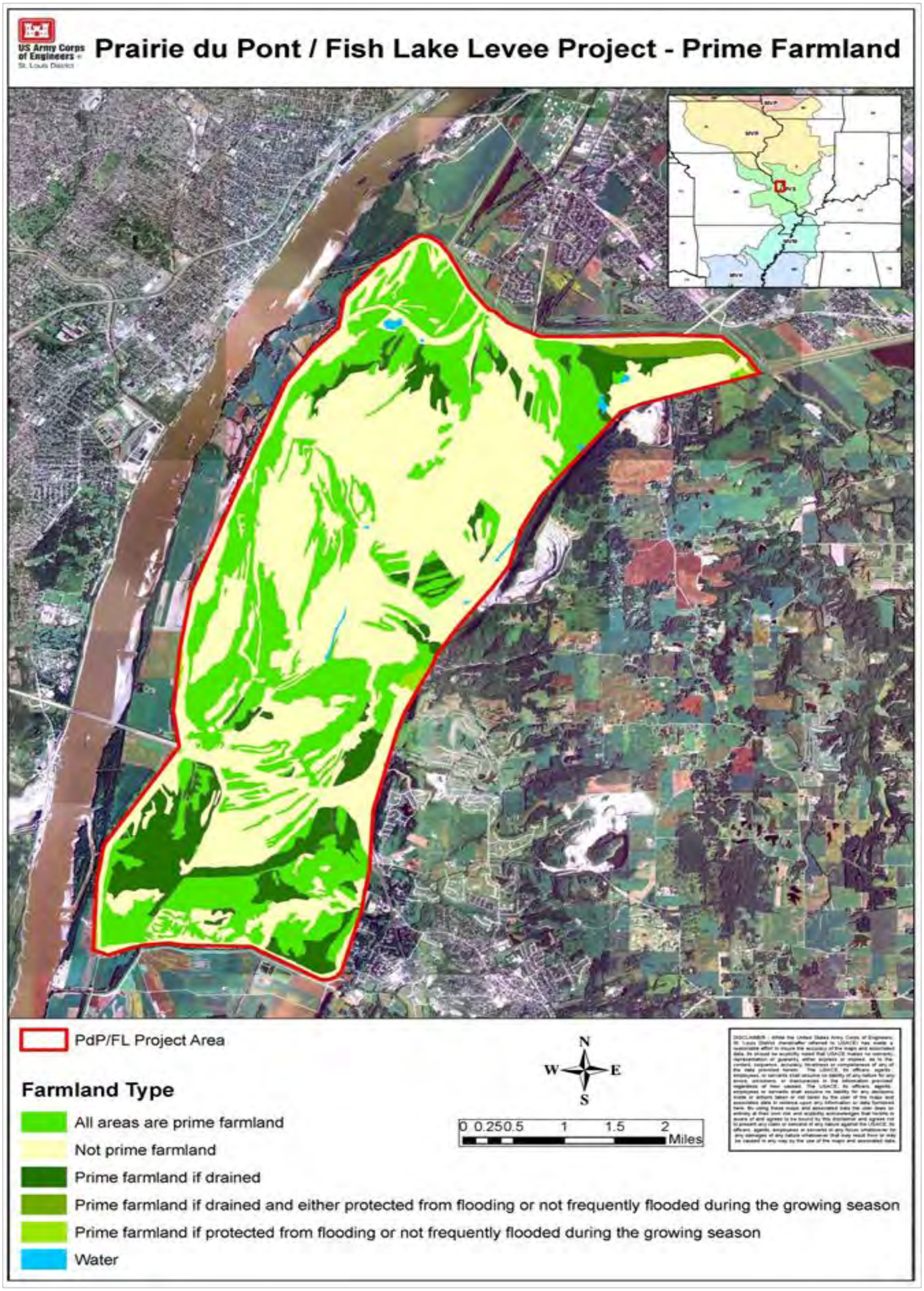

Exhibit EA-24. Prime farmland coverage for the Prairie du Pont / Fish Lake Project Location, St. Clair and Monroe Counties, Illinois.

importance" (7.5 acres; 0.1%). The mapping units included in the study area that are identified as prime farmland include Drury silt loam, Dupo silt loam, Haynie silt loam, Landes very fine sandy loam, Rocher loam, Shaffton clay loam, and Tice silty clay loam.

3.10. Recreation

Wood River

Madison County Transit supports a system of recreational trails in Madison County that are used for walking, running, roller-blading, and cycling (MCT, 2010). The Confluence Trail follows the top of the riverfront levee along the Mississippi River. This trail extends nine miles from the Cahokia Creek Diversion Channel at the south to Alton at the north, and passes by the Melvin Price Locks and Dam. The trail is crossed at a number of locations by public and private roads. A two-mile extension branches off at Wood River Creek and follows the creek upstream to about Illinois Route 3. A second trail, the Watershed Trail, occurs in the southeast portion of the lower levee and drainage district and was built along an abandoned rail corridor.

MESD

Within the Metro East area, the State of Illinois owns and maintains Horseshoe Lake State Recreation Area, Cahokia Mounds State Historic and World Heritage Site, and Frank Holten State Park. These areas are not in the vicinity of the MESD levee system. In addition, a regional trail and bikeway system extends into the Metro East area (Trailnet, 2010). The Metro-East Levee Trail, which opened in 2003, is a 7.5-mile unpaved walking and biking trail located atop a portion of the MESD levee system. The trail begins at the south end of the Riverfront levee at Cargill Road, extends south and then east along the top of the South Flank levee, and terminates at a point near the intersection of Il Rte 157 and Il Rte 163. About 3.5 miles of the trail is located along the top of the levee. The trail offers views of the Mississippi River and Prairie du Pont Creek.

Prairie du Pont / Fish Lake

No formal recreational facilities are located within the study area. In some areas, the roadway on the levee is gravel or paved, and people may use this roadway as a walking trail or as a location from which to fish. However, other areas of the levee are prohibited from use by the general public. Fish Lake, Schmids Lake, Hill Lake Creek, and Palmer Creek are located east of the study area. These waterbodies are not publicly owned and are typically not used for recreation.

The Columbia Airport is located near the southeastern portion of the study area. It is privately owned and may be used for recreational flying. The airport is not located within the study area.

3.11. Aesthetics

Wood River

Aesthetic resources are represented by those aspects of the natural and human environment that are pleasant or pleasing to people, especially to look at. For many people aesthetic resources include the natural channel of the Mississippi River, undeveloped open spaces such as

agricultural lands, natural habitats, and some development, such as residential areas. The project area's industrial areas are expected to be aesthetically attractive to relatively few people.

MESD

Because of the semi-rural nature of some portions of the project area, the overall aesthetic quality of the Metro East area is most likely favorable to residents living there. Remnant natural habitats are particularly attractive to these residents as well as the visiting public. Industrial and commercial areas would not be expected to be so. Aesthetic aquatic resources include the natural channel of the Mississippi River, Cahokia Creek Diversion Canal along the North Flank levee, and Prairie du Pont Creek along the South Flank levee. Along the levees, aesthetically unpleasant aspects would include littering and illegal dumping of trash, all terrain vehicle use, and vandalism.

Prairie du Pont / Fish Lake

Aesthetic resources include the natural channel of the Mississippi River, which is located a minimum of one-half mile west of the levee and study area, and undeveloped open spaces, which are mainly agricultural lands with small areas of forested habitat. The City of St. Louis cannot be observed from the study area due to the existence of the levee. Fish Lake is located west of the study area and is a meander lake. The view of the bluffs to the east of the study area may be considered an aesthetic resource. The study area's residential and infrastructure areas would not be considered to be aesthetically attractive to most people.

3.12. Cultural Resources

Congress has, historically, passed legislation for the preservation of cultural resources beginning with the Antiquities Act of 1906. Generically defined, cultural resources are objects or sites representing human occupation of the land. A cultural resource may be an historic old building, a prehistoric site, a battlefield, a statue, or any other object or location. The legislative history for historic preservation expresses the intent of Congress to ensure that the nation's rich heritage is preserved and that Federal agencies consider the effects or their actions upon cultural resources. The National Historic Preservation Act of 1966 (NHPA, or the Act), as amended, specifically requires every Federal agency to consider the effects of an undertaking or project upon cultural resources and outlines a process to ensure the same. However, the statute does not mandate the preservation of all cultural properties. Rather, the statute provides for protection of "historic properties or resources," which are legally defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register [of Historic Places], including artifacts, records, and material remains related to such a property or resource" (Section 301 of NHPA). In addition, the Act states that "properties of traditional religious and cultural importance" to Native American tribes or Native Hawaiian organizations may be eligible for inclusion on the National Register (Section 101(d)(6)(A) of the Act). The intent of the Act is to preserve those historic properties that represent significant events, people, achievements, or have the ability to provide information about prehistory. Additional legislation, executive orders, and regulations have refined and clarified the goals and procedures of historic preservation.

The study area is located within the American Bottoms, an area of Mississippi River floodplain extending from Alton on the north, south to the mouth of the Kaskaskia River, near the city of Chester. This area is known for its abundant and significant prehistoric, colonial, and historic cultural resources (Exhibit EA-25). Cahokia Mounds, a World Heritage site, lies east of the project area. The cultural resources and potential effects for each levee system are discussed below.

Exhibit EA-25. Cultural occupations within the project area.

Name of Occupation	Beginning	End
American	1778	Present
British	1765	1778
French	1673	1765
Historic Indian	1500	ca. 1800
Mississippian	AD. 900	1500
Woodland	1000 B.C.	AD. 900
Archaic	8000 B.C.	1000 B.C.
Paleo-Indian	(?)12000 B.C.	8000 B.C.

Wood River

The levees addressed in the proposed project lie along the Mississippi River, Wood River Creek, and the Cahokia Diversion Canal, constructed to channelize and divert Cahokia Creek and its tributaries to the Mississippi.

The records of the Illinois Historic Preservation Agency (IHPA), the State Historic Preservation Office (SHPO) for Illinois were reviewed to determine the extent of previous research in the project area. The records indicate that the there have been no survey investigations for the majority of the project area with the exception of the eastern terminus of the south flank of the levee.

Thirty previously recorded sites are located within 1000 ft. of the Wood River Levee (Exhibit EA-26). Within the proposed project construction footprint, six archaeological sites have been previously recorded: 11MS67 (further testing required), 11MS108 (ineligible), 11MS178 (further testing required), 11MS1584 (ineligible), 11MS1600 (further testing required), and 11MS2025 (eligible). As noted for each site, two have been determined to be ineligible for nomination to the National Register of Historic Places (NRHP); therefore, the project will have no adverse impact on these sites. Of the remaining four, additional research will be required for three sites in order to assess the potential effects of this undertaking upon the sites, while one site has been determined to be eligible.

Exhibit EA-26. Archaeological sites located within 1000 feet of the Wood River Levee system.

Site Number	Site Name	Location	NRHP Eligibility	Effect of Project
11MS5	Carl Steiner		Protected by HSRPA Burial Law	Avoided
11MS9	Gillham	South Flank	Determined Eligible, Protected by HSRPA Burial Law	Impacted
11MS17	Judge Gillham	South Flank	Determined Eligible, Protected by HSRPA Burial Law	Impacted
11MS35	William Smith		Not Reviewed	Avoided
11MS47	Poag-Springly		Not Reviewed	Avoided
11MS65	Ferguson Avenue	River Front	Not Reviewed	
11MS67	Wagon Wheel	South Flank	Partial Not Eligible, Phase II Completed	Avoided
11MS108	Linkeman	South Flank	Protected by HSRPA Burial Law	Impacted
11MS110	Willaredt		Protected by HSRPA Burial Law	Avoided
11MS114	Wagner		Not Reviewed	Avoided
11MS115	Ebelage		Not Reviewed	Avoided
11MS133	Olin		Eligible	Avoided
11MS178	S. Shafer	South Flank	Phase II Recommended	Impacted
11MS588	G.N. Radic Site #3		Not Eligible	N/A
11MS639	Campbell		Not Reviewed	Avoided
11MS640	Mike		Not Reviewed	Avoided
11MS641	Swamp		Not Reviewed	Avoided
11MS642	Rise		Not Reviewed	Avoided
11MS650	Wayne	South Flank	Not Reviewed	Avoided
11MS661	Fahnestock	South Flank	Not Reviewed	Avoided
11MS672	Russell	South Flank	Protected by HSRPA Burial Law	Avoided
11MS689	Stegall		Not Reviewed	Avoided
11MS847	Gilbert		Not Reviewed	Avoided

11MS866			Determined Eligible	Avoided
11MS868		North Flank	Not Reviewed	Avoided
11MS870	Chris Primas		Not Reviewed	Avoided
11MS895	Lawrence Primas		Not Reviewed	Avoided
11MS984	Gun Club		Not Reviewed	Avoided
11MS985	Gallery		Not Eligible	N/A
11MS1292	Losch I	South Flank	Not Eligible, Phase II Completed	N/A
11MS1324	East Alton Cemetery		Protected by HSRPA Burial Law	Avoided
11MS1584	Berm Base	River Front	Not Eligible	N/A
11MS1585	Levee Blip	River Front	Not Eligible	N/A
11MS1586	Doschert	River Front	Not Eligible	N/A
11MS1600		South Flank	Not Reviewed	Impacted
11MS1609		South Flank	Not Eligible	N/A
11MS1666		River Front	Not Eligible	N/A
11MS2025	Helmkamp	South Flank	Determined Eligible, Phase II Completed	Avoided
11MS2047		River Front	Not Reviewed	Avoided
11MS2048		River Front	Not Reviewed	Avoided
11MS2073			Not Eligible, Phase II Completed	N/A
11MS2282		River Front	Not Eligible	N/A
11MS2300	Auburn Sky site	River Front	Not Reviewed	Avoided
11MS2323	Gillham-Hughes site	River Front	Not Reviewed	Avoided
11MS2324		South Flank	Not Eligible	N/A

MESD

Historic properties previously identified within this area range in age from 50 to more than 12,000 years old, spanning occupations by prehistoric Native Americans, historic Native Americans and historic Euro-Americans (Exhibit EA-25).

The most prominent archaeological site within the study area is the Cahokia Mounds State Historical Site, which is the largest prehistoric site north of Mexico. It is listed on the National

Register of Historic Places, is a National Historic Landmark, and also is one of only 20 World Heritage Sites in the United States designated by the United Nations Education, Science and Cultural Organization (UNESCO). During historic times, the town of Cahokia was founded in 1699 by the French and is the oldest extant European settlement on the Mississippi River.

At present, a total of 13 structures and sites within the study area have been listed on the National Register of Historic Places:

- Cahokia Mounds State Park
- Horseshoe Lake Mound Village -Granite City
- Eads Bridge - East St. Louis
- Pennsylvania Avenue Historic District-East St. Louis
- Majestic Theater - East St. Louis
- Old Holy Family Church -Cahokia
- New Church of the Holy Family - Cahokia
- Old Cahokia Courthouse -Cahokia
- Jarrot House (Mansion) -Cahokia
- Pierre Martin-Boismenue House - East Carondolet
- Curtiss-Wright Hangars 1 and 2 – Cahokia
- Spivey Building – East St. Louis
- Emmert – Zippel House – Granite City

In addition to these, there are 19 known archaeological sites located within 500 feet of the toe of the Metro-East Sanitary District (MESD) levee system (Exhibit EA-27). Eleven of the 19 known archaeological sites are located on the North Flank levee of the project. From the eastern bluff end of the North Flank there are two large mound sites, and both of these sites are considered potentially eligible for the National Register of Historic Places (NRHP). On the western end of the North Flank there are four sites that have been determined potentially eligible for the NRHP and have been recommended for further testing. Five remaining sites have been identified along the North Flank however no determination has been made regarding their NRHP eligibility. The remaining eight previously recorded archaeological sites fall within 500 feet of the riverfront portion of the levee system. One site, 11S684 (the Eads Bridge) is listed on the NRHP. The other seven sites, all dating to the historic time period, have been either severely damaged or destroyed by urban development and, therefore, are ineligible for the NRHP and require no further cultural evaluation.

Exhibit EA-27. Archaeological sites located within 500 feet of the Metro-East Sanitary District (MESD) levee system.

Site Number	Site Name	Location	NRHP Eligibility	Effect of Project
11MS31	Poag Road Site	North Flank	Potentially Eligible	Avoided
11MS32	Drda Site	North Flank	Potentially Eligible	Avoided
11MS423	Mooney Creek Site	North Flank	Not Determined	Avoided
11MS688	Town Lot Site	North Flank	Not Determined	Avoided
11MS689	Stegall Site	North Flank	Not Determined	Avoided
11MS892	Two Pole Site	North Flank	Not Determined	Avoided
11MS895	Lawrence Primas Site	North Flank	Not Determined	Impacted
11MS904	Kerr Island Site	Riverfront	Not Eligible	N/A
11MS1860	N/A	North Flank	Potentially Eligible	Avoided
11MS1877	N/A	North Flank	Potentially Eligible	Avoided
11MS1903	Old Venice	Riverfront	Not Eligible	N/A
11MS1943	Lewis and Clark Interpretive Center Site	North Flank	Potentially Eligible	Avoided
11MS1955	N/A	North Flank	Potentially Eligible	Avoided
11S665	Wiggins Ferry Roundhouse	Riverfront	Not Eligible	N/A
11S670	B. & O. Freighthouse	Riverfront	Not Eligible	N/A
11S671	G. M. & O. Freighthouse	Riverfront	Not Eligible	N/A
11S673	Nickel Plate Road Freight	Riverfront	Not Eligible	N/A
11S674	Piggot-Wiggins Ferry	Riverfront	Not Eligible	N/A
11S684	Eads Bridge	Riverfront	Listed	Avoided

Prairie du Pont / Fish Lake

The project area lies within the American Bottoms of the Mississippi River Floodplain and is bounded on the north by Prairie du Pont Creek and on the south by Carr Creek. The river in the west and the bluff line to the east mark the natural boundaries. The pertinent natural feature of the area is the Lunsford-Pulcher Terrace, an elevated, abandoned river terrace running approximately north-south halfway between the river and the bluffs. Below the terrace, Fish Lake occupies the location followed by the Mississippi River circa AD 1000 The elevated lands of the terrace have been extensively surveyed for cultural resources and were found to be densely occupied in prehistoric times. The Lunsford-Pulcher Site (11-S-40), situated on the terrace, is listed on the National Register of Historic Places. The lands to the west of the terrace have been sparsely surveyed and few sites have been reported. As recently as 1870, the majority of the area below the terrace consisted of swamp—unlikely to have supported any habitation sites although the possibility exists that prehistoric resource extraction and historic sites may occur in this area.

The proposed project area along the landward side of the levee was the subject of a survey for cultural resources in 2008 (Booth *et al.,* 2009). The survey testing consisted of a pedestrian examination of ground surfaces for artifacts, augur testing to a depth of approximately 8 feet to test for buried sites, an architectural assessment of structures within the potential footprint of the project, and soil coring to a depth of up to 28 feet to test for buried sites and for a geomorphological assessment of the probability that undiscovered sites might exist. The survey area consisted of a 15.3 mile path ranging in width from 100 to 700 feet. Twenty-two sites were identified in the survey, of which ten sites were recommended for further testing. In addition, four structures were considered eligible for nomination to the National Register of Historic Places (NRHP) (Exhibit EA-28.)

Exhibit EA-28. Archaeological sites located within 1000 feet of the Prairie du Pont and Fish Lake levee systems.

Site Number	Site Name	Location	NRHP Eligibility	Effect of Project
11MO857		South Flank	Not Eligible	Avoided
11MO1085		River Front	Phase II	Avoided
11MO1086		River Front	Not reviewed	Avoided
11MO1087		River Front	Not Reviewed	Avoided
11MO1088		South Flank	Phase II	Avoided
11MO1089		South Flank	Phase II	Avoided
11MO1090		River Front	Not Reviewed	Impacted
11MO1091		South Flank	Phase II	Avoided
11S1278	Creamer House	North Flank	Phase II	Avoided

11S1279	Earl Cates	North Flank	Phase II	Avoided
11S1280	Bevelot	North Flank	Not Reviewed	Avoided
11S1282	Lavonne Cates	North Flank	Phase II	Avoided
11S1283	Levee Road	North Flank	Phase II	Avoided
11S1771		River Front	Not Reviewed	Avoided
11S1772		River Front	Not Reviewed	Impacted
11S1773		River Front	Not Reviewed	Avoided
11S1774		River Front	Phase II	Avoided
11S1777		North Flank	Not Reviewed	Avoided
11S1778		North Flank	Not Reviewed	Impacted
11S1783	Big Turn Site	River Front	Not Reviewed	Avoided

Note: For those sites listed as Phase II, testing to determine eligibility for NRHP listing was recommended by Booth et al. (2009).

3.13. Environmental Justice

Wood River

Environmental justice refers to fair treatment of all races, cultures and income levels with respect to development, implementation and enforcement of environmental laws, policies and actions. Environmental justice analysis was developed following the requirements of:

- Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations," 1994)

- "Department of Defense's Strategy on Environmental Justice" (March 24, 1995).

The purpose of environmental justice analysis is to identify and address, as appropriate, human health or environmental effects of the proposed action on minority and low-income populations. Following the above directives, the methodology to accomplish this includes identifying minority and low-income populations within the study area by demographic analysis. Census Block Group statistics from the 2000 Census (U.S. Census Bureau, 2010) and Environmental Systems Research Institute (ESRI) estimates were utilized for this analysis (ESRI, 2009).

The project area's population is 39,781, according to 2000 Census Data. Low-income and minority communities are present within the area protected by the Wood River levee system. Exhibit EA-29 presents demographic statistics for the area protected by the levee system as well as Madison County. Exhibit EA-30 displays the geographic location of census block groups with varying percentages of minorities. Low income populations are scattered throughout the levee protected area (Exhibit EA-31). Demographic data from the 2000 Census indicates that

Wood River, as well as some of the surrounding region, contain some low-income and minority population areas. Within the project area, the minority population is 10%. This is slightly below the level for Madison County as a whole. About 15% of the population in the project area is below the poverty level.

The Census Bureau defines a "poverty area" as a Census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level.

MESD

Environmental justice refers to fair treatment of all races, cultures and income levels with respect to development, implementation and enforcement of environmental laws, policies and actions. Environmental justice analysis was developed following the requirements of:

- Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations," 1994)

- "Department of Defense's Strategy on Environmental Justice" (March 24, 1995).

The purpose of environmental justice analysis is to identify and address, as appropriate, human health or environmental effects of the proposed action on minority and low-income populations. Following the above directives, the methodology to accomplish this includes identifying minority and low-income populations within the study area by demographic analysis. Census Block Group statistics from the 2000 Census (U.S. Census Bureau, 2010) and Environmental Systems Research Institute (ESRI) estimates were utilized for this analysis (ESRI, 2009).

Exhibit EA-29. Demographic statistics of Madison County and the Wood River levee protected area.

Total Population	**Madison County**		**Protected Area**	
	273,178		39,781	
White	242,112	88.6%	35,821	90.0%
Minority	33,103	**13.7%**	3,951	**9.9%**
Black or African American	23,851	9.9%	2,994	7.5%
American Indian and Alaska Native	753	0.3%	97	0.2%
Asian	1,592	0.7%	269	0.7%
Native Hawaiian and Other Pacific Islander	55	0.0%	5	0.0%
Hispanic or Latino	5,038	2.1%	448	1.1%
Some other race	1,814	0.7%	138	0.3%
Total Households	106,755		15,482	
Below Poverty Level (individuals)		**12.2%**		**15.0%**

Source: ESRI (2009)

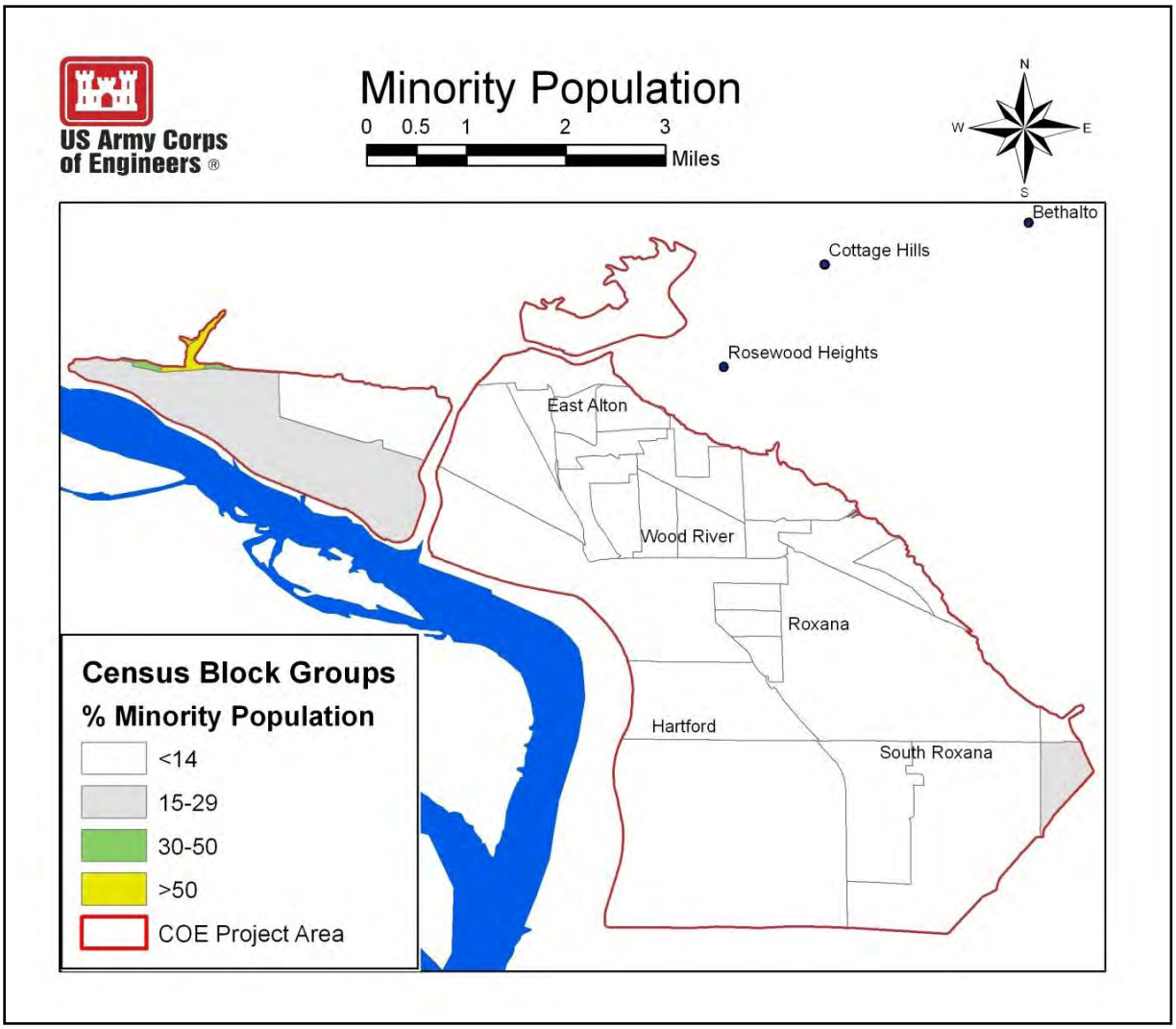

Exhibit EA-30. Geographic location of minority populations within the Wood River Levee Protected area.
Source: ESRI (2009)

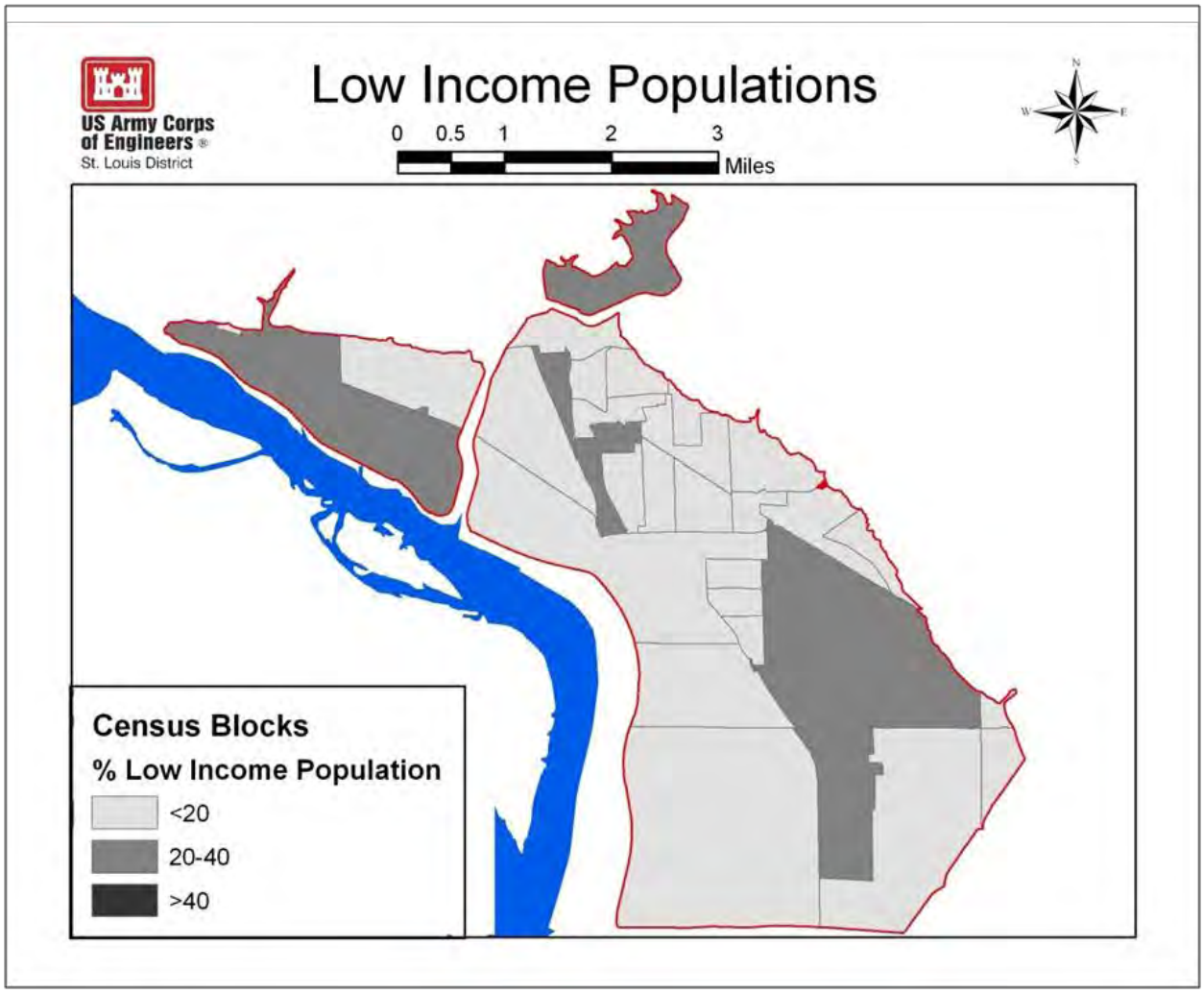

Exhibit EA-31. Geographic location of low income populations within Wood River levee protected area.

Source: ESRI (2009)

The project area's population is 143,586, according to 2000 Census Data. Low-income and minority communities are present within the area protected by the East St. Louis Levee System. Exhibit EA-32 presents demographic statistics for the area protected by the levee system as well as Madison and St. Clair counties. Exhibit EA-33 displays the geographic location of census block groups with a high percentage of minorities. Low income populations are present throughout most of the levee protected area (Exhibit EA-34). Demographic data from the 2000 Census estimate indicates that East St. Louis, as well as some of its surrounding region, is a predominantly low-income and minority population area. Within the project area, the minority population is 45%. This is well above the level for both Madison and St. Clair counties as a whole. About 20% of the family population in the project area is below the poverty level.

The Census Bureau defines a "poverty area" as a Census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level.

Exhibit EA-32. Demographic statistics of Metro East and MESD project area.

Total Population	**Madison County**		**St. Clair**		**Project Area**	
	258,941		256,082		143,586	
White	236,189	91.2%	176,745	69.0%	79,004	55.0%
Minority	22,752	**8.8%**	79,337	**31.0%**	64,582	**45.0%**
Black or African American	19896	7.7%	74995	29.3%	60339	42.0%
American Indian and Alaska Native	1710	0.7%	1625	0.6%	466	0.3%
Asian	2125	0.8%	3259	1.3%	547	0.4%
Native Hawaiian and Other Pacific Islander	163	0.1%	277	0.1%	29	0.0%
Hispanic or Latino	3925	1.5%	5604	2.2%	3964	2.8%
Some other race	1872	0.7%	2750	1.1%	3201	2.2%
Total Households	101,953		96,810		52,638	
Below Poverty Level (families)		7.2%		11.8%		**20.4%**

Source: ESRI (2009)

Exhibit EA-33. Geographic location of minority populations within MESD levee protected area.

Source: U.S. Census Bureau (2010)

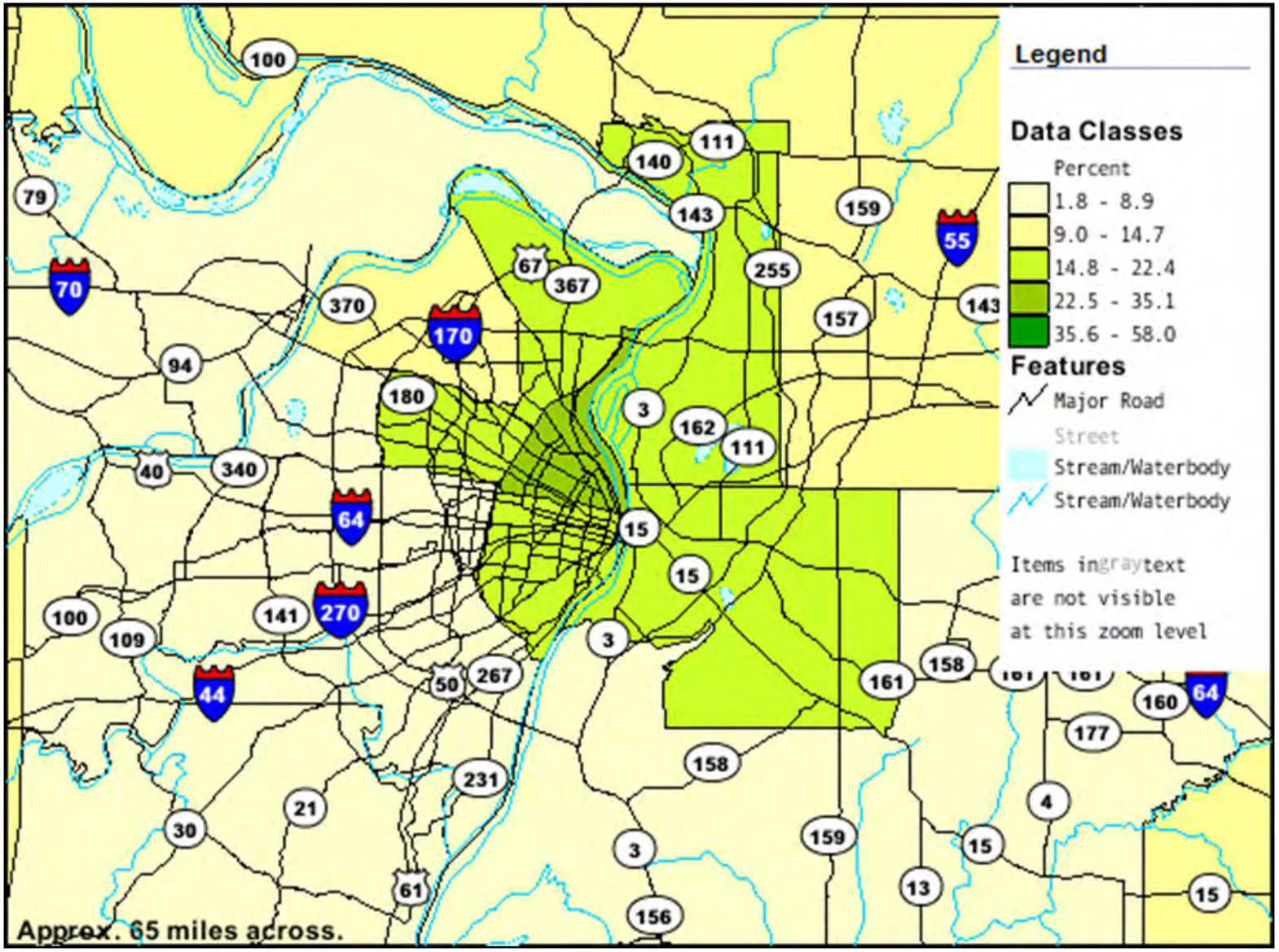

Exhibit EA-34. Geographic location of low income populations in the St. Louis Metropolitan Area and the MESD levee protected area.

Source: ESRI (2009) and U.S. Census Bureau (2010)

Prairie du Pont / Fish Lake

Environmental justice refers to fair treatment of all races, cultures and income levels with respect to development, implementation and enforcement of environmental laws, policies and actions. Environmental justice analysis was developed following the requirements of:

- Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations," 1994)

- "Department of Defense's Strategy on Environmental Justice" (March 24, 1995).

The purpose of environmental justice analysis is to identify and address, as appropriate, human health or environmental effects of the proposed action on minority and low income populations. Following the above directives, the methodology to accomplish this includes identifying minority and low-income populations within the study area by demographic analysis. Census Block Group statistics from the 2000 U.S. Census and Environmental Systems Research Institute (ESRI) estimates were utilized for this analysis. Exhibit EA-35 and Exhibit EA-36 display the geographic location of the low income and minority census block groups, respectively, within the project area.

Exhibit EA-37 presents demographic statistics for the area protected by the PDP/FL levee system as well as the communities of Dupo and East Carondelet. Demographic data from the 2000 Census and ESRI estimates indicate that the Prairie du Pont / Fish Lake district protects a population which is predominantly non-minority, and with none of the block groups being defined as a “poverty area”.

3.14. Biological Resources

Wood River

A variety of aquatic, wetland, and terrestrial natural communities are found in the project area. Aquatic resources include the Mississippi River, Cahokia Creek Diversion Channel, and Wood River Creek. The Mississippi River is an aquatic resource of major significance, and provides habitat to numerous species of invertebrates, fish, and birds. Some man-made ponds occur in the uplands and on the levee-protected floodplain. Because much of the levee district is developed, existing biological resources are relatively limited landside of the levee system.

Wetlands subject to Section 404 of the Clean Water Act are concentrated along the Mississippi River, mainly riverside but also landside of the levee. At a distance from the river, scattered wetlands occur on the historic floodplain. Wetlands also occur in a narrow band along the Diversion Channel, where they are bordered by the waterway’s flank levees. Most wetlands consist of either forested or herbaceous (nonwoody) habitats. Typical tree species in forested wetlands include cottonwood, black willow, silver maple, green ash, mulberry, and dogwood. Hard mast species such as oaks and pecans are often absent. Groundcover is related to site wetness, and may not be present at all, may be discontinuous and consists of various sedges, forbs, and grasses, or may be dense and support a diversity of herbaceous plant species.

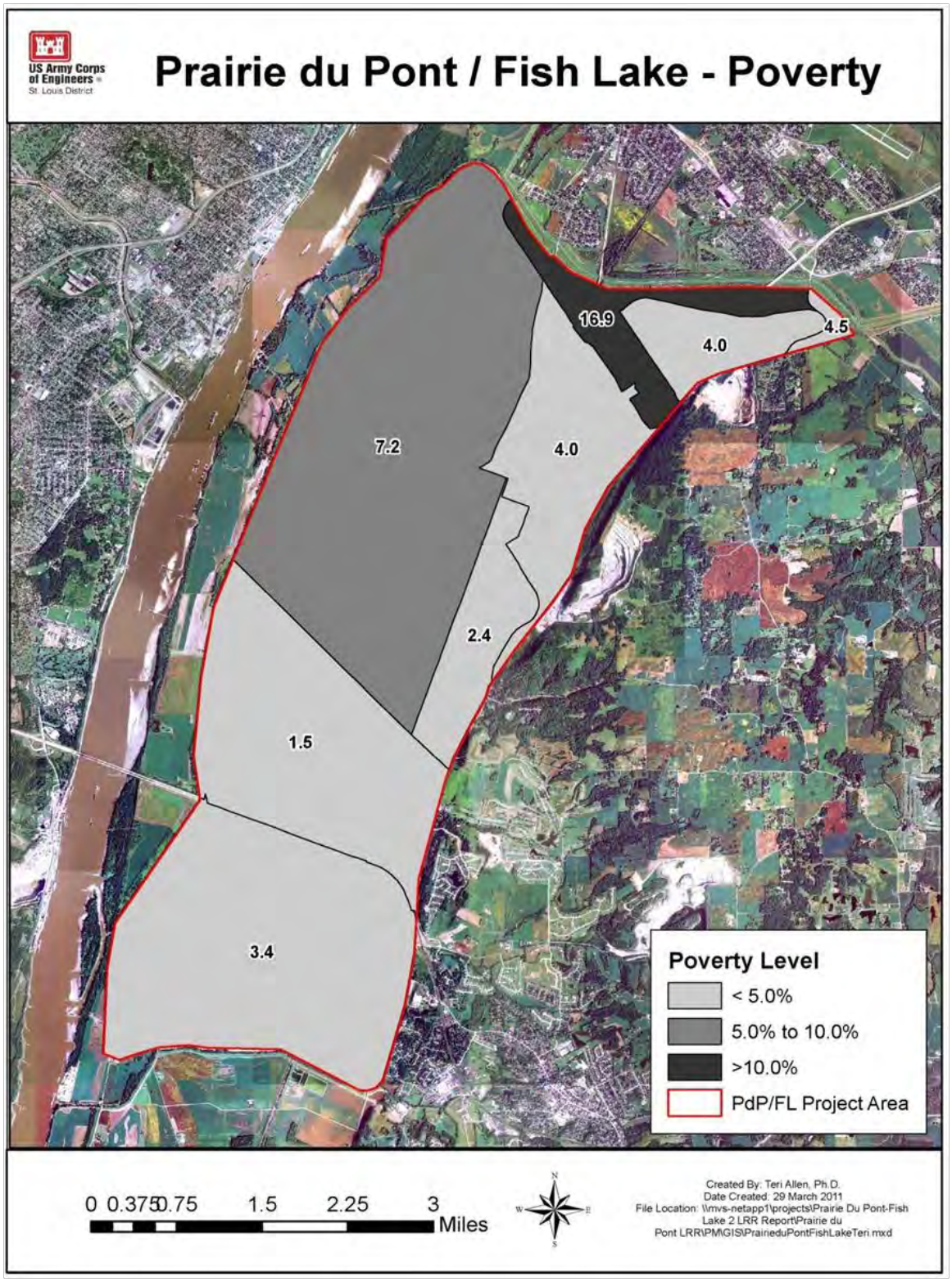

Exhibit EA-35. Percent of persons living below the poverty level within the proposed PDP/FL project area according to the 2000 U.S. Census Bureau data.

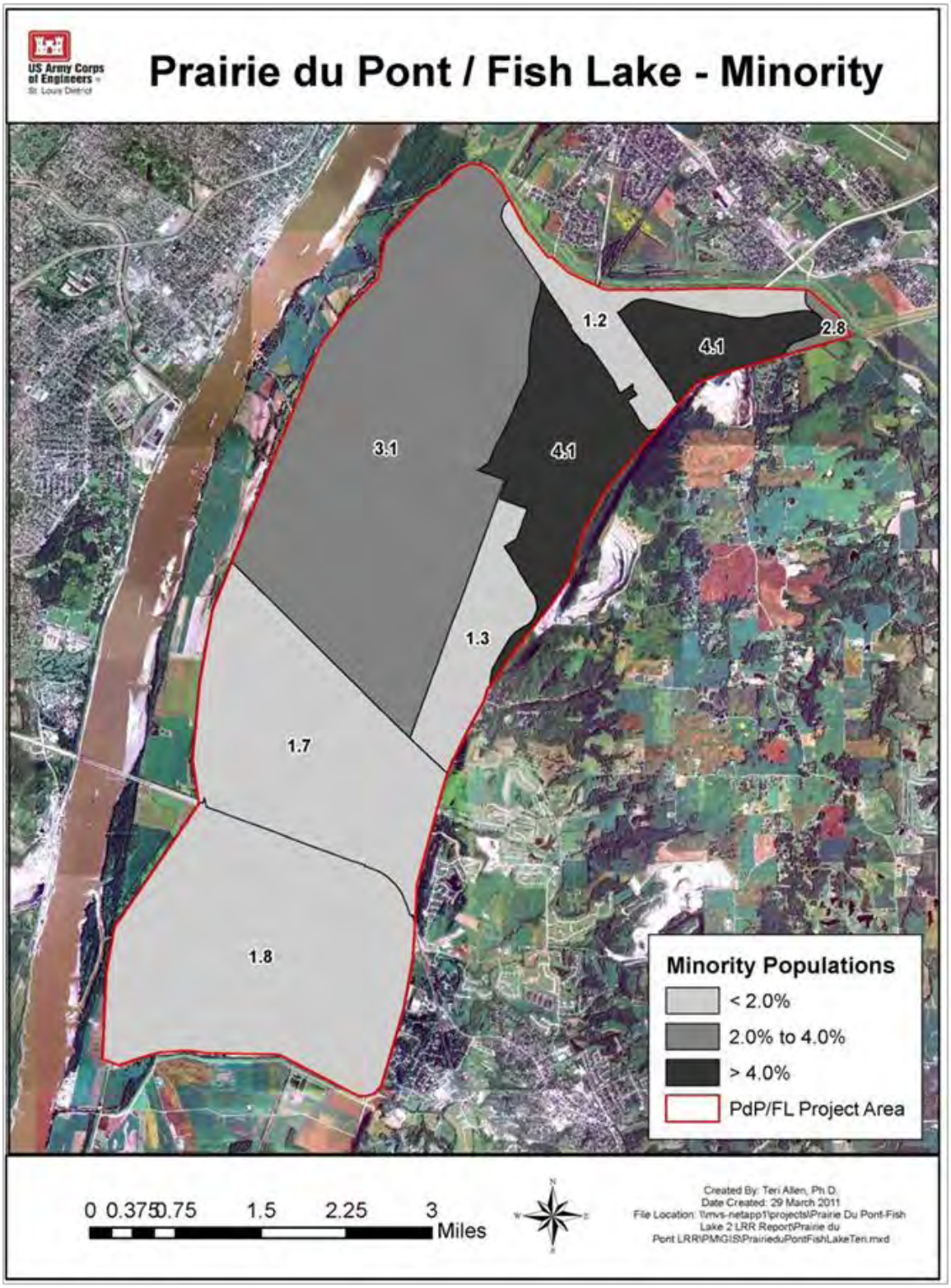

Exhibit EA-36. Percent of persons claiming minority status within the proposed PDP/FL project area according to the 2000 U.S. Census Bureau data.

Exhibit EA-37. Socioeconomic indicators for communities located within the proposed Prairie du Pont / Fish Lake project area.

Socioeconomic Indicator	Dupo, IL	East Carondelet, IL	Census Block Groups
Total Population	3933	267	14,936
% White	97.2	92.5	98.0
% Black	1.2	3.4	0.6
% American Indian / Alaska Native	0.3	1.9	0.3
% Asian	0.3	0.0	0.3
% Native Hawaiian/ Pacific Islander	0.0	0.0	0.0
% Other	0.4	0.4	0.2
% Multiple	0.7	1.9	0.7
% Hispanic	0.7	0.0	0.8
Median Age	34.8	36.3	36.5
Average Household Size	2.53	2.84	2.6
Average Family Size	3.04	3.28	3.1
Total Housing Units	1668	105	6132
Median Home Value	$71,900	$67,500	N/A
% High School Graduate or Higher	75.1	68.2	N/A
% Bachelor's Degree or Higher	10.3	0.0	N/A
% in Labor Force	70.7	67.3	N/A
Median Household Income	$43,036	$36,071	N/A
Median Family Income	$47,000	$39,583	N/A
Per Capita Income	$18,505	$13,402	N/A
% Families Below Poverty Level	2.9	3.8	N/A
% Individuals Below Poverty Level	4.3	2.9	5.7

A relatively large wetland complex is found along the landside of the levee immediately downriver of the confluence of the Mississippi River and Wood River Creek. This location supports about 75 acres of mainly open water wetlands and mudflats that are surrounded by wetland forest. Wetland hydrology consists of surface runoff from adjacent levee-protected land as well as groundwater inflow during times when the Mississippi River is high. The trunks of large cottonwood trees in this forested wetland exhibit staining from the seasonal ponding of stormwater, and these marks are about 10 feet above the ground.

