

SWOPE PARK INDUSTRIAL AREA, BLUE RIVER, KAN-
SAS CITY, MISSOURI FLOOD DAMAGE REDUCTION
PROJECT

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY,
CIVIL WORKS, DEPARTMENT OF DEFENSE

TRANSMITTING

THE SWOPE PARK INDUSTRIAL AREA, BLUE RIVER, KANSAS CITY,
MISSOURI FLOOD DAMAGE REDUCTION PROJECT-POST AUTHOR-
IZATION CHANGE REPORT FOR APRIL 2016 (REVISED MAY 2016)



SEPTEMBER 6, 2016.—Referred to the Committee on Transportation and
Infrastructure and ordered to be printed

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REDUCTION PROJECT**

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U.S. GOVERNMENT PUBLISHING OFFICE



HOUSE DOCUMENT NUMBER 114-156

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

JUL 15 2016

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2016 JUL 19 AM 10:19

Honorable Paul Ryan
Speaker of the House of Representatives
U.S. Capitol Building, Room H-232
Washington, DC 20515

Dear Mr. Speaker:

The Secretary of the Army recommends modifying the total project first cost of the authorized Swope Park Industrial Area, Blue River, Missouri project to increase the total project first cost from \$16,980,000 (October 2003 price levels) to \$31,085,000 (October 2015 price levels). The increase in the authorized cost is necessary because the construction costs are projected to exceed the maximum allowed by section 902 of the Water Resources Development Act (WRDA) of 1986. The enclosed April 2016 (revised May 2016) Post Authorization Change Report (PACR) explains and supports the cost increase. The report also documents that the project remains economically justified and environmentally acceptable.

The authorized project is the National Economic Development (NED) plan as described within the Feasibility Report, dated December 2003, and modified by the PACR. The Swope Park Industrial Area project consists of approximately 6,840 feet of floodwalls and earthen levees to form a perimeter of protection from a 0.2 percent annual exceedance probability flood event. Included in the authorized project are various floodwall and levee sections, gatewells, a rolling steel floodgate, and interior drainage collection system. The project includes fish and wildlife mitigation consisting of planting hardwood trees along the Blue River Parkway and excavation of a small wetland riverward of the levee just upstream of the project site. When completed, the project will reduce the expected annual flood damages to the area by approximately 92 percent.

The project was originally authorized for construction in section 1001(29) of WRDA 2007 at an estimated cost of \$16,980,000. The authorized project is described within the Feasibility Report, dated December 2003, and modified by the PACR. Funds to initiate Preconstruction Engineering and Design were first appropriated in FY 2001. Funds to initiate construction were first appropriated in FY 2009. The project is approximately 17 percent financially complete (based on sunk costs), and 8 percent physically complete.

The maximum cost for the authorized project, adjusted for allowable inflation in accordance with section 902, is \$25,267,000 (October 2015 price levels). Based on cost increases described in the PACR, the revised estimated project first cost (without inflation) is \$31,085,000 (October 2015 price level). The cost increase is due to omissions, underestimations, and unforeseen changes during design and construction



(III)

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activities. Project costs have increased primarily due to an underestimation of levee and floodwall quantities, consideration for the potential of unsuitable foundation material, increased requirement for off-site borrow material, higher construction cost for the interior drainage construction contract, and updated real estate values from the final design. Unforeseen changes include, but are not limited to, additional armoring for erosion protection, increased engineering and design due to extended duration of project administration (more than 10 years) and alternating design phases between architectural/engineering firms and the District, and increased Supervision & Administration due to anticipation of intermittent funding. Cost reductions have been implemented on project features to the maximum extent technically feasible. There are no changes in project location, purpose, or scope.

In accordance with the project authorization, the flood risk management features of the project are cost shared at 65 percent Federal and 35 percent non-Federal. The Federal share of the project first cost is estimated at \$20,205,250 and the non-Federal share is estimated at \$10,879,750. The non-Federal sponsor currently owns nearly all of the required lands, easements, rights-of-way, relocations, and excavated material disposal areas required for implementation of the project. The non-Federal cost sharing sponsor will be responsible for the operation, maintenance, repair, replacement, and rehabilitation of the project after construction, at a cost currently estimated at \$81,600 per year.

At the October 2015 price level, a 3.125 percent discount rate, and a 50-year period of economic analysis, the U.S. Army Corps of Engineers (Corps) estimates the total equivalent annual costs to be \$1,358,400 and total equivalent annual benefits to be \$3,018,100. Net benefits are estimated at \$1,659,700 and the benefit-to-cost ratio is 2.2 to 1.

With respect to environmental compliance, a Finding of No Significant Impact (FONSI) was signed in 2014 when an updated Environmental Assessment (EA) was prepared as part of the project. The Corps and my office reviewed the FONSI, EA, associated environmental permits and cultural resource clearances and have determined that the Swope Park Industrial Area project remains compliant with the aforementioned documents.

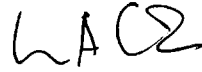
A Type I Independent External Peer Review (IEPR) was not completed for the Swope Park Industrial Area PACR. The Director of Civil Works for Corps Headquarters approved an IEPR exclusion request for the PACR on March 8, 2016. However, a Type II IEPR (for implementation documents), which is a Safety Assurance Review (SAR), will be conducted on design and construction activities. Corps policy directs that a SAR be conducted for any project involving public safety.

The Office of Management and Budget (OMB) advises that there is no objection to the submission of the PACR to Congress and concludes that its recommendation is consistent with the policy and programs of the President. However, OMB also noted that the project would need to compete with other proposed investments for funding in

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future budgets. A copy of OMB's letter, dated July 13, 2016, is enclosed. I am providing a copy of this transmittal and the OMB letter to the Subcommittee on Water Resources and Environment of the House Committee on Transportation and Infrastructure, and the Subcommittee on Energy and Water Development of the House Committee on Appropriations. I am also sending an identical letter to the President of the Senate.

Very truly yours,

A handwritten signature in black ink, appearing to read "LACZ" or similar, with a stylized flourish at the end.

 Jo-Ellen Darcy
Assistant Secretary of the Army
(Civil Works)

Enclosures

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3 Enclosures

1. Director of Civil Works' transmittal, April 21, 2016
2. OMB Letter, July 13, 2016
3. Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project, Post Authorization Change Report, April 2016 (revised May 2016)

VII



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

CECW-NWD

APR 21 2016

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project Kansas City District, Northwestern Division, Post Authorization Change Report

1. Purpose: Request your review and approval of the enclosed Swope Park Industrial Area, Blue River, Kansas City, Missouri (KCMO) Flood Damage Reduction Project (Swope Park), Post Authorization Change Report (PACR) that documents the need to modify the authorized total project cost to \$31,085,000.
2. Post Authorization Change: Section 1001(29) of Public Law 110-114 originally authorized the project at a total cost of \$16,980,000. The total project cost recommended by the PACR is \$31,085,000 (1 October 2015 price levels). The recommended total project cost includes \$5,494,100 in sunk costs, as of 30 September 2015. The recommended total project cost increase is primarily due to omissions or underestimations in the authorized project's cost estimate and unforeseen changes during design and construction activities. These changes have caused significant schedule delays and unforeseen costs. The project scope, purpose, and relocations included within the National Economic Development Plan remain as authorized. The estimated fully funded cost, including inflation to the midpoint of the scheduled future construction, is \$32,264,000. The maximum cost of the authorized project, adjusted for allowable inflation in accordance with Section 902 of the 1986 Water Resources Development Act (WRDA), is \$25,267,000. Thus, the recommended total project cost exceeds the Section 902 limit.
3. Background and Discussion: The Project is located on a 50 acre site on the left descending bank of the Blue River, which drains a highly urbanized 272 square-mile area. Within the corporate limits of KCMO, the industrial park is centered on 75th Street Terrace and bounded by Union Pacific Railroad tracks to the west and the Blue River channel to the north, south, and east. The area was fully developed prior to enactment of the 1968 National Flood Insurance Act and is almost entirely within the federal Emergency Management Agency floodplain. The city of KCMO is the non-federal project sponsor. The authorized project's flood damage reduction plan consists of approximately 6,840 feet of floodwalls and levees to form a perimeter of protection from a 0.2 percent annual exceedance probability flood event. Included in the authorized project are various floodwall and levee sections, gatewells, a rolling steel floodgate, interior drainage collection system, and environmental mitigation.

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CECW-NWD

SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project Kansas City District, Northwestern Division, Post Authorization Change Report

a. The city of KCMO cost shares the project with a 65% federal and 35% non-federal division of project costs. The completed project is expected to provide about \$3,018,100 in annual flood damage reduction benefits.

b. The Project Partnership Agreement with the non-federal local sponsor, KCMO, was executed on 11 May 2011. Funds to initiate planning, engineering, and design were first appropriated in FY 2001. Funds to initiate construction were appropriated in FY 2009. As of 1 October 2015, the project is approximately 17% complete, based on total project sunk costs and the recommended total project cost. The remaining construction contract will complete the levees & floodwalls and the interior drainage system.

c. The U.S. Army Corps of Engineers (USACE) Kansas City District completed a Cost and Schedule Risk Analysis (CSRA) for the remaining features yet to be constructed. The CSRA reports were reviewed by the Cost Engineering Directory of Expertise and certified on 9 December 2014. An exclusion from the requirements to conduct a Type I Independent External Peer Review was approved.

d. A Level 2 economic update was completed in conjunction with this report. The project remains economically justified. At the 1 October 2015 price level and the current federal interest rate of 3.125% (50-year period of analysis), annual benefits are \$3,018,100, annual costs are \$1,358,400, net benefits are \$1,659,700, and the benefit-to-cost ratio is 2.2.

e. In accordance with cost sharing provisions of Section 103(a) of WRDA 1986, costs for flood risk management features are shared 65 percent federal and 35 percent non-federal. The federal share of the recommended total project cost is estimated to be \$20,205,250 and the non-federal share is estimated at \$10,879,750. The estimated Lands, Easements, Rights-of-way, Relocations, and Disposals (LERRDs) are \$3,209,000. To date, the non-federal sponsors have requested no LERRD credit. The local sponsors are responsible for the operation, maintenance, repair, replacement, and rehabilitation of the project after construction, at a cost estimated at \$81,600 per year.

4. Conclusion: The Kansas City District prepared the PACR in accordance with ER 1105-2-100, Appendix G, dated 30 June 2004, to document the increases to the total project cost and recommend an increase in the authorized project cost. The HQUSACE policy compliance review of the PACR concluded that there are no unresolved policy issues and that the project is technically sound, environmentally acceptable, and economically justified. HQUSACE review documentation is enclosed.

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CECW-NWD

SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood
Damage Reduction Project Kansas City District, Northwestern Division, Post
Authorization Change Report

5. Recommendation: Transmission of the enclosed PACR to Congress as a basis for increasing the authorized total project cost of the Swope Park Industrial Area, KCMO, Flood Damage Reduction Project to \$31,085,000 (1 October 2015 price levels). In coordination with your staff, documents will be developed and provided separately to coordinate this recommendation with the Office of Management and Budget.

6. Questions or concerns should be directed to Mr. Mark Kramer, Acting Deputy Chief, Northwestern Division Regional Integration Team, at 202-761-4605.



STEVEN L. STOCKTON, P.E.
Director of Civil Works

Encl

X



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

July 13, 2016

The Honorable Jo-Ellen Darcy
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, DC 20310-0108

Dear Ms. Darcy:

As required by Executive Order 12322, the Office of Management and Budget has reviewed an Army Corps of Engineers (Corps) May 2016 post-authorization change report (report) for the Swope Park Industrial Area project (project). The report estimates that the project will now cost a total of \$31.085 million at the October 2015 price levels, and proposes to increase its estimated Federal, non-Federal, and total costs accordingly. We have concluded that an authorization to increase the estimated costs in this manner would be consistent with the policy and programs of the President.

The Office of Management and Budget does not object to your submitting this report to the Congress. When you do so, please advise the Congress that this project, like all other Corps projects, would need to compete with other proposed investments in future Budgets.

Sincerely,

A handwritten signature in black ink, appearing to read "John Pasquantino". The signature is written in a cursive style with a large, sweeping initial "J".

John Pasquantino
Deputy Associate Director
Energy, Science, and Water

SWOPE PARK
INDUSTRIAL AREA,
BLUE RIVER,
KANSAS CITY, MISSOURI
FLOOD DAMAGE
REDUCTION PROJECT

POST AUTHORIZATION CHANGE REPORT



15 May 1990. Flooding at Swope Park Industrial Area



US Army Corps
of Engineers®

April 2016 (Revised May 2016)

(1)

ERRATA SHEET

12 May 2016

Swope Park Industrial Area, Blue River, Kansas City, Missouri FDR Project

Post Authorization Change Report – April 2016

The following changes are made to the Post-Authorization Change Report:

- 1) Executive Summary
 - a) Third paragraph, second sentence – Change the sentence to read “The project is approximately 8-percent physically constructed and 17-percent financially complete at this time. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
 - b) Seventh paragraph, first sentence – Change the sentence to read “Based on the analysis of the cost increases experienced on the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction project, with construction approximately 8-percent physically complete, noting that no flood damage reduction performance is obtained until the construction of the Project is complete, it is recommended that the project’s authorized total project cost increase from \$16,980,000 (October 2006 price level) to \$31,085,000 (01 October 2015 price level, and that this is in the Federal Government’s best interest. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
- 2) Post Authorization Change Report
 - a) Page 3, paragraph 1.0, third sentence – Change the sentence to read “The Project is approximately 8-percent physically constructed and 17-percent financially complete. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
 - b) Page 8, paragraph 2.3, first sentence – Change the sentence to read in part “Construction on the project is approximately 8-percent physically constructed and 17-percent financially complete based on the construction costs included in the authorized total project cost. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”

- c) Page 18, paragraph 10.9, Table 6 – Add the following footnote to the table
“Estimate based on October 2014 Price Level”
- d) Page 18, paragraph 10.9.1 – Change the second sentence to read “The local NFS has submitted preliminary documents to initiate Corps of Engineers technical review for compliance but has not formally requested a credit for their cost share.”
- e) Section 15.0: Revise second paragraph as follows deleting the ambiguous reference to mitigation banking.

“The results of the revised EA determined the needs to utilize mitigation banking would be required. The public meeting for the updated EA was held on 25 January 2014. The public review period concluded with a finding of no significant impacts to threatened and endangered species or designated critical habitat, or cultural resources. A Finding of No Significant Impact (FONSI) was signed on 18 February 2014 with the final updated EA included in Appendix F – Environmental Considerations.”

- f) Section 15.0: Add the following paragraph as the third paragraph of which provides more detail on the mitigation bank:

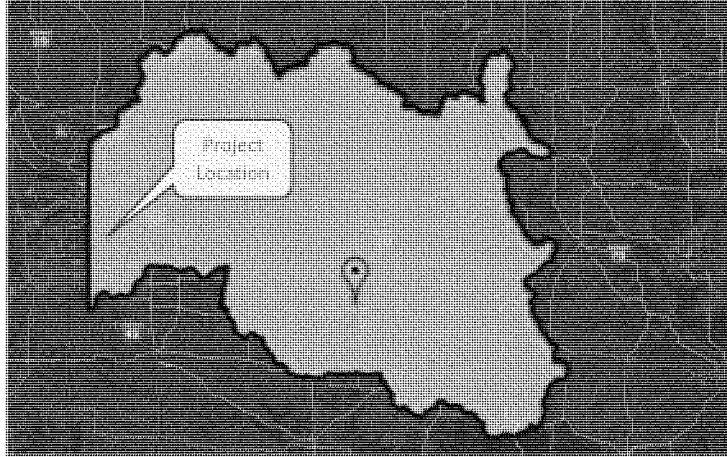
“The approved mitigation bank currently active and planned for the Swope Park Industrial Area Service Area is the Clear Fork Wetland and Stream Mitigation Bank. The Service Area for this mitigation bank is in the Blue River Watershed and is depicted below. The project is within the Service Area. The Clear Fork Wetland and Stream Mitigation Bank has both wetland and stream available. As of May 2016, the Clear Fork Wetland and Stream Mitigation Bank has 29.85 available wetland credits and 10,805.17 stream credits. These values are sufficient to offset the wetland and stream impacts expected at the Swope Park Industrial Area. All costs associated with the use of mitigation banks will be classified as a one-time construction cost and will be cost shared with the sponsor in accordance with the PPA. Purchase of these mitigation credits will comply with the Federal Acquisition Regulation 48 CFR.

General Information from the Regulatory In-Lieu Fee and Bank Information Tracking System provides the following information for the Clear Fork Wetland and Stream Mitigation Banks:

Chair: USACE
 USACE District: Kansas City
 FWS Field Office: Columbia
 NOAA Fisheries Region: Southeast
 State: Missouri
 Permit No. NWK-2008-01435
 Approved Date: 14-Jan-2014
 Website:
https://ribits.usace.army.mil/ribits_apex/f?p=107:10:8521427335796::NO::P10_BANK_ID:3078
 Bank Credit Classification: Wetlands, Stream

RIBITS (Regulatory In lieu fee and Bank Information Tracking System) was developed by the U.S. Army Corps of Engineers with support from the Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Federal Highway Administration, and NOAA Fisheries.

Service Area Map (Swope Park is located along the western edge of the Service Area)



Analysis of Potential Mitigation Banks for Swope PACR Project Watershed: Blue River Watershed - Sub Watershed of Missouri River Watershed Description of Project Impacts (Habitat/Function Type): Wetland and Stream		
Mitigation Bank Name	Clear Fork Wetland and Stream Mitigation Bank	Clear Fork Wetland and Stream Mitigation Bank
Watershed	Blue River	Blue River
Location	Kansas City, Missouri	Kansas City, Missouri
Service Area	Kansas City, MO to near Columbia, MO	Kansas City, MO to near Columbia, MO
Project w/in Service Area (Y/N)	Y	Y
Regulatory Approval Date and Number	14-Jan-14	14-Jan-14
ESA Compliance (No Effect, NLAA Concurrence Letter, BiOP & date)	Permit No. NWK-2008-01435	Permit No. NWK-2008-01435
Habitat Type/ Function Mitigated	Wetland	Stream
Meets Project Impact Requirements (Y/N)	Y	Y

- g) Page 23, paragraph 18.1, second sentence – Change the sentence to read in part “approximately 8-percent physically constructed and 17-percent financially complete based on the construction cost estimate. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
- 3) Tab 3 – Project Cost Increase Fact Sheet
 - a) Paragraph 10, first sentence – Change the sentence to read in part “The project is approximately 8-percent physically constructed and 17-percent financially complete based on sunk costs and total project costs. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
- 4) Tab 4 – Report Summary
 - a) Page 4, paragraph 1.9 – Change the sentence to read “The Project is approximately 8-percent physically constructed and 17-percent financially complete, based upon total sunk costs and the recommended total project cost. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
 - b) Page 6, paragraph 3.4 – Change the second sentence to read “The Project is 8-percent physically constructed and 17-percent financially complete. The percent constructed (8-percent) is based on only the construction cost accounts (11-Levees & Floodwalls and 16 – Bank Stabilization) divided by the overall project costs. The 17-percent includes all costs accounts divided by the Total Project Cost.”
- 5) Tab 14 – Real Estate Plan
 - a) Paragraph 11, Table Baseline Cost Estimate – Change 35.90% Contingency to read “16% Contingency”.
 - b) Paragraph 11, Table Baseline Cost Estimate – Add footnote that reads “Estimate based on October 2014 Price Level”
- 6) Tab 2 – Appendix F, Environmental Considerations

In **Section 6.0 Mitigation Measures**, add the following two paragraphs at the end:

Kansas City District consulted with the USACE Ecosystem PCX regarding use of the Missouri Stream Method as a tool for Section 404.b.1 and Section 401 analysis, and obtaining State Water Quality Certification. The Missouri Stream Method tool was used in the current EA process only for validation of the mitigation already approved in the final Feasibility Report of 2002, and signed Report of the Chief of Engineers dated December 2003, and as an approved component of the project authorized in WRDA 2007. There is no change to mitigation requirements, and no new or additional

mitigation being proposed in this PACR or EA. The following guidance was received from the Ecosystem PCX:

"The tool was used in an updated Environmental Assessment and in regulatory compliance for Section 404 analysis and Section 401 Water Quality Certification. Based upon the use of the tool to confirm already approved decisions and mitigation requirements, the PCX does not see a need for certification under EC 1105-2-412 in this circumstance. In the future, if NWK chooses to employ the tool for other new planning work please consult with the Ecosystem Restoration PCX regarding certification or approval needs. Thank you for reaching out to us in this matter."



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, KANSAS CITY DISTRICT
635 FEDERAL BUILDING
601 EAST 12TH STREET
KANSAS CITY MO 64106-2824

JUL 20 2015

CENWK-PM-CJ

MEMORANDUM FOR Programs Directorate, Northwestern Division, (CENWD-PD/David Ponganis), 1201 NE Lloyd Boulevard, Suite 400, Portland, Oregon 97232

SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project, Kansas City District, Northwestern Division, AMSCO 081396, Post Authorization Change Report (PACR), Submittal to CENWD

1. The Swope Park Industrial Area, Kansas City, Missouri Flood Damage Reduction Project (Swope Park), Kansas City District, Northwestern Division, PACR package is submitted to CENWD for review and transmission to Headquarters, United States Army Corps of Engineers (HQUSACE).
2. The Swope Park flood damage reduction plan consists of floodwalls and levees approximately 6,840 feet long, which is located near the intersection of 75th Street Terrace and Manchester Trafficway in a highly urbanized area of Kansas City, Missouri. The project is located along the left bank of the Blue River in Jackson County, Missouri and is the source of the flooding in the Swope Park Industrial Area. The project is approximately 17% complete (based upon the total sunk costs and the recommended total project cost). The Project is originally authorized under Section 1001(29) of the WRDA 2007, PL 110-114 in accordance with the Chief's Report dated 30 Dec 2003, accompanied by the report of the District and Division Engineers (Feasibility Report and Environmental Assessment dated 29 Jan 2003). The estimated total project cost will exceed the authorized Section 902 limit; therefore, PACR submission is required as the basis for requesting Congress to increase the authorized project cost.
3. District Quality Control was completed on 7 Jan 2014. The total project cost estimate was certified by the Cost Mandatory Center of Expertise (MCX) on 8 Jan 2014 and recertified for a price level update on 12 Dec 2014. Agency Technical Review (ATR) was completed on 3 Feb 2014.
4. Please find enclosed (7) hard copies of the Swope PACR and three (3) copies of the Project Map. Electronic submission will also occur to CENWD (Jeremy Weber). The Swope Park PACR package consists of the following:
 - a. Post-Authorization Decision Document Checklist, ER 1165-2-502, Appendix A;
 - b. Project Study Issue Checklist, ER 1105-2-100, Exhibit H-2;
 - c. PACR Report and Appendices A through J;
 - d. Project Cost Increase Fact Sheet;
 - e. PACR Report Summary, ER 1005-2-100, Exhibit H-11;

- f. Scope Reduction Memorandum;
- g. PACR Review Plan;
- h. District Quality Control Memorandum;
- i. ATR Review Documentation and Certification;
- j. Cost MCX Review Documentation and Certification;
- k. Legal Review Certification;
- l. Value Engineering Statement;
- m. Local Sponsor Support Documentation;
- n. PGM Compliance Memorandum – *Placeholder for HQUSACE Document*
- o. Risk Management Plan;
- p. Real Estate Plan; and
- q. Draft ASA (CW) and Office of Management and Budget Briefing Slides.

5. The point of contact is Mr. Kent Myers, Project Manager, (816) 389-3399 or email at kent.n.myers@usace.army.mil.

- 2 Encls
- 1. Swope Park PACR (x10)
 - 2. Project Map (x3)



ANDREW D. SEXTON
COL, EN
Commanding

SWOPE PARK
INDUSTRIAL AREA,
BLUE RIVER,
KANSAS CITY, MISSOURI
FLOOD DAMAGE
REDUCTION PROJECT

POST AUTHORIZATION CHANGE REPORT



15 May 1990, Flooding at Swope Park Industrial Area



US Army Corps
of Engineers ®

April 2016

**Swope Park Industrial Area, Blue River, Kansas City, Missouri
Flood Damage Reduction Project**

**POST AUTHORIZATION CHANGE REPORT
DECISION DOCUMENT**

**Kansas City District
Northwestern Division**

**P2#: 156415
AMSCO No.: 012821**

April 2016



**US Army Corps
of Engineers ®**

EXECUTIVE SUMMARY

This Post Authorization Change Report (PACR) recommends an increase to the authorized cost of the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction project, herein referenced as “the Project”. The total project costs are estimated to increase from \$16,980,000 (October 2006 price levels) to \$31,085,000 (01 October 2015 price levels). This PACR documents the reasons for the recommendation and includes an economic update to the overall Project and a cost risk analysis on the features yet to be constructed. A PACR is required since the Project is anticipated to exceed its maximum cost limit, although value engineering recommendations and cost & scope reductions have been evaluated and implemented where viable.

The Project is located on a 50 acre site on the left descending bank of the Blue River, which drains a highly urbanized 272 square-mile area. Within the corporate limits of Kansas City, Missouri, the industrial park is centered on 75th Street Terrace and bounded by Union Pacific Railroad tracks to the west and the Blue River channel to the north, south, and east. The area was fully developed prior to enactment of the 1968 National Flood Insurance Act and is almost entirely within the FEMA floodplain. The City of Kansas City, Missouri is the non-Federal project Sponsor. The authorized project’s flood damage reduction plan consists of approximately 6,840 feet of floodwalls and levees to form a perimeter of protection from the 0.2 percent Annual Chance of Exceedance (ACE) flood event. Included in the authorized project are various floodwall and levee sections, gatewells, a rolling steel floodgate, interior drainage collection system, and environmental mitigation. The City of Kansas City, Missouri (KCMO) cost shares the Project with a 65% Federal and 35% non-Federal division of project costs.

The project was authorized after approval of a feasibility study, dated December 2003, by Public Law 110-114 (WRDA 2007), Section 1001, Paragraph 29. The project is approximately 8-percent constructed and 17-percent financially complete at this time. The purpose, location, and local cooperation requirements remain unchanged since authorization. No scope changes have occurred to the authorized Project. All remaining features to be constructed are undergoing final design reviews and are planned to begin construction in Fiscal Year 2016. The Project, as authorized, is scheduled to be fully constructed by Fiscal Year 2021, assuming optimal Federal and non-Federal funding.

Project costs have increased primarily due to an underestimation of levee and floodwall quantities, consideration for the potential of unsuitable foundation material, increased requirement for off-site borrow material, higher construction cost for interior drainage construction contract, and updated real estate values from the final design. They account for the increase in the total project cost by over \$5M (01 October, 2015 prices) above the Section 902 limits of the authorized project. Unforeseen changes include, but are not limited to, additional armoring for erosion protection, increased engineering and design due to extended duration of project administration (more than 10 years) and alternating design phases between architectural/engineering firms and the District, and increased S&A due to anticipation of intermittent funding.

Cost reductions have been implemented on Project features to the maximum extent technically feasible. A Value Engineering Study has been completed to determine if potential cost savings are available and to ensure the most effective and cost efficient design is provided. Furthermore, a Cost and Schedule Risk Analysis (CSRA) was completed on the remaining features currently under design – Levees & Floodwalls and Bank Stabilization. The CSRA used the Monte Carlo technique and was supported by District and Project Delivery Team (PDT) members. Contingencies were calculated for the features based on an 80% confidence level. The total project cost estimate was updated to include all sunk costs and estimated

future design and construction costs, including the appropriate risk-associated contingencies. The updated total project cost for the recommended Project is \$31,085,000 (01 October 2015 price level) and \$32,264,000 (fully funded). In addition to the updated total project cost, the Section 902 cost limit was updated to \$25,267,000 based on the current authorized project.

A Level 2 economics update was completed to update the economic justification for the recommended Project. The update analyzed the fundamental economic assumptions supporting the benefit-cost computations in previously approved documents and accounted for any changes significant enough to alter the scale of previously reported benefits and costs. As with costs, benefits were also updated to reflect current conditions. At the current FY16 interest rate of 3.125%, the total project benefit-to-cost ratio is 2.2.

Based on the analysis of the cost increases experienced on the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction project, with construction approximately 8-percent complete, noting that no flood damage reduction performance is obtained until the construction of the Project is complete, it is recommended that the project's authorized total project cost increase from \$16,980,000 (October 2006 price level) to \$31,085,000 (01 October 2015 price level, and that this is in the Federal Government's best interest. The Remaining Benefit-to-Remaining Cost Ratio (RBRCR) was recalculated at 2.6-to-1 based on the current prevailing interest rate of 3.125-percent. Therefore, reauthorization of the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction project at a cost of \$31,085,000 (01 October 2015 price levels) is recommended to allow completion of the remaining portions of the project and realization of the Project's benefits.

POST AUTHORIZATION CHANGE REPORT

Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project

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1.0 REPORT PURPOSE

Projects authorized by the Water Resources Development Act (WRDA) of 1986 and 1988 and subsequent authorizations require additional Congressional authorization if the total project cost increases more than 20-percent of the authorized amount, exclusive of price level increases. The estimated total project costs for the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction project, herein referenced as “the Project”, are anticipated to exceed the authorized Section 902 limit. Congressional action to authorize an increase to the total cost limit is required to complete the Project, as originally authorized.

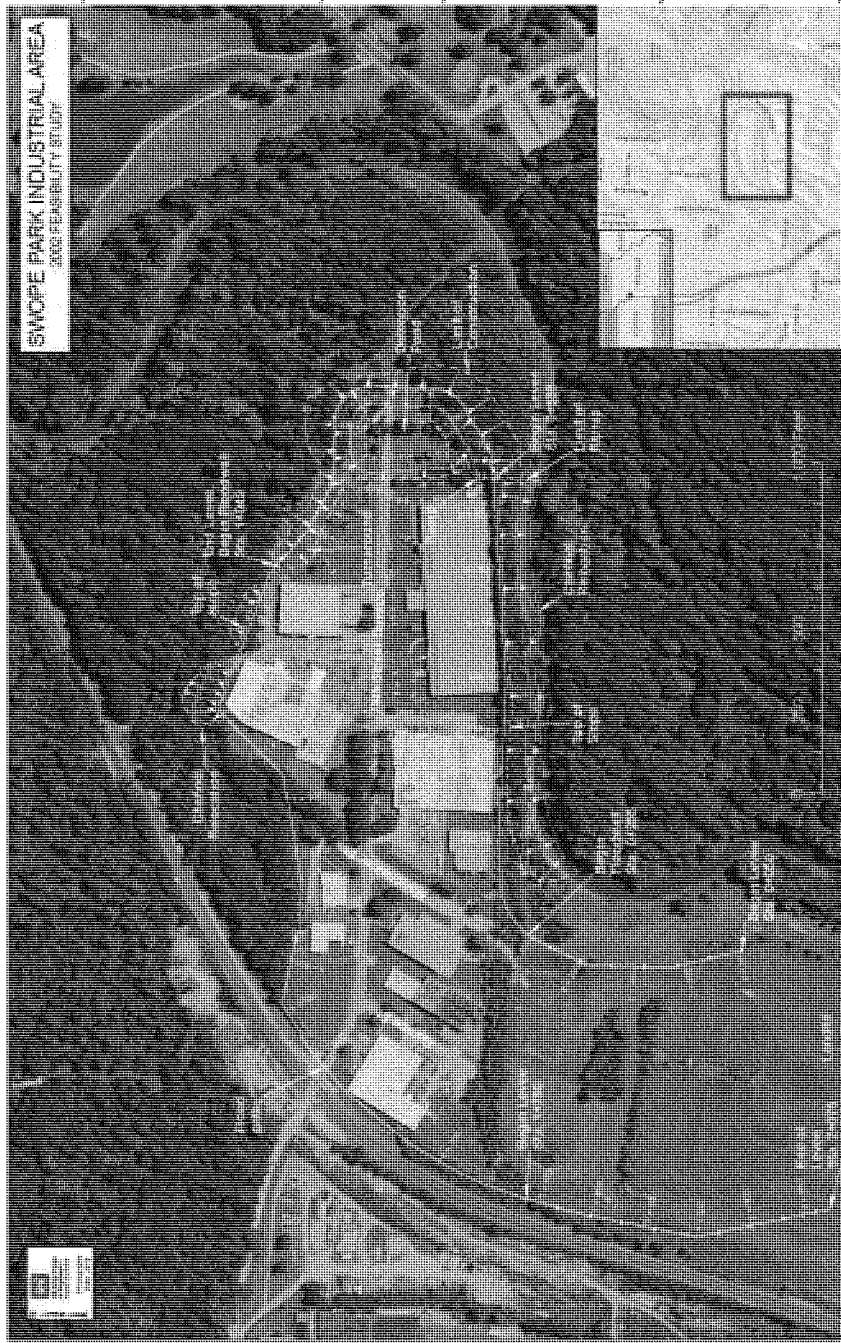
The Project has maintained its original purpose and scope, but underestimation of levee and floodwall quantities, consideration for the potential of unsuitable foundation material, increased requirement for off-site borrow material, higher construction cost for interior drainage construction contract, and updated real estate values from the final design have resulted in higher project costs. Unforeseen changes include, but are not limited to, additional armoring for erosion protection, increased engineering and design due to extended duration of project administration (more than 10 years) and alternating design phases between architectural/engineering firms and the District, and increased S&A due to anticipation of intermittent funding. The Project is approximately 8-percent physically complete. One construction contract is complete, which installed the majority of the interior stormwater drainage pipes. The remainder of the project, including the floodwalls, levees, bank stabilization, and detention pond are in the final stages of design.

2.0 DESCRIPTION OF AUTHORIZED PROJECT

The Project consists of construction of approximately 3,990 feet of reinforced concrete floodwall and approximately 2,850 feet of compacted earthen levee, as well as construction of an interior drainage system consisting of 1,030 feet of reinforced concrete pipe and a 2.5 acre interior storm water retention pond. A rolling-gate closure would be constructed at the existing 75th Street Terrace entrance to the industrial park. The project also includes fish and wildlife mitigation consisting of planting of hardwood trees along the Blue River Parkway and excavating a small wetland riverward of the levee at a location just upstream of the Swope Park Industrial Area. The City of Kansas City, Missouri (KCMO) cost shares the Project with a 65% Federal and 35% non-Federal division of project costs. Please refer to the Figure 1 for the project location and a map of the current project. Figure 2 shows the project as defined in the Feasibility Study.

[illegible]

Figure 2 – Swope Park Industrial Area, Kansas City MO Authorized Project Features Map



2.1 BRIEF DESCRIPTION OF AUTHORIZED PLAN

See Appendix H- *Chief's Report and Feasibility Overview Drawings* for a visual depiction of the authorized project.

2.1.1 ACCOUNT 01 – LANDS AND DAMAGES

The authorized Project generally identifies lands which would require real estate acquisition around the protected area. This division includes all lands, easements, damages, etc. required to provide adequate real estate to construct the Project.

2.1.2 ACCOUNT 02 – RELOCATIONS

This feature code applies to relocations of utilities to accommodate the Project's needs. The sole source of relocations is to avoid utility conflicts with building foundations or the proposed interior drainage system. The following paragraphs describe the relocations from the authorized project.

2.1.2.1 Utility Relocations

There are a number of existing public and private utilities that are situated within the limits of the Project. The utilities identified for relocation by the authorized project include sanitary sewer line, gas line, and water main. Additional utilities exist in the area including water mains, private water connections, private sewer connections, private stormwater connections, overhead power distribution lines, and communication lines.

2.1.2.2 Sanitary Sewers

The sanitary sewers drain to a 10-inch trunk line along 75th Street Terrace. The trunk line drains west to a lift main that discharges through a 6-inch force main under the railroad tracks to a 42-inch interceptor west of the tracks. Laterals include an 8-inch sewer located along the south portion of Manchester Trafficway and an 8-inch sewer located halfway between Spruce Avenue and Manchester Trafficway. A 10-inch pipe serves as an emergency outfall to the natural creek in the north part of the Industrial Area. The following are proposed relocations/modifications to the Sanitary Sewer System as result of the structural flood protection measures:

1. Replacement of 131 feet of the 10-inch sewer overflow with Ductile Iron Pipe with a gate valve and construction of a concrete headwall with a 10-inch round flap gate.
2. Construction of a new 8-inch lateral immediately east of Manchester Trafficway to eliminate interference with the proposed storm sewer.
3. Construction of a new manhole at the proposed detention pond and elimination of approximately 230 feet of 10-inch sewer.
4. Construction of a new manhole on the lateral between Spruce Avenue and Manchester Trafficway and elimination of approximately 33 feet of 8-inch sewer.
5. Installation of a gate valve on the 6-inch sanitary sewer line running beneath the rolling flood gate.

2.1.2.3 Water Line System

The water line system consists of a 12-inch water line located in the south side of 75th Street Terrace; a 12-inch water line located on the west side of Manchester Trafficway; and a 6-inch water line located at the east of Spruce Avenue. The water line into the industrial area was not identified for relocation (up and over the floodwall or via other methods) in the authorized project. This is because routing it up and over the levee could expose the line to freezing since it does not flow at night, on weekends, and during holidays due to low demand. A gate valve was planned to provide positive shutoff to the project area in the event of any kind of failure to the line.

2.1.2.4 Natural Gas Lines

The gas distribution is comprised of a 4-inch line along the north side of 75th Street Terrace and 4-inch line on the west side of Manchester Trafficway. The line along the north side of 75th Street Terrace runs under the proposed location of the floodgate. The line will be relocated away from the gate and over the floodwall. This will eliminate the pipe under the wall which could provide a conduit for flood waters.

2.1.2.5 Electrical Distribution.

An overhead electrical distribution system is located on the south side of 75th Street Terrace and on the east side of Manchester Trafficway. This system extends across the proposed detention pond and levee on the east side of the site, and across the floodwall on the west side. The authorized project did not propose relocation of the overhead power lines as a result of the structural flood protection measures.

2.1.3 ACCOUNT 11 – LEVEES AND FLOODWALLS

2.1.3.1 Levees

The authorized plan included 2,850 feet of compacted earthen levee embankment. There were three levee sections authorized (two extension levees connecting to the Allied Waste landfill and one levee around the detention pond). Each levee top width is 12 feet with side slopes of 1 vertical to 3 horizontal.

2.1.3.2 Floodwalls

The authorized plan includes approximately 3,990 feet of reinforced concrete floodwall with a foundation of auger cast piles extending to shale bedrock. The average length of piles would be between 44 and 46 feet assuming a rock (shale) penetration of 10 feet. A rolling structural steel flood gate at the current entrance to the Swope Park Industrial area at 75th Street Terrace was proposed as the sole entry into and out of the industrial area and would require full evacuation of the leveed area before closure during a flood event. Section 9.3.4 provides further details of the flood gate.

2.1.3.3 Interior Drainage Pond

The interior drainage pond is designed to retain up to the 1 percent chance interior flood with outflow blocked by a simultaneous Blue River flood event. The area will serve as an internal drainage area of about 40 acres. Water exits the interior drainage pond to the Blue River via a gravity operated gatewell. Excavation from the ponding area will be used to construct the levees. In total, about 3,380 feet of concrete pipe conveys interior drainage to the pond. The pipe ranges in size from 1-foot to 4.5-feet.

2.1.3.4 Mitigation Area

The project unavoidably affects 6.5 acres of riparian woodland and 0.2 acres of jurisdictional wetlands. An area riverward of the levee at the Blue River bend just upstream of the Swope Park Industrial Area was identified for wetland and riparian mitigation. About 0.4 acres of wetland is proposed at this location. Surrounding this wetland area and extending along the left bank of the Blue River for over one-half mile upstream of the project, the Blue River Parkway will be planted with new riparian hardwood trees. There are no federally listed threatened or endangered species or habitats in the project area.

2.1.4 ACCOUNT 16 – BANK STABILIZATION

Along the Blue River adjacent to the project site, about 1,300 feet of the left bank will be benched and graded to allow for construction of the floodwall and stability of its foundation. Toe protection and riprap will be provided to anchor the slope to ensure a stable foundation for the floodwall. Additionally, from the start of the levee and along the Blue River left bank for about 2,600 feet the levee and

foundation of the flood wall will be protected by riprap. The project was authorized without foreseeing impacts to the channel or right bank.

2.2 LOCAL COOPERATION

The non-Federal Sponsor (NFS) for the Project is the City of Kansas City, Missouri (KCMO). The Project Partnership Agreement (Agreement) was signed by the Government and NFS on 11 May 2011. Please refer to Appendix A for a copy of the signed Agreement.

2.3 PROJECT STATUS

Construction on the project is approximately 8-percent complete based on the construction costs included in the authorized total project cost. Construction is complete on the majority of the interior drainage pipes, including all utilities relocations required for the interior drainage system. The final design of the remaining project features, including the levees, floodwalls, and interior drainage pond, is 95-percent complete and is currently under review. Assuming funds are available, design completion will include Agency Technical Review and a Type II Independent External Peer Review (Safety Assurance Review). Assuming optimal funding, construction will resume in FY16 with completion of all project features by 2021.

2.4 PROJECT SCHEDULE

The schedule for completing construction of the Project is based on the Project receiving authorization for the recommended fully funded cost through FY18.

3.0 AUTHORIZATION

The project is authorized by Public Law 110-114 (WRDA 2007), Section 1001, Paragraph 29, which states:

"SWOPE PARK INDUSTRIAL AREA, BLUE RIVER, KANSAS CITY, MISSOURI. The project for flood damage reduction, Swope Park Industrial Area, Blue River, Kansas City, Missouri: Report of the Chief of Engineers dated December 30, 2003, at a total cost of \$16,980,000, with an estimated Federal cost of \$11,037,000 and an estimated non-Federal cost of \$5,943,000."

4.0 FUNDING SINCE AUTHORIZATION

4.1 FEDERAL FUNDING. Table 1 summarizes the Project's Federal funding history by fiscal year and appropriation category. Note that General Investigations do not contribute to Total Project costs.

Table 1: Federal Funding History

	Appropriations Category			ALLOCATION
	GENERAL INVESTIGATIONS	PRELIMINARY ENGINEERING AND DESIGN	CONSTRUCTION GENERAL	
FY1993	\$143,000			\$143,000
FY1994	(\$143,000)			(\$143,000)
FY1995	\$90,100			\$90,100
FY1996	\$144,000			\$144,000
FY1997	\$49,000			\$49,000
FY1998	\$184,000			\$184,000
FY1999	\$138,000			\$138,000
FY2000	\$58,000			\$58,000
FY2001		\$10,000		\$10,000
FY2002		\$40,000		\$40,000
FY2003		\$80,500		\$80,500
FY2004		\$144,000		\$144,000
FY2005		\$219,000		\$219,000
FY2006		\$99,000		\$99,000
FY2007		\$158,000		\$158,000
FY2008		\$162,000		\$162,000
FY2009			\$638,000	\$638,000
FY2010			\$1,938,000	\$1,938,000
FY2011			\$99,792	\$99,792
FY2012			\$100,000	\$100,000
FY2013			\$99,800	\$99,800
FY2014			\$50,000	\$50,000
TOTAL	\$663,100	\$912,500	\$2,925,592	\$4,501,192

4.2 NON-FEDERAL FUNDING. As of October 2015, the Local NFS has provided nearly \$1.5M in cash. The Local NFS has requested credit for project coordination team expenses and for Lands, Easements, Rights of Way, Relocations, or Disposal (LERRD). The request is in review for certification of expenditures.

5.0 CHANGES IN SCOPE OF AUTHORIZED PROJECT

There have not been any changes to the scope of the authorized project benefit output which defines scope. The authorized project is the National Economic Development (NED) plan, which maximizes net annual economic benefits. A reduction in scope (such as a lower levee with a reduced level of protection) is not possible without realizing an associated reduction in project benefits. The proposed system of floodwalls and levees is consistent with the authorized project and cannot be reduced or eliminated without impacting the function or flood damage reduction benefits of the project.

6.0 CHANGES IN PROJECT PURPOSE

The purpose of the Project- flood damage reduction (flood risk management) - is unchanged since the original authorization in WRDA 2007.

7.0 CHANGES IN LOCAL COOPERATION REQUIREMENTS

The local cooperation requirements of the Project are unchanged since the original Agreement was signed by the Government and NFS on 11 May 2011.

8.0 CHANGE IN LOCATION OF PROJECT

The Project location and associated features are unchanged since the original authorization in 2007.

9.0 DESIGN CHANGES

The following paragraphs identify noteworthy design changes to Project features during design and construction activities. See Appendix I- *Current Drawings Overview* for a visual depiction of the current (95%) plans. Only the more important changes are detailed below:

9.1 ACCOUNT 01 – LANDS AND DAMAGES

The authorized project anticipated the acquisition of 17.8 acres of flood protection easement and 0.2 acres of temporary construction easement. The current design calls for an increased footprint with 25.4 acres needed for Permanent Flood protection easement, 1.3 acres for Temporary Construction easement, 2.1 acres of Pipeline/Utility easement and 0.98 acres of flowage easement. The NFS has initiated acquisition but has not yet been credited with any expenditure.

9.2 ACCOUNT 02 – RELOCATIONS

Relocations estimates were modified at the time of the Project Partnership Agreement and include a significantly higher contingency based on a risk assessment, lessons learned from local projects, and NFS input. These relocations are entirely focused on utility relocations, which are discussed in further detail below. The estimate compared to recent total project cost estimates was reduced upon completion of the design of the entire project and is comparable to the authorized project cost.

9.2.1 UTILITY RELOCATIONS – COMPLETED

As each feature of a project is designed and constructed, the required utility relocations change, sometimes significantly. The information available for the feasibility study did not provide accurate depth and alignment of all utilities in the project area. During the final design and construction of the interior drainage system, all utilities along 75th Street Terrace were accurately located via potholing, field investigation, or remote camera in order to install the required drainage pipe. These utility relocations included a short portion of a water main, a fire hydrant, natural gas line (performed by a public utility company), communication lines (performed by a private utility company), and sanitary sewer laterals.

9.2.2 UTILITY RELOCATIONS – REMAINING

Remaining construction efforts will require additional utility relocations. The number and impact of the relocations was determined during the final design of the entire project. These include a sanitary sewer force main and a water main at the entrance of the industrial park. Other utilities (e.g. natural gas line, communication line, and overhead power distribution lines) will also require relocation, some of the cost will be the responsibility of the private utility companies. Overall, the remaining utility relocations are not a significant part of the work remaining for the project.

The sanitary sewer was not identified for relocation up and over the floodwall in the Feasibility Study and it was assumed that it would remain in place with the floodwall constructed on top of it. The sewer is relocating over an adjacent levee section with a lift station instead of constructing a shut off valve reducing the risk due to failing to close the valve in the event of a line rupture.

9.3 ACCOUNT 11 – LEVEES AND FLOODWALLS

9.3.1 Levee Length. None of the levees segments or flood walls have been constructed yet. The total levee length has decreased by approximately 500 feet, which is mostly accounted for by elimination of the proposed levee extensions in the southwest corner of the project area terminating at a closed landfill. The current design replaces the two levee extensions shown in the authorized project that connect to high ground on Allied Waste Property with a single levee section enclosing the park in a ring of protection. The design has been coordinate with the local government, the City of Kansas City, Missouri, to be compatible with an approach to a planned vehicular bridge into the park. The bridge allows for the elimination of the rolling gate into the project area and ensures unimpeded evacuation of the leveed area. The height of the current design levee remains the same to provide the same level of protection.

This levee change reduces the total length of levees in the project and eliminates the need for a second gatewell in the southwest area of the project., This engineering solution also avoids the risk of dealing with potentially unsuitable materials from the landfill tie-in as well as the regulatory risk of dealing with a capped landfill in a monitoring phase, resulting in an overall project risk reduction.

9.3.2 Utility Levee. A small levee (125 feet in length) was added in the northwest corner of the project area at the industrial park entrance to allow routing of utilities (water, gas, sanitary sewer, and communication) up and over the line of protection. The utilities will be placed above the designed levee section with at least three feet of impervious fill to provide cover and protect the utilities from freezing. This will make the finished grade at the top of the levee slightly higher than the nearby floodwall.

9.3.3 Detention Pond Levee. The current design assumes over-excavation of the northern portion of the levee that is associated with the detention pond. This is a result of additional geotechnical investigations that identified the existing soil strengths were not adequate for the height on the levee associated with the detention pond. Approximately 220 feet of the levee will require over-excavation and additional fill from an outside borrow source to meet stability criteria.

9.3.4 Floodwall Foundation. The authorized project assumed pile foundations would be used around the full perimeter of the project, which is unnecessarily robust. The current design assumes auger cast pile foundations only on the area where buildings encroach on the top of the riverbank on the southern perimeter, coinciding with slope stability concerns identified during later design phases. Remaining floodwalls use spread footings for the floodwall foundation.

9.3.5 Floodwall Length. The floodwall length has decreased by approximately 450 feet. This is due to the addition of the utility levee and the shorter distance allowed by replacing the two levee extensions with a single levee.

9.3.6 Rolling Structural Steel Flood Gate. The design of the authorized project included a rolling structural steel flood gate. The rolling gate is a feasible but less desirable solution to provide ingress/egress to the site during a flood event. The rolling gate closes off the only access to the site and

is immediately adjacent to a railroad crossing that also blocks access to the site. All personnel would have been required to evacuate the leveed area at the start of a flood event, before the gate could have been closed. Once closed, it could not open again until the floodwaters receded. The rolling gate would have some negative aspects including interruption of business operations and the possibility of isolating some personnel inside the leveed area could not be evacuated. Operationally, a rolling gate always introduces some risk of flooding during a flood event due to the potential of the gate not getting closed in time.

The city considers the existing condition of railroad tracks blocking the entrance to the industrial area as an undesirable situation. Trains occasionally park on the crossing blocking the entrance to the industrial park. For this reason, the City of Kansas City, Missouri now has an approved and budgeted project to construct a new flyover bridge over the railroad tracks. That project is funded and is moving to final design and construction. The flyover bridge will be constructed with appropriate railroad clearance such that it will be over the top of the project's levee embankment along the west end. The City will build the bridge regardless of this Flood Damage Reduction (FRM) project being built, and it eliminates the need for a rolling gate. It is essentially the future without project condition to the FRM project. The City of Kansas City, Missouri is constructing the flyover bridge independent of the Corps project using City funding. Construction of the flyover bridge by the City makes the rolling gate at 75th Street Terrace redundant for access into the industrial park, and it provides independent benefit from the flood damage reduction project. Absent the Corps flood damage reduction measures it would provide full time access to the site by crossing up and over the railroad track and improving transportation and access safety for employees/visitors to the industrial area by eliminating a railroad crossing. Construction of the flyover bridge by the City of Kansas City, Missouri allows the Corps to remove the rolling gate at 75th Street Terrace from the Corps' design and replace it with a continuous section of floodwall and levee. The Corps has evaluated the impacts of the proposed flyover bridge as a reasonably foreseeable City action in the EA, as part of the future without project condition. Eliminating the rolling gate decreases construction and maintenance costs while increasing reliability of the project and improves public safety by eliminating ingress/egress issues due to the train crossing.

Regardless of whether or not the flood damage reduction project is executed, the City of Kansas City, Missouri plans on completing the flyover bridge. The City is nearing 95% design completion on the bridge and is planning on starting pre-consolidation construction as soon as the design is complete. As such construction of the bridge is planned to occur prior to construction of the floodwall that would block the entrance. City funds are planned and approved in the City's 5-year plan.

The Corps' flood damage reduction project is not dependent of the construction of the Flyover Bridge. If the bridge were not being constructed, the Corps and City have agreed that the rolling gate would be constructed as authorized, but now that will not be necessary. The cost effect of removing the rolling gate from the authorized project is not significant. It was addressed in the formal project cost risk analysis and shows a resultant effect on the total project cost of \$70,000. The cost of the rolling gate as a flat percentage of current total project cost is 2 percent.

9.3.7 Care and Diversion of Water (Interior Drainage). The authorized project design sized the stormwater drainage pipes with a maximum size at the downstream end of 54-inches in order to limit local ponding and to limit street ponding. This was to be accomplished with 13 curb inlets. Later design phases and a stormwater routing model identified a need for larger pipes (66-inch at the downstream end) to limit local ponding and a total of 25 inlets to keep street ponding within acceptable limits.

9.3.8 Mitigation Area. The Environmental Assessment has been updated for consideration of channelization impacting the right bank and additional bank protection along the north side of the project. No additional impacts were identified compared to the approved feasibility study. Mitigation banking is considered the best option to meet the project's mitigation requirements and meets the guidance from the Secretary in WRDA 2007. It is estimated that this cost is either the same or slightly higher than originally anticipated and that the contingency would be able to absorb this minor increase.

9.4 ACCOUNT 16 – BANK STABILIZATION

9.4.1 Right Bank. The current design assumes realignment of the Blue River channel and protection on the right bank, across from the bank erosion. The authorized project did not include work on the right bank that is now required due to the increasing erosion requiring stabilization of the bank. The 65-percent design phase identified slope stability issues with the left bank adjacent to the southern floodwall that required a stability berm at the channel toe, extending into the Blue River channel. Much of this is the result of erosion on the left bank and deposition on the right bank that has occurred since the completion of the feasibility study. In order to allow the same flow through the channel, the channel cross section must remain constant, necessitating modification and protection of the right bank to maintain the cross section through the reach. In coordination with the NFS, articulating concrete mat (ACM) was identified to provide bank stabilization on the right bank and lower portions of the left bank through this reach. ACM is easier to maintain, easier to construct, comparable in cost to riprap, more resistant to freeze/thaw action, and allows vegetative growth through the gaps to produce a more aesthetic appearance. The additional area on the right bank needing erosion protection is approximately 1.3 acres.

9.4.2 Northern Perimeter. The current design assumes additional bank stabilization (grading and riprap) will be required along the northern perimeter that is not included in the authorized project. This protects the floodwall foundation from erosion by the intermittent stream that runs along the site's northern perimeter. Additional riprap is also added to protect from erosion at the gateway exit. The total additional riprapped area along the northern perimeter amounts to approximately 0.4 acres.

9.4.3 Elimination of Levee Extensions. A Value Engineering study recommended replacing the two levee extensions from the authorized project with a single levee in the current design that will result in a decrease in the proposed quantity of riprapped areas by about 1.25 acres.

9.5 SENSITIVITY ANALYSIS OF NOAA ATLAS 14 IMPACTS.

A sensitivity analysis was conducted to determine whether changes are warranted to the hydrology and corresponding water surface profiles of the subject projects. The analysis included updated flow frequency analysis and hydrologic modeling using point precipitation estimates pre- and post-publication of National Oceanic and Atmospheric Administration (NOAA) Atlas 14, volume 8, version 2.0 (Atlas 14). Analysis has shown that the flows from the 1990 hydrology report used to justify both projects during feasibility phase still provides a reasonable estimate of flow frequencies for the Blue River Basin. The result would be no changes to the authorized project, no changes to benefits and no changes to the project costs. See Appendix G for the analysis.

10.0 CHANGES IN TOTAL PROJECT FIRST COSTS

10.1 AUTHORIZED COST

Per public law 110-114 (WRDA 2007), Section 1001, Paragraph 29, the project was authorized at \$16,980,000. The current 902 maximum cost limit is based on the current authorized Project and a price

level of 1 October 2015. The maximum cost limit for the Swope Park project is now estimated at \$25,267,000. The 902 limit was calculated in accordance with ER 1105-2-100 and was made using the official, certified 902 analysis spreadsheet. Table 2 below compares the total project costs throughout the project life.

Table 2: Summary of Total Project Costs

Estimate Type	Construction Completed
Authorized Project, PL110-114 (OCT 2006 Price Levels)	\$16,980,000
Current Total Project Cost (OCT 2015 Price Levels)	\$31,085,000
Current Total Sunk Costs Through SEPT 2015	\$5,494,100
Current Remaining Project Costs (OCT 2015 Price Levels)	\$25,590,900

The authorized costs at FY07 and subsequent year escalated price levels are included in Table 3. Below is a summary of the changes to the Total Project Cost, as broken down by cost account. Please note there are minor rounding differences between the final Total Project Cost and the table below.

Table 3: Total Project Costs by Feature

Feature	WRDA 2007	Price Level 01 OCT 2015
	OCT 2006 Cost	Final Total Cost
ACCOUNT 01 - LANDS AND DAMAGES		
LAND ACQUISITIONS	\$459	\$2,453
ACCOUNT 02 - RELOCATIONS		
CEMETERIES, UTILITIES, & STRUCTURES	\$608	\$756
ACCOUNT 11 - LEVEES AND FLOODWALLS		
LEVEES AND FLOODWALLS	\$10,800	\$19,036
ACCOUNT 16 - BANK STABILIZATION		
EARTHWORK	\$3,616	\$3,346
ACCOUNT 30 - ENGINEERING AND DESIGN		
ENGINEERING AND DESIGN	\$1,108	\$4,172
ACCOUNT 31 - SUPERVISION & ADMINISTRATION		
SUPERVISION & ADMINISTRATION	\$388	\$1,322
TOTAL PROJECT COSTS	\$16,980	\$31,085

NOTE: \$ in thousands

10.1.1 Table 3 above, when compared to the 902 limit of the authorized project of \$25,267,000 reveals the 01 October 2015 price of \$31,085,000 has increased above the 902 limit by \$5,818,000. Further, Table 4 below summarizes the cost increases above inflation since the project was authorized.

Table 4: Total Project Costs Increases above Inflation

Federal Cost Account	WRDA 07 Estimate (FY07 Pricing)	FY07 Cost Inflated to FY15 Price Basis	Current Certified Cost (FY15 Pricing)	Cost Increase above inflation
01- Lands and Damages	\$459	\$508	\$2,453	\$1,945
02- Relocations	\$608	\$757	\$756	\$(1)
11- Levees and Floodwalls	\$10,800	\$13,554	\$19,036	\$5,482
16- Bank Stabilization	\$3,616	\$4,713	\$3,346	\$(1,367)
30- Design	\$1,108	\$1,219	\$4,172	\$2,953
31- Supervision & Admin	\$388	\$426	\$1,322	\$896
Total	\$16,980	\$21,177	\$31,085	\$9,908

NOTE: \$ in thousands

The numbers in Table 4 are further detailed in the applicable paragraphs of this section.

10.2 COST REDUCTION STRATEGIES

10.2.1 Cost reductions have been implemented on all features of the Project to the maximum extent technically feasible. A Value Engineering Study has been completed on the Project to determine if potential cost savings are available. The recommendations for the study were analyzed by the design team to determine the practicality of the suggestions. In addition to Value Engineering Studies, the design is reviewed at each stage to ensure the most effective and cost efficient design is provided for each feature. These reviews have yielded additional cost reduction measures discussed in detail below.

10.2.2 The most significant cost reduction is achieved by replacing two levee extensions from the authorized project with a single levee section. A comparison of the cost of the two authorized levee extensions to the cost of the replacement levee on the southern perimeter of the project is provided in the table below.

Table 5: Levee Cost Comparison (Two Levee Extensions vs. Replacement Levee)

	Length (feet)	Total Cost (FY15 Basis)
Two Levee Extensions	1608	\$2,447,000
Replacement Levee	932	\$1,288,000
Savings	676	\$1,159,000

10.2.3 Also included in the levees and floodwall account is the cost savings realized by eliminating the rolling gate due to the City's construction of the flyover bridge. The segment where the rolling gate was planned has been replaced by an equivalent length of floodwall. This cost savings is estimated at \$650,000. The City of Kansas City, Missouri is constructing the flyover bridge independent of the Corps FRM project. City funds have been scheduled and approved in their 5-year plan for this purpose.

10.3 ACCOUNT 01 – LANDS AND DAMAGES

There is an increase above inflation on the lands and damages costs associated with the Project, primarily due to an updated Real Estate plan with an estimate based on new appraisals and additional requirements accounting for the majority of the increase. All of the costs associated with lands and damages are estimates with acceptable contingencies. The NFS has submitted a package to the COE for partial LERRD credit as acquisition has been initiated. The package is in the process of evaluation.

10.4 ACCOUNT 02 – RELOCATIONS

10.4.1 UTILITY RELOCATIONS – COMPLETED

Unknown utilities were encountered during construction of the interior drainage main line. This work was along the primary public street's right-of-way where the majority of the utilities are located within the industrial park. The authorized project did not have access to accurate as-built conditions of existing utilities with the project limits and subsequently did not account for the unknown utilities encountered. The interior drainage pipe construction constitutes the majority of the utility relocation efforts, and lessons learned from the first contract were considered for future relocation risk assessments and contingencies.

10.4.2 UTILITY RELOCATIONS – FUTURE

The majority of the remaining utility relocations are related to the utility corridor at the entrance to the industrial park and any utilities encountered during construction of the remaining interior drainage lines located in the right-of-way of side streets. The risk of encountering a significant number of other unknown utilities is minimal with the majority of the remaining work outside of the utility easement at the entrance and the main public street. The completed design, including additional field investigations discovered few remaining utilities requiring relocation and was reflected in the latest certified project costs. Overall, there is a slight decrease for this cost account from the authorized project costs.

10.5 ACCOUNT 11 – LEVEES AND FLOODWALLS

10.5.1 Changes to the levees and floodwalls account include the design changes detailed in Paragraph 9.3 above. The interior drainage construction included in this account is a sunk cost from the placement of the majority of the pipes needed for the interior drainage system. Additionally, omissions or oversights in the authorized project cost estimate (October, 2006 Price Basis) account for a \$5.5M (October, 2015 Price Basis) increase in the current cost estimate above inflation. The items below account for the majority of this increase:

10.5.1.1 Unsuitable Fill. The authorized project cost estimate did not include an allowance for unsuitable materials based on the experience with other local projects along the Blue River. It is common practice to include an unsuitable material allowance reducing the estimate of available borrow on the project site. Geotechnical investigations after authorization of the project indicated the strength of the soils in the area of the detention pond levee would require excavation and backfill with suitable fill further reducing the estimated available borrow from the project site.

10.5.1.2 Care & Diversion of Water. The authorized project cost estimate did not include adequate allowances for care & diversion of water provided by the project's interior drainage system. Contracting method for the construction of the main line was by 8A small business set aside and resulted in actual costs greater than the project estimate. The actual cost of the completed work is approximately \$1.1 M greater than estimated for the authorized project. The remaining interior drainage pipes along the side streets are estimated at approximately \$1.0M accounting for an overall cost increase of approximately \$2.1M greater than the authorized project.

10.5.1.3 Structural Costs. The sheetpile cutoff walls for levee transitions were not included in the original estimate, the Floodwall Type I costs were underestimated by roughly 400 cubic yards, and the Type 2 Floodwalls were underestimated by roughly 900 cubic yards in the authorized project cost estimate. The estimated cost increase is approximately \$1.3M greater than the authorized project before contingency is considered.

10.5.1.4 Offsite Borrow. The authorized project cost estimate assumed fill for the levees would come exclusively from excavation of the detention pond and channel slope excavation along the south side of the project. Subsequent design analysis confirmed excavation of the detention pond would not provide enough suitable borrow to compensate for the loss of material from the bank due to progressive erosion now requiring offsite borrow to stabilize the bank. Additional offsite borrow is also required due to underestimation of fill required compared to the authorized project and for the detention pond levee.. The amount of offsite borrow is estimated at approximately 87,000 cubic yards with an overall cost increase of approximately \$1.7M greater than the authorized project.

10.6 ACCOUNT 16 – BANK STABILIZATION

This account decreased below inflation between the authorized project cost and the current project cost. Changes to the bank stabilization account costs include the design changes detailed in Paragraph 9.0 above. Riprap increases along the channel and the northern boundary were part of the overall increase in the riprap quantities for those areas. This was offset by the reduction of the riprap required for the levee extensions originally planned to the landfill. Removing the levee extensions and replacing them with a single levee section actually resulted in a net decrease below inflation for the Bank Stabilization account.

10.7 ACCOUNT 30 – ENGINEERING AND DESIGN

10.7.1 Engineering and design costs increased above inflation from the authorized cost for two significant reasons: an extended design schedule and new review requirements. The extended design schedule is due to inconsistent funding which results in changes in team members from design phase to design phase, an increase in the number of design contracts and task order modifications to extend periods of performance, and additional design required to implement cost reduction measures as well as the extended duration of project administration (more than 10 years). This was considered and accounted for in the risk assessment used to develop the certified total project cost.

10.7.2 The COE now has additional product review requirements mandated to ensure quality and compliance with statutory requirements. This includes new guidance requiring Type II Independent External Peer Reviews (IEPR) and Agency Technical Reviews (ATR) not included in the authorized project costs. These additional reviews are now required on all design and construction efforts. The IEPR costs do not contribute to the 902 limit, but they are cost-shared with the local NFS.

10.8 ACCOUNT 31 – SUPERVISION AND ADMINISTRATION

Cost estimate for construction supervision and administration increased due to a greater number of contracts than anticipated during Feasibility and longer construction durations. The authorized project anticipated construction in one phase under one contract, and also underestimated the contingency and cost of Supervision and Administration (S&A). The current estimate accounts for the sunk costs of the completed S&A and considers that construction will occur with at least one remaining contract. Continued funding in amounts below what is needed to complete the project will result in further increases in the S&A costs. This was considered and accounted for in the risk assessment used to develop the certified total project cost.

10.9 LANDS, EASEMENTS, RIGHTS OF WAY, RELOCATIONS, AND DISPOSALS (LERRD)

Table 6: LERRD ESTIMATE

BASELINE COST ESTIMATE	
ESTIMATED VALUES FOR LERRD ACQUIRED BY THE NON-FEDERAL SPONSOR	
LANDS AND DAMAGES	\$0
TOTAL ESTIMATED LERRD FOR LANDS ALREADY ACQUIRED BY THE NFS	\$0
ESTIMATED VALUES FOR LERRD STILL REQUIRED FOR THE PROJECT	
LANDS AND DAMAGES	\$1,635,597
P.L. 91-646 RELOCATIONS	\$50,000
ADMINISTRATIVE COSTS	\$209,400
25% CONTINGENCY	\$473,649
TOTAL ESTIMATE OF LERRD STILL REQUIRED FOR THE PROJECT	\$ 2,368,646
VALUE FOR UTILITY RELOCATION COMPLETED BY NON-FEDERAL SPONSOR	
UTILITY/FACILITY RELOCATION	\$210,000
TOTAL OF UTILITY/FACILITY RELOCATION	\$210,000
ESTIMATED COST FOR UTILITY RELOCATION STILL REQUIRED FOR THE PROJECT	
UTILITY/FACILITY RELOCATION ESTIMATES	\$454,000
16% CONTINGENCY	\$74,000
TOTAL ESTIMATE OF UTILITY/FACILITY RELOCATION	\$528,000
TOTAL ESTIMATED LERRD FOR THE PROJECT	\$3,106,646

10.9.1 The authorized project estimated the total LERRD for the Project at \$1,138,000 (FY2002), but current estimates are higher due to additional land requirements on the north side of the project and the right bank of the channel along the south side of the project and updated real estate appraisals for the final design. The local NFS has submitted documentation for partial certification of LEERD credit of expenditures. In accordance with the PPA, the COE Real Estate Specialist and Real Estate Attorney will review the submittals to determine the fair market value of LERRDs for crediting purposes.

10.10 COST RISK ANALYSIS

10.10.1 A Cost and Schedule Risk Analysis (CSRA) has been performed as part of the PACR to estimate the amount of cost risk associated with the upcoming construction projects and assign an appropriate amount of contingency to the feature. The CSRA was conducted on the remaining project features utilizing the Monte Carlo technique.

10.10.2 The PDT for the project convened together on 16 September 2013 to work through the risk register and discuss scope, investigations, design and cost information, and identify potential risks and their probabilities of occurring, and the severity of their consequences for each feature. Contingencies were calculated based on an 80-percent confidence level. The total project cost estimate for the Project has been updated to include all sunk costs and estimated future design and construction costs, including the appropriate risk-associated contingencies. The contingencies range from 13- to 25-percent by cost account.

10.10.3 Please refer to Appendix B— *Cost and Schedule Risk Analysis* for detailed cost and risk information associated with each feature.

10.11 SECTION 902 COST LIMIT CALCULATION

The Section 902 Analysis Certified Tool was used to determine the Section 902 Maximum Cost Limit, which is calculated at \$25,267,000 based on 01 OCT 2015 price levels. The calculation input and results are provided in Appendix D – *Economic Update* of this report.

11.0 CHANGES IN PROJECT BENEFITS

11.1 Please refer to Appendix D – *Economic Update* for additional details and calculations. A level 2 economic update has been completed that investigated the economic justification of the recommended project. The update analyzes the fundamental economic assumptions supporting the benefit-cost computations in previously approved documents and accounts for any changes significant enough to alter the scale of previously reported benefits and costs.

11.2 ECONOMIC ANALYSIS HISTORY.

Multiple economic analyses have been completed on the project. The following is a brief summary of those major decision documents that precede this report.

11.2.1 2002 Feasibility Report/EA. A Feasibility Report and Environmental Assessment was published in 2002. The economic survey estimated total investment in the Swope Park Industrial Area at \$39,325,000 (FY 2000 prices). This economic base was the foundation of the damage analysis, performed as a risk-based analysis using HEC-FDA (the Hydrologic Engineering Center's Flood Damage Analysis program), the standard program for flood risk economic analyses in the Corps. The future without-project equivalent annual damages (EAD) were estimated at \$1,513,000. This total reflected an FY 2002 price level and an interest rate of 6.125%, the then-current Federal interest rate.

The screening analysis identified the alternative corresponding to the project described above as the NED plan. The estimated total project cost was \$14,144,000. At the 6.125% interest rate, annual benefits were estimated at \$1,395,000 and annual costs were \$982,000, resulting in a benefit-cost ratio of 1.4 at the prevailing interest rate. The plan had net benefits of \$413,000 and residual damages of \$118,000.

11.2.2 2003 Chief's Report. Following approval of the Feasibility Report and Environmental Assessment in early 2003, a Chief's Report for the Swope Park project (i.e., the NED plan from the feasibility study) was approved in December 2003. The economic data in the Chief's Report were updated from the FY 2002 prices in the feasibility report to FY 2004 prices and an interest rate of 5.625%. The total project cost estimate was \$14,987,000. The reported benefit-cost ratio was 1.5, based on annual benefits of \$1,399,000 and annual costs of \$946,000. Net benefits of \$453,000 were reported.

11.2.3 WRDA 2007. During preparation of the 2007 Water Resources Development Act, A5A(CW) (the office of the Assistant Secretary of the Army for Civil Works) requested an update of the economic data from the Chief's Report. Revised benefit-cost data eventually were submitted at a price level of 1 October 2007 and an interest rate of 4.875%, although no decision document containing these figures was prepared. The benefit-cost ratio at 4.875% was 1.7, a higher benefit-cost ratio than previously reported due to the drop in interest rates.

11.2.4 Economic Updates, Post-2003. Subsequent to project authorization in WRDA 2007, economic justification for the SPIA has been the subject of required economic updates in 2008, 2011 and 2013. Each was subsequently approved by NWD. These updates are briefly summarized below:

- 2008 – Despite the preparation of nominally updated benefit-cost data to support WRDA 2007 in the previous year, the 2007 data were not published in a decision document. As a result, the last approved economic report remained the Chief’s Report of 2003 and that document was more than three years old. An economic update was therefore required. The 2008 update was completed prior to the release of CWPM 12-001 in 2012, which provided detailed guidance on economic updates, but the 2008 update would have qualified as a Level 2 update in the terminology of that memorandum. That is to say, project configuration and engineering data assumptions were maintained while damages and benefits were revised in response to changes in the economic base of the SPIA. The total project cost estimate had increased to \$18,667,000 (FY 2008 prices). At the interest rate of 4.875%, the benefit-cost ratio was 1.8, with benefits of \$1,905,400, annual costs of \$1,085,600, and net benefits of \$819,800.
- 2011 – The brief 2011 update was essentially a Level 1 update. The minor changes in economic activity since 2008 were not considered significant enough to affect the broad conclusions of the feasibility report. The project cost estimate had increased to \$22,000,000, and at the current interest rate of 4.125%, the BCR remained strong at 1.7, with benefits of \$1,905,400, annual costs of \$1,091,000, and net benefits of \$814,400.
- 2013 – Another Level 1 update was submitted in 2013 to support the 2015 budget preparation process. The interim cost estimate had grown to \$28,000,000, with the BCR remaining constant at 1.7 at the current interest rate due to the drop in the rate from 4.125% to 3.75%.

11.3 BENEFITS UPDATE

The updated 2016 benefits for the Swope Park project, reflecting a 01 October 2015 price level, total \$3,018,100, as shown in Table 7. The benefits are not interest-rate sensitive. Table 7 also summarizes benefits by category. Approximately 98.3% of the benefits total is accounted for by the industrial category, while 1.3% result from cleanup costs avoided and 0.4% are associated with streets. The 2016 benefits total represents an increase in benefits of 58.4% from the 2008 update and 116.4% from the feasibility study.

Table 7: Annual Benefits

BENEFITS	Total	
Future without-project EAD	\$3,188.7	
Residual with-project EAD	\$211.0	
Damage reduction EAD	\$2,977.7	
Annual cleanup costs reduction	\$40.4	
Total benefits	\$3,018.1	
BENEFITS BY CATEGORY		
Commercial/Industrial	\$2,965.8	98.3%
Streets	\$11.9	0.4%
Cleanup	\$40.4	1.3%
Total	\$3,018.1	100.0%
PROBABILISTIC BENEFITS	Total	
75% probability that benefits exceed:	\$1,263.5	
50% probability that benefits exceed:	\$2,531.2	
25% probability that benefits exceed:	\$4,275.6	
Mean benefits	\$2,977.7	

Notes:

1. OCT 2015 price level;
2. Values shown in \$1,000s;
3. Probabilistic benefit estimates do not include cleanup costs

12.0 BENEFIT-COST RATIO (BCR)

12.1 Table 8 below summarizes the benefit-cost calculations for the Swope Park project and how they have changed since the 2002 and 2008 reports. At the current FY 2016 interest rate of 3.125%, the total project benefit-to-cost ratio is 2.2. Annual benefits are \$3,018,100 and annual costs are \$1,358,400, resulting in net benefits of \$1,660,700.

Table 8: Annual Benefit-Cost Data

	INTEREST RATE 3.125%
Annual Benefits	\$3,018.0
Annual Costs	\$1,358.0
Benefit-Cost Ratio	2.2
Net Benefits	\$1,660.0
Remaining Benefits	\$3,018.0
Remaining Costs	\$1,140.0
Remaining Benefit-Cost Ratio	2.6
Remaining Net Benefits	\$1,878.0

Notes: OCT 2015 price level; Values shown in \$1,000s

13.0 CHANGES IN COST ALLOCATION

There is no change in the cost allocation since the Project was authorized. The Project purpose remains flood damage reduction (flood risk management).

14.0 CHANGES IN COST APPORTIONMENT

This is no change in the estimated cost apportionment since the Project was authorized in 2007. The cost share percentages for the NED remain Federal – 65% and non-Federal – 35%.

15.0 CHANGES IN ENVIRONMENTAL CONSIDERATIONS

The design changes described in Paragraph 9.0 required a revision of the original Environmental Assessment (EA). This did not result in preparation of a supplemental Environmental Impact Statement (EIS) since the changes do not have significantly different environmental impacts from what was originally authorized. The design changes that required the EA revision are the overexcavation of the detention pond levee, the additional bank stabilization along the northern perimeter, and the modification of the Blue River Channel and associated right bank stabilization.

The results of the revised EA determined additional mitigation lands (or mitigation banking) are required. Mitigation banking would be selected if no other feasible mitigation lands can be located nearby due to other projects in the area. The public meeting for the updated EA was held on 25 January 2014. The public review period concluded with a finding of no significant impacts to threatened and endangered species or designated critical habitat, or cultural resources. A Finding of No Significant Impact (FONSI) was signed on 18 February 2014 with the final updated EA included in Appendix F – *Environmental Considerations*.

A potential borrow source for this project is located along the Kansas River and is used for compatible permitted commercial uses. It was evaluated and cleared by the Corps of Engineer during the Feasibility Study for Kansas City Levees EIS process. The Record of Decision for Phase 1 Kansas City was signed November 21, 2007, the Record of Decision for Phase 2 Kansas City is currently in the Assistant Secretary of the Army's office for signature.

The borrow source is approximately 16 miles from the project area. The project area and the route to the borrow source is predominately industrial with minimal residences and the service roads for these areas are designed to frequent heavy truck traffic. The slight increase to the heavy truck traffic needed for obtaining borrow would be negligible due to the large volume of heavy truck traffic already present along the route. There would be no anticipated impacts due to the traffic from accessing the off-site borrow for the project completion.

16.0 PUBLIC INVOLVEMENT

16.1 Communications with the local NFS, stakeholders, and public are extremely valuable to the success of the project. As the project is located in an urban environment with several economically valuable employers on the site, accurate and consistent communication is crucial to project realization.

16.2 The local NFS is invited to, and does participate in, all design reviews and construction progress meetings to ensure they are fully aware of the proposed design, schedule changes, operations and maintenance requirements, and modifications encountered during construction. This also helps keep the public cognizant of changes to the total project costs for each feature and impacts to the overall project. Each design submittal is also presented to the local NFS for comment on the design and ensures it meets their needs and the scope of the authorized project.

16.3 Also, quarterly meetings are held with local business owners and other stakeholders to keep them informed on the status of the project. These meetings are typically attended by several business owners, the local NFS, community leaders and activists, and the public. The COE provides an overview of the project and schedule of anticipated events. The participants are also able to stress any concerns and identify challenges they may experience due to the construction of the project.

16.4 When necessary, public meetings for each feature are held to discuss construction schedules and traffic detours (if applicable) to ensure the public and surrounding land owners are aware of the ongoing activities. The public is also informed on the purpose of the feature and the life safety benefits and reduction in risk of flooding that will be experienced after construction is completed.

17.0 PROJECT HISTORY

17.1 The flood risk reduction project at Swope Park can trace its roots back to 1974 when a Final Environmental Statement on Blue River Projects in the Blue River Basin was completed. This report was followed by a broad looking Reconnaissance Report seeking potential flood damage reduction opportunities in the Blue River Basin in 1997 and a Swope Park focused Reconnaissance Report in 1996, which recommended a feasibility study. A feasibility cost sharing agreement (FCSA) was completed with the local NFS in 1997.

17.2 The feasibility study was completed in 2003 and the Division Engineer of the Northwestern Division issued a notice of concurrence on the Feasibility Report on 29 January 2003. The Chief of Engineers recommended authorization of the project as recommended in the Feasibility Report in his report dated 30 December 2003. The project recommended by the Chief of Engineers was among those authorized in the 2007 Water Resources Development Act at an estimated cost of \$16,980,000.

18.0 RECOMMENDATIONS

18.1 Authorization of an increase in the total project cost to \$31,085,000 (01 October 2015 price levels) from \$16,980,000 (October 2006 price levels) is recommended and is in the Federal Government's best interest. This is based on the analysis of the cost increases experienced for the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project with construction approximately 8-percent complete based on the construction cost estimate. The increases are primarily due to an underestimation of levee and floodwall quantities, consideration for the potential of unsuitable foundation material, increased requirement for off-site borrow material, higher construction cost for interior drainage construction contract, and updated real estate values from the final design. Unforeseen changes include, but are not limited to, additional armoring for erosion protection, increased engineering and design due to extended duration of project administration (more than 10 years) and alternating design phases between architectural/engineering firms and the District, and

increased S&A due to anticipation of intermittent funding. Additionally, flood damage reduction performance and economic benefits are only obtained by completing the construction of the project.

18.2 Therefore, it is recommended that the Swope Park Industrial Area, Blue River, Kansas City, Missouri Flood Damage Reduction Project be authorized at a cost of \$31,085,000 (01 October 2015 price levels), followed by completion of the remaining portions of the project.

18.3 The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendations may be modified before they are transmitted to the congress as proposals for authorization and implementation funding.

19 JAN 16
DATE


Andrew D. Sexton
Colonel, Corps of Engineers
District Commander

Appendix A
Project Partnership Agreement

PROJECT PARTNERSHIP AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE CITY OF KANSAS CITY, MISSOURI
FOR
CONSTRUCTION
OF THE

SWOPE PARK INDUSTRIAL AREA, BLUE RIVER, KANSAS CITY, MISSOURI

THIS AGREEMENT is entered into this 11th day of May 2011, by and between the Department of the Army (hereinafter the "Government"), represented by the U.S. Army Engineer, Kansas City District and The City of Kansas City, Missouri (hereinafter the "Non-Federal Sponsor"), represented by the Director of Water Services.

WITNESSETH, THAT:

WHEREAS, construction of the Swope Park Industrial Area, Blue River, Kansas City, Missouri, for flood risk management (hereinafter the "*Project*", as defined in Article I.A. of this Agreement) at Kansas City, Jackson County, Missouri was authorized by Section 1001 (29) of the Water Resources Development Act of 2007, Public Law 110-114;

WHEREAS, the Government and the Non-Federal Sponsor desire to enter into a Project Partnership Agreement (hereinafter the "Agreement") for construction of the *Project*;

WHEREAS, Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, (33 U.S.C. 2213) specifies the cost-sharing requirements applicable to the *Project*;

WHEREAS, the Non-Federal Sponsor does not qualify for a reduction of the non-Federal cost share for flood control pursuant to the guidelines that implement Section 103(m) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213(m));

WHEREAS, Section 902 of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2280), establishes the maximum amount of costs for the *Project* and sets forth procedures for adjusting such maximum amount;

WHEREAS, the Government and a non-Federal interest entered into an agreement, dated 7 September 2003, for engineering and design of the *Project* (hereinafter the "Design Agreement"), under the terms of which the non-Federal interest contributed a portion of the costs for engineering and design;

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended (42 U.S.C. 1962d-5b), and Section 103(j) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213(j)), provide, *inter alia*, that the Secretary of the Army shall not commence construction of any water resources project, or separable element thereof, until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the project or separable element;

WHEREAS, the Government and Non-Federal Sponsor have the full authority and capability to perform as hereinafter set forth and intend to cooperate in cost-sharing and financing of the *Project* in accordance with the terms of this Agreement; and

WHEREAS, the Government and the Non-Federal Sponsor, in connection with this Agreement, desire to foster a partnering strategy and a working relationship between the Government and the Non-Federal Sponsor through a mutually developed formal strategy of commitment and communication embodied herein, which creates an environment where trust and teamwork prevent disputes, foster a cooperative bond between the Government and the Non-Federal Sponsor, and facilitate the successful implementation of the *Project*.

NOW, THEREFORE, the Government and the Non-Federal Sponsor agree as follows:

ARTICLE I - DEFINITIONS

A. The term "*Project*" shall mean planning, investigation, design, review, real estate acquisition, environmental assessment and permitting activities, construction, management, and associated activities required to construct floodwalls and levees to provide flood damage reduction, interior storm water drainage and detention, a rolling gate to enclose the industrial area during flood events subsequently cutting off ingress/egress, and environmental mitigation as required. The *Project* as authorized is generally described in the Feasibility Study Report Swope Park Industrial Area, Kansas City, Missouri, dated January 10, 2003 and approved by the Commander, Northwestern Division on 29 January, 2003.

B. The term "*total project costs*" shall mean the sum of all costs incurred by the Non-Federal Sponsor and the Government in accordance with the terms of this Agreement directly related to construction of the *Project*. Subject to the provisions of this Agreement, the term shall include, but is not necessarily limited to: the Government's share of Preconstruction Engineering and Design costs pursuant to the terms of the Design Agreement; the value of the contributions provided by a non-Federal interest pursuant to the terms of the Design Agreement; the Government's engineering and design costs during construction; the Non-Federal Sponsor's and the Government's costs of investigations to identify the existence and extent of hazardous substances in accordance with Article XIV.A. of this Agreement; the Government's costs of historic preservation activities in accordance with Article XVII.A. and Article XVII.B.1. of this Agreement; the Government's actual construction costs, including the costs of alteration, lowering, raising, or replacement and attendant removal of existing railroad bridges and approaches thereto; the Government's

supervision and administration costs; the Non-Federal Sponsor's and the Government's costs of participation in the Project Coordination Team in accordance with Article V of this Agreement; the Government's costs of contract dispute settlements or awards; the value of lands, easements, rights-of-way, *relocations*, and improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material for which the Government affords credit in accordance with Article IV of this Agreement or for which reimbursement by the Government is required pursuant to Article II.B.4. of this Agreement; and the Non-Federal Sponsor's and the Government's costs of audit in accordance with Article X.B. and Article X.C. of this Agreement. The term does not include any costs for operation, maintenance, repair, rehabilitation, or replacement of the *Project*; any costs of *betterments* under Article II.G.2. of this Agreement; any costs of dispute resolution under Article VII of this Agreement; the Government's costs for data recovery activities associated with historic preservation in accordance with Article XVII.B.2. and Article XVII.B.3. of this Agreement; or the Non-Federal Sponsor's costs of negotiating this Agreement.

C. The term "*period of construction*" shall mean the time from the date the Government issues the solicitation for the first construction contract for the *Project* or commences construction of the *Project* using the Government's own forces, whichever is earlier, to the date that construction of the *Project* is complete, as determined by the Government, or the date that this Agreement is terminated in accordance with Article XIII or Article XIV.C. of this Agreement, whichever is earlier.

D. The term "*financial obligations for construction*" shall mean the financial obligations of the Government that result or would result in costs that are or would be included in *total project costs* except for obligations pertaining to the provision of lands, easements, and rights-of-way, the performance of *relocations*, and the construction of improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material.

E. The term "*non-Federal proportionate share*" shall mean the ratio of the Non-Federal Sponsor's total contribution of funds required by Article II.B.1. and Article II.B.3. of this Agreement to *financial obligations for construction*, as projected by the Government.

F. The term "*highway*" shall mean any highway, roadway, street, or way, including any bridge thereof, that is owned by a public entity.

G. The term "*relocation*" shall mean providing a functionally equivalent facility to the owner of a utility, cemetery, *highway*, railroad (excluding existing railroad bridges and approaches thereto), or public facility when such action is authorized in accordance with applicable legal principles of just compensation; or providing a functionally equivalent facility when such action is specifically provided for, and is identified as a relocation, in the authorizing legislation for the *Project* or any report referenced therein. Providing a functionally equivalent facility may take the form of alteration, lowering, raising, or replacement and attendant demolition of the affected facility or part thereof.

H. The term “*functional portion of the Project*” shall mean a portion of the *Project* for which construction has been completed and that can function independently, as determined by the U.S. Army Engineer, Kansas City District (hereinafter the “District Engineer”) in writing, although the remainder of the *Project* is not complete.

I. The term “*betterment*” shall mean a difference in the construction of an element of the *Project* that results from the application of standards that the Government determines exceed those that the Government would otherwise apply to the construction of that element. The term does not include any construction for features not included in the *Project* as defined in paragraph A. of this Article.

J. The term “*Federal program funds*” shall mean funds provided by a Federal agency, other than the Department of the Army, plus any non-Federal contribution required as a matching share therefor.

K. The term “*fiscal year*” shall mean one year beginning on October 1 and ending on September 30.

ARTICLE II - OBLIGATIONS OF THE GOVERNMENT AND THE NON-FEDERAL SPONSOR

A. The Government, subject to receiving funds appropriated by the Congress of the United States (hereinafter the “Congress”) and using those funds and funds provided by the Non-Federal Sponsor, expeditiously shall construct the *Project* (including alteration, lowering, raising, or replacement and attendant removal of existing railroad bridges and approaches thereto) applying those procedures usually applied to Federal projects, in accordance with Federal laws, regulations, and policies.

1. The Government shall not issue the solicitation for the first contract for construction of the *Project* or commence construction of the *Project* using the Government’s own forces until the Non-Federal Sponsor has confirmed in writing its willingness to proceed with the *Project*.

2. The Government shall afford the Non-Federal Sponsor the opportunity to review and comment on the solicitations for all contracts, including relevant plans and specifications, prior to the Government’s issuance of such solicitations. To the extent possible, the Government shall afford the Non-Federal Sponsor the opportunity to review and comment on all proposed contract modifications, including change orders. In any instance where providing the Non-Federal Sponsor with notification of a contract modification is not possible prior to execution of the contract modification, the Government shall provide such notification in writing at the earliest date possible. To the extent possible, the Government also shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the Non-Federal Sponsor, but the contents of solicitations, award of contracts or commencement of construction using the Government’s own forces,

execution of contract modifications, resolution of contract claims, and performance of all work on the *Project* shall be exclusively within the control of the Government

3. At the time the District Engineer furnishes the contractor with the Government's Written Notice of Acceptance of Completed Work for each contract awarded by the Government for the *Project*, the District Engineer shall furnish a copy thereof to the Non-Federal Sponsor.

4. Notwithstanding paragraph A.2. of this Article, if the award of any contract for construction of the *Project*, or continuation of construction of the *Project* using the Government's own forces, would result in *total project costs* exceeding **\$23,043,000**, the Government and the Non-Federal Sponsor agree to defer award of that contract, award of all remaining contracts for construction of the *Project*, and continuation of construction of the *Project* using the Government's own forces until such time as the Government and the Non-Federal Sponsor agree in writing to proceed with further contract awards for the *Project* or the continuation of construction of the *Project* using the Government's own forces, but in no event shall the award of contracts or the continuation of construction of the *Project* using the Government's own forces be deferred for more than three years. Notwithstanding this general provision for deferral, in the event the Assistant Secretary of the Army (Civil Works) makes a written determination that the award of such contract or contracts or continuation of construction of the *Project* using the Government's own forces must proceed in order to comply with law or to protect human life or property from imminent and substantial harm, the Government, after consultation with the Non-Federal Sponsor, may award a contract or contracts, or continue with construction of the *Project* using the Government's own forces.

5. As of the effective date of this Agreement, **\$3,488,500** of Federal funds is currently projected to be available for the *Project*. The Government makes no commitment to request Congress to provide additional Federal funds for the *Project*. Further, the Government's financial participation in the *Project* is limited to the Federal funds that the Government makes available to the *Project*.

B. The Non-Federal Sponsor shall contribute a minimum of 35 percent, but not to exceed 50 percent, of *total project costs* in accordance with the provisions of this paragraph.

1. The Non-Federal Sponsor shall provide a contribution of funds equal to 5 percent of *total project costs* in accordance with Article VI.B. of this Agreement.

2. In accordance with Article III of this Agreement, the Non-Federal Sponsor shall provide all lands, easements, and rights-of-way, including those required for *relocations*, the borrowing of material, and the disposal of dredged or excavated material, shall perform or ensure performance of all *relocations*, and shall construct improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material that the Government determines to be required or to be necessary for construction, operation, and maintenance of the *Project*.

3. The Non-Federal Sponsor shall provide additional funds in accordance with Article VI.B. of this Agreement in the amount necessary to meet the Non-Federal Sponsor's required minimum share of 35 percent of *total project costs* if the Government projects at any time that the collective value of the following contributions will be less than such required minimum share: (a) the value of the Non-Federal Sponsor's contributions under paragraph B.1. of this Article; (b) the value of the cash contribution provided by a non-Federal interest pursuant to the terms of the Design Agreement that exceeds the 5 percent amount required by paragraph B.1. of this Article and the value of the non-cash contributions provided by a non-Federal interest pursuant to the terms of the Design Agreement; (c) the value of the Non-Federal Sponsor's contributions under paragraph B.2. of this Article, as determined in accordance with Article IV of this Agreement; and (d) the value of the Non-Federal Sponsor's contributions under Article V, Article X, and Article XIV.A. of this Agreement.

4. The Government, subject to the availability of funds, shall refund or reimburse to the Non-Federal Sponsor any contributions in excess of 45 percent of *total project costs* if the Government determines at any time that the collective value of the following contributions has exceeded 45 percent of *total project costs*: (a) the value of the Non-Federal Sponsor's contributions under paragraph B.3. of this Article; (b) the value of the cash contribution provided by a non-Federal interest pursuant to the terms of the Design Agreement that exceeds the 5 percent amount required by paragraph B.1. of this Article and the value of the non-cash contributions provided by a non-Federal interest pursuant to the terms of the Design Agreement; (c) the value of the Non-Federal Sponsor's contributions under paragraph B.2. of this Article, as determined in accordance with Article IV of this Agreement; and (d) the value of the Non-Federal Sponsor's contributions under Article V, Article X, and Article XIV.A. of this Agreement. After such a determination, the Government, in its sole discretion, may acquire any remaining lands, easements, and rights-of-way required for the *Project*, perform any remaining *relocations* necessary for the *Project*, or construct any remaining improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material required for the *Project* on behalf of the Non-Federal Sponsor. Notwithstanding the acquisition of lands, easements, and rights-of-way, performance of *relocations*, or construction of improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material by the Government under this paragraph, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for any costs of cleanup and response in accordance with Article XIV.C. of this Agreement.

C. When the District Engineer determines that the entire *Project*, or a *functional portion of the Project*, is complete, the District Engineer shall so notify the Non-Federal Sponsor in writing and furnish the Non-Federal Sponsor with a final Operation, Maintenance, Repair, Rehabilitation, and Replacement Manual (hereinafter the "OMRR&R Manual") or, if the final OMRR&R Manual is not available, an interim OMRR&R Manual for the entire *Project* or such completed portion. Upon such notification, the Government also shall furnish to the Non-Federal Sponsor a copy of all final as-built drawings for the entire *Project* or such completed portion if such drawings are available. Not later than 6 months after such notification by the Government that the

entire *Project* is complete, the Government shall furnish the Non-Federal Sponsor with the final OMRR&R Manual and all final as-built drawings for the entire *Project*. In the event the final OMRR&R Manual or all final as-built drawings for the entire *Project* cannot be completed within the 6 month period, the Government shall provide written notice to the Non-Federal Sponsor, and the Government and the Non-Federal Sponsor shall negotiate an acceptable completion date for furnishing such documents. Further, after completion of all contracts for the *Project*, copies of all of the Government's Written Notices of Acceptance of Completed Work for all contracts for the *Project* that have not been provided previously shall be provided to the Non-Federal Sponsor.

D. Upon notification from the District Engineer in accordance with paragraph C. of this Article, the Non-Federal Sponsor shall operate, maintain, repair, rehabilitate, and replace the entire *Project*, or the *functional portion of the Project* as the case may be, in accordance with Article VIII of this Agreement.

E. Upon conclusion of the *period of construction*, the Government shall conduct an accounting, in accordance with Article VI.C. of this Agreement, and furnish the results to the Non-Federal Sponsor.

F. The Non-Federal Sponsor shall not use *Federal program funds* to meet any of its obligations for the *Project* under this Agreement unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is expressly authorized by Federal law.

G. The Non-Federal Sponsor may request the Government to perform or provide, on behalf of the Non-Federal Sponsor, one or more of the services (hereinafter the "additional work") described in this paragraph. Such requests shall be in writing and shall describe the additional work requested to be performed or provided. If in its sole discretion the Government elects to perform or provide the requested additional work or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs of the additional work performed or provided by the Government under this paragraph and shall pay all such costs in accordance with Article VI.D. of this Agreement.

1. Acquisition of lands, easements, and rights-of-way; performance of *relocations*; or construction of improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material for the *Project*. Notwithstanding acquisition of lands, easements, and rights-of-way, performance of *relocations*, or construction of improvements by the Government, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for any costs of cleanup and response in accordance with Article XIV.C. of this Agreement.

2. Inclusion of *betterments* in the construction of the *Project*. In the event the Government elects to include any such *betterments*, the Government shall allocate the costs of the *Project* features that include *betterments* between *total project costs* and the costs of the *betterments*.

H. Not less than once each year the Non-Federal Sponsor shall inform affected interests of the extent of protection afforded by the *Project*.

I. The Non-Federal Sponsor agrees to participate in and comply with applicable Federal floodplain management and flood insurance programs.

J. The Non-Federal Sponsor shall comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), which requires a non-Federal interest to prepare a floodplain management plan within one year after the date of signing this Agreement, and to implement such plan not later than one year after completion of construction of the *Project*. The plan shall be designed to reduce the impacts of future flood events in the project area, including but not limited to, addressing those measures to be undertaken by non-Federal interests to preserve the level of flood protection provided by the *Project*. The Non-Federal Sponsor shall provide an information copy of the plan to the Government upon its preparation.

K. The Non-Federal Sponsor shall publicize floodplain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the *Project*.

L. The Non-Federal Sponsor shall prevent obstructions or encroachments on the *Project* (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on *Project* lands, easements, and rights-of-way or the addition of facilities which might reduce the level of protection the *Project* affords, hinder operation and maintenance of the *Project*, or interfere with the *Project's* proper function.

ARTICLE III - LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS, DISPOSAL AREA IMPROVEMENTS, AND COMPLIANCE WITH PUBLIC LAW 91-646, AS AMENDED

A. The Government, after consultation with the Non-Federal Sponsor, shall determine the lands, easements, and rights-of-way required for construction, operation, and maintenance of the *Project*, including those required for *relocations*, the borrowing of material, and the disposal of dredged or excavated material. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of the lands, easements, and rights-of-way that the Government determines the Non-Federal Sponsor must provide, in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with acquisition of such lands, easements,

and rights-of-way. Prior to the issuance of the solicitation for each Government contract for construction of the *Project*, or prior to the Government incurring any *financial obligations for construction* of a portion of the *Project* using the Government's own forces, the Non-Federal Sponsor shall acquire all lands, easements, and rights-of-way the Government determines the Non-Federal Sponsor must provide for that work and shall provide the Government with authorization for entry thereto. Furthermore, prior to the end of the *period of construction*, the Non-Federal Sponsor shall acquire all lands, easements, and rights-of-way required for construction, operation, and maintenance of the *Project*, as set forth in such descriptions, and shall provide the Government with authorization for entry thereto. The Non-Federal Sponsor shall ensure that lands, easements, and rights-of-way that the Government determines to be required for the *Project* and that were provided by the Non-Federal Sponsor are retained in public ownership for uses compatible with the authorized purposes of the *Project*.

B. The Government, after consultation with the Non-Federal Sponsor, shall determine the *relocations* necessary for construction, operation, and maintenance of the *Project*, including those necessary to enable the borrowing of material or the disposal of dredged or excavated material. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of such *relocations* in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with such *relocations*. Prior to the issuance of the solicitation for each Government contract for construction of the *Project*, or prior to the Government incurring any *financial obligations for construction* of a portion of the *Project* using the Government's own forces, the Non-Federal Sponsor shall prepare or ensure the preparation of plans and specifications for, and perform or ensure the performance of, all *relocations* the Government determines to be necessary for that work. Furthermore, prior to the end of the *period of construction*, the Non-Federal Sponsor shall perform or ensure performance of all *relocations* as set forth in such descriptions.

C. The Government, after consultation with the Non-Federal Sponsor, shall determine the improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material associated with construction, operation, and maintenance of the *Project*. Such improvements may include, but are not necessarily limited to, retaining dikes, wasteweirs, bulkheads, embankments, monitoring features, stilling basins, and de-watering pumps and pipes. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of such improvements in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with construction of such improvements. Prior to the issuance of the solicitation for each Government contract for construction of the *Project*, or prior to the Government incurring any *financial obligations for construction* of a portion of the *Project* using the Government's own forces, the Non-Federal Sponsor shall prepare plans and specifications for all improvements the Government determines to be required for the disposal of dredged or excavated material under that contract, submit such plans and specifications to the Government for approval, and provide such improvements in

accordance with the approved plans and specifications. Furthermore, prior to the end of the *period of construction*, the Non-Federal Sponsor shall provide all improvements set forth in such descriptions.

D. The Non-Federal Sponsor shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for construction, operation, and maintenance of the *Project*, including those required for *relocations*, the borrowing of material, or the disposal of dredged or excavated material, and shall inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV - CREDIT FOR VALUE OF LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS, AND DISPOSAL AREA IMPROVEMENTS

A. The Government shall include in *total project costs* and afford credit toward the Non-Federal Sponsor's share of *total project costs* for the value of the lands, easements, and rights-of-way that the Non-Federal Sponsor must provide pursuant to Article III.A. of this Agreement; for the value of the *relocations* that the Non-Federal Sponsor must perform or for which it must ensure performance pursuant to Article III.B. of this Agreement; and for the value of the improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material that the Non-Federal Sponsor must provide pursuant to Article III.C. of this Agreement. However, no amount shall be included in *total project costs*, no credit shall be afforded, and no reimbursement shall be provided for the value of any lands, easements, rights-of-way, *relocations*, or improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material that have been provided previously as an item of cooperation for another Federal project. In addition, no amount shall be included in *total project costs*, no credit shall be afforded, and no reimbursement shall be provided for the value of lands, easements, rights-of-way, *relocations*, or improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material that were acquired or performed using *Federal program funds* unless the Federal agency providing the Federal portion of such funds verifies in writing that affording credit for the value of such items is expressly authorized by Federal law.

B. The Non-Federal Sponsor in a timely manner shall provide the Government with such documents as are sufficient to enable the Government to determine the value of any contribution provided pursuant to Article III.A., Article III.B., or Article III.C. of this Agreement. Upon receipt of such documents, the Government in a timely manner shall determine the value of such contributions for the purpose of including such value in *total project costs* and for determining the amount of credit to be afforded or reimbursement to be provided in accordance with the provisions of this Agreement.

C. For the purposes of determining the value to be included in *total project costs* and the amount of credit to be afforded or reimbursement to be provided in accordance with

this Agreement and except as otherwise provided in paragraph G. of this Article, the value of lands, easements, and rights-of-way, including those required for *relocations*, the borrowing of material, and the disposal of dredged or excavated material, shall be the fair market value of the real property interests, plus certain incidental costs of acquiring those interests, as determined in accordance with the provisions of this paragraph.

1. Date of Valuation. The fair market value of lands, easements, or rights-of-way owned by the Non-Federal Sponsor on the effective date of this Agreement shall be the fair market value of such real property interests as of the date the Non-Federal Sponsor provides the Government with authorization for entry thereto. The fair market value of lands, easements, or rights-of-way acquired by the Non-Federal Sponsor after the effective date of this Agreement shall be the fair market value of such real property interests at the time the interests are acquired.

2. General Valuation Procedure. Except as provided in paragraph C.3. or paragraph C.5. of this Article, the fair market value of lands, easements, or rights-of-way shall be determined in accordance with the provisions of this paragraph.

a. The Non-Federal Sponsor shall obtain, for each real property interest, an appraisal that is prepared by a qualified appraiser who is acceptable to the Non-Federal Sponsor and the Government. The Non-Federal Sponsor shall provide the Government with the appraisal no later than 6 months after the Non-Federal Sponsor provides the Government with an authorization for entry for such real property interest. The appraisal must be prepared in accordance with the applicable rules of just compensation, as specified by the Government. The fair market value shall be the amount set forth in the Non-Federal Sponsor's appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's appraisal, the Non-Federal Sponsor may obtain a second appraisal, and the fair market value shall be the amount set forth in the Non-Federal Sponsor's second appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's second appraisal, the Non-Federal Sponsor chooses not to obtain a second appraisal, or the Non-Federal Sponsor does not provide the first appraisal as required in this paragraph, the Government shall obtain an appraisal, and the fair market value shall be the amount set forth in the Government's appraisal, if such appraisal is approved by the Non-Federal Sponsor. In the event the Non-Federal Sponsor does not approve the Government's appraisal, the Government, after consultation with the Non-Federal Sponsor, shall consider the Government's and the Non-Federal Sponsor's appraisals and determine an amount based thereon, which shall be deemed to be the fair market value.

b. Where the amount paid or proposed to be paid by the Non-Federal Sponsor for the real property interest exceeds the amount determined pursuant to paragraph C.2.a. of this Article, the Government, at the request of the Non-Federal Sponsor, shall consider all factors relevant to determining fair market value and, in its sole discretion, after consultation with the Non-Federal Sponsor, may approve in writing an amount greater than the amount determined pursuant to paragraph C.2.a. of this Article, but not to exceed the amount actually paid or proposed to be paid. If the Government approves such an amount,

the fair market value shall be the lesser of the approved amount or the amount paid by the Non-Federal Sponsor, but no less than the amount determined pursuant to paragraph C.2.a. of this Article.

3. Eminent Domain Valuation Procedure. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted after the effective date of this Agreement, the Non-Federal Sponsor, prior to instituting such proceedings, shall submit to the Government notification in writing of its intent to institute such proceedings and an appraisal of the specific real property interests to be acquired in such proceedings. The Government shall have 60 calendar days after receipt of such a notice and appraisal within which to review the appraisal, if not previously approved by the Government in writing.

a. If the Government previously has approved the appraisal in writing, or if the Government provides written approval of, or takes no action on, the appraisal within such 60 day period, the Non-Federal Sponsor shall use the amount set forth in such appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

b. If the Government provides written disapproval of the appraisal, including the reasons for disapproval, within such 60 day period, the Government and the Non-Federal Sponsor shall consult in good faith to promptly resolve the issues or areas of disagreement that are identified in the Government's written disapproval. If, after such good faith consultation, the Government and the Non-Federal Sponsor agree as to an appropriate amount, then the Non-Federal Sponsor shall use that amount as the estimate of just compensation for the purpose of instituting the eminent domain proceeding. If, after such good faith consultation, the Government and the Non-Federal Sponsor cannot agree as to an appropriate amount, then the Non-Federal Sponsor may use the amount set forth in its appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

c. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted in accordance with paragraph C.3. of this Article, fair market value shall be either the amount of the court award for the real property interests taken, to the extent the Government determined such interests are required for construction, operation, and maintenance of the *Project*, or the amount of any stipulated settlement or portion thereof that the Government approves in writing.

4. Incidental Costs. For lands, easements, or rights-of-way acquired by the Non-Federal Sponsor within a five year period preceding the effective date of this Agreement, or at any time after the effective date of this Agreement, the value of the interest shall include the documented incidental costs of acquiring the interest, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs. In the event the Government modifies its determination made pursuant to Article III.A. of this Agreement, the Government shall afford credit for the documented incidental costs associated with preparing to acquire the lands, easements, or rights-of-way identified in

the original determination, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs. Such incidental costs shall include, but not necessarily be limited to, closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, mapping costs, actual amounts expended for payment of any relocation assistance benefits provided in accordance with Article III.D. of this Agreement, and other payments by the Non-Federal Sponsor for items that are generally recognized as compensable, and required to be paid, by applicable state law due to the acquisition of a real property interest in accordance with Article III of this Agreement. The value of the interests provided by the Non-Federal Sponsor in accordance with Article III.A. of this Agreement shall also include the documented costs of obtaining appraisals pursuant to paragraph C.2. of this Article, as determined by the Government, and subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs.