Terrestrial habitats occur in the vicinity of Wood River Creek and at scattered locations on the levee-protected floodplain, and consist of nonwetland floodplain and upland forests. Old field habitat is also present along the levee system and consists of areas previously cleared of trees or formerly developed sites. Maintained grassy areas occur along the sideslopes of the levee system and adjacent highways.

Many of these wetland and terrestrial natural communities have limited ecological importance because they are relatively small and fragmented as a result of past and ongoing development. A variety of animal species use the urbanizing project area. Most wildlife species are adapted to human disturbance or tolerant of fragmented habitats or poor water quality, and consist of a variety of amphibians, reptiles, birds, and mammals. For example, fishes observed in open water wetlands are tolerant of high turbidity, and include such species as mosquito fish and carp. The open water and herbaceous wetlands serve as resting and feeding areas for some migratory ducks and geese. Wading birds that typically feed in shallow ponded areas or ditches include the great blue heron (*Ardea herodias*) and great egret (*Ardea alba)*. Turkey may also be seen as well as red-winged blackbirds. Larger mammals include raccoon, opossum, and deer.

MESD

The Metro East area has the largest concentration of industrial, commercial, and residential land use on the Mississippi River floodplain north of New Orleans. Despite this development, significant aquatic and terrestrial habitats remain from presettlement times, although all have become degraded. A variety of forest, prairie, wetland, lake and pond, and stream natural communities persist (USACE, 2003). Land cover of the levee protected area is summarized in Exhibit EA-19 and displayed in Exhibit EA-20.

Significant aquatic resources on the Mississippi River floodplain in the flood-protected Metro East area include the 2,000-acre Horseshoe Lake, several lakes at Frank Holten State Park, and over 6,000 acres of various wetlands, comprised primarily of forested wetlands and marshes (USACE, 2003). Most of the approximately 3,000 acres of remaining forested wetlands are located away from the Mississippi River in historic river meander scars. Relatively large areas of publicly owned floodplain forest occur at Brushy (Levy) Lake, Cahokia Mounds State Historic Site, Frank Holten State Park, and Horseshoe Lake State Park. Like forested wetlands, most remnant marshes are also located away from the river in historic meander belts. Natural resources are relatively scarce along the inside border of the MESD levee system. The major man-made drainage canals built to carry interior runoff and flows from the upland tributary system to the river include Cahokia Canal, Harding Ditch, and Canal No. 1.

The Mississippi River borders the exterior of the MESD levee system, as does the Cahokia Creek Diversion Channel along the North Flank levee and Prairie du Pont Creek along the outside of the South Flank levee. Blue Waters Ditch borders the inside of the South Flank levee. A relatively narrow band of floodplain forest, most of which is wetlands, occurs along the exterior of the levee system in a scattered fashion.

The project area supports a diverse variety of animals, including birds, mammals, fish, reptiles, and amphibians. Many species of migratory waterfowl and songbirds using the Mississippi flyway are supported by aquatic, wetland, and terrestrial habitats within the project area and adjacent river corridor. Horseshoe Lake and surrounding wetlands are an important resting and feeding stopover for about 30 species of waterfowl during fall and spring migrations along the flyway. A few waterfowl species also use these aquatic resources as breeding habitat. Other migrant birds such as shorebirds and landbirds use Horseshoe Lake, other local waterbodies, the Mississippi River corridor, or its adjacent uplands (USACE, 2003).

The Illinois Department of Natural Resources provided a list of state-listed species that were associated with the project areas (IDNR, 2008), and that list is included in this EA as Appendix EA-2. Poag Railroad Prairie Natural Area, near the eastern end of the North Flank levee, is a small prairie remnant identified by the Illinois Natural Area Inventory as a significant example of wet-mesic prairie and sand prairie communities (IDNR 1998c). It lies east of Illinois Route 111 along the embankment of railroad for a distance of nearly two miles. A state-endangered plant, spring ladies' tresses (*Spiranthes vernalis*), is known from this natural area. In addition, habitat for the Illinois chorus frog (*Pseudacris streckeri illinoensis*), a state-threatened species, is located not far from this natural area along the historic channel of Cahokia Creek (USACE, 2003).

Prairie du Pont / Fish Lake

Much of the study area has been developed or is in use as agriculture. As a result, there are few aquatic, wetland, or terrestrial natural communities present within the study area. Many of the natural communities have limited ecological importance because they are relatively small and fragmented as a result of the development. Most wildlife species are adapted to human disturbance, and consist of a variety of amphibians, reptiles, birds, and mammals. Additionally, the majority of aquatic resources identified during site visits drain under the levees through pump stations. This suggests that the hydrologic conditions of the tributaries are dependent on the amount of water on either side of the levee at a given time.

Wetlands subject to Section 404 of the Clean Water Act were identified in scattered pockets along the entire length of the levee system. In total, 17 wetlands were identified within the study area (Billings et al. 2009). All but one of the identified wetlands were identified as farmed wetlands. Based on a historic slide review and field observations, it appears that the majority of the farmed wetlands are likely cultivated during drier seasons. Detailed descriptions of the tributaries and wetlands identified during the field survey are found in the report entitled *Wetland and Waterbody Delineation* (Billings et al. 2009).

Illinois Department of Natural Resources (IDNR) Ecological Compliance Assessment Tool (EcoCAT) was used to identify any state-identified species or habitat that may exist within the study area or the areas proposed for borrow within the Mississippi River. The Falling Spring

Illinois Natural Area Inventory (INAI) Site was identified during the review, but was found to be beyond the limits of the study area. Based on the results of the EcoCAT, no other records of state-listed threatened or endangered species, natural areas, or nature preserves exist within the boundaries of the study area.

3.15. Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was removed from the List of Endangered and Threatened Species in August 2007 but it continues to be protected under the Bald and Golden Eagle Protection Act and by the Migratory Bird Treaty Act. Recommendations to minimize potential project impacts to the bird and its nest are provided by the U.S. Fish and Wildlife Service in that agency's National Bald Eagle Management Guidelines publication (USFWS, 2010b). Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. Specifically, construction activity is prohibited within 660 feet of an active nest during the nesting season, which in the Midwest is generally from late January through late July.

The bald eagle is identified as breeding and/or wintering along the Mississippi River in both Illinois and Missouri. Winter use is highest where the river is ice-free and adequate perch sites are available. These areas are important, providing stable feeding sites during high caloric demand periods. Large concentrations of eagles often are associated with open water areas bordered by suitable perch trees. Trees within 100 feet of the shore are preferred (USFWS 2000).

The Mississippi River is a focal point for wintering eagles, especially upriver of the Wood River project area north of Alton. Nesting has been observed on islands near the confluence with the Illinois River, further upriver from Alton, and also at other locations. There is one known nest in the vicinity of the Wood River levee system and Mel Price Locks and Dam. It was last used in 2006.

In an effort to identify any state-listed threatened or endangered species that are identified within the Prairie du Pont / Fish Lake study area and the proposed borrow sites, an EcoCAT assessment was conducted through IDNR. The EcoCAT results identified the potential presence of the bald eagle near the very northern edge of the Prairie du Pont Levee, near where the flank levee begins, as well as near a potential borrow area is located. A planning aid letter (PAL) to USACE from USFWS dated 21 April 2009 also identified a potential bald eagle nest at the lower end of Arsenal Island. While the current status of this nest is unknown, bald eagles could potentially nest anywhere in or near the project area where large trees occur. The proposed project would follow the National Bald Eagle Management (NBEM) Guidelines.

3.16. Threatened and Endangered Species

<u>Wood River, MESD, and Prairie du Pont/Fish Lake</u>

In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, AMEC requested that the U.S. Fish and Wildlife Service provide a listing of Federally threatened or endangered species, currently classified or proposed for classification, that may occur in the vicinity of the proposed Wood River, MESD, and Prairie du Pont / Fish Lake levee system project areas. The U.S. Fish and Wildlife Service (USFWS; Columbia Ecological Services Field Office) stated in a letter dated 27 June 2011, that there are potentially nine federally listed or candidate species within the proposed project area. There is no designated critical habitat within the proposed project area for any of these species at this time.

To identify state-listed species potentially occurring within project areas, the SIFPDC utilized occurrence information obtained from the Illinois Natural Heritage Database on 23 August 2011. Using this data, five state-listed species have a recorded occurrence within a one-mile radius of the proposed Wood River project, five state-listed species occur within a one-mile radius of the proposed MESD project, and two state-listed species were identified as occurring within one mile of the proposed Prairie du Pont / Fish Lake project improvements.

No Federal or State-listed species have known occurrences within the proposed project areas.

Exhibit EA-38 lists the species identified by the USFWS and/or the Illinois Natural Heritage Database results as applicable to the proposed project areas.

The following discussion addresses the potential presence and life habits of these federally and/or state listed species within the vicinity of the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems.

Gray bat. The gray bat (*Myotis grisecens*) is listed as endangered and occurs in several Illinois and Missouri counties where it inhabits caves both during summer and winter. This species forages over rivers and reservoirs adjacent to forests. A search for this species should be made prior to any cave impacting activity.

Indiana bat. Indiana bats (*Myotis sodalis*) winter in caves or mines, but such features used by this bat are not known in the Metro-East area (Herkert, 1992). Females use trees in the summer months as nursery roosts, and forage for insects in the tree canopy. The presence of this species within the project area during the maternity season is assumed. Trees preferred for maternity roosting in Illinois have included dead individuals with shaggy or loose bark, and diameters at breast height (dbh) greater than 9 inches. Species have included slippery elm, American elm, northern red oak, white oak, post oak, shagbark hickory, bitternut hickory, cottonwood, silver maple, green ash, white ash, and sycamore (Hofmann, 1994). Live shagbark hickory trees with loose bark or cavities are also used. Males have been known to roost in single oak, sassafras, and sugar maple (Hofmann, 1994). Some dead cottonwood, silver maple and sycamore greater than 10 inches dbh are present near the railroad embankment and the riverside depressions. However, the use of a particular tree does appear to be influenced by weather conditions, such as temperature and precipitation. Disturbance and vandalism, improper cave gates and structures, natural hazards such as flooding or freezing, microclimate changes, land use

changes in maternity range, and chemical contamination are the leading causes of population decline in the Indiana bat (USFWS 2000, 2004).

Exhibit EA-38. Federal and state threatened, endangered, or candidate species potentially occurring within the proposed project area in Madison, St. Clair and Monroe counties, Illinois.

Common Name ***Scientific Name***	**Federal Status**	**State Status**	**Project Vicinity**	**Habitat**
Mammals				
Gray bat *Myotis grisecens*	FE	SE	WR MESD PDP/FL	Caves and mines; rivers & reservoirs adjacent to forests
Indiana bat *Myotis sodalis*	FE	SE	WR MESD PDP/FL	Caves, mines (hibernacula); small stream corridors with well developed riparian woods; upland forests (foraging)
Birds				
Peregrine falcon *Falco peregrinus*		ST	MESD	Waterways, wetland swamps/marshes, open fields and woodlands along wetlands. Open space above hunting area required for aerial prey capture
Least tern *Sterna antillarum*	FE	SE	WR MESD PDP/FL	Bare alluvial and dredged spoil islands
Fish				
Lake Sturgeon *Acipenser fulvescens*		SE	WR	Large rivers and lakes
Western sand darter *Ammocrypta clara*		SE	MESD	Medium to large rivers over extensive sand flats, slightly turbid waters, moderate to strong current
Gravel chub *Erimystax x-punctatus*		ST	PDP/FL	Moderately deep portions of large, clear streams and rivers over a sand-gravel-rock bottom
Pallid sturgeon *Scaphirhynchus albus*	FE	SE	WR MESD PDP/FL	Large rivers

Amphibians				
Illinois Chorus frog *Pseudacris illinoensis*		ST	WR PDP/FL	Sandy soils (fossorial)
Reptiles				
Eastern massasauga rattlesnake *Sistrurus catenatus catenatus*	FC	SE	MESD	Wetlands and adjacent upland woods
Lined snake *Tropidoclonion lineatum*		ST	WR	Grasslands and urban lots in former prairie, where it is found under rocks, logs, leaves, boards, and other debris
Mussels				
Spectaclecase mussel *Cumberlandia monodonta*	FE	SE	WR MESD	Large rivers with swiftly flowing water, among boulders in patches of sand, cobble, or gravel in areas where current is reduced
Butterfly mussel *Ellipsaria lineolata*		ST	WR	Large rivers in sand or gravel
Ebonyshell mussel *Fusconaia ebena*		ST	WR	Large rivers in sand or gravel
Black sandshell mussel *Ligumia recta*		ST	WR	Medium to large rivers in riffles or raceways in gravel or firm sand
Amphipods				
Illinois cave amphipod *Gammarus acherondytes*	FE	SE	WR MESD PDP/FL	Karst caves & streams
Plants				
Decurrent false aster *Boltonia decurrens*	FT	ST	MESD PDP/FL	Disturbed alluvial soils
Eastern prairie fringed orchid *Platanthera leucophaea*	FT	SE	MESD PDP/FL	Mesic to wet prairies
Spring ladies' tresses *Spiranthes vernalis*		SE	WR	Mesic and dry upland prairies, roadsides through prairies

Peregrine falcon. The peregrine falcon (*Falco peregrines*) occurs in Illinois from early April or mid May through early Sept to November. Historically, the peregrine nested mostly on rock cliffs, bluffs and vertical escarpments; preferring river gorges and watergaps with precipitous cliffs. However, since human encroachment is generally deleterious, peregrines are now found to use tree sites and city buildings. The peregrine hunts over waterways, wetlands, and open fields. They feed almost exclusively on birds, and open space above the hunting area is important to allow aerial capture. Breeding behavior is centered around nesting sites. Nestlings are fed in the nest, and juveniles remain on nest ledge for 5-6 weeks. After fledging, they accompany parents on hunting trips or to a plucking post.

Least tern. The least tern (*Sterna antillarum*) is a colonial, migratory waterbird, which resides and breeds along the Mississippi River during the spring and summer. Nesting colonies of the least tern have been recorded in southern Illinois from Jackson and Alexander Counties (Herkert, 1992). The least tern has occasionally been observed in the Metro-East area at Horseshoe Lake during spring migration (McMullen 2001). No known natural nesting habitat of the least tern occurs within the study area or adjacent reach of the Mississippi River. This bird forages for small fish in shallow water areas along the river and in backwater areas, such as side channels and sloughs. Foraging and nesting habitat are located in close proximity to each other. From late April to August, least terns nest on sparsely vegetated alluvial or dredge spoil islands and sand/gravel bars in or adjacent to rivers, lakes, gravel pits and cooling ponds. They nest in colonies with conspecifics and sometimes with the piping plover (*Charadrius melodus*). Nesting locations usually are at the higher elevations and away from the water's edge. Dams, reservoirs, and other changes to river systems have eliminated most historic least tern habitat. Narrow forested river corridors have replaced historical wide channels dotted with sandbars that are preferred by the terns. Furthermore, recreational activities on rivers and sandbars disturb the nesting terns, causing them to abandon their nests. Currently, reoccurring nesting is known at Marquette Island (RM 50.5), Bumgard Island (RM 30), and Brown's Bar (RM 24.5-23.5) (USFWS 2004, Jones 2009). Some nesting attempts have also been made at Ellis Island (RM 202), however these are not considered to be reoccurring.

Lake Sturgeon. Lake sturgeon (*Acipenser fulvescens*) spend their entire life cycle in freshwater and are widely distributed in North America. They currently range throughout much of the drainages of the Mississippi River, the Great Lakes, Lake Champlain, the St. Lawrence River, Hudson Bay-James Bay, and the Saskatchewan River (Pflieger 1975, Becker 1983, Ferguson and Duckworth 1997). In the Mississippi basin this species occurs from the headwaters in Minnesota to the northern portion of the state of Louisiana and up the Missouri River into southern South Dakota. Usual lake sturgeon habitat is the highly productive shoal areas of larger lakes and rivers. In the Mississippi basin habitat that is in or adjacent to current is generally depositional and has relatively compact silt or silt-sand substrates with presumed high densities of benthic invertebrates. During the spring season, lake sturgeon spawning occurs when water temperatures rise and reach 9-15°C (Priegel and Wirth 1971, Kempinger 1988). Spawning sturgeon will select shallow areas over hard clean substrate with relatively strong current velocities (Kempinger 1988). Based on pectoral fin ray sections it has been determined that lake sturgeon can live to be over 100 years old. Though lake sturgeon harvest from the Mississippi River is prohibited, financial incentive to collect

roe for caviar remains. This illegal practice, in addition to their life history characteristics of slow growth, late maturation, and irregular spawning periodicity, make lake sturgeon populations particularly vulnerable to over-exploitation.

Western sand darter. The western sand darter (*Ammocrypta clara*) occurs sporadically in the Mississippi drainage and adjacent Great Lakes drainage with small disjunct populations throughout this range (Becker 1983). The western sand darter is associated with clear to moderately turbid water, slight to moderate current, and substrates of course sand and fine gravel (Becker 1983; Douglas 1974; Eddy and Underhill 1974; Etnier and Starnes 1993; Pflieger 1997; Phillips et. al. 1982; Robison and Buchanan 1988). This species feeds on immature aquatic insects (Pfeiger 1997). Adhesive eggs are buried singly in sand (Pfeiger 1997).

Gravel chub. The gravel chub (*Erimystax x-punctatus*) inhabits clear to moderately turbid streams with permanent flow and well-defined silt-free gravelly or rocky riffles. Their food source is unknown. They spawn at water temperatures around 60 degrees Fahrenheit, generally at a depth of 2-3 feet. Spawning sites are on gravel bars in swift current.

Pallid sturgeon. The endangered pallid sturgeon (*Scaphirhynchus albus*) is found in the Mississippi River downstream of its confluence with the Missouri River, which is about 4 miles downriver of the Melvin Price Locks and Dam. The entire stretch of river below the mouth of the Missouri River is considered potential habitat. Recent tag returns have also shown that the species may be using a range of habitats in off-channel areas, including tributaries of the Mississippi River. Pallid sturgeon are adapted to large rivers with extensive micro-habitat diversity, turbid water, braided channels, irregular flows and flood cycles. Little is known of its micro-habitat preferences, however, it is suspected that sand/gravel bars and the mouths of major tributaries may be utilized for spawning. This species feeds on aquatic invertebrates and small fish.

Pallid sturgeon utilize aquatic habitats throughout this portion of the Upper Mississippi River and are known to make long distance movements between the Upper Mississippi River and Missouri River during spawning migrations. Early developmental stages of pallid sturgeon spawned upstream potentially drift with the current through the project area and may settle out in shallow sand habitat located behind wing dikes. A concern is the potential for entrainment during dredging operations for all life stages of pallid sturgeon.

Illinois chorus frog. The Illinois chorus frog (*Pseudacris streckeri illinoensis*) is distributed in Illinois mainly along the central part of the Illinois River (see Tucker and Phillip 1995). Other populations are also scattered along the Mississippi River floodplain from Madison to Alexander counties, Illinois (see Tucker and Phillip 1995). *Pseudacris streckeri illinoensis* is restricted to areas in the Midwest that have sand substrates, particularly sand ridges (see Tucker and Phillip 1995). Tucker and Phillip (1995) documented the presence of the Illinois chorus frog in the vicinity of the Wood River (Madison County, IL) project. The Illinois chorus frog is adapted to digging and life underground (fossorial; Brown 1978), and eats a variety of insect larvae (primarily moth larvae; Tucker and Phillip 1995) that it finds in its sandy burrows. Tucker and Phillip (1995) speculate that warm spring rains trigger

emergence for breeding, and the frogs leave their home range to find suitable breeding sites (i.e., fishless bodies of water). They deduce that once breeding is completed, the frogs return to their home ranges. Extensive urbanization and agricultural practices have contributed to the decline of the Illinois chorus frog.

Eastern massasauga rattlesnake. The eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) is known from the historic floodplain of the Mississippi River in the Metro East area near Horseshoe Lake, to the south of the Wood River Levee and Drainage District. The largest known population in Illinois is found in the vicinity of Carlyle Lake (Clinton, Bond and Fayette Counties) where it hibernates near the lake shoreline. Massasaugas live in wet areas, including wet prairies, marshes and low areas along rivers and lakes. In many areas massasaugas also use adjacent uplands, including forest, during part of the year. They often hibernate in crayfish burrows but they also may be found under logs and tree roots or in small mammal burrows.

Lined snake. The lined snake (*Tropidoclonion lineatum*) inhabits grasslands and urban lots in former prairie, where it is found under rocks, logs, leaves, boards, and other debris. This secretive and semifossorial nocturnal snake subsists almost entirely on earthworms. It is generally active March to November, spending less time at the surface during hot summers and more after heavy rains. The lined snake mates in late August and 5-10 young are born the following August or September. Newborn are 7-12 cm in length. The lined snake often curls its tail into a tight coil when disturbed, but is otherwise passive. Predators include other snakes, birds, and mammals.

Spectaclecase mussel. The spectaclecase mussel (*Cumberlandia monodonta*) most often inhabits riverine microhabitats sheltered from the main force of current. It occurs in substrates including mud, sand to gravel, cobble, and boulders in relatively shallow riffles and shoals with slow to swift current (Buchanan 1980, Parmalee and Bogan 1998, Baird 2000). Unlike most species, the spectaclecase may seldom, if ever, move except to burrow deeper. They may die from stranding during droughts (Oesch 1984). It filter-feeds, siphoning phytoplankton, diatoms, and other microorganisms from the water column (Fuller 1974). For their first several months, juvenile mussels employ foot (pedal) feeding consuming algae and detritus (Yeager et al. 1994).

The spectaclecase is thought to be a short-term brooder of its young. The larvae (glochidia) are released from early April to late May in Missouri streams (Baird 2000). These glochidia must come into contact with a specific host fish(es) to survive. The host(s) for the spectaclecase is unknown. The fact that spectaclecase populations are oftentimes highly aggregated with apparently many even-aged individuals indicates that glochidia may excyst simultaneously from a host (Gordon and Layzer 1989). Thus, any component of its complex life history may limit the population.

The spectaclecase has declined significantly relative to its historical distribution of at least 45 streams in 15 states and several major river systems. It is now known to occur in only 20 streams in 10 states. Of the 20 extant populations, seven are represented by only a single specimen each and are likely not viable. The decline of the spectaclecase in the Illinois River

system is primarily the result of habitat loss and degradation (Neves 1991). Additional threats include exotic species, especially zebra mussels; sedimentation; small population sizes; isolation of populations; livestock grazing; wastewater effluents; chemical contaminants; mine runoff; unstable and coldwater flows downstream of dams; gravel mining; channel dredging; impoundments; and channelization.

Butterfly mussel. The butterfly mussel (*Ellipsaria lineolata*) usually inhabits areas of large rivers with swift currents in sand or gravel substrates. However, it appears that the butterfly has adapted to life in reservoirs in some southern states, where it is found in water depths up to 6 m (20 ft) (Parmalee and Bogan 1998).

Mussels are long-lived animals. Members of many species may live for several decades and in some instances, a century or more. They spend most of their lives buried in the bottom sediments of permanent water bodies, and often live in multi-species communities called mussel beds (Sietman 2003).

Mussels are primarily sedentary, but they can move around with the use of their foot, which is a hatchet shaped muscle that can be extended out between the valves (shells). A mussel will burrow its foot into the sediment and then contract it to pull itself slowly along the bottom of its aquatic habitat (Sietman 2003). Mussels eat by filtering bacteria, protozoans, algae, and other organic matter out of the water.

Female butterfly mussels brood their young long-term from August through July before they are released as glochidia (Baker 1928). Once the glochidia are expelled from the female's gills, they attach to fish gills or fins by clamping onto them with their valves. The glochidia live as parasites on the host fish until they develop into juvenile mussels, at which point they detach from the fish and fall to the streambed as free-living mussels. Known fish hosts for the glochidia of the butterfly mussel include sunfish (*Lepomis* spp.), sauger (*Stizostedion canadense*), and drum (*Aplodinotus grunnieus*) (Fuller 1978).

The viability of remaining butterfly mussel populations in the Mississippi River is jeopardized by the continuing decline in habitat conditions associated with the river's management as a navigation canal, and with non-point and point source water and sediment pollution. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and block the movement of fish hosts. The butterfly is also being impacted by the infestation of non-native zebra mussels (*Dreissena polymorpha*) in the Mississippi River and its tributaries. Zebra mussels can attach in large numbers to the shells of native mussels, eventually causing death by suffocation. Historically the butterfly mussel was harvested for use in the pearl button industry (Baker 1928), and today it is harvested in some portions of its North American range for use in the cultured pearl industry (Oesch 1984).

Ebonyshell mussel. The ebonyshell mussel (*Fusconaia ebena*) primarily inhabits large rivers in sand or gravel (Cummings and Mayer 1992). Mussels are long-lived animals. Members of many species may live for several decades and in some instances, a century or more. They spend most of their lives buried in the bottom sediments of permanent water bodies, and often live in multi-species communities called mussel beds (Sietman 2003).

Mussels are primarily sedentary, but they can move around with the use of their foot, which is a hatchet shaped muscle that can be extended out between the valves (shells). A mussel will burrow its foot into the sediment and then contract it to pull itself slowly along the bottom of its aquatic habitat (Sietman 2003). Mussels eat by filtering bacteria, protozoans, algae, and other organic matter out of the water.

Female ebonyshell mussels brood their young short-term, from May to early fall, before they are released as glochidia (Parmalee and Bogan 1998). Once the glochidia are expelled from the female's gills, they attach to fish gills or fins by clamping onto them with their valves. The glochidia live as parasites on the host fish until they develop into juvenile mussels, at which point they detach from the fish and fall to the streambed as free-living mussels. The primary host fish for the ebonyshell is the skipjack herring (*Alosa chrysochloris*) (Watters 1994).
Overharvest during the pearl button era, pollution, and dams, which block the migration of its primary host fish, skipjack herring, are the reasons for the species' demise. Its extreme rarity and narrow distribution make it vulnerable to catastrophic events.

Black sandshell mussel. The black sandshell (*Ligumia recta*) is usually found in the riffle and run areas of medium to large rivers in areas dominated by sand or gravel. Mussels are long-lived animals. Members of many species may live for several decades and in some instances, a century or more. They spend most of their lives buried in the bottom sediments of permanent water bodies, and often live in multi-species communities called mussel beds (Sietman 2003).

Mussels are primarily sedentary, but they can move around with the use of their foot, which is a hatchet shaped muscle that can be extended out between the valves (shells). A mussel will burrow its foot into the sediment and then contract it to pull itself slowly along the bottom of its aquatic habitat (Sietman 2003). Mussels eat by filtering bacteria, protozoans, algae, and other organic matter out of the water.

Black sandshell female mussels brood their young long-term from August through July before they are released as glochidia (Ortmann 1919). Once the glochidia are expelled from the female's gills, they attach to fish gills or fins by clamping onto them with their valves. The glochidia live as parasites on the host fish until they develop into juvenile mussels, at which point they detach from the fish and fall to the streambed as free-living mussels. Host fish for the glochidia of the black sandshell include the bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), sauger (*Stizostedion canadense*), and white crappie (*Pomoxis annularis*) (Watters 1994).

Degradation of mussel habitat in streams throughout the black sandshells known range is a continuing threat to this species. Declines in habitat conditions are associated with management of the Mississippi River as a navigational canal, and with non-point source water pollution and sediment pollution. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and block the movement of fish hosts. The black sandshell is also being impacted by the infestation of non-native zebra mussels (*Dreissena*

polymorpha) in the Mississippi River and its tributaries. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation.

Illinois cave amphipod. The Illinois cave amphipod (*Gammarus acherondytes*) is a small, cave-dwelling crustacean. It measures less than an inch in length and is light gray-blue in color. The Illinois cave amphipod lives in the "dark zone" of cave streams. Like other amphipods, this species needs cold water and does not tolerate a wide range in water temperatures. They are sensitive to touch and avoid light. The Illinois cave amphipod feeds on all kinds of dead animals and plants as well as the thin bacterial film covering submerged surfaces. Because of its sensitivity to contamination, the Illinois cave amphipod is an excellent indicator of the water quality of the cave systems it inhabits and the groundwater from the surrounding area.

This species has never been widely distributed. It is endemic to the Illinois Sinkhole Plain in Monroe and St. Clair Counties in southwestern Illinois. Historically, the Illinois cave amphipod was known from six cave systems, all within a 10-mile radius of Waterloo, Illinois. These caves are each fed by separate watersheds, with no known connection among them. Therefore, scientists believe it is unlikely that the amphipod could be distributed to other cave systems via streams.

Currently, the Illinois cave amphipod is found in only three of the original six cave sites. These caves are all in Monroe County. Entrances to two caves are owned by the Illinois Department of Natural Resources, which allows public use of one of the sites. Three entrances to the third cave, which is privately owned, are dedicated as Nature Preserves and are protected.

Factors that threaten the Illinois cave amphipod include groundwater pollution from pesticides, along with contamination from human and animal wastes. Groundwater feeding the caves in which the amphipod lives can be affected in a number of ways, including seasonal application of pesticides and fertilizers, contamination from septic systems, sewers, or livestock feedlots, or accidental or intentional dumping of toxic substances into a sinkhole. Scientists have found evidence of several pesticides, some of which may be affecting the amphipod, in streams, wells, and springs near the caves inhabited by the species. Also found were quantities of metals and bacterial pollution from livestock and human wastes. The presence of these contaminants indicate that the deterioration of water quality is likely the primary cause of the decline of the Illinois cave amphipod. Human use of caves inhabited by the amphipod could also be a factor affecting its survival. People moving through the caves in which public use is permitted can potentially introduce toxic materials, injure or kill amphipods, or disturb habitat.

The amphipod's current range is close to the growing St. Louis metropolitan area, and there is potential for increased impacts on the species. The U.S. Fish and Wildlife Service has listed the amphipod as an endangered species, protecting the species from take and providing a means to ensure that its populations do not decline due to alteration of habitat.

Decurrent false aster. The decurrent false aster *(Boltonia decurrens)* is a perennial floodplain plant of open, wetland habitats, and its distribution includes Madison and St. Clair Counties, Illinois (USFWS 2001). Historically it occurred in wet prairies, shallow marshes, and shores of rivers, creeks, and lakes on the floodplain of the Illinois and Mississippi Rivers (Schwegman and Nyboer 1985). Currently it is found most often in old agricultural fields and along roadsides and lake shores where alluvial soils have been disturbed (USDOT 2000). This plant is an early successional species that requires either natural or human disturbance to create and maintain suitable habitat. In the past, the annual flood/drought cycle of the Illinois and Mississippi rivers provided the natural disturbance required by this species. Annual spring flooding created open, high-light habitat and reduced competition by killing other less flood-tolerant, early successional species. Field observations indicate that in "weedy" areas without disturbance, the species is eliminated by competition within 3 to 5 years (USFWS 1990). *Boltonia decurrens* has high light requirements for growth and seed germination (Smith *et al.* 1993, Smith *et al.* 1995), and shading from other vegetation is thought to contribute to its decline in undisturbed areas. Seeds of this plant can be dispersed by flooding, or carried by wind and animals (Keevin, 2010).

Records of this plant occur within the Metro-East area. These sites "are predominantly located on old or mowed fields, in wetlands, or on the edges of active fields, farm facilities, golf courses, or a railroad" (USDOT 2000:60). One site is the Fairmont City INAI (Illinois Natural Area Inventory) site, which is located on the south side of I-55/70 between IL Routes 203 and 111. Another is at Horseshoe Lake west of Walker Island. Also, USDOT (2000) reported colonies scattered locations adjacent to Cahokia Canal and Lansdowne Ditch (Schoenberger Creek) in the vicinity of the new Mississippi River bridge and relocated I-70 and I-64 connector. Colonies located in the vicinity of Cahokia Canal and Lansdowne Ditch "are predominantly located on old or mowed fields, in wetlands, or on the edges of active fields, farm facilities, golf courses, or a railroad" (USDOT 2000:60). Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law.

Eastern prairie fringed orchid. The eastern prairie fringed orchid *(Platanthera leucophaea)* was listed as Federally threatened on September 28, 1989. In September 1999 a recovery plan was completed by the U.S. Fish and Wildlife Service which delineates reasonable actions needed to recover and/or protect this orchid (USFWS 1999). Recovery Plan Actions include: habitat protection and management, increase size and numbers of populations, conduct surveys on known populations, and conduct additional research. Early decline of the species was due to the loss of habitat, mainly conversion of natural habitats to cropland and pasture. Current decline is mainly due to habitat loss from the drainage and development of wetlands. Other reasons for the current decline include succession to woody vegetation; competition from non-native species; and over-collection.

The eastern prairie fringed orchid occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. It requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment. Also known as the prairie white fringed orchid, this species formerly occurred over much of north

and central Illinois, including Madison County, but is now confined to the northeast corner of the state (Herkert 1991). However, it may be present wherever prairie remnants are encountered. There is only one known prairie remnant on the historic floodplain of the Mississippi River in the Metro-East area; the Poag Railroad Prairie Illinois Natural Area Inventory site is located in the vicinity of the North Flank levee along Cahokia Creek Diversion Channel, between IL Rte 111 and New Poag Road.

Spring ladies' tresses. Spring ladies' tresses (*Spiranthes vernalis*) is a perennial orchid. Habitats include prairies, meadows, ditches, sandy woods, and fields. Spring lady's tresses generally blooms in the summer.

4. ANTICIPATED ENVIRONMENTAL IMPACTS

The discussion of impacts (environmental consequences) details those resources that could be impacted, directly or indirectly, by the no-action alternative, and the proposed action. Direct impacts are those that would take place at the same time and place (40 CFR §1508.8(a)) as the action under consideration. Indirect impacts are those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR §1508.8(b)).

The discussion of cumulative impacts considers the effects on the resource that result from the incremental impact of the action being considered when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taken place over a period of time (40 CFR §1508.7). Because stockpile and disposal areas have yet to be identified, the following discussion of environmental consequences does not address these features.

4.1. Topography and Geology

No Action - Wood River, MESD, Prairie du Pont / Fish Lake

Scattered borrow activities on either side of the levee system are expected to continue, as earthen material taken from such areas is useful for a variety of construction purposes. Minor filling activities are expected for site development. Effects of a levee failure on topography within the levee protected area include the formation of localized scour holes and the broad deposition across the ground of sand and finer sediments by flood waters.

Proposed Action

The proposed action would not cause any changes to the geology.

Wood River

Existing ground elevations would be maintained or restored after construction at all design reaches where relief wells and cutoff walls are proposed. Installation of relief wells would not cause any changes to topography.

At the location of the shallow cutoff wall (20+00 – 33+00, 34+00 – 39+00), a trench extending about 25 feet deep (to elevation 400 feet NGVD) and two feet wide would be excavated along the riverside of the levee.

At the location of the deep cutoff wall (150+00 – 159+75), a trench varying in depth from 110 to 140 feet deep and three feet wide would be excavated down to bedrock along the riverside of the levee. The excavated earthen material would be side cast, mixed on-site with bentonite and/or cement and bentonite, and the mixture would be placed back in the trench. After construction of the wall existing ground elevations would be restored. Excess excavated earthen material would be taken to a yet to be identified disposal area.

Where random fills and seepage berms are proposed along the south flank levee, topography would be altered to a minor degree. Ground elevations would be permanently raised. Berms would vary in thickness from about 2 to 5 feet and cover a total of about 20 acres. They would extend out away from the levee for a distance of about 100 to 400 feet.

Where the installation of trench drains and graded filters are proposed, construction would take place on the protected dry side of the levee to control seepage and should have relatively minor impacts to topography. To install the graded filters, approximately 2-3 feet of existing sediment would be excavated and backfilled with sand and gravel. In some cases additional material may require excavation until aquifer is encountered. Excavated material would be placed in an upland area or disposed of in a suitable off-site disposal area. Most of the graded filters are designed to match existing grades. Trench drains have a vertical dimension greater than width, typically penetrating a thicker blanket to reach the aquifer; trench drains may extend 25 feet or deeper.

MESD

Existing ground elevations would be maintained or restored after construction at all design reaches where graded filters and clay caps are proposed. Installation of relief wells would not cause any changes to topography.

Prairie du Pont / Fish Lake

The proposed action would cause minor changes to the local topography. These changes would be made along the existing landside toe of the levee in association with construction of the project features.

The proposed action, a combination of new relief wells, modifying existing relief wells to T-type wells, construction of seepage berms, and clay caps, is anticipated to result in the construction of approximately 43 acres of seepage berms. The existing ground elevations, in the area of the seepage berms, would be raised about 2 to 5 feet, depending on the location. The seepage berms

would extend between 150 and 500 feet from the existing landside toe of the levee, depending on the location.

Installation of relief wells at the proposed new locations would require the creation of a swale (shallow ditch) or subsurface collector system along the landside toe of the levee to direct relief well water to the nearest pump station.

4.2. Socioeconomics and Land Cover

No Action

Wood River
Development is expected to continue in the levee-protected portion of the Wood River project area, as only a few years ago a major Interstate Highway (I-255) opened within the Levee District. The connection that this new expanded highway makes to the regional interstate system increases the likelihood of future development in the project area. The surrounding region has become a distribution center and this new interstate spur, which will soon be further expanded, makes the project area attractive for development. Investments by Conoco-Philips and the issuance of another permit for refinery operations by the State in the last 5 years would indicate that this base would continue to expand also. This increases the importance of the flood protection system to perform as intended in the future.

However, as the levee system's features continue to degrade as a result of flood events and to exceed their performance life, the system's ability to operate as originally intended under future flood events becomes an even greater concern. If no action is taken, underseepage problems could cause interior flooding that can impact industries, infrastructure and interrupt the transportation system. Future odds increase that a significant failure could occur under the no action alternative. Public safety will continue to be jeopardized.

For example, within the Upper and Lower Wood River levee protected areas, total expected structure damages at the 500 year flood event exceed $200 million while damages at the 1,000 year flood event exceed $2.25 billion. The number of residential, commercial, and industrial structures likely to be damaged are displayed in Exhibit EA-18. Impacts to the petrochemical industry residing within Lower Wood River are a significant National Security interest. These companies produce 1.6 million gallons of defense grade jet fuel each year. If their operations were to be shut down, costs would be large and widespread.

The loss of the Wood River Levee system would not only have devastating economic impacts in the traditional measurement of losses but would have the added implication of creating an environmental contamination scenario not experienced on any inland waterway system to date. When the U.S. EPA was contacted for information on potential effects, they likened such an occurrence to that experienced as a result of the Exxon Valdez. Not only would the land protected by the levee experience significant contamination from oil, oil byproducts and chemicals used in the refining process, but also the Mississippi River system itself would be impacted. At a conservative estimate of $125,000 per acre of clean up costs, a loss of this levee

would result in environmental damages exceeding $2,000,000,000 (two billion dollars), not including the relocation costs of residents and future loss of agriculturally productive land.

MESD

If the MESD levee system failed, the population affected from the imminent flooding is estimated at 250,000 people as well as 86,000 acres consisting of major industrial and commercial businesses valued over $2.5 billion, including hazardous and toxic waste (HTW) contaminated areas. Population affected is defined as the number of people (residing, working, or transient) located within the floodplain afforded flood protection by the project at its design level. Catastrophic failure of the ESTL levee would cause considerable catastrophic damages to commercial/heavy industrial development; environmental and agricultural losses, spread of hazardous and toxic wastes and could lead to significant loss of life among the 250,000 mainly low income people protected by the levee.

Levee failure would flood East St. Louis, Granite City, Cahokia and Sauget, Illinois, plus additional communities within the project area. Safety issues would include high velocities and rapid flooding of residences, schools, industry (including a chemical plant, an ethanol plant, and a fuel storage facility), and vehicles to great depths; potential spread of hazardous and toxic contaminates from nearby Superfund sites could also greatly impact the life-risk safety of the project area population. The ESTL Levee is an integral part of a levee system that includes Wood River, Chain of Rocks and Prairie du Pont/Fish Lake levees, which collectively protect over 300,000 people, as well as major industrial developments, including the producer of one-quarter of the Nation's military jet fuel. In the event of failure of the ESTL levee under the design level flood condition, the risk depth of flooding is estimated at 20+ feet across most of the project area, placing many project area inhabitants at risk of serious injury or loss of life.

Prairie du Pont / Fish Lake

If the Prairie Du Pont / Fish Lake levee system failed, the population affected from the imminent flooding is estimated at 75,000 people as well as 13,000 acres consisting of industrial and commercial businesses valued over $23 million. If inundated, typical crop production losses on average are $3,225,000 per year. Population affected is defined as the number of people (residing, working, or transient) located within the floodplain afforded flood risk reduction by the project at its design level. Catastrophic failure of the levee would cause considerable catastrophic damages to commercial/heavy industrial development; environmental and agricultural losses, and could lead to significant loss of life among the approximately 14,500 residents as well as 68,000 commuters protected by the levee. The levee has high probability of failure during significant flood event due to inadequate underseepage controls.

Levee failure would flood East Carondelet and Dupo, Illinois, plus additional communities within the project area. Safety issues would include high velocities and rapid flooding of residences, schools, industry, and vehicles to great depths.

The “No Action” alternative may lead to changes in the land cover of the area as a result of inundation due to levee failure. Depending on the magnitude and duration of the inundation, trees and other vegetation may die off. Agricultural fields may no longer be appropriate for

farming. Thus, conversion from one land cover type to another would be expected, depending upon existing environmental conditions.

Proposed Action

According to the U. S. Department of Housing and Urban Development, "Economic development is an important part of strengthening communities by creating and retaining jobs" (USDHUD, 2010). The creation of jobs that could reasonably be expected to occur or continue once the 100-year flood event level of protection is restored within the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems, would invariably lead to or complement other types of development such as single-family and multi-family housing, commercial and service industry, retail, and industrial developments. Job creation would bring more people to the area, and more people would create a demand for services, thereby creating a demand for new, improved, and/or an expansion of infrastructure. Examples of infrastructure include roads and bridges; recreation and open spaces such as parks, sports facilities and community gardens; public or institutional facilities such as hospitals, airports, and cultural attractions; utility and sewer capacity; and health and human, and environmental services.

The proposed project falls within Madison, St. Clair, and Monroe county, Illinois, which are located in the southwestern part of the state. The East-West Gateway Council of Governments states that "Southwest Illinois has more than $9 billion dollars in its economic development pipeline"; and that "in recent years the area has seen significant new investments in commercial, office and institutional projects across the region while major industrial facilities are reinvesting in and expanding their operations in the Metro East". In addition, "public and private investment in the region's infrastructure has created a transportation network that makes Madison, St. Clair, and Monroe counties prime locations for development and their development potential will only be enhanced upon completion of the new Mississippi River Bridge" (EWGCG, 2010b). It is clear that "growth and development can improve quality of life by adding services, creating opportunity, and enhancing access to amenities. But it can also drive disinvestment, reduce competitiveness, and degrade the environment" (Smart Growth Network, 2010). "Smart growth", techniques such as master planning, zoning, and land use planning enhance the safety and livability of communities through the efficient application of programs that balance growth and conservation.

Wood River

With regard to land cover, the proposed project features would result in very minor losses to cropland, emergent wetlands, forested wetlands, and bottomland hardwood forests (Exhibit EA-39). With regard to agricultural lands, the proposed action would impact approximately 8.3 acres of cropland, which is less than one quarter of one percent of the estimated 3,417 acres of various small-grain crops identified by satellite imagery in 2000 within the flood-protected levee district (Exhibit EA-14). Similarly, very small percentages of wetlands (8.5 acres versus 723 acres), and bottomland hardwood forest (7.9 acres versus 228 acres) would be affected by the project compared to the amount of these natural resources that would be remaining (Exhibit EA-14). Exhibit EA-39 displays the expected changes in land cover by design reach and proposed

feature. A discussion of prime farmland impacts and wetland impacts associated with each alternative are provided within Section 4.9 and Section 4.14, respectively.

MESD

With regard to croplands, the proposed action would impact approximately 3.5 of the estimated 31,627 acres of agricultural land identified by satellite imagery in 2000 within the flood-protected levee district (Exhibit EA-19). Similarly, very small percentages of wetlands (4.3 acres versus 13,020 acres) would be affected by the project compared to the amount of these natural resources that would be remaining (Exhibit EA-19). No impacts to bottomland hardwood forest is anticipated. Exhibit EA-39 displays the expected changes in land cover by design reach and proposed feature. A discussion of prime farmland impacts and wetland impacts associated with each alternative are provided within Section 4.9 and Section 4.14, respectively.

Prairie du Pont / Fish Lake

The proposed action would impact approximately 22.8 acres of cropland, which is less than one quarter of one percent of the estimated 9,439 acres of agricultural land, identified by satellite imagery in 2000 within the flood-protected levee district (see Section 3.2 - Socioeconomics and Land Cover, Prairie du Pont/ Fish Lake). Similarly, very small percentages of wetlands (12.3 acres versus 899 acres), and bottomland hardwood forest (0.2 acres versus 1301 acres) would be affected by the project compared to the amount of these natural resources that would be remaining (see Section 3.2 - Socioeconomics and Land Cover, Prairie du Pont/ Fish Lake). Exhibit EA-39 displays the expected changes in land cover by design reach and proposed feature. A discussion of prime farmland impacts and wetland impacts associated with each alternative are provided within Section 4.9 and Section 4.14, respectively.

Exhibit EA-39. Expected changes in land cover by proposed feature for the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems.

Proposed Features[1]	Direct Impacts to Land Cover by Category (Acres)				
	Grassy / Developed	Trees	Cropland	Water	Wetlands
Wood River					
Clay cap	5.6				
Cutoff wall	0.1				
Graded filter	10.2	1.3		10.6	7.8
Seepage berm	5.3	6.6	8.3	0.3	0.7
Subtotal (56.8 ac)	21.2	7.9	8.3	10.9	8.5
Relief Well (#)	2			1	
Piezometer (#)	45	1		5	5
MetroEast Sanitary District					
Clay cap	18.5		3.5		0.3
Graded filter	2.1				4.0
Toe drain	0.8				
Pump Station	<0.0				
Subtotal (29.2 ac)	21.4		3.5		4.3
Relief Well (#)	22	2			1
Piezometer (#)	5	2	1		
Prairie du Pont/Fish Lake					
Clay cap	2.2				0.3
Seepage berm	7.7	0.2	22.8		12.0
Subtotal (45.2 ac)	9.9	0.2	22.8		12.3
Relief Well (#)	172		20		13
Piezometer (#)	8		1		1
All Levee and Drainage Districts					
Total All Features	52.5	8.1	34.6	10.9	25.1

(131.2 ac)	(40.0%)	(6.2%)	(26.4%)	(8.3%)	(19.1%)
Relief Well (#)	196	2	20	1	14
Piezometer (#)	58	3	2	5	6

Source: Geospatial analysis based on 2010 digital aerial photo and AMEC wetland delineations.
[1]Relief well and piezometer impacts expressed as number of proposed features (not acres).

4.3. Air Quality

No Action - Wood River, MESD, Prairie du Pont / Fish Lake

Because the St. Louis metropolitan area is a nonattainment area for ozone and particulate matter (PM-2.5), control strategies resulting in reduced emissions have been implemented across the region. Control measures targeted at transportation include physical improvements in regional transportations systems and management strategies to reduce hydrocarbons and carbon monoxide emissions from motor vehicles (EWGCG, 2010a). The "No Action" alternative would have no direct impacts on air quality.

Proposed Action - Wood River, MESD, Prairie du Pont / Fish Lake

A Clean Air Act General Conformity Determination has been prepared for the proposed action by the Corps of Engineers, St. Louis District. This air quality assessment is based on General Conformity Determinations recently prepared by the Corps for similar levee improvement projects proposed by the St. Louis District for these same three levee and drainage districts (USACE, 2010c, 2011a, 2011b). Because the AMEC project is at the 60% design phase, detailed information describing types of motorized construction equipment and number of pieces needed to build all the proposed features has not yet been developed. The assessment prepared for the proposed action is very conservative because it assumes all required motorized construction equipment would be operated concurrently at all three levee systems in a single year.