5. Waiver of Appraisal. Except as required by paragraph C.3. of this Article, the Government may waive the requirement for an appraisal pursuant to this paragraph if it determines that an appraisal is unnecessary because the valuation is uncomplicated and that the estimated fair market value of the real property interest is \$10,000 or less based upon a review of available data. In such event, the Government and the Non-Federal Sponsor must agree in writing to the value of such real property interest in an amount not in excess of \$10,000.

D. After consultation with the Non-Federal Sponsor, the Government shall determine the value of *relocations* in accordance with the provisions of this paragraph.

1. For a *relocation* other than a *highway*, the value shall be only that portion of *relocation* costs that the Government determines is necessary to provide a functionally equivalent facility, reduced by depreciation, as applicable, and by the salvage value of any removed items.

2. For a *relocation* of a *highway*, the value shall be only that portion of *relocation* costs that would be necessary to accomplish the *relocation* in accordance with the design standard that the State of Missouri would apply under similar conditions of geography and traffic load, reduced by the salvage value of any removed items.

3. *Relocation* costs shall include, but not necessarily be limited to, actual costs of performing the *relocation*; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with performance of the *relocation*, as determined by the Government. *Relocation* costs shall not include any costs due to *betterments*, as determined by the Government, nor any additional cost of using new material when suitable used material is available. *Relocation* costs shall be subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs.

E. The value of the improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material shall be the costs of the

improvements, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs. Such costs shall include, but not necessarily be limited to, actual costs of providing the improvements; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with providing the improvements, but shall not include any costs due to *betterments*, as determined by the Government.

F. Any credit afforded or reimbursement provided under the terms of this Agreement for the value of *relocations*, or improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material, performed within the *Project* boundaries is subject to satisfactory compliance with applicable Federal labor laws covering non-Federal construction, including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)). Notwithstanding any other provision of this Agreement, credit or reimbursement may be withheld, in whole or in part, as a result of the Non-Federal Sponsor's failure to comply with its obligations under these laws.

G. Where the Government, on behalf of the Non-Federal Sponsor pursuant to Article II.G.1. of this Agreement, acquires lands, easements, or rights-of-way, performs *relocations*, or constructs improvements required on lands, easements, or rights-of-way to enable the disposal of dredged or excavated material, the value to be included in *total project costs* and the amount of credit to be afforded or the amount of reimbursement provided in accordance with this Agreement shall be the costs of such work performed or provided by the Government that are paid by the Non-Federal Sponsor in accordance with Article VI.D. of this Agreement. In addition, the value to be included in *total project costs* and the amount of such credit to be afforded or the amount of reimbursement provided in accordance with this Agreement shall include the documented costs incurred by the Non-Federal Sponsor in accordance with the terms and conditions agreed upon in writing pursuant to Article II.G.1. of this Agreement subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs.

ARTICLE V - PROJECT COORDINATION TEAM

A. To provide for consistent and effective communication, the Non-Federal Sponsor and the Government, not later than 30 calendar days after the effective date of this Agreement, shall appoint named senior representatives to a Project Coordination Team. Thereafter, the Project Coordination Team shall meet regularly until the end of the *period of construction*. The Government's Project Manager and a counterpart named by the Non-Federal Sponsor shall co-chair the Project Coordination Team.

B. The Government's Project Manager and the Non-Federal Sponsor's counterpart shall keep the Project Coordination Team informed of the progress of construction and of significant pending issues and actions, and shall seek the views of the Project Coordination Team on matters that the Project Coordination Team generally oversees.

C. Until the end of the *period of construction*, the Project Coordination Team shall generally oversee the *Project*, including matters related to: plans and specifications; scheduling; real property and *relocation* requirements; real property acquisition; contract awards and modifications; contract costs; the application of and compliance with 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)) for *relocations* and improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material; the investigations to identify the existence and extent of hazardous substances in accordance with Article XIV.A. of this Agreement; historic preservation activities in accordance with Article XVII of this Agreement; the Government's cost projections; final inspection of the entire *Project* or *functional portions of the Project*; preparation of the proposed OMRR&R Manual; anticipated requirements and needed capabilities for performance of operation, maintenance, repair, rehabilitation, and replacement of the *Project* including issuance of permits; and other matters related to the *Project*. This oversight of the *Project* shall be consistent with a project management plan developed by the Government after consultation with the Non-Federal Sponsor.

D. The Project Coordination Team may make recommendations to the District Engineer on matters related to the *Project* that the Project Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider the recommendations of the Project Coordination Team. The Government, having the legal authority and responsibility for construction of the *Project*, has the discretion to accept or reject, in whole or in part, the Project Coordination Team's recommendations.

E. The Non-Federal Sponsor's costs of participation in the Project Coordination Team shall be included in *total project costs* and shared in accordance with the provisions of this Agreement, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs. The Government's costs of participation in the Project Coordination Team shall be included in *total project costs* and shared in accordance with the provisions of this Agreement.

ARTICLE VI - METHOD OF PAYMENT

A. In accordance with the provisions of this paragraph, the Government shall maintain current records and provide to the Non-Federal Sponsor current projections of costs, financial obligations, contributions provided by the parties, the value included in *total project costs* for lands, easements, rights-of-way, *relocations*, and improvements

required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material determined in accordance with Article IV of this Agreement

1. As of the effective date of this Agreement, *total project costs* are projected to be **\$22,940,000**; the Non-Federal Sponsor's contribution of funds required by Article II.B.1. and Article II.B.3. of this Agreement is projected to be **\$5,200,000**; the *non-Federal proportionate share* is projected to be **27** percent; the Non-Federal Sponsor's contribution of funds required by Article XVII.B.3. of this Agreement is projected to be **\$0**; the value included in *total project costs* for lands, easements, rights-of-way, *relocations*, and improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material determined in accordance with Article IV of this Agreement is projected to be **\$2,300,000**; and the Government's total financial obligations for the additional work to be incurred and the Non-Federal Sponsor's contribution of funds for such costs required by Article II.G. of this Agreement are projected to be **\$0**. These amounts and percentage are estimates subject to adjustment by the Government, after consultation with the Non-Federal Sponsor, and are not to be construed as the total financial responsibilities of the Government and the Non-Federal Sponsor.

2. By **the beginning of the second quarter of FY12** and by each quarterly anniversary thereof until the conclusion of the *period of construction* and resolution of all relevant claims and appeals and eminent domain proceedings, the Government shall provide the Non-Federal Sponsor with a report setting forth all contributions provided to date and the current projections of the following: *total project costs*; the Non-Federal Sponsor's total contribution of funds required by Article II.B.1. and Article II.B.3. of this Agreement; the *non-Federal proportionate share*; the Non-Federal Sponsor's total contribution of funds required by Article XVII.B.3. of this Agreement; the maximum amount determined in accordance with Article XX of this Agreement; the value included in *total project costs* for lands, easements, rights-of-way, *relocations*, and improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material determined in accordance with Article IV of this Agreement; and the Government's total financial obligations for additional work incurred and the Non-Federal Sponsor's contribution of funds for such costs required by Article II.G. of this Agreement.

B. The Non-Federal Sponsor shall provide the contributions of funds required by Article II.B.1., Article II.B.3., and Article XVII.B.3. of this Agreement in accordance with the provisions of this paragraph.

1. Not less than 90 calendar days prior to the scheduled date for issuance of the solicitation for the first contract for construction of the *Project* or commencement of construction of the *Project* using the Government's own forces, the Government shall notify the Non-Federal Sponsor in writing of such scheduled date and the funds the Government determines to be required from the Non-Federal Sponsor, after consideration of any cash contribution provided by a non-Federal interest pursuant to the terms of the Design Agreement, to meet its projected share under Article II.B.1., Article II.B.3., and

Article XVII.B.3. of this Agreement. Not later than such scheduled date, the Non-Federal Sponsor shall provide the Government with the full amount of such required funds by delivering a check payable to “FAO, USAED, Kansas City District, EROC Number: G5” to the District Engineer, or verifying to the satisfaction of the Government that the Non-Federal Sponsor has deposited such required funds in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor, or by presenting the Government with an irrevocable letter of credit acceptable to the Government for such required funds, or by providing an Electronic Funds Transfer of such required funds in accordance with procedures established by the Government.

2. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary, after consideration of any contributions provided by a non-Federal interest pursuant to the terms of the Design Agreement, to cover: (a) the *non-Federal proportionate share of financial obligations for construction* incurred prior to the commencement of the *period of construction*; (b) the *non-Federal proportionate share of financial obligations for construction as financial obligations for construction* are incurred; and (c) the Non-Federal Sponsor’s share of financial obligations for data recovery activities associated with historic preservation pursuant to Article XVII.B.3. of this Agreement as those financial obligations are incurred. If at any time the Government determines that additional funds will be needed from the Non-Federal Sponsor to cover the Non-Federal Sponsor’s share of such financial obligations, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required and provide an explanation of why additional funds are required. Within 60 calendar days from receipt of such notice, the Non-Federal Sponsor shall provide the Government with the full amount of such additional required funds through any of the payment mechanisms specified in paragraph B.1. of this Article.

C. Upon conclusion of the *period of construction* and resolution of all relevant claims and appeals and eminent domain proceedings, the Government shall conduct a final accounting and furnish the Non-Federal Sponsor with written notice of the results of such final accounting. If outstanding relevant claims and appeals or eminent domain proceedings prevent a final accounting from being conducted in a timely manner, the Government shall conduct an interim accounting and furnish the Non-Federal Sponsor with written notice of the results of such interim accounting. Once all outstanding relevant claims and appeals and eminent domain proceedings are resolved, the Government shall amend the interim accounting to complete the final accounting and furnish the Non-Federal Sponsor with written notice of the results of such final accounting. The interim or final accounting, as applicable, shall determine *total project costs* and the costs of any data recovery activities associated with historic preservation. In addition, for each set of costs, the interim or final accounting, as applicable, shall determine each party’s required share thereof, and each party’s total contributions thereto as of the date of such accounting.

1. Should the interim or final accounting, as applicable, show that the Non-Federal Sponsor’s total required shares of *total project costs* and the costs of any data recovery activities associated with historic preservation exceed the Non-Federal

Sponsor's total contributions provided thereto, the Non-Federal Sponsor, no later than 90 calendar days after receipt of written notice from the Government, shall make a payment to the Government in an amount equal to the difference by delivering a check payable to "Kansas City District EROC Number: G5" to the District Engineer or by providing an Electronic Funds Transfer in accordance with procedures established by the Government.

2. Should the interim or final accounting, as applicable, show that the total contributions provided by the Non-Federal Sponsor for *total project costs* and the costs of any data recovery activities associated with historic preservation exceed the Non-Federal Sponsor's total required shares thereof, the Government, subject to the availability of funds, shall refund or reimburse the excess amount to the Non-Federal Sponsor within 90 calendar days of the date of completion of such accounting. However, the Non-Federal Sponsor shall not be entitled to any refund of the 5 percent cash contribution required pursuant to Article II.B.1. of this Agreement. In the event the Non-Federal Sponsor is due a refund or reimbursement and funds are not available to refund or reimburse the excess amount to the Non-Federal Sponsor, the Government shall seek such appropriations as are necessary to make the refund or reimbursement.

D. The Non-Federal Sponsor shall provide the contribution of funds required by Article II.G. of this Agreement for additional work in accordance with the provisions of this paragraph.

1. Not less than 60 calendar days prior to the scheduled date for the first financial obligation for additional work, the Government shall notify the Non-Federal Sponsor in writing of such scheduled date and of the full amount of funds the Government determines to be required from the Non-Federal Sponsor to cover the costs of the additional work. No later than 30 calendar days prior to the Government incurring any financial obligation for additional work, the Non-Federal Sponsor shall provide the Government with the full amount of the funds required to cover the costs of such additional work through any of the payment mechanisms specified in paragraph B.1. of this Article.

2. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover the Government's financial obligations for such additional work as they are incurred. If at any time the Government determines that the Non-Federal Sponsor must provide additional funds to pay for such additional work, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required and provide an explanation of why additional funds are required. Within 30 calendar days from receipt of such notice, the Non-Federal Sponsor shall provide the Government with the full amount of such additional required funds through any of the payment mechanisms specified in paragraph B.1. of this Article.

3. At the time the Government conducts the interim or final accounting, as applicable, the Government shall conduct an accounting of the Government's financial obligations for additional work incurred and furnish the Non-Federal Sponsor with

written notice of the results of such accounting. If outstanding relevant claims and appeals or eminent domain proceedings prevent a final accounting of additional work from being conducted in a timely manner, the Government shall conduct an interim accounting of additional work and furnish the Non-Federal Sponsor with written notice of the results of such interim accounting. Once all outstanding relevant claims and appeals and eminent domain proceedings are resolved, the Government shall amend the interim accounting of additional work to complete the final accounting of additional work and furnish the Non-Federal Sponsor with written notice of the results of such final accounting. Such interim or final accounting, as applicable, shall determine the Government's total financial obligations for additional work and the Non-Federal Sponsor's contribution of funds provided thereto as of the date of such accounting.

a. Should the interim or final accounting, as applicable, show that the total obligations for additional work exceed the total contribution of funds provided by the Non-Federal Sponsor for such additional work, the Non-Federal Sponsor, no later than 90 calendar days after receipt of written notice from the Government, shall make a payment to the Government in an amount equal to the difference by delivering a check payable to "FAO, USAED Kansas City District, EROC Number: G5" to the District Engineer or by providing an Electronic Funds Transfer in accordance with procedures established by the Government.

b. Should the interim or final accounting, as applicable, show that the total contribution of funds provided by the Non-Federal Sponsor for additional work exceeds the total obligations for such additional work, the Government, subject to the availability of funds, shall refund the excess amount to the Non-Federal Sponsor within 90 calendar days of the date of completion of such accounting. In the event the Non-Federal Sponsor is due a refund and funds are not available to refund the excess amount to the Non-Federal Sponsor, the Government shall seek such appropriations as are necessary to make the refund.

ARTICLE VII - DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, that party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to both parties. Each party shall pay an equal share of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

ARTICLE VIII - OPERATION, MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT (OMRR&R)

A. Upon receipt of the notification from the District Engineer in accordance with Article II.C. of this Agreement and for so long as the *Project* remains authorized, the Non-

Federal Sponsor, pursuant to Article II.D. of this Agreement, shall operate, maintain, repair, rehabilitate, and replace the entire *Project* or *functional portion of the Project*, at no cost to the Government. The Non-Federal Sponsor shall conduct its operation, maintenance, repair, rehabilitation, and replacement responsibilities in a manner compatible with the *Project's* authorized purposes and in accordance with applicable Federal and State laws as provided in Article XI of this Agreement and specific directions prescribed by the Government in the interim or final OMRR&R Manual and any subsequent amendments thereto.

B. The Non-Federal Sponsor hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor now or hereafter owns or controls for access to the *Project* for the purpose of inspection and, if necessary, for the purpose of completing, operating, maintaining, repairing, rehabilitating, or replacing the *Project*. If an inspection shows that the Non-Federal Sponsor for any reason is failing to perform its obligations under this Agreement, the Government shall send a written notice describing the non-performance to the Non-Federal Sponsor. If, after 30 calendar days from receipt of such written notice by the Government, the Non-Federal Sponsor continues to fail to perform, then the Government shall have the right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor now or hereafter owns or controls for the purpose of completing, operating, maintaining, repairing, rehabilitating, or replacing the *Project*. No completion, operation, maintenance, repair, rehabilitation, or replacement by the Government shall relieve the Non-Federal Sponsor of responsibility to meet the Non-Federal Sponsor's obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to ensure faithful performance pursuant to this Agreement.

ARTICLE IX – HOLD AND SAVE

Subject to the provisions of Article XXI of this Agreement, the Non-Federal Sponsor shall hold and save the Government free from all damages arising from construction, operation, maintenance, repair, rehabilitation, and replacement of the *Project* and any *betterments*, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X - MAINTENANCE OF RECORDS AND AUDIT

A. Not later than 60 calendar days after the effective date of this Agreement, the Government and the Non-Federal Sponsor shall develop procedures for keeping books, records, documents, or other evidence pertaining to costs and expenses incurred pursuant to this Agreement. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the Non-Federal Sponsor shall maintain such books, records, documents, or other evidence in accordance with these procedures and for a minimum of three years after completion of the accounting for which such books, records, documents, or other evidence were required. To the extent permitted under applicable Federal laws and

regulations, the Government and the Non-Federal Sponsor shall each allow the other to inspect such books, records, documents, or other evidence.

B. In accordance with 32 C.F.R. Section 33.26, the Non-Federal Sponsor is responsible for complying with the Single Audit Act Amendments of 1996 (31 U.S.C. 7501-7507), as implemented by Office of Management and Budget (OMB) Circular No. A-133 and Department of Defense Directive 7600.10. Upon request of the Non-Federal Sponsor and to the extent permitted under applicable Federal laws and regulations, the Government shall provide to the Non-Federal Sponsor and independent auditors any information necessary to enable an audit of the Non-Federal Sponsor's activities under this Agreement. The costs of any non-Federal audits performed in accordance with this paragraph shall be allocated in accordance with the provisions of OMB Circulars A-87 and A-133, and such costs as are allocated to the *Project* shall be included in *total project costs* and shared in accordance with the provisions of this Agreement.

C. In accordance with 31 U.S.C. 7503, the Government may conduct audits in addition to any audit that the Non-Federal Sponsor is required to conduct under the Single Audit Act Amendments of 1996. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits performed in accordance with this paragraph shall be included in *total project costs* and shared in accordance with the provisions of this Agreement.

ARTICLE XI - FEDERAL AND STATE LAWS

In the exercise of their respective rights and obligations under this Agreement, the Non-Federal Sponsor and the Government shall comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)).

ARTICLE XII - RELATIONSHIP OF PARTIES

A. In the exercise of their respective rights and obligations under this Agreement, the Government and the Non-Federal Sponsor each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other.

B. In the exercise of its rights and obligations under this Agreement, neither party shall provide, without the consent of the other party, any contractor with a release that

waives or purports to waive any rights the other party may have to seek relief or redress against that contractor either pursuant to any cause of action that the other party may have or for violation of any law.

ARTICLE XIII - TERMINATION OR SUSPENSION

A. If at any time the Non-Federal Sponsor fails to fulfill its obligations under this Agreement, the Assistant Secretary of the Army (Civil Works) shall terminate this Agreement or suspend future performance under this Agreement unless he determines that continuation of work on the *Project* is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the *Project*.

B. In the event the Government projects that the amount of Federal funds the Government will make available to the *Project* through the then-current *fiscal year*, or the amount of Federal funds the Government will make available for the *Project* through the upcoming *fiscal year*, is not sufficient to meet the Federal share of *total project costs* and the Federal share of costs for data recovery activities associated with historic preservation in accordance with Article XVII.B.2. and Article XVII.B.3. of this Agreement that the Government projects to be incurred through the then-current or upcoming *fiscal year*, as applicable, the Government shall notify the Non-Federal Sponsor in writing of such insufficiency of funds and of the date the Government projects that the Federal funds that will have been made available to the *Project* will be exhausted. Upon the exhaustion of Federal funds made available by the Government to the *Project*, future performance under this Agreement shall be suspended. Such suspension shall remain in effect until such time that the Government notifies the Non-Federal Sponsor in writing that sufficient Federal funds are available to meet the Federal share of *total project costs* and the Federal share of costs for data recovery activities associated with historic preservation in accordance with Article XVII.B.2. and Article XVII.B.3. of this Agreement the Government projects to be incurred through the then-current or upcoming *fiscal year*, or the Government or the Non-Federal Sponsor elects to terminate this Agreement.

C. In the event that the Government and the Non-Federal Sponsor determine to suspend future performance under this Agreement in accordance with Article XIV.C. of this Agreement, such suspension shall remain in effect until the Government and the Non-Federal Sponsor agree to proceed or to terminate this Agreement. In the event that the Government suspends future performance under this Agreement in accordance with Article XIV.C. of this Agreement due to failure to reach agreement with the Non-Federal Sponsor on whether to proceed or to terminate this Agreement, or the failure of the Non-Federal Sponsor to provide funds to pay for cleanup and response costs or to otherwise discharge the Non-Federal Sponsor's responsibilities under Article XIV.C. of this Agreement, such suspension shall remain in effect until: 1) the Government and Non-Federal Sponsor reach agreement on how to proceed or to terminate this Agreement; 2) the Non-Federal Sponsor provides funds necessary to pay for cleanup and response costs and otherwise discharges its responsibilities under Article XIV.C. of this Agreement; 3)

the Government continues work on the *Project*; or 4) the Government terminates this Agreement in accordance with the provisions of Article XIV.C. of this Agreement.

D. In the event that this Agreement is terminated pursuant to this Article or Article XIV.C. of this Agreement, both parties shall conclude their activities relating to the *Project* and conduct an accounting in accordance with Article VI.C. of this Agreement. To provide for this eventuality, the Government may reserve a percentage of total Federal funds made available for the *Project* and an equal percentage of the total funds contributed by the Non-Federal Sponsor in accordance with Article II.B.1., Article II.B.3., and Article XVII.B.3. of this Agreement as a contingency to pay costs of termination, including any costs of resolution of contract claims and contract modifications.

E. Any termination of this Agreement or suspension of future performance under this Agreement in accordance with this Article or Article XIV.C. of this Agreement shall not relieve the parties of liability for any obligation previously incurred. Any delinquent payment owed by the Non-Federal Sponsor shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13 week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3 month period if the period of delinquency exceeds 3 months.

ARTICLE XIV - HAZARDOUS SUBSTANCES

A. After execution of this Agreement and upon direction by the District Engineer, the Non-Federal Sponsor shall perform, or ensure performance of, any investigations for hazardous substances that the Government or the Non-Federal Sponsor determines to be necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA") (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, and rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for construction, operation, and maintenance of the *Project*. However, for lands, easements, and rights-of-way that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the District Engineer provides the Non-Federal Sponsor with prior specific written direction, in which case the Non-Federal Sponsor shall perform such investigations in accordance with such written direction.

1. All actual costs incurred by the Non-Federal Sponsor for such investigations for hazardous substances shall be included in *total project costs* and shared in accordance with the provisions of this Agreement, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of such costs.

2. All actual costs incurred by the Government for such investigations for hazardous substances shall be included in *total project costs* and shared in accordance with the provisions of this Agreement.

B. In the event it is discovered through any investigation for hazardous substances or other means that hazardous substances regulated under CERCLA exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for construction, operation, and maintenance of the *Project*, the Non-Federal Sponsor and the Government, in addition to providing any other notice required by applicable law, shall provide prompt written notice to each other, and the Non-Federal Sponsor shall not proceed with the acquisition of the real property interests until the parties agree that the Non-Federal Sponsor should proceed.

C. The Government and the Non-Federal Sponsor shall determine whether to initiate construction of the *Project*, or, if already in construction, whether to continue with construction of the *Project*, suspend future performance under this Agreement, or terminate this Agreement for the convenience of the Government, in any case where hazardous substances regulated under CERCLA are found to exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for construction, operation, and maintenance of the *Project*. Should the Government and the Non-Federal Sponsor determine to initiate or continue with construction of the *Project* after considering any liability that may arise under CERCLA, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of cleanup and response, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall not be considered a part of *total project costs*. In the event the Non-Federal Sponsor does not reach agreement with the Government on whether to proceed or to terminate this Agreement under this paragraph, or fails to provide any funds necessary to pay for cleanup and response costs or to otherwise discharge the Non-Federal Sponsor's responsibilities under this paragraph upon direction by the Government, the Government, in its sole discretion, may either terminate this Agreement for the convenience of the Government, suspend future performance under this Agreement, or continue work on the *Project*.

D. The Non-Federal Sponsor and the Government shall consult with each other in accordance with Article V of this Agreement in an effort to ensure that responsible parties bear any necessary cleanup and response costs as defined in CERCLA. Any decision made pursuant to paragraph C. of this Article shall not relieve any third party from any liability that may arise under CERCLA.

E. As between the Government and the Non-Federal Sponsor, the Non-Federal Sponsor shall be considered the operator of the *Project* for purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Sponsor shall operate, maintain, repair, rehabilitate, and replace the *Project* in a manner that will not cause liability to arise under CERCLA.

ARTICLE XV - NOTICES

A. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and delivered personally or sent by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the Non-Federal Sponsor:

Director
Water Services Department
City of Kansas City, Missouri
4800 East 63rd Street Trafficway
Kansas City, Missouri 64130

If to the Government:

Chief
Planning, Programs, and Project Management Division
Civil Branch
Kansas City District Corps of Engineers
601 E. 12th Street
Kansas City, Missouri 64106-2896

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

ARTICLE XVI - CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XVII - HISTORIC PRESERVATION

A. The Government, as it determines necessary for the *Project*, shall perform any identification, survey, or evaluation of historic properties. Any costs incurred by the Government for such work shall be included in *total project costs* and shared in accordance with the provisions of this Agreement.

B. The Government, as it determines necessary for the *Project*, shall perform or ensure the performance of any mitigation activities or actions for historic properties or that are otherwise associated with historic preservation including data recovery activities.

1. Any costs incurred by the Government for such mitigation activities, except for data recovery activities associated with historic preservation, shall be included in *total project costs* and shared in accordance with the provisions of this Agreement.

2. As specified in Section 7(a) of Public Law 86-523, as amended by Public Law 93-291 (16 U.S.C. 469c(a)), the costs of data recovery activities associated with historic preservation shall be borne entirely by the Government and shall not be included in *total project costs*, up to the statutory limit of one percent of the total amount authorized to be appropriated to the Government for the *Project*.

3. The Government shall not incur costs for data recovery activities associated with historic preservation that exceed the statutory one percent limit specified in paragraph B.2. of this Article unless and until the Assistant Secretary of the Army (Civil Works) has waived that limit and the Secretary of the Interior has concurred in the waiver in accordance with Section 208(3) of Public Law 96-515, as amended (16 U.S.C. 469c-2(3)). Any costs of data recovery activities associated with historic preservation that exceed the one percent limit shall not be included in *total project costs* but shall be shared between the Non-Federal Sponsor and the Government consistent with the minimum cost sharing requirements for flood risk management, as follows: 35 percent will be borne by the Non-Federal Sponsor and 65 percent will be borne by the Government.

C. If, during its performance of *relocations* or construction of improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material in accordance with Article III of this Agreement, the Non-Federal Sponsor discovers historic properties or other cultural resources that have not been evaluated by the Government pursuant to this Article, the Non-Federal Sponsor shall provide prompt written notice to the Government of such discovery. The Non-Federal Sponsor shall not proceed with performance of the *relocation* or construction of the improvement that is related to such discovery until the Government provides written notice to the Non-Federal Sponsor that it should proceed with such work.

ARTICLE XVIII - THIRD PARTY RIGHTS, BENEFITS, OR LIABILITIES

Nothing in this Agreement is intended, nor may be construed, to create any rights, confer any benefits, or relieve any liability, of any kind whatsoever in any third person not party to this Agreement.

ARTICLE XIX - NON-LIABILITY OF OFFICERS AND EMPLOYEES

No officer, agent, consultant, or employee of the Non-Federal Sponsor, nor any officer, agent, consultant, or employee of the Government, may be charged personally, or held liable, under the terms or provisions of this Agreement because of any breach, attempted breach, or alleged breach thereof, except as provided in Section 912(b) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (42 U.S.C. 1962d-5b note), or other applicable law.

ARTICLE XX - SECTION 902 MAXIMUM COST OF PROJECT

A. The Non-Federal Sponsor understands that Section 902 of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2280) establishes the maximum amount of *total project costs* for the *Project*. On the effective date of this Agreement, the maximum amount of *total project costs* for the *Project* is estimated to be **\$23,043,000**, as calculated in accordance with Engineer Regulation 1105-2-100, using 01 October 2010 price levels and including allowances for projected future inflation. The Government shall adjust such maximum amount of *total project costs* for the *Project*, in accordance with Section 902 of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2280), when necessary.

B. Notwithstanding any other provision of this Agreement, the Government shall not incur a new financial obligation or expenditure for the *Project*, or include in *total project costs* any additional contribution provided by the Non-Federal Sponsor, if such obligation, expenditure or additional contribution would cause cumulative project costs to exceed such maximum amount of *total project costs* for the *Project*, unless otherwise authorized by law.

ARTICLE XXI - OBLIGATIONS OF FUTURE APPROPRIATIONS

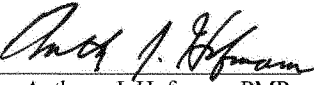
A. Nothing herein shall constitute, nor be deemed to constitute, an obligation of future appropriations by the City of Kansas City, Missouri, where creating such an obligation would be inconsistent with the charter of the City of Kansas City, Section 1211(b).

B. The Non-Federal Sponsor intends to fulfill its obligations under this Agreement. The Non-Federal Sponsor shall include in its budget request or otherwise propose appropriations of funds in amounts sufficient to fulfill these obligations for that year, and shall use all reasonable and lawful means to secure those appropriations. The Non-Federal Sponsor reasonably believes that funds in amounts sufficient to fulfill these obligations lawfully can and will be appropriated and made available for this purpose. In the event funds are not appropriated in amounts sufficient to fulfill these obligations, the Non-Federal Sponsor shall use its best efforts to satisfy any requirements for payments or contributions of funds under this Agreement from any other source of funds legally available for this purpose. Further, if the Non-Federal Sponsor is unable to fulfill these obligations, the Government may exercise any legal rights it has to protect the Government's interests related to this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the District Engineer, Kansas City District, U.S. Army Corps of Engineers.

DEPARTMENT OF THE ARMY

THE CITY OF KANSAS CITY, MISSOURI

BY: 
 Anthony J. Hofmann, PMP
 District Engineer
 Colonel, Corps of Engineers

BY: 
 Director
 Water Services Department

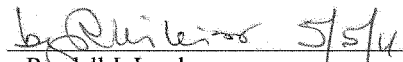
DATE: 5/11/11

DATE: 5/4/11

Approved as to Form:


 Assistant City Attorney

I hereby certify that there is a balance, otherwise unencumbered, to the credit of the appropriation to which the foregoing expenditure is to be charged, and a cash balance otherwise unencumbered, in the treasury, to the credit of the fund from which payment is to be made, each sufficient to meet the obligation hereby incurred.

 5/5/11
 Randall J. Landes
 Director of Finance

MAY 04 PM 02:40

CERTIFICATE OF AUTHORITY

I, Galen Beaufort, do hereby certify that I am the principal legal officer of the City of Kansas City, Missouri, that the City of Kansas City, Missouri is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the City of Kansas City, Missouri in connection with the construction of SWOPE PARK INDUSTRIAL AREA, BLUE RIVER, KANSAS CITY, MISSOURI, and to pay damages, if necessary, in the event of the failure to perform in accordance with the terms of this Agreement, as required by Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended (42 U.S.C. 1962d-5b), and that the persons who have executed this Agreement on behalf of the City of Kansas City, Missouri have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this
9th day of May 20 11.

Galen Beaufort
 Galen Beaufort
 City Attorney
 Kansas City, Missouri

CERTIFICATION REGARDING LOBBYING

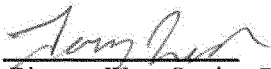
The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.



Director, Water Services Department

DATE: 5/4/11

Appendix B

Cost and Schedule Risk Analysis

Abbreviated Risk Analysis

Project (less than \$40M): Swope Park Industrial Area

Project Development Stage: PED 90%

Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 17,085,000

CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
01 LANDS AND DAMAGES	Real Estate	\$ 1,895,000	10.00%	\$ 189,500	\$ 2,084,500.00
02 03 CEMETERIES, UTILITIES, AND STRUCTURES,					
1 Construction Activities	Relocations and Utility Work	\$ 454,000	13.06%	\$ 59,297	\$ 513,296.80
2 11 01 LEVEES	Levees	\$ 4,731,000	20.17%	\$ 954,242	\$ 5,685,242.26
3 11 01 LEVEES	Gateways/Other Structures	\$ 1,258,000	11.47%	\$ 144,333	\$ 1,402,333.34
4 11 02 FLOODWALLS	Floodwalls	\$ 7,866,000	13.84%	\$ 1,089,022	\$ 8,955,022.44
5 16 BANK STABILIZATION	Bank Stabilization	\$ 2,776,000	18.45%	\$ 512,165	\$ 3,288,164.96
13 30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 1,415,000	12.69%	\$ 179,554	\$ 1,594,554.45
14 31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 1,000,000	12.69%	\$ 126,894	\$ 1,126,893.60
Totals					
	Real Estate	\$ 1,895,000	10.00%	\$ 189,500	\$ 2,084,500.00
	Total Construction Estimate	\$ 17,085,000	16.15%	\$ 2,759,060	\$ 19,844,060
	Total Planning, Engineering & Design	\$ 1,415,000	12.69%	\$ 179,554	\$ 1,594,554
	Total Construction Management	\$ 1,000,000	12.69%	\$ 126,894	\$ 1,126,894
	Total	\$ 21,395,000	15.21%	\$ 3,255,008	\$ 24,650,008

Acquisition Strategy					Max Potential Cost Growth	30%	
AS-1	Relocations and Utility Work	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1
AS-2	Levees	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1
AS-3	Gateways/Other Structures	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1
AS-4	Floodwalls	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1
AS-5	Bank Stabilization	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1
AS-13	Planning, Engineering, & Design	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1
AS-14	Construction Management	Contracting plan firmly established?	- Ba or small business likely? - Contracting plan firmly established?	Project manager will push against the use of Ba set asides. Construction costs may increase if Ba set asides are used. Have seen higher costs when competition is limited to smaller contractors, which usually have subcontractors complete a higher percentage of the work. Higher costs associated with using an Ba could have a substantial impact on the viability of the project.	Unlikely	Significant	1

Construction Elements							Max Potential Cost Growth	25%
CE-1	Relocations and Utility Work	Potential for construction modification and claims?	Potential for construction modification and claims?	Potential for construction modification and claims?	Without identification of utilities, there's a high risk for mods. Low risk of cultural impacts.	Likely	Marginal	2
CE-2	Levees	Potential for construction modification and claims?	Potential for construction modification and claims?	Potential for construction modification and claims?	Excessive overcompensation could result in traps. Unqualified fill and/or borrow location could result in mods. Inspection/tracks needed for exploration for footprint of levees. Low risk of cultural impacts.	Possible	Significant	2
CE-3	Gateways/Other Structures	Accelerated schedule or harsh weather schedule?	No concerns identified.	No concerns identified.	No concerns identified.	Unlikely	Negligible	0
CE-4	Floodwalls	Accelerated schedule or harsh weather schedule?	No concerns identified.	No concerns identified.	No concerns identified.	Unlikely	Negligible	0
CE-5	Bank Stabilization	Potential for construction modification and claims?	High risk or complex construction elements, site access, in-water? Water care and diversion plan?	Potential for construction modification and claims?	A portion of the bank stabilization will be in water. Low risk of cultural impacts.	Possible	Marginal	1
CE-13	Planning, Engineering, & Design	Accelerated schedule or harsh weather schedule?	No concerns identified.	No concerns identified.	No concerns identified.	Unlikely	Negligible	0
CE-14	Construction Management	Accelerated schedule or harsh weather schedule?	No concerns identified.	No concerns identified.	No concerns identified.	Unlikely	Negligible	0

Quantities for Current Scope						Max Potential Cost Growth	20%
Q-1	Relocations and Utility Work	• Sufficient investigations to develop quantities?	• Sufficient investigations to develop quantities?	Quantities of utility relocations are impossible to investigate without sufficient investigation.	Possible	Negligible	0
Q-2	Leaves	• Sufficient investigations to develop quantities?	• Level of confidence based on design and assumptions? • Sufficient investigations to develop quantities?	New topographic survey may impact quantities calculations. Baseline estimate assumes 30% of excavated material is unobtainable. Percentage recommended by ED/SO and ED/SO upon evaluation of boring logs.	Possible	Marginal	1
Q-3	Gateways/Other Structures	• Level of confidence based on design and assumptions?	• No concerns identified.	No concerns identified.	Unlikely	Negligible	0
Q-4	Rockwalls	• Level of confidence based on design and assumptions?	• No concerns identified.	No concerns identified.	Unlikely	Marginal	0
Q-5	Bank Stabilization	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions?	Currently using an allowance to estimate mitigation area.	Possible	Marginal	1
Q-13	Planning, Engineering, & Design	• Level of confidence based on design and assumptions?	• No concerns identified.	No concerns identified.	Unlikely	Negligible	0
Q-14	Construction Management	• Level of confidence based on design and assumptions?	• No concerns identified.	No concerns identified.	Unlikely	Negligible	0

Specialty Fabrication or Equipment						Max Potential Cost Growth	75%
FE-1	Relocations and Utility Work or installed?	Unusual parts, material or equipment manufactured or installed?	No concerns identified.		Unlikely that unique fabrication or project installed equipment would be required. Common materials can be used.	Unlikely	Negligible
FE-2	Leaves	Unusual parts, material or equipment manufactured or installed?	No concerns identified.		Unlikely that unique fabrication or project installed equipment would be required. Common materials can be used.	Unlikely	Negligible
FE-3	Gateways/Other Structures	Unusual parts, material or equipment manufactured or installed?	No concerns identified.		Unlikely that unique fabrication or project installed equipment would be required. Common materials can be used.	Unlikely	Negligible
FE-4	Rockwalls	Confidence in contractor's ability to install?	Confidence in contractor's ability to install?		Agreement plans could be complicated for a contractor to install.	Possible	Marginal
FE-5	Bank Stabilization	Unusual parts, material or equipment manufactured or installed?	No concerns identified.		Unlikely that unique fabrication or project installed equipment would be required. Common materials can be used.	Unlikely	Negligible
FE-13	Planning, Engineering, & Design	Unusual parts, material or equipment manufactured or installed?	No concerns identified.		Unlikely that unique fabrication or project installed equipment would be required. Common materials can be used.	Unlikely	Negligible
FE-14	Construction Management	Unusual parts, material or equipment manufactured or installed?	No concerns identified.		Unlikely that unique fabrication or project installed equipment would be required. Common materials can be used.	Unlikely	Negligible

Cost Estimate Assumptions						Max Potential Cost Growth	35%
CT-1	Relocations and Utility Work	• Overuse of Cost Book lump sum allowances?	• Overuse of Cost Book lump sum allowances?		Relies on a allowance and conservative assumptions utility costs.	Unlikely	0
CT-2	Leaves	• Site accessibility, transport delays, congestion? • Assumptions regarding crew, productivity, overtime?	• Site accessibility, transport delays, congestion? • Assumptions regarding crew, productivity, overtime?		Used historical information to derive crew production rates, site congestion may slow down crew production rates. Baseline estimate includes a care & diversion of water allowance to account for river crossings and high water events. The riparian and wetland mitigation baseline estimate assumes conservative approach of 200 plantings an acre and seeding.	Possible	1
CT-3	Gateways/Other Structures	• Site accessibility, transport delays, congestion?	• Site accessibility, transport delays, congestion?		Used 2012 Cost Book for concrete and steel costs and not a local vendor quote. 2012 Cost Book is considered conservative. Traffic congestion to and from site is a concern.	Possible	1
CT-4	Floodwalls	• Site accessibility, transport delays, congestion?	• Site accessibility, transport delays, congestion?		Used 2012 Cost Book for concrete and steel costs and not a local vendor quote. 2012 Cost Book is considered conservative. Traffic congestion to and from site is a concern.	Possible	1
CT-5	Bank Stabilization	• Site accessibility, transport delays, congestion?	• Site accessibility, transport delays, congestion?		Used historical information to derive crew production rates, site congestion may slow down crew production rates.	Possible	1
CT-13	Planning, Engineering, & Design	• Reliability and number of key quotes?	• No concerns identified.		Costs based on general percentages from TPCS.	Unlikely	0
CT-14	Construction Management	• Reliability and number of key quotes?	• No concerns identified.		Costs based on general percentages from TPCS.	Unlikely	0

External Project Risks					Max Potential Cost Growth		40%
EX-1	Relocations and Utility Work	Unanticipated inflation in fuel, key materials?	- Funding for project. - Potential for market volatility impacting competition, pricing? - Unanticipated inflation in fuel, key materials?	Anticipate inflation in material costs, however, inflation of material costs would be marginal. Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1
EX-2	Leaves	Potential for market volatility impacting competition, pricing?	- Funding for project. - Potential for market volatility impacting competition, pricing? - Unanticipated inflation in fuel, key materials?	Anticipate inflation in material costs, however, inflation of material costs would be marginal. Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1
EX-3	Gateways/Other Structures	Potential for severe adverse weather?	- Funding for project. - Potential for market volatility impacting competition, pricing? - Unanticipated inflation in fuel, key materials?	Anticipate inflation in material costs, however, inflation of material costs would be marginal. Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1
EX-4	Floodwalls	Potential for market volatility impacting competition, pricing?	- Funding for project. - Potential for market volatility impacting competition, pricing? - Unanticipated inflation in fuel, key materials?	Anticipate inflation in material costs, however, inflation of material costs would be marginal. Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1
EX-5	Bank Stabilization	Potential for severe adverse weather?	- Funding for project. - Potential for market volatility impacting competition, pricing? - Unanticipated inflation in fuel, key materials?	Anticipate inflation in material costs, however, inflation of material costs would be marginal. Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1
EX-13	Planning, Engineering, & Design	Potential for severe adverse weather?	Funding for project.	Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1
EX-14	Construction Management	Potential for severe adverse weather?	Funding for project.	Based on current budget climate, project may be subjected to incremental funding over a couple of years. Funding delays would increase project schedule and increase construction and management costs.	Possible	Marginal	1

Appendix C
Total Project Cost Summary

The Total Cost Summary was based on a 95-percent design will be made available only upon request.

This information is For Official Use Only (FOUO) and can not be released in a public document.



**US Army Corps
of Engineers ®**

CENWK-PM-CJ

21 November 2014

MEMORANDUM FOR RECORD

SUBJECT: Engineering Basis for the Swope Park Industrial Area Flood Risk Reduction Project's Cost Estimate

1. **Purpose.** The purpose of this memorandum is to document and clarify the engineering basis for the subject's cost estimate, dated 21 November 2014.

2. **Background.** The Swope Park Flood Damage Reduction project is in the process of developing a Post-authorization Change Report (PACR). A certified Total Project Cost Summary (TPCS) is required for the PACR. The district was directed to revise the economics to reflect the current prevailing interest rate which dictated the need to update the TPCS.

3. **Design Basis for Cost Estimate.** The 95% design package is under final internal review and included the complete estimate of quantities for the entire project. The package was submitted in November 2013 but funding and resource limitations has delayed completion of the review. These quantities were the basis for the updated TPCS in January 2014 for certification. Subsequent to the 2014 update, a final Real Estate Plan was prepared based on the 95% design package with an updated estimate of real estate acquisition costs. The TPCS was updated to reflect the new RE estimate and updated utilities relocation estimate based on the final design package.

4. **Engineering Support for Cost Estimate Assumptions.**

a. **Utilities.** The estimate for utility relocations used in previous TPCS had been coordinated with the local sponsor and was based on a history of costs for city projects and the Blue River Channel project. The TPCS had included a large contingency at the request of the Sponsor, to minimize the chance of exceeding the cost estimate. With the design now in its final state, the sponsor is satisfied with the investigation of the impacts the project will have on utility relocations and the contingency amount requested by the sponsor has been reduced. The contingency is now limited to the overall project contingency based on the cost and schedule risk analysis.

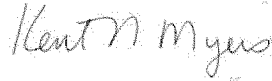
b. The Sponsor has submitted some documentation for credit of LERRD and it is in the process of being certified. The TPCS only reflected sunk costs for work executed by Wolfe Construction for the interior drainage collection construction contract.

c. No other changes to the TPCS were revised except to index costs to October 2015 price levels.

CENWK-PM-CJ

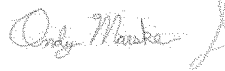
SUBJECT: Engineering Basis for the Swope Park Industrial Area Flood Risk Reduction Project's Cost Estimate.

5. **Point of Contact.** Mr. Kent Myers, Project Manager, at 816-389-3399.



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Kent Myers
Project Manager



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Andy Marske
Project Technical Lead

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David Roberts
Project Cost Engineer

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Cost Engineering, Chief

Appendix D
Economic Update

**SWOPE PARK INDUSTRIAL AREA
FLOOD DAMAGE REDUCTION PROJECT
BLUE RIVER BASIN – KANSAS CITY, MISSOURI**

**APPENDIX D
ECONOMIC UPDATE**

March 2016

1.0 INTRODUCTION

1.1 Purpose

The purpose of this economic update is to provide a current economic analysis supporting the Post-Authorization Change Report (PACR) and Limited Reevaluation Report (LRR) requesting reauthorization of the Kansas City District's Swope Park Industrial Area Flood Damage Reduction Project on the Blue River in Kansas City, Missouri. The update investigates whether, and to what extent, the Swope Park project remains economically justified. Significant assumptions and data underlying previous economic analyses of this project are reexamined and updated as necessary, and ultimately, updated damages and benefits are computed reflecting an FY 16 price level. Finally, an updated total project cost estimate is used to compute current benefit-cost data and 902 maximum cost limit data.

1.2 Scope

The present update is intended to review the status of the fundamental economic assumptions supporting benefit-cost computations in previously approved documents and to account for any changes significant enough to alter the scale of previously reported benefits and costs, especially if they affect economic justification.

Guidance for economic analysis is cited in section 1.3 below, but the main reference for updates in particular is CWPM 12-001, Methodology for Updating Benefit-to-Cost Ratios (BCR) for Budget Development (8 March 2012). The policy memorandum does not envision the same level of detail for an economic update as in the original feasibility study. According to the memorandum, the update is not to involve "major new analysis." The purpose of the update is "not to reevaluate authorization" and is "limited to reviewing and updating previous assumptions and limited surveying, sampling, and application of other techniques to affirm or develop a reasonable revised estimate of project benefits." Again, the goal "is to reaffirm that the initial investment decision was sound, not to complete new plan formulation." Finally, ER 1105-2-100 (section D-4.b(3)) states that "Any rational set of procedures that result in a current analysis of benefits may be acceptable except procedures which amount solely to indexing of benefits."

This economic update has been prepared as a Level 2 update in the terms established by the guidance memorandum. According to the memorandum, key factors that would establish the need for a Level 2 update (as opposed to Level 1 or 3) include the following:

- Engineering data and assumptions have not changed and no new data is needed;
- Plan configuration has not changed;
- NEPA analysis does not need revision;
- Economic inventory and parameters have not undergone major change;
- Economic inventory and parameters have, however, undergone moderate change - enough to warrant some quantitative re-analysis.

Applying these considerations to this update:

- No new engineering data is required for the Swope Park project at this time. The last significant flood event in this area was in 1990, well before the preparation and publication of the 2002 feasibility report, and the feasibility study hydrology and hydraulics were calibrated based on the 1990 event. In the interim since the 2002 report, no other major changes have occurred in the Blue River basin that might necessitate reanalysis of the H&H data. Therefore, the engineering data is unchanged from the feasibility report.
- Plan configuration also has not changed significantly in the interim. Minor changes that have occurred are summarized in the main report, section 9.2, but they would not impact project benefits. O&M costs may be reduced to a degree by these changes, but any resulting increase in the benefit-cost ratio of the project is not expected to be significant at this time.
- No significant new NEPA analysis is currently warranted. The project has an existing signed FONSI and 401 permit from 2002. A new supplement is being prepared due to the age of these documents and the minor design changes that have occurred since 2002 (primarily, a requirement in WRDA 2007 that mitigation banks be utilized), but the update in progress does not require any extensive NEPA evaluation.

The only change that has occurred in any of the factors above since the feasibility report is in the economic base, where there has been moderate change. While not fundamentally affecting the assumptions or threatening the conclusions of the feasibility analysis, the economic data changes are significant enough to warrant quantification and revised computation of damages and benefits.

Only the recommended plan (currently in construction) is reevaluated for this update; the screening analysis is not revisited.

1.3 Guidance

Pertinent guidance governing economic analysis procedures in this analysis includes:

- Economic and Environmental Principles and Guidelines for Water and Related Resources Implementation Studies (P&G) (March 1983)
- Engineer Regulation (ER) 1105-2-100, Planning Guidance Notebook (22 April 2000), including amendments to Appendices G (30 June 2004) and H (20 November 2007)

- Civil Works Policy Memorandum CWPM 12-001, Methodology for Updating Benefit-to-Cost Ratios (BCR) for Budget Development (8 March 2012)
- Engineer Regulation (ER) 1105-2-101, Risk Analysis for Flood Damage Reduction Studies (3 January 2006)
- Engineer Manual (EM) 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies (1 August 1996)
- Engineer Regulation (ER) 200-2-2, Procedures for Implementation of NEPA (4 March 1988)
- Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships for Residential Structures With Basements, dated 10 October 2003.
- Economic Guidance Memorandum (EGM) 09-04, Generic Depth-Damage Relationships for Vehicles, dated 22 Jun 2009.
- Depth-Damage Relationships for Structures, Contents, and Vehicles and Content-to-Structure Value Ratios in Support of the Lower Atchafalaya Reevaluation and Morganza to the Gulf, Louisiana Feasibility Studies, New Orleans District, Corps of Engineers, May 1997.
- IWR Report 96-R-12, Analysis of Nonresidential Content Value and Depth-Damage Data for Flood Damage Reduction Studies, Jack C. Kiefer and J. Scott Willett (Planning & Management Consultants Ltd., Carbondale IL), May 1996.
- Water Resources Development Act (WRDA) of 1990, Section 308.

2.0 PROJECT AND STUDY AREA DESCRIPTION

2.1 Study Area Description

The Swope Park Industrial Area (which will be referred to as the SPIA in this update) is located in the southeastern portion of Kansas City, Missouri, about 10 miles from the downtown business district, just southeast of the intersection of 75th Street and Cleveland Avenue. It lies on the left bank of the Blue River, approximately 18.5 miles upstream of the Blue River's confluence with the Missouri River, from about mile 18.8 to mile 18.2. As shown in Figure 1, the area is on the western edge of Swope Park, a major municipal park and recreation area. (The Lakeside Nature Center, KC Zoo, and Heart of America Golf Course shown on Figure 1 are all components of the park.) The SPIA is located between two other Corps Blue River projects: the Blue River Basin Flood Damage Reduction project (usually referred to as the Dodson project), a levee/floodwall project currently in construction at a similar industrial area a mile upstream, and the Blue River Channel project (essentially completed) beginning a mile downstream. All current land use in the area is industrial or infrastructure (streets and railroad track); there is no residential, commercial or agricultural development in the study area, although neighborhoods

are adjacent to the study area. The main north-south route in the area is U.S. Highway 71, about a mile west of the SPIA, while east-west access is provided by 75th Street. The Union Pacific Railroad runs along the western edge of the area.

As seen in Figure 1, the businesses in the area are along a 5-block stretch of 75th Terrace, from the Union Pacific Railroad tracks east to the street's dead-end at the Blue River. Within this area are 8 businesses housed in 11 commercial structures (2 currently vacant). These businesses, several of which are manufacturers, are listed and discussed briefly below.

- Gasket Engineering Company – Gasket Engineering employs 140 in two structures in the SPIA with a total area of approximately 125,000 square feet. The company is a precision die cutting and custom conversion business for the automotive, medical, rail and wind turbine industries. The company has existed since the 1940s, but business has expanded rapidly in the past few years due to increasing demand for wind energy products.
- Livers Bronze – Livers designs, manufactures and installs ornamental commercial hand railing systems. They occupy a 125,000 square feet structure in the SPIA staffed by 80 employees. Livers is currently undergoing an internal expansion.
- Trinity Biotech – Probably the most rapidly expanding business in the SPIA currently, Trinity specializes in research and development and manufacturing of clinical medical diagnostic devices, particularly for the treatment of diabetes. The Kansas City facility is one of four U.S. facilities; the company headquarters is in Ireland. Their 35,000 square-foot structure in the SPIA houses 70 employees. With sales in at least 75 countries, the SPIA facility is expected to continue its rapid growth over the next several years. This facility is particularly sensitive to flood risk due to the critical need for a sanitary environment in which research, development, manufacturing and testing can take place.
- Salvajor – Salvajor manufactures commercial waste disposers and waste handling systems for the food industry. Salvajor has two buildings in the SPIA totaling approximately 45,000 square feet. There are 50 employees.

In addition to these four companies that anchor the SPIA, the area also is home to Entech, a plumbing, heating and cooling contractor for residential and commercial/industrial customers; Forte Plastics, a plastics manufacturer; and two other businesses that have equipment storage in the SPIA (no structures).

Figure 1: The Swope Park Industrial Area

2.2 Project Description

The SPIA project was authorized in the 2007 Water Resources Development Act (WRDA), following publication of a General Reevaluation Report and approval of a Chief's Report in 2003. The non-Federal sponsor for the project is the City of Kansas City, Missouri. The main component of the project is a levee/floodwall approximately 6,000 feet long - about 40% levee and 60% floodwall – encompassing all of the industrial properties in the SPIA. It would be built to a height 1.5 feet above the nominal 0.002 flood elevation, which entails an average height of approximately 12.5 feet. A secondary project feature is an interior drainage ponding area with piping to collect runoff up to a 1% event when high stages on the Blue River block runoff. Although adverse environmental effects are expected to be minimal since there is no channel alteration and floodwall is being used extensively to minimize the footprint, a small amount of mitigation is planned in the form of riparian wetland restoration and timber planting.

3.0 PREVIOUS REPORTS

This section summarizes pertinent economic data and results from previous Swope Park decision documents and economic updates.

3.1 2002 Feasibility Report/EA

A Feasibility Report and Environmental Assessment was published in 2002. The economic survey estimated total investment in the SPIA at \$39,925,000 (FY 00 prices). This economic

base was the foundation of the damage analysis, performed as a risk-based analysis using HEC-FDA (the Hydrologic Engineering Center's Flood Damage Analysis program), the standard program (subsequently certified) for flood risk economic analyses in the Corps. The future without-project equivalent annual damages (EAD) were estimated at \$1,513,000. This total reflected a FY 02 prices and an interest rate of 6.125%, the then-current Federal interest rate.

The screening analysis identified the alternative corresponding to the project described above as the NED plan. The estimated total project cost was \$14,144,000. At the 6.125% interest rate, annual benefits were estimated at \$1,395,000 and annual costs were \$982,000, resulting in a benefit-cost ratio (BCR) of 1.4 at the prevailing interest rate. The plan had net benefits of \$413,000 and residual damages of \$118,000. At the budgetary interest rate of 7.00%, the benefit-cost ratio was 1.3, with annual benefits of \$1,388,000 and annual costs of \$1,106,000.

3.2 2003 Chief's Report

Following approval of the Feasibility Report and Environmental Assessment in early 2003, a Chief's Report for the Swope Park project (i.e., the NED plan from the feasibility study) was approved in December 2003. The economic data in the Chief's Report were updated from the FY 02 prices in the feasibility report to FY 04 prices and an interest rate of 5.625%. The total project cost estimate was \$14,987,000. The reported benefit-cost ratio was 1.5, based on annual benefits of \$1,399,000 and annual costs of \$946,000. Net benefits of \$453,000 were reported. At the 7.00% interest rate, the benefit-cost ratio (not included in the Chief's Report) was 1.2, a slight reduction from the BCR of 1.3 at the same rate in the feasibility report.

3.3 WRDA 2007

During preparation of the 2007 Water Resources Development Act, ASA(CW) (the office of the Assistant Secretary of the Army for Civil Works) requested an update of the economic data from the Chief's Report. Revised benefit-cost data eventually were submitted at a price level of 1 October 2007 (FY 08) and an interest rate of 4.875%, although no decision document containing these figures was prepared. The benefit-cost ratio at 4.875% was 1.7, a higher benefit-cost ratio than previously reported due to the drop in interest rates.

3.4 Economic Updates, Post-2003

Subsequent to project authorization in WRDA 2007, economic justification for the SPIA has been the subject of required economic updates in 2008, 2011 and 2013. Each was subsequently approved by NWD. These updates are briefly summarized below:

- 2008 – Despite the preparation of nominally updated benefit-cost data to support WRDA 2007 in the previous year, the 2007 data were not published in a decision document. As a result, the last approved economic report remained the Chief's Report of 2003 and that document was more than three years old. An economic update was therefore required. The 2008 update was completed prior to the release of CWPM 12-001 in 2012, which provided detailed guidance on economic updates, but the 2008 update would have qualified as a Level 2 update in the terminology of that memorandum. That is to say, project configuration and engineering data assumptions were maintained while damages and benefits were revised in response to changes in the economic base of the SPIA. The total project cost estimate had increased to \$18,667,000 (FY 08 prices). At the interest

rate of 4.875%, the benefit-cost ratio was 1.8, with benefits of \$1,905,400, annual costs of \$1,085,600, and net benefits of \$819,800.

- 2011 – The brief 2011 update was essentially a Level 1 update. The minor changes in economic activity since 2008 were not considered significant enough to affect the broad conclusions of the feasibility report. The project cost estimate had increased to \$22,000,000, but at the current interest rate of 4.125%, the BCR remained strong at 1.7, with benefits of \$1,905,400, annual costs of \$1,091,000, and net benefits of \$814,400 in FY 11 prices.
- 2013 – Another Level 1 update was submitted in 2013 to support the 2015 budget preparation process. The interim cost estimate had grown to \$28,000,000, but the benefit-cost ratio remained constant at 1.7 at the current interest rate due to the drop in the rate from 4.125% to 3.75%.

The Swope Park project has now been in construction since FY 2009. Approximately 7% of the project construction has been completed as of this report, and 15% of total project costs has been spent. However, the total project cost estimate exceeds the 902 maximum cost limit, and this has resulted in stalling the project.

4.0 ECONOMIC UPDATE METHODOLOGY

4.1 Update Parameters and General Approach

General parameters for this economic analysis include the following points:

- A price level of 1 October 2015 (FY 16) is assumed for all data in this update.
- A 50-year period of analysis is assumed for the economic analysis, as in the feasibility report.
- The current FY 16 Federal interest rate of 3.125% is used in the analysis.
- The structure inventory as updated for this report is relative to FY 16 economic conditions in the study area.
- Both existing and base year conditions are deemed to be represented by the 2016 index year and the updated structure inventory.
- H&H data are unchanged from the feasibility report, as discussed in section 1.2.
- Plan features and configuration are likewise unchanged from the feasibility report.
- Although economic updates have been accomplished and approved for the Swope Park project in 2008, 2011 and 2013, the main points of reference used for this update are the Feasibility Report and Environmental Assessment of 2002 and the economic data submission supporting WRDA 2007. Changes in investment, damages and benefits will be displayed primarily in relation to the 2002 report and the 2007 calculations.

A major consideration in developing an approach for this update has been to maintain as much consistency as possible with the procedures used in the feasibility analysis. The goal is for the update results to reflect real changes in the economic base of the study area and to minimize distortion in the results that might result from simply making changes in the economic analysis

procedures used. We have attempted, in preparing the data inputs for the model, to maintain as much consistency as possible with the procedures. Only a few aspects of the data development have been modified where absolutely necessary. These changes will be discussed below, but for the most part, the procedures used for the feasibility report have been carried over for this update.

4.2 Data Collection and Updating Process

Under the economic updates guidance memorandum of March 2012, several different approaches are available for carrying out an economic update, depending on the nature of the economic base and project. In some study areas, total investment and economic damage potential are dominated by a few larger companies, and updates can be readily prepared in these cases by obtaining current data and reevaluating the benefits of just a few companies that account for a high percentage of project benefits. This is the primary approach that has been followed in the present economic update for the Swope Park project. The update tasks have been focused on a few large companies that anchor the district, while updating of values for smaller properties accounting for a lesser share of benefits has been more abbreviated. This process is summarized in more detail below. No significant modeling revisions were required for this update.

4.2.1 Field survey - A 100% field survey of businesses in the study area was completed in October 2013. The structure inventory for the SPIA includes only 11 structures and 8 businesses. Changes in occupied/vacant status, business type, apparent operational level, and structure size were noted, as were any significant changes in structure condition. A brief follow-up survey to update any changes in current occupancy was carried out in December 2015.

It should also be noted that, in accordance with Section 308 of the Water Resources Development Act of 1990, structures built since 1991 in the 1% ACE floodplain with a first-floor elevation lower than the 1% ACE flood elevation were not included in the structure inventory. That said, Section 308 issues are nonexistent in this study area since no recently constructed buildings have been noted in the 2013 survey or other recent surveys.

4.2.2 Structure values, commercial and industrial - Structure values for all 11 structures in the inventory were updated to 1 October 2015 (FY 16) prices. As a basis, we used depreciated replacement values developed during the feasibility study and last updated in 2006 for the WRDA 2007 documentation. These values were developed by utilizing Marshall and Swift square foot cost data. The original calculations, which covered all of the currently existing structures, were based on standard Marshall and Swift procedures, taking into account such factors as exterior wall type, number of stories, size of structure, condition, and age. These values were reevaluated in 2007 and used in the 2008 economic update.

For the present analysis, structures were inspected during the 2013 field survey for any changes, particularly in condition. It was subsequently learned from interviews with the leading companies in the SPIA that most of these buildings have experienced some level of rehabilitation in recent years, with the result that the condition ratings from 2007 appeared to still be adequately representative of current condition. We therefore updated the 2007 depreciated replacement values for the structures using a price index factor. Since the Kansas City District no longer uses Marshall and Swift data, the 2007 values were converted to FY 14 values using a

factor developed from the Construction Cost Index (CCI), published by Engineering News Record. A factor of 1.229 for the FY 07 to FY 14 time period was applied to the depreciated replacement value of these buildings. Comparing the ENR factor to other available indices for the same period, the factor derived from the Consumer Price Index-Urban (CPI-U) for all U.S. cities is 1.157, and the RS Means Historical Cost Index factor (national average) is 1.242. The CCI factor appears to be reasonable within this context. The CCI is generally used in District economic flood damage analyses because it has a significant labor component that is very relevant to repair, rehabilitation and general rebuilding tasks.

In December 2015, the benefits were updated to a FY 16 price level. Structure values were updated from FY 14 to FY 16 prices using the Construction Cost Index (CCI). The factor was 1.0453. HEC-FDA was then loaded with the updated structure inventory and executed to produce updated damages and benefits.

Uncertainty factors applied to the structure values were held constant from previous analyses. These factors were developed from data obtained during interviews with the companies in the SPIA.

4.2.3 Structure values, infrastructure – Infrastructure in the Swope Park structure inventory consists of a few city streets. This category is a minor component of the benefits base, accounting for about 0.7% of total investment in the Swope Park area as estimated in the 2002 feasibility report. Since this is a very minor category accounting for less than 10% of investment and benefits, a price index factor was used to update values from FY 07 to FY 14. The CCI factor of 1.229 used to update building values was also used to update the street values. For uncertainty, a standard deviation of 10% was applied to the street values; this percentage was broadly representative of the amount of variation in the average construction costs per mile, obtained from a variety of different sources, used in the original feasibility study estimates.

In December 2015, the benefits were updated to a FY 16 price level using the same procedure and the same CCI factor shown above in section 4.2.2 for commercial/industrial structure values.

4.2.4 Content values – Obtaining updated content values (equipment and inventory) for the major businesses in the SPIA was the main task in preparing this update. From the 1997 reconnaissance study to the 2007 WRDA supporting data, the companies in this industrial area generally have been interviewed several times. For the present analysis, we focused on the four largest businesses in the SPIA, as discussed in section 2.1: Salvajor, Gasket Engineering, Livers Bronze and Trinity Biotech. These four companies accounted for 78% of estimated total investment in the 2007 data. Consequently, it was clear that obtaining updated data from these four businesses would be an excellent basis for the economic update.

For the present update, we conducted new on-site interviews, including tours of the facilities, with these four businesses. These companies now account for 91% of total SPIA investment. The first-hand data obtained from these anchor companies provided a strong foundation for the overall economic update. For the other companies in the study area, comprising less than 10% of total investment, we adjusted the content values estimated for the 2008 update (2007 prices) to FY 14 prices using a Consumer Price Index-Urban (CPI-U) factor of 1.157. No changes in

activity levels at these businesses were noted that would warrant additional adjustments, with one exception: one recently occupied structure is now apparently vacant (bringing the total to two), and the contents value for that structure was reduced to 10% of structure value. (Contents are not necessarily zeroed out for vacant buildings unless there is reason to think they would no longer be marketable. Otherwise, the period of analysis is 50 years, so it is assumed that these structures might be occupied at some point within that time period even if they are currently vacant.)

In December 2015, the benefits were updated to a 1 October 2015 (FY 16) price level. Content values for businesses and public facilities were updated from FY 14 to FY 16 prices using the Consumer Price Index-Urban (CCI-U). The factor was 1.0184. HEC-FDA was then loaded with the updated structure inventory and executed to produce updated damages and benefits.

Uncertainty factors for contents were not included in the feasibility analysis for unknown reasons. They are added for this update. To estimate uncertainty for contents, the maximum and minimum content value were calculated for the interviewed companies based primarily on the ranges in values that were estimated by company representatives during the interviews. The maximum contents value calculated for these companies was about 26% above the most likely value, while the minimum value was about 19% below the most likely value. These results implied a relatively normal distribution, and a standard deviation was estimated by taking the total uncertainty range between the maximum and minimum and dividing by four. The resulting value was rounded to 10% for use in the analysis. For the other study area companies that were not interviewed, a slightly higher standard deviation of 15% was chosen due to the somewhat greater uncertainty inherent in the use of more generic data.

4.2.5 Depth-damage functions - Depth-damage functions used in the economic analysis are summarized in Table D-1. The functions have been carried over from the feasibility analysis with some changes. The functions, including maximum and minimum percentages used as uncertainty factors in the HEC-FDA analysis, were originally estimated from data obtained during onsite interviews. (The function for streets was an exception, originally developed based on professional judgment and anecdotal data for different scales of street repair and reconstruction.) Several functions include damages beginning at one foot below the first floor due to the basements in these structures. The other functions begin damages at zero feet relative to the first floor. These depth-damage functions were reevaluated in light of the 2013 interviews and were modified based on the updated information in some cases, particularly for Trinity Biotech.

4.2.6 Other economic costs – Time and schedule constraints prevented consideration of post-flood cleanup costs in the feasibility study. These were eventually added to the analysis in the 2008 economic update. Cleanup costs were estimated based on a combination of anecdotal information from area property owners and data obtained from previous reports completed by both the Kansas City District and other districts. These costs were calculated outside the HEC-FDA program and were included in the revised benefits calculated for the 2008 update. The annual benefits for this category totaled \$35,500. This total has been updated from FY 08 to FY 16 prices using a Consumer Price Index-Urban (CPI-U) factor of 1.1383.

TABLE D-1 DEPTH-DAMAGE FUNCTIONS										
Stage (in feet, relative to first floor)>>		-1	0	1	2	3	4	6	8	12
Waste management manufacturer - main bldg	Struc	0	1	5	6	7	8	12	16	25
	Inventory	0	10	25	45	65	80	90	100	100
	Equip	0	31	60	68	75	85	96	100	100
Waste management manufacturer - 2nd bldg	Struc	7	8	10	12	14	16	19	25	37
	Inventory	25	50	100	100	100	100	100	100	100
	Equip	25	39	78	98	99	99	100	100	100
Metal manufacturer - 1st bldg	Struc	0	1	5	6	7	8	12	16	25
	Inventory	10	20	50	100	100	100	100	100	100
	Equip	0	19	49	73	98	99	100	100	100
Metal manufacturer - 2nd bldg	Struc	0	1	5	6	7	8	12	16	25
	Inventory	25	50	100	100	100	100	100	100	100
	Equip	0	5	20	50	100	100	100	100	100
Gasket manufacturer - 1st bldg	Struc	0	1	5	6	7	8	12	16	25
	Inventory	0	1	10	25	50	75	100	100	100
	Equip	0	1	10	20	26	51	76	95	95
Gasket manufacturer - 2nd bldg	Struc	0	2	5	6	7	9	13	16	26
	Inventory	0	0	50	75	100	100	100	100	100
	Equip	0	0	31	52	65	73	82	86	92
Medical devices manufacturer	Struc	7	8	9	11	13	15	18	23	37
	Inventory	0	0	10	30	55	62	78	87	100
	Equip	0	0	15	30	40	48	65	100	100
Plastics manufacturer	Struc	0	1	5	6	7	8	12	16	25
	Inventory	0	0	20	30	40	50	60	85	85
	Equip	0	5	30	40	50	60	80	100	100
HVAC contractor	Struc	6	7	8	9	11	13	17	20	35
	Inventory	0	1	5	10	30	40	60	80	100
	Equip	0	2	9	18	71	83	96	100	100
Construction company storage	Struc	0	1	5	6	7	8	12	16	25
	Equip	0	5	20	45	100	100	100	100	100
Railroad storage	Struc	1	4	6	8	9	11	14	18	30
	Equip	15	25	100	100	100	100	100	100	100
Streets	Struc	0.3	0.6	2	4	6	8	15	23	43

4.2.7 Costs – An updated total project cost estimate was prepared for the economic update in FY 16 prices. This cost estimate is the basis for the benefit-cost ratio and the 902 maximum cost limit.

The estimate of OMRR&R (operations, maintenance, repair, replacement and rehabilitation) costs for the Swope Park levee was reevaluated in 2014 by District engineering staff, and a new estimate was prepared and used in this report. The new estimate considers regular annual responsibilities such as inspections, riprap spraying and replacement, vandalism repairs, mowing, reseeding, animal control, lubrication of flap gates, gate/fence repair, road maintenance, top of levee survey, patrolling during flood events, post-flood inspections and debris removal, and environmental mitigation. Also included are periodic tasks including dewatering manholes for inspection, caulking floodwall joints, replacing gatewell hydraulic structures, watering during drought, and tree replanting. This OMRR&R costs estimate has been updated from FY 14 to FY 16 prices using a CCI factor of 1.0453.

4.3 Modeling

4.3.1 Program utilized – Beginning with the feasibility-phase economic analysis, damages and benefits for the Swope Park project were computed using HEC-FDA version 1.2. Version 1.2 was widely used prior to the issuance of model certification and approval requirements in 2005. This update continues to use HEC-FDA, but in the latest certified version (1.4).

The HEC-FDA program inputs for economic data include study reaches, structure values, first-floor elevations, stream stationing, and depth-damage functions for both structures and contents. Engineering data inputs include water surface profiles for eight events that integrate stage-frequency-discharge relationships for stream cross-sections throughout the study area, including the index point in each reach. All major variables, both economic and H&H, are input as most likely or median values framed by specified uncertainty parameters for each variable. The uncertainty factors are expressed as either normal or triangular distributions. Economic and H&H data are prepared and entered for both without-project conditions and alternative plans. Once the model is loaded with risk-based data, the program analyzes the data probabilistically utilizing a Monte Carlo-based process. The Monte Carlo analysis samples the variables within the specified uncertainty ranges to simulate thousands of possible flood events. The first step in the program is computation of economic outputs with uncertainty – i.e., the stage-damage relationship. The program then integrates the stage-damage functions for each reach and category with H&H data and produces outputs for expected annual damages, damages reduced, and project performance. These outputs are expressed as expected values accompanied by a range of uncertainty.

4.3.2 Model update: Reference years – The first step in updating the HEC-FDA model is study configuration. The reference year used in the analysis for existing conditions is 2015. Even though the field survey and interviews were carried out in 2013 and 2014, the economic information collected at that time encompassed known development over the next year or two (though there are no major developments pending). Moreover, the water surface profiles and other H&H data used are also referenced to 2015, so it seems that the “cleanest” way to handle the modeling is to simply designate 2015 as the reference year for the existing condition analysis.

The base year for the analysis is 2021, the year that the project would be expected to become operational, and the model is structured to also include a future condition of 2046. However, the hydrology and hydraulics data, the economic development assumptions and all other assumptions are identical for all three conditions: existing (2015), base year (2021) and future (2046) conditions. The differences are only nominal. There is no sufficiently firm information on future economic developments in the Swope Park area beyond the next one or two years to support modifying the structure inventory for base year and/or future conditions. Section 4.3.3 includes more discussion of the hydrology and hydraulics modeling as it pertains to these reference years.

4.3.3 Model update: Hydrology/Hydraulics -- The 2002 feasibility analysis used a base year of 1999 and a future condition indexed to 2015 conditions. The distinction between the base year and future conditions in that analysis was in the water surface profiles, which were expected to increase due to continued urbanization and other changes in the Blue River basin. This assumed growth in river stages assumed in the 2002 study is summarized in Table D-2.

TABLE D-2 COMPARISON OF 1999 & 2015 BLUE RIVER WATER SURFACE PROFILES					
Exceedance Probability	1999 Profiles		2015 Profiles		Change in Elevation
	Discharge (cfs)	Elevation	Discharge (cfs)	Elevation	
0.5	10,637	773.58	12,033	775.47	1.89
0.2	20,196	781.27	22,129	782.21	0.94
0.1	27,937	784.43	30,093	785.17	0.74
0.04	39,322	787.86	41,739	788.42	0.56
0.02	49,079	789.96	51,446	790.40	0.44
0.01	59,941	791.84	61,997	792.19	0.35
0.004	76,858	794.37	78,283	794.61	0.24
0.002	85,000	795.00	87,000	795.40	0.40
<i>Elevations are relative to Blue River mile 18.61, the economic index point.</i>					

The same set of water surface profiles used in the 2002 study is basically carried over for the present update, with the exception that we have discarded the 1999 profiles and moved the 2015 profiles from the future condition to the existing condition. The 2015 profiles also are used, without change, to represent the base year condition of 2021, and they continue to be used for the future condition (2046) as in 2002. No additional growth in Blue River stages is assumed from 2015 to 2021 or from 2021 to 2046.

One modeling assumption used in the present analysis might be questioned based on the discussion thus far. The 2015 profiles used for the future condition analysis in the 2002 study

were admittedly projections rather than a representation of actual conditions at that time. These 2002 projections of 2015 conditions are now taken and used, without change, to represent actual conditions in 2015. Thus, continuity is assumed between previous projections and present reality. The appropriateness or validity of this assumption was in fact verified for this analysis, but some further background and explanation is required. The District originally produced Blue River hydrology for the Swope Park project based on a SWMM (Storm Water Management Model) analysis done in 1990. Two sets of hydrology, estimating future flows, emerged from the SWMM analysis: one for 1999 conditions and one for 2015. Both sets were prepared using a land use report from the Johnson County, Kansas Planning Commission that assumed maximum urbanization in the upper Blue River basin.

The water surface profiles used in the 2002 feasibility report were based on these data sets, and the same water surface profiles have subsequently been used in design of the Swope Park project and in the economic analysis for the present PACR. In 2014, District hydrologic and hydraulic engineering staff prepared an updated assessment of these profiles using an updated HEC-HMS model and the most up-to-date hydrologic information available from the Atlas 14 data. They found that the updated estimated Blue River flows they calculated, based on actual present-day conditions, essentially matched the projected 2015 condition flows from the 1990 SWMM model within reason. The conclusion of the updated assessment, therefore, was that the 2015 flows and stages used throughout the development of this project provide a reasonable representation of present-day conditions that can, with validity, be carried over to the present analysis. (See Appendix G to this report.)

In addition, the engineering staff believe that the basin is now essentially “built out,” and little if any additional urbanization that could increase profiles is to be expected in the future. Thus, the updated H&H assessment also confirmed that the profiles used in this PACR update, indexed originally to 2015 for the feasibility report and verified in 2014, can be used appropriately to represent all three conditions -- existing (2015), base year (2021) and future (2046).

Water surface profiles included in the model, for both without- and with-project conditions, are for the 0.5, 0.2, 0.1, 0.04, 0.02, 0.01, 0.004, and 0.002 ACE events. Exceedance frequency functions with uncertainty for each plan (i.e., the without condition and the authorized plan) are based on the graphical method, assuming a 30-year equivalent period of record for the Blue River basin. The exceedance frequency functions were modified to include the estimated discharge and stage for the 0.9999 event, as the extension of the exceedance frequency and stage-discharge functions with uncertainty to the 0.9999 event is a standard operating procedure for effective use of HEC-FDA. Stage-discharge functions are formed from the profiles and include uncertainty based on a standard deviation varying from 1.2 feet in the smallest, most frequent events to 2 feet in the largest events. Finally, a levee is included in the model for the authorized plan, with a top of levee elevation equivalent to 1.5 feet above the 0.002 event elevation, which was the NED plan selected in the 2002 feasibility study and authorized in WRDA 2007. All of the modeling described in this paragraph was done for the feasibility study and has been carried over unchanged for the current update.

4.3.4 Model update: Economic data -- Economic analyses for the Swope Park project have from the beginning been based on a single economic reach, given the small size of the study area

(only about 50 acres). This update continues to be based on a single reach. In addition, it should be noted that this update does not revisit the screening analysis documented in the 2002 feasibility report. A re-screening would be beyond the scope of a Level 2 economic update. Only the authorized plan is included in the current HEC-FDA analysis.

For the economic structure inventory, uncertainty for first floor elevations was estimated as 0.3 feet based on Table 6-5 of EM 1110-2-1619 (the value is for analyses based on aerial surveys with 2-foot contour intervals). Uncertainty factors for other economic variables are discussed above in section 4.2.

An updated economic structure inventory, reflecting FY 16 structure and content values for the SPIA businesses and infrastructure, was imported into the HEC-FDA model. Economic occupancies also were modified slightly to include uncertainty factors for content values, as discussed above in section 4.2.5. The resulting revised HEC-FDA model was then executed to obtain expected annual damages, benefits, residual damages and project performance. These results are discussed in the next section.

5.0 RESULTS OF ECONOMIC UPDATE

5.1 Population at Risk

The Swope Park project area has no residential population, although there are adjacent neighborhoods. However, total population is not the same as population at risk (PAR). PAR includes not only residents but also workers, customers and others temporarily in the study area floodplain. Workers can be accounted for, and there are approximately 400 workers employed in the SPIA based on information obtained from the companies. But transient PAR (customers and others passing through the area as drivers or passengers) is nearly impossible to estimate closely for this location. Traffic counts for city streets are unavailable for any nearby intersections. Counts are available for U.S. 71, and the average daily counts range from 70,000 to 77,000 in this general area. But there are no indications in the data as to how many of these vehicles might be exiting at 75th Street and then going east to the SPIA. We believe PAR probably amounts to a few thousand for the SPIA and have estimated 4,000 for previous budget submissions, but more specific data that might reduce the uncertainty in the estimate are not currently available.

5.2 Investment

Increased business activity at the key companies in the SPIA since the previous reports has driven up the investment total. Total investment in the study area is estimated at \$63,391,000 in FY 16 prices, as summarized in Table D-3. Approximately 99.2% of this total is industrial, while streets account for the remaining 0.8%. Of the \$62,913,000 in industrial investment, approximately 25% of the value is structure value and 75% contents value. The structure inventory remains essentially constant, with 11 structures housing eight businesses. Two of the structures are currently vacant.

TABLE D-3 SWOPE PARK INVESTMENT			
\$000s			
	2002 Feas. Report	2008 Econ Update	2016 PACR
Price level	FY 2000 \$\$	FY 2008 \$\$	FY 2016 \$\$
INDUSTRIAL			
Quantity			
# structures	11	11	11
# businesses	10	10	8
Value			
Structures	\$7,648.0	\$12,643.2	\$15,949.0
Contents	\$31,384.0	\$26,542.3	\$46,964.0
Total Value	\$39,032.0	\$39,185.5	\$62,913.0
PUBLIC			
Quantity (miles)	0.6	0.6	0.6
Value	\$293.0	\$378.7	\$478.0
TOTAL VALUE			
Structures	\$7,941.0	\$13,021.9	\$16,427.0
Contents	\$31,384.0	\$26,542.3	\$46,964.0
Total Value	\$39,325.0	\$39,564.2	\$63,391.0

The FY 16 total investment represents approximately a 60% nominal increase over the estimate of \$39,564,000 in the 2008 economic update (2008 dollars) and a 61% increase over the total of \$39,325,000 in the 2002 feasibility report. Available price indices would suggest an increase of 34% (CPI-U) to 58% (CCI) for the FY 02 to FY 16 time period and 14% to 26% for the FY 08 to FY 16 period, indicating that a relatively small portion of the increase since the feasibility report is a real increase (as little as 5% if the CCI factor is preferred, as it probably should be), while the real increase since the 2008 economic update is more substantial (36% to 45%).

5.3 Without-Project Damages

Table D-4 summarizes the results from the HEC-FDA model for the without-project condition. Future without-project expected annual damages (EAD) total \$3,188,600 in FY 16 prices. This total represents an increase of 62% over the comparable total from the 2008 economic update and 111% over the 2002 feasibility study. As was the case for investment, price level increases would account for an increase of 34% (CPI) to 58% (CCI) for the FY 02-FY 16 period and 14% to 26% for the FY 08-FY 16 period. If the CCI-derived increases of 58% and 26% are preferred, the real increase in EAD for the FY 02-FY 16 period is about 4%, while for the FY 08-FY 16 period, the real increase would be an estimated 85%.

TABLE D-4 SWOPE PARK ANNUAL DAMAGES, 2002 vs. 2008 vs. 2015			
\$000s			
	2002 Feas. Report	2008 Econ Update	2016 PACR
Price level	FY 2002 \$\$	FY 2008 \$\$	FY 2016 \$\$
Residential	\$0.0	\$0.0	\$0.0
Commercial/Public	\$1,506.0	\$1,958.0	\$3,175.7
Streets & Roads	\$7.0	\$8.9	\$12.9
TOTAL	\$1,513.0	\$1,966.9	\$3,188.6

A perhaps surprising result is the large difference in the 2008-2016 increase compared to the 2002-2016 increase. The increase in investment for these periods (60% since 2008 and 61% since 2002) was nearly the same, yet the comparable increases in future without-project EAD (4% and 85%) are quite distinct. Part of the explanation seems to be that structure value as a percentage of overall industrial investment was significantly higher in 2008 than it was for either 2002 or 2016. Structures tend to be much less damageable than contents. Most of the increase in EAD since 2008 is due to the increase in equipment and inventory investment values. An additional factor is the gradual change to more up-to-date versions of the HEC-FDA damage program. As a comparison between the three FDA versions used up till now, using the identical December 2015 structure inventory for the without-project condition in all three versions, the without-project EAD would total \$3,079,000 in version 1.2 (as used in the 2002 feasibility study), \$3,090,000 in version 1.2.5, and \$3,189,000 in the current version 1.4.

The HEC-FDA model also produces estimates of single event damages. A 1% flood event would be expected to result in damages of \$48.7 million in FY 16 dollars. A 0.2% event would be expected to result in damages of \$58.7 million. These single event totals are not annualized.

5.4 Costs

5.4.1 Total costs - At the FY 16 (1 October 2015) price level, the total project cost for the Swope Park project is currently estimated at \$31,085,000. Table D-5 shows a breakdown of the total project cost by accounts. The fully funded cost is estimated at \$32,264,000.

Table D-5 also shows the current total project cost estimate in comparison to the original estimates for the project in the feasibility report and the 2008 update. The total project cost estimate has increased 120% since the 2002 feasibility report and 67% over the 2008 update. In comparison, the levees and floodwalls account of the Civil Works Construction Cost Index System (CWCCIS) maintained by the Corps indicates an increase of 59% for FY 02 to FY 15 and 19% for FY 08 to FY 15. These figures indicate that, after considering price level effects, there are still substantial real increases in costs of approximately 61% from the 2002 feasibility report to the present and 48% from the 2008 update to the present. Factors that have resulted in the cost increases are discussed elsewhere in this report (see the Executive Summary in particular).

TABLE D-5 TOTAL PROJECT COSTS AND GROWTH					
5000s					
	2002 Feas. Report	NRDA 2007	2008 Econ Update	2015 PACR	2002- 2015 Increase
Price level	FY 2002 \$\$	FY 2007 \$\$	FY 2008 \$\$	FY 2016 \$\$	
Planning, Engineering & Design (PED)	\$1,000.0	\$1,108.0	\$1,400.0	\$4,172.0	317%
Land & Damages	\$459.0	\$459.0	\$647.6	\$2,453.0	434%
Construction Management (S&A)	\$390.0	\$388.0	n.a.	\$1,322.0	238%
Construction					
Relocations	\$158.0	\$608.0	n.a.	\$756.0	448%
Bank Substitution	\$0.0	\$3,617.0	n.a.	\$3,346.0	na
Levees & Floodwalls	\$12,197.0	\$10,800.0	\$16,619.4	\$19,036.0	56%
TOTAL PROJECT COST	\$14,144.0	\$16,980.0	\$18,667.0	\$31,085.0	120%
Fully-Funded Cost	n.a.	n.a.	n.a.	\$32,264.0	

5.4.2 Annual costs - Table D-6 summarizes the annual cost calculations. (All annual cost and benefit calculations for this report assume a 50-year period of analysis.) At the current FY 16 Federal interest rate of 3.125%, the annual costs are \$1,358,400.

Interest during construction (IDC), shown in Table D-7, is estimated at \$1,002,000. IDC assumes a project completion date of 2021.

Total annual OMRR&R costs are estimated at \$81,600.

TABLE D-6 ANNUAL COST CALCULATIONS			
FY 16 prices; \$000s			
	2002 Feas. Report	2008 Econ Update	2016 PACR
Price Level	FY 2002	FY 2008	FY 2016
Interest Rate	6.125%	4.875%	3.125%
First Costs	\$14,144.0	\$18,667.0	\$31,085.0
IDC	<u>\$760.0</u>	<u>\$1,051.0</u>	<u>\$1,002.0</u>
Total Investment Cost	\$14,904.0	\$19,718.0	\$32,087.0
I&A factor (50 years)	<u>0.06455</u>	<u>0.05372</u>	<u>0.03979</u>
Annual Cost subtotal	\$962.1	\$1,059.3	\$1,276.8
Annual OMRR&R Cost	<u>\$20.0</u>	<u>\$26.3</u>	<u>\$81.6</u>
Total Annual Cost	\$982.1	\$1,085.6	\$1,358.4

TABLE D-7 INTEREST DURING CONSTRUCTION CALCULATIONS 3.125% INTEREST RATE					
<i>FY 16 prices; \$000s</i>					
Year	Total expenditure for year	n-factor	Interest factor	Interest charge	Total payment
2015	\$0.0	0	0.0000	\$0.0	\$0.0
2016	\$70.0	4.5	0.1485	\$10.4	\$80.4
2017	\$3,099.0	3.5	0.1137	\$352.4	\$3,451.4
2018	\$703.7	2.5	0.0800	\$56.3	\$760.0
2019	\$9,663.0	1.5	0.0472	\$456.5	\$10,119.5
2020	\$8,156.0	0.5	0.0155	\$126.5	\$8,282.5
2021	\$3,899.2	0	0.0000	\$0.0	\$3,899.2
2022	\$0.0	0	0.0000	\$0.0	\$0.0
Total	\$25,590.9			\$1,002.0	\$26,592.9

5.4.3 Remaining costs – Through FY 16, sunk costs for the Swope Park project total \$5,494,100. The sunk costs make up about 18% of the total project cost estimate of \$31,085,000. Remaining costs total \$25,590,900.

Annual remaining costs are summarized in Table D-8. Based on the total remaining costs of \$25,590,900, annual remaining costs at 3.125% are estimated at \$1,139,800. There are no sunk OMRR&R costs since the levee/floodwall project is far from complete and is not yet providing any benefits.

TABLE D-8 REMAINING ANNUAL COST CALCULATIONS	
<i>FY 16 prices; 3.125% interest rate; \$000s</i>	
Total First Costs	\$31,085.0
Sunk Costs	\$5,494.1
Remaining Costs	\$25,590.9
IDC	\$1,002.0
Total Investment Costs	\$26,592.9
IRA Factor (50 years)	0.039793
Annual Costs	\$1,058.2
Annual OMRR&R Costs	\$81.6
Total Remaining Annual Costs	\$1,139.8

5.5 Annual Benefits

The updated FY 16 benefits for the Swope Park project, reflecting a 1 October 2015 price level, total \$3,018,100, as shown in Table D-9. The benefits are not interest-rate sensitive. Table D-9 also summarizes benefits by category. Approximately 98.3% of the benefits total is accounted for by the industrial category, while 1.3% result from cleanup costs avoided and 0.4% are associated with streets. The FY 16 benefits total represents a nominal increase in benefits (not adjusted for price level growth) of 58% from the 2008 update total of \$1,905,400 and 117% from the feasibility study total of \$1,388,000.

Probabilistic estimates of the FY 16 benefits are also shown. (They do not include clean-up costs.) For example, the mean benefits for the project are \$2,977,700, but there is a 75% chance that benefits are at least \$1,263,500, a 50% chance that benefits are at least \$2,531,200, and a 25% chance that benefits are at least \$4,275,600.

Residual damages – i.e., those damages that would still occur after project implementation – are relatively small for this levee/floodwall project with a top of levee elevation 1.5 feet above the nominal 0.002 event flood elevation. Annual residual damages total \$211,000, which is approximately 7% of future without-project EAD.

TABLE D-9 ANNUAL BENEFITS		
FY 16 prices: \$000s		
BENEFITS	Total	
Future without-project EAD	\$3,188.7	
Residual with-project EAD	\$211.0	
Damage reduction EAD	\$2,977.7	
Annual cleanup costs reduction	\$40.4	
Total benefits	\$3,018.1	
BENEFITS BY CATEGORY		
Commercial/Industrial	\$2,965.8	98.3%
Streets	\$11.9	0.4%
Cleanup	\$40.4	1.3%
Total	\$3,018.1	100.0%
PROBABILISTIC BENEFITS *	Total	
75% probability that benefits exceed	\$1,263.5	
50% probability that benefits exceed	\$2,531.2	
25% probability that benefits exceed	\$4,275.6	
Mean benefits	\$2,977.7	
* The probabilistic estimates do not include cleanup costs.		

5.6 Benefits and Costs

Table D-10 summarizes the benefit-cost calculations for the Swope Park project and how they have changed since the 2002 and 2008 reports. At the current FY 16 interest rate of 3.125%, the total project benefit-to-cost ratio is 2.2. Annual benefits are \$3,018,100 and annual costs are \$1,358,400, resulting in net benefits of \$1,659,700.

The remaining benefit-remaining cost ratio, also shown in Table 8, is 2.6 at 3.125%.

TABLE D-10 BENEFIT-COST DATA			
<i>FY 16 prices; \$000s</i>			
	2002 Feas. Report	2008 Econ Update	2016 PACR
Interest Rate	6.125%	4.875%	3.125%
Annual Benefits	\$1,395.0	\$1,905.0	\$3,018.0
Annual Costs	\$982.0	\$1,086.0	\$1,358.0
Benefit-Cost Ratio	1.4	1.8	2.2
Net Benefits	\$413.0	\$819.0	\$1,660.0
Remaining Benefits	n.a.	n.a.	\$3,018.0
Remaining Costs	n.a.	n.a.	\$1,140.0
Remaining Benefit-Cost Ratio	n.a.	n.a.	2.6
Remaining Net Benefits	n.a.	n.a.	\$1,878.0

5.7 Project Performance (Assurance)

While estimating project performance is somewhat beyond the scope of an economic update, it is an output of the HEC-FDA model, and Table 9 summarizes the assurance statistics generated by the model. The table shows, as an example, that while there is only a 0.55% chance that the area would escape damage in a 0.01 event without the project, there is a 88.7 chance that an event of that magnitude would be contained by the project. For a 0.002 event, there would be only a 0.05% chance of containing the flood without the project, but the chances would rise to 64.2% with the project. The expected annual exceedance probability (the chance of a damaging flood, of any magnitude, occurring in any year) would be reduced from 0.1863 (18.6%) without the project to 0.0035 (0.3%) with the project in place.

It should be emphasized that the actual performance of the project has not changed since the feasibility report. That is to say, neither the engineering data nor the project's configuration has changed, so nothing has occurred that would affect the project's expected assurance in any way. The 2016 update figures differ slightly from those published in the feasibility report of 2002; for example, the estimated nonexceedance probability for a 0.01 event was 90.2% in 2002 rather

than the current estimate of 88.7%. But any differences in the 2016 update assurance figures relative to those shown in the feasibility report are very slight and are attributable to the use of newer versions of the HEC-FDA damage program. (Measurement of certain performance standards in FDA has evolved over time to obtain what are considered more accurate results relative to older versions of FDA.)

TABLE D-11 PROJECT PERFORMANCE (ASSURANCE) - HEC-FDA ESTIMATES		
	WITHOUT PROJECT	WITH PROJECT
ANNUAL EXCEEDANCE PROBABILITY*		
Median	0.1875	0.0013
Expected	0.1863	0.0035
LONG-TERM RISK (chance of flooding during period)		
over 10 years	0.8728	0.0346
over 30 years	0.9979	0.1002
over 50 years	1.0000	0.1614
PERFORMANCE VS. 1% FLOOD		
Conditional nonexceedance probability	0.0055	0.8866
Conditional exceedance probability	0.9945	0.1134
OTHER FLOOD EVENTS - NON-EXCEEDANCE PROBABILITY		
0.1	0.1654	0.9998
0.04	0.0395	0.9855
0.02	0.0135	0.9449
0.004	0.0019	0.7875
0.002	0.0005	0.6424
* Annual exceedance probability is the chance of a damaging flood in any year. The statistic implies nothing about the magnitude of the flood except that it would be large enough to exceed the system's capacity.		

5.8 902 Maximum Cost Analysis

The current 902 maximum cost limit is based on the current authorized project and a price level of 1 October 2015. The maximum cost limit for the Swope Park project is now estimated at \$25,267,000. The 902 calculations are displayed in Attachment 1. These calculations are in accordance with ER 1105-2-100 and were completed using the official, certified 902 analysis spreadsheet.

6.0 CONCLUSION

This 2016 update of the economic analysis and justification for the Swope Park project has investigated current conditions in the basin, prepared updated economic data, and computed revised damages and benefits. There have been significant increases in the total project cost estimate over several years, and recent economic updates have found that the benefit-cost ratio was near unity. A closer look at the key companies in the SPIA has found that investment and benefits are higher than previously thought due to increased business activity at several companies. We now conclude that the project continues to be safely economically justified. Total project costs are estimated at \$31,085,000 in FY 16 dollars. Updated annual benefits total \$3,018,000, while annual costs are estimated at \$1,358,000 at the current Federal interest rate of 3.125%. The benefit-cost ratio at 3.125% is 2.2, with net benefits of \$1,660,000. The project also has a strong remaining benefit-remaining cost ratio of 2.6 at 3.125%.

Total Project Costs (1 Oct 2015 \$\$)	\$31,085,000
Fully Funded Costs	\$32,264,000
Benefit-Cost Ratio @ 3.125%	2.2
Annual Benefits	\$ 3,018,000
Annual Costs	\$ 1,358,000
Net Benefits	\$ 1,660,000
Remaining Benefit-Cost Ratio	2.6

**ATTACHMENT 1 -- 902 MAXIMUM COST LIMIT CALCULATIONS
(\$1,000s)**

Project Name:		Swope Park Industrial District - Kansas City MO			
Date Prepared:		12/18/2015			
Total Authorized Cost:		\$16,980			
Authorized Cost for Construction		\$16,528			
Authorized Cost for Real Estate		\$452			
Date of Authorized Price Level:		10/1/2006			
First Year of Expenditure:		10/1/2000			
Current Cost Estimate		\$31,085			
Current Cost for Construction		\$28,632			
Current Cost for Real Estate		\$2,453			
Current Fully Funded Cost Estimate		\$32,264			
Date of Current Price Level:		10/1/2015			
Costs of modifications specified by Law		\$200			
Project Purpose:		11 - LEVEES & FLOODWALL			
Date of EM 1110-2-1304 Used		9/30/2015			
Type of CWCCIS Used		CWCCIS, Levees and floodwalls account, quarterly (1Q)			
Date of Real Estate Index Used		10/1/2015			
Type of Real Estate Index Used		CPI-U Rent of primary residence, U.S. city avg., annual avg.			
INDEX INPUTS			EXPENDITURE INPUTS		
Fiscal Year	CWCCIS Index	Rent-Residential	Fiscal Year	Construction	Real Estate Expenditure
FY 07	669.920	228.000	FY 01	\$8.60	\$0.00
FY 08	697.520	237.135	FY 02	\$33.80	\$0.00
FY 09	721.640	245.855	FY 03	\$85.80	\$0.00
FY 10	726.980	248.888	FY 04	\$151.50	\$0.00
FY 11	753.700	249.618	FY 05	\$279.60	\$0.00
FY 12	785.640	255.651	FY 06	\$208.90	\$0.00
FY 13	798.030	262.707	FY 07	\$28.60	\$0.00
FY 14	814.930	269.960	FY 08	\$131.00	\$0.00
FY 15	829.760	278.985	FY 09	\$121.20	\$0.00
FY 16	833.070	289.428	FY 10	\$234.30	\$0.00
			FY 11	\$87.70	\$0.00
			FY 12	\$773.20	\$0.00
			FY 13	\$2,217.00	\$207.40
			FY 14	\$520.40	\$0.00
			FY 15	\$405.10	\$0.00

Table G-1 (ER 1105-2-100 Appendix G)									
CWCCIS Index(s)									
Item	(b)	(c)	Index (d)	Yearly Inflat Rate (e)	Cumul Inflat Rate (f)	Cumul rate to Begin FY (h)	One Half rate of Infl FY (i)	Tot Allow Inflat for FY (j)	
Date of Price Level		10/1/2006							
Authorized Estimate		16,528	669.920		1				
First Fiscal year		FY 07		0.0412		1	1.020599	1.0205995	
1st Qtr, 2nd yr	FY 08		697.520		1.0412				
Second Fiscal year		FY 08		0.03458		1.0412	1.01729	1.0592011	
1st Qtr, 3rd yr	FY 09		721.640		1.0772				
Third Fiscal year		FY 09		0.0074		1.0772	1.0037	1.0811888	
1st Qtr, 4th yr	FY 10		726.980		1.08517				
Fourth Fiscal year		FY 10		0.03675		1.08517	1.018377	1.105117	
1st Qtr, 5th yr	FY 11		753.700		1.12506				
Fifth Fiscal year		FY 11		0.04238		1.12506	1.021189	1.1488984	
1st Qtr, 6th yr	FY 12		785.640		1.17274				
Sixth Fiscal year		FY 12		0.01577		1.17274	1.007885	1.1819844	
1st Qtr, 7th yr	FY 13		798.030		1.19123				
Seventh Fiscal year		FY 13		0.02118		1.19123	1.010589	1.2038452	
1st Qtr, 8th yr	FY 14		814.930		1.21646				
Eighth Fiscal year		FY 14		0.0182		1.21646	1.009099	1.2275272	
1st Qtr, 9th yr	FY 15		829.760		1.2386				
Ninth Fiscal year		FY 15		0.00399		1.2386	1.001995	1.2410661	
1st Qtr, 10th yr	FY 16		833.070		1.24354				

Table G-2 (ER 1105-2-100 Appendix G)									
CPI Index(s)									
				Index	Yearly Inflat Rate	Cumul Inflat Rate	Cumul rate to Begin FY	One Half rate of Infl FY	Tot Allow Inflat for FY
Item		(b)	(c)	(d)	(e)	(f)	(h)	(i)	(j)
Date of Price Level			10/1/2006						
Authorized Estimate			452	228.000		1			
First Fiscal year			FY 07		0.04007		1	1.02003	1.02003
1st Qtr, 2nd yr		FY 08		237.135		1.04007			
Second Fiscal year			FY 08		0.03677		1.04007	1.01839	1.05919
1st Qtr, 3rd yr		FY 09		245.855		1.07831			
Third Fiscal year			FY 09		0.01234		1.07831	1.00617	1.08496
1st Qtr, 4th yr		FY 10		248.888		1.09161			
Fourth Fiscal year			FY 10		0.00293		1.09161	1.00147	1.09321
1st Qtr, 5th yr		FY 11		249.618		1.09482			
Fifth Fiscal year			FY 11		0.02417		1.09482	1.01208	1.10805
1st Qtr, 6th yr		FY 12		255.651		1.12128			
Sixth Fiscal year			FY 12		0.0276		1.12128	1.0138	1.13675
1st Qtr, 7th yr		FY 13		262.707		1.15222			
Seventh Fiscal year			FY 13		0.02761		1.15222	1.0138	1.16813
1st Qtr, 8th yr		FY 14		269.960		1.18404			
Eighth Fiscal year			FY 14		0.03343		1.18404	1.01672	1.20383
1st Qtr, 9th yr		FY 15		278.985		1.22362			
Nineth Fiscal year			FY 15		0.03743		1.22362	1.01872	1.24652
1st Qtr, 10th yr		FY 16		289.428 ²⁸		1.26942			

Table G-3 (ER 1105-2-100 Appendix G)									
Authorized Cost Increase Computation									
FY	Current Project Cost			Current Sched (%)		Authorized Cost Sched		Auth Cost Inflat	
	Total	Constr	R.E.	Constr	R.E.	Constr	R.E.	Constr	R.E.
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
FY 01	\$8.60	\$8.60	\$0	0.030	0.00	\$4.96	\$0.00	\$4.96	\$0.00
FY 02	\$33.80	\$33.80	\$0	0.118	0.00	\$19.51	\$0.00	\$19.51	\$0.00
FY 03	\$85.80	\$85.80	\$0	0.300	0.00	\$49.53	\$0.00	\$49.53	\$0.00
FY 04	\$151.50	\$151.50	\$0	0.529	0.00	\$87.45	\$0.00	\$87.45	\$0.00
FY 05	\$279.60	\$279.60	\$0	0.977	0.00	\$161.40	\$0.00	\$161.40	\$0.00
FY 06	\$208.90	\$208.90	\$0	0.730	0.00	\$120.59	\$0.00	\$120.59	\$0.00
FY 07	\$28.60	\$28.60	\$0	0.100	0.00	\$16.51	\$0.00	\$16.85	\$0.00
FY 08	\$131.00	\$131.00	\$0	0.458	0.00	\$75.62	\$0.00	\$80.10	\$0.00
FY 09	\$121.20	\$121.20	\$0	0.423	0.00	\$69.96	\$0.00	\$75.64	\$0.00
FY 10	\$234.30	\$234.30	\$0	0.818	0.00	\$135.25	\$0.00	\$149.47	\$0.00
FY 11	\$87.70	\$87.70	\$0	0.306	0.00	\$50.63	\$0.00	\$58.16	\$0.00
FY 12	\$773	\$773	\$0	2.700	0.00	\$446	\$0	\$527.56	\$0.00
FY 13	\$2,424	\$2,217	\$207	7.743	8.45	\$1,280	\$38	\$1,540.65	\$44.64
FY 14	\$520	\$520	\$0	1.818	0.00	\$300	\$0	\$368.75	\$0.00
FY 15	\$405	\$405	\$0	1.415	0.00	\$234	\$0	\$290.22	\$0.00
Balance to complete	\$25,591	\$23,345	\$2,246	81.536	91.55	\$13,476	\$414	\$16,758	\$525
Total	\$31,085	\$28,632	\$2,453	100.00	100.00	\$16,528	\$452	\$20,309	\$570

Table G-4 (ER 1105-2-100 Appendix G)		
MAXIMUM COST INCLUDING INFLATION THROUGH CONSTRUCTION		
FY 15 - Thousands Dollars (000's)		
Line 1		
a.	Current Project estimate at current price levels:	\$31,085
b.	Current project estimate, inflated through construction:	\$32,264
c.	Ratio: Line 1b / line 1a	1.0379
d.	Authorized cost at current price levels:	\$20,879
	(Column (h) plus (i) from table G-3)	
e.	Authorized cost, inflated through construction:	\$21,671
	(Line c x Line d)	
Line 2 Cost of modifications required by law:		
		\$200
Line 3 20 percent of authorized cost:		
	.20 x (table G-3, columns (f) + (g))	\$3,396
Line 4 Maximum cost limited by section 902:		
	Line 1e + line 2 + line 3	\$25,267

Appendix E
Cost MCX ATR Certification

**WALLA WALLA COST ENGINEERING
MANDATORY CENTER OF EXPERTISE**

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 156415

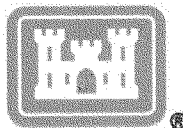
**NWK– Swope Park Industrial Area Flood Damage Reduction
Post Authorization Change Request**

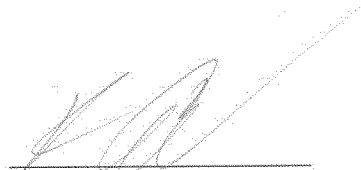
The Swope Park Industrial Area Flood Damage Reduction Project Post Authorization Change Request, as presented by Kansas City District, reflects a cost update from the 2014 Cost Certification. The 2014 Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

Certification Date: 26 January 2015:

FY16 Remaining Cost:	\$25,946,000 (Cost ATR Certified)
FY14 Spent Cost:	\$ 5,139,000 (Provided by NWK)
FY16 Project First Cost:	\$31,085,000
FY16 Fully Funded Costs:	\$32,264,000 (includes Spent Costs)

Note: Cost ATR was devoted to remaining work. It did not review spent costs, which requires an audit process. It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.



For 
Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District

Appendix F
Environmental Considerations

U.S. Army Corps of Engineers - Kansas City District



U.S. Army Corps of Engineers - Kansas City District

**Updated Environmental Assessment,
Finding of No Significant Impact,
&
Clean Water Act Section 404 (b)(1) Evaluation**

**Swope Park Industrial Area Flood Risk
Management Project
Kansas City, Jackson County, Missouri**

April 2014

U.S. Army Corps of Engineers - Kansas City District



DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
600 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106-2896

Finding of No Significant Impact

Swope Park Industrial Area Flood Risk Management Project Kansas City, Jackson County, Missouri

April 2014

Summary

The Swope Park Industrial Area (SPIA) covers approximately 53 acres, includes 10 commercial-industrial buildings with 9 business occupants, and is located near 75th Street Terrace and Manchester Trafficway, on the left descending bank of the Blue River, within the City of Kansas City, Jackson County, Missouri. The SPIA is located in the 100-year floodplain and the area has been subject to frequent flooding with resulting property damages, lost wages and potential loss of human life.