The General Conformity Determination indicates that the project would have minimal air quality impacts and would be below the de minimis levels set for a moderate ozone nonattainment area and for a PM-2.5 1997 nonattainment area. The determination also shows that the project is not regionally significant as the project's emissions would not exceed 10% of the total emissions in the nonattainment or maintenance area. Minor short term effects on air quality are expected during construction from exhaust and dust. Care would be taken to minimize all impacts on air quality, such as wetting down excavated materials/construction areas and wearing appropriate respiratory protection as needed. These impacts would cease once construction was completed.

A contingency plan would be developed to handle any unexpected encounter with contaminated materials and their potential effects on air quality. If ground disturbance during construction activities were to uncover unknown significant soil and/or groundwater contamination, certain

contaminants can be volatilized, potentially causing impacts to air quality. If this were to occur, depending on site conditions, on-site construction workers may need to wear respiratory protection. Activities associated with stockpiling or handling contaminated soils could also cause impacts to air quality. Care would be taken to minimize soil contamination impacts on air quality, such as covering stockpiled materials or wetting down excavated materials.

4.4. Surface Water and Surface Water Quality

No Action - Wood River, MESD, Prairie du Pont / Fish Lake

The surface water quality within the project area has a wide variety of impairments. There is a general increasing trend in population and commercialization/industrialization within the project area. Based upon this trend, surface water quality would most likely have additional impairment loads placed upon it over time. Downstream receiving waters would then have increased impairment loads, which decreases water quality within those regions. Degrading water quality could result in a decreased amount of designated uses (USACE, 2003).

At the same time, the land use planning strategy in Madison and St. Clair counties includes adopting strict stormwater/watersheds management standards, working with various governmental entities to upgrade aging storm water drainage facilities in the Mississippi River floodplain, and extending public water and sewer facilities (USACE, 2003). These efforts are expected to result in some improvements in surface water quality, including within the watersheds that drain into the levee and drainage districts.

The "No Action" alternative would have no direct impacts on surface water resources, other than connectivity with the mainstem Mississippi River if the levee were to fail.

Proposed Action - Wood River, MESD, Prairie du Pont / Fish Lake

Planned activities during construction are not expected to cause impacts to any surface waters as long as proper stormwater pollution prevention practices are enacted during construction and disturbed areas are reseeded to restore levee turf or other groundcover. Proper stormwater pollution prevention practices would be employed in construction areas where the ground surface is disturbed. If it becomes necessary to pump out groundwater or precipitation that fills cutoff wall excavations, trench filters, or relief well holes during construction, proper environmental protocols would be followed (e.g., any potentially contaminated water would be tested and treated/properly disposed of if conditions warrant).

With regard to permitting requirements, AMEC would need to receive from the Illinois Environmental Protection Agency (IEPA) a water quality certification issued under Section 401 of the Clean Water Act for the proposed action. Similarly, because proposed construction activities would disturb a relatively large ground surface area and could potentially affect water quality due to land erosion, AMEC would also need to receive a National Pollutant Discharge Elimination System (NPDES) permit from the IEPA under Section 402 of the Clean Water Act.

Issuance of these authorizations would need to precede the commencement of any work. The permit conditions contained in these authorizations specifying standard erosion control measures and any other measures deemed specific to the proposed action would need to be implemented to protect water quality.

The primary concern with water quality is the potential for underground contaminants to be spread to surface waters by contaminated groundwater flowing from relief wells and similar structures proposed in the vicinity of HTRW areas of concern. In general, groundwater would discharge from these proposed features when the Mississippi River is high, and flow would be collected into an existing or proposed ditch system that would go to a pump station (existing or proposed), where the water would be discharged to the Mississippi River. Because AMEC is proposing that groundwater discharging in the vicinity of HTRW areas of concern would flow through these structures without permitting or treatment, there is a potential for contaminants to be carried to surface waters.

4.5. Groundwater and Groundwater Quality

No Action - Wood River, MESD, Prairie du Pont / Fish Lake

Based on the general increasing trend in population, commercialization and industrialization within the Wood River and MESD portions of the project area (USACE, 2003), it is likely that overall groundwater quality will decline slightly over time due to the infiltration of surface water of declining quality. At the Prairie du Pont / Fish Lake area, groundwater conditions are expected to remain the same assuming agricultural land use continues in the future.

Proposed Action

With regard to existing patterns of groundwater movement underneath the three levee systems, no change is expected at those locations where construction of clay caps, graded filters, seepage berms and fills, trench drains, relief wells, and piezometers is proposed. These features would not modify or inhibit groundwater movement that typically occurs along gradients that are perpendicular to the Mississippi River channel or its tributaries. However, by design cutoff walls would inhibit groundwater movement, and such effects would occur at two locations along the Wood River levee system.

Wood River

In the upper portion of this levee system, the riverside shallow cutoff wall proposed at Alton in the vicinity of the Hwy 367 Bridge at stations 20+00 – 33+00 and 34+00 – 39+00 would extend down into the ground but not to bedrock. This feature would not act as a total barrier to movement of groundwater beneath the levee, but as a barrier to movement of groundwater through an existing layer of sand near the ground surface underlain by impermeable clays. Construction of this shallow wall would also lower groundwater elevations in the landside area adjacent to this proposed feature.

In the lower portion of the levee system at the confluence of Wood River Creek with the Mississippi River, two cutoff walls extending down to bedrock would be located at stations 150+00 – 159+75 and 162+20 – 170+10. These walls would act as a barrier to the movement of groundwater under this part of the levee during periods of high water on the Mississippi River, when groundwater typically moves toward the protected interior. Construction of these deep cutoff walls would also lower groundwater elevations in the landside area adjacent to these proposed features.

Additional effects of these features include the potential for groundwater mounding on the landside of the cutoff wall during low or normal river flows and the creation of localized groundwater gradients that may trend perpendicular to the walls. Once these flows reach the ends of a cutoff wall, groundwater would then flow back toward the river in a normal fashion.

The proposed action is not expected to cause any impacts to groundwater quality. A limited Phase II Environmental Site Assessment conducted in August 2011 by the Corps of Engineers, St. Louis District in the lower portion of the levee system at Hartford from levee station 298+65 to 308+55 in the vicinity of a known HTRW plume did not identify any underground petroleum related contaminants in the vicinity of relief wells proposed by the Corps (USACE, 2011b). Because the AMEC proposed relief well locations at this location are outside the extent of the known plume, no impacts of HTRW on groundwater quality are expected.

MESD

The proposed action in the vicinity of known HTRW sites (levee stations 1110+00 – 1312+00) is not expected to cause any impacts to groundwater quality or worsen contamination that may be present in groundwater in this area.

Prairie du Pont / Fish Lake

The bottom of the proposed relief wells would be located in the unconsolidated materials located above bedrock. Installation of the proposed relief wells would not affect the groundwater aquifer located in these unconsolidated materials. There are no known HTRW sites within the project area, thus no impacts of HTRW on groundwater quality are expected.

4.6. Hazardous, Toxic, and Radioactive Wastes

No Action

Wood River

Remediation efforts are ongoing at known contaminated sites within the lower Wood River drainage and levee district that are under the State Site Remediation Program; the Resource Conservation and Recovery Act program; and Comprehensive Environmental Response, Compensation, and Liability Act program (see Section 3.6 Hazardous, Toxic, and Radioactive Wastes).

MESD
Remediation efforts are ongoing at several Superfund sites adjacent to the riverfront levee of the MESD levee system.

Prairie du Pont / Fish Lake
As areas adjacent to this levee system are absent of any known sites of contamination, concerns about contamination are unlikely assuming agricultural land use continues in these areas.

Proposed Action

It is anticipated that HTRW may be encountered in soils and groundwater during construction activities at some proposed construction areas. AMEC is currently working with regulatory agencies (including the Illinois Environmental Protection Agency) and other parties in an effort to fully understand the nature and extent of contamination in these areas of concern and attempt to mitigate project impacts. To prevent the potential spread of any contaminated materials, AMEC has developed environmental/hazmat protocols to be used during geotechnical subsurface investigation and construction activities in the areas outlined below. These protocols specify how to properly handle and dispose of any soil and/or groundwater during construction that may be regarded as containing contaminated materials. Appendix EA-HTRW of this document includes these protocols. The proposed action is described in detail in this EA, Section 2.4 Proposed Action, Exhibits EA 9-12.

It is current Corps of Engineer policy that the Corps will not incur any liability for HTRW that might result from proposed modifications and alterations of Corps of Engineers projects, such as the proposed action.

Wood River
Four areas of concern have been identified along the Wood River levee system. No construction is proposed in the vicinity of a fifth area of concern (Upper Wood River Levee, from station 230+00 to 270+00, in proximity to EDR Site #17: Laclede Steel Co Alton Works, Broadway Cut STS, Alton, IL).

Upper Wood River Levee, from station 40+00 to 60+00 (EDR Sites #14, #16, #19: Owens-Brockway Glass facility). The proposed action includes the construction of a graded filter and six piezometers in the vicinity of this area of concern.

Upper Wood River Levee, from station 118+00 to 134+00 (in vicinity of an industrial impoundment). The proposed action includes construction of a trench drain, a graded filter, and six piezometers in the vicinity of this area of concern.

Lower Wood River Levee, from station 00+00 to 50+00 (EDR Site #12, Olin Corporation, Zone 17 Plant, Illinois Route 3, East Alton, IL; restricted along south side of Wood River).
The proposed action includes construction of a new pump station with outfall, two piezometers, and conversion of four existing relief wells to T-type in the vicinity of this area of concern.

Lower Wood River Levee, from station 222+00 to 327+00; Hartford hydrocarbon plume area. The proposed action includes construction of a graded filter, the sliplining of gravity drains, conversion of 18 existing relief wells to T-type, construction of a new pump station and outfall, and installation of 6 new piezometers in the vicinity of this area of concern.

Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at these four areas of concern is expected to mitigate any project impacts. In the event that HTRW is encountered, coordination with the Illinois Environmental Protection Agency (IEPA) and local stakeholders would continue.

With regard to the operation of the proposed features in these areas of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface. AMEC is currently coordinating this issue with the IEPA.

MESD

One area of concern has been identified along the MESD levee system, from station 1110+00 to 1312+60 (Sauget Areas 1 & 2: EDR Sites #93, 94, 96, Orphan, Conoco Phillips). The proposed action includes construction of 3 pump stations with outfalls; 4 new relief wells; a protruding riverside clay cap and a hybrid riverside clay cap; 2 toe drains; 8 new piezometers; 3 graded filters; and a protection berm in the vicinity of this area of concern.

Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at this area of concern is expected to mitigate any project impacts. In the event that HTRW is encountered, coordination with the Illinois Environmental Protection Agency (IEPA) and local stakeholders would continue.

With regard to the operation of the proposed features in this area of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface. AMEC is currently coordinating this issue with the IEPA.

Prairie du Pont / Fish Lake

As no areas of concern have been identified along this levee system, the proposed action in the Prairie du Pont / Fish Lake area would have no potential for HTRW impacts.

4.7. Hydrologic Conditions

No Action

Wood River, MESD, and Prairie du Pont / Fish Lake
No significant climatological changes are expected to occur over the next 50 years. In addition, in regard to surface flows carried by the project area's interior drainage system to the Mississippi River, in 2000 Madison County adopted a comprehensive storm water management ordinance (USACE, 2003). This ordinance requires new developments to implement permanent facilities on site for the temporary detention of stormwater before release to downstream tributaries. Because of these factors, no significant changes in hydrologic characteristics of the Mississippi River or landside ponding area are expected.

Proposed Action

Wood River
A combination of relief wells and graded filters are proposed in the Wood River levee area. Additional flow from new drainage structures would be conveyed over the levee during a flood event by way of new pump stations. New pump stations are proposed at Upper Wood River levee station 217+50, and Lower Wood River levee stations 13+40, 160+60, 308+00, 580+60 and 591+20.

The net effect of the proposed drainage structures along with new pump stations would be a zero flow increase in the levee interior during a 500-year flood event. With these measures, the proposed project would have no significant effect on interior hydrologic conditions in the project area.

MESD
A combination of relief wells, blanket drains, cutoff walls, toe drains and other drainage structures are proposed in the MESD levee area. Additional flow from new drainage structures would be conveyed over the levee during a flood event by way of new pump stations. New pump stations are proposed at MESD levee stations 259+00, 793+00, 888+00, 1112+00, 1345+00 and 1503+00. Increased capacity is proposed at the existing Phillips Reach Pump Station (levee station 1225+50) and at Cahokia Pump Station (levee station 1310+50).

The net effect of the proposed drainage structures along with new pump stations would be a zero flow increase in the levee interior during a 500-year flood event. With these measures, the proposed project would have no significant effect on interior hydrologic conditions in the project area.

Prairie du Pont / Fish Lake
A combination of relief wells and other drainage structures are proposed in the Fish Lake/Prairie du Pont levee area. Additional flow from new drainage structures would be conveyed over the levee during a flood event by way of new pump stations. New pump stations are proposed at

Prairie du Pont levee stations 454+00, 684+00, 537+00 and 300+00. Increased capacity is proposed at the existing Palmer Creek Pump Station (levee station 623+25).

The net effect of the proposed drainage structures along with new pump stations would be a zero flow increase in the levee interior during a 500-year flood event. With these measures, the proposed project would have no significant effect on interior hydrologic conditions in the project area.

4.8. Noise

No Action - Wood River, MESD, and Prairie du Pont / Fish Lake

Industrial, commercial, and residential development on the floodplain of the Mississippi River is expected to increase within the levee and drainage district. The land use planning strategy in Madison County includes the formation of residential and agricultural zoning districts, and applying zoning and subdivision regulations to reduce non-managed growth in agricultural areas (USACE, 2003). Because of increasing development, noise levels are expected to increase, but these increases are expected to be associated with land use type.

Proposed Action - Wood River, MESD, and Prairie du Pont / Fish Lake

Noise receptors consisting of residential areas or single residences are located near some of the areas of proposed work. Short-term noise impacts would be generated by the use of various types of construction machinery, and these impacts would be intermittent in nature. These impacts in the vicinity of residential areas would be alleviated by confining construction operations to daylight hours when practicable. Overall, the proposed action is not expected to significantly create noise effects for the short or long-term.

4.9. Prime Farmland

No Action

Wood River, MESD, and Prairie du Pont / Fish Lake
The existing land use planning strategy in Madison, St. Clair, and Monroe counties includes the conservation of agricultural lands, including preservation of crop lands for specialty crops (e.g., horseradish). This is to be accomplished by strengthening the downtown areas and the residential neighborhoods of municipalities in the vicinity of the project area to reduce the premature conversion of agricultural lands outside of those municipalities. Agricultural lands would remain a significant form of land use, but increasingly, these lands are expected to be converted to other uses (USACE, 2003). The “No Action” alternative could eventually result in catastrophic levee failure, resulting in inundation of prime farmland within the project area.

Proposed Action

Farmland impacts were assessed by geospatial analysis of the Madison, St. Clair, and Monroe County digital soil surveys (USDA-NRCS, 2010), which classify each county's soils by capability for agricultural production.

Wood River

The construction of clay caps, cutoff walls, graded filters, and seepage berms would affect areas considered to consist of prime farmland soils, and would result in the conversion of about 25 acres of such lands to nonagricultural use (Exhibit EA-40). These proposed features would not affect any areas considered to support soils of statewide importance, nor would they affect the production of horseradish, a locally important crop.

MESD

Areas considered to be prime farmland that would be converted to nonagricultural use would total less than one acre. The proposed action would not affect any areas that support the production of horseradish, a locally important crop (Exhibit EA-40).

Prairie du Pont / Fish Lake

The placement of fill materials in locations proposed for seepage berm construction would be the main cause of farmland impacts. The proposed action would result in the conversion of approximately 20 acres of prime farmland (Exhibit EA-40). Additionally, the proposed project may lead to secondary and indirect impacts as a result of future development within the levee protected area. Secondary and indirect impacts may also include the irreversible conversion of farmland to nonagricultural use in areas outside of the current study area.

Coordination. The currently proposed project reflects the 60% design phase, and construction requirements for features such as borrow areas, staging areas, and disposal areas have yet to be identified. In addition, the compensatory mitigation plan described in Section 4.14 Biological Resources, is a concept plan and does not identify a specific site. Coordination with NRCS and IDOA would continue during this site selection process.

Exhibit EA-40. Conversions of soils to nonagricultural use by proposed feature for the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems.

Proposed Features[1]	Conversions of Soils to Nonagricultural Use (Acres)					
	All Areas are Prime Farmland	Not Prime Farmland	Prime Farmland if Drained	Prime Farmland if Drained and either Protected from Flooding or Not Frequently Flooded During the Growing Season	Prime Farmland if Protected from Flooding or Not Frequently Flooded During the Growing Season	Water
Wood River						
Clay cap		5.6		0.2	<0.1	
Cutoff wall		0.1				
Graded filter	4.1	18.5	2.6		1.2	4.3
Seepage berm	13.5	3.0	<0.1		3.7	
Subtotal (56.8 ac)	17.6	27.2	2.6	0.2	4.9	4.3
Relief Well (#)		3				
Piezometer (#)	4	47	4	1		
MetroEast Sanitary District						
Clay cap	0.4	22.8				
Graded filter		4.9				
Toe drain		0.8				
Pump Station	0.2	0.1				
Subtotal (29.2 ac)	0.6	28.6				
Relief Well (#)		25				
Piezometer (#)			2	4	2	
Prairie du Pont/Fish Lake						
Clay cap		2.6				

Seepage berm	17.6	23.2	2.0			
Subtotal (45.2 ac)	17.6	25.8	2.0			
Relief Well (#)	65	140				
Piezometer (#)	2	8				
All Levee and Drainage Districts						
Total All Features (131.4 ac)	35.8	81.6	4.6	0.2	4.9	4.3
	(27.2%)	(62.1%)	(3.5%)	(0.2%)	(3.7%)	(3.3%
Relief Well (#)	65	168				
Piezometer (#)	6	55	6	5	2	

Source: Geospatial analysis based on digital soil surveys for Madison, St. Clair, and Monroe counties (citation).
1 Relief well and piezometer impacts expressed as number of proposed features (not acres).

4.10. Recreation

No Action - Wood River MESD Prairie du Pont / Fish Lake

As urban growth continues in the project area, the demand for open space preservation and the development of recreational opportunities is expected to increase. The future land use plans for Madison and St. Clair counties document these needs (USACE, 2003).

Proposed Action

Wood River
Construction of various features at several locations along the lower Wood River levee system is likely to temporarily disrupt use of the Confluence Trail atop the levee. At such locations heavy equipment would likely either cross over the levee or use the trail as an access road periodically during the construction period. These locations include the proposed cutoff walls on the riverside of the levee centerline at stations 150+00 – 159+75 and stations 162+20 – 170+10, piezometers at stations 289+90 and 324+50, and a pump station and outfall pipe at station 309+00. Coordination between the proponent and trail officials would occur prior to construction to ensure that appropriate measures at such trail locations crossings are included in the contract specifications to ensure the safety of trail users. This short term impact would cease once construction at these locations is complete, and recreational use of the trail is expected to continue. Recreational use of the Mississippi River channel would not be affected.

MESD
Construction of various features at several locations along the MESD levee system near the Chain of Rocks canal is likely to temporarily disrupt use of the Confluence Trail atop the levee. These locations include the proposed piezometers at stations 258+00, 784+00, 803+00, and

825+50, and pump stations and outfall pipes at stations 258+75 and 782+00. At such locations heavy equipment would likely either cross over the levee or use the trail as an access road periodically during the construction period. Coordination between the proponent and trail officials would occur prior to construction to ensure that appropriate measures at such trail locations crossings are included in the contract specifications to ensure the safety of trail users. Recreational use of the trail is expected to continue. Recreational use of the Mississippi River channel would not be affected.

Prairie du Pont / Fish Lake
The proposed action would have no impacts on recreation, as no formal recreation areas exist within the project boundaries. The Columbia Airport, which is located outside of the study area and used in part for recreational flying, would not be impacted by the project.

4.11. Aesthetics

No Action

Wood River, MESD, and Prairie du Pont / Fish Lake
The Metro East area, including that portion located on the floodplain of the Mississippi River, is expected to experience increasing industrial, commercial, and residential development (USACE, 2003). Much of the industrial and commercial development is expected to occur along major transportation routes. Within the Wood River and MESD levee systems, the semi-rural character of remaining agricultural land is expected to gradually diminish as this urbanization progresses. Where no agriculture lands occur, new development is likely to be located on previously used lands. The overall aesthetics of the project area are expected to progressively change.

Proposed Action

At all three levee systems, the aesthetics of the project area would be temporarily impacted by the presence of construction equipment, removal of vegetation in limited areas, and the creation of noise, fumes and dust during the construction phase. Areas where the ground surface is disturbed would be reseeded and returned to pre-project conditions.

Wood River
The aesthetics of the proposed construction sites once work is completed would change slightly. In those design reaches where new relief wells are proposed, aesthetic changes would be limited to the visual appearance of new wells, as any disturbed grassy turf would be restored. Where cutoff walls are proposed, these features would not be visible at all after construction because they would be underground. Trenches would be backfilled to the original ground surface, and grassy turf would be reestablished over them.

Where berms are proposed along the South Flank levee, about 10 acres of natural habitats along a railroad would be replaced by extensions of the levee system. These berms would consist of maintained turf. Once constructed, none of the proposed action's features are likely to be

considered as aesthetically unpleasant, as they would likely blend in with the existing levee system and surroundings.

MESD
Once constructed, none of the features of the proposed action are likely to be considered as aesthetically unpleasant, as they would likely blend in with the existing levee system and surroundings.

Prairie du Pont / Fish Lake
Levee and relief wells already exist within the study area. Therefore, it is expected that neither the construction of berms nor the installation of additional relief wells would negatively impact the overall aesthetics of the area. The proposed action would only widen the levee by adding the berms but would not add to the authorized levee height. Views of the bluffs to the east would remain unobstructed. Views of the Mississippi River and the City of St. Louis would remain possible only from certain areas atop the existing levee.

4.12. Cultural Resources

No Action

Wood River, MESD, and Prairie du Pont / Fish Lake
As development continues to expand within the project area, including the floodplain of the Mississippi River, archaeological resources not in public ownership or protection are increasingly vulnerable to commercial and residential development (USACE, 2003).

Proposed Action

Within each levee system, the nature of the impacts is consistent. The impacts resulting from the placement of relief wells are the least adverse of the alternatives evaluated. The impacts would result from movement and use of heavy equipment within an area extending approximately 100 feet from the landward toe of the levee. The subsurface effects would be limited to the well boring.

The emplacement of berms and clay blankets would have the most extensive impacts due to their size. The construction of the berms would require the removal of the top layer of soil resulting in the complete destruction of any shallow sites. More deeply buried sites, if they existed, might escape destruction.

Wood River
For those areas of the project area that have not been surveyed, the impacts of construction have yet to be determined (Exhibit EA-41). Of those sites previously recorded, five will be impacted by the proposed construction.

Exhibit EA-41. Cultural resource sites previously recorded at Wood River which will be impacted by the proposed construction.

Site Number	Site Name	Location	NRHP Eligibility
11MS9	Gillham	South Flank	Determined Eligible, Protected by HSRPA Burial Law
11MS17	Judge Gillham	South Flank	Determined Eligible, Protected by HSRPA Burial Law
11MS108	Linkeman	South Flank	Protected by HSRPA Burial Law
11MS178	S. Shafer	South Flank	Phase II Recommended
11MS1600		South Flank	Not Reviewed

The USACE has reached agreement with the Illinois Historic Preservation Agency (IHPA), regarding its NHPA Section 106 responsibilities and has executed a Memorandum of Agreement (MOA) specifying how USACE will address preservation concerns within the project area. In addition, USACE contacted 29 tribal organizations of which two, the Osage Nation and the United Keetowah Band of Cherokee, indicated a desire to be a concurring party to the MOA with the IHPA. The applicant has participated in these consultation efforts. The MOA stipulates the necessary actions to ensure compliance with provisions of the National Historic Preservation Act of 1966 as amended (NHPA, P.L. 89-665, 16 U.S.C. 470 et seq.), the Illinois State Agency Historic Resources Preservation Act (20 ILCS 3420), the Illinois Historic Preservation Act (20 ILCS 3410), and the Illinois Municipal Code (65 ILCS 5), specifically Article 11 Division 48.2 Preservation of Historical and Other Special Areas. Execution of the MOA constitutes compliance with Section 106 of the NHPA. The MOA is applicable to the proposed project with the USACE acting as the reviewing agency of the applicant's efforts.

MESD

All six of the potentially eligible sites as well as four of the five sites, for which no determination of NRHP eligibility has been made, that have been recorded within 500 feet of the toe of the Metro-East Sanitary District (MESD) levee system; as well as, the National Register listed, Eads Bridge, will be avoided by proposed project. One known site located along the North Flank levee, 11MS895 (the Lawrence Primas Site) will potentially be impacted by this project. It has been recorded within the proposed footprint of the seepage berm embankments at 45+60 to 48+90 and 52+00 to 55+50. No determination of eligibility for the NRHP has been made for this site; however, based on a preliminary investigation of the site in 1980 by a team from Southern Illinois University, Edwardsville, the site is believed to have been occupied from the Late Archaic through the Late Woodland period (1,000 B.C – A.D. 1,000). In accordance with Section 106 of the National Historic Preservation Act (NHPA), site 11MS895 will require further testing, as well as coordination and consultation with the Illinois (SHPO) and interested Native American Tribes, to determine its eligibility for the NRHP. Once a determination of significance is made, further excavation may be required to mitigate adverse effects to the site resulting from the placement of seepage berm embankments at 45+60 to 48+90 and 52+00 to 55+50.

All remaining project features of the levee improvement project are proposed on areas previously disturbed by industrial or urban development or areas previously surveyed for cultural resources where none had been identified; therefore, impacts to unknown sites is considered unlikely. In the unlikely event archaeological deposits or historic sites are discovered during the project, the USACE has prepared and forwarded to IHPA a MOA, mirroring the MOA for the Wood River Levee System, to ensure compliance with Section 106 of the NHPA. The USACE also entered into consultation with 29 Federally-Recognized Tribes and the Osage Nation and the United Keetowah Band of the Cherokee have indicated a desire to be concurring parties. The applicant has participated in these consultation efforts. Execution of the MOA will constitute compliance with Section 106 of the NHPA.

Prairie du Pont / Fish Lake

As indicated in Section 3.12, cultural resources surveys within the proposed study area have recorded prehistoric and historic sites. Of these sites, three will require further testing to determine their eligibility for the NRHP (Exhibit EA-42). The remaining sites will be avoided or fail to meet the criteria for inclusion in the NRHP.

Exhibit EA-42. Cultural resource sites at Prairie du Pont / Fish Lake which will be require further testing to determine their eligibility for the NRHP.

Site Number	Site Name	Location	NRHP Eligibility
11MO1090		River Front	Not Reviewed
11S1772		River Front	Not Reviewed
11S1778		North Flank	Not Reviewed

The USACE has prepared a MOA, mirroring the MOA for the Wood River Levee System, to ensure compliance with Section 106 of the NHPA. The USACE has also entered into consultation with 29 Federally-Recognized Tribes and the Osage Nation and the United Keetowah Band of the Cherokee have indicated a desire to be concurring parties. The applicant has participated in these consultation efforts. Execution of the MOA will constitute compliance with Section 106 of the NHPA.

Summary

For each levee system, the applicant has prepared and submitted a workplan describing the efforts required to comply with historic preservation statutes. The USACE has reviewed this plan and submitted it the IHPA with the recommendation that the workplan be accepted as provisional compliance with Section 106 of the NHPA. The IHPA has concurred with this recommendation. Provided that any permit issued to the applicant is conditioned by implementation of the submitted workplan, full compliance with historic preservation statutes will be achieved.

4.13. Environmental Justice

No Action

Wood River and MESD
This alternative is not acceptable since the safety criteria for underseepage would not be met for the design flood. Under the no-action alternative, failure to maintain 100 year protection would result in significant impacts borne directly by minority and low- income populations.

Prairie du Pont / Fish Lake
The "No Action" alternative would not disproportionately affect low income or minority populations.

Proposed Action

Wood River and MESD
Logistics and Social Impacts. Construction activities associated with the proposed project would have a temporary impact on the immediate area. As with any project, vehicle and equipment traffic would be ongoing, especially during the construction phases of the project. No significant impact on community activities or cohesiveness appears imminent.

Social impacts on the community would not be significant. The proposed project would not require displacement of businesses or private residences. Nor would access to critical local institutions such as churches, community centers or government offices be impacted.

Public Health Factors. This project would not significantly increase environmental health risks faced by local residents. During the course of the project, levels of dust caused by construction activities and volatile organic carbon (VOC) emitted by construction vehicles and equipment may cause a temporary increase. However, these increased levels would represent a small increase in current levels in the area and would not significantly increase background levels.

Additional Exposures. Noise, water quality, air quality issues may affect the area due to construction activities. Concerns with noise and air quality impacts stem from the influx of construction and material handling equipment at construction sites. A scientific analysis of noise and air quality impacts on nearby communities has not been conducted. However, due to the distances from residential sites, layout of the construction sites, as well as the use of conventional construction equipment, the project's construction activities are not likely to have an adverse impact on the local communities.

Economic Impacts. The proposed levee improvement corrections are designed to reduce the risk of flooding and therefore may be beneficial to local communities by attracting and encouraging further agriculture and industrial development.

Cumulative Impacts. The impacts caused by the proposed action would have positive cumulative effects to protect low-income and minority individuals from flooding.

Taking all of the above factors into consideration, the proposed action does not conflict with the federal government's policy on environmental justice.

Overall, the proposed project appears unlikely to pose increased environmental risk factors. It is expected to improve environmental conditions in the area, and at the same time, opportunities for economic activity would be enhanced. Residential areas are situated far enough away from the expected short term environmental impacts and would not be adversely affected.

Therefore, the inhabitants of Alton and surrounding municipalities as well as East St. Louis and surrounding communities encompassing a wide spectrum of income levels and socioeconomic backgrounds would realize cumulative environmental and economic benefits from the proposed project.

Prairie du Pont / Fish Lake
The project would not disproportionately affect low income or minority populations.

4.14. Biological Resources

No Action - Wood River, MESD, Prairie du Pont / Fish Lake
The existing land use planning strategy in Madison County includes the protection of wetlands by avoiding their destruction, establishment of wetlands retention areas as temporary storage areas for surface drainage, development of new wetlands via wetlands banking, and the guiding of new development to non-environmentally sensitive areas, including enterprise zones for industrial development (USACE, 2003).

However, due to past and ongoing development, current ecological problems for the project area's biological resources, including forested and emergent wetlands and bottomland hardwoods, are expected to continue. These problems include fragmentation and degradation resulting from altered hydrologic regimes that depart from natural conditions, the addition of sediments and agricultural chemicals or urban runoff, encroachment by exotic plant species, and the prevalence of disturbance-tolerant native plant species in local plant communities (USACE, 2003).

Proposed Action
About 45 acres of various terrestrial and aquatic habitats would be impacted by the proposed project. A summary of these unavoidable impacts is provided in Exhibit EA-43. These affected areas are located on the Mississippi River floodplain, and mainly on the protected side of the levee off of the existing levee right-of-way. The location of affected habitats is displayed on the project maps provided as Appendix EA-Maps to this document. Aquatic habitats that would be affected by the project are identifiable on these maps by a unique site name.

Exhibit EA-43. Summary of unavoidable impacts (acres) to terrestrial and aquatic habitats for all levee systems.

Levee System	Impacts (acres)						Total
	Terrestrial	Aquatic					
	Floodplain Forest	Stream	Open Water Wetland	Forested Wetland	Emergent Wetland	Farmed Wetland	
Wood River	7.9	0.6	11.4	3.0	4.5	0.1	27.5
MESD				3.8	0.5		4.3
Prairie Du Pont / Fish Lake	0.2				0.8	11.5	12.5
Total Impacts (Acres)	**8.1**	**0.6**	***11.4**	**6.8**	**5.8**	**11.6**	**44.3**

Source: AMEC (2011), supplemented by geospatial analysis of floodplain forest by Corps of Engineers, St. Louis.
* Permanent impacts 1.9 acres, temporary impacts 9.5 acres.

Wetlands that would be affected by the proposed project are generally of low quality due to various kinds of disturbances, such as mowing/maintenance, prior cultivation, and previous habitat losses resulting in fragmentation (AMEC 2011a; USACE 2011). Farmed wetlands that would be impacted consist of herbaceous wetlands that are regularly cultivated. Emergent wetlands that would be affected are usually located within drainage features and are disturbed by seasonal mowing and periodic ditch clean-out activities that are associated with maintenance of the levee systems. Forested wetlands impacted by the project consist of typical wet floodplain forest plant communities dominated by soft-wooded tree species such as eastern cottonwood (*Populus deltoides*), box elder (*Acer negundo*), and silver maple (*Acer saccharinum*). Hard mast-producing tree species are generally not present in these affected forested wetlands. The open water areas affected by the project typically do not support any aquatic vegetation. Small areas in several intermittent or perennial streams would also be impacted. Proposed mitigation for unavoidable impacts is described briefly at the end of this section and in more detail in Appendix EA-MP to this document.

Wood River

About 27 acres of habitat impacts, more than half from the overall project, would occur within the Wood River Drainage and Levee District. Exhibit EA-44 provides details of the aquatic impacts. Impacts to open water systems are restricted to this levee system. At five sites where construction of graded filters is proposed in open water areas, no aquatic vegetation currently exists. Because of the lack of such vegetation, and because substrate elevations in these aquatic areas would be restored upon completion of construction, impacts to these five sites would be considered to be of a temporary nature rather than permanent. This determination was made after coordination with representatives of the U.S. Fish and Wildlife Service, and regulatory and environmental offices of the Corps of Engineers, St. Louis. Impacts to streams are also limited to this levee system. A description of the affected streams and associated impacts is provided on pages 6-7 of Appendix EA-MP to this document.

Exhibit EA-44. Direct impacts to aquatic habitats by proposed feature for the Wood River levee system.

Location	Proposed Feature	Site Name	Impacts (Acres)				
			Water	Wetlands			
			Stream	Open Water	Forested	Emergent	Farmed
Upper Wood River							
38+30 - 51+80	Graded filter	WLW302		*0.8	1.4		
44+00	Graded filter	WLS302a	<0.1				
121+00 - 129+00	Trench drain	WLW306			0.1		
127+00 - 134+30	Graded filter	WLW306a		*2.8			
143+00 - 153+00	Graded filter	WLW304			0.9		
216+00 - 221+00	Graded filter	WRLS100	0.1				
Lower Wood River							
132+50 - 151+00	Graded filter, trench drain	WLW329				4.0	
170+00 - 187+00	Graded filter, piezometers	WLW328		1.9			
185+40 - 189+10	Graded filter	WLW330				0.3	
195+00 - 199+00	Graded filter	WLW312				0.1	
225+00 - 236+00	Graded filter	WLP313		*4.4			
290+00, 550+00	Piezometers	WLW314				<0.1	
585+00 - 586+00	Required fill	WLW318					0.1
594+00 - 597+00	Seepage berm, graded filter	WLW319a		*0.6			
597+00 - 598+00	Seepage berm, graded filter	WLW319				0.1	
614+76 - 623+31	Graded filter	WLP321		*0.9			
642+50 - 645+00	Required fill	WLW323			0.1		
649+00 - 651+00	Required fill	WLW324			0.1		
652+00 - 659+00	Required fill	WLW322			0.4		
677+00 - 684+00	Bank protection	WRS399	0.5				
Wood River (Total 19.4)			**0.6**	**11.4**	**3.0**	**4.5**	**0.1**

Source: AMEC (2011).
* Impacts considered temporary and not permanent.

About 8 acres of floodplain forest that is not wetland would be impacted at several locations by the construction of graded filters and seepage berms (including random fills). The forested areas affected by graded filters are located in the upper portion of the levee system, and are located adjacent to wetlands identified as WRLS100, WLW330, and WLR302. Floodplain forest impacted by berms and fills is located in the lower portion of the levee system along the south flank levee in the vicinity of levee stations 631- 660. Like typical forested wetlands, these floodplain forest areas to be affected by construction are also of low quality, and because of the same types of disturbance as described above.

As shown in Exhibit EA-39, proposed construction would also affect an additional 21 acres with minimal to no habitat value. Much of this area is located within the existing levee right-of-way, and consists mainly of grassy turf and small developed areas. Old fields comprise a minor portion of this area, and they are typically located off of the existing right-of-way.

Indirect Impacts. The two cutoff walls proposed in the lower portion of the Wood River levee system at stations 151 - 159 and 162 - 170 are likely to indirectly impact groundwater hydrology of a relatively large aquatic area consisting of wetlands landside of the levee and adjacent to the confluence of the Mississippi River and Wood River Creek. During high river conditions, the proposed cutoff walls are expected to eliminate the movement of groundwater beneath the levee toward the land side, and aquatic habitats on the landside of the levee are expected to experience "drier" or less wet hydrological conditions. Existing mud flats are expected to be gradually replaced by shallow marshes and wet meadows. The elimination of underseepage during high river conditions is not expected to result in a conversion of aquatic habitats to terrestrial (non-wetland) habitats (USACE 2011). It is likely that groundwater surface elevations in the landside area would remain about two feet below the ground surface when the Mississippi River is below flood levels. Under these conditions, capillary fringe action of the soil (alluvial silts and clays on top of the underlying sands) would be expected to draw groundwater upward into the root zone of the existing wetland plant communities.

As such, the existing wetland area would likely meet the criterion of wetland hydrology by exhibiting inundation or saturation to the surface continuously for at least 5% of the growing season in most years (50% probability of recurrence) (USACE 2010a). As a result of less wet conditions in the ponding area, shifts in the abundance and spatial extent of several wetland plant communities are expected. The currently extensive mud flats are expected to diminish in area and be replaced by shallow marshes and wet meadows. Within wetland forest fringing these mudflats, the species composition of herbaceous ground cover is expected to gradually shift to slightly drier species. Surface wetland hydrology provided by local stormwater runoff is not expected to change, which can at times create temporary ponding in this wetland area up to about 10 feet deep. No mitigation for these indirect impacts is being proposed at this time.

MESD

About 5 acres of forested and emergent wetlands would be impacted by the proposed construction in the Metro East Sanitary District (Exhibit EA-45).

Exhibit EA-45. Direct impacts to aquatic habitats by proposed feature for the MESD levee system.

Location	Proposed Feature	Site Name	Impacts (Acres)	
			Wetlands	
			Forested	Emergent
255+00 - 259+00	Relief well, pump station	MESD1		<0.1
1113+50 – 1116+00	Relief wells	MLW203		<0.1
1245+00 - 1276+56	Graded filter, protection berm	MLW201d	3.3	
1293+00 - 1297+00	Riverside clay cap	MRW290		0.3
1316+50 - 1321+00	Graded filter	MESD3		0.2
1342+23 - 1344+95	Graded filter	MLW501	0.5	
Metro East Sanitary District (Total 4.3)			**3.8**	**0.5**

Source: AMEC (2011).

As shown in Exhibit EA-39, proposed construction would also affect an additional 21 acres of grassy, developed, and old field areas with minimal to no habitat value.

Prairie du Pont / Fish Lake

As shown in Exhibit EA-46, about 12 acres of wetlands in this levee system would be impacted by the proposal. Farmed wetlands adjacent to the levee are located at most of these proposed construction areas.

Exhibit EA-46. Direct impacts to aquatic habitats by proposed feature for the Prairie du Pont / Fish Lake levee system.

Location	Proposed Feature	Site Name	Impacts (Acres)	
			Wetlands	
			Emergent	Farmed
171+00 - 174+00	Seepage berm	PLW129		0.4
192+00 - 193+00	Seepage berm	PLW128		<0.1
196+00 - 200+00	Seepage berm, relief wells	PLW127	0.5	0.6
201+00 - 204+00	Seepage berm, relief wells	PLW126		1.9
211+00 - 214+00	Relief well	PLW125		<0.1

324+50 - 330+50	Clay cap	PLW123	0.3	
382+50 - 383+50	Clay cap	PRW122	<0.1	
432+00 - 442+50	Seepage berm, relief wells	PLW120		0.6
445+00 - 452+00	Seepage berm, relief wells	PLW117-119		2.2
497+00 - 511+00	Seepage berm, relief wells	PLW115		3.6
530+00 - 534+00	Seepage berm	PLW112		0.8
564+00 - 576+00	Relief wells	PLW111		<0.1
587+00 - 590+00	Seepage berm	PLW110		1.4
605+00 – 607+00	Relief wells	PLW107		<0.1
608+00 – 611+00	Relief wells	PLW106		<0.1
615+00 – 616+00	Relief wells	PLW105		<0.1
654+00 – 655+00	Relief wells	PLW104		<0.1
683+00 – 687+00	Relief wells	PLW103		<0.1
Prairie du Pont / Fish Lake (Total 12.3)			**0.8**	**11.5**

Source: AMEC (2011).

As shown in Exhibit EA-39, proposed construction would also affect an additional 10 acres of grassy, developed, and old field areas with minimal to no habitat value.

Mitigation

Following the requirements of the Clean Water Act, AMEC Environment & Infrastructure, Inc., on behalf of the Southwestern Illinois Flood Prevention District Council, has taken all appropriate and practicable steps to first avoid impacts to aquatic resources, then to minimize potential impacts, and as a last resort to mitigate for unavoidable impacts. According to AMEC (2011), "Permanent impacts to wetlands were avoided by selecting relief wells as the preferred solution as long as they were considered an adequate solution. Additional wetland impacts were reduced or avoided by selecting toe drains or cutoff walls instead of seepage berms at several locations along the levee system." As a result of selection of those features with lesser wetland impacts, avoided wetland impacts consist of about 35 acres in the lower portion of the Wood River levee system, and about 20 avoided wetlands in the Prairie du Pont levee system.

As the project would require authorization under Sections 401 and 404 of the Clean Water Act, a Section 404(b)(1) Guidelines Evaluation is included as Appendix EA-404 to this document.

The proposed action would result in about 26.1 acres of permanent unavoidable impacts to wetlands (waters of the U.S.), consisting of 1.9 acres of open water wetlands, 6.8 acres of

forested wetlands, 5.8 acres of herbaceous wetlands, and 11.6 acres of farmed wetlands. It would also result in a permanent loss of about 0.6 acres of streams. A mitigation plan is proposed as part of the levee improvement project to compensate for these losses. This mitigation plan would create about 48 acres of replacement wetlands, and provide 2,869 stream mitigation credits at a yet to be determined location on the Mississippi River floodplain within the project area. This conceptual plan is presented as Appendix EA-MP to this document.

The currently proposed project reflects the 60% design phase, and construction requirements for features such as borrow areas, staging areas, and disposal areas have yet to be identified. Coordination with federal and state resource agencies will continue through the remainder of the design process.

Based on current information, the direct and indirect impacts described in this section, along with the inclusion of the mitigation plan as part of the proposed action, would not have a significant impact on biological resources.

4.15. Bald Eagle (*Haliaeetus leucocephalus*)

Wood River, MESD, and Prairie du Pont/Fish Lake

The bald eagle was removed from the List of Endangered and Threatened Species in August 2007 but it continues to be protected under the Bald and Golden Eagle Protection Act and by the Migratory Bird Treaty Act. Recommendations to minimize potential project impacts to the bird and its nest are provided by the U.S. Fish and Wildlife Service in that agency's National Bald Eagle Management Guidelines publication (USFWS, 2010b). Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. Specifically, construction activity is prohibited within 660 feet of an active nest during the nesting season, which in the Midwest is generally from late January through late July.

There is one known nest in the vicinity of the Wood River levee system and Mel Price Locks and Dam. It was last used in 2006.

The IDNR EcoCAT Natural Heritage Database identified the potential presence of the bald eagle towards the northern portion of the Prairie du Pont Levee, near the Mississippi River. A Planning Aid Letter (PAL) dated 21 April 2009 from the U.S. Fish and Wildlife Service, Marion, Illinois, Suboffice (ES) to the U.S. Army Corps of Engineers, St. Louis District also identified a potential bald eagle nest at the lower end of Arsenal Island.

Bald eagles could potentially nest anywhere in or near the project area where large trees occur. The proposed project would follow the National Bald Eagle Management (NBEM) Guidelines (http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf).

4.16. Threatened and Endangered Species

Wood River, MESD, and Prairie du Pont/Fish Lake

Coordination with the USFWS and IDNR concerning federally and/or state threatened or endangered species currently classified or proposed for classification that may occur in the vicinity of the levee project have been conducted. Habitats within the project area include farmland, forested uplands, forested and non-forested wetlands, and disturbed areas. Impacts to listed species potentially occurring within the proposed project area are discussed below.

Gray bat. The project area contains no caves or mines; therefore, this species is not likely to occur in the project area. AMEC has determined that the project poses "no effect" to the gray bat.

Indiana bat. Extensive tree clearing activities are not anticipated. However, to avoid impacting this species, tree clearing activities should not occur during the period of 1 April to 30 September. In the event that it is necessary to clear trees during this time frame, mist net surveys would be conducted to determine if Indiana bats are present, and the USFWS would be consulted. The SIFPDC will continue to coordinate with the USFWS to ensure that the Indiana bat in not adversely affected by the project. AMEC has determined that the proposed project "may affect but is not likely to adversely affect" the Indiana bat.

Peregrine falcon. In Illinois, breeding is presently restricted to buildings, bridges and other man-made structures in the Chicago and St. Louis metropolitan areas. No impact is expected.

Least tern. Since the project area does not contain least tern nesting or adjacent foraging habitat, AMEC has determined that the project poses "no effect" to the least tern.

Lake Sturgeon. Since the project area does not include the Mississippi River or contain lake sturgeon habitat. No impact to this species is expected.

Western sand darter. The western sand darter is restricted to sandy runs of medium to large rivers. This species is not known to occur in the project area and no impacts are expected.

Gravel chub. This species historically occurred in the Mississippi River, but the latest occurrence within one mile of the project area was recorded in 1963. In Illinois the most recent reports of this species are from the Rock River system in northwestern Illinois and a recent record from the Wabash drainage in southeastern Illinois (Nyboer et al. 2006). Therefore, this species is not expected to occur in the project area.

Pallid sturgeon. This species uses aquatic habitats throughout this portion of the Upper Mississippi River. This species is not expected to occur within the project area and therefore AMEC has determined that the project poses "no effect" to the pallid sturgeon.

Illinois chorus frog. Habitat includes open sandy areas of river lowlands. Ideal habitat of this type is available on the central Illinois sand prairies, adjacent to the Illinois River. These frogs are fossorial and seldom seen except during the February-April breeding season. The Illinois

Natural Heritage database has an element occurrence along the Wood River Levee system from approximately Station 551+00 to Station 563+00. This occurrence was the result of a survey in March of 1998. No impact to this species is expected.

Eastern massasauga rattlesnake. Habitat includes shrub wetlands. This species also lives in wet prairies, marshes, and low areas along rivers and lakes. This species is not known to occur in the project area. Thus, AMEC has determined that the project poses "no effect" to the eastern massasauga rattlesnake.

Lined snake. This secretive and semifossorial nocturnal snake subsists almost entirely on earthworms. In Illinois it occurs in grasslands and urban lots in former prairie lands, where it is found under rocks, logs, leaves, boards, and other debris. Based on the Natural Heritage database, the last recorded observation of this species within a mile of the project area is from 1965. No impact to this species is expected.

Spectaclecase mussel. Habitat includes shallow areas in larger rivers and streams. This species is not expected to occur within the project area and thus AMEC has determined that the project poses "no effect" to the spectaclecase mussel.

Butterfly mussel. Found in large rivers in sand or gravel. This species is not expected to occur within the project area and no excavation of river sediments is proposed. No impact to this species is expected.

Ebonyshell mussel. Habitat includes large rivers in sand and gravel substrates with swift currents. This species is not expected to occur within the project area and no excavation of river sediments is proposed. No impact to this species is expected.

Black sandshell mussel. Habitat includes medium to large rivers where it occurs in riffles or raceways in gravel or firm sand This species is not expected to occur within the project area and no excavation of river sediments is proposed. No impact to this species is expected.

Illinois cave amphipod. Habitat includes karst caves and streams. It is currently known to occur in only a few cave streams of the Illinois sinkhole plain in southwestern Illinois. This species is not expected to occur within the project area, thus AMEC has determined that the project poses "no effect" to the Illinois cave amphipod.