In 2002 the Kansas City District of the U.S. Army Corps of Engineers (Corps) prepared a Final Feasibility Report, Environmental Assessment, Section 404(b)(1) Evaluation and a Finding of No Significant Impact for the Swope Park Industrial Area Flood Damage Reduction and Related Measures Project. The following alternatives were considered:

"No Action" Alternative. This alternative would involve no construction of flood damage reduction measures on the Swope Park Industrial Area.

Alternative 1 - Structural Flood Protection. Concrete floodwall, approximately 5,249 feet in length, completely around the perimeter of the existing Swope Park Industrial Area, with access provided via the existing road. A rolling gate would be used to close 75th Street Terrace on the west end of the site during periods of high water. This alternative was not selected because of higher costs.

Alternative 2 - Structural Flood Protection. Concrete floodwall that follows the same alignment as Alternative 1, but includes a section of earthen levee that encloses and borders the interior drainage pond area at the east end of the site. The earthen levee would commence at the southern-most point of the interior drainage pond and extend around the east end of the pond and on west and northwest to join the floodwall. This alternative was not selected because of higher costs.

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Alternative 3 (Formerly Alternative 6 from original EA) - Relocation of the Swope Park Industrial Area. This alternative would involve the relocation of the existing businesses in the Swope Park Industrial Area to areas that are not subject to flooding. This alternative was not selected because of higher costs and lack of practicality.

Alternative 4 (Formerly Alternative 4D from original EA)- Structural Flood Protection (Recommended Plan): construction of a concrete floodwall and earthen levee around the perimeter of the existing Swope Park Industrial Area, which could accommodate a locally funded access road while also maintaining the existing 75th Street Terrace access to the area. The project features are designed to protect against a flood with a 0.2 annual percent chance of exceedence with an estimated 90 percent reliability. The City of Kansas City, Missouri is the project cost share sponsor.

Project construction was initiated on the interior drainage system in August of 2012 and completed in May of 2013. Subsequent to the completion of the Corps' 2002 study, during final project design, several minor design changes to the Selected Plan - Alternative 4 were identified. These included:

- 1) the Blue River channel would need to be shifted approximately 30 feet towards the right bank to ensure floodwall stability and additional rock riprap would need to be placed on the channel bottom and right descending bank in response to increased bank erosion and migration of the Blue River channel towards the left bank that has occurred within the project area since 2002.

- 2) the Project Sponsor indicated that accommodating a new locally funded access road connecting with Manchester Trafficway at the southwest corner of the area was no longer needed as they no longer intended to construct a road across the former landfill site. Based on this information the Corps proceeded with design and access to the area would be solely by the rolling gate at 75th Street. This change allowed the Corps to remove the two earthen levee segments that extended along either side of the unused landfill cell and replace them with a segment of earthen levee along the north side of the unused landfill cell tying into the section of the floodwall adjacent to the railroad tracks on the west side and to the floodwall at Manchester Trafficway on the east. Reducing the length of earthen levee resulted in decreased costs.

Currently the Project Sponsor has indicated that they intend to construct a new flyover bridge that would be built on and/or over the new earthen levee segment described above. The Project Sponsor proposes to construct the flyover bridge independent of the Corps action and using their funding. Construction of the flyover bridge by the Project Sponsor could negate the need for the rolling gate at 75th Street. The flyover bridge has been determined to have independent utility from the Corps project. Absent the Corps flood damage reduction measures it would still provide greatly improved access to the site by crossing up and over the railroad track and improve safety for employees/visitors to the industrial area.

The Corps has evaluated the impacts of the Project Sponsors proposed flyover bridge as a reasonable foreseeable action. The local sponsor intends to provide the Corps with a letter documenting their plan and budget to complete this item. Construction of this feature could allow the Corps to remove the rolling gate at 75th St. from the Corps' design and replace it with a continuous section of floodwall, which could be a cost savings for the Corps and would not increase environmental impacts. However, removal of the rolling gate at 75th St. from the design would make the Corps' project dependant on the Project Sponsor's flyover bridge and the Corps' project would no longer have independent utility. The rolling gate would remain part of the Corps' authorized project until the documentation arrives from the sponsor.

In addition, the Corps has conducted a new Section 404 of the Clean Water Act jurisdictional determination for the project area and has reassessed project compliance and mitigation requirements.

The 2014 Environmental Assessment and Section 404(b)(1) Evaluation has considered the proposed design changes to the Recommended Plan – Alternative 4D that have been identified since the 2002 study was completed.

Alternatives

“No-Action” Alternative: No additional flood damage reduction measures would be constructed on the Swope Park Industrial Area.

Alternatives 1-3: These were re-evaluated with the updated economic information and were found to still be too costly.

Alternative 4 with Minor Design Changes (Recommended Plan): The Corps would construct Alternative 4 as identified as the Selected Plan in the 2002 study with minor design changes to include: shifting the Blue River channel approximately 30 feet towards the right bank and placing additional rock riprap on the channel bottom and right descending bank, and; removing the two earthen levee segments that extended along either side of the unused landfill cell from proposed project design and replacing them with a segment of earthen levee along the north side of the unused landfill cell tying into the section of the floodwall adjacent to the railroad tracks on the west side and to the floodwall at Manchester Trafficway on the east. The rolling gate would be part of the Recommended Plan and evaluated for impacts. If necessary, it could be removed once the local sponsor provides the appropriate documentation concerning their flyover bridge project.

Alternatives Evaluation

The alternatives were evaluated as they relate to overall flood protection, maintenance, environmental, channel stability, and cost. Additionally, project alternatives were also evaluated with regards to potential cultural and economic impacts, which are discussed

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in the updated Environmental Assessment. Based on these evaluations, Alternative 4 with Minor Design Changes has been identified as the Recommended Plan.

Summary of Environmental Impacts

The Recommended Plan would require the clearing of approximately 6.4 acres of riparian timber and the filling of 0.3 acre of wetland. A 1,370 linear foot section of the Blue River channel would be shifted approximately 30 feet towards the right descending bank and armored with rock riprap. The project would result in adverse impacts to the adjacent floodplain, recreation, aesthetics, riparian and wetland resources. These above impacts are considered to be long term minor. Impacts to recreation and aesthetics would be greatest during the actual construction activity. The proposed project would result in minor long term benefits to public safety and economic stability for businesses, employees and customers who depend on the Swope Park Industrial Area.

Mitigation Measures

All practicable measures to avoid and or minimize adverse environmental impacts have been incorporated into the project design. The project would result in the clearing of 6.4 acres of riparian vegetation and filling of 0.3 acre of wetland adjacent to the Blue River. These impacts are considered unavoidable and therefore require appropriate mitigation. Using the Missouri Stream Mitigation Guidelines this equates to 454 debits. To mitigate these unavoidable impacts the project would likely utilize an approved mitigation bank, in accordance with Corps guidance. Best management practices would be utilized during construction to prevent any avoidable impacts to the aquatic ecosystem.

Public Availability

A description of the proposed project will be circulated to the public and resource agencies through a Public Notice, No. 2014-197, dated March 3, 2014, with a thirty-day comment period ending on April 2, 2014. This notice contained a project description, along with information on the Corps' preliminary determination to prepare a Finding of No Significant Impact for the project and a draft Section 404(b)(1) Evaluation. The notice was emailed to individuals, agencies, and businesses listed on the Kansas City District - Regulatory Branch's General mailing list and hard copies were mailed to individuals who attended the initial public meeting and the City of Kansas City, Missouri's mailing list. The Public Notice was also available for public/agency review and comment on the NWK-Regulatory Branch's webpage page at the following address: <http://www.nwk.usace.army.mil/Media/PublicNotices.aspx>. In addition, the Corps held an open house Public Information Meetings on the Swope Park Industrial Area Flood Damage Reduction and Related Measures Project in April 2013 at the Livers Bronze Company, 4621 East 75th Terrace, Kansas City, Missouri 64132 and on March 14, 2014 at the Kansas City, Missouri Water Services Office. This meeting provided an opportunity for interested stakeholders to receive additional information on the project

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and provide input for use in completion of the Final Environmental Assessment and Section 404(b)(1) Evaluation.

Conclusion

Alternative 4 - Structural Flood Protection: Construction of a concrete floodwall and earthen levee around the perimeter of the existing Swope Park Industrial Area accommodating a new locally funded access road connecting with Manchester Trafficway at the southwest corner of the area and maintaining the existing 75th Street Terrace access to the area was identified as the Selected Plan in the Corps' 2002 report. Minor design changes to the Selected Plan have been determined to have minor increases in unavoidable adverse impacts to wetlands and riparian timber. These minor design changes have been developed to ensure the project meets design objectives and performs to the expected design level. The Recommended Plan continues to represent the least environmentally damaging practicable alternative, ensures flood risk management benefits, avoids impacts to existing wetlands and riparian vegetation to the maximum extent practicable, has the least adverse impact on fish and wildlife, has the lowest cost, and results in no significant adverse impacts to the environment. The "No Action" alternative was not recommended because it fulfills none of the project objectives. The "No Action" Alternative would not address the reason for the requested assistance and would allow continued flood damage in the Swope Park Industrial Area.

After evaluating the anticipated environmental, economic, and social effects as described in the Environmental Assessment, I have determined that the Recommended Plan - Alternative 4 with Minor Design Changes for the Swope Park Industrial Area Flood Damage Reduction Project does not constitute a major Federal action that would significantly affect the quality of the human environment; and therefore, preparation of an Environmental Impact Statement is not required. In addition, I have determined that the Recommended Plan is in full compliance with the requirements of the Clean Water Act Section 404(b)(1) Guidelines.

Date: 20140416



FOR Andrew D. Sexton
Colonel, Corps of Engineers
District Commander

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1.0 Introduction

This updated Environmental Assessment (EA) was prepared in accordance with provisions of the National Environmental Policy Act (NEPA) of 1969, and following U.S. Army Corps of Engineers (USACE) NEPA policies and guidance. This updated EA addresses the potential impacts of the Kansas City District, USACE proposed flood protection project. The proposed project would incorporate protective measures to reduce the effects of flooding on the businesses located in the project site. An earlier EA (USACE 2002) was prepared that evaluated the environmental effects of the project and is hereby incorporated by reference. Figure 1 of Appendix I depicts the previous Recommended Plan. This updated EA was prepared because of changes during final engineering design after the 2002 EA was released and because of the time that has passed (approximately 11 years). The design changes include:

- The floodwall extended across the southern part of the Swope Park Industrial Area (SPIA), instead of merging with two levees on the Allied Landfill site (removing the levees at the landfill);
- Addition of a small bank stabilization area on the right bank of the Blue River.

This EA update examines two alternatives (the Recommended Plan and the No Action alternative). Under the No Action Alternative, no changes would be made to the existing flood protection. Implementation of the Recommended Plan would entail permanent changes to portions of the site where flood control and other related structures would be constructed. This EA examines the environmental effects (impacts) these structures may induce and the relative significance of these effects. Environmental effects discussed in the 2002 EA are reviewed herein along with potential environmental effects not covered by the 2002 EA resulting from design changes occurring after the 2002 EA was released. In general, the 2002 EA discussion is summarized in this EA along with an updated evaluation of environmental effects and recommended mitigation.

The SPIA is located on the Blue River in southeastern Kansas City, Jackson County, Missouri, east of the intersection of Cleveland Avenue and East 75th Street. The project location is illustrated on Figure 2 of Appendix I. Preceding industrial development, a stockyard was the primary land use, supported by a now abandoned rail spur along the southern edge of the developed portions of the SPIA. Development of the SPIA as an industrial park began in 1957 (predating national flood management programs), with most buildings completed by the early 1960s. The industries present occupants are generally small to medium scale manufacturers and suppliers, employing approximately 400 people. Several of the existing buildings are located in the 100-year floodplain and have been subjected to flooding at roughly ten-year intervals, with the most recent flood events causing extensive damage. (USACE, 2003).

Because of its location in the Blue River floodplain, the SPIA is unsafe during flood conditions, with resulting economic damage to structures and businesses as well as placing workers and visitors in jeopardy. Flooding has been a problem in the Blue River basin for as many as 48 years as development has increased on both sides of the state line, including both residential and industrial development, with the latter mainly along the Blue River. A major flood event in 1990 caused damage to the SPIA in excess of \$1,000,000 in 1990 dollars (USACE, 2003).

The proposed levees and floodwalls would protect the SPIA from a 500-year flood event or the 0.2 percent flood event. The project design (the Recommended Plan from the 2002 EA) includes approximately 3,530 feet of reinforced concrete floodwall and 2,360 feet of earthen levee. The interior storm water drainage improvements that have been completed will convey storm water flow to the proposed detention pond. The interior storm water drainage system is able to convey volumes equivalent to a 100-year flood event. Figure 3 illustrates the proposed project structures.

1.1 Purpose and Need for Action

The project purpose is to address flooding problems in the SPIA and vicinity, and to develop environmentally, socially, economic, and technically acceptable means of resolving these problems. A major purpose is to reduce the flooding risks and prevent damage to structures or loss of life in the SPIA. An earlier EA and Finding of No significant Impact (FONSI) was completed in October 2002 and is hereby incorporated into this report by reference (USACE 2002). This current EA provides an update to the 2002 EA. Actions previously covered in the 2002 EA that remain applicable are discussed briefly in context. A copy of the 2002 EA is available upon request.

The project need arises because the SPIA is located in the Blue River floodplain and is subject to periodic flooding. Most of the occupied buildings in the SPIA are located in the 100-year floodway, as designated by the Federal Emergency Management Agency (FEMA). Recurring floods have adversely affected the established businesses, employees, suppliers and customers in the SPIA. The economic benefits of maintaining the SPIA in its current or an improved configuration are important to the City of Kansas City (the City).

1.2 Project Location

The Swope Park Industrial Area (SPIA) is located on an approximately 53 acre site on the left descending bank of the Blue River between U.S. Highway 71 and Swope Park. It is south of Gregory Boulevard in the NW ¼ of Section 14, T48N R33W in the City of Kansas City, Jackson County, Missouri. The SPIA access is via East 75th Street, east of Cleveland Avenue. The SPIA is positioned between the Union Pacific Railroad (UPRR) tracks and the Blue River, as illustrated in Figure 1 of Appendix I Project Location Map.

The general geographic area covered by this EA is that portion of the project area and the immediate surrounding area that would be directly or indirectly affected by the Recommended Plan. This results in an area extending from the Blue River south of the SPIA and the unused landfill cell to the unnamed tributary north of the SPIA, and from the right bank of the Blue River along the eastern edge of the SPIA west across the UPRR tracks to Cleveland Avenue.

2.0 Recommended Plan and Alternatives

The alternatives considered in the 2002 EA are outlined below, along with the Recommended Plan. The alternatives were evaluated with the current design changes to examine environmental impacts and cost. The design updates that triggered this 2014 EA did not result in selection of a new alternative different from those considered in the 2002 EA. The Recommended Plan from 2002, with minor design changes, remains the Recommended Plan for this EA. This EA considers the additional environmental effects associated with the design changes. Updates to cumulative environmental impacts and other information from the period between the two EAs are also considered in this EA.

2.1 "No-Action" Alternative:

This non-action would allow current conditions to continue and the flood damage reduction project would not be executed. Existing problems with flooding would continue, as would the periodic physical damage to structures and loss of economic productivity.

Under the No Action alternative a number of detrimental social and economic effects would continue, including:

- Floods would periodically restrict access to the area;
- All businesses in the SPIA would continue to suffer structural deterioration and loss of market value due to flooding as well as effects on productivity and losses of equipment and inventory during floods;
- The employees who work in the study area would be subject to income losses;
- Businesses would continue to undertake flood avoidance measures in advance of threatened flooding, diverting personnel and adding expense. Clean-up operations in the wake of flooding could require substantial effort and expense, affecting productivity;
- Opportunities for expansion would be sharply limited for SPIA businesses.

2.2 Alternative 4 with Minor Design Changes (Recommended Plan):

The Recommended Plan (essentially *Alternative 4D-Structural Flood Protection* from the 2002 EA with various design changes occurring after 2002) would provide protection from the 500-year flood with 90 percent reliability through construction of floodwalls and levees around the SPIA. The flood damage reduction project also includes construction of a storm water detention pond within SPIA that is designed for up to a 100-year flood event. Access to the SPIA would be via a rolling gate on 75th Terrace. The recommended plan would cost approximately \$28,000,000 with a 1.4 benefit-cost ratio at 7%.

The total length of the flood damage reduction system per the current design is approximately 5,890 feet, of which approximately 2,360 linear feet (40 percent) is composed of compacted earthen levee embankment. Geotechnical analysis indicates adequate factors of safety for 2 Horizontal: 1 Vertical side slopes; however, 3H:1V side slopes would be used for maintenance and safety reasons.

The southern floodwall section would trend in an east/west direction along the back side of the SPIA buildings. Beginning near Manchester Trafficway the floodwall extends approximately 1,300 feet before it transitions to Levee B. Proceeding along the levee alignment, floodwall resumes near the Salvajor building, transitioning to Levee C at the northwestern corner of the SPIA, after which floodwall resumes, ending near Levee A. The floodwall along this alignment is approximately 20 feet from the rear of the SPIA buildings to allow for emergency access. Along the landward side of the floodwall, a concrete gutter would extend along the length of the floodwall to provide drainage. The drainage would be split and run to the east and the west, with the high point located near the southeastern corner of the Livers Bronze building. Drop inlets at both ends of the gutter run would collect the flow, which would then be piped to an area inlet on Manchester Trafficway and then into a storm sewer manhole. The storm water ultimately would be conveyed to the detention pond at the east end of the SPIA. The section of gutter running towards the east would drain to an outfall near the toe of the next levee section.

The floodwall foundation on the river side of the floodwall would be protected by riprap and articulating concrete mat. The bank slope would be benched (terraced) for stability and covered with riprap. The top terrace would be 11.5 feet wide with an elevation at the base of the floodwall of 782.00. The terrace would be sloped away from the floodwall with a 4 percent grade. The bank would have a side slope of 2.5H:1V. The width of the intermediate terrace at elevation 761.19 would vary; however, it also would have a 4 percent slope. The bottom elevation of the bank would be 749.71 at the river's edge. The articulating concrete mat on the intermediate terrace would be allowed to vegetate naturally.

Alteration of the interior drainage system is required because the floodwall and levee system would obstruct the existing drainage to the Blue River. The area behind the

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flood reduction system includes approximately 40 acres of drainage. The interior storm water drainage improvements that have been completed will convey storm water flow to the proposed detention pond. The interior storm water would be conveyed via underground pipes to the proposed detention pond. Drainage would discharge through the detention pond to the unnamed tributary with little to no accumulation in the detention pond until the Blue River floodwater level increases to the detention outfall elevation. At that point, without intervention floodwater from the Blue River could travel "upstream" through the storm water drainage system into the SPIA protected area. To prevent against this, a series of interior drainage improvements were constructed in 2012. This included improvements to storm water and sanitary sewer piping. Construction of the detention pond and a gravity pipe system with a gate well containing a sluice gate would be completed concurrent with the floodwall and levee construction. The gate well structure would drain the detention pond and have the same invert elevation as the detention pond bottom, resulting in a dry basin, except when large or frequent smaller rain events occur. Water flow from the detention pond would be controlled by a duckbill check valve (Black & Veatch 2010). The check valve would open once sufficient water accumulates on the upstream side of the valve, but it would close when water pressure on the downstream side exceeds the pressure on the upstream side (that is, when the Blue River backs up the unnamed tributary to the outlet elevation of the detention pond).

Levee B starts near the southeastern corner of the Livers Bronze Co. building and generally follows an alignment encircling the detention pond (Figure 3 of Appendix I). This section of the levee blocks off the eastern end of East 75th Terrace and would include a detention pond capable of detaining up to the 100-year (1 percent chance) interior flood during a simultaneous Blue River flood event. The flood damage reduction project currently authorized includes:

- Floodwall along the south side of the site west to the Blue River bend;
- a detention pond at the east end of the SPIA with controlled discharge to the Blue River via an unnamed tributary stream;
- a levee from the end of the flood wall around the eastern part of the SPIA, enclosing the detention pond;
- modifications to the right and left banks of the Blue River along the reach located on the south side of the SPIA, including bank stabilization; and
- wetland and riparian habitat mitigation (Black & Veatch 2010).

Alternative 4 (formerly Alternative 4D) as expressed in the 2002 EA, sections of earthen levees would be constructed around the detention pond in the eastern portion of the SPIA. An additional two levee sections would be tied in from the proposed floodwall to the unused landfill levee on the southwest side of the project to accommodate new locally funded access road connecting with Manchester Trafficway at the southwest corner of the area and maintain the existing 75th Terrace access to the area.

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Since the completion of the 2002 EA, the Project Sponsor indicated that accommodating the new locally funded access road connecting Manchester Trafficway at the southwest corner of the area was no longer needed as they no longer intended to construct a road across the former landfill site. Based on this information the Corps is proceeding with the design and access to the area being solely by the rolling gate at 75th Street. This change allows the Corps to remove the two earthen levee segments that would have extended along either side of the unused landfill cell and replace them with a segment of earthen levee along the north side of the unused landfill cell tying into the section of the floodwall adjacent to the railroad tracks on the west side and to the floodwall at Manchester Trafficway on the east. Reducing the length of the earthen levee resulted in decreased costs. Due to the increased erosion along the Blue River there was also a need to stabilize both descending banks of the river south of the SPIA to stabilize the constructed floodwall.

The USACE is continuing to identify Alternative 4 with Minor Design Changes as the Recommended Plan because it best meets the following criteria:

- Satisfies statutory requirements.
- Reflects the best combination of measures that achieve the project purpose and need.
- Provides the best approach to address the key resource and planning issues.
- Provides resource protection and a minimum viable footprint for flood damage reduction.

The Recommended Plan is the alternative recommended by the USACE, but it does not represent a final USACE decision. The Recommended Plan could change between publication of the updated draft EA and the Final EA based on public comments, availability of new information, or changes in laws, regulations, or USACE policies. The USACE invites comments on the Recommended Plan.

2.3 Other Alternatives Considered but Withdrawn

These alternatives were considered in the 2002 EA, but were ultimately withdrawn as having unacceptable costs, unacceptable adverse environmental effects or otherwise failing to meet the project purpose and need. These earlier rejected alternatives are not reconsidered in this EA but are summarized below as a reference. Refer to the 2002 EA for more information on these alternatives.

2.3.1 Alternative 1

This alternative conceived of structural flood protection in the form of approximately one mile (1.6 km) of concrete floodwall completely around the circumference of the SPIA using the existing access at East 75th Terrace. A rolling gate would be used at the entrance into SPIA on East 75th Terrace to close the SPIA access during periods of high water. A detention pond would be constructed at the eastern end of the SPIA for

interior storm water drainage. This alternative would have similar environmental effects as the Recommended Plan, but would not accommodate a locally funded road with all-season access at Manchester Trafficway. The locally funded road is no longer a consideration and an updated economic analysis was completed. It was found to be more expensive than the Recommended Plan and was withdrawn.

2.3.2 Alternative 2

Under this alternative, concrete floodwall would be constructed in the same alignment as Alternative 1, but the area near the interior detention pond would be enclosed by an earthen levee. As with Alternative 1, a rolling gate would be used to close access at East 75th Terrace during floods. This alternative would have similar environmental effects to the Recommended Plan, but would not accommodate a locally funded road with all-season access at Manchester Trafficway. The locally funded road is no longer a consideration and an updated economic analysis was completed. It was found to be more expensive than the Recommended Plan and was withdrawn.

2.3.3 Alternative 3

This alternative (formerly Alternative 6 in 2002 EA) would have required relocation of the SPIA to a location that is not subjected to floods. This alternative would have adverse affects on the current workforce of the SPIA and it was found to be much more expensive than the Recommended Plan, so it was withdrawn. In addition, the environmental effects of abandoning the existing SPIA and relocating the SPIA businesses would be greater than retaining those businesses in place.

3.0 Affected Environment

The subsections that follow describe the environmental conditions present in the extant SPIA as an aid in evaluating potential impacts from the action. The section is subdivided into four subsections focusing on Natural Resources, Cultural Resources, Socioeconomic Resources, and Hazardous, Toxic, and Radioactive Wastes (HTRW).

3.1 Natural Resources

The climate in the region of the SPIA is characterized by hot summers and cold winters, but prolonged periods of very cold or very hot weather are unusual. Heavy precipitation is primarily in the spring and early summer months, activated by moist air from the Gulf of Mexico interacting with drier continental air masses. The spring and early summer months can produce severe precipitation, thunderstorms with hail and tornados. Average summer temperatures are 78 °F (25.6 °C), with July typically the warmest and most humid month. Winter temperatures average 33 °F (0.6 °C), with January typically the coldest month. In Jackson County, Missouri, the average annual precipitation is 35

inches (88.9 cm), with approximately 70 percent falling between April and September. The average annual snowfall is 22 inches (55.9 cm).

3.1.1 Wetlands, Streams and Floodplains

The National Wetland Inventory (NWI) indicates wetlands in forested areas adjacent to the Blue River. The NWI mapped wetlands are illustrated on Figure 2 of the Wetland Delineation Report located in (Black & Veatch 2012a). Black & Veatch conducted the wetland delineation in December 2011 and encountered seven wetlands within the SPIA, only one of which corresponded to the NWI-mapped wetlands. The landfill cell contains another three wetlands, bringing the total number of wetlands in the project area to 10 and the corresponding total acreage is approximately 8.38 acres.

The Blue River is a right bank tributary of the Missouri River, extending upstream approximately 41 miles to the confluence of Wolf and Coffee Creeks, about 3 miles south of the town of Stanley in Johnson County, Kansas. The major tributaries of the Blue River (from its origin to convergence with the Missouri River) are Camp Branch Creek, Mill Creek, Negro Creek, Indian Creek, Brush Creek, and Round Grove Creek. The drainage area of the Blue River is approximately 272 miles², with 189 miles² upstream of the SPIA. The general direction of flow is northerly, with the river impinging on the southern and eastern edges of the SPIA. Two unnamed tributaries are present north of the SPIA, draining a large residential area and woods under the UPRR tracks. The smaller more northerly tributary converges with the larger tributary close to the SPIA, which then conveys flows to the Blue River near the northeastern corner of the SPIA. Both these unnamed tributaries are located within land that is an undeveloped part of Swope Park with limited public access. The smaller tributary is not discussed further since it is located outside of the area that would be affected by project construction activities. There are several other dry drainages that may have temporary flows after larger precipitation events, but like the smaller tributary these are located far enough from construction activities that they would not be affected.

Two other unnamed tributaries to the Blue River are located at the southwestern edge of the SPIA and between the landfill cell and the northern face of the closed landfill. The first of these is a constructed drainway used to convey flows from the City area west of the SPIA. It includes a wetland (SP-6; Figure 2 in the Wetland Delineation Report) near its eastern terminus. The drainway enters a three-barrel culvert southeast of Manchester Trafficway before entering the Blue River. The latter tributary also is a constructed drainway that receives surface runoff from approximately half of the Allied Landfill and the unused cell proposed for the bridge and roadway. It drains to the Blue River via a culvert located in a berm at the eastern edge of the landfill cell. A second constructed drainway is located in the unused landfill cell, just north of the face of the closed landfill. Wetland LF-10 is located in the western portion of this drainway below large riprap and it extends eastward in the drainway, draining to the Blue River through a culvert located in the landfill berm above the Blue River.

The Blue River has been severely degraded, particularly downstream of Swope Park, where intense urbanization has occurred (USACE 2005). The reach between 63rd Street and the confluence with Brush Creek is the subject of a Kansas City District channelization and flood reduction project, which includes improvements to the stream banks through native plantings of grasses in most areas along with trees and shrubs in selected locations to enhance the riparian habitat.

Beneficial uses in the Blue River include livestock and wildlife watering, fish consumption, recreation, and industrial uses (mainly downstream of the SPIA). Approximately 38 km of the Blue River, including the SPIA vicinity, is considered impaired due to bacteria associated with whole-body contact recreation. The source is believed to be from urban nonpoint storm water runoff, although no specific sources of bacteria have been identified. Storm water is known to wash many types of pollutants into the Blue River.

The SPIA is within the 100-year floodplain of the Blue River, as defined in the September 14, 1990, Floodplain Insurance Rate Map (FIRM) as prepared by FEMA. The floodplain and floodway are illustrated on Figure 4 of Appendix I. Development of the SPIA was substantially completed prior to ratification of the Federal Flood Insurance Act (FFIA), and the concurrent mapping of flood-prone areas on the Blue River. With some minor exceptions, both the 100-year and the 500-year floodplains in or near the SPIA extend from the UPRR tracks on the west to Blue River Road on the east. Additions to existing buildings in the Industrial Area are not currently permitted under the FFIA Program administered by the City of Kansas City, Missouri, because of limitations placed on floodplain development. Protective works such as proposed by this project require FEMA approval of a corresponding floodplain map revision from the City (Conditional Letter of Map Revision (CLOMR) process).

3.1.2 Physiography and Soils

The Blue River Basin is part of the Osage Plains physiographic section of western Missouri and eastern Kansas. This physiographic region is characterized by gently rolling hills with relatively broad stream valleys. The geology of this region developed over cyclic deposits of Pennsylvanian age shale and limestone, with interbeds of sandstone and coal.

The Natural Resource Conservation Service (NRCS) soil survey for Jackson County indicates three soil series within the project area. The NRCS soil survey maps indicate six soil series within the study area; Snead-Urban land complex, 9 to 30 percent slopes (Map Unit symbol 10143); Snead-rock outcrop complex, 14 to 30 percent slopes (10141); bremer silt loam, 0 to 2 percent slopes, occasionally flooded (36007), Kennebec silt loam, 0 to 2 percent slopes, occasionally flooded (36020); Sarpy fine sand, 0 to 2 percent slopes, frequently flooded (66010), and Udarents-Urban land complex, 2 to 9 percent slopes (99033). Of these soil map units, only Sarpy and Bremer are considered hydric soils, while Kennebec is known to contain occasional

inclusions of Colo or Nodaway soils, which are hydric soils. The Sarpy soil occurs mainly at the southern fringes of the SPIA and under the Allied Landfill. However, the soils in the landfill area were likely modified by the landfill construction and the present soils are unclassified. Therefore, wetlands are more likely to occur on the undeveloped portions of the SPIA, particularly near the Blue River, in the Blue River floodplain, or in locations along the northern tributary stream where hydric soils are present as inclusions within the Kennebec soils. Because of high clay content, soils in the landfill cell may retain surface water for extended periods, but the resulting hydrology is likely to be variable and wetlands are present in just three locations (Figure 2 of Appendix I and Black & Veatch 2012a).

3.1.3 Vegetation

The native vegetation along the Blue River before European-American settlement was dominated by prairie, although hardwoods were present in alluvial soils along the river (Schroeder 1985). Much of the upland and alluvial plains along the Blue River have been converted for various urban land uses, although substantial riparian forests are present in many locations, primarily in or near Swope Park.

The dominant tree species in the oak-hickory forest include Bitternut Hickory (*Carya cordiformis*), Shagbark Hickory (*Carya ovata*), White Oak (*Quercus alba*), Red Oak (*Quercus rubra*), and Black Oak (*Quercus velutina*). Common understory woody species include Riverbank Grape (*Vitis riparia*), Coralberry (*Symphoricarpos orbiculatus*), and Wood Nettle (*Laportea canadensis*). Dominant tree species in frequently flooded areas include Eastern Cottonwood (*Populus deltoides*), Green Ash (*Fraxinus pennsylvanica*), Box Elder (*Acer negundo*), Silver Maple (*Acer saccharinum*), Sugar Maple (*Acer saccharum*), Black Willow (*Salix nigra*), Sycamore (*Platanus occidentalis*), and Pin Oak (*Quercus palustris*). In low, saturated areas, smartweeds (*Polygonum* spp.), Arrowhead (*Sagittaria* spp.), Stinging Nettle (*Urtica dioica*) and Jewelweed (*Impatiens capensis*) may be common.

Most of the SPIA is covered by maintained landscaping, consisting primarily of lawns with scattered mature trees, paved parking areas and buildings. Around the developed portion of the SPIA, natural vegetation has colonized, consisting of trees, shrubs and understory herbaceous vegetation, mostly volunteers and including weedy or invasive shrub species, such as Amur Honeysuckle (*Lonicera maackii*).

3.1.4 Aquatic and Terrestrial Fauna

The study area is predominantly composed of three habitat types. The dominant habitat form is a developed industrial park, with paved streets having curb and gutters, about 10 buildings, and parking areas. The buildings typically are fronted by lawns that are mowed regularly during the growing season. There may be fertilizer or herbicide applications to the lawns. Although located in an urbanized area, the SPIA generally has a suburban appearance. Outside the SPIA, commercial properties are located west

of the UPRR tracks and are heavily disturbed areas with marginal habitats for wildlife. No waterbodies are present in these areas, although occasional discharges of water do occur. Within the SPIA, a small area (approximately 1.33 acres) between the Environmental Temperature Control building and the UPRR tracks was planted with native prairie grasses. Bird feeders were installed along a mowed path adjacent to trees at the northern edge of the area and at other locations within the SPIA. This "prairie" area is likely to attract some birds, primarily various sparrow species, but it is too small to support grassland bird species that require large expanses of grassland (e.g., Henslow's Sparrow). In general, the SPIA developed area provides poor wildlife habitat and the species most likely to use this area are tolerant of or dependent on a human presence, such as European Starlings, House Sparrows, mice, and rats. This habitat encompasses approximately 53-acres of the study area. The remainder of the SPIA site (approximately 50-acres) is composed of a closed canopy woods with some canopy openings from fallen snags. These latter areas include a riparian zone (as defined by the USACE) extending from the Blue River bank to approximately the top of the slope at the edge of the developed portion of the study area and including the area between the unnamed tributary north of the SPIA. The third dominant habitat type is in the landfill cell and is managed grassland, with scrub-shrub and woods as minor components. After grading to form the landfill cell, it was planted to a variety of grasses. It is maintained by regular mowing, except in wet locations, primarily LF-8. The dominant grass species appears to be Tall Fescue (*Schedonorus arundinaceus*), with some native grasses, mainly Little Bluestem (*Schizachyrium scoparius*), Switchgrass (*Panicum virgatum*) and Indian Grass (*Sorghastrum nutans*), also present. The dominant plant species in emergent wetlands is Narrow-leaf Cattail (*Typha angustifolia*), with Sandbar Willow (*Salix interior*) dominant in the scrub-shrub wetland (LF-10) within the landfill cell and in SP-6.

Swope Park, just outside the study area to the east and north, is the largest city park in Kansas City, Missouri. It contains large stands of upland and bottomland hardwood forest and surrounds the SPIA on three sides. Swope Park provides suitable habitat for a variety of wildlife species, some of which could use the undeveloped portion of the study area abutting the park or across the Blue River. Upland hardwood forests in Swope Park may provide habitat for White-tailed Deer (*Odocoileus virginianus*), Wild Turkey (*Meleagris gallopavo*), Red Fox (*Vulpes vulpes*), Eastern Cottontail (*Sylvilagus floridana*), various mouse species (e.g., *Microtus* sp., *Peromyscus* spp.), Raccoon (*Procyon lotor*), Striped Skunks (*Mephitis mephitis*), and a variety of songbirds. Swope Park bottomland hardwood forests support squirrels (*Sciurus* spp.) and various other mammals, including Muskrat (*Ondatra zibethicus*), Virginia opossum (*Didelphis virginiana*), Beaver (*Castor canadensis*) and possibly Coyote (*Canis latrans*). In addition, two golf courses in Swope Park provide relatively open areas of low-profile grasses that may be attractive for edge-tolerant species and wildlife tolerant of human activities or presence, such as Canada Goose (*Branta canadensis*). At scattered locations, limestone bluffs are present along the Blue River Parkway, some of which are sufficiently clear for occasional use by raptors, such as Turkey Vulture (*Cathartes aura*) or Sharp-shinned Hawk (*Accipiter striatus*). While these bluffs are likely to be used for

perching or roosts, nesting is considered unlikely because of frequent human disturbance.

Immediately south of the bank stabilization along the right descending back of the Blue River is a great blue heron (*Ardea herodias*) rookery. Employees of some of the SPIA businesses have set up a small bird watching station on the top of the left bank of the Blue River in order to observe the annual arrival and nesting of the great blue herons. The great blue heron is protected by Migratory Bird Treaty Act (MBTA).

The Blue River provides habitat suitable for various species of waterfowl, some shorebirds and fish. Common waterfowl species known to frequent the Blue River include Mallard (*Anas platyrhynchos*), Wood Duck (*Aix Sponsa*), Northern Shoveler (*Anas clypeata*), and Green Heron (*Butorides striatus*). Deep pools, shallow riffles, large woody debris and logjams provide habitat for catfish (*Ictalurus* spp.), Common Carp (*Cyprinus carpio*), bass (*Micropterus* spp.), and sunfish (*Lepomis* spp.). Other nongame fish species known from the Blue River include Shortnose gar (*Lepisosteus platostomus*), and Gizzard Shad (*Dorosoma cepedianum*). The Blue River also provides habitat for Common Snapping Turtles (*Chelydra serpentina*) and Bullfrogs (*Rana catesbeiana*) (USACE 2002).

The Missouri Department of Conservation (MDC) conducted fish surveys in the Blue River Basin in 1966, 1978 to 1980, and 1986 to 1998 (MDC 2011). Thirty-eight fish species were collected during these surveys, although a potential exists for up to 67 fish species, based on distribution (MDC 2011). The fish species observed during 32 years of MDC sampling are presented in Table 3-1.

Table 3-1. Blue River Fish Collected by the Missouri Department of Conservation.

Common Name	Scientific Name	1966	1978-1980	1986-1998
Largemouth Bass	<i>Micropterus salmoides</i>	x	x	x
Bluegill	<i>Lepomis macrochirus</i>	x	x	x
Black Bullhead	<i>Ameiurus melas</i>		x	x
Yellow Bullhead	<i>Ameiurus natalis</i>		x	x
Smallmouth Buffalo	<i>Ictiobus bubalus</i>			x
Bigmouth Bullalo	<i>Ictiobus cyprinellus</i>			x
Bighead Carp	<i>Hypophthalmichthys nobilis</i>			x
Common Carp	<i>Cyprinus carpio</i>	x	x	x
Grass Carp	<i>Ctenopharyngodon idella</i>			x
River Carpsucker	<i>Carpodacus carpio</i>	x	x	x
Flathead Catfish	<i>Pylodictis olivaris</i>		x	x
Channel Catfish	<i>Ictalurus punctatus</i>	x	x	x
Creek Chub	<i>Semotilus atromaculatus</i>	x	x	
Black Crappie	<i>Pomoxis nigromaculatus</i>			x

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White Crappie	<i>Pomoxis annularis</i>	x	x	x
Johnny Darter	<i>Etheostoma nigrum</i>		x	x
Orangethroat Darter	<i>Etheostoma spectabile</i>	x		x
Freshwater Drum	<i>Aplodinotus grunniens</i>			x
Shortnose Gar	<i>Lepisosteus platostomus</i>		x	
Goldfish	<i>Carassium auratus</i>		x	x
Logperch	<i>Percina caprodes</i>	x		x
Slender Madtom	<i>Noturus exilis</i>	x	x	x
Bluntnose Minnow	<i>Pimephales notatus</i>	x	x	x
Fathead Minnow	<i>Pimephales promelas</i>	x		
Suckermouth Minnow	<i>Phenacobius mirabilis</i>	x	x	x
Quillback	<i>Carpoides cyprinus</i>			x
Gizzard Shad	<i>Dorosoma cepedianum</i>		x	x
Emerald Shiner	<i>Notropis atherinoides</i>		x	x
Golden Shiner	<i>Notemigonus crysoleucas</i>	x	x	x
Red Shiner	<i>Cyprinella lutrenses</i>	x	x	x
Redfin Shiner	<i>Lythrurus umbratilis</i>	x	x	x
Sand Shiner	<i>Notropis stramineus</i>	x	x	x
Central Stoneroller	<i>Camptostoma anomalum</i>	x	x	x
White Sucker	<i>Catostomus commersoni</i>	x	x	x
Green Sunfish	<i>Lepomis cyanellus</i>	x	x	x
Hybrid Sunfish	<i>Lepomis sp.</i>			x
Orange-spotted Sunfish	<i>Lepomis humilis</i>	x	x	x
Longear Sunfish	<i>Lepomis megalotis</i>			x

Source: Inventory and Assessment of the Blue River Watershed, Tables Bc01 and Bc02. <http://mdc.mo.gov/landwater-care/stream-and-watershed-management/missouri-watersheds/blue-river/biotic-community/table>.

3.1.5 Threatened and Endangered Species

The purpose of the Endangered Species Act (ESA) is to protect and recover imperiled species and the habitats on which they depend. The U.S. Fish and Wildlife Service (USFWS) and the Commerce Department's National Marine Fisheries Service (NMFS) administer the ESA at the federal level. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife and anadromous fish. Under the ESA, "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range, while "Threatened" means a species is likely to become endangered within the foreseeable future. For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments. As of March 2011, the FWS listed 1,967 species worldwide as endangered or threatened, of which 1,372 occur in the United States.

In Missouri, the state listing process is lead by the MDC Endangered Species Coordinator with the participation of many MDC biologists and managers, as well as

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people from colleges, universities and participating organizations. An annually updated checklist with the status of each species of conservation concern is prepared by the MDC. MDC list ranking includes endangered, rare, status undetermined, watch list, extirpated, or extinct.

The threatened and endangered wildlife species listed as occurring in Jackson County, Missouri are presented in Table 3-2, which includes species listed at both the federal and state levels. A larger species list was reduced based on preferred habitat, known range or other factors making some listed species unlikely to be present in or near the SPIA.

Table 3-2. Endangered or Threatened Wildlife Species in Jackson County, Missouri.

Common Name	Scientific Name	State Status	Federal Status
Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	E	E
Indiana Bat	<i>Myotis sodalis</i>	E	E

Data sources: State: <http://mdc.mo.gov/discover-nature/field-guide/endangered-species>
Federal: <http://www.fws.gov/midwest/endangered/lists/missouri-cty.html>

The threatened and endangered plant species listed as occurring in Jackson County, Missouri are Mead's Milkweed (*Asclepias meadii*) and Western Prairie Fringed Orchid (*Platanthera praeclara*), with species listed at both the federal and state levels. Because the habitat preferred by these two plant species is not present in the study area (i.e., prairie), no endangered or threatened plant species are known to be present in the SPIA vicinity.

3.1.6 Invasive Species

Invasive species have the potential to displace native plants and animals. According to Executive Order 13122, Federal agencies may not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species. Invasive aquatic species that are a concern in Missouri which have the potential to be introduced into new water bodies by contaminated construction equipment include zebra mussels (*Dreissena polymorpha*), quagga mussels (*Dreissena bugensis*), New Zealand mudsnails (*Potamogyrus antiposarum*), purple loosestrife (*Lythrum salicaria*), and Eurasian watermilfoil (*Myriophyllum spicatum*), among others. Invasive terrestrial species often flourish on land that has recently been disturbed. They may also be transported to new locations on construction equipment. Examples of invasive terrestrial species of concern in Missouri include Johnson grass (*Sorghum halepense*), reed canary grass (*Phalaris arundinacea*), and brome grass (*Bromus sterilis*). Field assessments of the SPIA yielded invasive shrub species, such as Amur Honeysuckle (*Lonicera maackii*) and turf grasses.

3.2 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) requires federal agencies to take into account the effects of their undertakings on historic properties. By definition, historic properties are properties eligible for or listed on the National Register of Historic Places (NRHP). Federal undertakings refer to any federal involvement including funding, permitting, licensing, or approval. Federal agencies are required to define and document the Area of Potential Effect (APE) for undertakings. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties. For the SPIA project the APE includes the area of construction, staging areas, and any other areas of ground disturbance.

Archeological investigations of the proposed project have been undertaken in 1995, 1999 and since 2012. These efforts have consisted of records searches and literature reviews of the project area and surrounding area and archeological field investigations within the project APE. The background research has consisted of reviews of the online database maintained by the Missouri Cultural Resources Inventory, archeological records, and historic maps and structure information from the Missouri State Historic Preservation Office (SHPO) and the Corps. In addition, geomorphologic information has been reviewed to determine the likelihood of unrecorded archeological sites within the project area.

Previous archeological field investigations of the project area were conducted in 1995 and 1999 in support of the original environmental assessment (EA) for the SPIA project. These investigations consisted of an archeological survey conducted in 1995 and a subsequent NRHP evaluation testing of two prehistoric archeological sites, 23JA488 and 23JA489, identified during the survey (Appendix III). Based on the findings of the evaluation and the proposed project impacts planned at that time, the Corps determined the sites to be not eligible for the NRHP. SHPO concurred with this determination in a letter dated June 4, 1999.

As project plans had been changed since the original EA, additional archeological investigations for the current revised project were required and were conducted in 2012 and 2013 by Goodwin and Associates. The investigations consisted of an update of the records search and an archeological and geoarcheological evaluation of the revised APE. The revisit confirmed that site 23JA488 was not eligible for the NRHP. However, the geoarcheological examination of site 23JA489 landform found that the site has the potential to contain deeply buried archeological material. As original plans did not call for deep impacts, only the first 40 cm below ground surface were examined during the 1999 investigations. Given the deep impacts required for the construction of a storm water detention pond now proposed in the site area, deeper investigations are recommended to determine if unknown site elements are present. The deep

investigations have not been completed but will be conducted once the land has been obtained for the project or land owner permission obtained. The field investigations recorded one new site, 23JA1763, a limestone rock quarry. The site is recommended as not eligible for the NRHP. The remainder of the APE outside of the proposed detention pond area was found to be severely disturbed by past construction associated with the SPIA and determined to have a low likelihood of containing intact sites eligible for the NRHP.

The consultant recommended deep testing in the area of site 23JA489 but no further investigations for the remainder of the project area. The Corps concurs with these recommendations. The consultant report and results of the deep testing will be coordinated with SHPO and federally recognized Native American tribes.

3.3 Socioeconomic Resources

The structures in the SPIA contain approximately 379,966 ft² (35,300 m²) of industrial space, with an estimated value of approximately \$8 million. The structures range from 6,404 ft² (595 m²) to 118,403 ft² (11,000 m²). The structures collectively held an additional \$31 million worth of investment in infrastructure and inventory, for a total investment of approximately \$39 million in 2002 dollars. Around 400 manufacturing and related jobs were provided by the SPIA businesses (USACE 2003). Revision of these values occurred in 2013. Approximately 400 manufacturing and related jobs are still provided by the SPIA and no new structures have been built on site. However, renovations and updates to structures, infrastructure, and inventory have occurred. The total investment in the SPIA is approximately \$61.8 million dollars. Currently, the project is expected to cost \$28,000,000 and has a benefit-cost ratio of 1.4 at 7%.

The SPIA has historically endured flood damage during frequent high flow events along the Blue River. Reported Blue River flood events occurred in September 1977, June 1984, September 1986, May 1990, and May 1995. The May 1995 flood event crested approximately 2 feet below the flood damage elevation for the SPIA. The most recent Blue River flood that caused damage in the SPIA occurred in May 1990. This event is estimated to have been a 10-year event, causing a reported \$1 million in damage. Five businesses were reported to have been flooded with water depths of approximately three feet.

3.3.1 Recreation

At 1,805 acres, Swope Park is the largest city park in Kansas City, Missouri. The Blue River Parkway, owned by Jackson County, Missouri, abuts the SPIA along its southern and eastern boundaries. The existing Blue River channel is located within the Parkway. The Recommended Action requires that some right-of-way be acquired from Swope Park and county-owned Blue River Parkway lands. Recreational opportunities are provided by both these areas in the vicinity of the SPIA, as further described below.

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Swope Park: Recreation in Swope Park near the SPIA includes a variety of activities, from wildlife viewing, off-trail hiking or walking, and nature study (passive recreation) to more active forms of recreation (e.g., canoeing the Blue River). The Heart of America Golf Academy is located east of Blue River Road, roughly due east of the SPIA. Other park attractions are the Kansas City Zoo, the Lakeside Nature Center, Swope Memorial Golf Course, a sports training facility, Southeast Community Center, Starlight Theatre, Battle of Westport Museum, Camp Lake of the Woods, Kansas City Community Gardens and Beanstalk Children's Garden, a disc golf course north of Gregory Boulevard, KC Master Gardeners Demonstration Garden, Swope Pool, several trails including mountain bike trails; tennis courts, playgrounds, shelter houses, picnic areas, baseball diamonds, cricket fields, and soccer fields.

The SPIA is severed from the larger eastern portion of Swope Park by the Blue River and is rarely used for public recreational purposes. An unnamed Blue River tributary with 223 acres of drainage area meanders through the SPIA portion of Swope Park, generally parallel to the northern edge of the buildings in the SPIA. This undeveloped part of the SPIA site is wooded and includes some wetlands (refer to section 3.1.1 for more information on wetlands).

Blue River Parkway: Casual recreation in the SPIA on Parkway lands includes birdwatching and scenic viewing by workers during breaks. Minimal public recreation uses occur in this part of the SPIA. Overbank areas within the Parkway are naturally wooded with a mix of hardwood trees and both native and non-native understory shrubs, with grasses and herbaceous vegetation more prevalent adjacent to the river in the riparian zone. Although a large area near the Blue River Parkway southern terminus is a designated Section 6(f) Land and Water Conservation Fund Act property, the Blue River Parkway adjacent to the Swope Park Industrial Area is not within this designated boundary.

Other: In some parts of the SPIA, employees have established walking trails, bird feeder stations, chairs and picnic tables for use during breaks. These informal amenities are located along the vegetated edge of the developed portion of the SPIA, primarily along the Blue River left bank. Examples of these amenities are illustrated in Figure 7 of the Feasibility Report (USACE 2003).

3.3.2 Aesthetics

The SPIA location along the Blue River and bordered by Swope Park and the Blue River Parkway provides natural vistas for SPIA visitors and workers. Since there are no through roads, traffic in the Industrial Area is primarily destination-driven and the industrial park is somewhat secluded. Most businesses grounds are well maintained with large trees present; the SPIA has a park-like appearance in some locations. The exceptions would be the salvage and storage yards west of the UPRR tracks, which are suited to their purpose, but are not maintained for aesthetics.

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Some areas within the SPIA and on the commercial properties west of the UPRR tracks have construction equipment and materials stored in public view and these areas are more visually intrusive on the surrounding natural setting. As noted above in the Recreation section, some areas in the SPIA have walking trails, bird feeders, chairs and tables for use during employee breaks. These are positioned to take advantage of the natural vistas available, particularly along the Blue River.

3.3.3 Public Safety

Public access to the SPIA is solely via East 75th Street and East 75th Terrace. This access road crosses the UPRR tracks at the entrance to the industrial area. When trains are using these tracks, access to and from the industrial area is temporarily blocked. This train crossing can substantially delay fire, police, or medical response to businesses in the SPIA, raising a potential safety concern. In addition, floods can prevent employees and business owners, as well as vendors or customers, from accessing or evacuating the SPIA.

3.4 Hazardous, Toxic, and Radioactive Wastes

A Hazardous, Toxic, and Radioactive Waste (HTRW) site assessment was conducted in accordance with the requirements of USACE Engineering Regulation ER-1165-2-132 for the SPIA proper. This assessment included a records search and review, interviews with business tenants, and a visual reconnaissance survey of the site and adjoining properties. Field sampling was completed in September 2000 (USACE 2000). The site visits and soil samples did not reveal contamination or significant items of concern on any SPIA property, except Tract 1A (Bates & Sons Construction Company). The proposed detention pond would be located on Tract 1A. On this tract, petroleum products were not detected in soil samples, but limited areas of stained soils were observed. In addition, materials stored on Tract 1A included quantities of motor oil, hydraulic fluid, lead acid batteries, asbestos brake pads, and other miscellaneous construction debris and trash. Some of these materials may require special disposal. One soil sample collected in Tract 1A had lead contamination at a level high enough to be considered a hazardous waste, potentially requiring specific handling and disposal procedures. A copy of the USACE HTRW site assessment is available upon request.

USACE Engineer Regulation ER-1165-2-132 requires that HTRW remediation on civil cost shared projects be a 100 percent sponsor cost. Therefore, the City would need to provide a clean site before the Corps' project construction can begin, if necessary. If a recognized environmental condition was found in the project area, a phase II environmental site assessment normally would be conducted to determine the nature and extent of potential contamination.

4.0 Environmental Consequences (Impacts)

This section evaluates the potential environmental consequences of implementing the Recommended Plan and includes preliminary measures to avoid, minimize or mitigate for potential adverse environmental effects where appropriate. As discussed previously, the Recommended Plan is Alternative 4 – Structural Flood Protection from the 2002 EA with some minor design changes.

4.1 Natural Resources (Impacts)

Project related effects on wetlands, streams, floodplains, soils, vegetation, aquatic and terrestrial fauna, and threatened and endangered species are considered in the following sections.

4.1.1 Wetlands, Streams, Floodplains (Impacts)

“No-Action” Alternative: This alternative would not adversely affect wetlands, streams, or floodplains in the SPIA in that the proposed structures would not be constructed. Current conditions would continue, which may include periodic flooding.

Alternative 4 – with Minor Design Changes (Recommended Plan): Under the Recommended Plan, construction of the floodwall and earthen levee system would permanently impact a total of approximately 0.3 acres of wetland. Most wetland impacts would occur from clearing or grading for the floodwall, along with temporary access or haul roads required for construction equipment. The other wetlands on the SPIA would not be impacted by project-related activities.

The Recommended Plan would have minor, short-term construction related impacts to water quality due to the bank stabilization taking place within the Blue River channel and on the river and unnamed tributary banks. During construction, downstream waters could see an increase in turbidity. Construction activities with this alternative would occur in a jurisdictional water of the United States and require a Clean Water Act (CWA) Section 404 authorization and CWA Section 401 State Water Quality Certification. A Draft 404 (b)(1) Evaluation (40 CFR 230) has been prepared for this plan and is included as Appendix IV. A CWA State Water Quality Certification would need to be obtained from MDNR. Additionally, the construction contractor would be required to obtain a Section 402 National Pollutant Discharge Elimination System (NPDES) stormwater permit from MDNR. These CWA requirements would need to be met prior to any construction activities. Best Management Practices (BMPs) would be implemented to minimize the fallback of material into the waterway and to minimize the introduction of fuel, petroleum products, or other deleterious material from the waterway. Such measures could include the use of erosion control fences; storing equipment, solid waste, and petroleum products above the ordinary high water mark and away from areas prone to runoff; and requiring that all equipment be clean and free

of leaks. To prevent fill from reaching water sources by wind or runoff, fill would be covered, stabilized or mulched, and silt fences would be used as required. Other measures to minimize adverse effects would include using clean rock fill with minimal fines, stabilizing the earthen material with rock, using appropriate construction equipment, minimizing the amount of time that equipment would be in the creek channel, and not placing fill in the creek during unusual high water events. The project would impact both the left and right streambanks of the Blue River for approximately 1,370 linear feet and the northern unnamed tributary for approximately 141 linear feet. Approximately 6.4 acres of riparian habitat would be permanently impacted by these activities.

The Missouri Stream Mitigation Method (MSMM) is used within Missouri to assess the impacts (debits) and benefits (credits) of projects as part of CWA Section 404 authorizations. This method has been publicly vetted and approved for use by Corps Regulatory Offices within the state of Missouri. Completion of the MSMM worksheets demonstrated that the Recommended Plan would result in an overall net debit to the environment. The Recommended Plan generated 4,100 debits resulting from the addition of armoring to the stream banks. A total of 3,646 credits would be generated by restoring streambank stability along the two reaches. The MSMM worksheets are located in Appendix V. Once construction has been completed, the water quality of the impacted streams would return to its current state. No significant adverse long-term impacts to water quality would occur as a result of this alternative.

The proposed project would take place within the mapped floodway boundary because the entire project site is located in the floodplain of the base flood (100-year flood). The project has been designed to protect existing structures within the SPIA and uses an alignment maximizing the flood and environmental protection of undeveloped land, including portions of Swope Park, while minimizing floodplain intrusion. A study of the increased flood heights attributable to the project indicates that no insurable structures, as defined by FEMA, would be adversely affected. The City would request a Conditional Letter of Map Revision (CLOMR) from FEMA to revise the floodplain. No other impacts to floodplains are expected with the Recommended Plan.

4.1.2 Physiography and Soils (Impacts)

“No-Action” Alternative: The “No-Action” alternative would not have a direct impact on soil conditions at the SPIA. The existing erosion of the Blue River left bank would continue, potentially undermining the Livers building foundation, leading to its failure. The resulting bank erosion could increase sedimentation in the Blue River, further degrading the water quality and potentially altering water flow as well as the river channel.

Alternative 4 – with Minor Design Changes (Recommended Plan): The Recommended Plan uses a concrete floodwall and earthen levee to provide flood damage reduction for the SPIA. The earthen material needed to complete levee

sections of the project would be obtained onsite during excavation of the ponding area or imported from offsite commercial sources and concrete would be obtained from local commercial producers. Some locations along the floodwall alignment would need to be excavated for fill because of unstable conditions incapable of supporting floodwall components. Excavated soils would be stockpiled and used elsewhere onsite or disposed offsite at a distance from all surface waterbodies. Soils imported to stabilize the slopes and support the floodwalls and levees should have no significant effect on physiography or soils since the existing contours would be similar. Therefore, this alternative would have no significant adverse effect on physiography or soils in the SPIA. However, a net benefit may be achieved by reducing or eliminating left bank erosion.

4.1.3 Vegetation (Impacts)

“No-Action” Alternative: The “No-Action” alternative would have minor long-term impacts to the vegetation around the SPIA. The streambanks would continue to erode, which would continue to impact existing vegetation along the banks. The erosion would encroach on the narrow riparian corridor between the Blue River and the SPIA.

Alternative 4 – with Minor Design Changes (Recommended Plan): The Recommended Plan would result in long term impacts to the vegetation at the SPIA by the removal of approximately 6.4 acres of riparian habitat. The resulting streambank stabilization of the project would decrease streambank erosion and exposed soils would be seeded with native vegetation. Utilizing articulating mat at the lower levels of the stabilized bank would allow for quicker revegetation of the streambanks. The other vegetation impacts would be short term minor as a result of the construction activities and would be considered temporary.

4.1.4 Aquatic and Terrestrial Fauna (Impacts)

“No-Action” Alternative: The “No-Action” alternative would not directly impact any fish and wildlife resources. Indirectly, continued erosion along the streambanks of the Blue River could contribute to negatively impacting species that are not tolerant of turbid conditions.

Alternative 4 – with Minor Design Changes (Recommended Plan): The Recommended Plan would result in small-scale localized long-term adverse effects on terrestrial and aquatic fauna in the SPIA vicinity. These effects have been avoided and/or minimized to the greatest extent practicable using a proposed floodwall alignment located immediately adjacent to the existing developed area, and earthen levees while allowing for emergency access. The use of a concrete floodwall and minimal use of levees minimizes the loss of adjacent fish and wildlife habitat. However, the floodwall would disrupt terrestrial wildlife movement patterns. Most bird species would still be able to access the SPIA and the vicinity by flying over the floodwall, while movement by ground-dwelling mammals and other wildlife could be impaired. This may

have implications for long-term survival by some small mammals in the SPIA such as squirrels, who may lose access to the larger undeveloped portion of the SPIA site. However, access to the SPIA by roaming mammals, such as coyotes (*Canis latrans*), opossum (*Didelphis marsupialis*) and raccoon (*Procyon lotor*), would be limited by their ability to climb over the floodwall or earthen levees. Because the SPIA is an industrial park intended to provide office and manufacturing space for businesses, the potential displacement of some wildlife species inside the floodwall is considered a minor concern since extensive areas of suitable habitat would remain available in the undeveloped portions of the SPIA, the closed landfill, and in Swope Park.

The rookery tree utilized by the great blue herons is located sufficiently far enough away to limit any potential disturbances to the rookery. However, if any impacts were to occur it would be limited to time frames in which the great blue herons were not actively utilizing the rookery tree. If any of these impacts were to occur it would not be expected to have a negative impact on the great blue heron population around the project area.

The project construction may have a minor short term impact on turbidity in the SPIA streams. Fish and other aquatic organisms not adapted to the extra turbid conditions may be temporarily displaced. These impacts are expected to be only temporary and the site is expected to revert to pre-project conditions after construction.

4.1.5 Threatened or Endangered Species (Impacts)

“No-Action” Alternative: The “No-Action” alternative would not result in any impacts to Federally-listed threatened or endangered species.

Alternative 4 – with Minor Design Changes (Recommended Plan): Discussions with the United States Fish & Wildlife Service (USFWS) and Missouri Department of Conservation (MDC) along with sight visits have determined that only two species of bat (Indiana bat, *Myotis sodalis* and Northern Long-Eared bat, *Myotis septentrionalis*) may be effected by the potential impacts of the SPIA project.

In an August 2000 Draft Fish and Wildlife Coordination Act Report prepared by the USFWS for the SPIA flood damage reduction project, the USFWS stated that the Indiana Bat could occur in the project area, since Indiana bat occurs in the southern and eastern portions of the state. The Indiana bat also migrates from winter hibernacula in the southern parts of Missouri and other states through northern portions of Missouri to areas in Iowa and Illinois, returning to southern Missouri in the fall. The habitat most likely to be affected by the project would be trees used as summer roosts and nurseries since no caves or mines are present in the project area that might be used as winter hibernacula. A site assessment during a December 18, 2013, site visit by USACE biologists did find suitable roost habitat for Indiana Bat in areas that would be affected by project construction (USFWS Bat Assessment Worksheets are located in Appendix II). The USFWS indicated that if no suitable roost trees were removed from the site

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between April 1 and October 31, then adverse effects on Indiana Bat were unlikely (i.e., *"May affect, not likely to adversely affect"*).

In October 2013 the USFWS purposed listing the Northern Long-Eared bat as "Endangered and Threatened." Northern Long-Eared bats are known to occur throughout Missouri and eastern Kansas and in the summer prefer the same types of roosting trees as the Indiana bat. The potentially impacted trees identified as suitable bat habitat for the Indiana bat during the December 2013 site assessment would also be suitable for the Northern Long-Eared bat.

Thus, one federal endangered species and one candidate species may be temporarily affected by the project in the short-term, but long-term permanent effects on population size are unlikely due to the relative abundance of suitable roosts within the adjacent approximately 1,800 acre Swope Park and the low quality of potential roost sites within the project area. As well, any activities that would impact potential roost trees would be done between November 1 and March 31 when bats are in their winter hibernacula.

4.1.6 Invasive Species (Impacts)

"No-Action" Alternative: The "No-Action" alternative would not result in the introduction of any invasive species.

Alternative 4 – with Minor Design Changes (Recommended Plan): The Recommended Plan is not expected to introduce any invasive species to the project site. The construction contractor would be required to ensure that all construction equipment has been cleaned and is free from soil residuals, egg deposits from plant pests, noxious weeds, plant seeds, and aquatic nuisance species prior to its use on the project. Disturbed land areas would be replanted with native plant species such as big bluestem, Indiangrass, switchgrass, eastern redbud, rough-leaved dogwood, and Chickasaw plum to minimize the likelihood that invasive plants would become established.

4.2 Cultural Resources (Impacts)

Project-related impacts on cultural resources (e.g., archaeological sites, traditional cultural properties and historic properties) are discussed in the following subsections.

"No-Action" Alternative: The "No Action" alternative would have no adverse effect on cultural resources in the SPIA. Existing conditions, including slow, natural degradation of the two existing sites would continue in the area.

Alternative 4 – with Minor Design Changes (Recommended Plan): The recommended plan would likely have no impact on sites listed on or eligible for listing on the National Register of Historic Places. However, deep testing is required within the portion of site 23JA489 mapped within the area of the proposed storm water detention

basin to ensure that no currently unknown archeological materials are buried on the site. The testing will be completed after permission has been granted by the landowner or after the land is obtained by Kansas City but prior to construction of the detention basin.

4.3 Socioeconomic Resource (Impacts)

Project-related socioeconomic impacts are discussed in the following subsections, including recreation, aesthetics and public safety.

4.3.1 Recreation (Impacts)

“No-Action” Alternative: The "No Action" Alternative would have no adverse effect on recreation since public access to the SPIA and Swope Park adjacent to the SPIA currently is restricted. Casual recreational use of the SPIA vicinity by SPIA employees would continue as at present, consisting mainly of outside seating areas, a fire pit, and other lightly used locations near the existing SPIA buildings.

Alternative 4 – with Minor Design Changes (Recommended Plan): The Recommended Plan would have minor long-term adverse effects on recreation in the project area. In addition, some natural areas presently available for recreation would be graded for bank stabilization, permanently removing trees and temporarily most other vegetation. However, the bank stabilization areas have very low recreational use and serve primarily as a buffer for Swope Park. Bank stabilization would be provided in three locations; a small area of the unnamed northern tributary north of the current Gasket Engineering building, a larger area along the left bank of the Blue River and a small portion of the right bank of the Blue River. Employees of businesses in the SPIA use these natural areas immediately adjacent to the SPIA during breaks for casual recreation. Public access to these areas is limited and may be blocked to people inside the floodwalls and levee system post-construction. Therefore, the primary group of recreational users affected by the project would be employees of businesses in the SPIA.

4.3.2 Aesthetics (Impacts)

“No-Action” Alternative: The "No Action" Alternative would have the effect of continuing the structural decline of the SPIA from periodic floods, which would result in economic deterioration, including the appearance of buildings and grounds keeping. Maintenance of the SPIA grounds is likely to decline as some businesses find other priorities, resulting in further visual degradation.

Alternative 4 – with Minor Design Changes (Recommended Plan): The primary aesthetic function of the SPIA is to provide limited views of Swope Park and the Blue River. The viewscape is from an industrial area surrounded on three sides by heavily wooded natural viewsapes that limit the visual access to the larger landscape. Landscaping within the SPIA would not be affected by the Recommended Plan, except

at the rear of buildings where clearing may be required for the floodwall and levee. The Recommended Plan would have minimal adverse aesthetic effects in the study area, primarily from visual intrusion of the levee and floodwall structures and the area cleared for bank stabilization. Employees of the SPIA businesses who take breaks outside the buildings would be the group most affected by the changed viewscape. Trees and wildlife using trees would be viewable from inside the floodwall, although mainly the tree crowns since the lower portions would be obscured by the floodwall. In addition, recreational viewing in flood-prone portions of the SPIA would remain partially accessible, thus continuing to afford opportunities for viewing.

4.3.3 Public Safety (Impacts)

"No-Action" Alternative: The "No Action" alternative would have a net negative effect on public safety since the existing deterioration of the SPIA from flooding would continue unabated.

Alternative 4 – with Minor Design Changes (Recommended Plan): The primary purpose of the Recommended Plan is for flood damage reduction to structures in the SPIA. This would be accomplished by enclosing the SPIA in a system of floodwall and levees that is designed to protect SPIA from a 500-year flood event. The proposed storm water pond would receive storm water runoff from SPIA and is designed for up to a 100-year flood event. The Recommended Plan would not have an impact on public safety.

4.4 Hazardous, Toxic and Radioactive Wastes (Impacts)

Project-related impacts from hazardous, toxic and radioactive wastes that may be present in the SPIA are discussed in this section. These materials would be significant to the construction effort, since site cleanup might be required where such materials are present before construction can safely begin.

"No-Action" Alternative: The "No Action" Alternative would have no effect, whether positive or negative, on existing hazardous, toxic and radioactive wastes in the project area nor would it prevent them from accumulating in the future. Previously spilled materials would not be removed for proper disposal. Existing conditions on parts of the SPIA would persist, with a potential for additional storage of various materials already present, along with the attendant potential for spillage.

Alternative 4 – with Minor Design Changes (Recommended Plan): As noted above in Section 3.4, the Kansas City District completed an initial HTRW site assessment and sampling program for the SPIA in 2000. Site visits conducted and soil samples collected in 2000 did not result in any evidence of contamination or any significant items of concern on any SPIA tract except Tract 1A at the east end of East 75th Terrace. This property presently is used as a construction storage yard and it is the preferred location for the SPIA storm water detention pond. A single soil sample on Tract 1A indicated

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significant lead contamination. Pursuant to the Recommended Plan, the one lead-contaminated soil sample on Tract 1A was in a location that would be affected by excavation for the detention pond. In addition, overburden removed from the pond location would be used for levee construction; therefore, additional sampling is considered necessary. Should further evidence of soil contamination be observed, sampling would be continued to evaluate the nature and extent of the contamination. Contaminated soil containing toxic materials in toxic amounts would be collected for disposal in an approved offsite facility. The HTRW assessment report for the sampling program in 2000 is included in the 2002 EA. A copy of the 2002 EA is available upon request.

USACE Engineer Regulation ER-1165-2-132 requires that HTRW remediation on civil cost-shared projects be a 100 percent sponsor cost. Therefore, the City would need to provide a clean site before project construction begins in SPIA Tract 1A.

Fuel or lubricant spills from construction equipment could occur during construction or from stored materials, contractors would be required to prepare and implement a construction Spill Prevention Control and Countermeasure (SPCC) Plan before beginning work on the site. Operations and maintenance of the project could potentially require equipment like chain saws that contains lube oil, engine oil, and engine fuel that could be released into the environment due to operator error or equipment malfunction. Should such a release occur, it is expected that the impact would be minor due to the likely quantity that could be released. However, prior to using maintenance equipment of any kind, the project owner would ensure, through inspection and routine maintenance that all equipment is functioning properly. Further, designated personnel would be trained in the use and maintenance of the equipment.

It is anticipated that there would be no significant HTRW impacts from the Recommended Plan.

5.0 Cumulative Impacts

The Council on Environmental Quality (CEQ) Regulations defines cumulative impacts 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (CEQ, 1997). The cumulative impacts addressed in this document consist of the impacts of multiple actions that result in similar effects on the natural resources. The geographic extent for this analysis is a 3-mile diameter area centered on the SPIA. The temporal framework is the period preceding the proposed project and terminating with the end of the SPIA flood damage reduction project construction, estimated at 21 months. Operation of the flood damage reduction project during the service life of the project is not expected to add to impacts from other reasonably foreseeable actions.

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5.1 Foreseeable Future Actions

Foreseeable actions include actions reasonably expected to occur that could add to or amplify the effects from this project. While full details of some future actions may not be available, enough information should be obtainable to allow for a reasonable evaluation of potential environmental effects relative to effects from this project.

The reasonably foreseeable actions considered in the EA include the ongoing or planned actions by the City or Jackson County within 3 miles of the SPIA as summarized below. These actions have some potential for an additive or cumulative effect on environmental impacts added to the SPIA flood damage reduction project and they are reasonably expected to be completed within the same period as the project construction or during the operational life of the flood damage reduction project.

Swope Park Industrial Area Flyover Access Bridge (City)

Kansas City has indicated that they intend to construct a new flyover bridge that would be built on/over the new earthen levee segment along the north end of the unused landfill site. The City proposed to construct the flyover bridge independent of the Corps action and using their own funding. Construction of the flyover bridge by the Project Sponsor would negate the need for the rolling gate at 75th Street. The flyover bridge has been determined to have independent utility from the Corps project. Absent the Corps flood damage reduction measures it would still provide full time access to the site by crossing up and over the railroad track and improve safety for employees/visitors to the industrial area. Construction of the flyover bridge by the Project Sponsor could allow the Corps to remove the rolling gate at 75th St. from the Corps' design and replace it with a continuous section of floodwall saving project funds. Removal of the rolling gate from the Corps' design would take place once the Project Sponsor has provided the necessary documentation to ensure the bridge's construction. Based on this information the Corps has evaluated the impacts of the Project Sponsors proposed flyover bridge as a reasonably foreseeable action. In addition, the Corps has conducted a new Section 404 of the Clean Water Act jurisdictional determination for the project area and has reassessed project compliance and mitigation requirements. The construction of the flyover bridge would impact approximately 0.46 acres of wetland along the north end of the unused landfill cell (wetland LF-8). These impacts to these wetlands would be considered long term minor. Impacts to recreation and aesthetics would be greatest during the actual construction activity. However, the proposed project would result in minor long term benefits to public safety and economic stability for businesses, employees and customers who depend on continued access to the Swope Park Industrial Area.

Recreational Improvements in Swope Park (City and County)

The City and County have plans to develop a small park area and hiking trail near the upstream terminus of the project as part of a citywide trail system linking various parks. Future development of the trail system connecting the Blue River Parkway and Swope Park could make these facilities available to a wider group of recreation users, including

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the public. The planned improvements would provide opportunities for recreational enhancement that would initially provide a benefit to employees of businesses in the SPIA, although limited public access would be available. Because limited public access would continue, and the planned recreational use is primarily passive recreation (i.e., outdoor lunch area, hiking trail), the planned recreational additions would have a minimal cumulative environmental effect that would be beneficial to recreation use near the SPIA.

Mid-America Resource Council (MARC)

An extensive system of biking, hiking, and equestrian trails are under construction connecting Swope Park to Blue River Park. These trails are not expected to have any impacts on the SPIA project.

City Development Plan for the Swope Area

The City Development Plan for the Swope Area is in development and specific details were not available at the time of this report submittal. The Swope Area planning region is bounded by Emanuel Cleaver Boulevard and Swope Boulevard to the north; the Blue River and the Kansas City Southern Railroad to the east; Oldham Road, Blue River Road and the Blue River to the south, and Paseo Boulevard to the west. Land use within the planning area generally can be characterized as low to high density residential, with some commercial and industrial development interspersed along major roads, railroad corridors and along the Blue River. Low-density residential and light industrial are concentrated in locations nearest the SPIA, while residential density tends to increase with distance from the SPIA. Vacant lots are present in scattered locations, and some near the SPIA have a naturalized appearance, with moderate-sized trees and shrubs present.

Infill residential or commercial development using these vacant lots is feasible, although new development in currently wooded areas is unlikely. Residential, industrial and commercial redevelopment has a potential to affect existing streams, including the Blue River, by increasing surface runoff, thereby increasing erosion and sedimentation, including possible contaminants such as petroleum products. However, numerous development regulations (e.g., grading permits, dust control permits, storm water construction general permits, CWA Section 404 permits, etc.) and best management practices (BMPs) that collectively address regulatory requirements should have the effect of lowering the overall cumulative impact from development to a non-significant level. Because much of the SPIA is surrounded by parkland, any residential, commercial or industrial development adjacent to the SPIA is likely to be limited to areas west of the SPIA site, assuming the park areas remain in the public trust. Because much of the area west of the SPIA site is already developed, with impervious surfaces unlikely to be substantially increased over the current impervious area, the overall effect of such development is likely to be incremental, allowing time for adjustments to the regional storm water management. In addition, sewer repairs and upgrades throughout the City are scheduled to address Combined Sewer Overflow

issues, which would have the effect of reducing storm water runoff, thereby potentially compensating for increases in impervious surface in the SPIA region.

Sidewalk Improvements on East 75th Street between US 71 and Cleveland Avenue

The City has plans to improve the existing sidewalks at East 75th Street, between Bruce Watkins Drive and Cleveland Avenue. Cleveland Avenue is the last north-south oriented street west of the SPIA with access to the SPIA. It also is the origination point of the proposed SPIA access via the re-aligned East 75th Street. Sidewalk improvements would introduce construction traffic, such as trucks and concrete mixers to the area. Washout of concrete mixers could produce effluent containing pollutants that might eventually be transported to the Blue River. Added to the concrete work to be done in the SPIA, the relative scale of effects from the sidewalk improvements would be localized, and conventional requirements to prevent polluted runoff from construction sites should be sufficient to prevent significant cumulative impacts. Because the area affected by sidewalk improvements is already impervious surface, runoff amounts are not likely to be significantly different from the existing condition.

Noble Park Improvements (75th and Cleveland)

Noble Park is a city park bounded west to east by Indiana and Cleveland Avenues and north-south by 73rd Street and 75th Street. Improvements are planned for this park, although the nature of these improvements is not clear. However, the unnamed tributary north of the SPIA apparently has its origin in Noble Park, and pollutants (mostly sediments from soil erosion) entering the stream would be conveyed through Swope Park to the Blue River. However, the scale of accumulated pollutants in the unnamed tributary is likely to be minor relative to the SPIA flood damage reduction project construction. In addition, the park improvements would be subject to their own environmental review, some of which would likely result in impact reductions using conventional BMPs. Therefore, it is anticipated that park improvements in Noble Park are unlikely to contribute to measureable water quality problems when compared with the SPIA flood damage reduction project.

Kansas City Wildlands and MDC Restoration Work in the Blue River Parkway

Prescribed burning, brush cutting and other work to restore native plant communities in the Blue River Parkway are planned at irregular ongoing intervals. Kansas City Wildlands and the MDC are working together on these projects, along with volunteers. While specific dates for restoration work were not available, restoration work is likely to be a continuing intermittent activity in the Blue Parkway beyond the period covered by this analysis. However, the likely impacts from restoration work are considered temporary and minimal and they would ultimately benefit the region. The impacts most likely to affect the SPIA project would arise from air quality conditions and soot generated during controlled burns; however, since the prevailing winds generally would move smoke and soot away from the SPIA and because air emissions from the SPIA project are considered short-term and temporary, the cumulative impact to air quality is considered minor. Brush cutting and related activities would be localized and unlikely to contribute to SPIA project cumulative effects.

Increased Residential or Commercial Development West of Tracks

Existing vacant lots near the SPIA could be developed for additional residential or commercial purposes, converting vegetated areas to impervious surfaces that could increase surface runoff entering the Blue River. However, storm water runoff from these areas would pass through the City's storm water management system before entering the river and is therefore unlikely to add to impacts from the SPIA since the flood damage reduction project would provide a controlled release of storm water instead of the current uncontrolled situation.

5.2 Cumulative Impacts: Natural Resources

Project-related natural resource impacts in combination with other reasonably foreseeable actions are discussed in the following subsections, including wetlands, streams and floodplains, physiography and soils, vegetation, aquatic and terrestrial fauna, and threatened and endangered species.

5.2.1 Cumulative Impacts: Wetlands, Streams, and Floodplains

The area most likely affected by the addition of other reasonably foreseeable actions is the wetland LF-8 at the north end of the unused landfill. The additional fill is needed to support the flyover bridge would impact approximately 0.46 acres of wetland.

Streams in the region are largely confined to an existing channel without the ability to forge new channels because of past development and subsequent efforts to channelize and control streams. Some streams may have been put underground in pipes. Relatively undeveloped areas may contain uncontrolled streams, and storm water runoff may have created or would create new stream channels that limit the extent of any expanded development. Stream impacts from the SPIA project are related to bank stabilization of the right and left banks south of the SPIA and at the unnamed tributary stream north of the SPIA. These impacts arise from placement of rock riprap in the existing river channel, with some channel grading anticipated. However, the extent of these stream impacts relative to other actions coupled with the Recommended Plan are minor, but long-term. Eventually, the riprap and articulating concrete mat at and below the waterline would likely become silted over and provide fish habitat, particularly if it becomes vegetated. Vegetation that grows in the riprap located adjacent to the river would be allowed to flourish. Woody vegetation that grows in the riprap areas above the waterline would be removed.

Storm water during construction could potentially transport sediment and possibly pollution into the unnamed tributary of the Blue River and the Blue River. The project would be required to implement a SWPPP, which would address BMPs designed to minimize potential impacts to surface water. Potential impacts to surface waters from construction-related sediment transport are expected to be minimal with correct implementation and management of storm water BMPs.

5.2.2 Cumulative Impacts: Physiography and Soils

The process of development generally has adverse effects on soils, altering or modifying soil properties and structure. However, the relative change incurred from the SPIA flood damage reduction project would be smaller than the change related to general urban development since most of the site is already developed and flood damage reduction structures would be in mostly existing disturbed areas. Furthermore, natural processes of soil formation would not be interrupted in the SPIA or the Swope Park portions of the site, except where floodwall and levees would be constructed. The existing Blue River left bank near the SPIA is eroding, causing sedimentation in the river, which degrades water quality. Bank stabilization as part of the Recommended Plan would reduce or eliminate this erosion, thus suspending further soil-break down and stabilizing the riverbank. Physiography would not be significantly affected, since no large-scale grading would occur.

Soils in the vicinity of the SPIA would remain much as they are now, with the possible exception of infill projects on currently vacant lots outside the SPIA. However, most of the potentially affected areas have been disturbed in the past and new development would not have a significant regional-level impact on the soils. Impacts to physiography are unlikely since most grading was completed in the past and regional-scale grading is unlikely to be required for new development.

5.2.3 Cumulative Impacts: Vegetation

Vegetation clearing in the immediate vicinity of the SPIA would be limited to the area necessary for floodwall and levee placement, and stabilization of the left and right banks of the Blue River necessary to prevent failure of the floodwall and to limit left bank erosion. After construction is completed, the cleared area would be maintained as needed to prevent floodwall or levee failure (i.e., removal of woody vegetation except in the areas at or below the waterline of the river). The creation of additional "edge" habitat in the area cleared for the left bank stabilization would be the largest single area cleared by the project. No similar actions from other projects are anticipated since most vegetation in the vicinity is within Swope Park, which is protected. However, disturbed soils can allow invasive species to gain a foothold, eventually becoming uncontrollable without drastic measures. In particular, regeneration from seeds or cut vegetation by invasive honeysuckle (*Lonicera spp.*) in the SPIA undeveloped area may occur where suitable conditions are present. Clearing for recreational trails (hiking or biking trails) is not expected to remove large numbers of trees, since trails would be allowed to meander and avoid most trees, while providing some locations for viewing when appropriate. The amount of ground cover removed would be minimal and is unlikely to have a significantly adverse effect on the remaining vegetation.

Vegetation in portions of the City west of the SPIA is incidental in areas zoned for light industrial, and generally limited to property edges and residential landscape. Clearing

of vegetation reaching the same magnitude as the SPIA left bank stabilization is unlikely.

Therefore, the overall cumulative effect on vegetation is expected to be small-scale, localized and short- to moderate-term. Effects on wooded habitat would be long-term and permanent, but would be localized and partially offset by the increase in habitat complexity and edge habitat to increase habitat diversity.

5.2.4 Cumulative Impacts: Aquatic and Terrestrial Fauna

The existing habitat outside of Swope Park is urbanized and unlikely to support large resident wildlife assemblages. None of the reasonably foreseeable actions would have a large cumulative effect on terrestrial fauna since existing conditions and habitat in the SPIA vicinity would be relatively unchanged. Reasonably large wooded areas and other habitats would remain in Swope Park, so refugia are available in which temporarily displaced terrestrial wildlife could persist during project construction or while habitat conditions in the SPIA improve sufficiently to allow for re-colonization. Conversely, the cumulative effect on aquatic fauna may be to increase the diversity of the community as water quality conditions are improved through improvements in the City's storm water runoff control and other related measures. Habitat complexity in the Blue River would be increased because of riprap placed in the river channel, which if vegetated might provide nursery habitat for some fish species. Proposed channel modifications in the Blue River would have little effect on past actions related to flood control since upstream/downstream movements would not be obstructed, similar to the present conditions. Movement of some terrestrial wildlife may be partially obstructed by the floodwall, but most terrestrial species should be able to move into and out of the SPIA in much the same way they do now. The level of wildlife impacts is not expected to be significant, particularly given the sparse habitat in an industrial park largely given over to buildings and lawns.

Therefore, cumulative effects on terrestrial and aquatic fauna from the Recommended Plan and foreseeable future actions would result in small-scale localized long-term adverse effects on terrestrial and aquatic fauna. However, the same effects are occurring throughout the City and eventually it is anticipated that wildlife using the SPIA would recover locally in parallel with habitat availability and quality in similar fashion to natural or naturalized areas throughout the City. Since no known conservative species (i.e., threatened or endangered species and rare or sensitive habitat specialists) are present, the species assemblage after SPIA construction is anticipated to be similar in scale and composition to the present assemblage.

5.2.5 Cumulative Impacts: Threatened and Endangered Species

As discussed in section 4.1.5, no long-term adverse effects on threatened or endangered species are anticipated. The threatened and endangered species reported as occurring in Jackson County, Missouri, do not rely on urban habitats, although some

are capable of using urban habitats for nesting and foraging. The larger portions of Swope Park and the Blue River Parkway east of the SPIA provides habitat usable by some of these species. However, Swope Park would not be significantly affected by the Recommended Plan or other reasonably foreseeable actions in the SPIA vicinity.

5.2.6 Cumulative Impacts: Invasive Species

As discussed in section 4.1.6, the project would not be expected to have a positive impact on invasive species. The construction contractor would be required to ensure that all construction equipment has been cleaned and is free from soil residuals, egg deposits from plant pests, noxious weeds, plant seeds, and aquatic nuisance species prior to its use on the project. Disturbed land areas would be replanted with native plant species such as big bluestem, Indiangrass, switchgrass, eastern redbud, rough-leaved dogwood, and Chickasaw plum to minimize the likelihood that invasive plants would become established.

5.3 Cumulative Impacts: Cultural Resources

As discussed in section 4.2, the cumulative impacts of the Recommended Plan and the Foreseeable Future Actions would not have an impact on sites listed on or eligible for listing on the National Register of Historic Places. However, deep testing is required within the portion of site 23JA489 mapped within the area of the proposed storm water detention basin to ensure that no currently unknown archeological materials are buried on the site. The testing will be completed after permission has been granted by the landowner or after the land is obtained by Kansas City but prior to construction of the detention basin.

5.4 Cumulative Impacts: Socioeconomic Resources

Project-related socioeconomic impacts in combination with other reasonably foreseeable actions are discussed in the following subsections, including recreation, aesthetics and public safety.

5.4.1 Cumulative Impacts: Recreation

The Recommended Plan would have localized long-term adverse effects on recreation opportunities in the SPIA, primarily passive recreation by employees in the SPIA during breaks. Clearing of trees and other vegetation for bank stabilization on the left and right banks of the Blue River and the unnamed tributary north of the SPIA would affect the use of these locations. However, current recreational use is limited, although all locations are on public lands. Planned development of a trail system in Swope Park, including portions of the SPIA vicinity in the park and the Blue River Parkway, could offset the impacts from clearing by making more of the area near the SPIA accessible by the public as well as employees in the SPIA.

5.4.2 Cumulative Impacts: Aesthetics

Vegetation clearing for bank stabilization on the banks of the Blue River and the unnamed tributary would adversely affect aesthetics by permanent conversion of these areas to an open area covered with riprap. The resulting plant and wildlife community would be different from that in the wooded portions of the SPIA vicinity, which may eventually provide additional aesthetics to the park areas near the SPIA by increasing local habitat complexity. Development of recreational opportunities in Swope Park and the Blue River Parkway could further enhance the aesthetics of the area by providing additional opportunities for public use.

5.4.3 Cumulative Impacts: Public Safety

Along with the flood damage reduction project for the SPIA, the proposed alternative access via the realigned East 75th Street roadway that would connect at Manchester Trafficway is the most significant cumulative impact associated with the Recommended Plan. The Recommended Plan and the alternative SPIA access would be beneficial to public safety by removing the threat of floods while providing an all-weather access to the SPIA and removing the public and employees in the SPIA from train traffic since the at-grade track crossing would be closed. The proposed flyover bridge would allow continuous access to the site by emergency personnel without interference by railroad traffic or floodwaters. However, the site would still be limited to a single entrance and egress to the SPIA.

5.5 Cumulative Impacts: Hazardous, Toxic, and Radioactive Wastes

No known hazardous, toxic or radioactive waste (HTRW) sources are known outside the SPIA vicinity, although household chemicals are likely to be used in small amounts. Because such materials are regulated in a manufacturing setting, onsite activities are unlikely to result in substantial adverse impacts. The existing storage yard at the eastern end of the SPIA would be replaced by the storm water detention pond and existing HTRW materials on this property would be removed before any project-related construction. Construction contractors would be required to implement control plans to prevent spills of hazardous or toxic materials and to prevent transport of such material into waterbodies. Therefore, cumulative effects from HTRW are anticipated to be negligible.

6.0 Mitigation Measures

Locations that are filled and/or disturbed would be seeded and planted with native herbaceous and woody vegetation such as big bluestem, Indiangrass, switchgrass, eastern redbud, rough-leaved dogwood, and Chickasaw plum following construction to stabilize the soil as a part of BMP's. The Recommended Plan is expected to impact 0.3 acres of wetland and approximately 6.4 acres of riparian habitat. The MSMM is used to determine compensatory mitigation for Clean Water Act Section 404 within the state of

U.S. Army Corps of Engineers - Kansas City District

Missouri. This method has been publicly vetted and approved for use by Corps Regulatory Offices within the State of Missouri. Using the MSMM, a total of 4,100 debits were generated by armoring the streambanks. A total of 3,646 credits were generated by providing streambank stability along the combined 1,511 feet of streambank from the Blue River and the unnamed tributary on the northern edge of the project area, resulting in a net of 454 debits. The Foreseeable Future Actions (the City's Flyover Bridge) is expected to impact approximately 0.46 acres of wetland. In order to offset these cumulative impacts, WRDA 2007 Section 2036(c) guidance directs USACE to utilize approved mitigation banks. The City would be solely responsible for their portion of wetland impacts resulting from the construction of the fly over bridge.

7.0 Conclusion

As part of the environmental review for this project, the following measures, including changes in project design, construction methods, or construction materials, were taken to avoid or minimize environmental impacts as much as practicable. This has been accomplished through a floodwall and smaller levees for most of the alignment (instead of multiple levees over a larger area); reducing the linear extent of bank stabilization along the Blue River and the unnamed tributary to the minimum necessary; and constructing the flood damage reduction project as close to the existing development as possible while allowing for fire, safety, and emergency access.

Based on the information in this EA, the Corps has made the preliminary determination that the Recommended Plan complies with the requirements of Section 404, including Sections 404(b)(1), and it is not contrary to the public interest. The Recommended Plan would have positive effects for SPIA business owners and employees, as there would be less flooding, reduced economic loss from natural disaster, and improved public safety. All practicable measures to avoid and/or minimize project related impacts to aquatic resources and natural areas on adjacent parkland have been incorporated in the project design. There are no expectations that any federally listed threatened or endangered species or critical habitat would be adversely affected by the proposed project. The project is not expected to adversely impact any historic properties listed in or eligible for listing in the National Register of Historic Places or the Missouri Cultural Resource Inventory. Coordination efforts with the SHPO resulted in concurrence with the USACE's determination that there would be no effect on any sites listed or eligible for the National Register of Historic Places, historic properties, or other sites with historical significance.

In consideration of the above, the Recommended Plan would have no significant adverse impacts on the human environment. Therefore, the preparation of an Environmental Impact Statement (EIS) is not required and a FONSI has been prepared.

U.S. Army Corps of Engineers - Kansas City District

8.0 Coordination and Comments

The USACE circulated a Public Notice for the Draft Updated Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), for a thirty-day public comment period ending on April 2, 2014. This Public Notice was also e-mailed to individuals/agencies/businesses listed on the USACE Regulatory e-mail distribution list. USACE received and addressed comments from the Missouri Department of Natural Resources (Appendix VII).

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9.0 Agency Compliance with Other Environmental Laws

Compliance with other environmental laws is listed below.

Federal Policies	Compliance
Archaeological Resources Protection Act, 16 U.S.C. 470, et seq.	Full Compliance
Clean Air Act, as amended, 42 U.S. C. 7401-7671g, et seq.	Full Compliance
Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq.	Full Compliance
Endangered Species Act, 16 U.S.C. 1531, et seq.	Full Compliance
Environmental Justice (Executive Order 12898)	Full Compliance
Farmland Protection Policy Act, 7 U.S.C. 4201, et seq.	Full Compliance
Federal Water Project Recreation Act, 16 U.S.C. 4601-12, et seq.	Full Compliance
Fish and Wildlife Coordination Act, 16 U.S.C. 661, et seq.	Full Compliance
Floodplain Management (Executive Order 11988)	Full Compliance
Invasive Species (Executive Order 13122)	Full Compliance
Land and Water Conservation Fund Act, 16 U.S.C. 4601-4, et seq.	Not Applicable
Migratory Bird Treaty Act, 16 U.S.C. 703 – 712, et seq.	Full Compliance
National Environmental Policy Act, 42 U.S.C. 4321, et seq.	Full Compliance
National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470a, et seq.	Full Compliance
Protection & Enhancement of the Cultural Environment (Executive Order 11593)	Full Compliance
Protection of Wetlands (Executive Order 11990)	Full Compliance
Rivers and Harbors Act, 33 U.S.C. 403, et seq.	Full Compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	Full Compliance
Wild and Scenic River Act, 16 U.S.C. 1271, et seq.	Full Compliance

NOTES:

- a. Full compliance. Having met all requirements of the statute for the current stage of planning (either preauthorization or post authorization).
- b. Partial compliance. Not having met some of the requirements that normally are met in the current stage of planning.
- c. Noncompliance. Violation of a requirement of the statute.
- d. Not applicable. No requirements for the statute required; compliance for the current stage of planning.

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10.0 References

- Black & Veatch. 2010. U.S. Army Corps of Engineers, Kansas City District, Swope Park Industrial Area Flood Protection, Design Documentation Report (DDR). February 2010, Volume 1 of 2. Prepared by Black & Veatch Special Projects Corporation for U.S. Army Corps of Engineers, Kansas City District. Contract No. W912DQ-08-D-0014, 95% Submittal.
- Black & Veatch. 2012a. Wetland Delineation Report, Swope Park Industrial Area (SPIA) Flood Reduction Project, Kansas City, Jackson County, Missouri. Prepared for U.S. Army Corps of Engineers, Kansas City District.
- CEQ. 1997. January, 1997. Considering Cumulative Effects Under the National Environmental Policy Act. Executive Office of the President, Washington, D.C. pp ix-x, 28-29 and 49-57.
- Missouri Department of Conservation (MDC). 2011. Inventory and Assessment of the Blue River Watershed. Online report at <http://mdc.mo.gov/landwater-care/stream-and-watershed-management/missouri-watersheds/blue-river>.
- Missouri Department of Conservation (MDC). 2014. Missouri Endangered Species. <http://mdc.mo.gov/discover-nature/field-guide/endangered-species>
- Schroeder, W.A. 1985. The Presettlement Prairie in the Kansas City Region (Jackson County, Missouri). Missouri Prairie Foundation. <http://www.moprairie.org/documents/MPJDecember1985-KansasCity.pdf>
- U.S. Army Corps of Engineers, Kansas City District (USACE). 2000. Swope Park Industrial Area, Kansas City, Missouri, Blue River Basin, Hazardous, Toxic, and Radioactive Waste Assessment Report, U.S. Army Corps of Engineers, Kansas City District.
- U.S. Army Corps of Engineers, Kansas City District (USACE). 2002. Final environmental Assessment for Flood Damage Reduction and Related Measures, Swope Park Industrial Area, Blue River Basin, Kansas City, Missouri.
- U.S. Army Corps of Engineers, Kansas City District (USACE). 2003. Feasibility Study Report, Swope Park Industrial Area, Kansas City, Missouri.
- U.S. Army Corps of Engineers, Kansas City District (USACE). 2005. Blue River Greenway Master Plan Study: Phase 1 Report. Prepared for U.S. Army Corps of Engineers, Kansas City District and Kansas City, MO Public Works by HAZMED Woolpert, Inc.
- U.S. Fish and Wildlife Service. 2014. <http://www.fws.gov/midwest/endangered/lists/missouri-cty.html>

U.S. Army Corps of Engineers - Kansas City District

11.0 List of Preparers

Name	Organization	EA Responsibility
Seth LaLiberty	U.S. Army Corps of Engineers, Kansas City District	Project Manager
Kent Meyers	U.S. Army Corps of Engineers, Kansas City District	Project Manager
Dave Hoover	U.S. Army Corps of Engineers, Kansas City District	Environmental Resources Manager
Rick Morrow	U.S. Army Corps of Engineers, Kansas City District	Environmental Resources Manager
Tim Meade	U.S. Army Corps of Engineers, Kansas City District	District Archeaologist
Lynda Hoffman	City of Kansas City, Missouri, Waterways	City Representative, Reviewer
Mickey Cruse	City of Kansas City, Missouri, Waterways	City Representative, Reviewer
Ed Shadrick	Black & Veatch	Environmental Author
Sarah Howard	Black & Veatch	Environmental Scientist
Raul Filardi	Black & Veatch	Task Order Manager
Laura McNeil	Black & Veatch	Environmental Scientist, Reviewer
Stephanie Hale	Black & Veatch	Engineering Design
Dan Finn	Black & Veatch	Hydraulics Engineer
Jason Hascall	Black & Veatch	Structural Engineer
Leon Schieber	Black & Veatch	Program Manager
Bob Hillman	Black & Veatch	Project Manager
Jim Higgins	Black & Veatch	Geotechnical Engineer
Genise M. Lueke	Black & Veatch	Environmental Reviewer

12.0 Appendices

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APPENDIX I
PROJECT FIGURES & DRAWINGS

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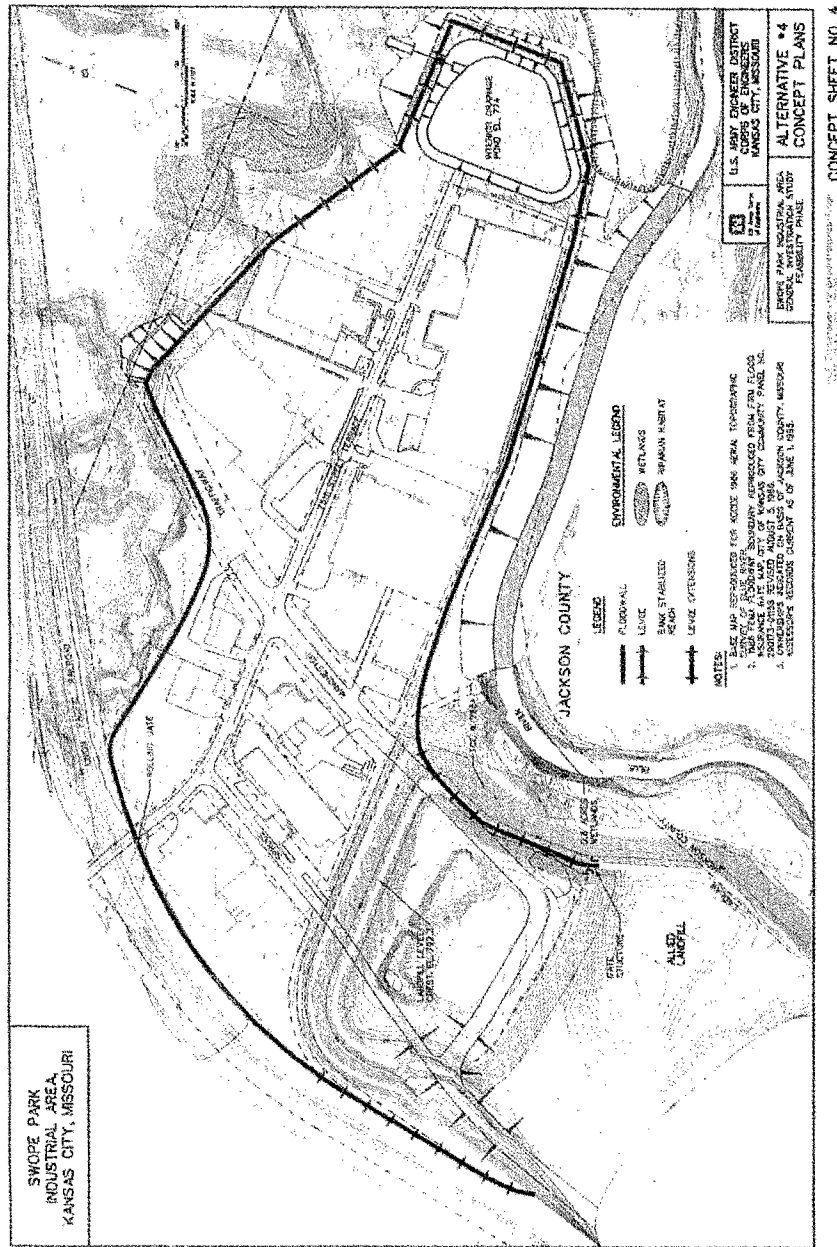


Figure 1 – Original design from 2002 SPIA EA

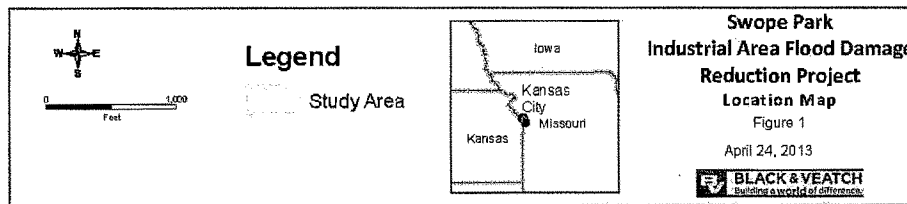
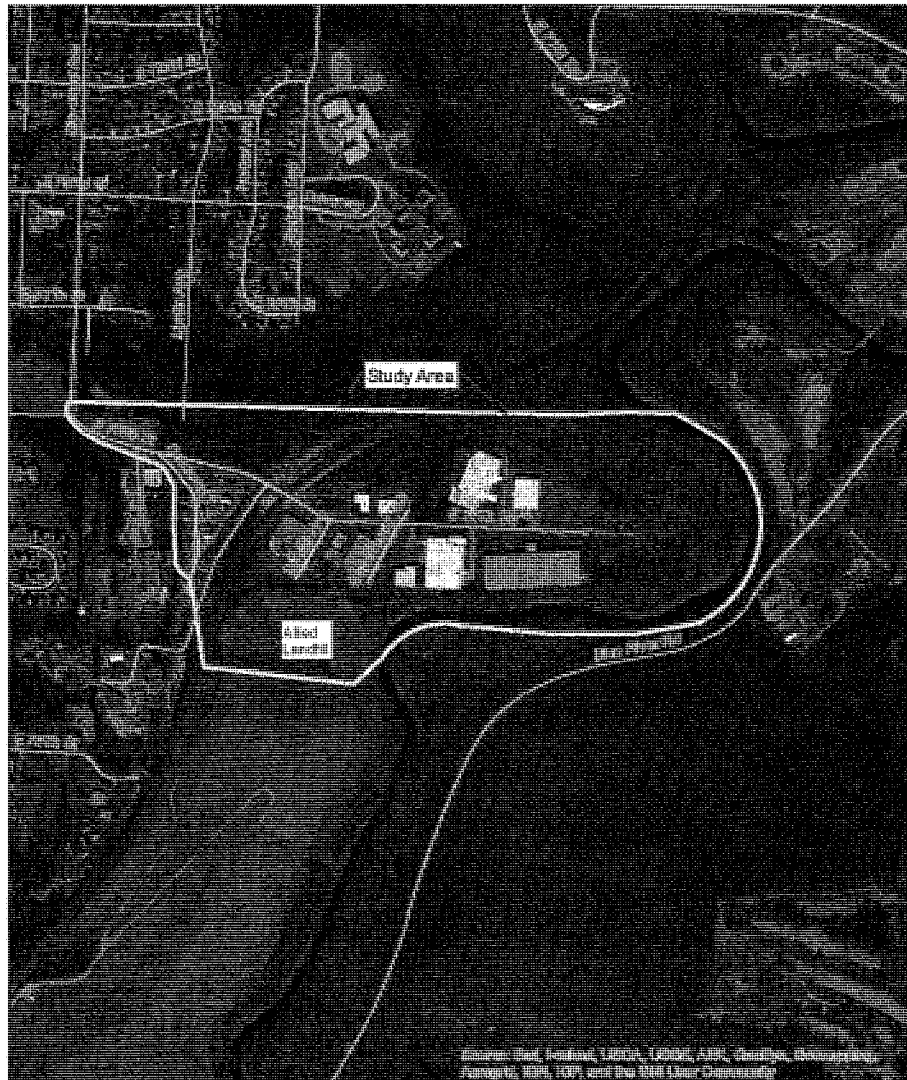


Figure 2 – Project Location

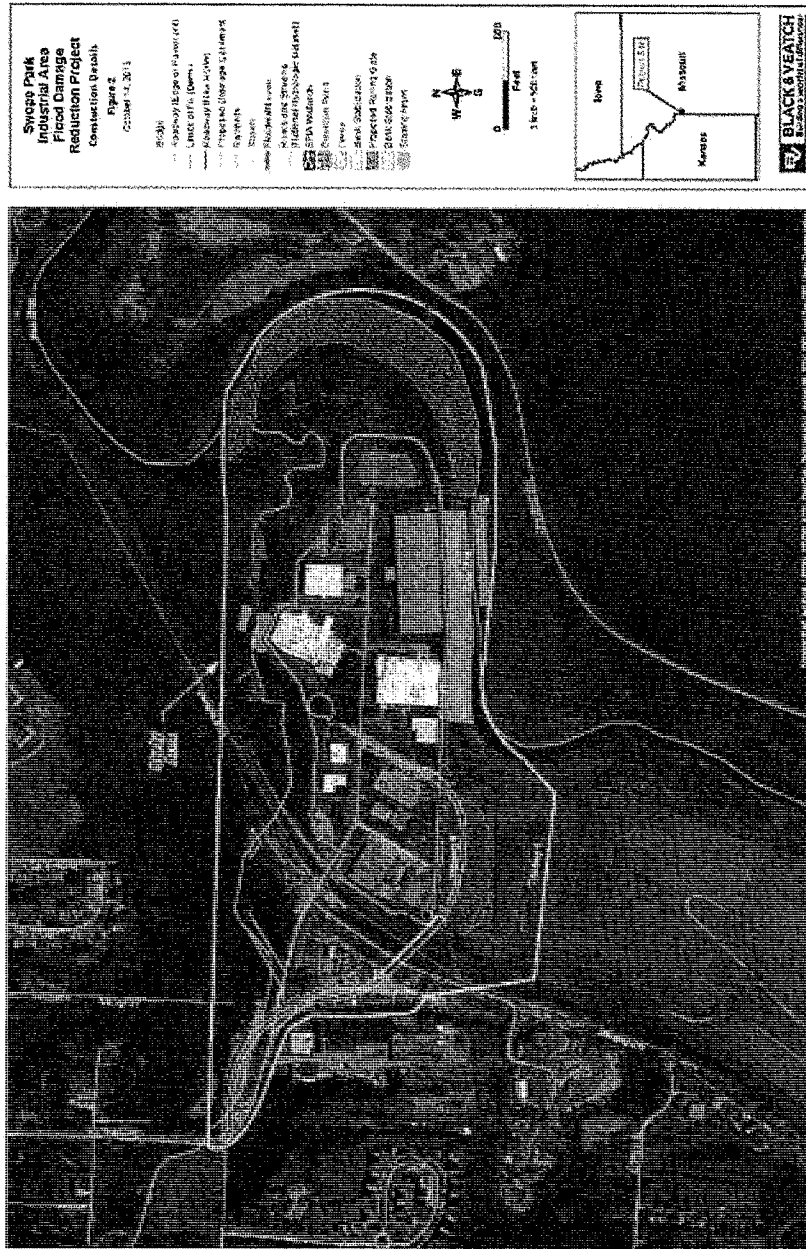


Figure 3 – SPIA project with design changes

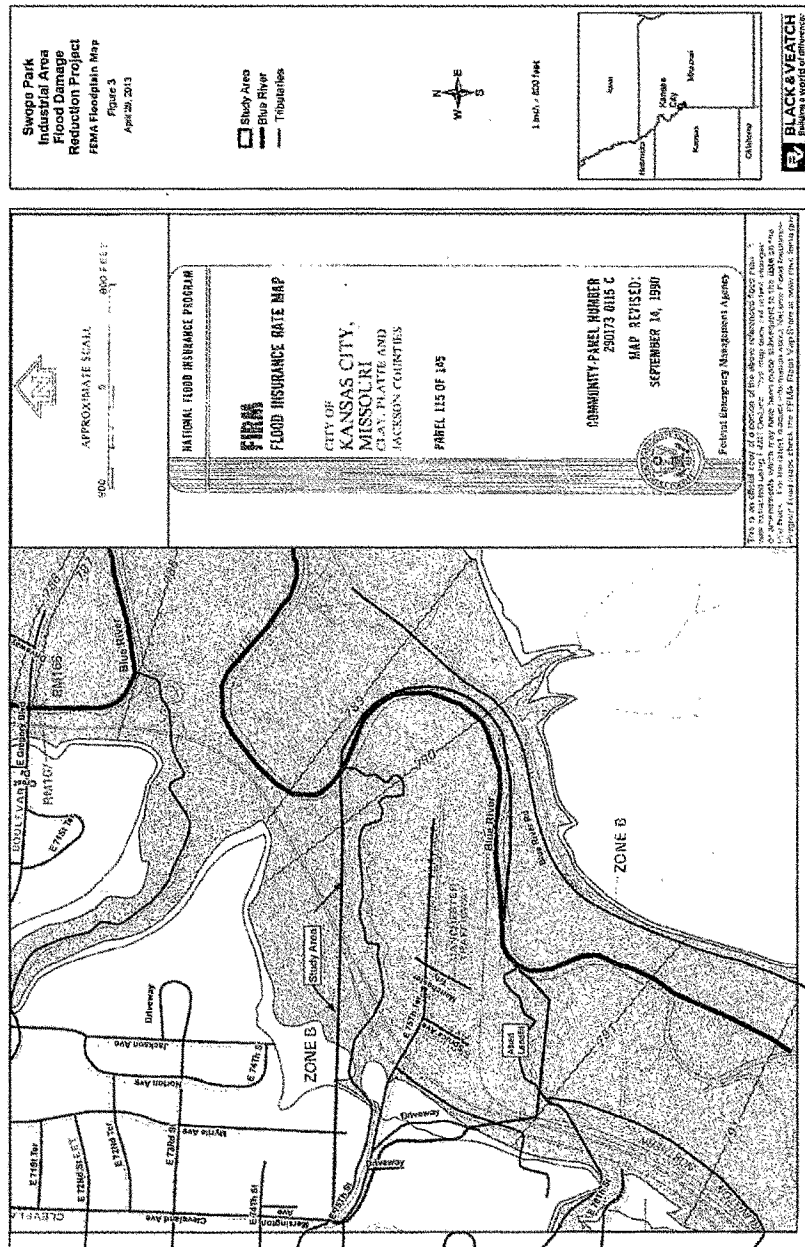


Figure 4 – SPIA/FEMA Floodplain Map

APPENDIX II
U.S. FISH AND WILDLIFE SERVICE COORDINATION

Environmental Assessment
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Myers, Kent N NWK

From: Morrow, Rick NWK
Sent: Friday, March 25, 2016 10:11 AM
To: Grothaus, John J NWK
Cc: Myers, Kent N NWK; Corkill, Melissa R NWK
Subject: FW: [EXTERNAL] Swope park (UNCLASSIFIED)
Classification: UNCLASSIFIED

CLASSIFICATION: UNCLASSIFIED

-----Original Message-----

From: Jane Ledwin [mailto:jane_ledwin@fws.gov]
 Sent: Friday, March 25, 2016 9:23 AM
 To: Morrow, Rick NWK <Rick.Morrow@usace.army.mil>
 Cc: Amy Salveter (USFWS): amy_salveter@fws.gov <amy_salveter@fws.gov>; Farmer, Jason W NWK
 <Jason.W.Farmer@usace.army.mil>; Switzer, Jennifer L NWK <Jennifer.L.Switzer@usace.army.mil>
 Subject: [EXTERNAL] Swope park

Hi Rick

Sorry for the short response but I'm on the road without access to my files. Based on the information you provided Amy Salveter in your March 24th emails, the Service concurs with the Corps determination that the proposed activities are not likely to adversely affect federally listed species.