Decurrent false aster. Habitat includes disturbed alluvial soils of the Mississippi floodplain. This species has not been recorded within a mile of the project area. However, the SIFPDC will continue to coordinate with the USFWS to ensure that this species is not adversely affected. The SIFPDC will implement required pre-construction surveys within appropriate habitat, if required by the USFWS. AMEC has determined that the project "may affect but is not likely to adversely affect" the decurrent false aster.

Eastern prairie fringed orchid. Habitat includes mesic and wet prairies. This species has not been recorded within a mile of the project area and was not observed during wetland delineations of the project area. Additionally, no remnant wet prairies were identified within the project areas.

This species is not expected to occur within the project area. AMEC has determined that the project poses “no effect" to the eastern prairie fringed orchid.

Spring ladies' tresses. Habitat includes acidic soils in prairies and old fields. No impact to this species is expected.

4.17. Relationship of the Proposed Project to Land-Use Plans

The proposed project, which is to restore a fully functional flood protection project for the Wood River, Metro East, Prairie du Pont, and Fish Lake floodplain areas, is consistent with the original purpose of the projects and the need to protect a relatively large urbanizing area from Mississippi River flooding.

4.18. Adverse Effects Which Cannot Be Avoided

There are unavoidable impacts associated with the proposed action. About 26.1 acres of various wildlife habitats would be lost, including 6.8 acres of forested wetlands, 5.8 acres of emergent wetlands, 11.6 acres of farmed wetlands, and 1.9 acres of open water wetlands, as well as 0.6 acres of streams. About 50 acres of various prime farmland soils would be converted to nonagricultural use. Other unavoidable impacts include noise and exhaust generated by heavy equipment during construction. Groundwater flow conditions would be altered in areas where cutoff wall construction is proposed. In addition to acting as barriers to groundwater movement, these features could give rise to groundwater mounding on the landside of the cutoff wall during low or normal river flows and the creation of localized groundwater gradients that may trend perpendicular to the walls. HTRW contamination may be encountered in soils and groundwater during construction at certain locations along the Wood River and MESD levee systems.

4.19. Short-Term Use versus Long-Term Productivity

The proposed action does not represent a short-term use of the environment, but a long-term or permanent solution to underseepage and rehabilitation problems of levee systems that require corrective measures. These levee problems raise the risk of levee failure and resulting catastrophic damage to property and infrastructure, and disruption of the livelihoods of many people. The areas of impact, for the most part, are within the existing levee right of way, but some proposed features lie outside and would affect various natural habitats and agricultural land, as well as some sites yet to be determined.

4.20. Irreversible or Irretrievable Resource Commitments

Irreversible or irretrievable resource commitments that have occurred to date include those associated with the acquisition of geotechnical data for the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems, the development of alternative underseepage solutions, and the

preparation of planning and engineering reports and environmental compliance documents in support of the proposed action.

4.21. Cumulative Impacts

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR Section 1508.7). Cumulative effects are defined as, "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

The Council on Environmental Quality (CEQ) issued a manual entitled "Considering Cumulative Effects under the National Environmental Policy Act". The manual details and 11 step procedure for addressing cumulative impact analysis. The 11 step procedure is broken down into three main components – scoping, describing the affected environment and determining the environmental consequences. Much of the information used in the following discussion is taken from USACE (2003).

Scoping: Past, Present and Future Actions:
Flood control or flood damage reduction activities in the Metro East area began soon after European settlement. Initial attempts to keep Mississippi River floodwaters out of the area were unsuccessful because early levees were relatively low and constructed in a piece-meal fashion. Earthen embankments constructed to bear a system of railroad tracks that converged on East St. Louis from different directions proved more effective. Flood control activities in the area between the river and bluff, interior to riverside levees, began with minor ditch systems to drain low areas of ponded water. About 90 years ago, Cahokia Creek, which entered what is now the lower portion of the Wood River levee district, was diverted from its historic course to the Mississippi River using a shorter man-made route (Cahokia Creek Diversion Channel). The existing urban river front levee built about 50 years ago has protected the bottoms from Mississippi River overflows.

The Wood River Levee and Drainage District – Lock and Dam No. 26 Replacement project completed in the late 1980s included relocation and increase in the size of the Alton pump station by constructing East Alton No .1 pump station, main drainage ditch modification, access road construction, replacement of relief wells, and construction of seepage conveyance channels. According to the EA (USACE, 1986), a total of 48.5 acres of terrestrial/wetland habitat were to be impacted by construction activities. A total of 19.2 acres of woody and 29.3 acres of herbaceous vegetation were to be cleared. Of this acreage, 6 acres was to be permanently lost by construction of the pump station, parking lot, concrete seepage conveyance channels and relief wells. The remaining 42.5 acres were expected to revegetate soon after construction was complete.

The Grassy Lake pump station in the lower portion of the Wood River levee district was constructed in 2007. This small facility did not impact any significant natural resources (USACE, 1998).

The Corps ongoing Wood River Levee System Reconstruction Project is intended to rehabilitate the riverfront and flank systems that have protected the area from river overflow and interior flooding for many years. The project includes replacing 163 of 170 existing relief wells and installing 60 new relief wells as a deficiency correction under the existing project authorization. Additional reconstruction and replacement is proposed for various components of 26 closure structures, 38 gravity drains, and 7 pump stations. These recommended actions are required to maintain the system's authorized level of protection. The EA for this project stated that no significant impacts were anticipated on natural resources, including fish and wildlife and forest resources (USACE, 2005).

The Design Deficiency Corrections for the East St. Louis, Illinois, Flood Protection Project would correct deficiencies or flaws in the levee system's underseepage and through-seepage designs. Major features of the approved recommended plan include 369 new relief wells; 2,410 linear feet of seepage berms; 12,300 linear feet of slurry trench cutoff wall through the levee and to bedrock; 2,640 linear feet of shallow (40 ft deep) cutoff wall at the riverside levee toe; 3,640 linear feet of clay filled cutoff trench; and 1,320 linear feet of 5 foot thick riverside clay blanket. The EA for this project described direct losses of about 8.6 acres of habitats, including about 7.7 acres of emergent and forested wetlands and about 0.9 acres of bottomland forest. With the inclusion of a compensatory mitigation plan as part of the overall plan, the EA also stated these direct impacts would not have a significant impact on biological resources (USACE, 2010c, 2011a).

The Design Deficiency Corrections for the Wood River Levee System, Madison County, Illinois would correct deficiencies in the levee system's underseepage and through-seepage designs. Major features of the approved recommended plan include 94 new relief wells; two small pump stations; 815 linear feet of seepage berms; 1,010 linear feet of landside clay fill; 2,910 linear feet of slurry trench cutoff wall at the riverside levee toe and to bedrock (140 ft deep); 1,060 linear feet of slurry trench cutoff wall (100 ft deep) at the riverside levee toe; 2,875 linear feet of slurry trench cutoff wall (25 ft deep) at the riverside levee toe. The Supplemental EA for this project described habitat losses of about 2.6 acres of emergent wetlands, 0.3 acres of forested wetlands, and 2.1 acres of bottomland hardwood forest (nonwetland floodplain forest). With the inclusion of a compensatory mitigation plan as part of the overall plan, the SEA also stated these direct impacts would not have a significant impact on biological resources (USACE, 2011b).

Probable future projects associated with flood risk reduction in the project area would include a Corps proposal to correct design deficiency corrections to the Prairie du Pont - Fish Lake, Illinois, Flood Protection Project. Future ecosystem restoration projects are possible (USACE, 2003), but most likely would involve small-scale habitat restoration projects. Such projects most likely would not make any large-scale changes to existing interior flood control features on the protected side of these levee systems.

Scoping: Geographic and Spatial Boundary
The geographic limits for this analysis include the areas protected by the Wood River, MESD, and Prairie du Pont / Fish Lake levee systems in Madison, St. Clair, and Monroe counties. To

establish the temporal frame for analysis, the most commonly used practice is the length of the project life. The project life for this design deficiency corrections project is 50 years.

Identification of Affected Environment
The essential components of determining the affected environment is the characterization of stressors and defining the baseline of the environment. Stressors result from natural events or human actions that cause a subsequent population, community or ecosystems level response. The goal of characterizing stressors is to determine whether the resources, ecosystems and human communities of concern are approaching conditions where additional stresses will have an important cumulative effect (CEQ, 2010). Generally, those occurring for a short duration at a localized site, such as the proposed design deficiency corrections project, are of less concern than those occurring for an extended time over a wide geographical region.

As a result of development over the last two centuries, the levee protected area is a major part of the second largest concentration of residential, commercial, and industrial land use on the Mississippi River floodplain, after New Orleans. The primary water and land resource problems of the levee protected area include ecosystem degradation, sedimentation from hillside tributaries, and recurring interior flooding. Ecosystem degradation is characterized by: the loss of biodiversity and the fragmentation of natural systems caused primarily by intensive urbanization over the years; the loss of historic ecosystem disturbances such as natural flooding and wildfires; the loss of habitat quality; and the degradation of tributary stream resources due to development in the adjacent uplands.

In 2000, Madison County passed a 100-year stormwater control ordinance requiring new development to incorporate post-construction measures to temporarily detain runoff onsite, up to and including the 100-year storm, with release of stormwater to the local watershed at a rate no greater than that of preconstruction conditions. The Federal Emergency Management Agency, acting through local counties, bought out some flood-damaged properties after flooding in the mid-1990s. Finally, the Metro East Regional Storm Water Committee issued in 2000 a framework for coordinated storm water work in the Metro East.

The existing land use planning strategy in Madison and St. Clair counties can be summarized as follows: conserve agricultural lands; diversify employment opportunities; give the environment consideration in land use decisions; ensure housing availability; manage growth in a sensible manner; utilize best management conservation practices; provide open space and recreational opportunities; and provide a safe, efficient, and compatible transportation system.

Description of Environmental Consequences
For the AMEC proposed action, key stressors of concern include changes to land cover or land use, natural habitats, and water quality. These stressors act to reduce environmental quality within the levee protected area and decrease the overall quality of life.

The proposed project would not affect sediment transport dynamics between the upland-floodplain interface. In the lower Wood River levee system, the hydrologic regime of a 75-acre wetland complex adjacent to the levee system would experience a minor reduction in groundwater recharge due to the installation of a cutoff wall down to bedrock. The

implementation of best management practices for the protection of water quality at project construction sites is expected to give rise to localized temporary adverse effects. A project-induced loss of about 26 acres of various habitats along with establishment of mitigation within the local watershed to compensate for this loss is not expected to contribute to an ongoing long-term spatial decline in natural areas due to floodplain development.

5. ISSUES AND CONCERNS

5.1. Potential for Fill Activities in Surface Waters and Wetlands Subject to Section 404 of Clean Water Act

Clean fill materials may need to be placed into wetlands during the creation of the seepage berms and to create work pads in association with the placement of new relief wells, if conditions are wet at the time of construction. A Section 404 permit review process is required through the Corps Regulatory Branch as well as a Section 401 Water Quality Certification review process through IEPA. Both processes would be required before any fill activities can take place in association with the project. Permits may be required from IDNR, Office of Water Resources for construction activities within waterways and design plans should be coordinated through their offices.

Any need for borrow or dredged material should be coordinated with the USACE Regulatory and Environmental leads relative to permit and endangered species issues. Additional Section 404 and 401 review could be required for these activities. A Section 10 permit and 404 permit review would be required for any dredging necessary for the project.

A 404(b)(1) document is attached as Appendix EA-404.

5.2. Hazardous, Toxic, and Radioactive Waste

AMEC is proposing levee improvements in the vicinity of known areas of contamination in the Wood River and MESD levee systems. To prevent the potential spread of any contaminated materials, AMEC has developed environmental/hazmat protocols to be used during construction activities in these areas. AMEC is currently working with regulatory agencies and other parties in an effort to fully understand the nature and extent of contamination in these areas of concern and attempt to mitigate project impacts. At the present time, there is a potential once construction is complete for proposed relief wells and similar features at these locations to carry contaminated groundwater to the ground service.

6. RELEVANT LAWS AND REGULATIONS

All 408 actions must be in full compliance with all applicable Public laws, executive orders, rules and regulations, treaties, and other policy statements of the Federal government and all plans and constitutions, laws, directives, resolutions, gubernatorial directives, and other policy statements of States with jurisdiction in the planning area. At a minimum, the permit request will include a discussion of the following:

National Environmental Policy Act, as amended. The completion of the EA and signing of the Finding of No Significant Impact (FONSI) would fulfill NEPA compliance. The environmental assessment is accompanies this permit application. A draft version of the unsigned FONSI is provided at the end of this document. The FONSI will be finalized and signed into effect only after having carefully considered all comments on the environmental effects of this project. The FONSI will be signed prior to approval of this permit (irreversible and irretrievable commitment of resources).

Endangered Species Act of 1973. The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide a program for the conservation of such endangered species and threatened species (16 U.S.C. 1531). It establishes a policy that all Federal departments and agencies seek to conserve endangered species and threatened species and utilize their authorities in furtherance of the purposes of this Act (16 U.S.C. 1531 and 1536). Section 7 (16 U.S.C. 1536) states that all Federal departments and agencies shall, in consultation with and with the assistance of the Secretary of the Interior/Commerce, insure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary (Interior/Commerce)to be critical, unless an exception has been granted by the Endangered Species Committee (16 U.S.C.1536(a)(2)).

Compliance with Section 7(c) of the Endangered Species Act of 1973 is covered in Sections 3.16 and 4.16 of this EA. AMEC has coordinated with the USFWS concerning federally threatened or endangered species currently classified or proposed for classification that may occur in the vicinity of the Wood River, MESD, and Prairie du Pont / Fish Lake Levee Districts. In the event that any listed species are detected during proposed project actions, the USFWS would be contacted immediately and consultation would be re-initiated.

Fish and Wildlife Coordination Act, as amended. AMEC project plans for the project areas have been coordinated with the USFWS and the IDNR. All USFWS and IDNR comments will be considered with great weight. Compliance will be achieved after both agencies have reviewed this document and a final Coordination Act Report or a letter from FWS stating that a Coordination Act Report is not required is received.

Marine Protection, Research, and Sanctuaries Act of 1972. The Act regulates the dumping of materials into ocean waters. It prevents, or restricts, dumping of materials that would degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. The Act provides for a permitting process to control the ocean dumping

of dredged material. The Act also establishes the marine sanctuaries program, which designates certain areas of the ocean waters as sanctuaries in order to preserve or restore these areas for their conservation, recreational, ecological, or aesthetic values. This Act does not apply to this project since dumping of materials into ocean waters will not occur.

Wild and Scenic Rivers Act. The Act establishes the policy that certain rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations (16 U.S.C. 1271). The Act both identifies specific river reaches for designation as wild or scenic, and provides criteria to be used for classifying additional river reaches (16 U.S.C. 1272). "Wild river areas" are those rivers or sections of rivers that are free from impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent the vestiges of primitive America. "Scenic river areas" are those rivers or sections of rivers that are free from impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. "Recreational river areas" are those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. (16 U.S.C. 1273). This Act does not apply to this project since there are no designated wild or scenic rivers in the proposed project areas.

Coastal Zone Management Act of 1972. The Act (as amended) establishes a policy: 1) to preserve, protect, develop and where possible, restore and enhance the resources of the Nation's coastal zone for current and future generations; and, 2) to encourage and assist states in their responsibilities in the coastal zone through development and implementation management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values, as well as the needs for compatible economic development (16 U.S.C. 1452). This Act does not apply to this project since there are no coastal zones in the proposed project areas.

Clean Air Act, as amended. The purpose of this Act is to protect public health and welfare by the control of air pollution at its source, and to set forth primary and secondary National Ambient Air Quality Standards (NAAQS) to establish criteria for States to attain, or maintain, these minimum standards. The U.S. Environmental Protection Agency (EPA) has identified standards for seven pollutants: lead, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, particulate matter less than 10 microns in diameter, and particulate matter less than 2.5 microns.

Air Quality is covered in Sections 3.3 and 4.3 of this EA. Madison, St. Clair, and Monroe counties are in attainment for most pollutants, including sulfur dioxide, carbon monoxide, nitrogen dioxide, and lead. However, a small area in Granite City, Illinois, is classified as nonattainment for lead 2008 (USEPA, 2010). The counties are considered a "moderate" nonattainment area for the 8-hour ozone standard, and a nonattainment area for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). No aspects of the proposed project have been identified that would result in violations of air quality standards.

HTRW. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), amended by Superfund Amendments and Reauthorization Act of 1986 (SARA); Resource Conservation and Recovery Act of 1976; Toxic Substances Control Act.

CERCLA (PL 96-510), as amended by SARA of 1986 (PL 99-499), provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and cleanup of inactive hazardous substances disposal sites.

The Resource Conservation and Recovery Act of 1976 governs the disposal of solid waste. Subtitle D of the Act, as amended November 1984 (42 U.S.C. 6941-6949a), establishes Federal standards and requirements for state and regional solid waste authorities. The objectives of this subtitle are to assist in developing and encouraging methods for the disposal of solid waste which are environmentally sound and which maximize the utilization of valuable resources recovered from solid wastes.

The Toxic Substances Control, as last amended in 1986, is the Federal legislation which deals with the control of toxic substances. The Act consists of three subchapters, one of which regulates the control of toxic substances (such as polychlorinated biphenyls (PCBs)), another governs asbestos hazard emergency response, and another subchapter regulates indoor radon abatement.

HTRW is covered in Sections 3.6 and 4.6 of this EA. Phase I Environmental Site Assessments were conducted for each levee district in the proposed project. The work was performed in accordance with ASTM E-1527; *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment (ESA) Process.* Recognized environmental conditions occur in both the Wood River and MESD proposed project areas. Coordination with regulatory agencies is ongoing in an effort to fully understand the nature and extent of contamination in the area and attempt to avoid or mitigate project impacts.

National Historic Preservation Act of 1966. The Act establishes preservation as a national policy and directs the Federal government to provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Preservation is defined as the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, or engineering.

Cultural resources are covered in Sections 3.12 and 4.12 of this EA. Full compliance will be attained after all required archaeological investigations, reports and coordination have been completed.

Noise Control Act of 1972. This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. To accomplish this, the Act establishes a means for the coordination of Federal research and activities in noise control, authorizes the establishment of Federal noise emissions standards for products distributed in commerce, and provides information to the public respecting the noise emission and noise reduction characteristics of such products (42 U.S.C. 4901). Each Federal agency is required to limit noise emissions to within compliance levels.

Noise is covered in Sections 3.8 and 4.8 of this EA. Noise is usually defined as "unwanted sound", and is recognized as an environmental pollutant that can interfere with communication, work, rest, recreation, and sleep. Project construction would generate a temporary increase in noise levels. Common construction equipment for this project generate noise levels of approximately 65 - 95 dBA. After construction completion, it is anticipated that noise levels would return to pre-construction conditions.

Executive Orders

Floodplain Management, Executive Order 11988. Under this Executive Order, Federal agencies shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Engineer Regulation 1165-2-26 states:

The Corps is required to provide leadership and take action to

- Avoid development in the base flood plain unless it is the only practicable alternative;
- Reduce the hazard and risk associated with floods;
- Restore and preserve the natural and beneficial values of the base flood plain.

The Corps is required to follow the general procedures listed below to address the requirements of Executive Order 11988:

Step 1. Determine if a proposed action is in the base floodplain.

The Wood River Levee and Drainage District, Metro East Sanitary District, Prairie du Pont Sanitary and Levee District, and the Fish Lake Drainage and Levee District are in the base flood plain of the Mississippi River. Together with the federally owned Chain of Rocks levee, they protect approximately 110,590 flood plain acres.

Step 2. If the action is in the base flood plain, identify and evaluate practicable alternatives to the action or to location of the action in the base flood plain.

Due to the nature of this project, there are no alternatives located outside of the base flood plain. The project involves rehabilitation and reconstruction of flood control systems that are already in place. Therefore all alternatives are located within the base flood plain.

Step 3. If the action must be in the flood plain, advise the general public in the affected area and obtain their views and comments.

The general public has been advised about the project and their views and comments have been requested as part of the project's public review process. The Draft Environmental Assessment (EA) will be submitted for a 30-day agency review. The comments will be addressed in the Final EA.

Step 4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial flood plain values. Where actions proposed to be located outside the base flood plain will affect the base flood plain, impacts resulting from these actions should also be identified.

Beneficial and adverse impacts have been described in this Environmental Assessment. No actions are proposed outside the base flood plain that would affect the base flood plain.

Step 5. If the action is likely to induce development in the base flood plain, determine if a practicable non-flood plain alternative for the development exists.

Improvements to the existing flood protection system are not likely to induce development in the base flood plain beyond what is already planned.

Step 6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative.

The "no action" alternative of doing nothing to fix the existing flood control systems is possible, but it would not address the problems facing the systems and the risk to life, property, and potential environmental contamination of the floodplain and river that would result from flooding if the systems were not to perform adequately. The most viable method to minimize adverse impacts is to implement the reconstruction project.

Step 7. If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings.

The Corps of Engineers has advised the general public in the affected area through the public review process.

Step 8. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order.

Alternative 2 – Levee Improvement Project (Proposed Action) is recommended as the plan most responsive to the planning objectives.

6.1. Relationship of Plan to Environmental Requirements

The alternatives within this review were subject to compliance review with all applicable environmental regulations and guidelines (Exhibit EA-47).

Exhibit EA-47. Federal policy compliance status.

Guidance	Degree of Compliance
Federal Statutes	
Archaeological and Historic Preservation Act, as Amended, 16 U.S.C. 469, et seq.	PC[1]
Bald and Golden Eagle Protection Act, 42 USC 4151-4157	FC
Clean Air Act, as Amended, 42 U.S.C. 7609	FC
Clean Water Act, as Amended 33 U.S.C. 466 et seq.	PC[2]
Coastal Zone Management Act of 1972, 16 U.S.C. 1451-1464	N/A
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), amended by Superfund Amendments and Reauthorization Act of 1986 (SARA)	FC
Endangered Species Act, as Amended, 16 U.S.C. 1531. et seq.	PC[2]
Farmland Protection Policy Act, 7 U.S.C. 4201, et seq.	PC[2]
Federal Water Project Recreation Act, as Amended. 16 U.S.C. 4601, et seq.	FC
Fish and Wildlife Coordination Act, as Amended, 16 U.S.C. 4601, et seq.	PC[2]
Land and Water Conservation Fund Act, as Amended, 16 U.S.C. 4601, et seq.	FC
National Environmental Policy Act, as Amended, 42 U.S.C. 4321, et seq.	PC
National Historic Preservation Act, as Amended, 16 U.S.C. 470a, et seq.	PC[1]
Noise Control Act of 1972, 42 U.S.C. 4901 to 4918	
Marine Protection, Research, and Sanctuaries Act of 1972, 33 U.S.C. 1401- 1445; 16 U.S.C. 1431 et seq; also 33 U.S.C. 1271	N/A
Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq	FC
Water Resources Development Acts of 1986, 1990, 2000 and 2007	
Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq.	N/A
Executive Orders	
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, EO 12898	FC
Floodplain Management, E.O. 11988 as amended by E.O. 12148	FC
Protection of Wetlands, E.O 11990 as amended by E.O. 12608	FC
Protection and Enhancement of the Cultural Environment, E.O. 11593	PC[1]
Protection of Migratory Birds, EO 13186	FC
Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, CEQ Memorandum, August 11, 1980.	PC[2]

FC = Full Compliance, N/A = Not Applicable, PC = Partial Compliance.

1. Full compliance will be attained after all required archaeological investigations, reports and coordination have been completed.
2. Full compliance will be attained upon completion of any permitting requirements or coordination with other agencies.

The National Environmental Policy Act (NEPA) process would continue once any required stockpile areas, borrow areas, disposal areas, and specific mitigation site(s) are identified. A Supplemental Environmental Assessment would be prepared and circulated to fulfill this requirement for public disclosure and involvement. Coordination will continue with the U.S. Fish and Wildlife Service, Illinois Department of Natural Resources, Natural Resources Conservation Service, Illinois Department of Agriculture, and Illinois State Historic Preservation Office.

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8. ENVIRONMENTAL ASSESSMENT PREPARERS

The staff members responsible for preparing this document are as follows:

Dr. Teri Allen, Aquatic Ecologist
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Role: EA Coordinator, Environmental Impact Analysis, Endangered Species, NEPA and Environmental Compliance

Mr. Rick Archeski, Environmental Engineer
Experience: 11 years USFWS, 10 years US Army, 10 years Environmental Quality Branch, St. Louis District
Role: Hazardous, Toxic, and Radioactive Wastes Compliance

Mr. James E. Barnes, District Archaeologist
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Role: Historic Properties Compliance

Mr. Tim George, Ecologist
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Mr. Mike Henry, Industrial Hygienist
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Mr. Dan Linkowski, Economist
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Ms. Erin Marks, Student Trainee Geographer
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Mr. Brandon Schneider, Biologist
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9. COORDINATION, DISTRIBUTION LIST, PUBLIC VIEWS, AND RESPONSES

Notification of this Environmental Assessment and Unsigned Finding of No Significant Impact will be sent to the following officials, agencies, organizations, and individuals for review and comment. All associated letters, comments, and responses will be filed with the final document.

To assure compliance with the National Environmental Policy Act, Endangered Species Act and other applicable environmental laws and regulations, coordination with these agencies would continue as required throughout the design phase of the proposed project.

In addition to the Corps of Engineers, St, Louis District, AMEC has initiated environmental compliance coordination with various federal and state agencies. A list of federally listed species for the project area was requested from the U.S. Fish and Wildlife Service in Marion, IL, which responded by letter dated June 27, 2011.

With regard to HTRW issues, AMEC has contacted Ms. Stephanie Linebaugh and Mr. Ken Bardo of the U.S. Environmental Protection Agency to gain additional information with regard to the status of investigation, corrective actions, and environmental impacts for Sauget Areas 1 and 2, Krummrich Vicinity - Sauget, IL (EDR Sites #93, 94, 96, Orphan). AMEC has also been coordinating with the Illinois Environmental Protection Agency to identify acceptable protocols for handling contaminated soils and groundwater.

With regard to compliance with Section 106 of the National Historic Preservation Act, AMEC has conducted background research on archaeological site files and survey reports located at the Illinois Historic Preservation Agency (IHPA) and the Illinois State Museum Research and Collections Center in Springfield, Illinois, and has begun discussions with the IHPA on procedures required for attaining 106 compliance.

9.1. Distribution List

The Draft Environmental Assessment and Unsigned Finding of No Significant Impact will be sent to the following elected officials, agencies, organizations and individuals for review and comment. All responses will be filed with this document.

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Edwardsville, IL 62025

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Alton, IL 62002

FINDING OF NO SIGNIFICANT IMPACT

SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT
MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

I. I have reviewed and evaluated the documents concerning the proposed Southwestern Illinois Levee Improvement Project, located in Madison, St. Clair and Monroe counties, Illinois. The project involves installation of approximately 181 new relief wells; converting approximately 70 existing relief wells to T-type wells which discharge below ground surface into a collector system; four cut-off walls; 10 clay caps; 18 graded filters (one with a protection berm); two trench drains; seven gravity drains; 12 pump stations (10 with outfalls, 1 with a French drain); 97 new or retrofitted piezometers; 2 toe drains; repair or abandon one relief well; sleeve 2 relief wells; place 24" riprap along approximately 780' of Indian Creek; construct approximately 63 acres of seepage berms; utility and road relocations; and easements for berms, relief wells in locations with no existing wells, flowage areas and environmental mitigation areas. Borrow material would be obtained from commercial sources. Specific locations have yet to be identified for some required features including staging and disposal areas, access routes, and wetland mitigation.

The levee systems serve the communities of Alton, East Alton, Wood River, Hartford, Roxana, South Roxana, Bethalto, East St. Louis, Granite City, Cahokia, Sauget, Dupo and East Carondelet, protecting a population of nearly 300,000. The Metro East levee systems also provide protection for several major roadways, including Interstate 255, U.S. Highway 50, and Illinois Routes 3, 111, and 143, as well as several railways. Numerous farms, residential structures, petrochemical and commercial industrial complexes valued in excess of 4.3 billion dollars are located throughout the interior portion of the levee systems.

II. As part of this evaluation, I have considered impacts to existing resources with:

a). Alternative 1 – No Action (future without Proposed Action)
b). Alternative 2 – Levee Improvement Project (Proposed Action)

III. The possible consequences of these alternatives have been studied for physical, environmental, cultural, social and economic effects. Significant factors evaluated as part of my review include:

a. The proposed action is selected because it provides an engineering solution to the problem in concert with the preservation of the environment.

b. *Safety and Socioeconomics*. Considerable safety and socioeconomic resource benefits would accrue as a result of the project. Catastrophic failure of the levees would cause considerable catastrophic damages to commercial/heavy industrial development, environmental and agricultural losses, spread of hazardous and toxic wastes, and could lead to significant loss of life among the 300,000 mainly low income people protected by the levees.

c. *Topography and Geology.* Where random fills and seepage berms are proposed, topography would be altered to a minor degree. Ground elevations would be permanently raised. Existing ground elevations would be maintained or restored after

construction at all design reaches where graded filters and clay caps are proposed. Installation of relief wells would not cause any changes to topography.

d. *Land Cover*. Project features to be constructed off of existing levee right-of-way will affect the following land cover types, resulting in a conversion to grassy turf at most locations: 8.1 acres of trees, 34.6 acres of farmland, 10.9 acres of open water, and 25.1 acres of wetlands. About 52.5 acres of existing grassy or developed right-of-way would also be affected.

e. *Air Quality*. With respect to air quality, exhaust and dust from construction activities will have minor short term effects. Care will be taken to minimize all impacts on air quality. A contingency plan would be developed to handle any unexpected encounter with contaminated materials and their potential effects on air quality.

f. *Surface Water*. Planned activities during construction are not expected to cause impacts to any surface waters as long as proper storm water pollution prevention practices are enacted during construction and disturbed areas are reseeded to restore levee turf or other groundcover.

g. *Groundwater*. Construction of deep cutoff walls would lower groundwater elevations in the landside area adjacent to these proposed features. There is also the potential for groundwater mounding on the landside of the cutoff wall during low or normal river flows and the creation of localized groundwater gradients that may trend perpendicular to the walls.

h. *Hazardous, Toxic, and Radioactive Wastes*. It is anticipated that HTRW may be encountered in soils and groundwater during construction activities at some proposed construction areas. Four areas of concern have been identified along the Wood River levee system, one area of concern has been identified along the MESD levee system. No areas of concern have been identified along Prairie du Pont / Fish Lake levee system. Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at these areas of concern is expected to mitigate any project impacts. With regard to the operation of the proposed features in these areas of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface.

i. *Hydrologic Conditions*. The net effect of the proposed drainage structures along with new pump stations would be a zero flow increase in the levee interior during a 500-year flood event. With these measures, the proposed project would have no significant effect on interior hydrologic conditions in the project area.

j. *Noise*. Short-term noise impacts would be generated by the use of various types of construction machinery. These impacts would be intermittent in nature, and confined to daylight hours when practicable in the vicinity of residential areas. Overall, the proposed action is not expected to significantly create noise effects for the short or long-term.

k. *Prime Farmland*. Areas considered to be prime farmland that would be converted to nonagricultural use would total about 46 acres. The proposed action would not affect any areas that support the production of horseradish, a locally important crop.

l. *Recreation*. Construction at several locations along the levee system is likely to temporarily disrupt use of the Confluence Trail atop the levee. This short term impact would cease once construction at these locations is complete, and recreational use of the trail is expected to continue. Recreational use of the Mississippi River channel would not be affected.

m. *Aesthetics*. The aesthetics of the project area would be temporarily impacted by the presence of construction equipment, removal of vegetation in limited areas, and the creation of noise, fumes and dust during the construction phase. Once constructed, none of the proposed action's features are likely to be considered as aesthetically unpleasant, as they would likely blend in with the existing levee system and surroundings.

n. *Cultural Resources*. The proposed action may adversely impact historic properties; however, all impacts will be mitigated through execution of the provisions of the Memorandum of Agreement with the Illinois Historic Preservation Agency.

o. *Environmental Justice*. The proposed action would not create any adverse effects on low-income and minority communities within the levee protected areas. Overall, the proposed action appears unlikely to pose increased environmental risk factors. The proposed action is expected to improve environmental conditions in the area, and at the same time, opportunities for economic activity would be enhanced. Residential areas are situated far enough away from the expected short term environmental impacts and would not be adversely affected.

p. *Biological Resources*. Construction would impact approximately 26 acres of various wetlands, including 11.6 acres of palustrine emergent wetland-farmed, 5.7 acres of palustrine emergent wetland, 6.8 acres of palustrine forested wetland, 1.9 acres of open water (plus an estimated 9.5 acres of temporary impacts to open waters from the installation of graded filters at 5 locations), and 0.4 acres of streambank. The proposed action includes a compensatory mitigation plan of 48 acres of mitigation wetland to offset these losses. With this mitigation, adverse impacts to wetlands will not be significant. Minor indirect impacts are expected to some biological resources due to changes in surface or groundwater hydrology.

q. *Bald Eagles*. Bald eagles could potentially nest anywhere in or near the project area where large trees occur. The proposed project would follow the National Bald Eagle Management (NBEM) Guidelines.

r. *Threatened and Endangered Species*. The proposed action is not likely to adversely impact the Federal or state listed gray bat, peregrine falcon, least tern, lake sturgeon, western sand darter, gravel chub, pallid sturgeon, Illinois chorus frog, eastern massasauga rattlesnake, lined snake, spectaclecase mussel, butterfly mussel, ebonyshell mussel, black sandshell mussel, Illinois cave amphipod, eastern prairie fringed orchid or spring ladies' tresses. Adverse impacts to the Indiana bat will be minimized by prohibiting tree felling activities between 1 April and 30 September when bats may use trees for summer

roosting habitat. Adverse impacts to decurrent false aster will be minimized by implementing pre-construction surveys within appropriate habitat, if required by the USFWS.

s. *Cumulative Impacts*. For the AMEC proposed action, key stressors of concern include changes to land cover or land use, natural habitats, and water quality. These stressors act to reduce environmental quality within the levee protected area and decrease the overall quality of life. A project-induced loss of about 26 acres of various habitats along with establishment of mitigation within the local watershed to compensate for this loss is not expected to contribute to an ongoing long-term spatial decline in natural areas due to floodplain development. Thus, no significant cumulative impacts are anticipated.

t. The "No Action" alternative was evaluated and would be unacceptable to recommend as it does not eliminate the unacceptable level of risk associated with the levee inadequacies, nor make the improvements necessary to the levee systems in order to obtain FEMA accreditation in accordance with 44 CFR 65.10.

IV. Compliance with Section 404 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act is achieved under an Individual Section 10/404 permit for unavoidable impacts to waters of the United States. Compliance with Section 106 of the National Historic Preservation Act (NHPA) will be achieved by execution of the Memorandum of Agreement with the Illinois State Historic Preservation Office to avoid or mitigate all adverse impacts to historic properties eligible for inclusion in the National Register of Historic Places. The U.S. Fish and Wildlife Service will review the document during public review to ensure compliance with the Endangered Species Act and Fish and Wildlife Coordination Act. Compliance with the National Environmental Policy Act will be achieved with the signing of this document. The project is in compliance with all other applicable laws and regulations as documented in Exhibit EA-47 of the Environmental Assessment.

V. Based on the disclosure of the proposed action impacts contained within the Environmental Assessment, no significant impacts to the environment are anticipated. The proposed action has been coordinated with the appropriate resource agencies, and there are no significant unresolved issues. Therefore, an Environmental Impact Statement will not be prepared prior to proceeding with the proposed Southwestern Illinois Levee Improvement Project, located in Madison, St. Clair, and Monroe counties, Illinois.

_____ /unsigned/

Date Christopher G. Hall
Colonel, U.S. Army
District Commander

APPENDIX EA-MAPS
TO
ENVIRONMENTAL ASSESSMENT
WITH
UNSIGNED FINDING OF NO SIGNIFICANT IMPACT

SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT
MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

Prepared for:

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Collinsville, IL 62234

and

AMEC Earth and Environmental, Inc. (Consultant)
3199 Riverport Tech Center Drive
St. Louis, MO
63043

By

U.S. Army Corps of Engineers, St. Louis District
Regional Planning and Environmental Division North
Environmental Compliance Section
CEMVP-PD-C
1222 Spruce Street
St. Louis, Missouri 63103-2833
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JANUARY 2012

Piezometer
Relief Well
Levee Station Point
Storm Pipes
Open Water
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Wetland

BANK PROTECTION
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Wood River Levee System AMEC 60% Improvements

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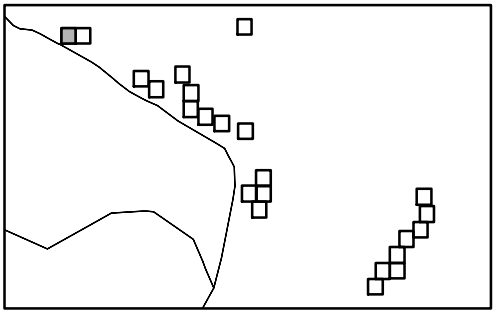

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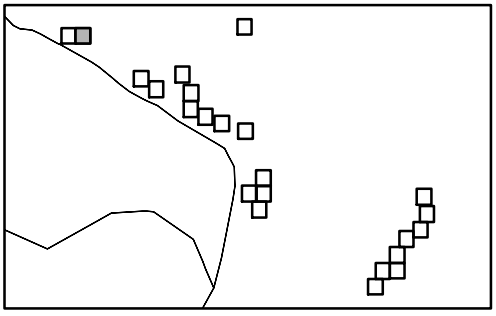

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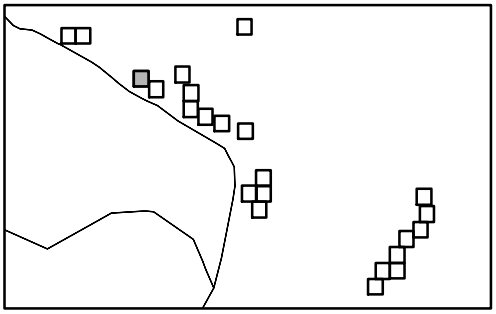

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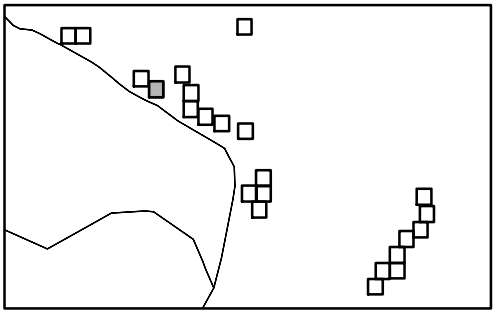

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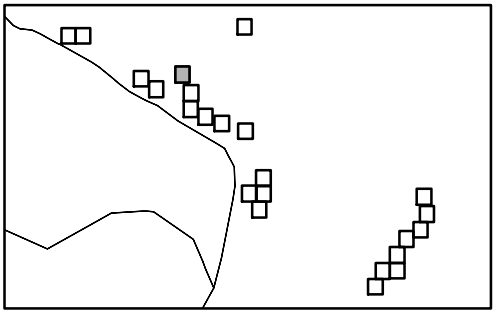

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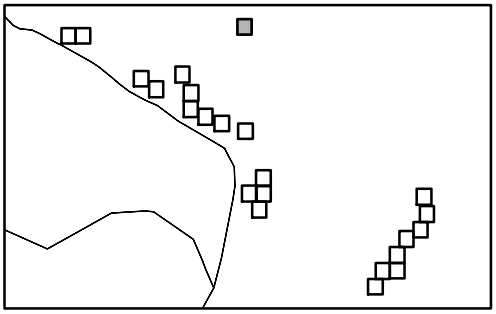

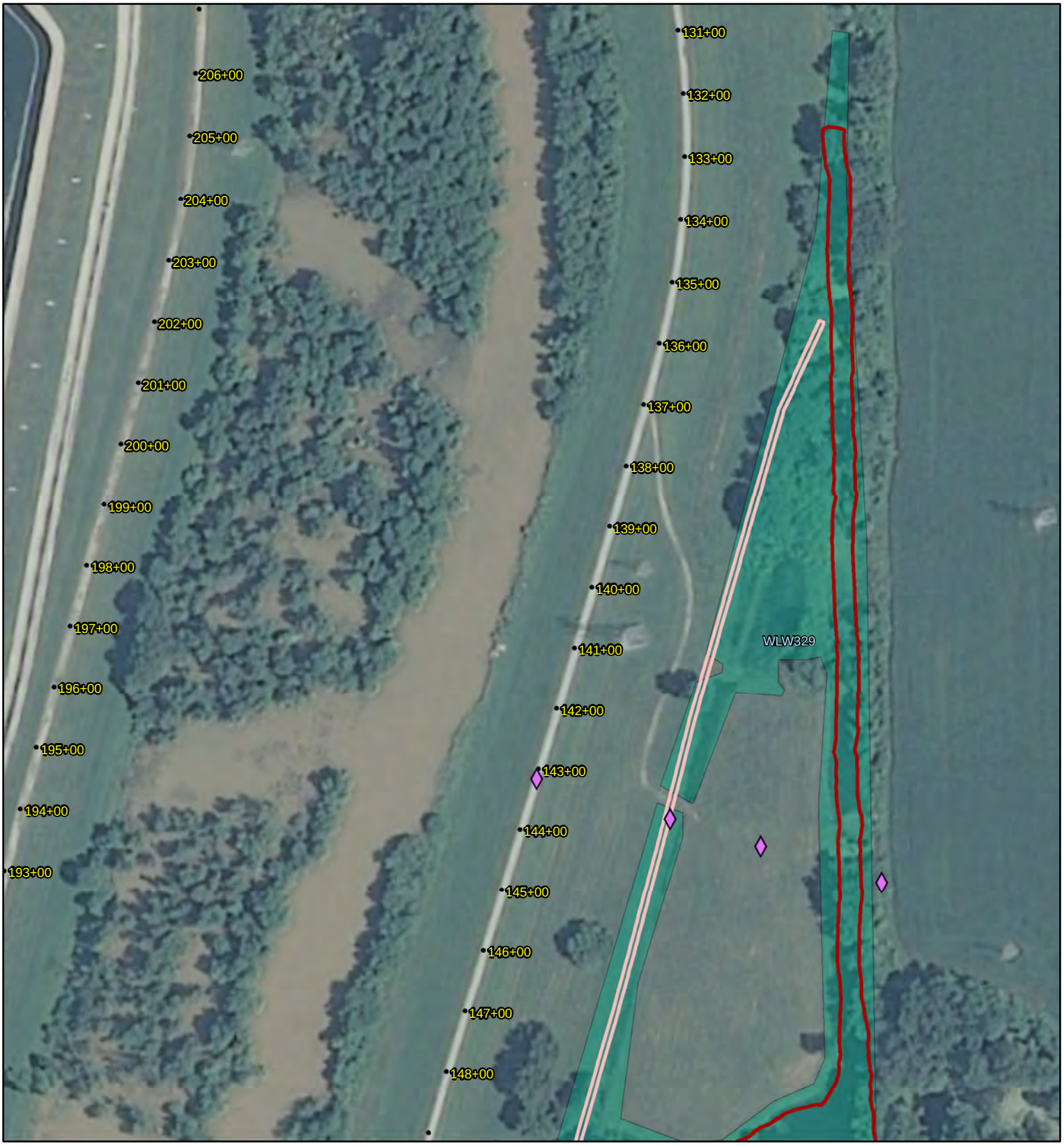

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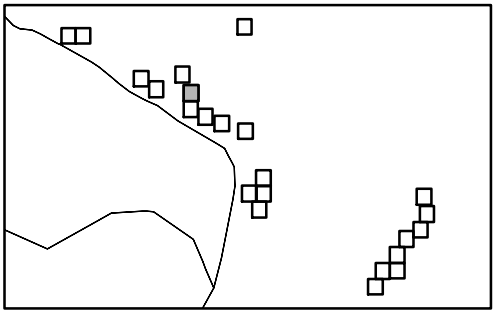

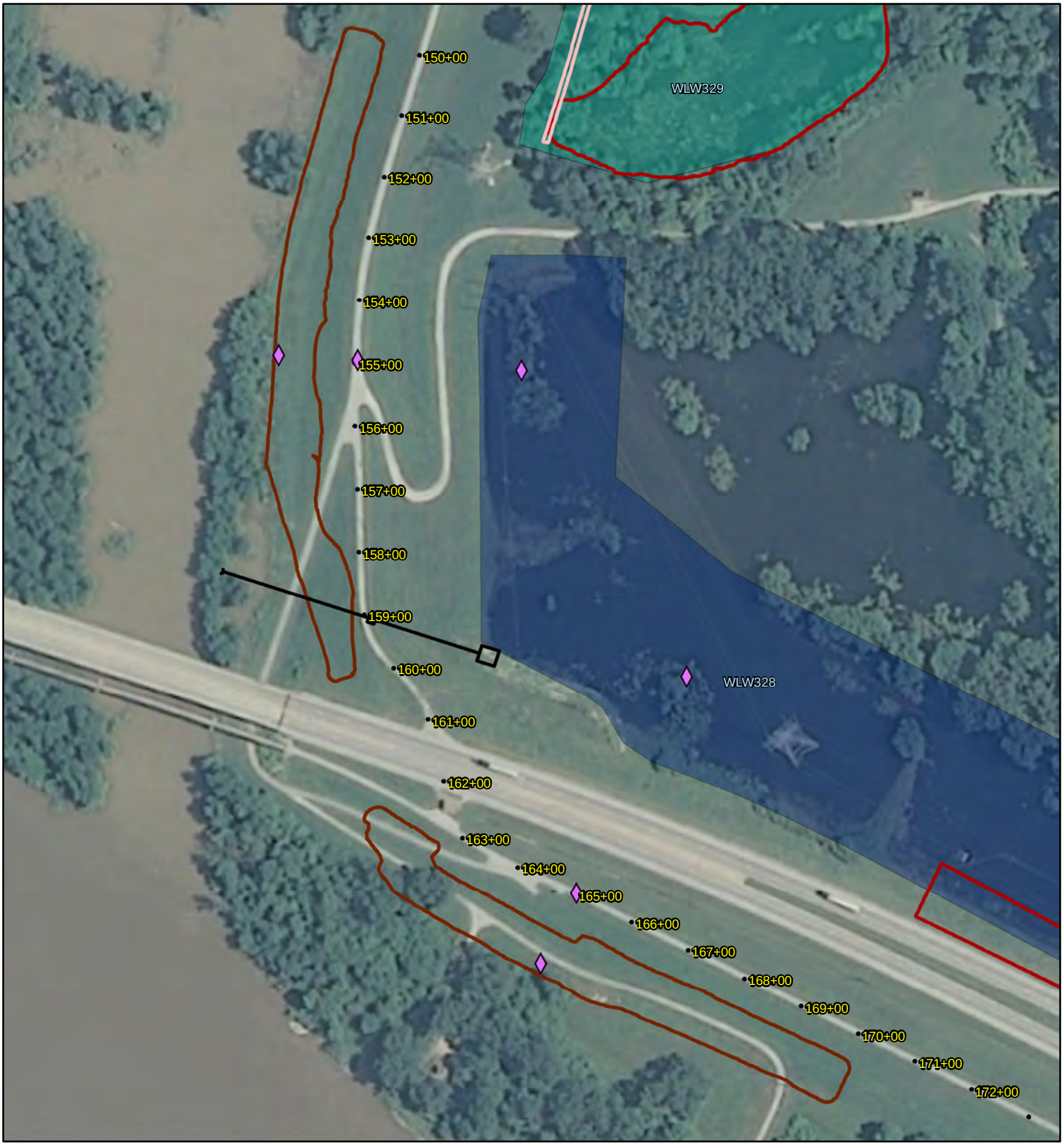

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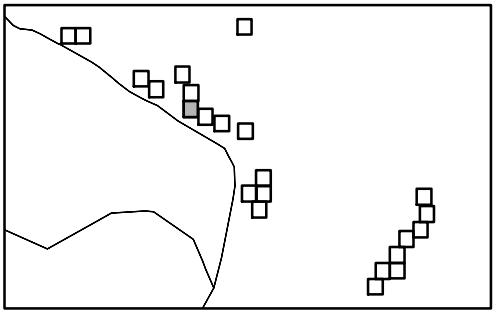