Best regards

Jane Ledwin

Sent via the Samsung Galaxy Note® 3, an AT&T 4G LTE smartphone
 CLASSIFICATION: UNCLASSIFIED

MEMORANDUM FOR RECORD

FROM: CENWK-PM-PR

DATE: 5 May 2014

FOR: CENWK-PM-CJ (Myers)

SUBJECT: Coordination with United States Fish and Wildlife Service for Swope Park Industrial Area Flood Risk Management project

An email was sent to Mr. Rick Hansen at the United States Fish and Wildlife Service, Columbia, Missouri office (FWS) on November 19, 2013 asking for new considerations at the Swope Park Industrial Area (SPIA). This was done due to the time that had passed since the previous 2002 EA to insure coordination was current. The attached letter was our only response despite numerous email and phone requests for a more formal response. The letter reiterates Mr. Hansen's concern for completion of an Indiana Bat Habitat Survey, but no other issues were noted. It is our assumption that the FWS's lack of further responses indicates the agency has no other concerns at the SPIA. The attached letter is to serve as our proof of coordination.

Prepared By:



Mr. Rick Morrow
Biologist, Environmental Resources Section

From: [Hansen, Rick](#)
To: [Morrow, Rick NWK](#); [Shauna Marquardt](#)
Subject: [EXTERNAL] Re: Swope Park Industrial Area (UNCLASSIFIED)
Date: Tuesday, November 19, 2013 12:41:05 PM
Attachments: [Ibat Habitat Assessment Worksheet.pdf](#)

Rick:

In response to you recent messages about the Swope Park project, one thing we need to look at more closely is the possible impacts to the Indiana and Northern long-eared bat. There is new information on the Indiana bat that was not considered in my coordination act letter in 2002. The Northern long-eared bat was recently proposed endangered. Both species have similar habitat requirements. Shauna Marquardt has the lead for these two species and I will keep her in the loop on future actions with this project

I have attached a habitat assessment worksheet that might be used for both species. Look at the assessment form and less discuss the applicability of the form for the proposed project.

Rick

On Tue, Nov 19, 2013 at 10:20 AM, Morrow, Rick NWK <Rick.Morrow@usace.army.mil> wrote:

Classification: UNCLASSIFIED
 Caveats: NONE

Howdy Mr. Hansen,

I have inherited an old project from Dave Hoover and he mentioned that you were the person he worked with back in 2002 when this project was first started. The Swope Park Industrial Area EA was completed in 2002 but now there are some design changes they want to include and due to the age of the original EA they are re-writing the EA. I have attached some documents that might explain things a bit better (original EA, brief description of changes, map w/changes). I was wanting to get your input on any possible changes to the T&E status for the area. Because of the location of the project, we intend to utilize a mitigation bank and the 2013 MSMM is indicating we will need approx. 3100 credits. Any feedback you would have would be appreciated.

Regards,
 Richard B. Morrow Jr
 US Army Corps of Engineers
 Kansas City District
 Biologist PM-PR
 (816) 389-3073

Classification: UNCLASSIFIED
 Caveats: NONE

Rick L Hansen
U.S. Fish and Wildlife Service
Ecological Services
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203
(573) 234-2132, ext 106
Rick_Hansen@fws.gov

BLACK & V

BLACK & V

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- This county has known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area. See http://mdc.mo.gov/nathis/caves/management_construct.htm for best management information.
- Streams in the area should be protected from soil erosion, water pollution and in-stream activities that modify or diminish aquatic habitats. Best management recommendations relating to streams and rivers may be found at <http://mdc.mo.gov/79>. The project should be managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions. Revegetate areas in which the natural cover is disturbed to minimize erosion using native plant species compatible with the local landscape and wildlife needs. Pollutants, including sediment, can have significant impacts far downstream. Use silt fences and/or vegetative filter strips to buffer streams and drainages, and monitor those after rain events and until a well-rooted ground cover is reestablished.
- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
 - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
 - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
 - When possible, wash and rinse equipment thoroughly with hard spray or HOT water ($\geq 104^{\circ}$ F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned lands could host unknown remnants of species once but no longer common.

Pre-screen heritage review requests at <http://myheritage.kcmv.us>. A "Level 1 response" will make further submission to MDC or USFWS unnecessary.

INDIANA BAT HABITAT ASSESSMENT WORKSHEET

Project Name: Swope Park Industrial Area Flood Risk Management Project Date: 2013 12 18Township/Range/Section: NW ¼ of Section 14, T48N R33WLatitude/Longitude: _____ Surveyor: Morrow/Alig**Project Description**

The project would surround the industrial area with a series of floodwalls and earthen levees. The unnamed tributary in northern end of project area and the Blue River bordering the south will have bank stabilization done to protect the floodwall stability

Project Area		Forest Acres		Open Acres	
Project	Total Acres	% of site	% w/in 1 mile	% of site	% w/in 1 mile
	53	~15	~50	~75	~25
Tree Removal (ac)	Completely cleared	Partially cleared (with leave trees)	Reserve acres- no clearing		
	~6	~3	~9		

Landscape within 3 mile radius**Corridors to other Forested Areas?**

The project site is adjacent to an 1800 acre park with forested areas.

Describe Adjacent Property (e.g. forested, grassland, commercial or residential development, water sources)

East is a large forested park, south is a landfill, north and west are commercial and residential development

Proximity to Public Land

What is the distance (mi.) from the project area to public lands (i.e., national or state forests, national or state parks, conservation areas)?

Approx. 1800 acre Swope Park is directly adjacent to the east.

Sample Site Description

Sample Site No.(s): _____

Water Resources at Sample Site

Stream Type and length	(#)	Ephemeral	Intermittent	Perennial	Describe existing condition of water sources: Three intermittent unnamed tributaries occur in project area. The Blue River borders the south and east of the project area.
			X	X	
Pools/Ponds (# and size)		0	Open and accessible to bats?	N/A	
Wetlands (approx. ac.)		Permanent	Seasonal		
		X			

Forest Resources at Sample Site

Closure/Density	Canopy	Midstory	Understory	1=1-10%, 2=11-0%, 3=21-40%, 4=41-60%, 5=61-0%, 6=81=100%
	/	/	/	
Dominant Species of Mature Trees	Oak species, cottonwood, shagbark hickory, maples, elms hedge, mulberry			
% Preferred Tree Species ≥ 9 in dbh (species list @ right)	write in tree species			
% Trees w/ ≥ 30% Exfoliating Bark	5			
Size Composition of Live Trees (%)	Small (4-8 in)	Med (9-15 in)	Large (>15 in)	
	90	5	5	
No. of Suitable Snags		~15		

Preferred Tree Species

Shagbark hickory

Cottonwood

White oak

Maple

American elm

Shortleaf pine

Other oak species

Standing dead trees with sloughing bark ≥ 30%, crevices, or holes. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Low

IF SUITABLE: HIGH MODERATE LOW

Additional Comments:

The project area is adjacent to an 1800 acre park, however, the park is centered in an urbanized area. There is no access to open pools or ponds in the project area. Typically the project area is on the western edge of the bat's range.

Attach map of project site and development plan

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX III
MISSOURI STATE HISTORIC PRESERVATION OFFICE
COORDINATION

Environmental Assessment
Swope Park Industrial Area Flood
Risk Management Kansas City, Missouri
April 2014



DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
 600 FEDERAL BUILDING
 KANSAS CITY, MISSOURI 64106-2896

January 27, 2014

REPLY TO
 ATTENTION OF

Environmental Resources Section
 Planning Branch

Mr. Mark Miles
 Director and Deputy State Historic Preservation Officer
 State Historic Preservation Office
 Department of Natural Resources
 P. O. Box 176
 Jefferson City, Missouri 65102-0176

Dear Mr. Miles:

The U.S. Army Corps of Engineers, Kansas City District (Corps) is constructing a flood damage reduction project within the Swope Park Industrial Area (SPIA) in Kansas City. The project and associated cultural resource investigations was coordinated with your office in 1995, 1999, and 2002. The project is currently under construction. However, since that time changing factors have necessitated a change in project plans. Attached for your review and comment is a copy of a cultural resource report prepared by R. Christopher Goodwin & Associates, Inc. completed for under subcontract to Black and Veatch, the consultant for the Corps. This letter continues coordination of this project with your office under Section 106 of the National Historic Preservation Act.

The SPIA project is located on a 50 acre site on the left descending bank of the Blue River that drains an approximately 272 square-mile area, much of which is highly urbanized. The industrial park is centered on 75th Terrace and bounded by Union Pacific Railroad tracks to the east and the Blue River channel to the north, south, and west and is almost entirely within the 100-year floodplain. The flood damage reduction plan consists of approximately 6,000 feet of floodwalls and levees to form a perimeter of protection from a 500-year flood event. Included in the authorized project are various floodwall and levee sections, gatewells, ingress/egress, interior drainage collection system, and environmental mitigation.

Since the project was originally approved unforeseen condition changes have required alterations to the original plans. These changes include changes to levee and floodwall alignment to accommodate the abandonment of a planned city roadway. The new alignment would also shift the Blue River; reduce the length of the required levee; reduce the amount of fill needed for the levees; eliminate the need for a second gatewell; eliminate a planned rolling steel flood gate; increase the size of interior drainage pipes; add riprap for increased bank stabilization; and add riprap and grading for additional floodwall protection.

Because of the project changes, the Corps required an updated archeological background review and archeological field investigations of the new project area. The fieldwork was completed by Goodwin and associates from 2011 to 2013. The results of the archeological investigations are presented in the attached report. In sum, one new archeological site (23JA1763) was recorded and two sites (23JA488 and 489) identified during the 1995 survey were revisited. Site 23JA1763 was recorded as a 1921 to 1964 industrial complex and limestone quarry. The site is recommended as not eligible for the National Register of Historic Places (NRHP) and no further work is recommended.

Both sites 23JA488 and 489 had been determined not eligible for the NRHP following the 1999 investigations. The revisit confirmed the "not eligible" determination for 23JA488. However, Goodwin has recommended deep mechanical testing in the landform containing site 23JA489 in the area of the proposed detention basin because of the potential for deeply buried archeological deposits on the alluvial terrace. The previous investigations examined only the first 40 centimeters below ground surface at the site, but the proposed excavation would extend 17 feet in depth. It should be pointed out that the previous investigations had found that the site may be from fill brought in from elsewhere and not an in situ site and that no buried material has been observed within the area. Also, the site is currently under a junk yard and there is a moderate potential for buried hazardous material within the area. The proposed deep testing has not as of yet been undertaken as the land has not been acquired by the city and landowner permission has not been obtained. Goodwin determined that the remainder of the project area has little potential for intact archeological sites or other cultural resources and has recommended that no additional work be undertaken for the project.

The Corps has reviewed the attached report and concurs with Goodwin's recommendations that sites 23JA488 and 23JA1763 are not eligible for the NRHP and that the remainder of the project area, outside of possibly the proposed detention basin area, has little potential to contain NRHP eligible sites. We also agree that deep testing should be conducted in the detention pond area once the land or permission has been obtained and prior to construction. However, if information comes to light through hazmat testing or other means that the area contains buried contaminated material, then we recommend no survey be required for the detention pond area. Thank you for your consideration in this matter. If you have any questions or have need of further information please contact me at timothy.m.meade@usace.army.mil or at (816) 389-3138.

Sincerely,



Timothy Meade
District Archeologist

Enclosure



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

February 5, 2014

Timothy Meade, District Archaeologist
Corps of Engineers, Kansas City District
600 Federal Building
Kansas City, Missouri 64106-2896

Re: Swope Park Industrial Area (COE) Kansas City, Jackson County, Missouri

Dear Mr. Meade:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which requires identification and evaluation of cultural resources.

We have reviewed the report of findings for the cultural resources survey conducted for the Swope Park Industrial Area prepared by R. Christopher Goodwin & Associates, Inc. Based on this review it is evident that a thorough and adequate cultural resources survey has been conducted of the project area. We concur with your recommendation that archaeological site 23JA489 has the potential for deeply buried components and therefore may be eligible for inclusion in the National Register. We also concur that sites 23JA488 and 23JA1763 are not eligible.

We look forward to the opportunity to review and comment on the results of the trench testing that will take place once access to the property has been obtained. Until the Section 106 review and comments process is complete, project plans change, information documenting the revisions should be submitted to this office for further review. In the event that cultural materials are encountered during project activities, all construction should be halted, and this office notified as soon as possible in order to determine the appropriate course of action.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number (070-JA-14) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

A handwritten signature in black ink, reading "Mark A. Miles".

Mark A. Miles
Director and Deputy State
Historic Preservation Officer

MAM:jd

c Brad Wolf, KC



APPENDIX IV
PUBLIC NOTICE
AND
CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

Environmental Assessment
Swope Park Industrial Area Flood
Risk Management Kansas City, Missouri
April 2014

PUBLIC NOTICE



**US Army Corps
of Engineers
Kansas City District**

Permit No. 2014-197
Issue Date: March 3, 2014
Expiration Date: April 2, 2014

30-Day Notice

JOINT PUBLIC NOTICE: This public notice is issued jointly with the Missouri Department of Natural Resources, Water Pollution Control Program. The Department of Natural Resources will use the comments to this notice in deciding whether to grant Section 401 water quality certification. Commenters are requested to furnish a copy of their comments to the Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, Missouri 65102.

APPLICANT: Kansas City District, Corps of Engineers
601 E. 12th Street
Kansas City, Missouri 64106-2896

PROJECT LOCATION: The Swope Park Industrial Area is located on an approximately 53-acre site on the left descending bank of the Blue River between U.S. Highway 49 and Swope Park. It is south of Gregory Boulevard in the NW ¼ of Section 14, T48N R33W in the city of Kansas City, Jackson County, Missouri. The Swope Park Industrial Area access is via East 75th Terrace, east of Cleveland Avenue. The Swope Park Industrial Area is positioned between the Union Pacific railroad tracks and the Blue River. Also included in the project area is an unused 24-acre landfill, bringing the total acreage to approximately 164-acres. A portion of the proposed project would occur in the Blue River, adjacent wetlands and an unnamed tributary.

AUTHORITY: Section 404 of the Clean Water Act (33 USC 1344). This project is authorized by Congress under Section 1001 (29) of WRDA 2007, PL 110-114 (29) Swope Park Industrial Area, Blue River, Kansas City, Missouri.

ACTIVITY: PROPOSED WORK: The U.S. Army Corps of Engineers (USACE) proposes to address flooding problems in the Swope Park Industrial Area and vicinity, and to develop environmentally, socially, economically, and technically acceptable means of resolving these problems. A portion of the proposed project would occur in the Blue River, adjacent wetlands and an unnamed tributary. A major purpose is to control flooding and prevent damage to structures and /or loss of life in the Swope Park Industrial Area. The Selected Plan based on that evaluation was Alternative 4D - Structural Flood Protection: construction of a concrete floodwall and earthen levee around the perimeter of the existing

Swope Park Industrial Area accommodating a new locally funded access road connecting with Manchester Trafficway at the southwest corner of the area and maintaining the existing 75th Street Terrace access to the area. The project features are designed to protect against a flood with a 0.2 annual percent chance of exceedence with an estimated 90 percent reliability. The City of Kansas City, Missouri is the project cost share sponsor. An earlier EA and Finding of No Significant Impact (FONSI) was completed in October 2002 on the Swope Park Industrial Area project and construction initiated. In addition, the project was evaluated for compliance under Section 404 of the Clean Water Act through comments received in response to USACE Public Notice No. 200200796, August 2002. During the final design study design changes were recognized. They include slightly shifting the Blue River channel towards the right bank to insure floodwall stability and additional rock riprap would need to be placed on the channel bottom and right descending bank in response to increased bank erosion of the Blue River channel towards the left bank. Also, the Project Sponsor had determined the access road across the former landfill in the southwest corner of the project area was no longer needed leaving the rolling gate as the sole means of ingress and egress to the project. Based on this information, the Corps would be allowed to remove the two earthen levee segments and replace them with a single segment of earthen levee along the north side of the unused landfill tying into the section of the floodwall adjacent to the railroad tracks on the west and the floodwall at Manchester Trafficway on the east. The Project Sponsor has indicated their intent to construct a new flyover bridge that would build on/over the new earthen levee segment along northern end of unused landfill cell. The Project Sponsor proposes to construct the flyover bridge independent of the Corps action and using their own funding. Construction of the flyover bridge by the Project Sponsor would negate the need for the rolling gate at 75th Street. The flyover bridge has been determined to have independent utility from the Corps project. Absent the Corps flood damage reduction measures it would still provide full time access to the site by crossing up and over the railroad tracks and improve safety for employees/visitors to the industrial area. Construction of the flyover bridge by the Project Sponsor could allow the Corps to remove the rolling gate at 75th St. from the Corps' design and replace it with a continuous section of floodwall. Removing the rolling gate at 75th St. from the Corps' design would not occur until the Corps has been given documentation to insure the bridge's construction.

WETLANDS/ AQUATIC HABITAT: 0.3 acres of wetlands would be unavoidably impacted during the construction of the floodwalls, and earthen levees. As well, the Missouri Stream Mitigation Model indicates that an a debit of 454 units due to in-stream impacts.

APPLICANT'S STATEMENT OF AVOIDANCE, MINIMIZATION, AND COMPENSATORY MITIGATION FOR UNAVOIDABLE IMPACTS TO AQUATIC RESOURCES:

The proposed project has been designed to incorporate all practicable measures to minimize and/or avoid adverse impacts to aquatic resources. During the development of the Environmental Assessment, five alternatives were analyzed. Of the three alternatives that fulfilled the project purpose, the recommended alternative had the least wetland impacts due to avoidance and minimization and the least cost. Due to the lack of suitable sites within the project, and in accordance with Corps Guidance, the Corps is proposing to acquire the necessary project mitigation from an approved mitigation bank.

PROPERTY ADJACENT TO PROJECT AREA: Swope Park and the Blue River Parkway are adjacent to the project area. Other adjacent properties are owned by private individuals.

CULTURAL RESOURCES: A cultural resources background review has been completed by the Kansas City District Archeologist for the proposed project in compliance with the National Historic Preservation Act of 1966 (Public Law 89-665). The review included a check of the National Register of Historic Places (NRHP), archeological site location maps, a review of historic channel and shipwreck maps was conducted for the project, and other pertinent documents. Two cultural sites were identified within the project area. Both of these sites were found ineligible for listing in the NRHP. As part of the EA update, R.C. Goodwin and Associates conducted a records search on December 13, 2011, at the Missouri Cultural Resource Inventory in Jefferson City, Missouri. The same sites reported in 2002 were identified in the records search. A pedestrian review of the SPIA was then conducted on January 24, 2012, relocating the recorded sites. No new, previously unrecorded, sites were encountered. Owing to past disturbances, it is considered unlikely that any significant cultural resource sites or historic properties are present. However, because alluvial soils are present in the lower elevations of the site, some potential remains for buried artifacts that could be exposed during the floodwall or levee construction. If archaeological or historic artifacts are uncovered during the project construction, work in that vicinity will cease until an archaeologist can evaluate the find.

The Corps provided the SHPO with a determination of “no effect on historic properties” affected by the proposed project and in a response letter dated February 5, 2014 the SHPO provided concurrence. In addition, the Corps will take into consideration any information from affiliated Native American tribes or the public on any sites or traditional cultural properties that may be of concern.

ENDANGERED SPECIES: The project area is located within Jackson County, Missouri. The following is a list of possible threatened or endangered species from Jackson County: Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), Pallid Sturgeon (*Scaphirhynchus albus*), and Western Prairie Fringed Orchid (*Plantantera praeclara*). The recommended plan would have no adverse long term effects on any of the above listed threatened or endangered species or their habitat. In order to complete the evaluation of this activity, comments are solicited from the U.S. Fish and Wildlife Service and Missouri Department of Conservation (MDC). USFWS and MDC have also indicated that no endangered or threatened species are likely to occur within the project area.

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1968, as amended: The Corps prepared a *Feasibility Report and Environmental Assessment* in October 2002 on the proposed project. The Finding of No Significant Impact and Section 404(b)(1) Evaluation was approved in January 2003. This document is available on request by contacting the Corps’ Kansas City District office. Based on minor design changes and the length of time since the original study was completed the Corps has prepared an updated Integrated Environmental Assessment with Section 404(b)(1) Evaluation. This document is available online at: <http://www.nwk.usace.army.mil/regulatory/CurrentPN/currentnotices.htm>

The Corps has made a preliminary determination that the proposed project would not result in significant degradation of the human environment and therefore the proposed project would support a Finding of No Significant Impact (FONSI). The Corps will utilize comments received in response to this Public Notice to complete our evaluation of the project for compliance with the

requirements of NEPA, and other Federal, state, and local regulations, including this review for project compliance with the requirements of Section 404 of the Clean Water Act. The Corps has made a preliminary determination that the proposed project would not be contrary to the public interest and is in compliance with the Section 404(b)(1) Guidelines. The DRAFT Section 404(b)(1) Evaluation is included with the Integrated Environmental Assessment.

FLOODPLAINS: This activity is being reviewed in accordance with Executive Order 11988, Floodplain Management, which discourages direct or indirect support of floodplain development whenever there is a practicable alternative. The project would occur within the 100-year mapped floodway boundary and require a Conditional Letter of Map Revision. The Corps has determined that no insurable structures would be impacted by the proposed project. By this public notice, comments are requested from individuals and agencies that believe the described work will adversely impact the floodplain.

WATER QUALITY CERTIFICATION: Section 401 of the Clean Water Act (33 USC 1341) requires that all discharges of dredged or fill material must be certified by the appropriate state agency as complying with applicable effluent limitations and water quality standards. This public notice serves as an application to the state in which the discharge site is located for certification of the discharge. The discharge must be certified before a Department of the Army permit can be issued. Certification, if issued, expresses the state's opinion that the discharge will not violate applicable water quality standards.

PUBLIC INTEREST REVIEW: The decision to issue a permit will be based on an evaluation of the probable impact including the cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, esthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and, in general, the needs and welfare of the people. The evaluation of the impact of the activity on the public interest will include application of the guidelines promulgated by the Administrator, Environmental Protection Agency under Section 404 (b) of the Clean Water Act (33 USC 1344). The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether or not the Finding of No Significant Impact for the preferred alternative is appropriate. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in preparation of an Environmental Assessment and /or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing to determine the overall public interest of the proposed activity.

COMMENTS: This notice is provided to outline details of the above-described activity so this District may consider all pertinent comments prior to determining if issuance of a permit would be in the public interest. Any interested party is invited to submit to this office written facts or objections relative to the activity on or before the public notice expiration date. Comments both favorable and unfavorable will be accepted and made a part of the record and will receive full consideration in determining whether it would be in the public interest to issue the Department of the Army permit. Copies of all comments, including names and addresses of commenters, may be provided to the applicant. Comments should be mailed to the address shown on page 2 of this public notice and include ATTN: PM-PR (Morrow).

PUBLIC HEARING: Any person may request, in writing, prior to the expiration date of this public notice, that a public hearing be held to consider this application. Such requests shall state, with particularity, the reasons for holding a public hearing.

PUBLIC MEETING: A public meeting will be held to receive input from the public during the 30-day public review period.

ADDITIONAL INFORMATION: Additional information about this application or a copy of the Environmental Assessment for this project may be obtained by contacting Mr. Rick Morrow, U.S. Army Corps of Engineers, 601 East 12th Street, Kansas City, Missouri 64106, at telephone 816-389-3073 or via e-mail at rick.morrow@usace.army.mil. All comments to this public notice should be directed to the above address.

**Swope Park Industrial Area Flood Damage
Reduction Project
Kansas City, Jackson County, Missouri**

Section 404(b)(1) Evaluation

1. Introduction

This Section 404(b)(1) Evaluation is for the Swope Park Industrial Area Flood Damage Reduction Project, Kansas City, Jackson County, Missouri. This evaluation meets the requirements found in 40 CFR 230, Section 404(b)(1): Guidelines for Specification of Disposal Sites for Dredged and Fill Material.

2. Project Description

- a. **Location:** The Swope Park Industrial Area (SPIA) is located on an approximately 53 acre site on the left descending bank of the Blue River between U.S. Highway 71 and Swope Park. It is south of Gregory Boulevard in the NW ¼ of Section 14, T48N R33W in the City of Kansas City, Jackson County, Missouri (the City). The SPIA access is via East 75th Street, east of Cleveland Avenue. The SPIA is positioned between the Union Pacific Railroad (UPRR) tracks and the Blue River.
- b. **General Description:** The U.S. Army Corps of Engineers - Kansas City District, in cooperation with the city of Kansas City, Missouri, propose a flood damage reduction project along the Blue River in Jackson County, Missouri. The purpose of the project is to reduce the flooding risks and prevent damage to structures or loss of life in the SPIA. The project need arises because the SPIA is located in the Blue River floodplain and is subject to periodic flooding. The occupied buildings in the SPIA are located in the 100-year floodway, as designated by the Federal Emergency Management Agency (FEMA). Recurring floods have adversely affected the established businesses, employees, suppliers and customers in the SPIA. The economic benefits of maintaining the SPIA in its current or an improved configuration are important to the city of Kansas City (the City).

An earlier EA and Finding of No Significant Impact (FONSI) was completed in October 2002 on the Swope Park Industrial Area project and construction initiated. During final design study several minor design changes were recognized. They include slightly shifting the Blue River channel towards the right bank to insure floodwall stability and additional rock riprap would need to be placed on the channel bottom and right

descending bank in response to increased bank erosion of the Blue River channel towards the left bank. To insure floodwall stability the Blue River would have 1,370 linear feet bank stabilization by means of riprap and concrete articulating mat sloped 2.5H:1V. The unnamed tributary north of the project would also use riprap along approximately 141 linear feet of the descending streambank in order to insure floodwall stability.

Direct project related impacts to waters of the U.S. would result from contouring the existing stream banks and placing clean rock fill along both banks of the Blue River and the unnamed tributary. Fill would be placed along approximately 1,370 linear feet of the Blue River and 141 linear feet of the unnamed tributary. Contouring of the Blue River banks would result in approximately 4751 cubic yards of earthen fill material being placed below the ordinary high water mark elevation of 746 ft. The unnamed tributary bank contouring would result in approximately 993 cubic yards of earthen fill being placed below the ordinary high water mark. Additionally, about 3,740 and 1280 cubic yards of clean rock fill with minimal fines would be placed below the ordinary high water mark of the Blue River and unnamed tributary, respectively. These quantities have been increased by 20% from the preliminary design calculations to represent the maximum amount of fill that would be placed below the ordinary high water mark.

- c. Authority:** Section 404 of the Clean Water Act (33 USC 1344). This project is authorized by Congress under Section 1001 (29) of WRDA 2007, PL 110-114 (29) Swope Park Industrial Area, Blue River, Kansas City, Missouri.

3. Review of Compliance (§ 230.10 a-d)

- a. No practicable alternative to the proposed project would have a less adverse impact on the aquatic ecosystem while providing a suitable level of protection to minimize the threat of flood damage to the Swope Park Industrial Area. Additional information on the impacts of various alternatives to waters of the U.S. can be found in Section 4 of the Draft EA.
- b. The proposed project does not appear to violate any applicable state water quality standards, or applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act. The proposed project is not likely to jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, to result in the likelihood of the destruction or adverse modification of critical habitat. Furthermore, the proposed project would not violate the requirements of any Federally designated marine sanctuary.

Section 404 (b)(1) Evaluation
Swope Park Industrial Area Flood
Damage Reduction Kansas City, Missouri
February 2014

2

- c. The proposed project would not cause or contribute to significant degradation of waters of the U.S. This includes no adverse effects on human health, life stages of organisms' dependant on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.
- d. Appropriate and practical steps have been taken which will minimize potential adverse impacts on the aquatic ecosystem.

4. Technical Evaluation Factors (Subparts C-F)

a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

- 1) **Substrate:** Placement of riprap structures along 1,370 linear feet of the Blue River and 141 linear feet of the unnamed tributary to armor the streambank would bury the existing sand and silt substrate. It is necessary to bury the existing substrate with riprap because it is highly erosive and is threatening the stability of structures in the Swope Park Industrial Area. The proposed project would result in a minor, long-term impact to the existing substrate along a relatively short section of the Blue River and unnamed tributary.

The Missouri Stream Mitigation Method was used to determine any compensatory mitigation that would be necessary to offset any potential negative impacts resulting from armoring the banks. The Missouri Stream Mitigation Method has been publicly vetted and approved for use by Corps Regulatory Offices within the state of Missouri. Using this method, a total of 4,100 debits were generated by protecting the streambanks using riprap structures. A total of 3,646 credits were generated by providing streambank stability along this same stretch of the Blue River and unnamed tributary. The balance of 454 units will be mitigated via use of an approved mitigation bank.

- 2) **Suspended particulates/turbidity:** The proposed plan would result in minor, short-term impacts to suspended particulates and an increase in turbidity during project construction. This would result from disturbing the existing sand/silt substrate in the channel and along the streambanks. Long-term, the eroding streambanks would be stabilized as a result of the project, therefore reducing the amount of particulates that enter the Blue River and the unnamed tributary. No long-term negative impacts are expected.

- 3) **Water:** The project would not result in any long-term negative impacts to water quality. The project may result in minor short-term construction related impacts to water quality due to activities taking place within the river channel and on the banks. These activities would result in increased suspended particulates and increased turbidity. This has the potential to have secondary impacts on nutrient concentrations, dissolved oxygen, pH, and conductivity. These impacts would be minimized by using Best Management Practices (BMPs) to minimize the amount of runoff, and land/channel disturbance that would occur during project construction. Furthermore, project construction is tentatively scheduled for mid/late fall time period which would further minimize the impact to water quality because of cooler temperatures and reduced biological activity during this time of the year.
- 4) **Current patterns and water circulation:** Earthen fill material and clean rock fill would be used to protect the streambanks from erosion and would redirect the flow of water away from the left descending bank of the Blue River on the south and the right descending bank of the unnamed tributary to the north, in order to insure floodwall stability. Any changes to the direction or velocity of water flow and circulation would be minor. It is not anticipated that this would result in any significant changes to the location, structure and dynamics of the aquatic community, or the rate and extent of the mixing of dissolved and suspended components of the water body.
- 5) **Normal water fluctuations:** There are no anticipated changes to normal water fluctuations that would result from the proposed project. The project would not result in any changes to inundation periods or water level modifications during flood events, or during periods of baseflow.
- 6) **Salinity Gradients:** The proposed project would not impact any salinity gradients. The Blue River basin is a freshwater system and this would not change as a result of the project.

b. Potential Impacts to the Biological Characteristics of the Aquatic Ecosystem (Subpart D)

- 1) **Threatened and endangered species:** There are no Federally-listed threatened or endangered species known to occur within or adjacent to the proposed project area. The only Federally-listed threatened and endangered species for Jackson County, Missouri is the Indiana bat (*Myotis sodalis*) and the Northern Long-Eared bat (*Myotis septentrionalis*). There are a small number of large

exfoliating bark trees that would be removed during construction. These trees could be used by the bats for temporary shelter or nursery sights in the spring. However, the trees would only be removed between November 1 and March 31, when the bats will have retreated to limestone caves for over wintering so no significant impacts to the bats are expected. The U.S. Fish and Wildlife Service was consulted and it was determined that no Federally-listed species, candidate species, or designated critical habitat are located within or adjacent to the project area. See Appendix II of the Environmental Assessment.

- 2) **Fish, crustaceans, mollusks, and other aquatic organisms in the food web:** The project would not result in significant adverse impacts to aquatic organisms. Minor, short-term impacts to the aquatic community may result from the smothering of immobile organisms, direct displacement of organisms, and an increase in turbidity, during project construction. The impacts may affect individual organisms in a small stretch of the Blue River, but would be unlikely to have a significant impact on the overall population of any particular species within the waterbody. The intermittent nature of the unnamed tributary insures that it does not have a resident aquatic organism population to be impacted. Long-term, there would be a positive impact to the aquatic community by reducing the amount of sediment entering the river. No significant adverse long-term impacts are anticipated.
- 3) **Other wildlife:** Wildlife associated with aquatic ecosystems includes resident and transient mammals, birds, reptiles, and amphibians. There would be minor, short-term impacts to these types of wildlife as a result of removing herbaceous vegetation and grasses. All disturbed land areas would be seeded with native grasses as part of project construction. Noise from construction equipment may also create a short-term negative impact to wildlife. No significant adverse long-term impacts are anticipated.

c. Potential Impacts on Special Aquatic Sites (Subpart E)

- 1) **Sanctuaries and Refuges:** No sanctuaries or refuges were identified in or adjacent to the project area.
- 2) **Wetlands:** Construction would fill approximately 0.3 acres of wetland in order to complete the floodwall and earthen levees. These losses would be mitigated through the use of an approved mitigation bank.

- 3) **Mud flats:** No mud flats would be impacted by the proposed project.
- 4) **Vegetated shallows:** No vegetated shallows would be impacted by the proposed project. No rooted aquatic vegetation is located within the project area.
- 5) **Coral reefs:** The project area does not provide the necessary environmental conditions to support corals.
- 6) **Riffle and pool complexes:** Because of the low gradient and sandy/silt nature of the channel substrate of the Blue River, and intermittent nature of the unnamed tributary, a stable riffle and pool complex does not exist.

d. Potential Effects on Human Use Characteristics (Subpart F):

- 1) **Municipal and private water supplies:** The project would not impact any municipal or private water supplies.
- 2) **Recreational and commercial fisheries:** The project would not affect the suitability of any recreational or commercial fisheries. The project area is relative small size and is not anticipated to negatively impact fish habitat.
- 3) **Water-related recreation:** The project would not impair or destroy any resources which support recreation activities.
- 4) **Aesthetics:** The project may result in minimal impacts to the aesthetics of the area as a result of using riprap to construct bank stabilization structures and the construction floodwalls and earthen levees. This impact will be minimized by planting native vegetation in the areas disturbed by the construction process.
- 5) **Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves:**
The project would not impact any of the above mentioned property types.

5. EVALUATION OF DREDGED OR FILL MATERIAL (Subpart G)

- a. **General evaluation of dredged or fill material:** Fill material placed below the ordinary high water mark would consist of earthen fill material obtained from the existing streambanks, and clean rock fill with minimal fines obtained from a commercial source. There is no reason to believe that the streambanks would contain any chemical, biological, or other

pollutants. Additionally, prior experience indicates that commercially available rock fill would be free from chemical, biological, or other pollutants.

- b. Chemical, biological, and physical evaluation and testing:** The fill material meets the testing exclusion based on the fact that it would consist of local earthen materials, and clean rock fill obtained from a commercial source. There is no reason to believe that the earthen material or the clean rock fill would be a carrier of harmful contaminants.

6. DISPOSAL SITE DELINEATION (§230.11 f)

The fill locations would consist of portions of the Blue River and an unnamed tributary north of the Swope Park Industrial Area. Local earthen material and clean rock fill with minimal fines would be used to stabilize the river banks in order to protect the constructed floodwalls. The amount of fill that would be used has been determined to be the minimum amount necessary to provide the desired level of protection to the project. The depth of the water, the current velocity, direction, and variability, the degree of turbulence, and the rate of discharge at the disposal site has been considered in determining the acceptability of the mixing zone.

7. ACTIONS TO MINIMIZE ADVERSE EFFECTS (SUBPART H)

The construction contractor would be required to obtain a Section 402 NPDES stormwater permit from Missouri Department of Natural Resources. As part of the NPDES permit, Best Management Practices (BMPs) would be required to minimize the incidental fallback of material into the waterway and to minimize the introduction of fuel, petroleum products, or other deleterious material from entering the waterway. Such measures could include the use of erosion control fences; storing equipment, solid waste, and petroleum products above the ordinary high water mark and away from areas prone to runoff; and requiring that all equipment be clean and free of leaks. To prevent fill from reaching water sources by wind or runoff, fill would be covered, stabilized or mulched, and silt fences would be used as required. Additional measures to minimize adverse effects would include using clean rock fill with minimal fines, stabilizing the earthen material with rock, using appropriate construction equipment, minimizing the amount of time that equipment would be in the river channel, and not placing fill in the river during unusual high water events.

8. FACTUAL DETERMINATIONS (§230.11)

A review of the information in items 4 through 7 of this report indicates that there is minimal potential for long-term environmental effects of the

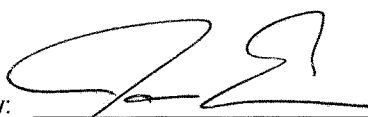
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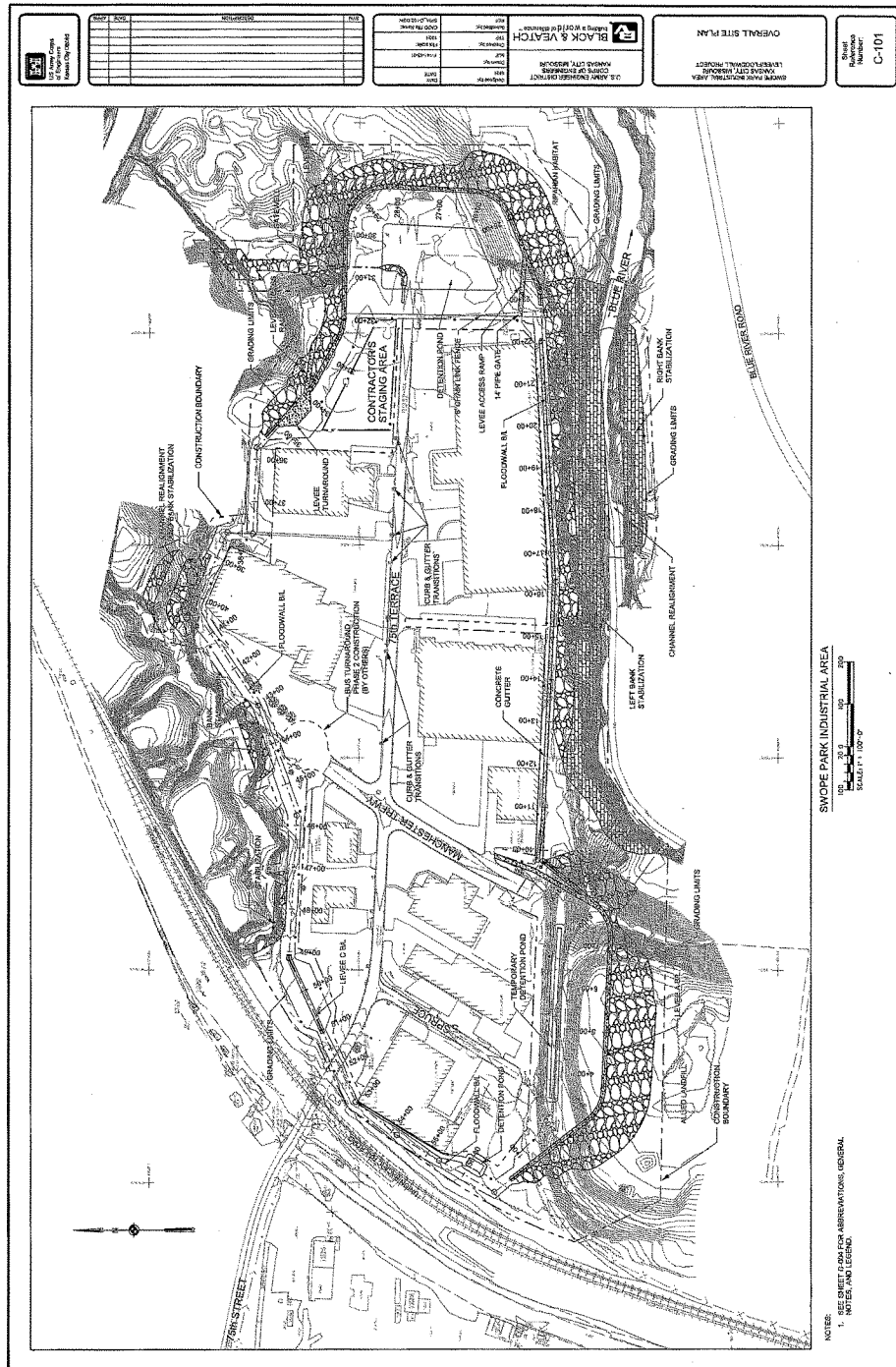
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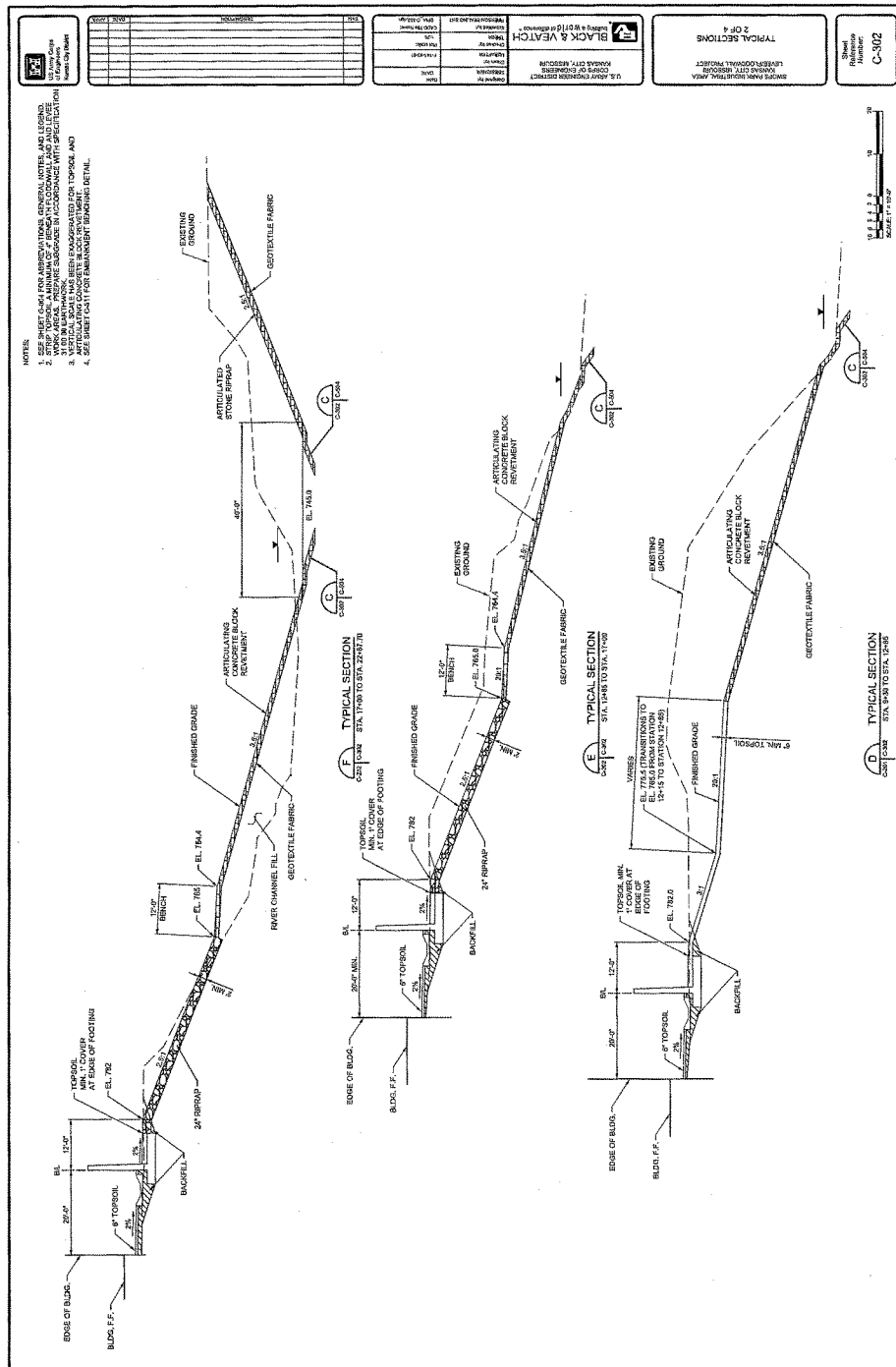
proposed discharge. Additionally, there are not expected to be any cumulative or long-term, secondary impacts as a result of the project.

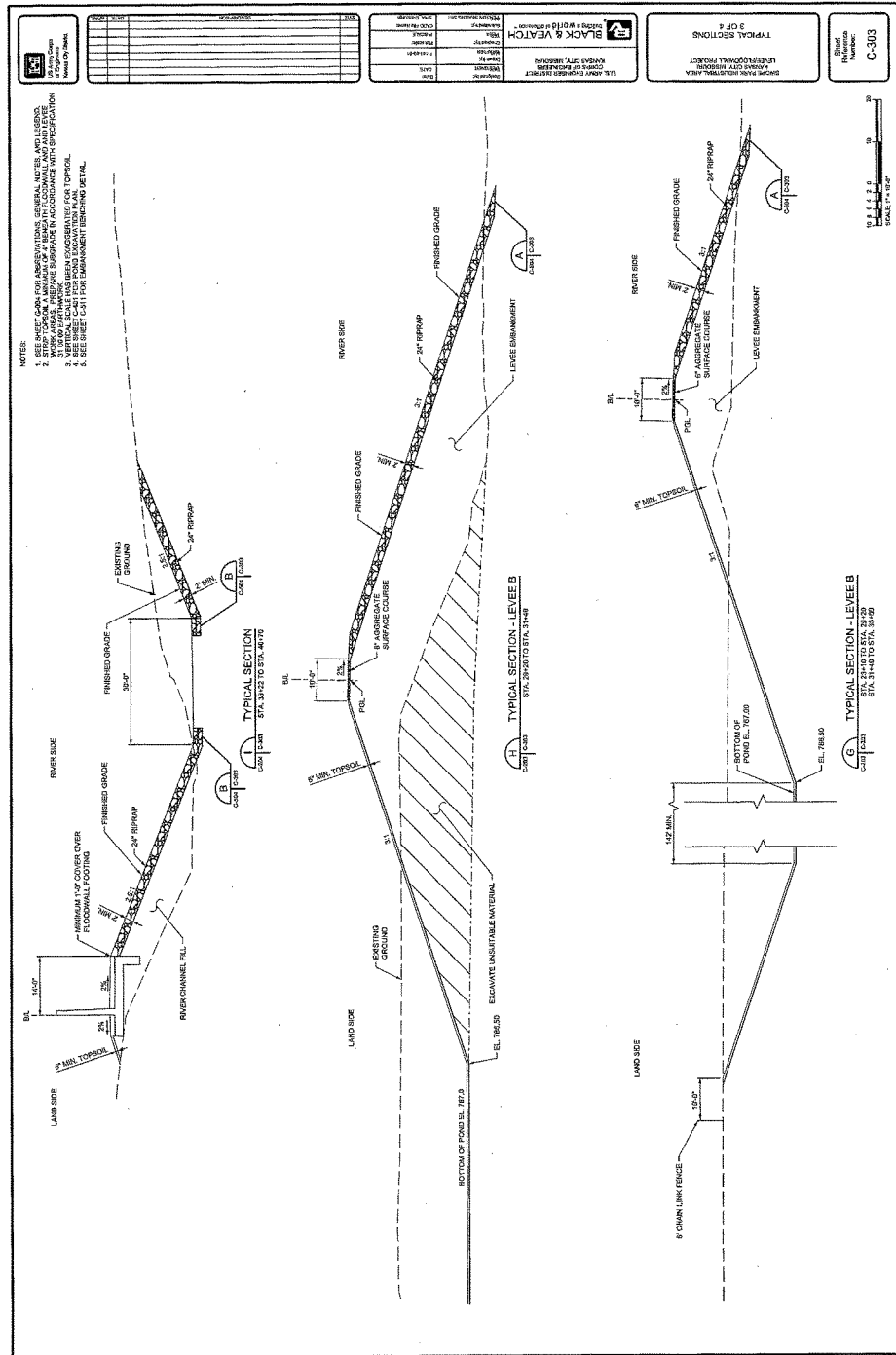
9. FINDINGS (§230.12)

The proposed Swope Park Industrial Area Flood Damage Reduction Project has been evaluated and determined to be in compliance with Clean Water Act Section 404(b)(1) guidelines, with the inclusion of appropriate and practical conditions to minimize pollution and adverse effects on the aquatic ecosystem.