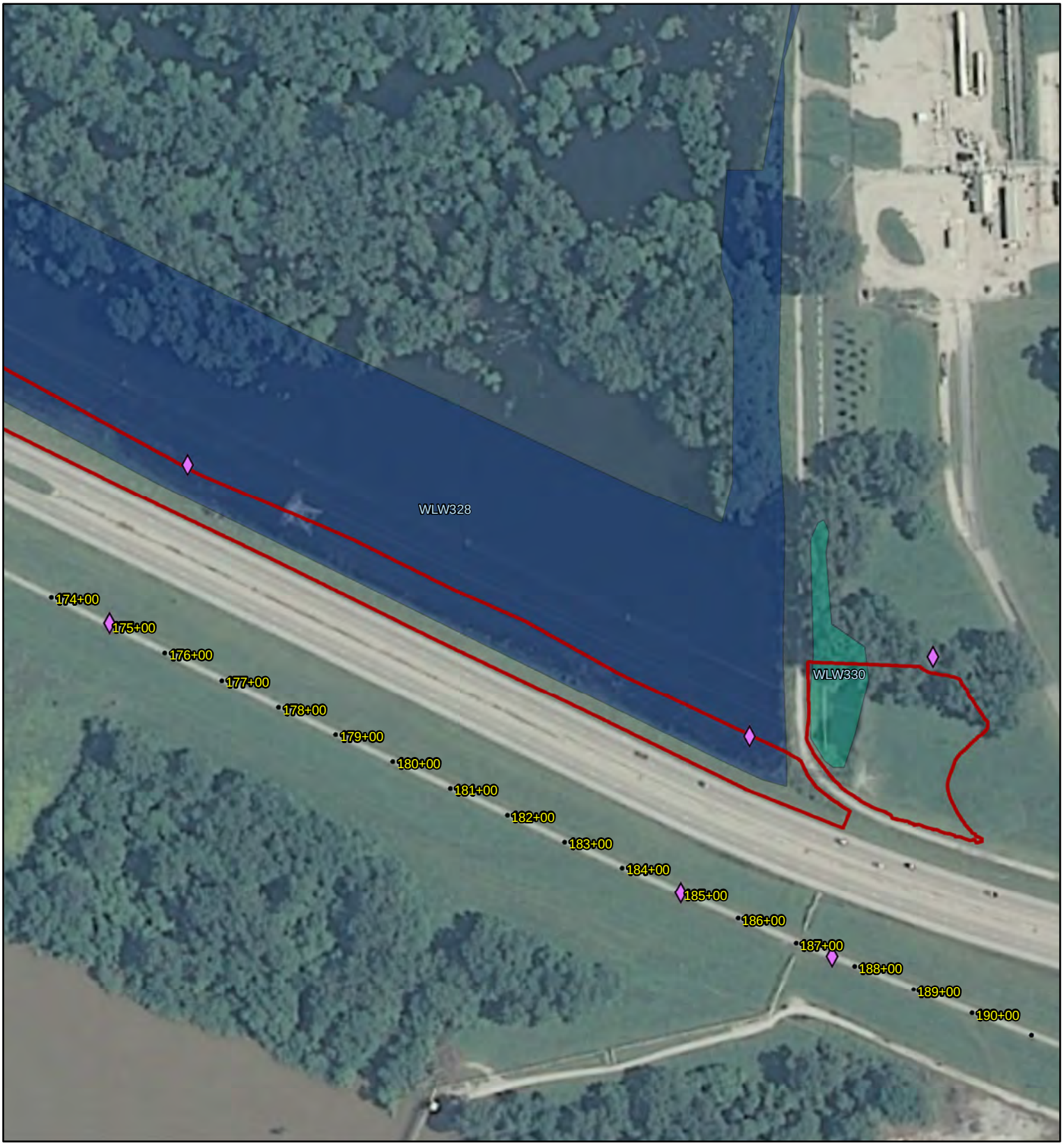

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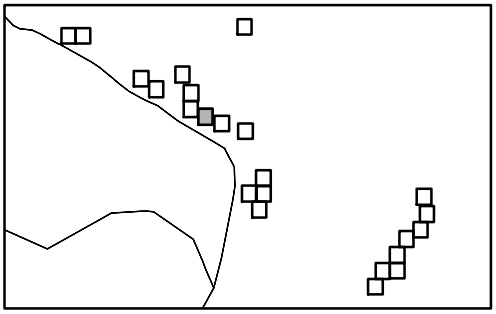
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



Piezometer
Relief Well
Levee Station Point
Storm Pipes
Open Water
Stream
Wetland

BANK PROTECTION
CLAY CAP
CUTOFF WALL
FRENCH DRAIN
GRADED FILTER
RANDOM FILL
RIP RAP PROTECTION
SEEPAGE BERM
TRENCH DRAIN

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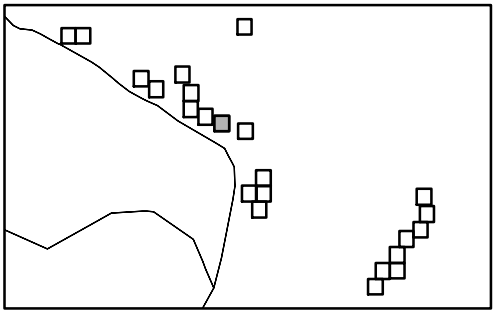
Page: 10

0 230 460 Feet

Wood River Levee System AMEC 60% Improvements



Piezometer
Relief Well
Levee Station Point
Storm Pipes
Open Water
Stream
Wetland

BANK PROTECTION
CLAY CAP
CUTOFF WALL
FRENCH DRAIN
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SEEPAGE BERM
TRENCH DRAIN

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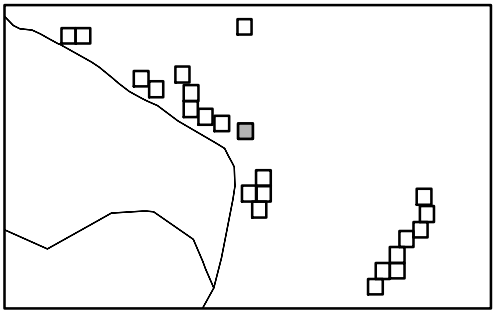
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



Piezometer
Relief Well
Levee Station Point
Storm Pipes
Open Water
Stream
Wetland

BANK PROTECTION
CLAY CAP
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TRENCH DRAIN

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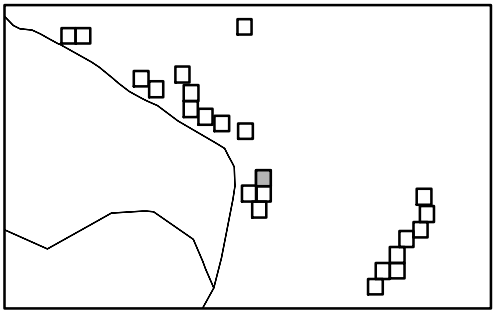
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



Piezometer
Relief Well
Levee Station Point
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Wetland

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TRENCH DRAIN

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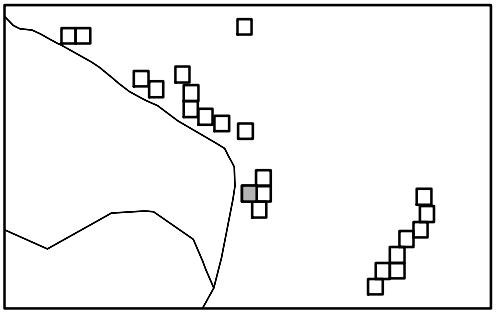
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



Piezometer
Relief Well
Levee Station Point
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Wetland

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TRENCH DRAIN

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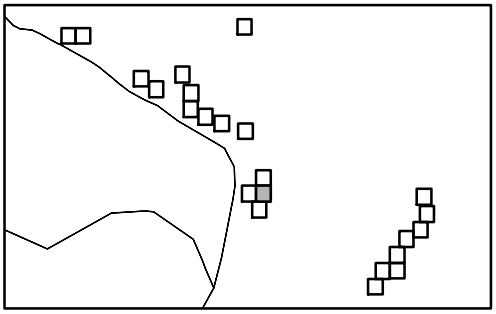
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



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TRENCH DRAIN

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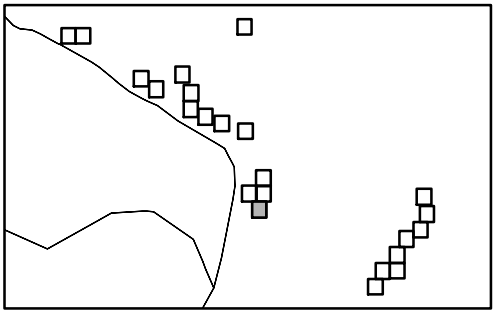
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



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Wetland

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TRENCH DRAIN

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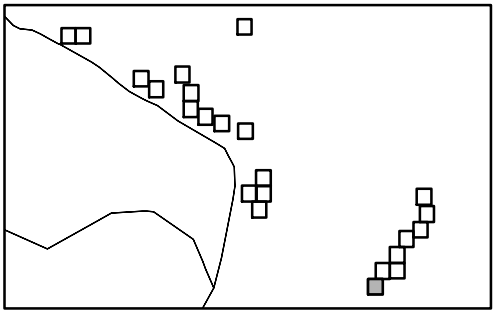
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



Piezometer
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Levee Station Point
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Wetland

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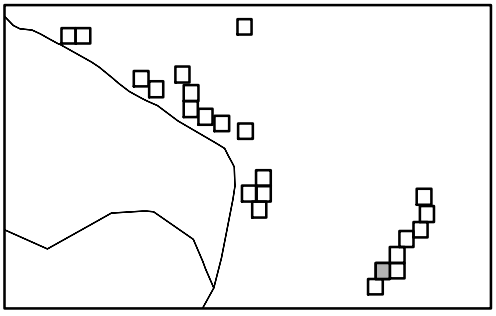
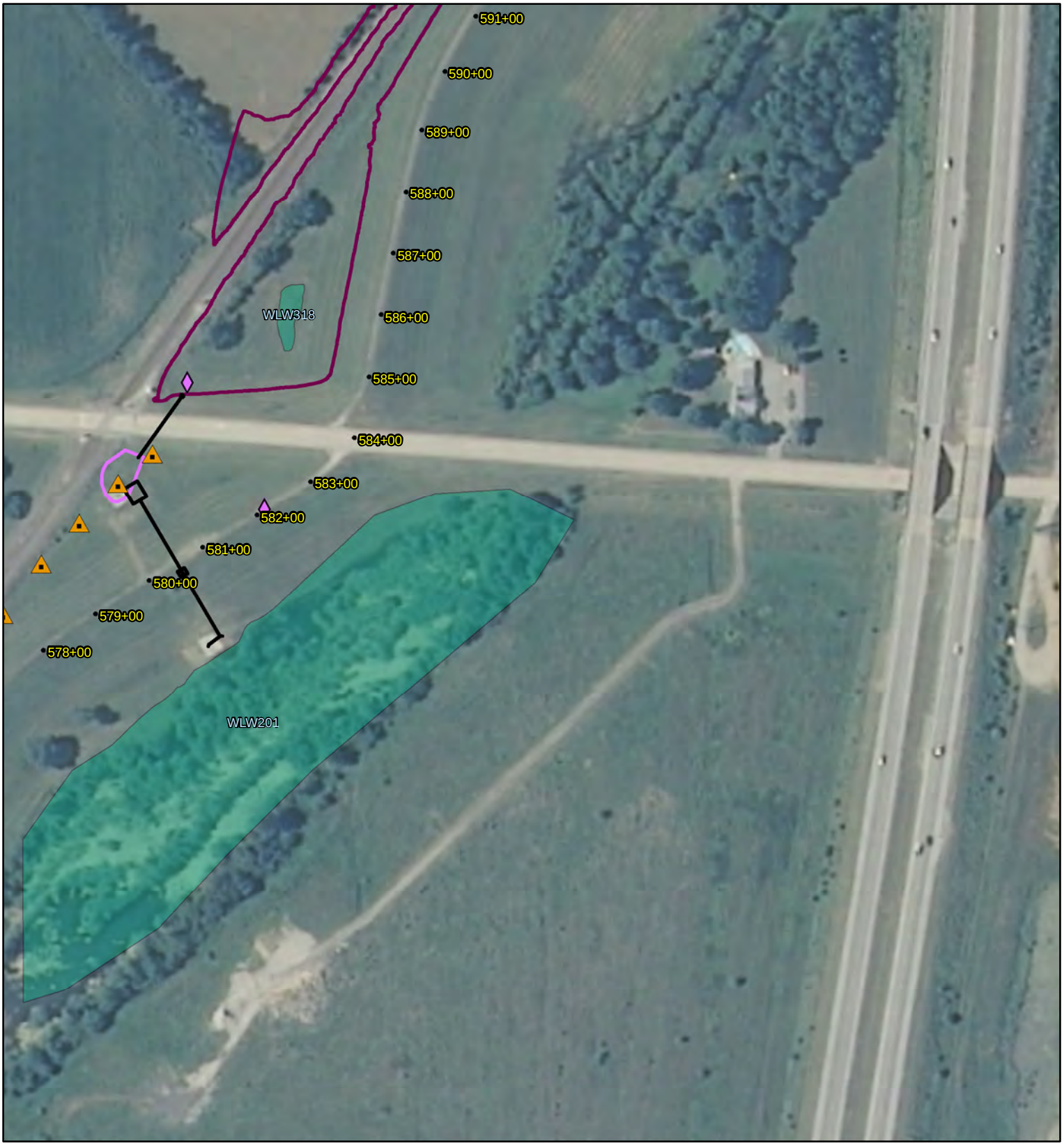
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet





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Wetland

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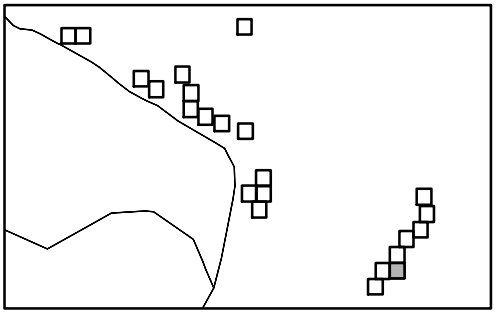
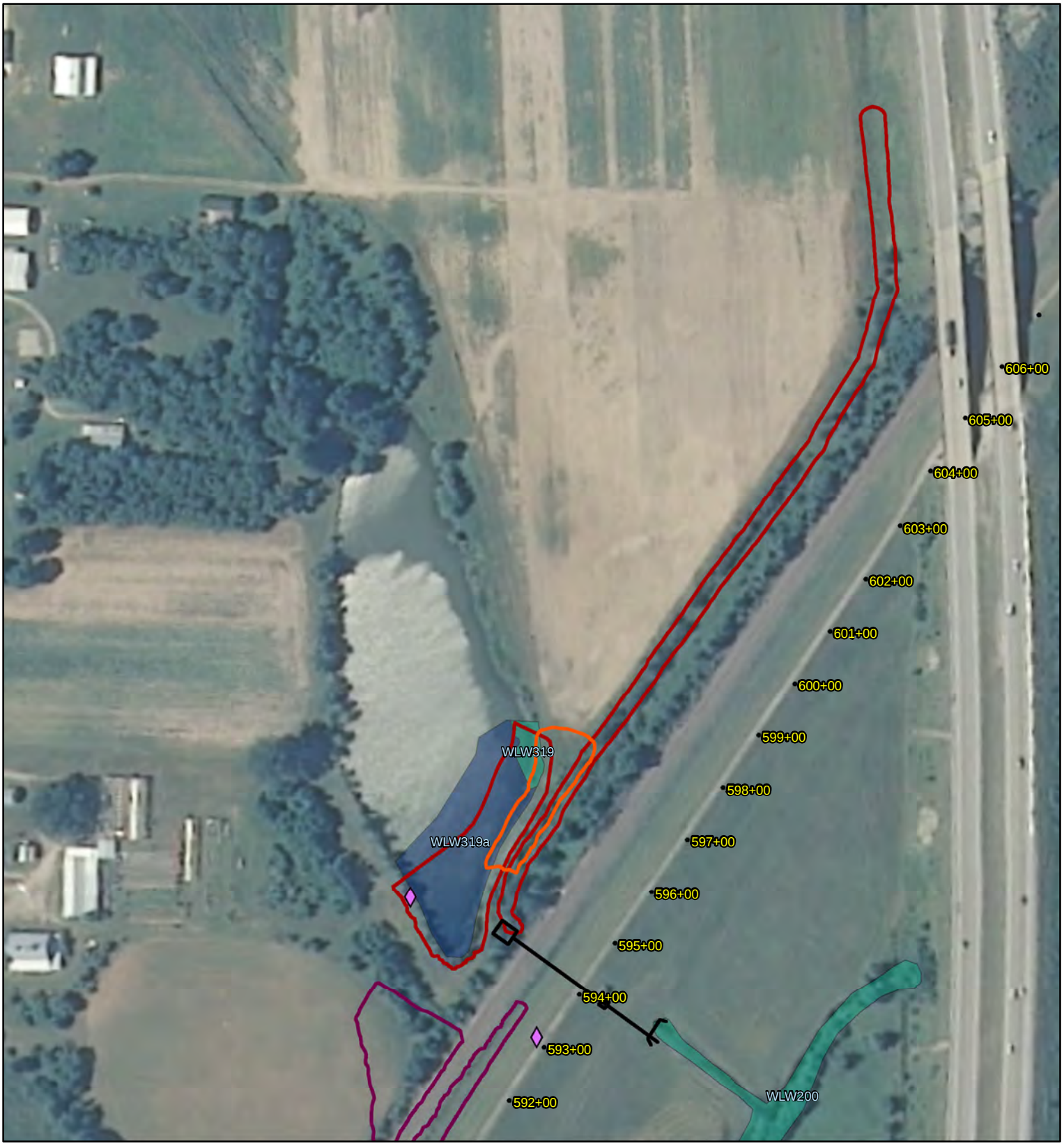
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet





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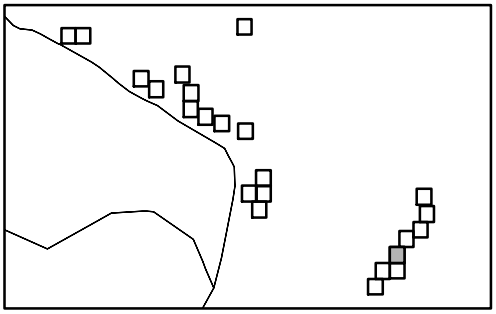
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



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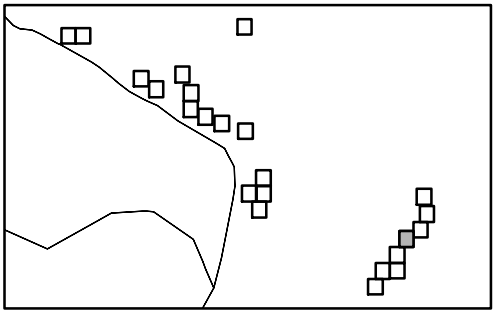
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



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Levee Station Point
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Wetland

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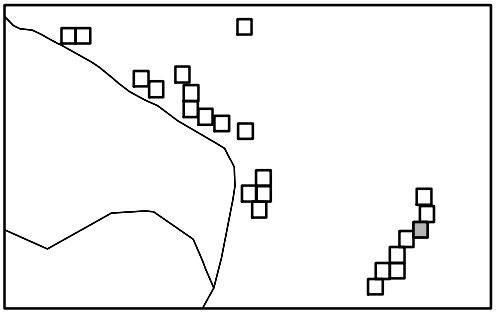
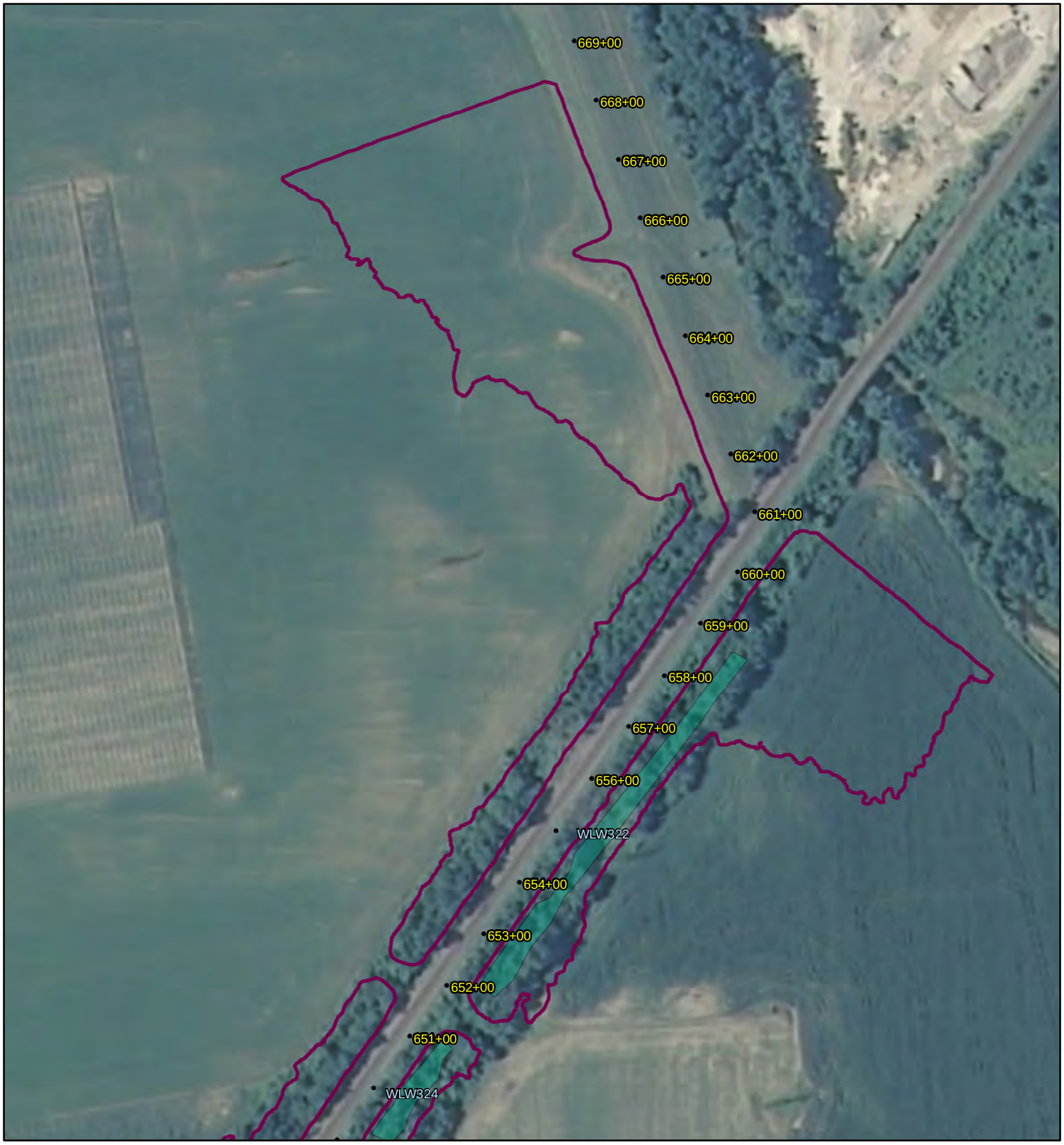
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet





Piezometer
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Levee Station Point
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Wetland

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SEEPAGE BERM
TRENCH DRAIN

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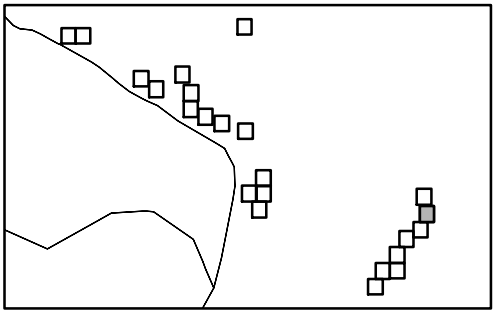
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet



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Levee Station Point
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Wetland

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SEEPAGE BERM
TRENCH DRAIN

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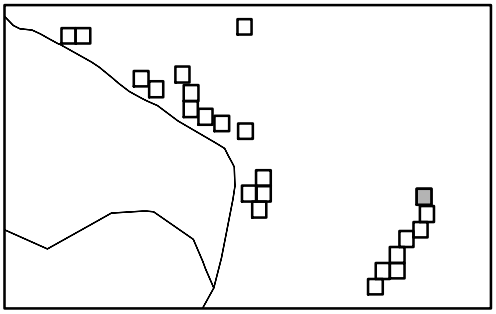
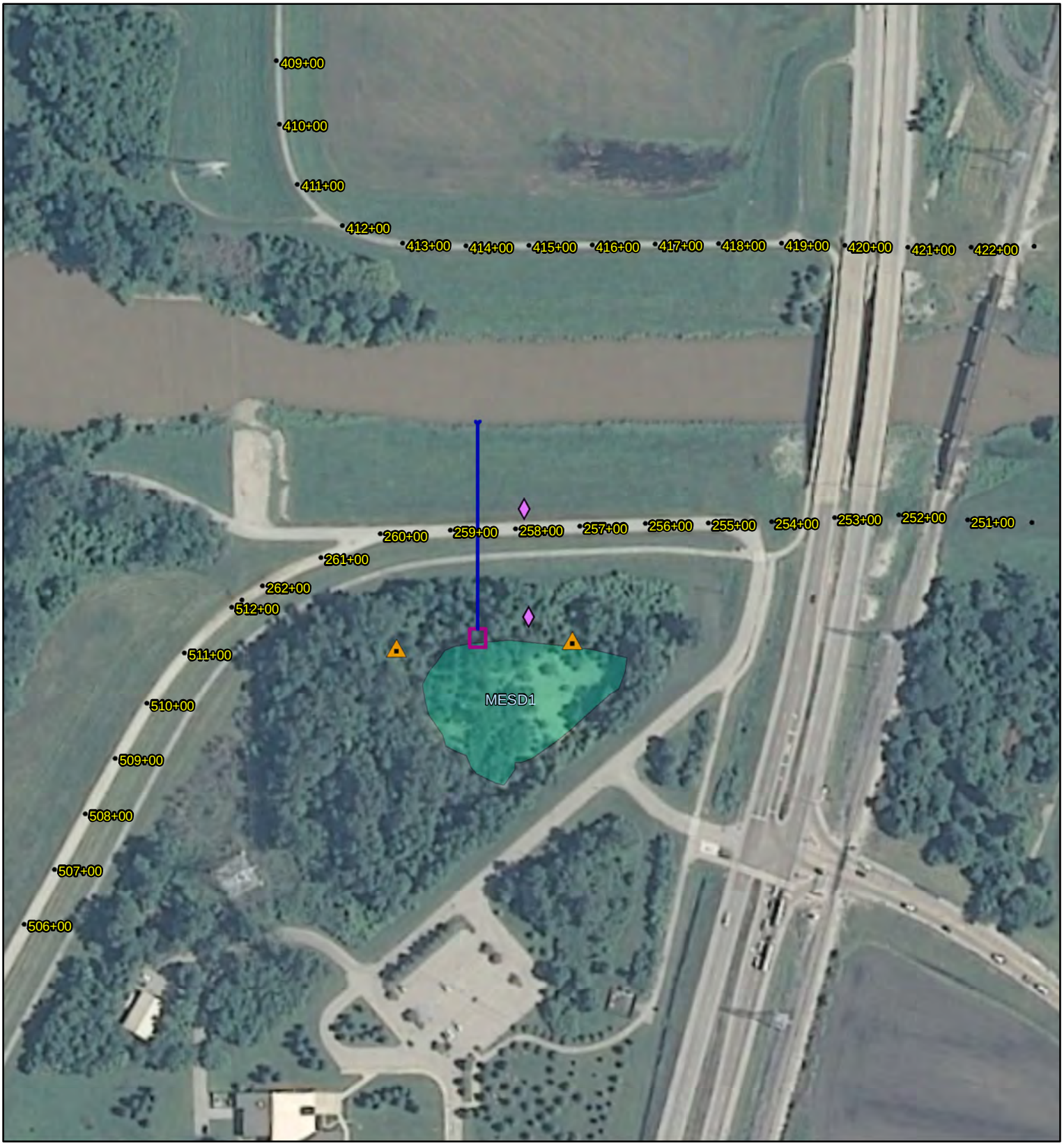
Wood River Levee System AMEC 60% Improvements

0 230 460 Feet





Piezometer
Relief Well
Toe Drain Manhole
Levee Station Point
Pump Station Pipes
Storm Pipes
Open Water
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CLAY CAP
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GRADED FILTER BERM
PUMP STATION
TOE DRAIN

2010 NAIP Imagery

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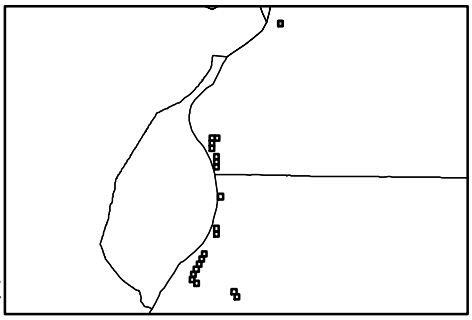
Page: 1

0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements



Piezometer
Relief Well
Toe Drain Manhole
Levee Station Point
Pump Station Pipes
Storm Pipes
Open Water
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CLAY CAP
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2010 NAIP Imagery

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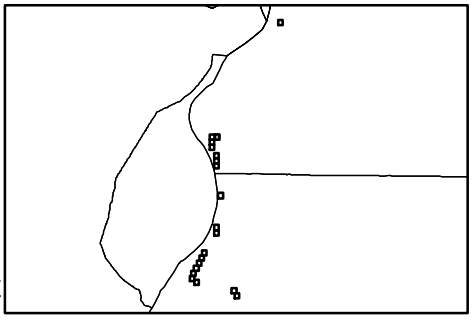
0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements



Piezometer
Relief Well
Toe Drain Manhole
Levee Station Point
Pump Station Pipes
Storm Pipes
Open Water
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Wetland

CLAY CAP
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2010 NAIP Imagery

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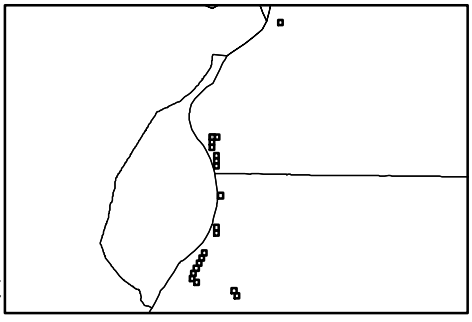
0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements



Piezometer
Relief Well
Toe Drain Manhole
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2010 NAIP Imagery

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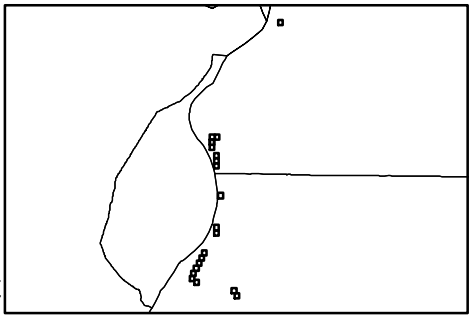
0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements



Piezometer
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2010 NAIP Imagery

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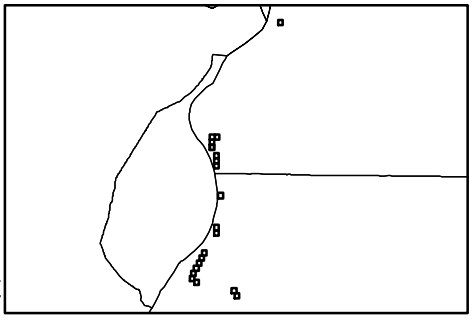
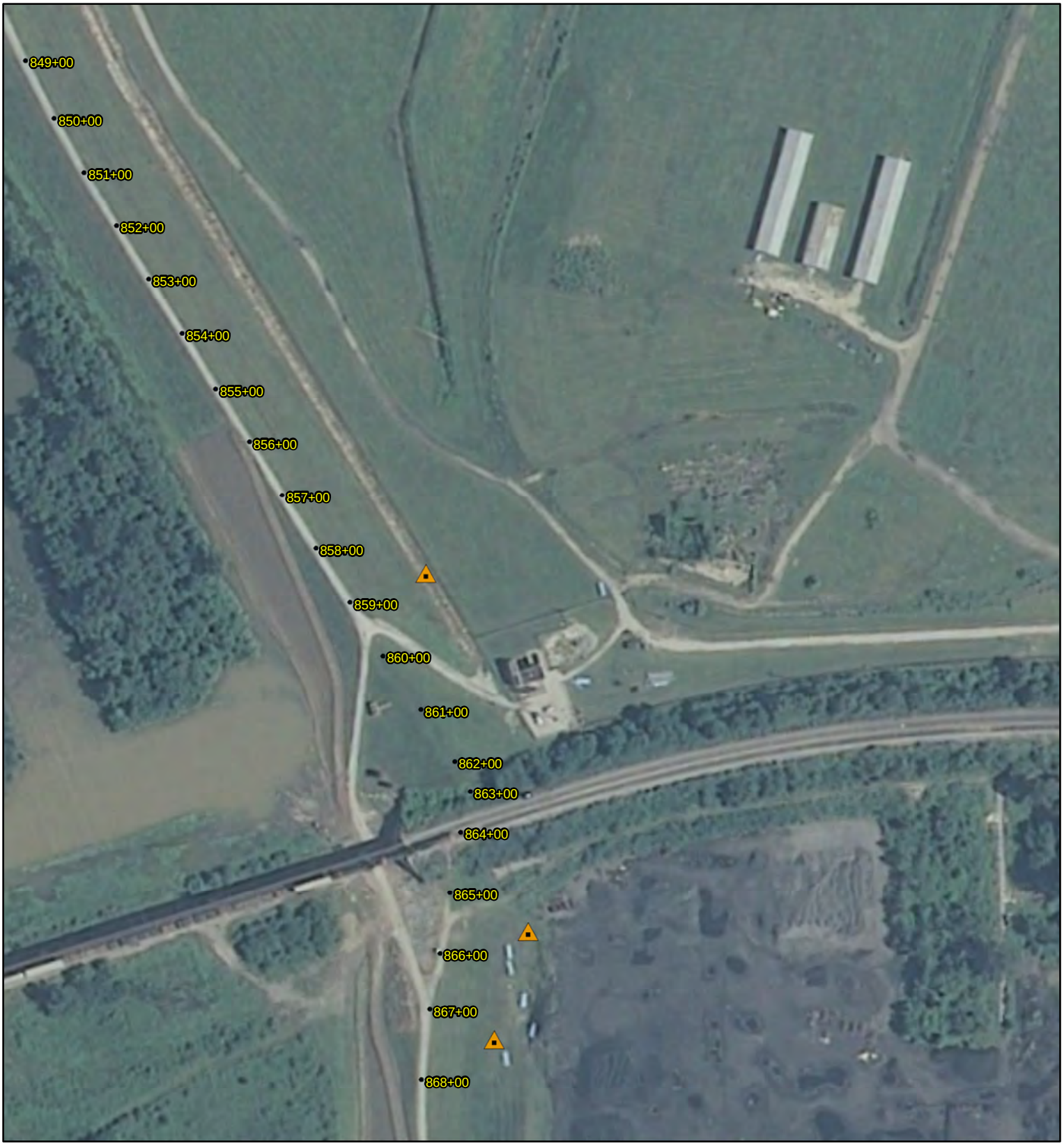
0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements





Piezometer
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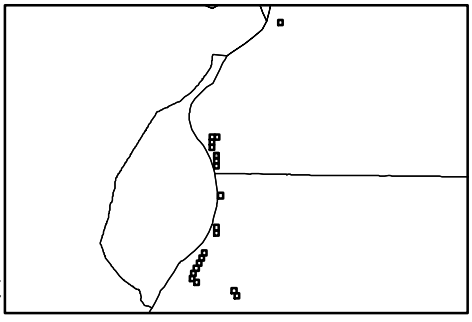
0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements



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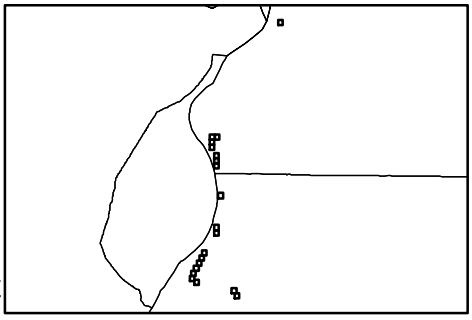
Metro East Levee System AMEC 60% Improvements



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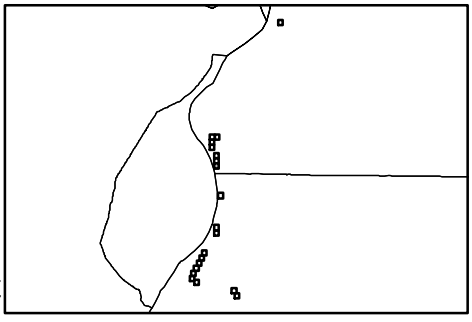
Metro East Levee System AMEC 60% Improvements



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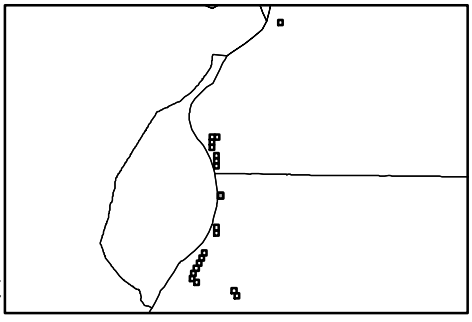
Metro East Levee System AMEC 60% Improvements



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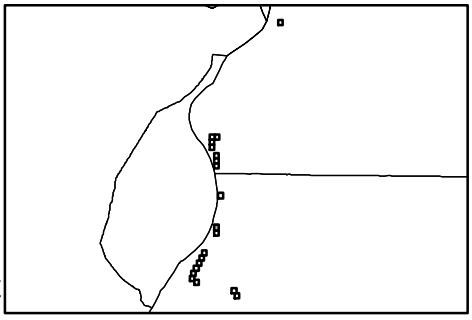

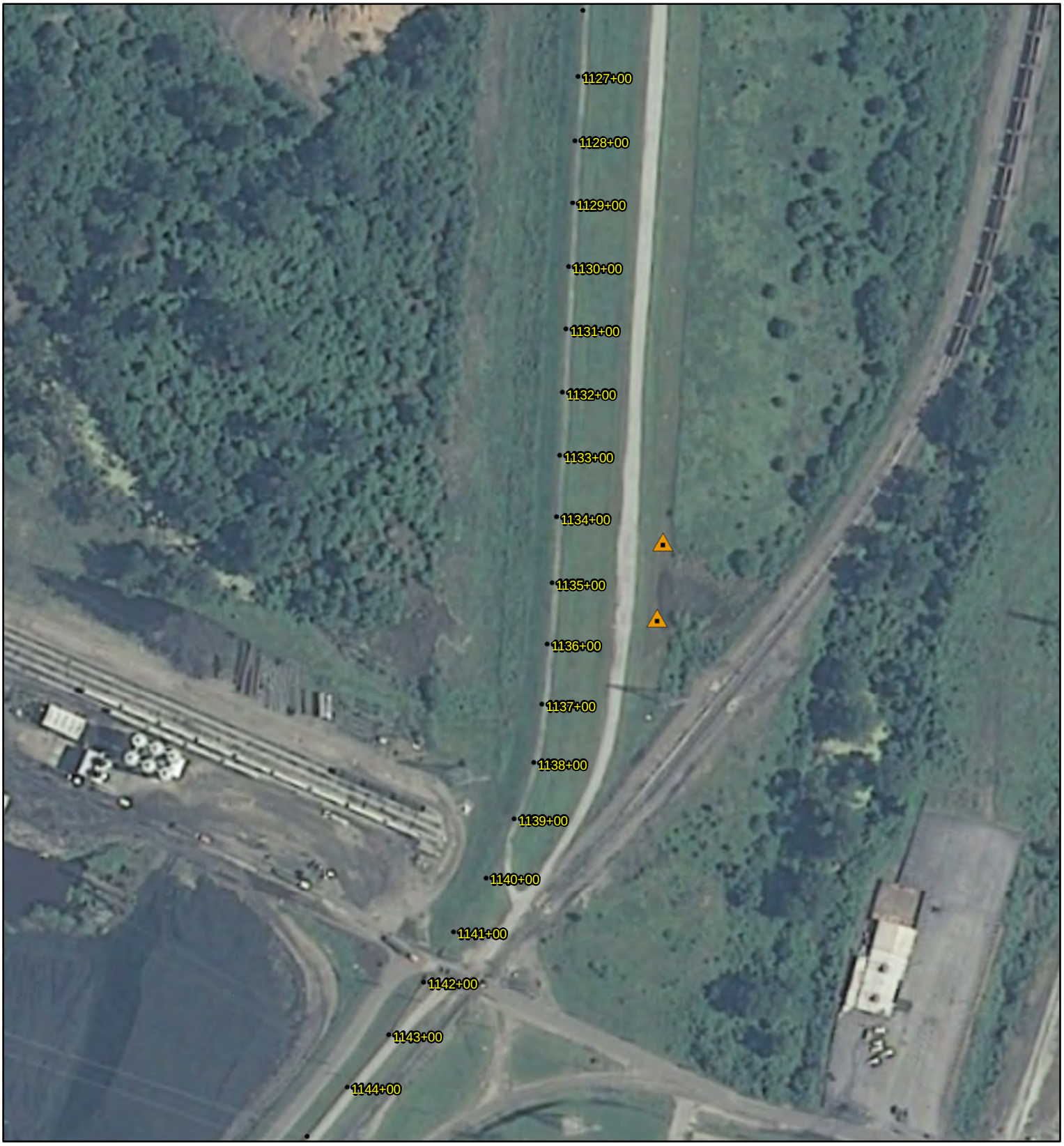

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2010 NAIP Imagery

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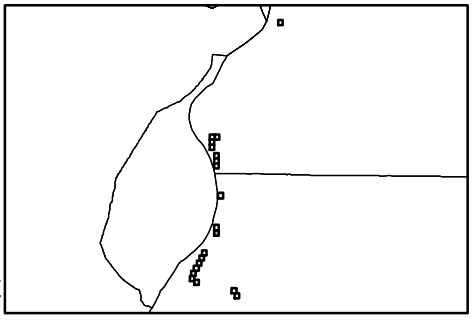
0 237.5 475 Feet

Metro East Levee System AMEC 60% Improvements



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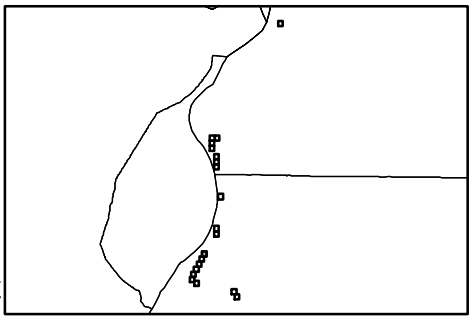
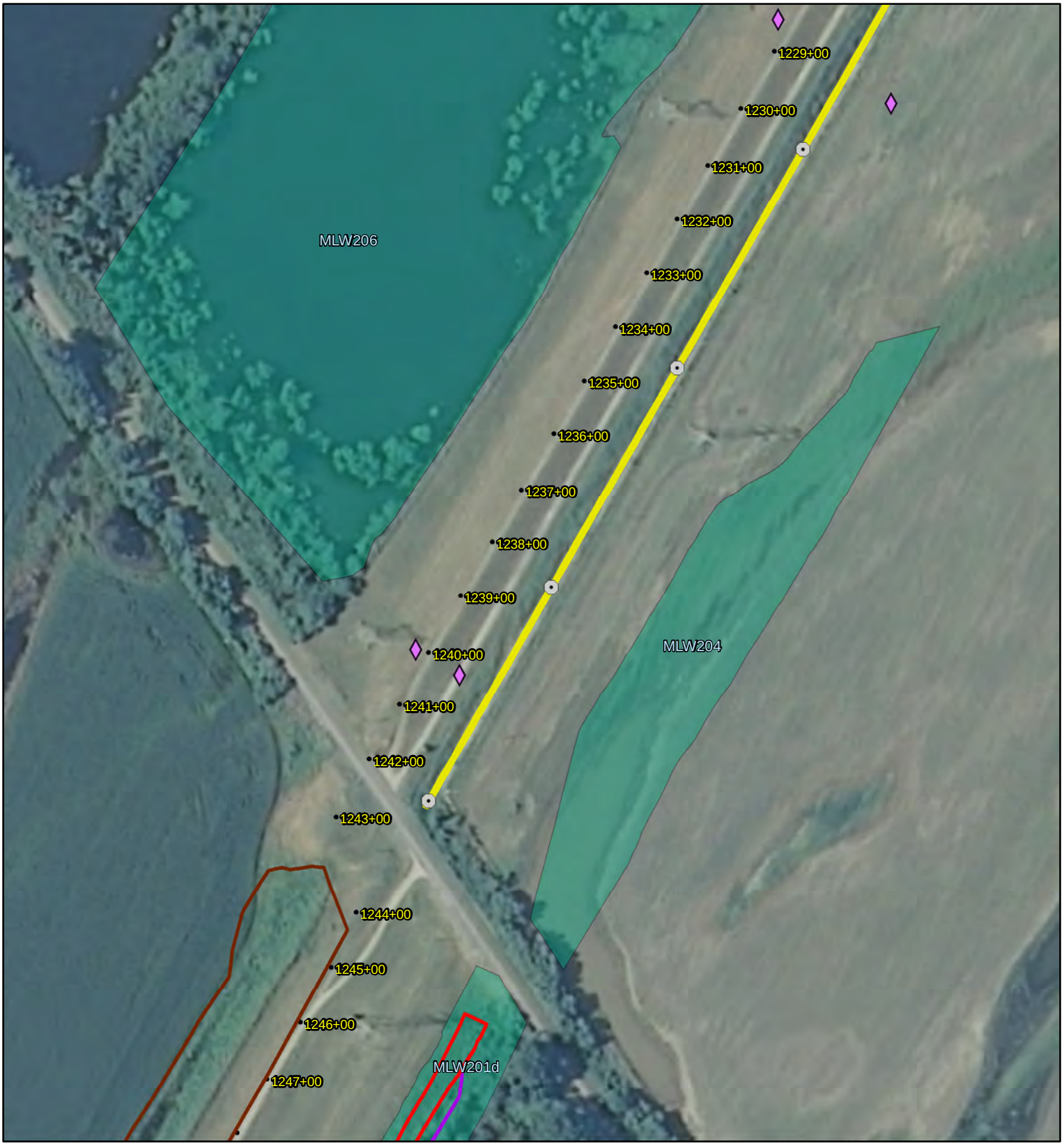
Metro East Levee System AMEC 60% Improvements





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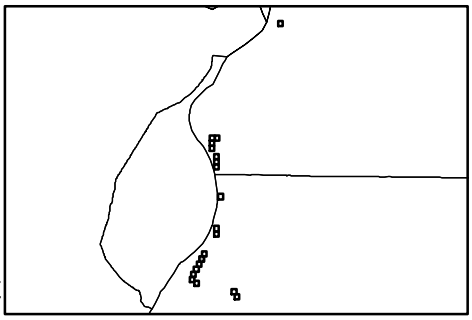
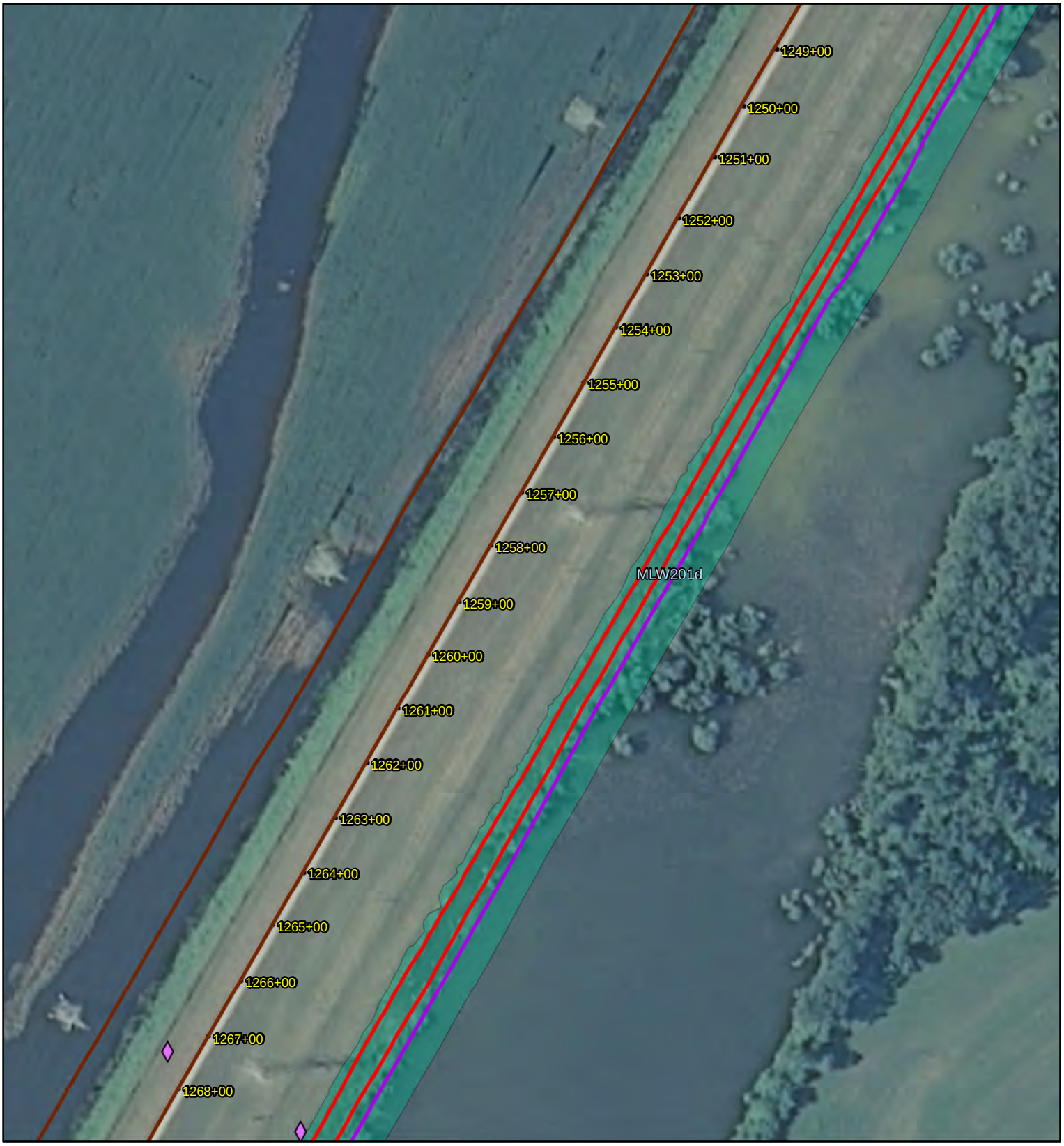
Metro East Levee System AMEC 60% Improvements





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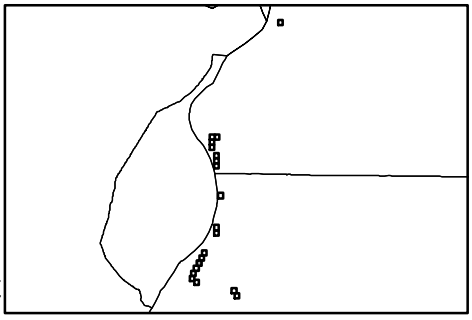

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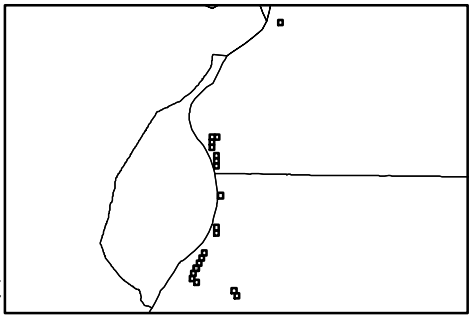

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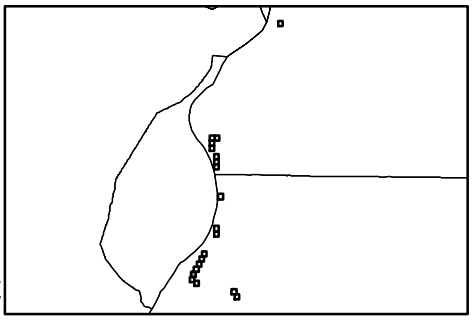

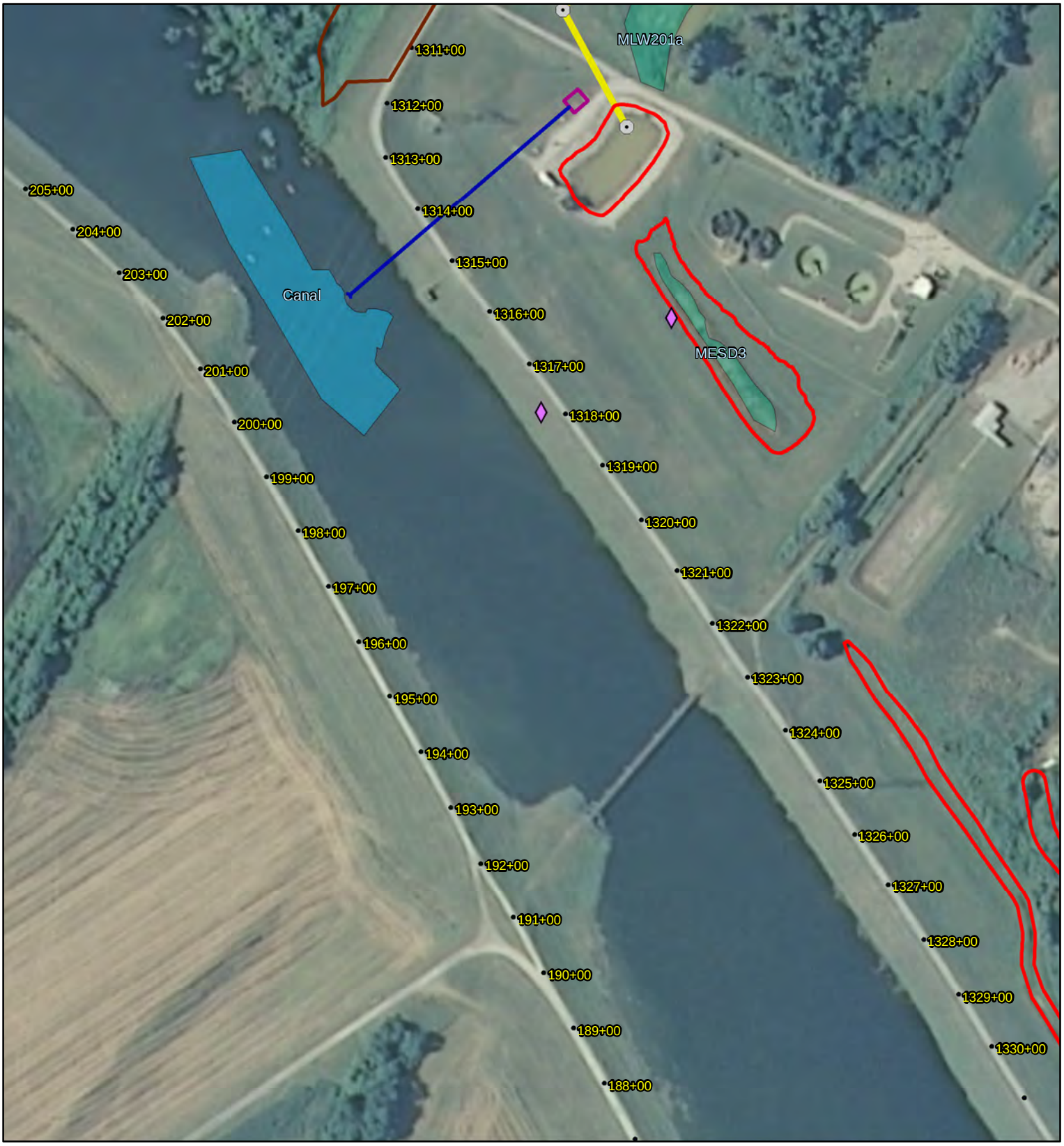

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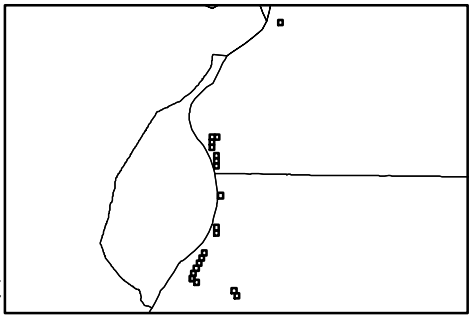

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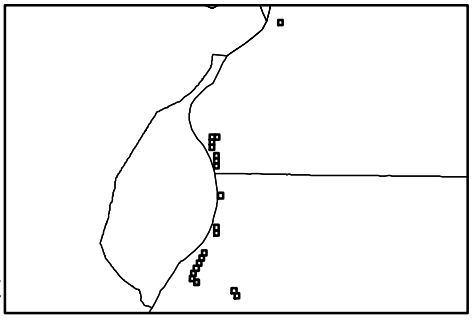

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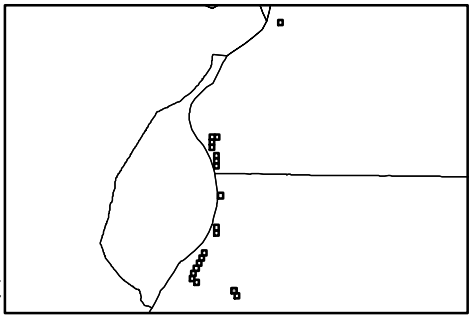

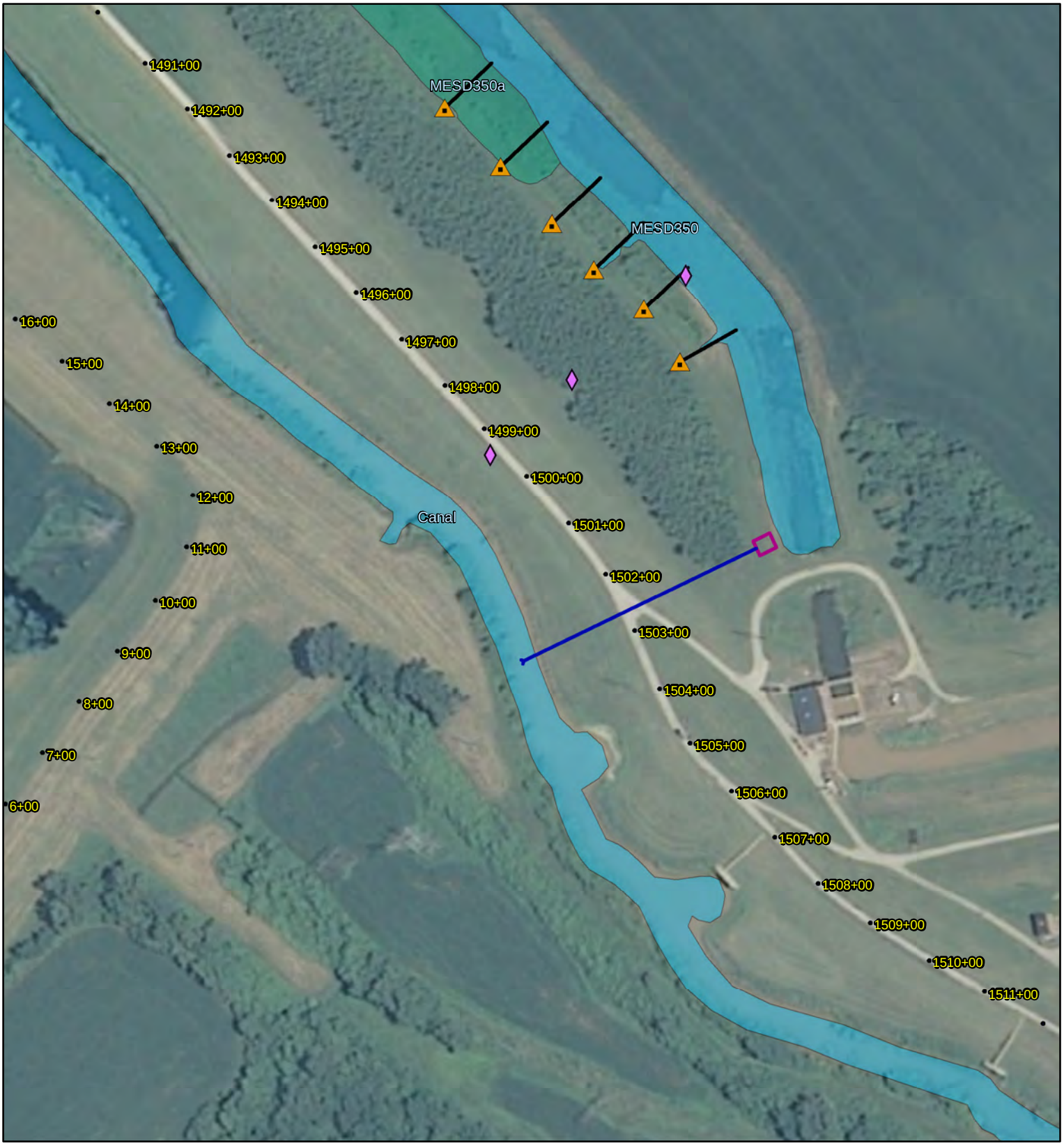

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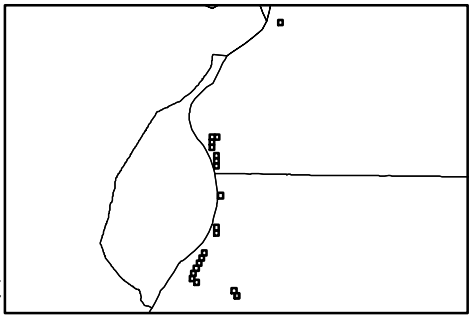

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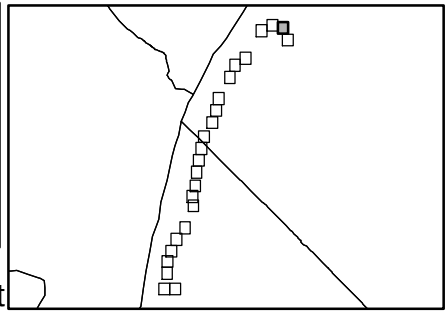

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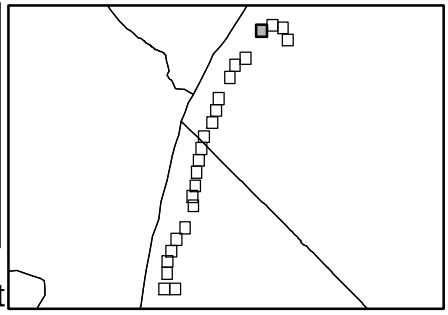

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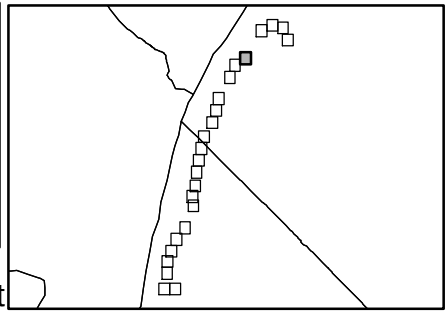

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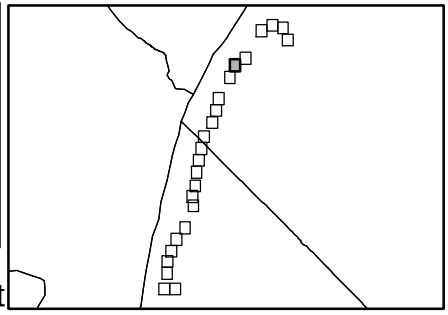

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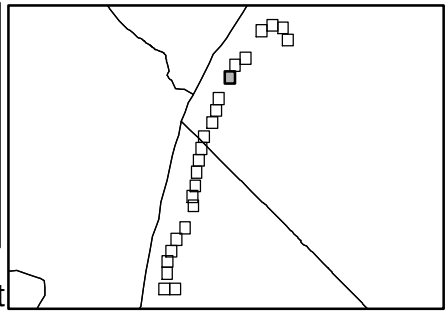

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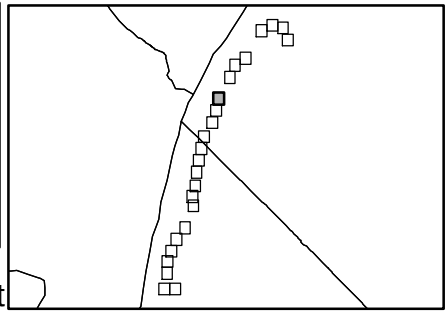

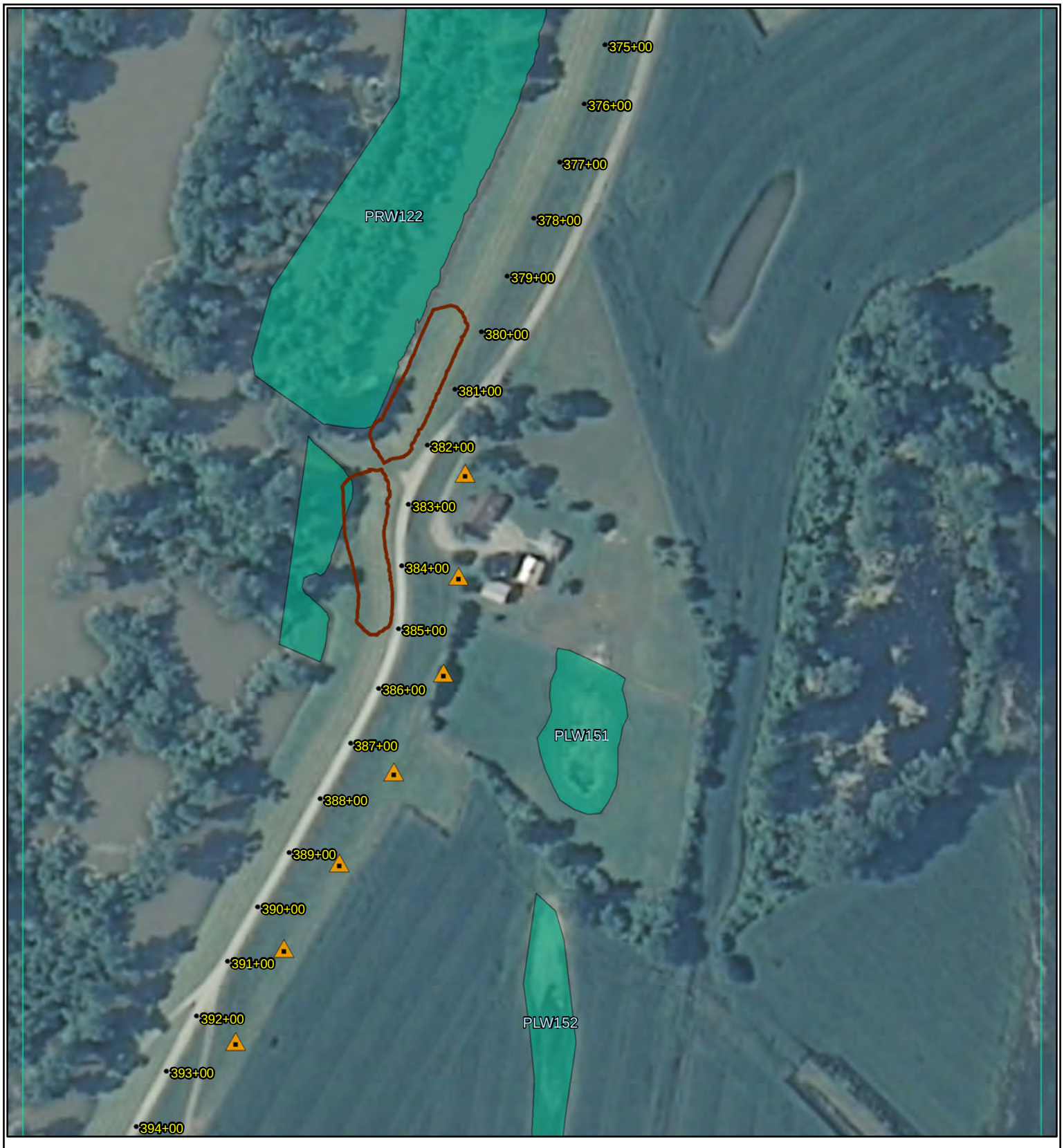

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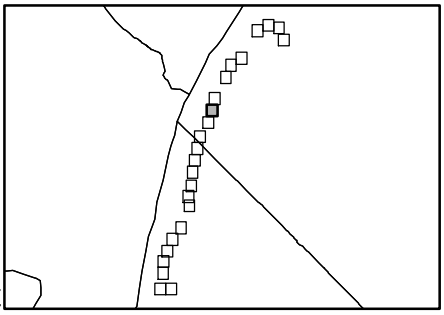

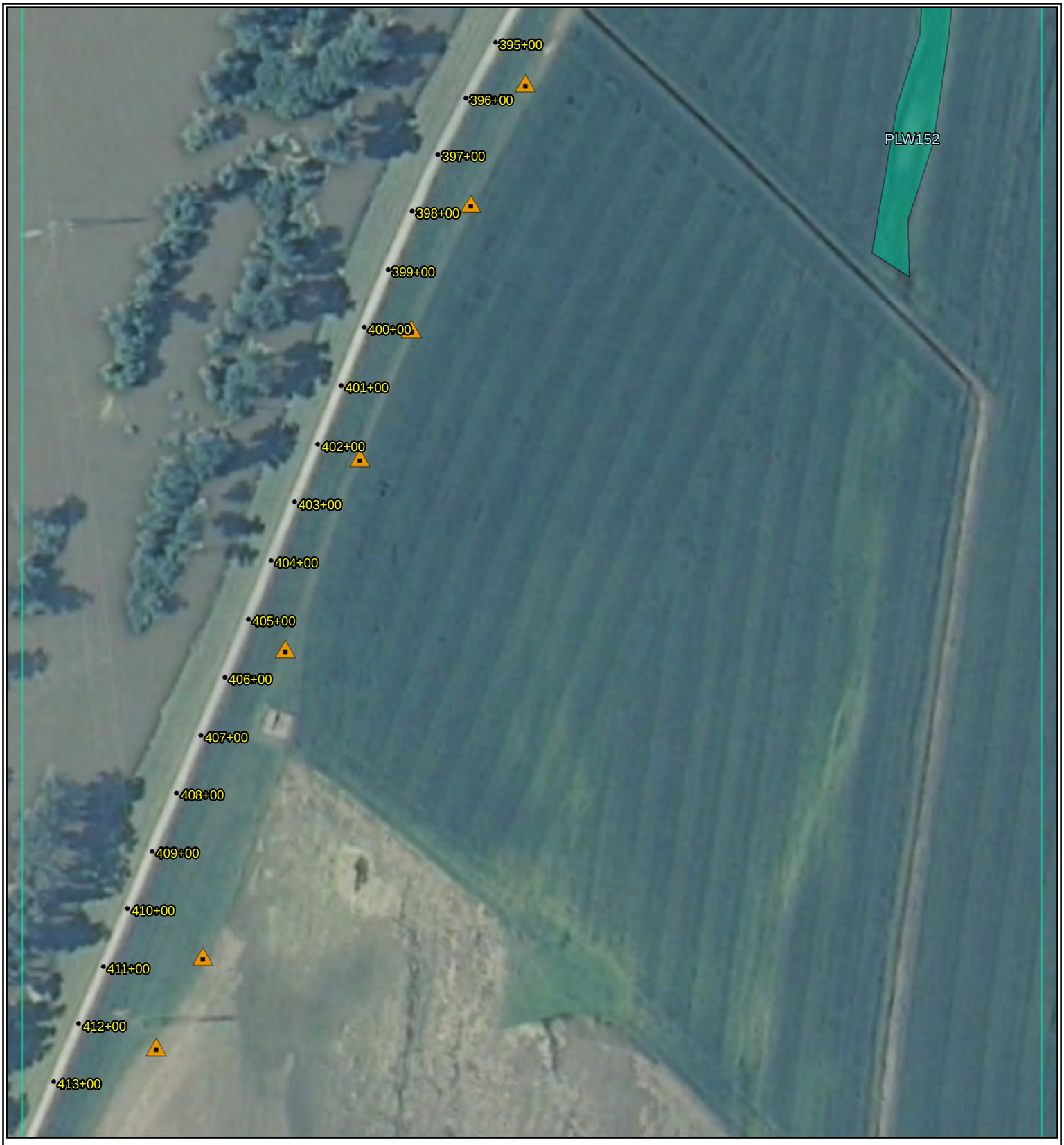

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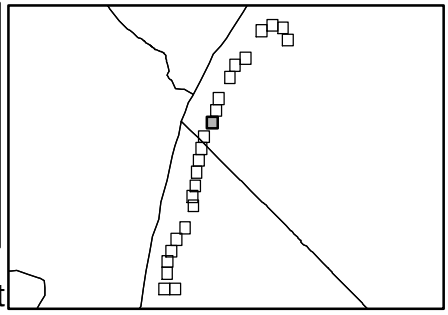

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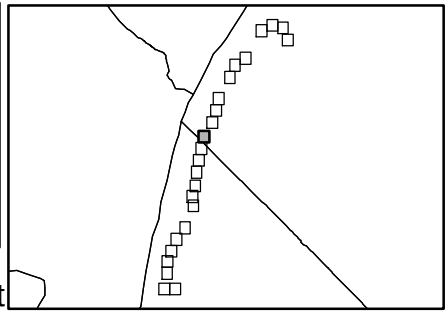

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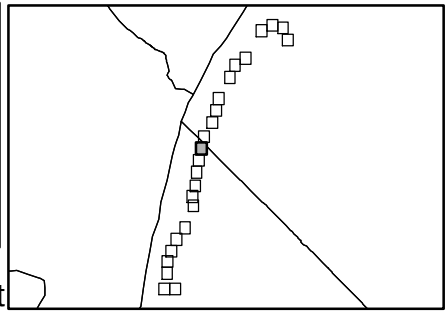

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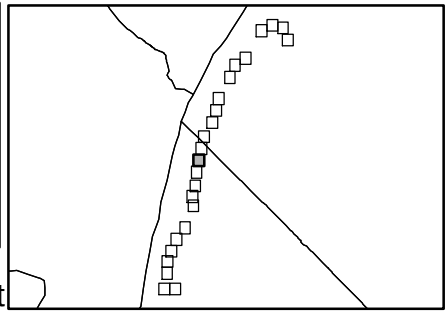

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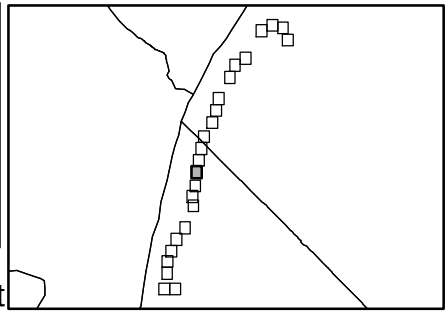

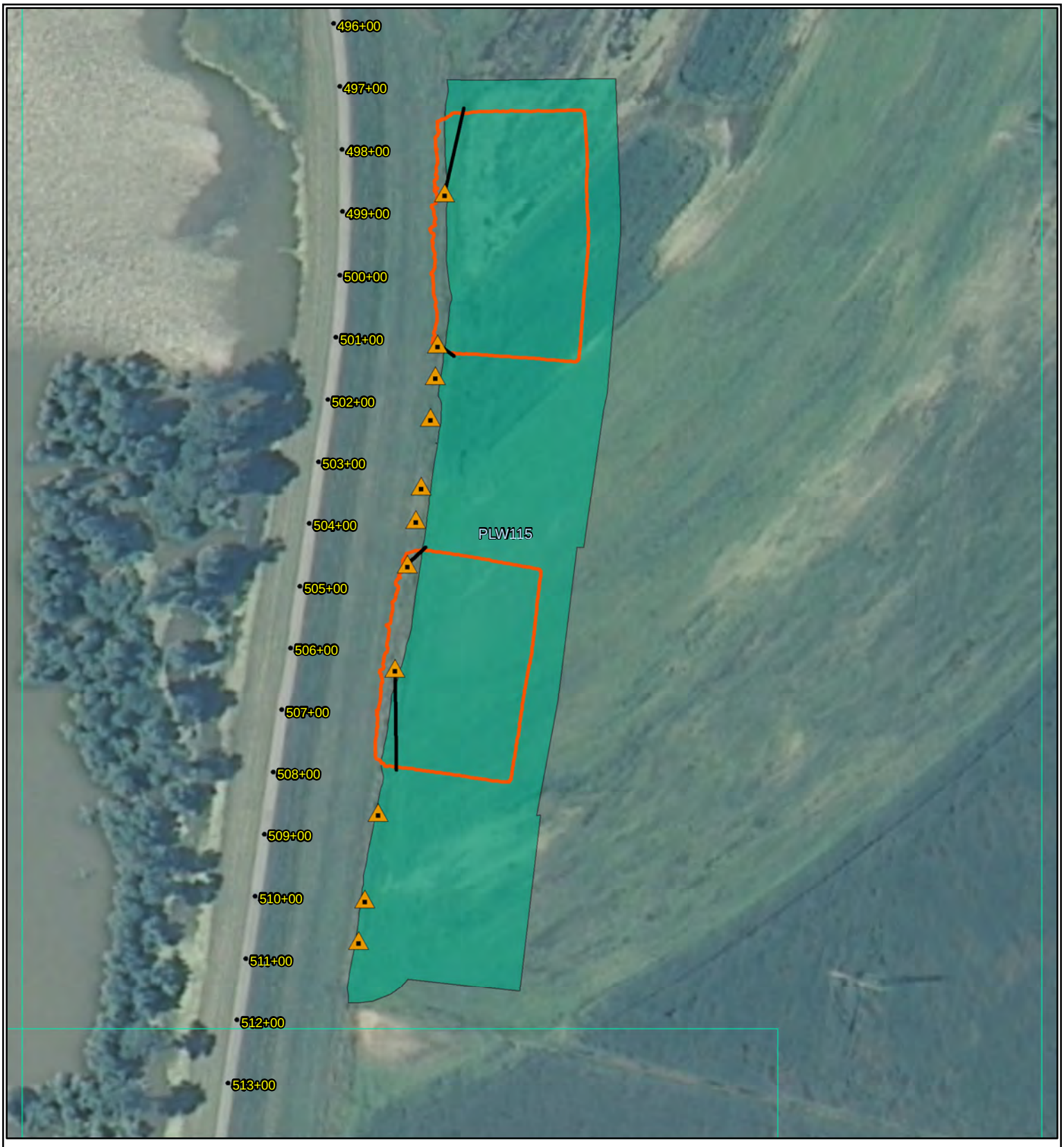

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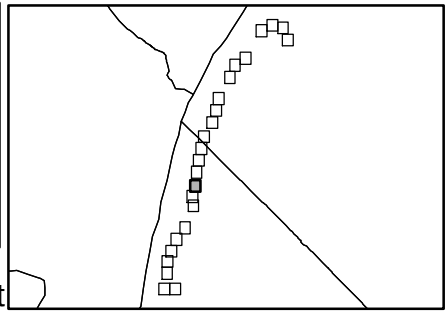

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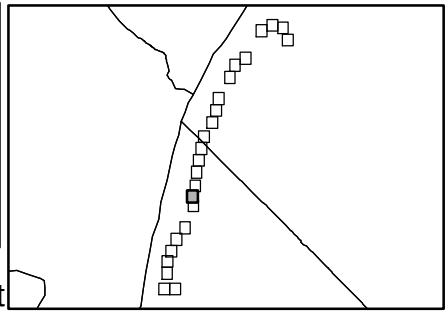

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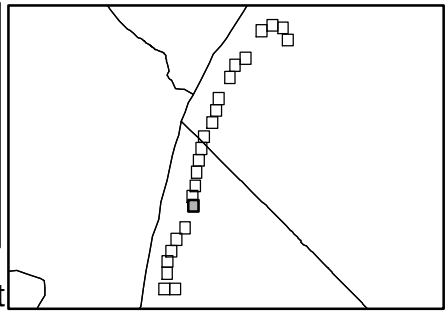

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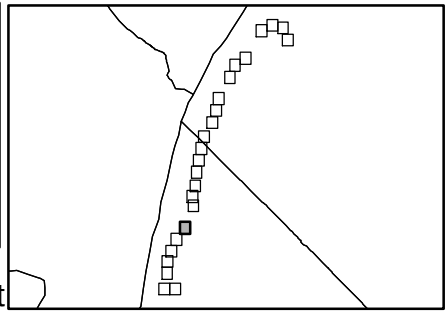

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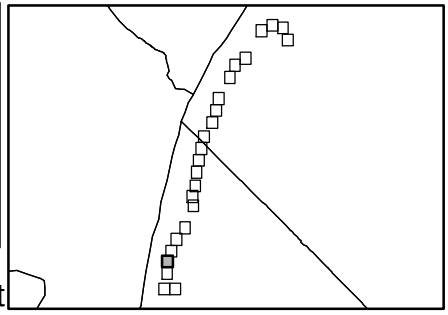

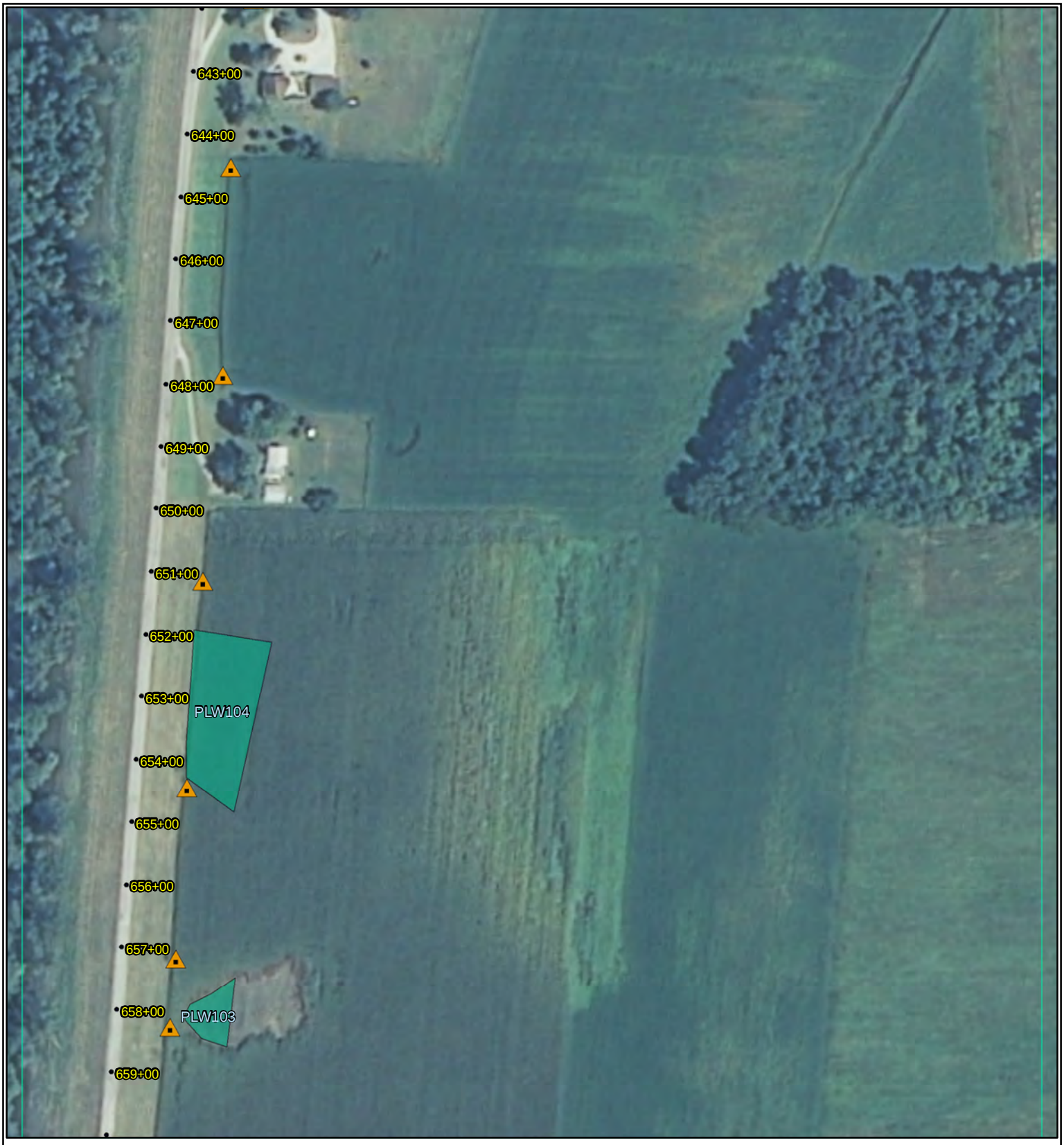

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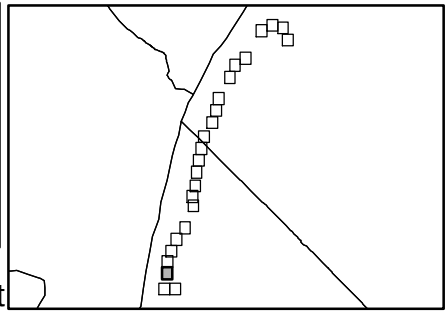

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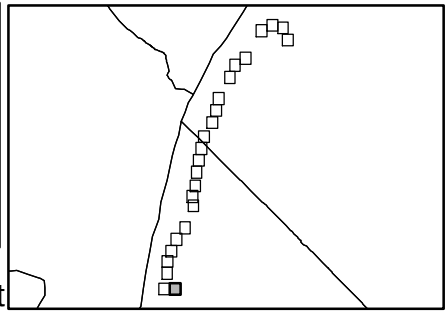

Conceptual Wetland and Stream Mitigation Plan for the Southwestern Illinois Levee Project

Prepared for:
Southwestern Illinois Flood Prevention District Council

Submitted to:
U.S. Army Corps of Engineers, St. Louis District

Prepared by:
AMEC Environment & Infrastructure
3199 Riverport Tech Center Drive
Maryland Heights, Missouri

AMEC Project No. 3250115518

December 9, 2011

Stephen R. Carty / for 12/9/2011

Stephen P. Stumne, M.S. **Date**
Principal Wetland Scientist
with permission

12.9.11

William J. Elzinga, M.S. **Date**
Senior Principal Scientist

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APPENDICES

ABBREVIATIONS AND ACRONYMS

CFR	Code of Federal Regulations
COR	Chain of Rocks
CWA	Clean Water Act
FEMA	Federal Emergency Management Agency
FL	Fish Lake Drainage and Levee District
FPD	Flood Prevention District
MESD	Metro-East Sanitary District
OHWM	ordinary high water mark
OW	open water
PDP	Prairie du Pont Drainage and Levee District
PEM	palustrine emergent wetlands
PEM-f	farmed wetlands
PFO	palustrine forested wetlands
SFHA	Special Flood Hazard Area
SIFPDC	Southwestern Illinois Flood Prevention District Council
USACE	U.S. Army Corps of Engineers
WR	Wood River Drainage and Levee District

1.0 INTRODUCTION

This Conceptual Wetland and Stream Mitigation Plan has been developed to initiate mitigation planning and support Clean Water Act (CWA) Section 404 permitting in association with the Southwestern Illinois Levee Project improvements. This conceptual plan is intended to be a precursor to the development of the final wetland mitigation plan required by the U.S. Army Corps of Engineers (USACE) under authority of 33 Code of Federal Regulations (CFR) 320.4(r) and 33 CFR 332. Specifically, the purpose of this conceptual mitigation plan is to:

- Provide support required for Section 404 permitting.
- Provide an internal tool guiding the approach and strategy for wetlands mitigation.
- Provide a framework for subsequent detailed mitigation planning.

The final wetlands mitigation plan will build upon this conceptual plan and will include details not provided herein. For USACE approval, the final wetlands mitigation plan will identify the specific wetland mitigation site, specific mitigation methods, specific objectives and performance standards, specific monitoring and reporting methods, maintenance and adaptive management plans, and the means to protect the site in perpetuity. Guidance for the content of the final mitigation plan is provided in 33 CFR 332.4(c) and includes the following key elements:

1. Objectives – A description of the resource type(s) and amount(s) that will be provided, the method of compensation (i.e. restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed, ecoregion, physiographic province, or other geographic region of interest.

2. Site Selection – A description of the factors considered during the site selection process. This should include consideration of watershed needs, on-site alternatives where applicable, and the practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the compensatory mitigation project site. Site selection requirements are provided in 33 CFR 332.3(d).

3. Site Protection Instrument – A description of the legal arrangements and instrument, including site ownership, that will be used to ensure the long-term protection of the compensatory mitigation project site. Site protection requirements are provided in 33 CFR 332.7(a).

4. Baseline Information – A description of the ecological characteristics of the proposed compensatory mitigation project site and, in the case of an application for a USACE Permit, the impact site. This may include
    - descriptions of historic and existing plant communities,
    - historic and existing hydrology,
    - soil conditions,
    - a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those sites, and
    - other site characteristics appropriate to the type of resource proposed as compensation.

    The baseline information should also include a delineation of waters of the United States on the proposed compensatory mitigation project site.

5. Determination of Credits – A description of the number of credits to be provided, including a brief explanation of the rationale for this determination. For permittee-responsible mitigation, this should include an explanation of how the compensatory mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity. Guidelines for the determination of credits are provided in 33 CFR 332.3(f).

6. Mitigation Work Plan – Detailed written specifications and work descriptions for the compensatory mitigation project, including, but not limited to
    - the geographic boundaries of the project;
    - construction methods, timing, and sequence;
    - source(s) of water, including connections to existing waters and uplands;
    - methods for establishing the desired plant community;
    - plans to control invasive plant species;
    - the proposed grading plan, including elevations and slopes of the substrate;
    - soil management; and
    - erosion control measures.

    For stream compensatory mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

7. Maintenance Plan – A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. Performance Standards – Ecologically based standards that will be used to determine whether the compensatory mitigation project is achieving its objectives. Performance standard guidelines are provided in 33 CFR 332.5.

9. Monitoring Requirements – A description of parameters to be monitored in order to determine if the compensatory mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting on monitoring results to the USACE District Engineer must be included. Monitoring guidelines are provided in 33 CFR 332.6.

10. Long-Term Management Plan – A description of how the compensatory mitigation project will be managed after performance standards are achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management. Long-term management guidelines are provided in 33 CFR 332.7(d).

11. Adaptive Management Plan – A management strategy to address unforeseen changes in site conditions or other components of the compensatory mitigation project, including the party or parties responsible for implementing adaptive management measures. This plan will guide decisions for revising compensatory mitigation plans and implementing measures to address both foreseeable and unforeseen circumstances that adversely affect compensatory mitigation success. Adaptive management guidelines are provided in 33 CFR 332.7(c).

12. Financial Assurances – A description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with its performance standards. Financial assurances guidelines are provided in 33 CFR 332.3(n).

This Conceptual Wetland and Stream Mitigation Plan is intended to support the permitting of levee improvements and thus provides an overview of impacts and mitigation proposed, identifies candidate mitigation sites, and identifies general aspects of the proposed activities intended to compensate for unavoidable adverse impacts. Certain aspects of the final plan will be developed subsequent to final mitigation site selection that include the identification of objectives, performance standards, detailed site investigations, grading plan details, site-specific erosion control measures, vegetation plan details, and other measures.

1.1 Project Description and Location

The Southwestern Illinois Flood Prevention District Council (SIFPDC) was formed in July 2009 by Madison, Monroe and St. Clair counties in direct response to the Federal Emergency Management Agency's (FEMA) announcement of its intention to de-accredit the 74-mile levee system protecting the St. Louis Metro East region. FEMA's decision would effectively designate substantial portions of the American Bottoms area of Southwestern Illinois as a Special Flood Hazard Area (SFHA) on new flood insurance rate maps, with devastating economic impact on the region. Recognizing the urgency of this situation, regional leaders successfully sought authorization from the Illinois General Assembly to impose a ¼ percent sales tax to pay for any necessary improvements to the levee system and created independent Flood Prevention Districts (FPDs) within each county with the authority to collect the tax.

The SIFPDC was formed by the three county FPDs as a joint venture to oversee the improvement of the Metro East levee systems so they can continue to protect the lives, property and the economic vitality of the St. Louis Metro East region.

The levee systems protecting the American Bottoms include five levee entities or levee districts that are combined into the following three units:

- Wood River Drainage and Levee District (WR)
- Metro-East Sanitary District (MESD) and Chain of Rocks (COR)
- Prairie du Pont Drainage and Levee District (PDP) and Fish Lake Drainage and Levee District (FL).

WR is made up of three standalone levees: Upper Wood River, East-West Fork of Wood River, and Lower Wood River. These three levees maintain protection independently from each other, and surrounding levees. The MESD and COR function as a single levee. The combined MESD/COR system is not dependent upon WR nor PDP/FL to maintain its protection. The PDP and FL levees are dependent upon each other and function as one continuous levee system. Figure 1-1 presents an overview of the levee system.

The SIFPDC proposes to implement improvements along all three levee systems in Madison, St. Clair, and Monroe counties in Illinois. The purpose of the improvements is to restore the level of protection such that the levee systems will be eligible for accreditation in accordance with 44 CFR 65.10 criteria.

The SIFPDC proposes to perform levee improvements on all three systems, but since they function independently of each other and have independent utility, three separate applications are being submitted for CWA Section 404/401 authorization. Thus, it is

anticipated that one permit will be issued for each of the three independent levee systems. Mitigation, however, may be implemented at a single site or at multiple locations within the American Bottoms. The purpose of this Plan is to provide for mitigation as may be required for each and all of the three levee systems.

1.2 Impact Avoidance and Minimization

As is required by the guidelines for Section 404(b)(1) of the CWA, activities proposed within "waters of the United States" that are not water dependent are required to demonstrate that they have considered all appropriate reasonable and prudent measures to avoid and minimize impacts to waters. Furthermore, compensatory mitigation should be considered only after avoidance and minimization measures have been fully evaluated and applied to the extent practicable.

Because of the floodplain position of the levee systems and the proximity of wetlands and streams that in some locations directly abut the levee, complete avoidance of all impacts to waters of the United States is not feasible. Measures have been taken, however, to avoid and minimize impacts to wetlands and streams to the extent practicable. Specifically, as detailed in the supporting documents of the permit applications for each levee, these measures include the following considerations:

- **Maximization of the Use of Relief Wells.** Relief wells have a very limited footprint or area of impact and have been selected as the preferred design tool in all cases where they provide an adequate solution to the site specific problem.
- **Construction Staging**. Access roads and lay-down areas will be sited to strategically avoid and/or minimize impacts to wetlands and streams.
- **Borrow Areas.** To avoid/minimize potential secondary impacts to waters of the United States, an effort will be made to site all borrow areas in non-wetland areas. All potential additional work areas that may be required during construction will be surveyed for wetlands to ensure wetlands are avoided.

2.0 SUMMARY OF UNAVOIDABLE WETLAND IMPACTS

2.1 Wetland Impacts

A total of 26.00 acres of jurisdictional wetlands will be impacted by the proposed levee improvements. These impacts, occurring within the Mississippi River floodplain, include 11.60 acres of farmed wetlands (PEM-f), 5.72 acres of palustrine emergent wetlands (PEM), 6.78 acres of palustrine forested wetlands (PFO), and 1.90 acres of open water (OW). A summary of wetland impacts is provided in Table 2-1. Wetlands that will be affected by construction of the proposed project are generally low-quality wetland systems due in part to disturbance caused by mowing/maintenance and prior cultivation. The largest single category of wetland impacts occurs within farmed wetlands that are regularly cultivated. Other non-farmed emergent wetlands impacted by the proposed project are typically located within drainage features and are regularly maintained by mowing and occasional ditch clean-out activities. Forested wetlands impacted by the proposed levee project include typical floodplain forest wetland communities consisting of eastern cottonwood (*Populus deltoides*), box elder (*Acer negundo*), and silver maple (*Acer saccharinum*). Wetland communities dominated by hard mast-producing trees are generally absent. Open water systems impacted by the proposed project generally lack hydrophytic vegetation.

Table 2-1. Summary of Wetland Impacts

Levee System	PEM-f	PEM	PFO	OW	Levee Impacts
WR (ac)	0.07	4.39	3.07	1.90	9.43
MESD/COR (ac)	0.00	0.50	3.71	0.0	4.21
PDP/FL (ac)	11.53	0.83	0.00	0.0	12.36
Total Impacts (ac)	**11.60**	**5.72**	**6.78**	**1.90**	**26.00**

Additional information regarding wetland impacts and descriptions is provided in the wetland reports generated for each permit application submittal. All wetlands were delineated in accordance with the *1987 Wetland Delineation Manual* (USACE, 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (USACE, 2010).

2.2 Stream Impacts

All stream impacts associated with the proposed levee project occur within the WR levee system in Madison County. Impacts at Indian Creek include rip rap armoring on one bank to stabilize approximately 780 linear feet of this stream. In this location, Indian Creek is a perennial stream with steep eroding banks and a width at ordinary

high water mark (OHWM) of approximately 30 feet. The other stream impacts are a result of graded filter improvements that will result in the deposition of aggregate (sand and gravel) in two unnamed streams for more than 800 linear feet. Graded filter improvements will maintain existing flow contours. Unnamed stream WLS-302a is an intermittent stream with steep incised banks and a width at OHWM of approximately 15 feet. Unnamed stream WRLS-100 is a small intermittent tributary of Wood River and has steep eroding banks and a width at OHWM of approximately 5 feet. Impacts are described in more detail in the wetland delineation report for the WR levee system.

Table 2-2. Summary of Stream Impacts

Stream Name	Flow Type	Width at OHWM (ft)	Length of Impact (ft)	Area of Impact (ac)
Indian Creek	Perennial	30	780	0.54
Unnamed (WLS-302a)	Intermittent	15	35	0.01
Unnamed (WRLS100)	Intermittent	5	782	0.09
Total Impacts			**1,597**	**0.64**

3.0 PROPOSED MITIGATION

3.1 Mitigation Commitments

The section provides a discussion of the mitigation commitments for both wetland and stream impacts associated with the project. Regulations governing wetland mitigation are provided in 33 CFR 332, Compensatory Mitigation for Losses of Aquatic Resources. Appropriate mitigation ratios are applied to account for the method of compensatory mitigation (e.g., preservation, restoration, creation), the likelihood of success, differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project, temporal losses of aquatic resource functions, the difficulty of restoring or establishing the desired aquatic resource type and functions, and/or the distance between the affected aquatic resource and the compensation site.

3.1.1 Wetlands

The wetland mitigation ratios used for this project are consistent with ratios used for similar mitigation projects in southern Illinois. A 1:1 ratio is proposed for open water because these areas generally lack hydrophytic vegetation and are considered to be fairly low in quality, thus their functions can be replaced quickly. Relatively higher mitigation ratios are proposed for emergent and forested wetlands because they typically have higher functional values. The replacement ratios are greatest for forested wetlands due to the relatively longer time needed to develop mature forested wetland systems. The SIFPDC is proposing to create 47.69 acres of wetlands through permittee-responsible compensatory mitigation as outlined in Table 3-1.

Table 3-1. Summary of Wetland Mitigation Commitments

Wetland Type	Wetland Impact (ac)	Mitigation Ratio	Mitigation Commitment (ac)
PEM-f	11.60	1.5:1	17.40
PEM	5.72	2.0:1	11.44
PFO	6.78	2.5:1	16.95
OW	1.90	1:1	1.90
Total	**26.00**		**47.69**

3.1.2 Streams

Stream mitigation commitments are based on the *Illinois Stream Mitigation Guidance* (Version 1.0), a stream mitigation methodology for processing Section 404 CWA permit applications in the State of Illinois. In accordance with the guidance, adverse impact factors such as stream type (ephemeral, intermittent, or perennial), priority or importance of the impacted stream, existing condition or health of the impacted stream, duration of impact, activity type proposed, and length of stream impact are evaluated to determine the amount of stream mitigation credits required. Based on this methodology, 2,869 stream mitigation credits are required to mitigate for the stream impacts identified in Section 2.2. The worksheet identifying stream mitigation credits based on the *Illinois Stream Mitigation Guidance* is provided in Appendix A.

3.2 Mitigation Banking

Wetland mitigation banks offer mitigation credits for sale which may be used to compensate for wetland losses. Although a few wetland mitigation banks are currently being developed within the American Bottoms, no existing wetland mitigation banks are available with service areas that cover the impacts associated with the Southwestern Illinois Levee Project. Furthermore, the banks in development will not be authorized to release credits in time to be of service for this project. As such, the purchase of credits from a commercial mitigation bank is not proposed for this project.

3.3 Mitigation Site Selection

After all reasonable measures have been explored to avoid and minimize impacts to wetlands; compensatory mitigation may be achieved through wetland restoration and/or creation measures. Factors typically considered when selecting a site for wetland mitigation include existing land use (historic and current), hydrologic potential, proximity to other wetland sites, site topography, connectivity to adjacent natural habitats, site accessibility, and the presence of or potential to develop hydric soils. Based on these general considerations, the American Bottoms was examined to identify potential sites suitable for wetland mitigation. Six candidate mitigation sites are identified and are discussed below. A summary of candidate mitigation sites is listed in Table 3-2 and Table 3-3 presents a matrix of site selection suitability factors that will be used when detailed site characteristic information is available to make future decisions regarding site selection.

Regarding the public review and comment period, 33 CFR 332.4(b) states that the public notice “shall not include information that the district engineer and the permittee believe should be kept confidential for business purposes, such as the exact location of a proposed mitigation site that has not yet been secured”. It is hereby noted that the

SIFPDC is considering other candidate mitigation sites that cannot be specifically disclosed at this time due to confidentiality reasons.

Table 3-2. Summary of Candidate Mitigation Sites

Candidate Site	Key Mitigation Concepts	Issues
Judy's/Burdick Branch	Excavation to achieve overbank hydrology; stream restoration	Multiple parcels with different owners
Elm Slough	Plug agricultural drainages to restore hydrology and create wetlands; stream restoration	Two property owners
Brushy Lake	Excavation to achieve overbank hydrology; stream restoration	Previously initiated restoration under the EEP program
South McDonough Lake	Sufficient excavation required to utilize groundwater for hydrology source	Only 70± ac available for mitigation due to existing forested areas
Fountain Creek	Conversion of planned mitigation bank into individual permittee-responsible site	Potential for stream credits good; insufficient wetland credits
American Bottoms	Conversion of planned mitigation bank into individual permittee-responsible site	Located directly on Mississippi River

Table 3-3. Candidate Wetland Mitigation Site Suitability Matrix

Selection Criteria	Definition/Clarification
Land Use/Land Cover	
Land Use and Availability	Site should consist of undeveloped land uses and ideally support impacted natural communities (i.e. fallow field, cultivated field, pasture, scrub-shrub communities, etc.). Developed natural communities (forest land, wetlands, etc.) are less desirable as these areas provide reduced mitigation credits.
Plant Community	Provide a description of the existing vegetative community at the candidate site.
Ecological Community Contiguity	Contiguity with adjacent ecological communities is beneficial for natural recruitment of plant species and faunal migration and movement. Availability of adjacent/contiguous lands that can be used to buffer created/restored wetland. Linkage to adjacent aquatic ecosystems that may offer functional value with regard to aquatic ecosystem support (food chain, fish spawning and nursery habitat, etc.). Linkage to ecosystems that have the potential to support species of concern and other wetland and terrestrial wildlife is preferred.
Presence of Invasive/Noxious Species	Site should not support invasive/noxious species that will compete with proposed wetland community to be established or present a management concern. Alternatively, site may support noxious species which may be the subject of restoration objectives (eliminating invasive species and planting natives).
Topography/Soils/Geology	
Topography and Geology	Site should consist generally of level terrain (within area proposed for establishment as wetlands) and provide necessary wetland hydrology.
Soil Characteristics	Soils should typically be of fine grained materials with low permeabilities ranging between 10^{-5} to 10^{-7}. Higher perm factors may only be considered with appropriate soil amendments and engineering design to reduce permeability.
Hydrology	
Surface Water	If primary hydrology source is surface water runoff, site must be supported by overbank flooding, precipitation, and/or runoff from the immediate watershed.
Groundwater	Groundwater hydrology (if intended driver of wetland hydrology) should be demonstrated to affect the proposed base elevation of the constructed wetland. Note, in some locations, caution should be taken to consider potential "upheaval" and "liner" rupture/swelling from rapid groundwater elevation increases.
Engineering	
Management/ Maintenance	Consider potential challenges with respect to management/maintenance (e.g., debris, fouling of site, deer browsing, beaver damage, etc.).
Access	Proximity to roads for equipment transport
Maintenance	
Engineering Feasibility/Cost	Consideration should be given to difficulty of engineering design (grading, water control, etc.) and overall cost for construction.
Ownership	
Land Ownership	Lands currently held in title by project proponent are most desirable. Secondarily, lands held by public ownership interested in ecosystem restoration.

3.3.1 Judy's/Burdick Branch

This candidate site is located in Madison County southeast of the junction of I-255 and Route 162, at the confluence of Judy's Branch, Burdick Branch, and Cahokia Canal (Figure 3-1). This site was previously identified as a potential ecosystem restoration site in accordance with the USACE St. Louis District's East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project (USACE, 2011), but the projects were never implemented due to a lack of funds. As such, siting mitigation at Judy's/Burdick Branch could potentially satisfy mitigation commitments for the levee project and provide needed flood control in the American Bottoms as previously identified by the USACE. Much of this candidate site lies at the southern end of historic Rattan's Prairie, a 15,000-acre wet prairie once located in the northeast part of the American Bottoms.

The site is currently in agriculture and Judy's Branch, Burdick Branch, and Cahokia Canal are all deeply incised, channelized streams with steep eroding banks. The soils are generally silts and clays with a large portion of the candidate site west of Cahokia Canal mapped as Darwin Silty Clay, 0 to 2 percent Slopes, a mapped hydric soil. Potential exists to create emergent wetlands, forested wetlands, wet prairie buffers, and to restore stream channels. Key mitigation concepts may include:

- Proposed restoration activities would incorporate the preliminary restoration candidate site developed by the USACE (East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project), as appropriate.
- Modification of the existing levees to direct pulsing floodwaters into the mitigation site and to protect adjacent properties from flood events delivered by Judy's and Burdick Branches combined.
- Stream mitigation that may include a new meandering channel and/or riparian corridor plantings.
- Excavation to create at least 1.90 acres of open water features that can be used to trap sediment coming into the site from the upland drainage systems.
- Excavation to create 28.88 acres of emergent wetland – deep and/or shallow marsh communities.
- Excavation to create 16.95 acres of forested wetlands.
- Creation of wet prairie buffer communities – this buffer area may provide suitable habitat for the threatened decurrent false aster (*Boltonia decurrens*).
- Excavated clay may be suitable for levee improvements.

Judy's/Burdick Branch is large enough to provide all the mitigation credits needed for the levee project. This candidate site would require the acquisition of private property prior to implementation of mitigation.

3.3.2 Elm Slough

This candidate site is located northeast of Horseshoe Lake in Madison County east of Route 111, south of Route 162, and west of I-255 (see Figure 3-1). The Elm Slough candidate site is located within an old meander scar of the Mississippi River and forest was the predominant pre-settlement vegetative community. This site was previously identified as a potential ecosystem restoration site in accordance with the USACE East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project (USACE, 2011) but the projects were never implemented due to a lack of funds. As such, siting mitigation at Elm Slough could potentially satisfy mitigation commitments for the levee project and provide needed flood control in the American Bottoms as previously identified by the USACE.

The site is primarily in agriculture. Groundwater is shallow and the soils are generally clays and silts with a large portion of the candidate site mapped as Darwin Silty Clay, 0 to 2 percent Slopes, a mapped hydric soil. Most of the cultivated fields have a series of ditches that convey water westward toward Horseshoe Lake. Potential exists to create emergent wetlands, forested wetlands, wet prairie buffers, and create/restore stream systems. Key mitigation concepts may include:

- Proposed restoration activities would incorporate the preliminary restoration candidate site developed by the USACE (East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project), as appropriate.
- Excavation, as necessary, to provide groundwater hydrology to the mitigation site. Excavation could be minimized due to shallow groundwater levels.
- Stream mitigation that may consolidate several drainage features into a single meandering channel with riparian corridor plantings.
- Excavation to create at least 1.90 acres of open water features.
- Excavation to create 28.88 acres of emergent wetland – deep and/or shallow marsh communities. The need for excavation here may be minimized due to the apparent shallow groundwater and may be augmented by plugging on-site agricultural drainage ditches.
- Creation of 16.95 acres of forested wetlands.
- Creation of wet prairie buffer communities – this buffer area may provide suitable habitat for the threatened decurrent false aster (*Boltonia decurrens*).
- Excavated clay may be suitable for levee improvements.

Elm Slough is large enough to provide all the mitigation credits needed for the levee project. This candidate site would require the acquisition of private property prior to implementation of mitigation.

3.3.3 Brushy Lake

The Brushy Lake candidate site is located immediately south of Horseshoe Lake Road in Madison County at the confluence of Schoolhouse Branch and Cahokia Canal and is bounded by Cahokia Canal on the west and I-255 on the east (see Figure 3-1). Cahokia Creek flowed through this area in pre-settlement times when forest was the predominant vegetative cover type. This site was previously identified as a potential ecosystem restoration site in accordance with the USACE St. Louis District's East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project (USACE, 2011) but the projects were never implemented due to a lack of funds. As such, siting mitigation at Brushy Lake could potentially satisfy mitigation commitments for the levee project and provide needed flood control in the American Bottoms as previously identified by the USACE.

The site is currently in agriculture and Schoolhouse Branch and Cahokia Canal are both deeply incised, channelized streams with steep eroding banks. Soils are generally silt loams and the site lacks mapped hydric soils. Potential exists to create emergent and forested wetlands and restore stream channels in concert with ongoing adjacent restoration and preservation activities. Key mitigation concepts include:

- Proposed restoration activities would incorporate the preliminary restoration candidate site developed by the USACE (East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project), as appropriate.
- Modification of the existing levees to direct pulsing floodwaters into the mitigation site and to protect adjacent properties from flood events delivered by Schoolhouse Creek and Cahokia Canal, as needed.
- Stream mitigation to include a new meandering channel and/or riparian corridor plantings.
- Extensive excavation to create at least 1.90 acres of open water features that can be used to trap sediment coming into the site from Schoolhouse Branch and/or Cahokia Canal.
- Extensive excavation to create 28.88 acres of emergent wetland – deep and/or shallow marsh communities.
- Excavation to create 16.95 acres of forested wetlands.
- Creation of wet prairie buffer communities – this buffer area may provide suitable habitat for the threatened decurrent false aster (*Boltonia decurrens*).

Brushy Lake is large enough to provide all the mitigation credits needed for the levee project. This candidate site would require the acquisition of private property prior to implementation of mitigation.

3.3.4 South McDonough Lake

The South McDonough Lake site is located immediately south of McDonough Lake in Madison County between I-255 and Illinois Route 157 (see Figure 3-1). Much of this candidate site is located within an old meander scar of the Mississippi River. Although this site was not included in the East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project, siting mitigation at South McDonough Lake could still potentially satisfy most of the mitigation commitments for the levee project and provide needed flood control in the American Bottoms as previously identified by the USACE.

The site is currently in agriculture and surface water conveyance systems are lacking. A large portion of this site is mapped as Darwin Silty Clay, 0 to 2 percent Slopes, a mapped hydric soil. Potential exists to create emergent wetlands, forested wetlands, and wet prairie buffers. Key mitigation concepts may include:

- Excavation to provide groundwater hydrology to the mitigation site.
- Extensive excavation to create at least 1.90 acres of open water features.
- Extensive excavation to create 28.88 acres of emergent wetland – deep and/or shallow marsh communities.
- Excavation to create 16.95 acres of forested wetlands.
- Creation of wet prairie buffer communities – this buffer area may provide suitable habitat for the threatened decurrent false aster (*Boltonia decurrens*).
- Excavated clay may be suitable for levee improvements.

South McDonough Lake is large enough to provide all the wetland mitigation credits needed for the levee project but is not a suitable site for generation of stream mitigation credits. This candidate site would require the acquisition of private property prior to implementation of mitigation.

3.3.5 Fountain Creek

The Fountain Creek candidate mitigation site is located in the American Bottoms near Bluff Road and HH Road in unincorporated Monroe County (Figure 3-2). This site is currently being developed as a mitigation bank in accordance with the Banking Instrument for the Fountain Creek Mitigation Bank. This bank will not have credits released in time to be purchased for the levee improvement project. As such, this site would be converted from a mitigation bank to a permittee-responsible mitigation site. This site is capable of generating 32 emergent wetland credits and can generate more than enough stream credits for the levee project. The required amount of forested wetland credits, however, could not be generated at Fountain Creek.

The site is currently cultivated and ditched to provide drainage for agricultural production. The soils consist of silts and clays and hydric soils are known to exist on portions of the site. Potential exists for emergent wetland creation and stream restoration. Proposed mitigation activities would follow the Banking Instrument for the Fountain Creek Mitigation Bank.

3.3.6 American Bottoms

The American Bottoms candidate mitigation site is located in unincorporated Monroe County on the left descending bank of the Mississippi River just above the Osborne Side Channel (see Figure 3-2). This site is currently being developed as the American Bottoms Mitigation Bank, but the bank will not have credits released in time to be purchased for the levee improvement project. As such, this site would be converted from a mitigation bank to a permittee-responsible mitigation site. This site is capable of generating all of the wetland credits needed for the levee project. Stream credits, however, cannot be generated at this site.

The site consists of prior converted wetland on the unprotected side of the levee. Because the site is located on the Mississippi River, it is subject to seasonal flooding cycles and associated scour and deposition that could create challenges for post-construction maintenance and monitoring. Potential exists for the creation of emergent and forested wetland systems as well as open water features. Proposed mitigation activities would follow the Banking Instrument for the American Bottoms Mitigation Bank.

4.0 CONCEPTUAL MITIGATION PLAN

This conceptual plan will require further data collection and refinement (e.g., finished base elevations, channel morphology, etc.) subsequent to detailed pre-design site investigations. Final site selection and design (specifications and plans) of the mitigation site will be developed at a later stage and will be coordinated with the USACE St. Louis District. Because of the need for additional planning and design activities following permit issuance (including site selection and acquisition), it is anticipated that the start of mitigation construction will be within 180 days of permit issuance or concurrent with the start of levee construction activities that impact waters of the United States (whichever is longer). Additionally, it is anticipated that mitigation construction may continue for the duration of the levee improvement schedule in order to support appropriate phasing of the overall project (e.g., timing associated with impacts to waters of the United States, need for borrow to support levee construction, etc.).

4.1 Pre-Design Investigation

Existing information and data collected during the pre-design investigation will be utilized to assist in the development of the design specifications for the selected site, which will be presented in the final mitigation plan. It is anticipated that site selection will be finalized prior to initiating subsequent pre-design tasks. Pre-design investigation may include:

- Task 1-Site Survey – Although U.S. Geological Survey topographic mapping is available for the candidate sites, additional detailed topographic survey (1-foot contours) will be required for the selected site to more accurately develop a grading plan and determine the local watershed and hydrology for mitigation design.

- Task 2-Hydrologic Investigation – A critical factor controlling wetland character and, consequently, the success or failure of a wetland mitigation project is hydrology. An improper hydroperiod (i.e., the length of time a site is saturated or inundated) may result in the formation of either a non-wetland or a wetland of a different type. The objective of this investigation will be to collect and analyze the necessary data (stream stage data, groundwater, etc.) that can be used to develop the construction plans and specifications that will result in the desired hydroperiod. Depending on the site selected, existing hydrologic studies may be available for use in project planning (i.e., East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project sites). Shallow piezometers may need to be installed and monitored for a short period during pre-design and may also be evaluated during the post-construction monitoring phase of the project. Hydrologic

information will be compared to survey data at the selected site to evaluate the potential connection of the site with an adjacent stream if surface water is to be the primary driver. If groundwater is to be the primary hydrology source then groundwater elevations will be compared to site topography to evaluate earthwork needs.

- Task 3 – Soils and Geotechnical Analysis – A limited number of shallow soil borings (typically less than 10 feet) may be taken concurrent with piezometer installation (Task 2). Results of these borings will provide information on the texture and water holding capacity of the soils at the desired depth of the proposed wetland. Additional soil sampling and geotechnical analyses may be performed, as deemed necessary, to evaluate soil engineering factors needed for design as well as risk factors (i.e., potential contamination) that could potentially be present at the site.

- Task 4 – Natural Heritage Review – Consultation with the Illinois Department of Natural Resources and/or U.S. Fish and Wildlife Service may be necessary to identify listed threatened or endangered species at the proposed mitigation site.

- Task 5 – Cultural Resources Review – Consultation with the State Historic Preservation Office may be necessary to identify any culturally significant resources at the proposed mitigation site.

4.2 Wetland Mitigation Concepts

Several options exist for compensatory wetland mitigation. Once mitigation site selection has been finalized, wetland mitigation will be achieved through a series of methods as outlined below. Methods will be tailored to the selected site. Thus, any of the methods listed below may be appropriate, but will depend ultimately on site selection and the needs of that site.

Control of Invasive Plant Species

Common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinacea*) are common invaders of disturbed areas such as roadside ditches and disturbed floodplain and riparian corridors. If invasive species are present at the selected mitigation site, then control methods including appropriate seasonal herbicide application may become an important element in the final mitigation plan. Control of invasive species allows for the establishment of desirable native wetland vegetation.

Hydrology Restoration

Various measures may be used to provide for or restore hydrology at a given candidate wetland mitigation site to provide a proper wetland hydroperiod. For example, in some locations, alterations to existing levees along drainages may be

needed to allow flow into the selected mitigation site and to protect adjacent property from flood waters. At other locations the disruption of agricultural drain tiles or plugging of ditches may be the most effective means by which to restore hydrology. Finally, at some sites, more extensive grading may be required to connect upland areas with surface water or groundwater sources.

Planting of Desirable Native Vegetation

Seeding, installation of vegetative plugs, and the planting of potted trees and/or shrubs will be used to hasten the establishment of desired native hydrophytic vegetation. Seeding and/or installation of vegetative plugs may also be used to provide adequate erosion control in select erosion-prone locations.

Two methods of vegetation establishment may be used for creation sites: live plantings and seed application. The actual establishment method will vary depending on the species, vegetative form of the species, commercial availability of the plant, cost, and time of year when planting.

Lists of potential plant species to be considered for establishment in the emergent wetland zone, the forested wetland zone, and native buffer zones are presented in Tables 4-1, 4-2, and 4-3, respectively. These tables represent species that could be used in the creation of new wetlands, in the restoration of former wetlands, or in the enhancement of existing wetlands. These lists are not intended for use as blueprints in determining the species composition of the mitigation site. Species may be added or deleted from this list as determined by such factors as local occurrence, likelihood of voluntary colonization of the site, commercial availability, and coordination with agencies. A planting plan will be prepared during final design that will finalize and detail the species selected for planting, their form (i.e., seed, rhizome, seedling, etc.), planting methodology, seeding rates, plant spacing, and timing.

Planning elements that will be addressed in detail in the final wetland mitigation plan will include the following:

- Grading plan that will identify any excavation requirements, grading plan details, and methods to establish the necessary hydroperiod.
- Planting plan that will identify the plant species, plant material types, and the methods to be used to establish the desired native vegetative communities.
- Monitoring plan to determine that project goals and permit conditions are being met.
- Contingency plan to address corrective measures to be performed in the event that failure of the mitigation site is identified during monitoring activities.

Table 4-1. List of Potential Plant Species for the Emergent Wetland Zone

Scientific Name	Common Name	Indicator Status	C*
Alisma subcordatum	Common water plantain	OBL	5
Asclepias incarnata	Swamp milkweed	OBL	5
Bidens polylepis	Bur marigold	FACW	1
Boltonia asteroides	False aster	FACW	5
Carex frankii	Frank's sedge	OBL	5
Carex hystricina	Porcupine sedge	OBL	7
Carex shortiana	Short's sedge	FACW+	4
Carex vulpinoidea	Fox sedge	OBL	4
Iris virginica	Southern blue flag iris	OBL	6
Juncus effuses	Common rush	OBL	5
Leersia oryzoides	Rice cut grass	OBL	4
Pontederia cordata	Pickerel weed	OBL	7
Sagittaria latifolia	Arrowhead	OBL	4
Schoenoplectus fluviatilis	River bulrush	OBL	7
Schoenoplectus validus	Softstem bullrush	OBL	5
Scirpus atrovirens	Dark green rush	OBL	4
Scirpus cyperinus	Wool grass	OBL	7

Note: Number, spacing and seed application rate to be determined during final design.
** Coefficient of Conservatism (C) obtained from The Nature Conservancy (TNC), 2000.*

Table 4-2. List of Potential Plant Species for the Future Forested Wetland Zone

Scientific Name	Common Name	Indicator Status	C*
Acer saccharinum	Silver maple	FACW	1
Betula nigra	River birch	FACW	3
Carya illinoensis	Pecan	FACW	6
Cephalanthus occidentalis	Button bush	OBL	3
Cornus obliqua	Swamp dogwood	OBL	5
Forestiera acuminata	Swamp privet	OBL	6
Fraxinus pennsylvanica	Green ash	FACW	2
Platanus occidentalis	Sycamore	FACW	3
Quercus bicolor	Swamp white oak	FACW+	7
Quercus lyrata	Overcup oak	OBL	8
Quercus palustris	Pin oak	FACW	4
Salix nigra	Black willow	OBL	2
Taxodium distichum	Bald cypress	OBL	8

Note: Number, spacing and seed application rate to be determined during final design.
** Coefficient of Conservatism (C) obtained from TNC, 2000.*

Table 4-3. List of Potential Plant Species for Wet Prairie Buffer Zones

Scientific Name	Common Name	Wetland Indicator Status	C*
Andropogon gerardii	*Big bluestem*	*FAC-*	*5*
Bidens polylepis	*Bur marigold*	*FACW*	*1*
Boltonia asteroides	False aster	FACW	5
Desmanthus illinoensis	*Illinois bundle flower*	*FAC-*	*3*
Elymus canadensis	*Canada wild rye*	*FAC-*	*5*
Elymus virginicus	*Virginia wild rye*	*FACW-*	*4*
Helianthus grosseserratus	*Sawtooth sunflower*	*FACW-*	*4*
Panicum virgatum	*Switch grass*	*FAC+*	*4*
Rudbeckia laciniata	Wild golden glow	FACW+	3
Rudbeckia subtomentosa	*Sweet black-eyed Susan*	*FACW*	*5*
Silphium terebinthinaceum	*Prairie doc*	*FAC-*	*5*
Sorghastrum nutans	*Indian grass*	*FACU+*	*5*
Spartina pectinata	*Prairie cord grass*	*FACW+*	*5*
Symphyotrichum novae-angliae	*New England aster*	*FACW*	*4*
Vernonia fasciculata	*Common ironweed*	*FACW*	*6*

Note: Number, spacing and seed application rate to be determined during final design.
** Coefficient of Conservatism (C) obtained from TNC, 2000.*
May also be used to seed forested wetlands and riparian zones

4.3 Stream Mitigation Concepts

Because a specific mitigation site has not yet been selected, the following list of mitigation components should be considered as potential mitigation elements to be applied in the final stream mitigation plan. Specific mitigation components will be used to develop the necessary stream mitigation credits (potentially at more than one site) to compensate for stream impacts. Therefore, not all of the following components will necessarily be utilized in the final plan.

Channel Restoration – Many streams in the American Bottoms have undergone some channel modification (straightening) in an effort to increase conveyance to maximize development potential and floodplain agricultural use. Selected locations as described in Section 3.3 have been identified as potential stream mitigation sites where work to reestablish stream meanders may be feasible.

Riparian Zone Restoration/Creation – In order to maximize the amount of cultivated land, many farmers plant row crops as close to adjacent streams as possible, thus leaving very little, if any, riparian corridor. Partial stream mitigation credits can be developed by improving/restoring riparian zones through planting a variety of native

vegetation. These activities will effectively decrease erosion and sediment input, and increase filter functions and wildlife usage, among other functions.

Trees and shrubs that may be utilized in the restoration of a stream's riparian zone are listed in Table 4-4. Native grasses and forbs, similar to those listed in Table 4-3, may be seeded into the riparian zone after installation of the woody plant material. These lists are not intended for use as blueprints in determining the species composition of the mitigation site. Species may be added or deleted from this list as determined by such factors as local occurrence, likelihood of voluntary colonization of the site, commercial availability, and coordination with agencies.

Table 4-4. List of Potential Plant Species for Riparian Zone Restoration

Scientific Name	Common Name	Wetland Indicator Status	C*
Alnus serrulata	Smooth alder	OBL	6
Betula nigra	River birch	FACW	3
Carya illinoensis	Pecan	FACW	6
Cephalanthus occidentalis	Button bush	OBL	3
Cornus racemosa	Gray dogwood	FACW-	3
Forestiera acuminata	Swamp privet	OBL	6
Fraxinus pennsylvanica	Green ash	FACW	2
Lindera benzoin	Spice bush	FACW-	5
Quercus palustris	Pin oak	FACW	4
Salix nigra	Black willow	OBL	2

Note: Number, spacing and seed application rate to be determined during final design.
** Coefficient of Conservatism (C) obtained from TNC, 2000.*

Stream Bank Stabilization – Many of the streams at the candidate mitigation sites have been subject to bank erosion and failure. Such areas can be stabilized to provide soil conservation and improve water quality within the stream system. Appropriate native vegetation should be incorporated with bioengineering principles in final bank stabilization plans.

In-Stream Restoration – Stream channels of candidate mitigation sites are typically incised, straightened channels. Such channels may be restored by reestablishing stream bed and gradient, natural meander patterns, and pool-riffle-run sequences. Restoration of these fluvial geomorphologic features could provide additional stream habitat, wildlife functions, and flooding of adjacent wetland areas.

4.4 Monitoring and Contingency Plan

A monitoring and adaptive management plan will be developed in order to assure the proper construction and function of restored wetlands. The final mitigation plan will be developed following consultation with the USACE and other appropriate regulatory agencies. The monitoring plan would ensure that project goals and permit conditions are being met. As prescribed in the final plan, monitoring may include:

- Wetland determination
- Plant community monitoring
- Hydrologic monitoring
- Photographic monitoring from a specified location to provide a temporal record of the site's development
- Direct sightings and indirect signs (i.e., tracks, nests, etc.) of wildlife use of the area
- Inspections for erosion, sedimentation, herbivory, etc.

Monitoring would be implemented upon completion of mitigation construction and is anticipated to continue annually for 5 years following construction or until monitoring objectives are achieved. An annual report will be prepared to document the condition of the mitigation site.

In addition, vegetative cover will be mapped and quantified for each wetland plant community type on an annual basis. The entire site will also be visually inspected to identify areas of significant bare ground and monitor the potential establishment of noxious or invasive species.

An adaptive management plan will be initiated in the event of the failure of the mitigation site to meet the goals and objectives of the project. Erosion control measures may be implemented as needed. The SIFPDC understands their commitment to ensure that the mitigation site is functioning as stated in the goals and objectives of the mitigation plan.

4.5 Financial Assurance

Financial assurances will be provided during the final design phase and may include performance bonds, corporate surety bonds, letters of credit, or similar means of assurance. This financial assurance will insure that the approved wetland mitigation, monitoring and contingency plans are properly implemented and that the various wetland types meet their intended functions.

5.0 References

The Nature Conservancy (TNC). 2000. *Missouri Flora*. Printed October 2000.

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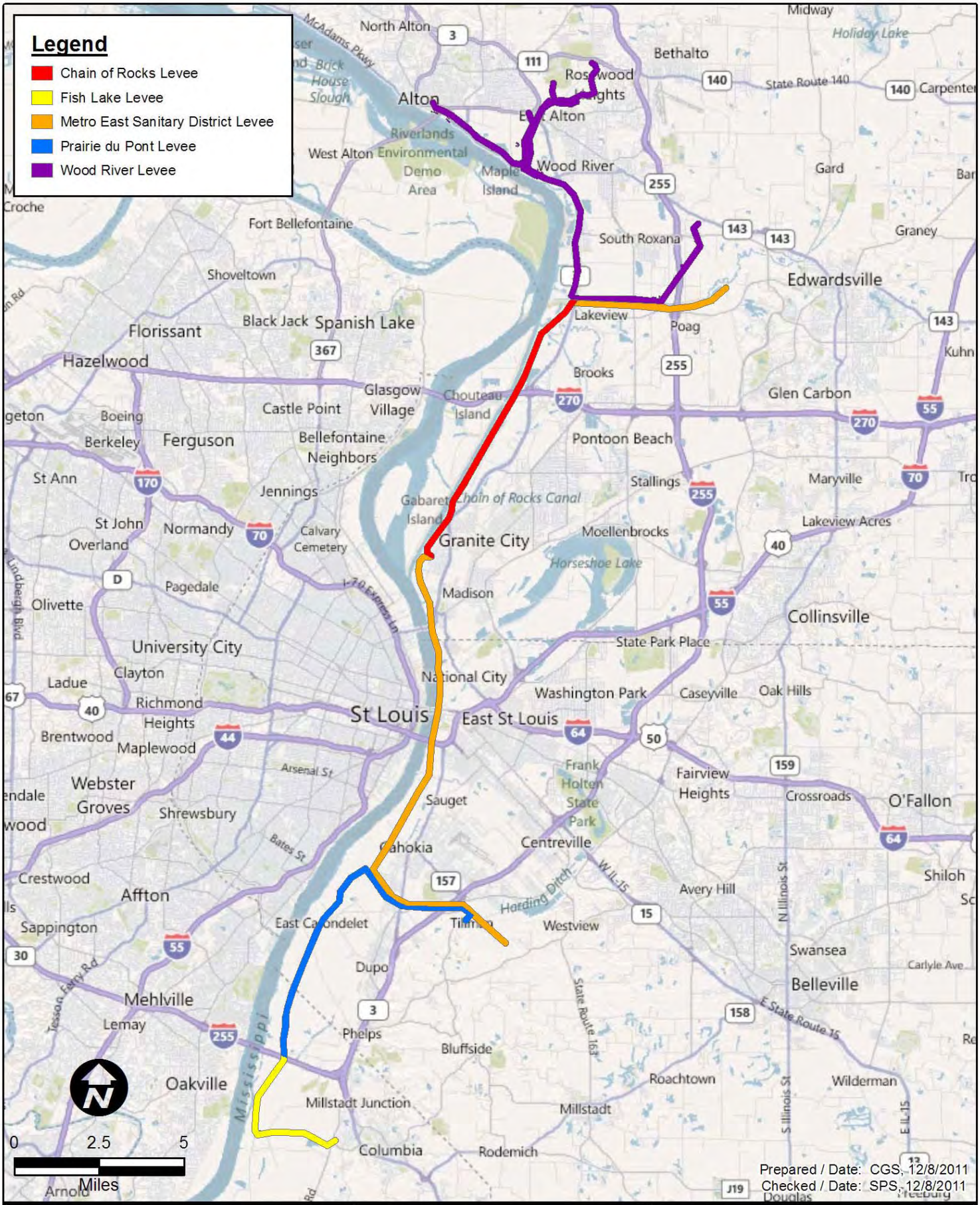
U.S. Army Corps of Engineers (USACE), 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0). August 2010.

U.S. Army Corps of Engineers (USACE) St. Louis District, 2011. *East St. Louis and Vicinity Interior Flood Control and Ecosystem Restoration Project*. Available online at http://www.mvs.usace.army.mil/pm/E_St_Louis/factsheet.htm. Accessed November 17, 2011.

Figures



SIFPDC Conceptual Mitigation Plan

amec

Figure 1-1
Levee System Overview

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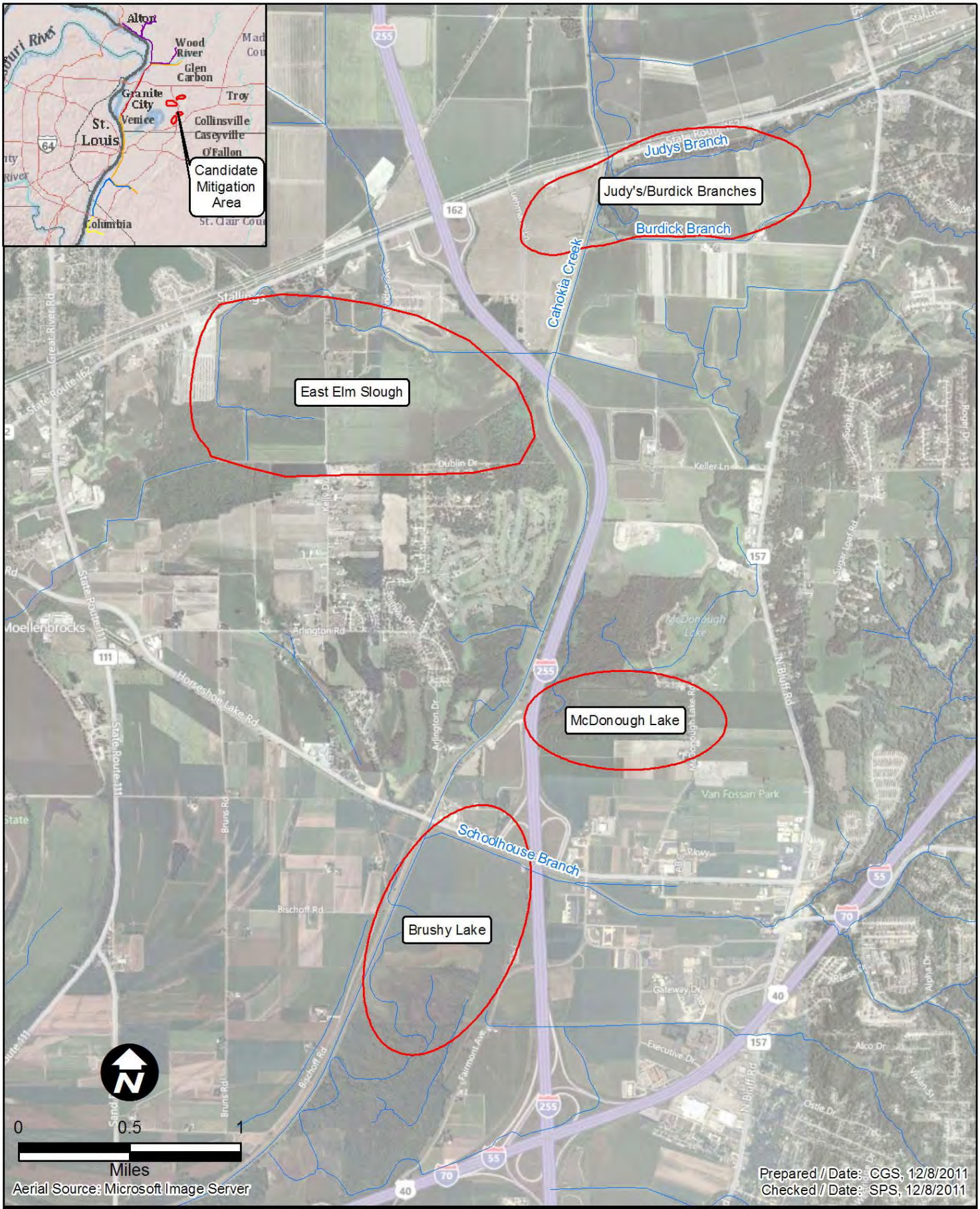

SIFPDC Conceptual Mitigation Plan

amec

Figure 3-1
Candidate Mitigation Sites in Madison County, Illinois

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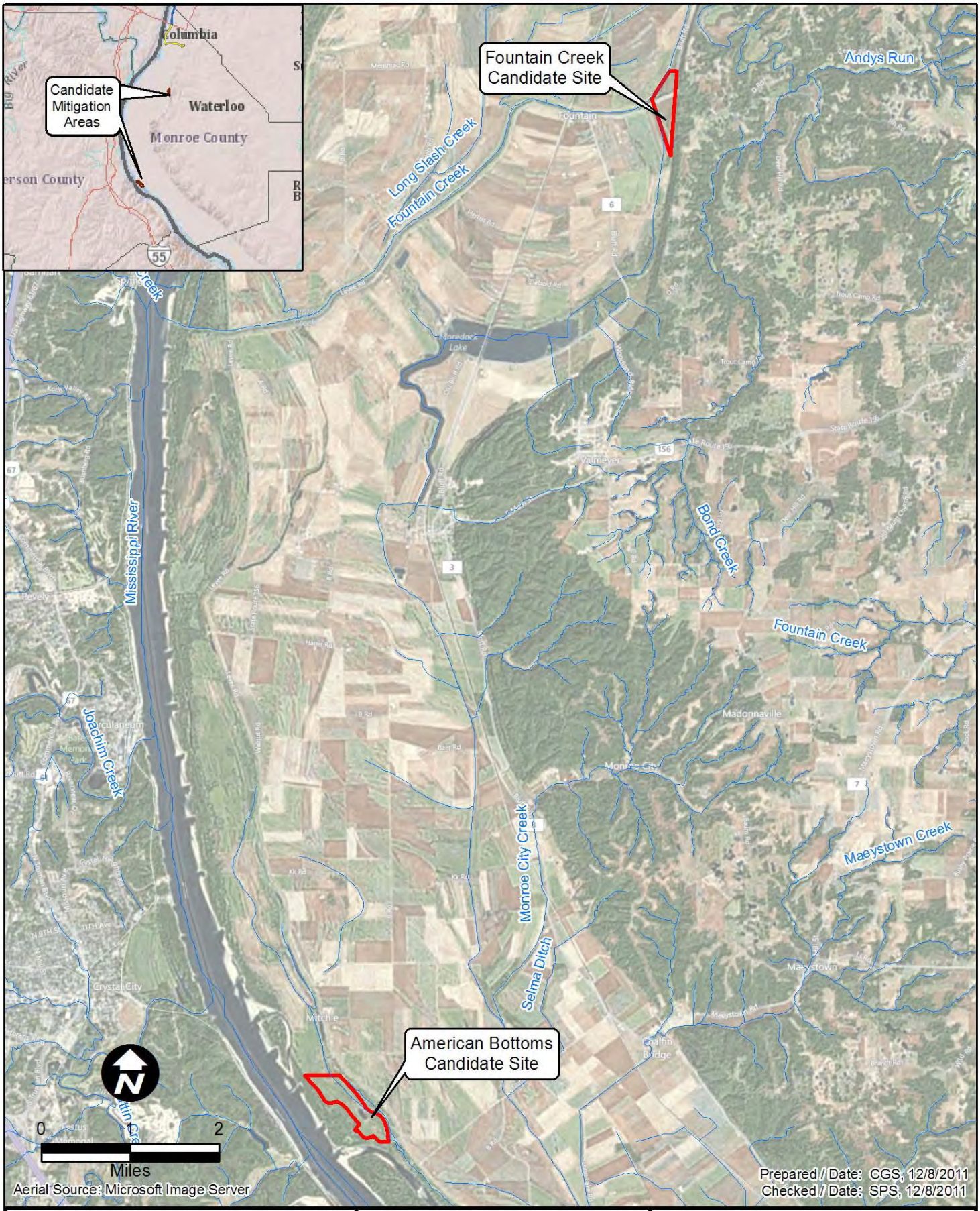

SIFPDC Conceptual Mitigation Plan

amec

Figure 3-2
Candidate Mitigation Sites in Monroe County, Illinois

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Appendix A
Stream Mitigation Worksheet

Illinois Stream Mitigation Method

Project Name: Southwestern Illinois Levee Improvements (100-yr) Date:12/7/11

ORM Number:

Adverse Impact Worksheet

Factor	Stream Reach 1	Stream Reach 2	Stream Reach 3	Stream Reach 4	Stream Reach 5
Stream Type Impacted	0.8	0.4	0.1		
Priority	0.4	0.1	0.1		
Existing Condition	0.2	0.2	0.2		
Duration	0.3	0.05	0.05		
Activity	0.5	0.5	0.5		
Cumulative Impact	0.234	0.0105	0.2346	0	0
Sum of Factors = **(m)**	2.434	1.2605	1.1846	0	0
Linear Feet of Stream Impacted in Reach = **(lf)**	780	35	782		
(m) x (lf)	1898.52	44.1175	926.3572	0	0

Total Mitigation Credits Required = 2868.9947

APPENDIX EA-404
SECTION 404(b)(1) EVALUATION REPORT
ON THE EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES

APPENDIX TO ENVIRONMENTAL ASSESSMENT

SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT
MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

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JANUARY 2012

SECTION 404(b)(1) EVALUATION REPORT ON THE EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES

SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

I. PURPOSE OF THIS EVALUATION

This document presents a Section 404(b)(1) Guideline evaluation for the proposed Southwestern Illinois Levee Improvement Project. This evaluation is based on the regulations found at 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged or Fill Material.

The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material. Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern. From a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these Guidelines. The guiding principle should be that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources.

These Guidelines have been developed by the Administrator of the Environmental Protection Agency in conjunction with the Secretary of the Army acting through the Chief of Engineers under section 404(b)(1) of the Clean Water Act (33 U.S.C. 1344). The Guidelines are applicable to the specification of disposal sites for discharges of dredged or fill material into waters of the United States.

II. PROJECT DESCRIPTION

A. Location – The proposed Southwestern Illinois Levee Improvement Project area is located in St. Clair, Madison, and Monroe counties, Illinois, along the east bank of the Mississippi River across from the City of St. Louis, Missouri, between river miles (RM) 203 and 166. The project area occupies portions of four separate locally owned levee districts: the Wood River Drainage and Levee District (Wood River), the Metro East Sanitary District (MESD), the Prairie du Pont Sanitary and Levee District, and the Fish Lake Drainage and Levee District (Prairie du Pont/Fish Lake; PDPFL) (Exhibit EA-404-1). Together with the federally owned Chain of Rocks levee, these five levee systems comprise the Metro East set of levee systems.

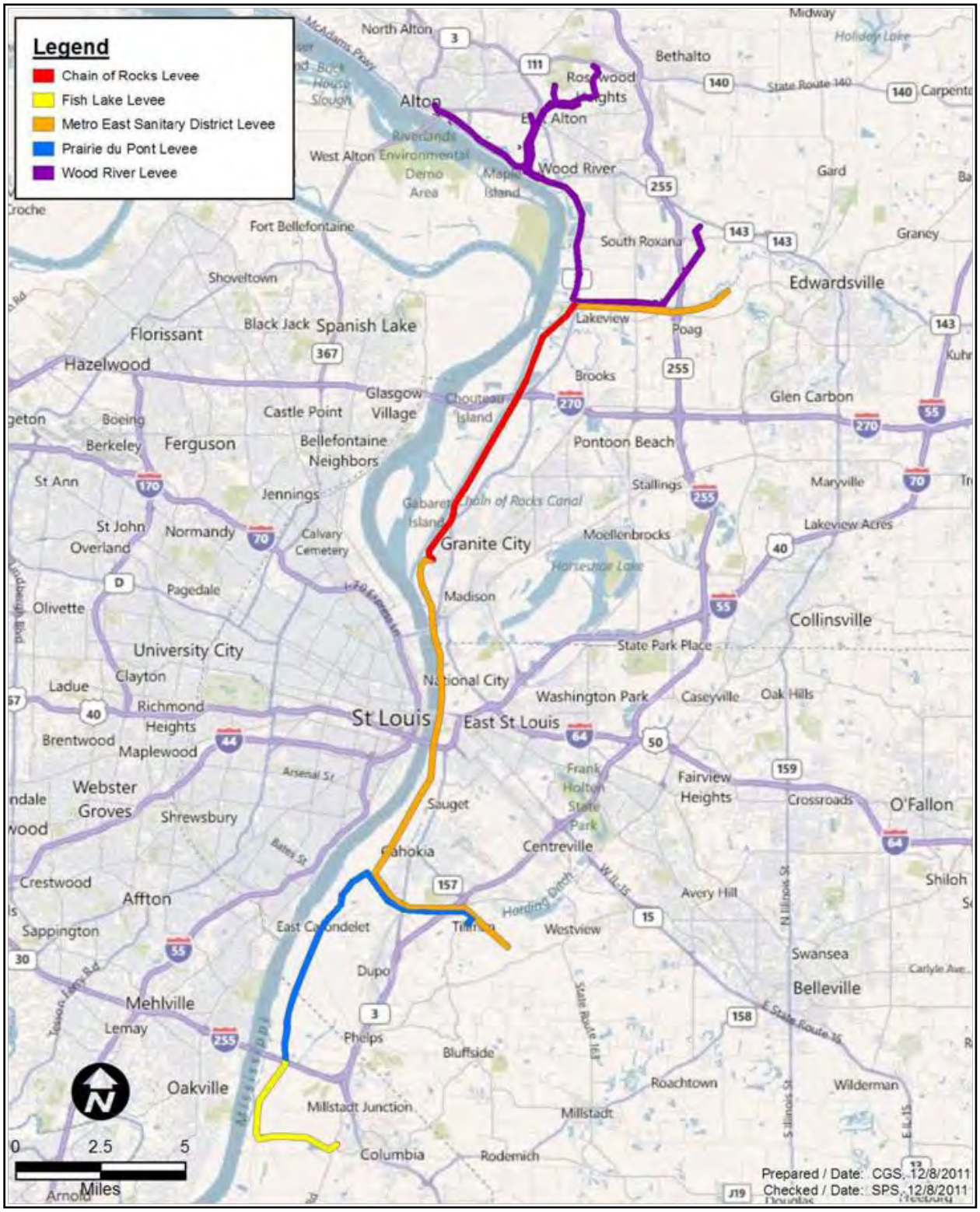

Figure EA-404-1. Location of the proposed Southwestern Illinois Levee Improvement Project.

B. General Description

1. Area Subject to Section 404 Jurisdiction – Those portions of the project area that are considered to be a water of the United States, and therefore subject to Section 404 review requirements, include waterways bordering the project area, namely the Mississippi River, Cahokia Creek Diversion Channel, the East and West Forks of the Wood River, and Wood River Creek, Prairie du Pont Creek, Palmer Creek, Carr Creek; the interior drainage system located on the protected side of the Metro East levee systems (such as Cahokia Canal, Canteen Creek, Harding Ditch, Hill Lake Creek, and their floodplain tributaries, such as Blue Waters Ditch); open water areas located on the protected side of the levee system (such as Horseshoe Lake, Spring Lake, Whispering Willow Lake, the lakes at Frank Holten State Park, and others), and various herbaceous and woody wetlands located along the waterways bordering the exterior of the levee system, along the interior drainage system, and occupying depressions within the levee protected areas.

Agricultural land comprises approximately 44,703 acres of the area while developed areas comprise approximately 40,223 acres. Numerous farms, residential structures, and commercial and industrial complexes are located throughout the interior portion of the levee systems. Other areas include fragmented deciduous forest areas (14,685 acres), forest and non-forest wetland areas (14,642 acres), and unclassified land cover types (825 acres).

2. Features of Proposed Action – The proposed action includes the following: construction of relief wells, conversion of relief wells to t-type wells, seepage berm construction, riverside cutoff walls, riverside clay caps, installation of piezometers, construction of toe drains, graded filters, blanket drains, and trench drains; environmental and archeological mitigation work. Additional project features involve relief well collector systems, ditches, pump stations, borrow areas, and road and utility relocations.

The main components of the proposed action for each reach are summarized in the EA, Exhibits EA-9-EA-12.

3. Authority and Purpose – In accordance with 33 USC Section 408, any modification to a Federal project requires that the USACE review and approve plans to ensure that the modification does not adversely impact the Federal Project.

The proposed project is designed to make improvements to Federal projects, namely the Wood River, Metro East St. Louis, and Prairie du Pont / Fish Lake levee systems in order to obtain accreditation in accordance with 44 CFR 65.10.

4. General Description of Dredged or Fill Material

(1) General Characteristics of Material (grain size, soil type)

(a) Fill Material – Fill materials include clean earthen fill such as sand or gravel, to construct project features. Fill locations are described in Exhibits EA-404-1 through EA-404-3, and displayed in Appendix EA-Maps.

(b) Dredged Material - Dredged material is defined as material that is either dredged or excavated from waters of the United States. The proposed project includes dredging of material from the several open water and wetland sites. Dredging locations are described in Exhibits EA-404-1 through EA-404-3 and displayed in Appendix EA-Maps.

(2) Quantity of Material – The proposed quantities of materials displayed in Exhibits EA-404-1 through EA-404-3 will be handled for the construction of project features.

No quantities have been determined for crushed stone which might be used at the discretion of a contractor to construct work pads for temporary access easement areas or relief well sites that might be soft or wet.

(3) Source of Material - Fill material consisting of clean earthen fill such as sand or gravel would be obtained from landside sources.

e. Description of the Proposed Discharge Sites

(1) Location – The location of the proposed features and work is displayed on a series of maps as an Appendix to the EA (Appendix EA-Maps). Most of the proposed construction sites are not located within any waters of the United States. However, several proposed discharge sites are located in waters of the United States consisting of palustrine emergent wetland, palustrine emergent wetland-farmed, palustrine forested wetland, and open water. The location of several staging/stockpile areas as well as the need for an area for disposal of excess material has not been identified. Although specific locations have yet to be identified, wetland sites will be avoided.

(2) Size (acres) and Types of Habitat - The proposed discharge sites that are considered to be waters of the United States occur at approximately 43 locations, totaling about 11.6 acres of palustrine emergent wetland-farmed (PEM-FW), 5.72 acres of palustrine emergent wetland (PEM), 6.78 acres of palustrine forested wetland (PFO), 1.9 acres of open water (plus an estimated 9.45 acres of temporary impacts to open waters from the installation of graded filters at 5 locations), and 0.36 acres of streambank (Exhibits EA-404-1 through EA-404-3). Additional information can be found in the Mitigation Plan, EA Appendix EA-MP.

Exhibit EA-404-1. Impacts to waters of the United States associated with the proposed levee improvement project at Wood River

Approximate Station(s)	Wetland Name	Impact Area (Acres)	Description of Impact	Type/ Amount (cy)
Upper Wood River				
38+30 – 51+80	WLW302	PFO–1.36 PUB-0.75	Graded filter	Clean fill (e.g., sand, gravel). Excavate ~3ft, final backfill will match existing grade.
127+00 – 134+30	WLW306a	PUB-2.78	Graded filter	Clean fill (e.g., sand, gravel). Excavate ~2ft, final backfill will match existing grade.
121+00 – 129+00	WLW306	PFO–0.13	Trench drain	Clean fill (e.g., sand, gravel). NA-Final backfill will match existing grade.
143+00 – 153+00	WLW304	PFO–0.87	Graded filter	Clean fill (e.g., sand, gravel). Sufficient to bring up to required design grade,~2,807 cy
Lower Wood River				
132+50 – 151+00	WLW329	PEM–3.96	Graded filter/trench drain	Clean fill (e.g., sand, gravel). Sufficient to bring up to required design grade, ~19,166 cy
170+00 – 187+00	WLW328	PUB–1.86	Graded filter, piezometers	Clean fill (e.g., sand, gravel). Excavate ~2ft, final backfill will match existing grade.
185+40 – 189+10	WLW330	PEM–0.27	Graded filter	Clean fill (e.g., sand, gravel). Sufficient to bring up to required design grade, ~1,742 cy
195+00 – 199+00	WLW312	PEM–0.07	Graded filter	Clean fill (e.g., sand, gravel). Excavate ~2-5+ft, final backfill will match existing grade.
225+00 – 236+00	WLP313	PUB-4.44	Graded filter	Clean fill (e.g., sand, gravel). Sufficient to bring up to required design grade,; ~21,490 cy
290+00	WLW314	PEM-<0.01	Piezometer	Clean fill (e.g., sand, gravel, concrete). Sufficient for piezometer installation
550+00	WLW314	PEM-<0.01	Piezometer	Clean fill (e.g., sand, gravel, concrete). Sufficient for piezometer installation
585+00 – 586+00	WLW318	PEM-FW – 0.07	Required fill	Clean earthen fill. Sufficient to bring up to required design grade, ~564 cy
594+00 – 597+00	WLW319a	PUB-0.04	Berm	Clean earthen fill. Sufficient to bring up to required design grade

Approximate Station(s)	Wetland Name	Impact Area (Acres)	Description of Impact	Type/ Amount (cy)
594+00 – 597+00	WLW319a	PUB-0.57	Graded filter	Clean fill (e.g., sand, gravel). Excavate ~2ft, final backfill will match existing grade.
597+00 – 598+00	WLW319	PEM-0.07	Berm/filter	Clean earthen fill/sand/gravel. Sufficient to bring up to required design grade
614+76 – 623+31	WLP321 (borrow pit)	PUB-0.91	Graded filter	Clean fill (e.g., sand, gravel). Excavate ~3ft, final backfill will match existing grade.
642+50 – 645+00	WLW323	PFO-0.14	Required fill	Clean earthen fill. Sufficient to bring up to required design grade, ~1,806 cy
652+00 – 659+00	WLW322	PFO–0.44	Required fill	Clean earthen fill. Sufficient to bring up to required design grade, ~5,679 cy
649+00 – 651+00	WLW324	PFO-0.13	Required fill	Clean earthen fill. Sufficient to bring up to required design grade, ~1,678 cy
Total 18.88 acres (includes temporary impacts associated with graded filters)				
Notes: PEM-palustrine emergent wetland, PEM-FW-palustrine emergent wetland-farmed, PFO-palustrine forested wetland				
Source: Wood River Wetland and Waterbody Delineation Report (AMEC, 2011)				

Exhibit EA-404-2. Impacts to waters of the United States associated with the proposed levee improvement project at MESD

Approximate Station(s)	Wetland Name	Impact Area (Acres)-	Description of Impact	Type/ Amount (cy)
255+00-259+00	MESD1	PEM -<0.01	Pump station and relief well construction	Clean fill/sufficient for construction
1113+50, 1116+00	MLW203	PEM- <0.01	Relief well construction	Clean fill/sufficient for construction
1245+00 – 1276+56	MLW201d	PFO-3.25	Protection berm, graded filter-	Clean fill/~2150 cy –final backfill will match existing grade
1293+00 – 1297+00	MRW290	PEM-0.29	Bring up to required design grade	Clean fill/ Sufficient to bring up to required design grade
1316+50 – 1321+00	MESD3	PEM-0.18	Final backfill will match existing grade	Clean fill (e.g., sand, gravel)/ Final backfill will match existing grade
1342+23 – 1344+95	MLW501	PFO-0.46	Final backfill will match existing grade	Clean fill (e.g., sand, gravel)/ Final backfill will match existing grade
Total 4.21 acres				
Notes: PEM-palustrine emergent wetland, PEM-FW-palustrine emergent wetland-farmed, PFO-palustrine forested wetland				
Source: Wetland and Waterbody Delineation Report for MESD (AMEC, 2011)				

Exhibit EA-404-3. Impacts to waters of the United States associated with the proposed levee improvement project at Prairie du Pont / Fish Lake

Approximate Station(s)	Wetland Name	Impact Area (Acres)-	Description of Impact	Type/amount (cy)
171+00 – 174+00	PLW 129	PEM-FW – 0.36	Fill for berm	Clean fill/~1775
192+00 – 193+00	PLW128	PEM-FW - 0.01	Fill for berm	Clean fill/~38
196+00 – 200+00	PLW127	PEM - 0.52 PEM-FW - 0.55	Fill for berm/ relief well construction	Clean fill/~7345
201+00 – 204+00	PLW126	PEM-FW - 1.93	Fill for berm/ relief well construction	Clean fill/~17,284
211+00-214+00	PLW125	PEM-FW - <0.01	Relief well construction	NA
324+50 – 330+50	PLW123	PEM - 0.29	Fill for clay cap	Clean fill/~1236
382+50 – 383+50	PRW122	PEM - 0.02	Fill for clay cap	Clean fill/~29
432+00 – 442+50	PLW120	PEM-FW – 0.56	Fill for berm/ relief well construction	Clean fill/~5694
445+00 – 452+00	PLW117-119	PEM-FW - 2.21	Fill for berm/ relief well construction/road relocation	Clean fill/~7692
497+00 – 511+00	PLW115	PEM-FW - 3.58	Fill for berms/ relief well construction	Clean fill/~21,000
530+00 – 534+00	PLW112	PEM-FW - 0.82	Fill for berm	Clean fill/~6,864
564+00-576+00	PLW111	PEM-FW - <0.02	Relief well construction	NA
587+00 – 590+00	PLW110	PEM-FW - 1.40	Fill for berm	Clean fill/~6,930
605+00-607+00	PLW107	PEM-FW - <0.01	Relief well construction	NA
608+00-611+00	PLW106	PEM-FW - <0.01	Relief well construction	NA
615+00-616+00	PLW105	PEM-FW - <0.01	Relief well construction	NA
654+00-655+00	PLW104	PEM-FW	Relief well construction	NA
683+00-687+00	PLW102	PEM-FW	Relief well construction	NA
Total 12.36 acres				
Notes: PEM-palustrine emergent wetland, PEM-FW-palustrine emergent wetland-farmed, PFO-palustrine forested wetland				
Source: Wetland and Waterbody Delineation Report for PDP/FL (AMEC, 2011)				

(3) Type of Site (confined, unconfined, open water)

(a) Permanent Deposits of Dredged and Fill Material - All disposal (placement or construction) sites are for permanent deposits of dredged (excavated) and fill materials. These disposal sites will be unconfined.

(b) Temporary Deposits of Fill Materials - Temporary easement areas for access of heavy construction equipment are located adjacent to the levee. If ground conditions within these easement areas are wet during construction, access may be facilitated by the contractor by placing either timber matting or crushed stone. The placement of any crushed stone would be unconfined.

(4) Timing and Duration of Discharge - An estimated duration of the construction period is assumed to be three years (2012-2014). Construction would occur any time during the typical construction season over this period of time. Actual duration of discharges will only be a fraction of the total construction time.

f. Description of Disposal Method (hydraulic, drag line, etc.) - Equipment used for stripping topsoil from levees and seepage berm areas would consist of bulldozers or scrapers, and trucks would be used for transporting and dumping clean fill at these areas; bulldozers would be used to shape the sand core of these berms. If any crushed stone would be needed for temporary access easement areas, this material would also be transported and dumped by trucks. Heavy equipment will be used to excavate and fill during construction of filters, drains, and other project features.

III. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

1. Substrate Elevation and Slope.

Wood River – Natural ground elevations in the vicinity of the Upper Wood River levee where it ties into high ground near the Alton Argosy Casino is about Elevation 430 feet NGVD. Nearer the Clark Bridge, the prevailing natural ground is between Elevation 425 and 426 NGVD. For the portion of the Lower levee located at the confluence of Wood River and the Mississippi River, the natural ground varies between Elevation 410 and 414 NGVD. For the portion of the Upper levee near Station 300+00 along the Mississippi River, the natural ground varies between Elevation 430 and 432 NGVD. At the south end of the Lower levee, on the portion perpendicular to the Mississippi River the natural ground varies from Elevation 426 to 424 NGVD. Towards the end of the Lower levee in the berm area, the natural ground varies between Elevation 430 to 432 NGVD. T he slope of natural ground on the protected side of the levee system varies by location, with relatively flat areas where wetlands occur (1-2%) and gentle slopes in other areas (2-5%). Levee embankment sideslopes are typically about 30%.

MESD – Natural ground elevations in the vicinity of the North Flank levee where it ties into high ground are about 435-440 feet NGVD. Where the North Flank levee joins the Riverfront levee, ground elevations are about 425 feet NGVD. Natural ground elevations along the Riverfront levee slope downward to the south, such that near the juncture with the South

Flank levee, about 20 miles away from the North Flank levee, they are about 400 feet NGVD. The slope of natural ground on the protected side of the levee system varies by location, with relatively flat areas where wetlands occur (1-2%) and gentle slopes in other areas (2-5%). The elevation of the Riverfront levee is about 441 feet NGVD at the juncture with the North Flank levee, and about 429 feet NGVD where it meets the South Flank levee. Levee embankment sideslopes are typically about 30%.

Prairie du Pont / Fish Lake –The existing riverfront levee system has a top of levee profile elevation (NAVD 88 datum) of 430.09 at the upstream end of the Prairie du Pont levee system adjacent to Prairie du Pont Canal, 427.37 at approximately the intersection of the riverfront levee with the Interstate 255 highway embankment and 425.22 at the downstream end of the Fish Lake levee system in the vicinity of Carr Creek. The top of levee elevation for the Prairie du Pont flank levee system varies from elevation 431.0 near Triple Lakes Road to elevation 430.09 at its tie in location with the riverfront levee. Likewise, the top of levee elevation for the Fish Lake flank levee system varies from elevation 432.1 near Bluff Road to 425.22 at its tie in location with the riverfront levee. The slope of natural ground on the protected side of the levee system varies by location, with relatively flat areas where wetlands occur (1-2%) and gentle slopes in other areas (2-5%). Levee embankment sideslopes are typically about 30%.

2. Sediment Type (grain size). Soils within the project area consist of alluvial materials consisting of silts, sands, and clays. Alluvial material extending down to bedrock consists of various layers of these materials, primarily sands and gravels.

3. Dredged/Fill Material Movement. Dredged and fill materials to be placed on the riverside of the levee system will be subject to the forces of flood flows along the Mississippi River or waterways bordering project depositional features when they get out of bank. Those materials placed on the protected side of the levee system will be subject to erosion forces related to the slope of the land. As none of the disposal (construction) sites will be confined (as with a cofferdam), all materials will have the potential to migrate downhill.

4. Physical Effects on Benthos (burial, changes in sediment type, etc.) Benthos (organisms that live on the bottom of water bodies) are found in the aquatic portions of the project area. Benthos present in jurisdictional wetlands where construction of seepage berms occurs will be destroyed by burial. Benthos present in open water areas will be disturbed, but natural recolonization is expected to occur rapidly.

5. Other Effects. No other effects are expected.

6. Actions Taken to Minimize Impacts. Best Management Practices (BMPs) will be followed to minimize erosion, turbidity, or other temporary impacts. Contractors will be required to employ BMPs to minimize the impacts of point and non-point source discharge. An erosion control plan will be implemented and will include temporary erosion-control devices, such as silt fences, check dams, sediment traps, sediment basins, burlap, jute matting, grading, seeding, and/or sodding to minimize erosion and sedimentation.

B. Water Circulation, Fluctuation and Salinity Determinations

1. Water

a. Salinity Not applicable.

b. Water Chemistry No changes in water chemistry are anticipated.

c. Clarity No changes in water clarity are anticipated to any waterbodies, including the Mississippi River, Cahokia Creek Diversion Channel, the East and West Forks of the Wood River, or Wood River Creek, Prairie du Pont Creek, Blue Waters Ditch, Palmer Creek, or Carr Creek.

d. Color No change is expected to any waterbodies.

e. Odor The proposed action is not expected to have an impact on water odors in any waterbodies.

f. Taste The proposed action is not expected to impact water taste of any waterbodies. The Mississippi River is a source for public and private water supplies in the St. Louis area.

g. Dissolved Gas Levels Construction activities associated with the proposed action will not affect dissolved gas levels of any waterbodies.

h. Nutrients Nutrients are not expected to be released to wetland or aquatic areas during the construction process. Fill used for construction is not expected to contain excessive levels of any nutrients.

i. Eutrophication The proposed action is not expected to contribute toward eutrophication of the water column in any aquatic areas.

j. Water Temperature Water temperatures are not expected to change in any aquatic areas.

2. Current Patterns and Circulation

a. Current Patterns and Flow. Project features located on the protected side of the levee systems will not have the potential to affect any current patterns or flow of any natural waterways. Work occurring on the riverside of the levees is not expected to affect current patterns and flow of either the Mississippi River or other natural waterways. Flows during high river stages coming from relief wells will be carried by drainage ways to pump stations or detention areas.

b. Velocity. No changes in water velocities within natural waterways are expected.

c. Stratification. No stratification is expected to occur in any waterways or waterbodies.

d. Hydrologic Regime. The project will not directly or indirectly alter the seasonal or annual hydrologic regime of any adjacent waterways or waterbodies. Ditching and/or flowage easement areas established along the protected side of the levees would receive flow from new relief wells. The hydrologic regime in these specific areas will be changed by making them temporarily wetter during high water conditions on the river; relief well flows will pond within these areas and disappear through infiltration and evapotranspiration.

3. Normal Water Level Fluctuations (tides, river stage, etc.) The proposed action will not directly or indirectly alter normal water level fluctuations of the Mississippi River, Cahokia Creek Diversion Channel, the East and West Forks of the Wood River, Prairie du Pont Creek, Blue Waters Ditch, Palmer Creek, or Carr Creek. Minor indirect impacts to fluctuations in some surface waters located on the protected side of the levees may occur due to a decrease in groundwater movement under the levees after the construction of cutoff walls extending to bedrock to control underseepage and through seepage.

4. Salinity Gradients Not applicable.

5. Actions Taken to Minimize Impacts The flows from most new relief wells will be directed to existing drainage ways that lead to the nearest pump station. Where no drainage ways currently exist, flow would be directed to a flowage easement area or drainage ways will be constructed to prevent flooding or unwanted surface ponding.

C. Suspended Particulate/Turbidity Determinations

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site. Construction activities will directly impact wetlands at approximately 43 locations, 11.6 acres of palustrine emergent wetland-farmed (PEM-FW), 5.72 acres of palustrine emergent wetland (PEM), 6.78 acres of palustrine forested wetland (PFO), and 1.9 acres of open water which will be entirely lost. On the protected side of the levee system, small ditches may be present in the vicinity of construction sites. These ditches have the potential to be affected by erosion taking place within the project's construction areas.

2. Effects (degree and duration) on Chemical and Physical Properties of the Water Column. The project does not involve any construction in the Mississippi River, Cahokia Creek Diversion Channel, the East and West Forks of the Wood River, Wood River Creek, Blue Waters Ditch, Prairie du Pont Creek, Palmer Creek, or Carr Creek. Permanent bodies of water that will be affected include some of the herbaceous wetlands described in Exhibits EA-404-1 through EA-404-3 and displayed in Appendix EA-Maps. Many of the affected wetlands experience only temporary inundation or soil saturation.

a. Light Penetration. Decreases in light penetration of the water column are unlikely.

b. Dissolved Oxygen. Changes in dissolved oxygen levels are not expected.

c. Toxic Metals and Organics. It is anticipated that HTRW may be encountered in groundwater during construction activities at some proposed construction areas. AMEC is currently working with regulatory agencies and other parties in an effort to fully understand the nature and extent of contamination in these areas of concern and attempt to mitigate project impacts. To prevent the potential spread of any contaminated materials, AMEC has developed environmental/hazmat protocols to be used during geotechnical subsurface investigation and construction activities in the areas outlined below. These protocols specify how to properly handle and dispose of any soil and/or groundwater during construction that may be regarded as containing contaminated materials. Appendix EA-HTRW of the EA includes these protocols.

Wood River – Four areas of concern have been identified along the Wood River levee system. No construction is proposed in the vicinity of a fifth area of concern (Upper Wood River Levee, from station 230+00 to 270+00, in proximity to EDR Site #17: Laclede Steel Co Alton Works, Broadway Cut STS, Alton, IL).

Upper Wood River Levee, from station 40+00 to 60+00 (EDR Sites #14, #16, #19: Owens-Brockway Glass facility). The proposed action includes the construction of a graded filter and six piezometers in the vicinity of this area of concern.

Upper Wood River Levee, from station 118+00 to 134+00 (in vicinity of an industrial impoundment). The proposed action includes construction of a trench drain, a graded filter, and six piezometers in the vicinity of this area of concern.

Lower Wood River Levee, from station 00+00 to 50+00 (EDR Site #12, Olin Corporation, Zone 17 Plant, Illinois Route 3, East Alton, IL; restricted along south side of Wood River). The proposed action includes construction of a new pump station with outfall, two piezometers, and conversion of four existing relief wells to T-type in the vicinity of this area of concern.

Lower Wood River Levee, from station 222+00 to 327+00; Hartford hydrocarbon plume area. The proposed action includes construction of a graded filter, the sliplining of gravity drains, conversion of 18 existing relief wells to T-type, construction of a new pump station and outfall, and installation of 6 new piezometers in the vicinity of this area of concern.

Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at these four areas of concern is expected to mitigate any project impacts.

With regard to the operation of the proposed features in these areas of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface.

MESD – One area of concern has been identified along the MESD levee system.

From station 1110+00 to 1312+60 (Sauget Areas 1 & 2: EDR Sites #93, 94, 96, Orphan, Conoco Phillips). The proposed action includes construction of 3 pump stations with outfalls; 4 new relief wells; a protruding riverside clay cap and a hybrid riverside clay cap; 2 toe drains; 8 new piezometers; 3 graded filters; and a protection berm in the vicinity of this area of concern.

Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at these four areas of concern is expected to mitigate any project impacts.

With regard to the operation of the proposed features in these areas of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface.

Prairie du Pont / Fish Lake – Toxic metals or organics are not expected to be encountered during construction. Similarly, flows coming from new relief wells are not expected to carry contaminated materials.

d. Pathogens. There is no reason to believe any pathogens exist in any of the proposed areas of construction.

e. Aesthetics. Aesthetics of work sites are likely to be temporarily adversely affected during construction, but are expected to improve with the establishment of vegetation after construction.

f. Water Temperature No changes in water temperatures are expected to occur in the water column of any waterbodies.

3. Effects on Biota

a. Primary Production, Photosynthesis. Impacts to primary production and photosynthetic processes will be slight; however, the loss of about 24 acres of various vegetated habitats (wetland and nonwetland) is negligible compared to the approximately 29,327 acres of forested land and wetland land cover categories that occur within the levee protected area. Additionally, mitigation of impacts will occur (see Mitigation Plan, Appendix EA-MP)

b. Suspension/Filter Feeders No reduction in benthos production is expected in any permanent waterbodies.

c. Sight Feeders No temporary or permanent impacts to sight-feeders are expected in any permanent waterbodies.

4. Actions taken to Minimize Impacts. Actions to minimize impacts associated with suspended particulates and turbidity include Best Management Practices (BMPs). Contractors will be required to employ BMPs to minimize the impacts of point and non-point source

discharge. An erosion control plan will be implemented and will include temporary erosion-control devices, such as silt fences, check dams, sediment traps, sediment basins, burlap, jute matting, grading, seeding, and/or sodding to minimize erosion and sedimentation.

D. Contaminant Determinations. The proposed action could involve potential special waste sites. It is anticipated that HTRW may be encountered in soils and groundwater during construction activities at some proposed construction areas. AMEC is currently working with regulatory agencies and other parties in an effort to fully understand the nature and extent of contamination in these areas of concern and attempt to mitigate project impacts. To prevent the potential spread of any contaminated materials, AMEC has developed environmental/hazmat protocols to be used during geotechnical subsurface investigation and construction activities in the areas outlined below. These protocols specify how to properly handle and dispose of any soil and/or groundwater during construction that may be regarded as containing contaminated materials. Appendix EA-HTRW of the EA includes these protocols.

Wood River – Four areas of concern have been identified along the Wood River levee system. No construction is proposed in the vicinity of a fifth area of concern (Upper Wood River Levee, from station 230+00 to 270+00, in proximity to EDR Site #17: Laclede Steel Co Alton Works, Broadway Cut STS, Alton, IL).

Upper Wood River Levee, from station 40+00 to 60+00 (EDR Sites #14, #16, #19: Owens-Brockway Glass facility). The proposed action includes the construction of a graded filter and six piezometers in the vicinity of this area of concern.

Upper Wood River Levee, from station 118+00 to 134+00 (in vicinity of an industrial impoundment). The proposed action includes construction of a trench drain, a graded filter, and six piezometers in the vicinity of this area of concern.

Lower Wood River Levee, from station 00+00 to 50+00 (EDR Site #12, Olin Corporation, Zone 17 Plant, Illinois Route 3, East Alton, IL; restricted along south side of Wood River). The proposed action includes construction of a new pump station with outfall, two piezometers, and conversion of four existing relief wells to T-type in the vicinity of this area of concern.

Lower Wood River Levee, from station 222+00 to 327+00; Hartford hydrocarbon plume area. The proposed action includes construction of a graded filter, the sliplining of gravity drains, conversion of 18 existing relief wells to T-type, construction of a new pump station and outfall, and installation of 6 new piezometers in the vicinity of this area of concern.

Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at these four areas of concern is expected to mitigate any project impacts.

With regard to the operation of the proposed features in these areas of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such

groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface.

MESD – One area of concern has been identified along the MESD levee system.

From station 1110+00 to 1312+60 (Sauget Areas 1 & 2: EDR Sites #93, 94, 96, Orphan, Conoco Phillips). The proposed action includes construction of 3 pump stations with outfalls; 4 new relief wells; a protruding riverside clay cap and a hybrid riverside clay cap; 2 toe drains; 8 new piezometers; 3 graded filters; and a protection berm in the vicinity of this area of concern.

Implementation of the environmental/hazmat protocols developed by AMEC during the construction process at these four areas of concern is expected to mitigate any project impacts.

With regard to the operation of the proposed features in these areas of concern, including relief wells, piezometers, and other features that provide for the conveyance of groundwater to the ground surface during periods of high water on the Mississippi River, AMEC is proposing that such groundwater would flow through these structures without permitting or treatment. If such groundwater were to carry contaminants with it, then there would be the potential for contamination to be spread above the ground surface.

Prairie du Pont / Fish Lake – Toxic metals or organics are not expected to be encountered during construction. Similarly, flows coming from new relief wells are not expected to carry contaminated materials.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton. No impacts on phytoplankton production are expected.

2. Effects on Benthos. Benthos (organisms that live on the bottom of water bodies) are found in the aquatic portions of the project area. Benthos present in jurisdictional wetlands where construction of seepage berms occurs will be destroyed by burial. Benthos present in open water areas will be disturbed, but natural recolonization is expected to occur rapidly.

3. Effects on Nekton. The term "nekton" refers basically to larger, free-swimming aquatic organisms, such as fishes. No impacts on nekton are expected.

4. Effects on Aquatic Food Web. Construction activities are not expected to disrupt the aquatic food chain.

5. Effects on Special Aquatic Sites.

a. Sanctuaries and Refuges. No sanctuaries or refuges will be affected by this project.

b. Wetlands. Construction activities are expected to impact a total of about 11.6 acres of palustrine emergent wetland-farmed (PEM-FW), 5.72 acres of palustrine emergent wetland (PEM), 6.78 acres of palustrine forested wetland (PFO), 1.9 acres of open water (plus an

estimated 9.45 acres of temporary impacts to open waters from the installation of graded filters at 5 locations), and 0.36 acres of streambank. The affected wetlands are of low to moderate quality because they are generally small in area (fragmented), many are farmed during non-high water periods, occur in close proximity to developed areas, support a low diversity of native plant species, and experience unnatural flood regimes because of their severed connection with the Mississippi River.

c. Mud Flats. No mud flats exist within any proposed discharge sites.

d. Vegetated Shallows. No vegetated shallows occur at any proposed disposal sites.

e. Coral Reefs. Not applicable.

f. Riffle and Pool Complexes. Riffle and pool complexes do not occur at any proposed discharge (construction) sites.

6. Threatened and Endangered Species. In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, AMEC requested that the U.S. Fish and Wildlife Service provide a listing of Federally threatened or endangered species, currently classified or proposed for classification, that may occur in the vicinity of the proposed Wood River, MESD, and Prairie du Pont / Fish Lake levee system project areas. The U.S. Fish and Wildlife Service (USFWS; Columbia Ecological Services Field Office) stated in a letter dated 27 June 2011, that there are potentially nine federally listed or candidate species within the proposed project area (Exhibit EA-404-4). There is no designated critical habitat within the proposed project area for any of these species at this time.

Exhibit EA-404-4. Federal threatened, endangered, or candidate species potentially occurring within the proposed project area in Madison, St. Clair and Monroe counties, Illinois.

Common Name ***Scientific Name***	**Federal Status**	**State Status**	**Project Vicinity**	**Habitat**
Mammals				
Gray bat *Myotis grisecens*	FE	SE	WR MESD PDP/FL	Caves and mines; rivers & reservoirs adjacent to forests
Indiana bat *Myotis sodalis*	FE	SE	WR MESD PDP/FL	Caves, mines (hibernacula); small stream corridors with well developed riparian woods; upland forests (foraging)
Birds				
Least tern *Sterna antillarum*	FE	SE	WR MESD PDP/FL	Bare alluvial and dredged spoil islands
Fish				

Pallid sturgeon *Scaphirhynchus albus*	FE	SE	WR MESD PDP/FL	Large rivers
Reptiles				
Eastern massasauga rattlesnake *Sistrurus catenatus catenatus*	FC	SE	MESD	Wetlands and adjacent upland woods
Mussels				
Spectaclecase mussel *Cumberlandia monodonta*	FE	SE	WR MESD	Large rivers with swiftly flowing water, among boulders in patches of sand, cobble, or gravel in areas where current is reduced
Amphipods				
Illinois cave amphipod *Gammarus acherondytes*	FE	SE	WR MESD PDP/FL	Karst caves & streams
Plants				
Decurrent false aster *Boltonia decurrens*	FT	ST	MESD PDP/FL	Disturbed alluvial soils
Eastern prairie fringed orchid *Platanthera leucophaea*	FT	SE	MESD PDP/FL	Mesic to wet prairies

FE – Federally endangered, FT – Federally threatened, SE – State endangered, ST – State threatened

AMEC has determined that the project poses “no effect” to: the gray bat because no caves are known to exist in the project area; the least tern since the project area does not contain least tern nesting or adjacent foraging habitat; the pallid sturgeon because no activities are occurring in or impacting the Mississippi River; the eastern massasauga rattlesnake since this species is not known to occur in the project area; the spectaclecase mussel since it is not expected to occur within the project area; the Illinois cave amphipod since cave streams of the Illinois sinkhole plain are not included in the proposed project area; the eastern prairie fringed orchid since it has not been found in the proposed project area. Additionally, AMEC has determined that the proposed project “may affect but is not likely to adversely affect" the Indiana bat due to tree clearing activities; and the decurrent false aster since it has the potential to be encountered during construction.

Extensive tree clearing activities are not anticipated. However, to avoid impacting this species, tree clearing activities should not occur during the period of 1 April to 30 September. In the event that it is necessary to clear trees during this time frame, mist net surveys would be conducted to determine if Indiana bats are present, and the USFWS would be consulted. The SIFPDC will continue to coordinate with the USFWS to ensure that the Indiana bat in not adversely affected by the project.

With regard to the decurrent false aster, this species has not been recorded within a mile of the project area. However, suitable habitat consisting of open wet areas do occur in the vicinity of

the levees. Because of the opportunistic nature of this species to colonize open moist or wet areas that experience natural or man-made disturbances, its ability to disperse over shorter distances by seeds carried by wind or animals, and the approximate time before final measures would be implemented, the SIFPDC will continue to coordinate with the USFWS to ensure that this species is not adversely affected. The SIFPDC will implement required pre-construction surveys within appropriate habitat, if required by the USFWS. If any individual plants or colonies are identified, the U.S. Fish and Wildlife Service will be notified and a course of action will be established.

7. Other Fish and Wildlife. Given the urban setting, a variety of animal species use the area on the landside of the levee. Most wildlife species are adapted to human disturbance or tolerant of fragmented habitats or poor water quality, and consist of a variety of amphibians, reptiles, birds, and mammals.

8. Actions to Minimize Impacts. As required under Section 404 of the Clean Water Act, the direct impacts to about 26 acres of wetlands would require mitigation as compensation for these losses. A compensatory mitigation plan is included as part of the proposed levee improvement project. These direct losses, along with inclusion of this mitigation as part of the proposed action, would not have a significant impact on biological resources.

F. Proposed Disposal Site Determinations

1. Mixing Zone Determination. A mixing zone is that volume of water at a placement site or discharge site required to dilute contaminant concentrations associated with a discharge of dredged material to an acceptable level. The discharges of fill and dredged material will occur in areas without permanent water at the affected forested and herbaceous wetlands. Discharges in approximately 1.9 acres of permanent water will occur. There is no need to develop a mixing zone determination since large size rip-rap will be used for bank stabilization.

2. Determination of Compliance with Applicable Water Quality Standards. Section 401 water quality certification will be required from the Illinois Environmental Protection Agency. In addition, a Section 402 NPDES (National Pollutant Discharge Elimination System) permit will also be required from the IEPA. Effluent limitations guidelines and new source performance standards promulgated in 2009 by the U.S. Environmental Protection Agency to control the discharge of pollutants from construction sites are likely to apply to this project, requiring the implementation of a range of erosion and sediment control measures and pollution prevention practices.

3. Potential Effects on Human Use Characteristics

a. Municipal and Private Water Supply. No municipal water supply will be adversely impacted by project construction.

b. Recreational and Commercial Fisheries. Commercial fishing activities occur in the Mississippi River at some distance from St. Louis, and recreational fishing occurs at many

locations along the river. Because this project will not directly affect any river or water body, it is not expected to diminish fishing opportunities.

c. Water Related Recreation. Although water-related recreation is an important activity in the Mississippi River, the project will not impact this kind of recreation.

d. Aesthetics. Construction activities will have minor impacts on the aesthetic quality of the project area during the duration of the work. Noise and exhaust will be generated by heavy equipment during the construction process.

e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. The project will not impact any of these resources.

f. Determination of Cumulative Effects on the Aquatic Ecosystem. For this levee improvement project, key stressors of concern include changes in land cover or land use, natural habitats, water quality, sediment transport, and hydrologic regime. These stressors act to reduce environmental quality within the levee protected area and decrease the overall quality of life. The proposed action would not affect sediment transport dynamics between the upland-floodplain interface. The hydrologic regime of natural habitats adjacent to the levee systems would experience minor beneficial and adverse effects due to the implementation of flowage easement areas and installation of cutoff walls. The implementation of best management practices for the protection of water quality at project construction sites is expected to give rise to localized temporary adverse effects. A project-induced loss of about 26 acres of various habitats along with establishment of mitigation within the local watershed to compensate for this loss is not expected to contribute to the ongoing long-term spatial decline in natural areas.

g. Determination of Secondary Effects on the Aquatic Ecosystem. No significant secondary impacts to the aquatic ecosystem have been identified.

IV. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adaptation of the Section 404(b)(1) Guidelines to this Evaluation.

In this evaluation of discharges proposed as part of the Southwestern Illinois Levee Improvement Project, the Environmental Protection Agency's Section 404(b)(1) Guidelines of 24 December 1980 were applied without significant adaptation.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem.

No practicable alternatives exist which meet the study objectives and do not involve discharge of fill or dredged material into waters of the United States. Alternatives for design deficiency corrections to underseepage problems were considered, and these fell into several general kinds of solutions: relief well construction, conversion of relief wells to t-type, seepage berm construction, riverside cutoff walls, riverside clay cap, toe drains, graded filters, blanket drains, and trench drains.

Underseepage analyses were conducted throughout the levee systems. The results of the initial analysis and modeling were completed to establish the reaches of the levee system for which an inadequate safety factor exists under the existing physical conditions with a 100-year storm applied to the wet side. If considered deficient based on AMEC's selected safety factor for FEMA 65.10 certification, a series of solutions were then evaluated to improve the safety factor.

Solutions were selected, where appropriate, to match the solutions identified by the USACE for the authorized level of protection for a specific reach. Because of their relatively low capital cost and small footprint, relief wells were generally recommended as the preferred control where they adequately reduce exit gradients. Where wells did not adequately reduce gradients, other improvements (i.e., berms, clay caps, graded filters) were proposed. (Typically, a design relief well spacing of less than 50 feet was deemed too close.)

In areas where topographically low areas (ditches or artificially excavated areas) exist on the dry side of the levee, seepage analyses were used to identify excessive hydraulic gradients. In these areas seepage berms were thickened to fill in low area, or where seepage berms were not required, soil fill was modeled to fill in the low areas thereby providing a counter weight to the underseepage forces. In some cases, the low areas were stormwater ditches that could not be filled; therefore, solutions were selected in these cases to accommodate either relocation of the ditch or conversion of the ditch to a pipe/ culvert.

Cutoff walls were used as last resort solutions where seepage berms and/or relief wells were inadequate to sufficiently reduce the seepage gradients on the levee dry side or where space or other constraints make the installation of seepage berms impractical. Deep cutoff walls, where used, would extend to the underlying bedrock surface and would be designed to completely cutoff seepage that currently flows through and beneath the levee. In several cases, a shallower cutoff wall was proposed where an interval of low permeability material extending over a wide geographic area was identified. Because cutoff walls represent a significantly higher construction cost per lineal foot of levee as compared to the other underseepage control methods, their application was limited.

In all cases where impacts to wetlands are proposed, there is no practicable alternative that would avoid or minimize the placement of fill or dredged material into those affected wetlands.

C. Compliance with Applicable State Water Quality Standards

Water quality certification under Section 401 of the Clean Water Act and a Section 402 permit will be required from the Illinois Environmental Protection Agency. The certification and permit conditions will be incorporated into the project's plans and specifications. Coordination of the proposed plan with the IEPA will be accomplished.

D. Compliance with Applicable Toxic Effluent Standard or Prohibition under Section 307 of the Clean Water Act

The proposed activities are not expected to violate the toxic effluent standards of Section 307 of the Clean Water Act.

E. Compliance with Endangered Species Act of 1973

The selected plan is not expected to adversely affect any of the federally listed endangered, threatened, or candidate species or their critical habitat, provided that restrictions pertaining to the Indiana bat are imposed.

F. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972
Not applicable.

G. Findings of Significant Degradation of the Waters of the United States
The proposed project will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Life stages of aquatic organisms and other wildlife would not be adversely affected in a significant manner. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values would not occur.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem
All appropriate and practicable measures have been taken through application of procedures contained in Subpart H of the Guidelines to insure minimal adverse effects of the proposed discharges.

I. On the Basis of the Guidelines the Proposed Disposal Sites for the Discharge of Dredged and Fill Material
Based on this evaluation, the proposed Southwestern Illinois Levee Improvement Project is specified as complying with the requirements of these guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

Prepared by: /unsigned/
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Approved by: /unsigned/

Thomas M. Keevin, Ph.D.
Chief, Planning and Environmental Branch,
Regional Planning and Environmental Division North

_____ /unsigned/

Date Christopher G. Hall
Colonel, U.S. Army
District Commander

To be signed following the review of comments received during the public comment period.

APPENDIX EA-HTRW
TO
ENVIRONMENTAL ASSESSMENT
WITH
UNSIGNED FINDING OF NO SIGNIFICANT IMPACT

SOUTHWESTERN ILLINOIS LEVEE IMPROVEMENT PROJECT
MADISON, ST. CLAIR, AND MONROE COUNTIES, ILLINOIS

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and

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JANUARY 2012

GENERAL PROCEDURE FOR WORK IN CONTAMINATED AREAS

Applicability:

Unless alternative site-specific guidance is provided, this procedure applies to any drilling, coring, testing, or construction activities involving potential environmental contamination impacts to soil and/or water, including previously-identified restricted areas or impacts discovered during the course of site work.

Should any visible, olfactory, or other evidence of actual waste material be encountered during construction or investigation activities, immediately stop work and evacuate the immediate area. Notify the AMEC Project Manager immediately so environmental professionals can be deployed for further investigation.

Potentially-contaminated water, groundwater, equipment decontamination and rinse water, and development water associated with a geotechnical well, relief well, or excavation should not be discharged to the ground surface! Likewise, potentially-impacted waste soil (e.g., cuttings, excavations, etc.) should not be placed or spread directly on the ground surface!

Soil-Disturbing Construction Activities:

1) Implement the Environmental HASP whenever working in a restricted area or if indications of contamination become apparent (e.g., if soil or water in a well or excavation has an odor, discoloration, sheen, or floating product or other indications of another liquid phase like oil, gasoline, or chemical). In restricted areas, wearing of nitrile or similar gloves should be mandatory in accordance with the HASP.

2) Take a PID reading in the worker breathing space periodically during work. If the breathing space PID reading is > 5 ppm or > 5 ppm above background readings, stop work and allow the well or excavation to ventilate until PID readings are below 5 ppm or return to background levels.

3) When disturbing soil during construction, such as augering a new relief well, the suspected petroleum or other chemical impact should be evaluated through the use of a calibrated photoionization detector (PID) or other device to measure headspace VOC (using bag method) in samples from cuttings/split spoons (for new wells) or otherwise excavated soil, as follows:

    a) Take background PID measurements at the ground level prior to breaking ground or drilling;
    b) Take PID measurements on a regular basis after ground is broken to promptly detect organic soil contamination during the excavation or drilling;
    c) Take a PID measurements at least every 5 feet during excavation or drilling and note visual or olfactory indications of contamination (e.g., brown soil becoming gray or other discoloration or solvent, gasoline, or other odors).

4) Treat waste soil as ‘contaminated’ if a PID reading of soil sample is > 50 ppm, or if visual or olfactory indications of contamination are present.

    a) Make plastic sheeting and two to three 55-gallon drums available at locations that have not been environmentally cleared.

    b) Segregate material with indications of contamination by placing on plastic sheeting. If material is to be staged overnight or longer, place additional plastic sheeting over the material to prevent precipitation from contacting it and secure sheeting.

    c) Transfer contaminated materials to drum(s) or other container (e.g., roll-off box) as soon as possible.

    d) Obtain representative soil sample for analysis

        i) Volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Solid Waste (SW)-846 Method 8260;

        ii) Semi-volatile organic compounds (SVOCs) by USEPA SW-846 Method 8270;

        iii) Total Priority Pollutant List (PPL) metals by USEPA SW-846 Method 6000/7000 series; and

        iv) Other parameters as necessary based on the known impact in the area.

    e) Arrange for shipment of contaminated soils to approved disposal facility.

5) Management of potentially-contaminated water:

    a) Place small quantities of water, including decontamination and rinse waters, in drums. Collect samples per *Management of Potentially-Impacted Water* procedure (below)

    b) See *Management of Potentially-Impacted Water* procedure (below) if removing large quantities of potentially-contaminated water from a relief well (during testing) or other excavation (during construction activities).

Management of Potentially-Impacted Water:

1) Implement the Environmental HASP whenever working in a restricted area or if indications of contamination become apparent (e.g., if water in the well or excavation has an odor, discoloration, sheen, or floating product or other indications of another liquid phase like oil or gasoline). In restricted areas, wearing of nitrile or similar gloves should be mandatory in accordance with the HASP.

2) Take a PID reading in the worker breathing space periodically during work. If the breathing space PID reading is > 5 ppm or >5 ppm above background readings, stop work and allow the well or excavation to ventilate until PID readings are below 5 ppm or return to background levels.

3) Take a reading near the top of the well or excavation. If a PID reading > 5 ppm or >5 ppm above background readings is measured at the top of the well or excavation, or odors, discoloration, sheen, or floating product are present, the water should be assumed to be contaminated. Liquids accumulating or withdrawn from the well or excavation must be contained and should not be discharged to the ground, sewer, or surface water bodies (including ditches and wetlands).

4) A sample of water with suspected impacts should be collected using standard environmental sampling protocols and health and safety precautions. The sample should be characterized with the following analyses, as appropriate:

    a) Volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Solid Waste (SW)-846 Method 8260;

    b) Semi-volatile organic compounds (SVOCs) by USEPA SW-846 Method 8270;

    c) Total Priority Pollutant List (PPL) metals by USEPA SW-846 Method 6000/7000 series; and

    d) Other parameters as necessary based on the known impact in the area.

5) Following characterization of the water, AMEC technical staff will determine appropriate management to be implemented prior to resuming work. Options available for management of water from impacted wells or construction areas may include:

    a) Capture and transfer via vacuum truck or other means to a licensed recycling or disposal facility. Appropriate characterization and disposal paperwork should be generated and maintained to document appropriate handling of water.

    b) Direct discharge to sanitary sewer without treatment. Approval from the receiving waste water treatment facility should be secured. A copy of the written approval should be obtained in advance and maintained to document appropriate handling of the water.

c) On-site treatment of the water can be accomplished through the use of granular activated carbon (GAC) secured from a vendor or by other means, depending on the nature of the impacts. Treated water should either be contained for subsequent discharge/transport or directly discharged. It should be noted that anticipated volumes may make containment difficult or impossible and discharge should only be completed following written approval. Direct discharge may be possible to the following:

   i) Local waste water treatment plant at a manhole after securing written approval from the local water treatment plant.

   ii) Nearby surface water, catch basin, wetland, or ditch after securing a National Pollutant Discharge Elimination System **(**NPDES**)** permit from the Illinois Environmental Protection Agency (IEPA).

   iii) Ground surface after securing a permit from IEPA.