Prepared by:	 _____ Mr. Rick Morrow Biologist Planning Branch	<u>4/18/14</u> Date
Reviewed by:	 _____ Mr. Jason Farmer Chief, Environmental Resources Section Planning Branch	<u>4/18/14</u> Date
Approved by:	 _____ Andrew D. Sexton Colonel, Corps of Engineers District Commander	<u>20140418</u> Date







APPENDIX V
MISSOURI STREAM MITIGATION METHOD WORKSHEETS

Environmental Assessment
Swope Park Industrial Area Flood
Risk Management Kansas City, Missouri
April 2014

ADVERSE IMPACT FACTORS FOR RIVERINE SYSTEMS WORKSHEET

Stream Type Impacted		Ephemeral 0.3		Intermittent 0.4		Perennial 0.8	
Priority Area		Tertiary 0.1		Secondary 0.4		Primary 0.8	
Existing Condition		Functionally Impaired 0.1		Moderately Functional 0.8		Fully Functional 1.6	
Duration		Temporary 0.05				Permanent 0.3	
Activity	Clearing 0.05	Utility Crossing/Bridge Footing 0.15	Below Grade Culvert 0.3	Armor 0.5	Detention 0.75	Morphologic Change 1.5	Impoundment (dam) 2.0 Pipe 2.2 Fill 2.5
Linear Impact		0.0002 multiplied by linear feet of stream impact					
Factor	Dominant Impact Type 1	Dominant Impact Type 2	Dominant Impact Type 3	Dominant Impact Type 4	Dominant Impact Type 5		
	Blue River	Unnamed Tributary					
Stream Type Impacted	0.8	.4					
Priority Area	.1	.1					
Existing Condition	.8	.8					
Duration	.3	.3					
Activity	.5	.5					
Linear Impact	.274	.0282					
Sum of Factors M=	2.774	2.1282					
Linear Feet of Stream Impacted in Reach LF=	1370	141					
M x LF	3800	300					

Total Mitigation Credits Required* = (M x LF)= 4100

*This value may be applied to mitigation at a mitigation bank at a 1:1 ratio, when the impact area is within the service area of an approved mitigation bank. An increased multiplier will be used at the Corps discretion when an impact occurs outside of the service area of an approved mitigation bank, or when mitigation is proposed through an in-lieu fee program.

In-Stream Work

Stream Channel/Stream Restoration or Enhancement and Relocation Worksheet

Stream Type	Ephemeral 0.05	Intermittent 0.4	Perennial Stream			
			<15' 0.4	15' - 30' 0.6	30' - 50' 0.8	>50' 1
Priority Area	Tertiary 0.05	Secondary 0.2	Primary 0.4			
Net Benefit		Stream Channel Restoration / Stream Enhancement				
		Relocated Stream w/In-Stream Features 0.5	Moderate 1.2	Good 2.4	Excellent 3.5	
Control / Site Protection	Corps approved site protection without third party grantee 0.1		Corps approved site protection recorded with third party grantee, or transfer of title to a conservancy 0.4			
Mitigation Construction Timing	Schedule 1 0.3		Schedule 2 0.1		Schedule 3 0	
Factors	Net Benefit 1	Net Benefit 1	Net Benefit 1	Net Benefit 1		
	Blue River	Unnamed Tributary				
Stream Type	.8	.4				
Priority Area	.05	.05				
Net Benefit	1.2	1.2				
Control / Site Protection	.1	.1				
Mitigation Construction Timing	.3	.3				
Sum Factors = M	2.45	2.05				
Stream Length in Reach = LF do not count each bank separately	1370	141				
Credits C = M x LF	3357	289				

Total Channel Restoration/Relocation Credits Generated = 3646

APPENDIX VI
CLEAN WATER ACT SECTION 401 PERMIT

Environmental Assessment
Swope Park Industrial Area Flood
Risk Management Kansas City, Missouri
April 2014



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

AUG 13 2014

Mr. Kent Myers
Kansas City District
U.S. Army Corps of Engineers
601 E. 12th Street
Kansas City, MO 64106

Jackson County
2014-197/CEK006867

Dear Mr. Myers:

The Missouri Department of Natural Resources' Water Protection Program has reviewed your request for Clean Water Act Section 401 Water Quality Certification (WQC) to accompany the U.S. Army Corps of Engineers' (USACE) Permit No. 2014-197 in which you are proposing to control flooding and prevent damage to structures and/or loss of life in the Swope Park Industrial Area. A portion of the proposed project would occur in the Blue River, adjacent wetlands and an unnamed tributary.

The Selected Plan was Alternative 4D – Structural Flood Protection: construction of a concrete floodwall and earthen levee around the perimeter of the existing Swope Park Industrial Area accommodating a new locally funded access road connecting with Manchester Trafficway at the southwest corner of the area and maintaining the existing 75th Street Terrace access to the area.

The project features are designed to protect against a flood with a 0.2 annual percent chance of exceedence with an estimated 90 percent reliability. An earlier Environmental Assessment and Finding of No Significant Impact were completed in October 2002 on the Swope Park Industrial Area project and construction initiated. In addition, the project was evaluated for compliance under Section 404 of the Clean Water Act through comments received in response to the USACE's Public Notice No. 2002-00796 in August 2002.

During the final design study design changes were recognized. They include shifting the Blue River channel towards the right bank for floodwall stability and additional rock riprap placed on the channel bottom and right descending bank in response to increased bank erosion of the Blue River channel towards the left bank. Due to changes to road access, a single segment of earthen levee along the north side of the unused landfill will tie into the section of the floodwall adjacent to the railroad tracks on the west and the floodwall at Manchester Trafficway on the east as well as removing the rolling gate at 75th Street and replacing it with a continuous section of floodwall.



Mr. Kent Myers
Page Two

The proposed project is located on the left descending bank of the Blue River between U.S. Highway 49 and Swope Park south of Gregory Boulevard in the NW ¼ of Section 14, Township 48 North, Range 33 West in Kansas City, Jackson County, Missouri.

This WQC is being issued under Section 401 of Public Law 95-217, The Clean Water Act of 1977 and subsequent revisions. This office certifies that the proposed project will not cause the general or numeric criteria to be exceeded nor impair beneficial uses established in the Water Quality Standards, 10 CSR 20-7.031, provided the following conditions are met:

1. A total of 0.3 acre of wetlands would be unavoidably impacted during the construction of the floodwalls and earthen levees. Compensatory mitigation shall be satisfied by the purchase of 0.3 wetland credits from an approved in-lieu fee provider or mitigation bank. Mitigation shall be within the state of Missouri. Copies of the purchase documents shall be provided to the Department at the address below prior to the start of work within jurisdictional waters at the site.
2. The 1,511 linear feet of stream impacts were assessed as a total of 4,100 stream debits using the "2013 State of Missouri Stream Mitigation Method." On-site stream mitigation in the form of bank stabilization equals 3,646 credits for an outstanding balance of 454 debits. Compensatory mitigation shall be satisfied by the purchase of 454 stream credits from an approved in-lieu fee provider or mitigation bank. Mitigation shall be within the state of Missouri. Copies of the purchase documents shall be provided to the Department at the address below prior to the start of work within jurisdictional waters at the site.
3. The on-site compensatory mitigation was calculated as a moderate net benefit, which cannot be achieved through solely armoring the banks. Native vegetation and/or in-stream rock structures that slow erosive velocities and/or train flows for the purpose of enhancing local channel stability and aquatic habitat must be used in combination with rock bank stabilization to qualify for moderate net benefit.
4. No water contaminant except uncontaminated cooling water, permitted stormwater discharges in compliance with permit conditions and excessive wet-weather bypass discharges not interfering with beneficial uses, shall be discharged to the watersheds of the metropolitan no-discharge streams.
5. Antidegradation requirements require all appropriate and reasonable Best Management Practices related to erosion and sediment control, project stabilization and prevention of water quality degradation (e.g., preserving vegetation, stream bank stability and basic drainage) are applied and maintained. Applicants will be responsible for ensuring that permit requirements and relevant WQC conditions are met.

Mr. Kent Myers
Page Three

6. Acquisition of a WQC shall not be construed or interpreted to imply the requirements for other permits are replaced or superseded, including Clean Water Act Section 402 National Pollutant Discharge Elimination System Permits. Permits or any other requirements shall remain in effect. Land disturbance activities disturbing one or more acres of total area for the entire project may require a stormwater permit. Instructions on how to apply for and receive the on-line land disturbance permit are located at <http://www.dnr.mo.gov/env/wpp/epermit/help.htm>. Questions may be directed to the Department's Kansas City Regional Office at (816) 251-0700.
7. The city of Kansas City is required to have a Municipal Separate Storm Sewer System Permit with measures to control and possibly treat stormwater as part of local requirements. You shall comply with all stormwater requirements as part of this program.
8. Care shall be taken to keep machinery out of the water way as much as possible. Fuel, oil and other petroleum products, equipment, construction materials and any solid waste shall not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions shall be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of this operation.
9. Petroleum products spilled into any water or on the banks where the material may enter waters of the state shall be immediately cleaned up and disposed of properly. Any such spills of petroleum shall be reported as soon as possible, but no later than 24 hours after discovery to the Missouri Department of Natural Resources' Environmental Emergency Response number at (573) 634-2436.
10. Only clean, nonpolluting fill shall be used. The following materials are not suitable for bank stabilization and shall not be used due to their potential to cause violations of the general criteria of the Water Quality Standards (10 CSR 20-7.031 (3)(A)-(H)):
 - a. Earthen fill, gravel, broken concrete where the material does not meet the specifications stated in the Missouri Nationwide Permit Regional Conditions (<http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MORegCon.pdf>) and fragmented asphalt, since these materials are usually not substantial enough to withstand erosive flows;
 - b. Concrete with exposed rebar;
 - c. Tires, vehicles or vehicle bodies, construction or demolition debris are solid waste and are excluded from placement in the waters of the state;
 - d. Liquid concrete, including grouted riprap, if not placed as part of an engineered structure; and
 - e. Any material containing chemical pollutants (including but not limited to creosote or pentachlorophenol).

Mr. Kent Myers
Page Four

11. Clearing of vegetation/trees shall be the minimum necessary to accomplish the activity. A vegetated corridor shall be maintained from the high bank on either side of the jurisdictional channel to protect water quality and to provide for long-term stability of the stream channel, unless physical barriers prevent such a corridor. Lack of ownership or control of any portion of this corridor may be considered a legitimate and discretionary cause to waive this requirement on that portion.
12. Streambed gradient shall not be permanently altered during project construction.
13. No project shall accelerate bed or bank erosion.
14. Best Management Practices shall be used during all phases of the project to limit the amount of discharge of water contaminants to waters of the state. The project shall not involve more than normal stormwater or incidental loading of sediment caused by construction disturbances.
15. Conduct activity at low flows and water levels to limit the amount of sediment disturbance caused by the heavy equipment. Limit the duration and extent that the heavy equipment is required to be in-stream.
16. The riparian area, banks, etc., shall be restored to a stable condition to protect water quality as soon as possible. Seeding, mulching and needed fertilization shall be within three days of final contouring. On-site inspections of these areas shall be conducted as necessary to ensure successful re-vegetation and stabilization, and to ensure that erosion and deposition of soil in waters of the state is not occurring from these projects.
17. Representatives from the Department shall be allowed on the project property to inspect the authorized activity at any time deemed necessary to ensure compliance with conditions.
18. The WQC is based on the plans as submitted. Should any plan modifications occur, please contact the Department to determine whether the WQC remains valid or may be amended or revoked.

Pursuant to Chapter 644.052.9, RSMo, commonly referred to as the Missouri Clean Water Law, this WQC shall be valid only upon payment of a fee of seventy-five dollars (\$75.00). The enclosed invoice contains the necessary information on how to submit your fee. Payment must be received within 15 days of receipt of this WQC. Upon receipt of the fee, the applicable office of the USACE will be informed that the WQC is now in effect and final.

Mr. Kent Myers
Page Five

You may appeal to have the matter heard by the Administrative Hearing Commission (AHC). To appeal, you must file a petition with the AHC within thirty (30) days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

This WQC is part of the USACE's permit. Water Quality Standards must be met during any operations authorized. If you have any questions, please contact Ms. Stacia Bax by phone at (573) 526-4586, by e-mail at stacia.bax@dnr.mo.gov, or by mail at the Missouri Department of Natural Resources, Water Protection Program, Operating Permits Section, P.O. Box 176, Jefferson City, MO 65102-0176. Thank you for working with the Department to protect our environment.

Sincerely,

WATER PROTECTION PROGRAM



Chris Wieberg, Chief
Operating Permits Section

CW:sbp

c: Mr. Rick Morrow, U.S. Army Corps of Engineers, Kansas City District
Mr. Mitch Roberts, Kansas City Regional Office
Mr. Jesse Cochran, Kansas City Regional Office
Ms. Terrie Williams, Kansas City Regional Office

Celebrating 40 years of taking care of Missouri's natural resources. To learn more about the Missouri Department of Natural Resources visit dnr.mo.gov.

APPENDIX VII
PUBLIC COMMENTS

Environmental Assessment
Swope Park Industrial Area Flood
Risk Management Kansas City, Missouri
April 2014

**U.S. Army Corps of Engineers, Kansas City District
And
The City of Kansas City, Missouri**

**SWOPE PARK INDUSTRIAL AREA (SPIA) FLOOD RISK MANAGEMENT
PROJECT**

**Public Meeting
Updated Environmental Assessment,
Finding of No Significant Impact, and
Clean Water Act Section 404(b)(1) Evaluation**

20-Mar-2014

Comment 1: Meeting Format. Debra Smith, Blue River Watershed Association

The current "Open House" format offers convenience, however it does not offer an organized presentation with Q&A for a group to hear other people's ideas, comments, concerns, etc. I urge the Corps to consider a "hybrid" format, e.g. ½ hr. open house; 1 hr. formal presentation w/Q&A; wrap up with ½ hr. open house. An experienced facilitator will be important to have to ensure meeting is not derailed with non-relevant issues or dominated by 1 or 2 very vocal, opinionated people.

Response 1: The Corps makes every attempt to conduct public meetings in a manner that is user-friendly to the attendee. The public meeting format used for this particular project has been successful in generating comments at previous meetings.

Comment 2: Maintaining Blue River Water Quality. Debra Smith, Blue River Watershed Association

Where the detention pond drains into the stream, provide forebays, filtration beds or something to capture trash, debris and some contaminants like oil and heavy metals before entering the stream/Blue River.

Response 2: The detention basin design includes a trash rack. The engineering design and operation of the detention basin and outlet conform to applicable regulatory requirements including surface water quality. The majority of contaminants like oil and heavy metals will settle out of the water in the sediments at the bottom of the detention pond.

Comment 3: Question: Habitat. Debra Smith, Blue River Watershed Association

How is natural habitat being maintained or improved? Project should maintain/improve water quality and habitat for flora & fauna as well as project property.

Response 3: The 'natural habitat' associated with the project includes mostly urban habitat and some riparian habitat within a mostly closed canopy. The urban habitat is expected to be essentially unchanged after construction of the project. There would be permanent impacts to approximately 6.4 acres of riparian habitat due to construction of the project. The Corps is going to mitigate for the permanent riparian impacts through mitigating banking. Mitigation banking involves the purchase of 'credits' at an approved mitigation site [bank]. Stream bank stabilization will utilize articulating mat, which would allow for natural vegetation to grow.

The existing Blue River left bank near the SPIA is eroding, causing sedimentation in the river, which degrades water quality. Bank stabilization as part of the proposed project would reduce or eliminate this erosion, thus suspending further soil-break down and stabilizing the river bank.

The diversity of the aquatic fauna community may increase as water quality conditions are improved through improvements in the City's storm water runoff control and other related measures. Habitat complexity in the Blue River would be increased because of riprap placed in the river channel, which if vegetated might provide nursery habitat for some fish species.

Comment 4: How is the mitigation going to take place?

Response 4: Mitigation for permanent impacts to 6.4 acres of riparian habitat and 0.3 acres of wetland located adjacent to the Blue River is proposed to be through the purchase of 454 credits from an approved mitigation bank.

Comment 5: Why can't mitigation be done in place?

Response 5: There is insufficient, suitable land available for onsite mitigation.

Comment 6: Can the riprap be vegetated?

Response 6: It is recommended that the riprap not be vegetated, in order to maintain the stability of the slope and the integrity of the levees.

Comment 7: Consider articulated concrete block in lieu of riprap.

Response 7: Articulated concrete block is being used on a couple of reaches of the Blue River. The slope behind the Liver's building and the right bank of the Blue River will be protected with articulated concrete block.

From: [WPSC Water Quality Certification](#)
To: [Morrow, Rick NWK](#)
Cc: "Bryan Simmons (bryan_simmons@fws.gov)"; USEPA Region 7; Thorne, David; Sternburg, Janet MVS External Stakeholder; Leary, Alan; "laura.ruman@mdc.mo.gov"; Campbell-Allison, Jennifer; Miller, Stuart; Hoke, John; Wieberg, Chris; Bax, Stacia
Subject: [EXTERNAL] U.S. Army Corps of Engineers, Kansas City District, 2014-197/CEK006867
Date: Thursday, April 03, 2014 1:45:04 PM

The Missouri Department of Natural Resources' Water Protection Program has reviewed the Public Notice for No. 2014-197 in which the U.S. Army Corps of Engineers' Kansas City District (USACE) is proposing to control flooding and prevent damage to structures and/or loss of life in the Swope Park Industrial Area. A portion of the proposed project would occur in the Blue River, adjacent wetlands and an unnamed tributary.

The Selected Plan based on that evaluation was Alternative 4D – Structural Flood Protection: construction of a concrete floodwall and earthen levee around the perimeter of the existing Swope Park Industrial Area accommodating a new locally funded access road connecting with Manchester Trafficway at the southwest corner of the area and maintaining the existing 75th Street Terrace access to the area.

The project features are designed to protect against a flood with a 0.2 annual percent chance of exceedence with an estimated 90 percent reliability. The city of Kansas City, Missouri, is the project cost share sponsor. An earlier Environmental Assessment and Finding of No Significant Impact were completed in October 2002 on the Swope Park Industrial Area project and construction initiated. In addition, the project was evaluated for compliance under Section 404 of the Clean Water Act through comments received in response to USACE Public Notice No. 2002-00796, August 2002.

During the final design study design changes were recognized. They include slightly shifting the Blue River channel towards the right bank for floodwall stability and additional rock riprap placed on the channel bottom and right descending bank in response to increased bank erosion of the Blue River channel towards the left bank. Due to changes to road access, a single segment of earthen levee along the north side of the unused landfill will tie into the section of the floodwall adjacent to the railroad tracks on the west and the floodwall at Manchester Trafficway on the east as well as removing the rolling gate at 75th Street and replacing it with a continuous section of floodwall.

A total of 0.3 acre of wetlands would be unavoidably impacted during the construction of the floodwalls and earthen levees. According to the applicant, the Missouri Stream Mitigation Model indicates a debit of 454 stream units due to 1,511 linear feet of in-stream impacts.

The proposed project is located on an approximately 53-acre site on the left descending bank of the Blue River between U.S. Highway 49 and Swope Park. It is south of Gregory Boulevard in the NW ¼ of Section 14, Township 48 North, Range 33 West in Kansas City, Jackson County, Missouri.

We offer the following comments:

1. The second paragraph on Page 2 of the Environmental Assessment notes that interior stormwater drainage system was constructed to handle 100-year flood events. The proposed levees and floodwalls are to be constructed for a 500-year flood event. Please explain how the facilities inside the proposed protected area will fair should significant precipitation event(s) occur over the site. Please explain how the interior drainage would handle the flow and/or containment and not flood the facilities due to lack of interior drainage. Will the two systems work together adequately?

2. Are there wetlands within the project area that would be indirectly and negatively impacted? If a wetland is within the flood protection area, it would most likely see a reduction in flood pulses which could change the vegetative community and type of wetland it is.

3. Several Missouri Stream Mitigation Method factors are incorrectly used. If both banks of a stream are protected by hard structures like riprap, then the factor should be considered at the very least 'morphological change' and not 'armoring.' When a channel is moved such as what appears to be proposed for one section of the tributary work, that impact should be considered a 'fill' impact.

4. The changes needed in the Missouri Stream Mitigation Method will result in a larger impact or debit. The in-stream work for the tributary would be classified as stream relocation under net benefit. The work within the Blue River may also be considered stream relocation. A moderate net benefit cannot be achieved through solely armoring the banks. In-stream work typically includes improvements in channel such as bendway weirs. If the riparian corridor will be revegetated, credits may be received using the buffer worksheet. Questions on the interpretation and use of the method may be sent to members of the Interagency Review Team who helped develop the method.

5. Please note the length of time the project will impact water resources. Short term and/or temporary is typically considered six months or less. Impacts six months or more in duration to waters of the state may require more intensive stormwater practices to protect the waters.

6. On Page 4 of Section 404(b)(1) Evaluation, the normal water fluctuations paragraph notes that the "project would not result in any changes to inundation periods or water level modifications during flood events, or during period of baseflow." The goal of the project was said to reduce flooding, which impacts the water levels and inundation periods within the project area. The two thoughts seem to contradict one another. The document appears to be saying that upstream and downstream water levels and inundation periods will not be impacted by the project. One might reference the model or documentation proving this statement. Please clarify this paragraph.

7. The Blue River, Water Body Identification Number 419, is classified for 7.7 miles as a permanently flowing water with the designated beneficial uses of protection of aquatic life and human health-fish consumption, livestock and wildlife watering, secondary contact recreation and whole body contact recreation-Category A. The Blue River is listed as impaired per Section 305(b) of the Clean Water Act for E. coli due to urban runoff and storm sewers affecting the whole body contact recreation-Category A use.

8. The Blue River is listed as a metropolitan no-discharge stream from the Kansas state line to 59th Street in Kansas City as well as from 59th Street to Guinotte Dam except the combined sewer overflow from Brush Creek. Discharge to metropolitan no-discharge streams is prohibited, except as

specifically permitted under the Water Quality Standards 10 CSR 20-7.031 and non-contaminated stormwater flows. No water contaminant except uncontaminated cooling water, permitted stormwater discharges in compliance with permit conditions and excessive wet-weather bypass discharges not interfering with beneficial uses, should be discharged to the watersheds of the metropolitan no-discharge streams.

9. Seven monitoring wells, three of which are abandoned, along with one abandoned soil boring and one unknown abandoned certified well exist within the industrial park. Please contact the Public Drinking Water Branch at (573) 751-5331 for additional information should additional wells be found or if the project will impact the wells as there are specific requirements for well closure and/or set back limits.

10. A stream, its channel configuration and its adjacent floodplain including wetlands and riparian vegetation are interrelated portions of a dynamic ecosystem that constitute a valuable natural resource. Disruption of this system through filling, relocating, shortening, or changing the shape and vegetation of the stream channel will likely result in negative impacts on the stream's water quality and associated habitat value. Channel modifications may cause cumulative impacts to watersheds including bank instability, loss of aquatic habitat (pool and riffle complexes), bed degradation, loss of riparian areas, prevention of fish passage and migration, and channel incision is likely to occur downstream. Any impacts are to be avoided or minimized if possible and will require appropriate mitigation.

11. Wetlands were once significant components of Missouri's natural heritage accounting for almost 11 percent of surface area. Historical wetland losses in Missouri have been significant, approaching 90 percent. This Department and other federal and state agencies are directed to implement a policy of "no net loss of wetlands." Any impacts are to be avoided or minimized if possible and will require appropriate mitigation.

12. A stream moved to a new location to accommodate construction of an authorized project should incorporate natural channel design features relative to a morphologically stable and appropriate stream channel [dimension (cross-section), pattern (sinuosity), profile (slope)] and incorporate measures (grade control, instream habitat, riparian plantings, etc.) prior to consideration given to accept any part of the relocated channel as compensatory mitigation. Relocations resulting in a reduced channel length generally require additional mitigation to replace net losses of stream channel.

13. To comply with antidegradation requirements, the Department will review any applicable alternatives analysis and/or compliance with Section 404(b)(1) guidelines to ensure the proposed discharges are unavoidable (i.e., necessary), that the least damaging practicable alternative is authorized, and mitigation is required for all impacts associated with the activity.

14. Antidegradation requirements require all appropriate and reasonable Best Management Practices related to erosion and sediment control, project stabilization and prevention of water quality degradation (e.g., preserving vegetation, stream bank stability and basic drainage) are applied and maintained. Applicants will be responsible for ensuring that permit requirements and relevant Clean Water Act Section 401 Water Quality Certification (WQC) conditions are met.

15. Acquisition of a WQC should not be construed or interpreted to imply the requirements for

other permits are replaced or superseded, including Clean Water Act Section 402 National Pollutant Discharge Elimination System Permits. Permits or any other requirements should remain in effect. Land disturbance activities disturbing one or more acres of total area for the entire project may require a stormwater permit. Instructions on how to apply for and receive the on-line land disturbance permit are located at <http://www.dnr.mo.gov/env/wpp/epermit/help.htm>. Questions may be directed to the Department's Kansas City Regional Office at (816) 251-0700.

16. The city of Kansas City is required to have a Municipal Separate Storm Sewer System Permit with measures to control and possibly treat stormwater as part of local requirements.

17. Care should be taken to keep machinery out of the water way as much as possible. Fuel, oil and other petroleum products, equipment, construction materials and any solid waste should not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions should be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of this operation.

18. Petroleum products spilled into any water or on the banks where the material may enter waters of the state should be immediately cleaned up and disposed of properly. Any such spills of petroleum should be reported as soon as possible, but no later than 24 hours after discovery to the Missouri Department of Natural Resources' Environmental Emergency Response number at (573) 634-2436.

19. Only clean, nonpolluting fill should be used. The following materials are not suitable for bank stabilization and should not be used due to their potential to cause violations of the general criteria of the Water Quality Standards (10 CSR 20-7.031 (3)(A)-(H)):

- a. Earthen fill, gravel, broken concrete where the material does not meet the specifications stated in the Missouri Nationwide Permit Regional Conditions (<http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MORegCon.pdf>) and fragmented asphalt, since these materials are usually not substantial enough to withstand erosive flows;
- b. Concrete with exposed rebar;
- c. Tires, vehicles or vehicle bodies, construction or demolition debris are solid waste and are excluded from placement in the waters of the state;
- d. Liquid concrete, including grouted riprap, if not placed as part of an engineered structure; and
- e. Any material containing chemical pollutants (including but not limited to creosote or pentachlorophenol).

20. Clearing of vegetation/trees should be the minimum necessary to accomplish the activity. A vegetated corridor should be maintained from the high bank on either side of the jurisdictional channel to protect water quality and to provide for long-term stability of the stream channel, unless physical barriers prevent such a corridor. Lack of ownership or control of any portion of this corridor may be considered a legitimate and discretionary cause to waive this requirement on that portion.

21. Streambed gradient should not be permanently altered during project construction.
22. No project should accelerate bed or bank erosion.
23. An approved mitigation plan needs to be submitted before consideration for WQC. After avoidance and minimization for the project, unavoidable stream impacts should be mitigated appropriately. Mitigation for loss of aquatic resources should be in conformance with the April 10, 2008, joint regulation "Compensatory Mitigation for Losses of Aquatic Resources; Final Rule" [USACE: 33 CFR Part 332 and U.S. Environmental Protection Agency: 40 CFR Part 230] and with guidance located on-line at <http://www.nwkc.usace.army.mil/Missions/RegulatoryBranch/StateofMissouri.aspx>.
24. Please provide the revised adverse impact worksheet for the stream impacts as well as the revised worksheet for the proposed mitigation. Proposed mitigation must be within the state of Missouri. If mitigation is being purchased from a mitigation bank, please name the provider/location.
25. Best Management Practices should be used during all phases of the project to limit the amount of discharge of water contaminants to waters of the state. The project should not involve more than normal stormwater or incidental loading of sediment caused by construction disturbances.
26. The Department encourages the permittee to consider environmentally-friendly design techniques such as Green Infrastructure into their plans. Green Infrastructure is a stormwater management strategy that maintains or restores the original site hydrology through infiltration, evaporation or reuse of stormwater. Designs might include creating vegetated swales, rain gardens and porous pavement. More information regarding Green Infrastructure can be found at these websites: <http://www.epa.gov/owow/NPS/lid/>, <http://water.epa.gov/infrastructure/greeninfrastructure/>, or www.lid-stormwater.net/lid_techniques.htm. A good source of information regarding green infrastructure is contained within the "Missouri Guide to Green Infrastructure: Integrating Water Quality into Municipal Stormwater Management" at <http://www.dnr.mo.gov/env/wpp/stormwater/mo-gi-guide.htm>.
27. Use bioengineering methods when practicable for bank stabilization that minimizes the amount of sediment and other pollutants entering the water ways. As opportunity allows, limit the amount of rock or other hard points while increasing the amount of native vegetation or a combination of rock and vegetation.
28. Conduct activity at low flows and water levels to limit the amount of sediment disturbance caused by the heavy equipment. Limit the duration and extent that the heavy equipment is required to be in-stream.
29. The riparian area, banks, etc., should be restored to a stable condition to protect water quality as soon as possible. Seeding, mulching and needed fertilization should be within three days of final contouring. On-site inspections of these areas should be conducted as necessary to ensure successful re-vegetation and stabilization, and to ensure that erosion and deposition of soil in waters of

the state is not occurring from these projects.

30. All other commenting parties' comments and the applicant's response to those comments should be sent by e-mail at wpsc401cert@dnr.mo.gov or to the address below. Consideration for WQC cannot be made until all comments and responses have been received.

31. The request for WQC that is part of the public notice is denied without prejudice. Once the USACE is ready to issue the 404 Permit and the applicant, their consultant, or the USACE has provided to the Department a complete application which includes a revised mitigation plan, a formal request for WQC should be made to the Department.

Thank you for the opportunity to comment on the proposed project. If you have any questions, please contact Stacia Bax by phone at (573) 526-4586, by e-mail at stacia.bax@dnr.mo.gov, or by mail at the Missouri Department of Natural Resources, Water Protection Program, Operating Permits Section, P.O. Box 176, Jefferson City, MO 65102-0176. Thank you for working with the Department to protect our environment.

SB/pc

Thanks.

Pat Conger
Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, MO 65102-0176
Phone (573) 751-1300 Fax (573) 522-9920
e-mail: wpsc401cert@dnr.mo.gov <<mailto:wpsc401cert@dnr.mo.gov>>
web site: www.dnr.mo.gov/env/wpp/401 <<http://www.dnr.mo.gov/env/wpp/401>>

Celebrating 40 years of taking care of Missouri's natural resources. To learn more about the Missouri Department of Natural Resources visit [dnr.mo.gov](http://www.dnr.mo.gov) <<http://www.dnr.mo.gov>> .

Response to MDNR Comments

1. The second paragraph on Page 2 of the Environmental Assessment notes that interior stormwater drainage system was constructed to handle 100-year flood events. The proposed levees and floodwalls are to be constructed for a 500-year flood event. Please explain how the facilities inside the proposed protected area will fair should significant precipitation event(s) occur over the site. Please explain how the interior drainage would handle the flow and/or containment and not flood the facilities due to lack of interior drainage. Will the two systems work together adequately?

Response: The floodwalls and interior drainage system work together as a single system. The drainage system will send stormwater falling inside the walls to be held in the detention pond and released via a duck bill valve that will control the release of the waters into the unnamed tributary.

2. Are there wetlands within the project area that would be indirectly and negatively impacted? If a wetland is within the flood protection area, it would most likely see a reduction in flood pulses which could change the vegetative community and type of wetland it is.

Response: The identified wetlands within the project area may see a minor reduction in runoff but it is not expected. Currently, our mitigation for wetlands includes the purchase of an acre of wetland from an approved mitigation bank to mitigate for the 0.3-acres of wetland expected to be impacted. The area in question is only 0.045-acres and would be covered by the excess mitigation we are providing.

3. Several Missouri Stream Mitigation Method factors are incorrectly used. If both banks of a stream are protected by hard structures like riprap, then the factor should be considered at the very least 'morphological change' and not 'armoring.' When a channel is moved such as what appears to be proposed for one section of the tributary work, that impact should be considered a 'fill' impact.

Response: Missouri Stream Mitigation Method states that "morphological change" is to be used when the stream bed is lined and "armoring" can occur on one or both sides of the stream. The channel is being returned to a previous location prior to the high levels of erosion that have occurred. It would not be considered "fill" because we are not filling the current channel and we are not creating a new channel. Corps Regulatory branch staff were consulted in the making of this decision.

Below are the quotes from the MSMM guide.

"Armor" means to riprap one or both stream channel banks, or use other hard methods (i.e. concrete or block retaining wall) on one bank alone leaving the stream bed unaltered.

Keying riprap revetments along the toe is an acceptable installation practice under this parameter.

User Note: *Armoring of the stream bed and banks with riprap or installing a retaining wall along both channel banks should be assessed as a "Morphologic change".*

Fill means the filling of a stream channel including the relocation of a stream channel (even if a new stream channel is constructed), or other fill activities.

4. The changes needed in the Missouri Stream Mitigation Method will result in a larger impact or debit. The in-stream work for the tributary would be classified as stream relocation under net benefit. The work within the Blue River may also be considered stream relocation. A moderate net benefit cannot be achieved through solely armoring the banks. In-stream work typically includes improvements in channel such as bendway weirs. If the riparian corridor will be revegetated, credits may be received using the buffer worksheet. Questions on the interpretation and use of the method may be sent to members of the Interagency Review Team who helped develop the method.

Response: Response to question 3 addresses this concern.

5. Please note the length of time the project will impact water resources. Short term and/or temporary is typically considered six months or less. Impacts six months or more in duration to waters of the state may require more intensive stormwater practices to protect the waters.

Response: The structures will be permanent as noted in the MSMM. The construction process is expected to last less than six months.

6. On Page 4 of Section 404(b)(1) Evaluation, the normal water fluctuations paragraph notes that the "project would not result in any changes to inundation periods or water level modifications during flood events, or during period of baseflow." The goal of the project was said to reduce flooding, which impacts the water levels and inundation periods within the project area. The two thoughts seem to contradict one another. The document appears to be saying that upstream and downstream water levels and inundation periods will not be impacted by the project. One might reference the model or documentation proving this statement. Please clarify this paragraph.

Response: The SPIA project is not expected to impact the normal water fluctuations or the Blue River or the unnamed tributary outside of the project area. The project will help to reduce the flood risks only to the businesses within the SPIA.

7. The Blue River, Water Body Identification Number 419, is classified for 7.7 miles as a permanently flowing water with the designated beneficial uses of protection of aquatic life and human health-fish consumption, livestock and wildlife watering, secondary contact recreation

and whole body contact recreation-Category A. The Blue River is listed as impaired per Section 305(b) of the Clean Water Act for E. coli due to urban runoff and storm sewers affecting the whole body contact recreation-Category A use.

Response: Concur

8. The Blue River is listed as a metropolitan no-discharge stream from the Kansas state line to 59th Street in Kansas City as well as from 59th Street to Guinotte Dam except the combined sewer overflow from Brush Creek. Discharge to metropolitan no-discharge streams is prohibited, except as specifically permitted under the Water Quality Standards 10 CSR 20-7.031 and non-contaminated stormwater flows. No water contaminant except uncontaminated cooling water, permitted stormwater discharges in compliance with permit conditions and excessive wet-weather bypass discharges not interfering with beneficial uses, should be discharged to the watersheds of the metropolitan no-discharge streams.

Response: Concur. The city is in compliance and has the necessary permits.

9. Seven monitoring wells, three of which are abandoned, along with one abandoned soil boring and one unknown abandoned certified well exist within the industrial park. Please contact the Public Drinking Water Branch at (573) 751-5331 for additional information should additional wells be found or if the project will impact the wells as there are specific requirements for well closure and/or set back limits.

Response: Concur. The City of Kansas City, Missouri are partners in the project and are familiar with all facets of the project.

10. A stream, its channel configuration and its adjacent floodplain including wetlands and riparian vegetation are interrelated portions of a dynamic ecosystem that constitute a valuable natural resource. Disruption of this system through filling, relocating, shortening, or changing the shape and vegetation of the stream channel will likely result in negative impacts on the stream's water quality and associated habitat value. Channel modifications may cause cumulative impacts to watersheds including bank instability, loss of aquatic habitat (pool and riffle complexes), bed degradation, loss of riparian areas, prevention of fish passage and migration, and channel incision is likely to occur downstream. Any impacts are to be avoided or minimized if possible and will require appropriate mitigation.

Response: Concur

11. Wetlands were once significant components of Missouri's natural heritage accounting for almost 11 percent of surface area. Historical wetland losses in Missouri have been significant, approaching 90 percent. This Department and other federal and state agencies are directed to

implement a policy of “no net loss of wetlands.” Any impacts are to be avoided or minimized if possible and will require appropriate mitigation.

Response: Concur

12. A stream moved to a new location to accommodate construction of an authorized project should incorporate natural channel design features relative to a morphologically stable and appropriate stream channel [dimension (cross-section), pattern (sinuosity), profile (slope)] and incorporate measures (grade control, instream habitat, riparian plantings, etc.) prior to consideration given to accept any part of the relocated channel as compensatory mitigation. Relocations resulting in a reduced channel length generally require additional mitigation to replace net losses of stream channel.

Response: Concur. However, neither stream in the project area are being moved to a new location.

13. To comply with antidegradation requirements, the Department will review any applicable alternatives analysis and/or compliance with Section 404(b)(1) guidelines to ensure the proposed discharges are unavoidable (i.e., necessary), that the least damaging practicable alternative is authorized, and mitigation is required for all impacts associated with the activity.

Response: Concur

14. Antidegradation requirements require all appropriate and reasonable Best Management Practices related to erosion and sediment control, project stabilization and prevention of water quality degradation (e.g., preserving vegetation, stream bank stability and basic drainage) are applied and maintained. Applicants will be responsible for ensuring that permit requirements and relevant Clean Water Act Section 401 Water Quality Certification (WQC) conditions are met.

Response: Concur

15. Acquisition of a WQC should not be construed or interpreted to imply the requirements for other permits are replaced or superseded, including Clean Water Act Section 402 National Pollutant Discharge Elimination System Permits. Permits or any other requirements should remain in effect. Land disturbance activities disturbing one or more acres of total area for the entire project may require a stormwater permit. Instructions on how to apply for and receive the on-line land disturbance permit are located at <http://www.dnr.mo.gov/env/wpp/epermit/help.htm>. Questions may be directed to the Department’s Kansas City Regional Office at (816) 251-0700.

Response: Concur

16. The city of Kansas City is required to have a Municipal Separate Storm Sewer System Permit with measures to control and possibly treat stormwater as part of local requirements.

Response: Concur. The City is compliance with the necessary permits.

17. Care should be taken to keep machinery out of the water way as much as possible. Fuel, oil and other petroleum products, equipment, construction materials and any solid waste should not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions should be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of this operation.

Response: Concur

18. Petroleum products spilled into any water or on the banks where the material may enter waters of the state should be immediately cleaned up and disposed of properly. Any such spills of petroleum should be reported as soon as possible, but no later than 24 hours after discovery to the Missouri Department of Natural Resources' Environmental Emergency Response number at (573) 634-2436.

Response: Concur

19. Only clean, nonpolluting fill should be used. The following materials are not suitable for bank stabilization and should not be used due to their potential to cause violations of the general criteria of the Water Quality Standards (10 CSR 20-7.031 (3)(A)-(H)):
- a. Earthen fill, gravel, broken concrete where the material does not meet the specifications stated in the Missouri Nationwide Permit Regional Conditions (<http://www.nwkc.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MORegCon.pdf>) and fragmented asphalt, since these materials are usually not substantial enough to withstand erosive flows;
 - b. Concrete with exposed rebar;
 - c. Tires, vehicles or vehicle bodies, construction or demolition debris are solid waste and are excluded from placement in the waters of the state;
 - d. Liquid concrete, including grouted riprap, if not placed as part of an engineered structure; and
 - e. Any material containing chemical pollutants (including but not limited to creosote or pentachlorophenol).

Response: Concur

20. Clearing of vegetation/trees should be the minimum necessary to accomplish the activity. A vegetated corridor should be maintained from the high bank on either side of the jurisdictional channel to protect water quality and to provide for long-term stability of the stream channel, unless physical barriers prevent such a corridor. Lack of ownership or control of any portion of this corridor may be considered a legitimate and discretionary cause to waive this requirement on that portion.

Response: Concur

21. Streambed gradient should not be permanently altered during project construction.

Response: Concur

22. No project should accelerate bed or bank erosion.

Response: Concur. This project is going to reduce erosion of the streambanks in the project area.

23. An approved mitigation plan needs to be submitted before consideration for WQC. After avoidance and minimization for the project, unavoidable stream impacts should be mitigated appropriately. Mitigation for loss of aquatic resources should be in conformance with the April 10, 2008, joint regulation "Compensatory Mitigation for Losses of Aquatic Resources; Final Rule" [USACE: 33 CFR Part 332 and U.S. Environmental Protection Agency: 40 CFR Part 230] and with guidance located online at <http://www.nwk.usace.army.mil/Missions/RegulatoryBranch/StateofMissouri.aspx>.

Response: Concur. We intend to utilize an approved mitigation bank as near the project area as practicable.

24. Please provide the revised adverse impact worksheet for the stream impacts as well as the revised worksheet for the proposed mitigation. Proposed mitigation must be within the state of Missouri. If mitigation is being purchased from a mitigation bank, please name the provider/location.

Response: The current MSMM worksheets are correct (addressed in #3) and do not need revision. The mitigation bank will be provided once an acceptable one has been identified.

25. Best Management Practices should be used during all phases of the project to limit the amount of discharge of water contaminants to waters of the state. The project should not involve more than normal stormwater or incidental loading of sediment caused by construction disturbances.

Response: Concur

26. The Department encourages the permittee to consider environmentally-friendly design techniques such as Green Infrastructure into their plans. Green Infrastructure is a stormwater management strategy that maintains or restores the original site hydrology through infiltration, evaporation or reuse of stormwater. Designs might include creating vegetated swales, rain gardens and porous pavement. More information regarding Green Infrastructure can be found at these websites: <http://www.epa.gov/owow/NPS/lid/>, <http://water.epa.gov/infrastructure/greeninfrastructure>, or www.lid-stormwater.net/lid_techniques.htm. A good source of information regarding green infrastructure is contained within the "Missouri Guide to Green Infrastructure: Integrating Water Quality into Municipal Stormwater Management" at <http://www.dnr.mo.gov/env/wpp/stormwater/mo-gi-guide.htm>.

Response: Concur. This project proposes to utilize articulating mat along the Blue River where practicable to allow for vegetation growth.

27. Use bioengineering methods when practicable for bank stabilization that minimizes the amount of sediment and other pollutants entering the water ways. As opportunity allows, limit the amount of rock or other hard points while increasing the amount of native vegetation or a combination of rock and vegetation.

Response: Concur

28. Conduct activity at low flows and water levels to limit the amount of sediment disturbance caused by the heavy equipment. Limit the duration and extent that the heavy equipment is required to be in-stream.

Response: Concur

29. The riparian area, banks, etc., should be restored to a stable condition to protect water quality as soon as possible. Seeding, mulching and needed fertilization should be within three days of final contouring. On-site inspections of these areas should be conducted as necessary to ensure successful re-vegetation and stabilization, and to ensure that erosion and deposition of soil in waters of the state is not occurring from these projects.

Response: Concur

30. All other commenting parties' comments and the applicant's response to those comments should be sent by e-mail at wpsc401cert@dnr.mo.gov or to the address below. Consideration for WQC cannot be made until all comments and responses have been received.

Response: Concur

31. The request for WQC that is part of the public notice is denied without prejudice. Once the USACE is ready to issue the 404 Permit and the applicant, their consultant, or the USACE has provided to the Department a complete application which includes a revised mitigation plan, a formal request for WQC should be made to the Department.

Response: The current mitigation plan does not need revision. The current MSMM guidance is complete and accurate per the MSMM worksheets.

Appendix G
Atlas 14 Analysis



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
635 FEDERAL BUILDING
601 E. 12TH STREET
KANSAS CITY MISSOURI 64106-2824

CENWK-ED-HH

14 May 2014

MEMORANDUM FOR RECORD

SUBJECT: Blue River Hydrology Sensitivity to NOAA Atlas 14 Point Precipitation Estimates, Blue River Basin, Dodson Industrial District (Dodson) and Swope Park Industrial Area (SPIA) Flood Damage Reduction Projects

1. A sensitivity analysis was conducted to determine whether changes are warranted to the hydrology and corresponding water surface profiles of the subject projects. The analysis included updated flow frequency analysis and hydrologic modeling using point precipitation estimates pre- and post-publication of National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 8, Version 2.0 (Atlas 14). Enclosed are the technical report and peer review comments conducted as part of district quality control efforts including a review from the Omaha District Hydrology Section Chief, Doug Clemetson.
2. Analysis has shown that the flows from the 1990 hydrology report used to justify both projects during feasibility phase still provides a reasonable estimate of flow frequencies for the Blue River Basin.
3. If there are any questions, please contact the undersigned at 816-389-3482.

CHANCE J. BITNER, P.E.
Chief, Hydrology and Hydraulics Section

Encls

1. Sensitivity Analysis Report
2. Peer Review Comments (Clemetson)
3. Peer Review Comments (Otero)

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DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
635 FEDERAL BUILDING
601 E. 12TH STREET
KANSAS CITY MISSOURI 64106-2824

**Blue River Hydrologic and Hydraulic Sensitivity to NOAA Atlas 14
Point Precipitation Estimates**

**Blue River Basin, Dodson Industrial District and Swope Park
Industrial Area Flood Damage Reduction Projects**



15 May 1990 Flooding at Swope Park Industrial Area

Jun 27, 2014

**Hydrologic Engineering Branch
Engineering Division
Kansas City, Missouri**

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SENSITIVITY ANALYSIS FOR THE BLUE RIVER, KANSAS CITY, MO

1.0 Introduction

A post authorization change request / limited reevaluation report was prepared for both the Blue River Basin, Dodson Industrial District (Dodson) and Swope Park Industrial Area (SPIA) Flood Damage Reduction Projects and submitted for Northwestern Division approval in January 2014. Following the submittal, additional information was requested regarding potential changes to the hydrology due to the 2013 publication of updated point precipitation frequency estimates by the National Oceanic and Atmospheric Administration (NOAA) contained in Atlas 14, Volume 8, Version 2.0 (Atlas 14).

Hydrology of the Blue River for Dodson, SPIA, as well as the Bannister Federal Levee Complex adjacent to Dodson and portions of the Blue River Channel was originally documented in an October 1990 design memorandum for the Blue River Channel (USACE, 1990). As part of the hydrology study, in 1989 the Missouri River Division (MRD), now part of Northwestern Division, performed a flow frequency analysis using the HEC-WRC Flood Flow Frequency Analysis Program. The flow frequency analysis utilized stream flow data from the U.S. Geological Survey (USGS) gage number 06893500 for the Blue River at Kansas City stream gage located at Bannister Road about one mile upstream of the Dodson project site (Bannister Gage). Minimal changes in drainage area are present between the stream gage, Dodson, and SPIA areas. Fifty water years of data at the gage from 1939 to 1988 were used for the 1989 flow frequency analysis.

In order to simulate future hydrology of the Blue River watershed, a basin model was developed by the Kansas City District in 1990 and calibrated to reconstitute the trend of the adopted frequency curve. Estimates of Blue River Basin flows were developed using a U.S. Environmental Protection Agency (EPA) SWMM Model. Estimates of future flows were developed for 1995 and for 2015 basin conditions using a Johnson County, Kansas, Planning Commission land use report which included development projections representative of the maximum amounts of urbanization. The SWMM model was calibrated to match the flow produced by an event with an annual chance exceedance (ACE) of 0.002 based on the 1989 flow-frequency analysis. Accordingly, a change in flow frequency could be considered a better indicator of the need to update hydrology than a change in point precipitation intensity. An additional 25 years of flow data is now available since the adopted flow frequency curve was generated. Therefore, consideration of hydrologic changes both due to additional peak flow data and updated precipitation frequency estimates is warranted. Several intermediate and more recent studies are also introduced and utilized in the sensitivity analysis.

1.1 Scope of the Sensitivity Analysis

Changes to the hydrology and corresponding water surface profiles could have potential implications for the economic analysis and project design. However, funds for a complete reanalysis are not available during this late stage of the projects with multiple features already constructed. Accordingly, a sensitivity analysis scope was created to determine the degree to which hydrology and hydraulic information could have changed to help gage whether additional economic and or cost analysis is warranted. A five part scope was developed as follows:

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27 Jun 2014

- 1) Re-run Bulletin 17B flow frequency analysis for the Blue River at Bannister Road gage for four time periods consistent with the 1989 analysis, a 1997 re-analysis, and the available 75 years of flow record, and recommend an updated flow frequency curve for the sensitivity analysis.
- 2) Compare the shifts of the frequency curve to the SWMM model output from the 1990 study. Explore how the updated flow frequency curve could impact flows throughout the project areas.
- 3) Compare Atlas 14 precipitation frequencies to both previous reports including Technical Paper 40 (TP40), which was used in the 1990 study, and a 2002 report published by the American Public Works Association (APWA) specific to the Kansas City Metropolitan area as used in 2004 and 2007 hydrology studies to determine the potential implications to flows.
- 4) Review hydrologic model studies completed in 2004 and 2007 and re-run the HEC-HMS models pre- and post Atlas 14. Compare the results to all previous hydrologic studies and recommend additional hydraulic sensitivity as needed.
- 5) Consider updates to hydraulic computations and other sensitivity analysis.

Sensitivity analysis methodology and results are discussed in more detail in the subsequent sections.

2.0 Flow Frequency Analysis

In order to test changes to the flow frequency analysis, the original flow frequency curve had to be reproduced to validate the analysis. The program HEC-SSP version 2.0 was selected for the flow frequency analysis. Original steps to perform the flow frequency analysis were reviewed in detail to be able to reproduce the Feasibility Study flow frequency curve.

2.1 1989 Flow Frequency Analysis Summary

Per the feasibility report, during the 50-year period of 1939-1988, land use changes and urban development in the basin may have altered the hydrologic characteristics of the basin. To determine possible effects of land use changes and urban development in the basin, comparisons were made by conducting two series of frequency analyses:

- The first analysis started with the latest 20 years of data, calculating flood frequencies for that and each data period incrementally one year longer until the entire 50 year period of record was covered;
- The second analysis repeated the same approach in reverse, starting from the earliest 20 years of data.

The analyses identified possible slight trends due to urbanization in the basin. Because of the possible urbanization impacts, the earliest data was eliminated from the analysis. Per procedures in Bulletin 17B, a flow of 41,000 cubic feet per second (cfs) in 1961 was identified as generally a high outlier and low outliers were identified in 1953 and 1956. A data period of 1961 to 1988 was proposed, to include the flood of record in 1961 which was also a high outlier by a slight margin. Due to the inclusion of the high outlier, it was decided to extend the period of record for the analysis

back to 1956, incorporating one low outlier. The mean flow for both series was relatively stable. The standard deviations for the data sets were considered relatively stable as well. Values of skew varied significantly depending upon the data span analyzed. An adopted skew of 0.4000 was used for the 1956-1988 analysis, based on the computed skew of 0.4204 and the fact that many other data periods considered had a skew of approximately 0.4. An adjusted skew of 0.0 was also considered, based on the results of the analysis, where computer runs for periods of record ranging from 1962-1988 to 1969-1988 produced computed skews ranging from 0.0290 to -0.0818. The results indicated, and the determination made, that the period of record from 1956 through 1988 with minimal skew adjustment was most appropriate as a basis for the frequency analysis. Therefore, the 33 year period from 1956 through 1988 was used to establish a base condition representative of the period in which urbanization was occurring. Expected probability was applied to the flow-frequency curve obtained from this analysis.

2.2 1997 Updated Flow Frequency Analysis

As part of continuing design and feasibility studies for several projects in the Blue River Basin, the Kansas City District contracted with the architect-engineering firm HNTB, Inc. to perform an updated flow frequency and hydraulic analysis utilizing current Bannister Road gage data in 1997. Updated hydrology incorporated the period of record from 1989 through 1996 and utilized the computer program HEC-FFA to complete the flow frequency analysis. Annual peak data from 1956 to 1988 was re-analyzed to confirm consistency with the previous MRD analysis performed with HEC-WRC. Both analyses used an adopted skew of 0.400 and incorporated one high and one low outlier. The results of these comparison analyses were virtually identical.

HNTB then expanded the previously adopted period of record from 1956-1989 to 1956-1996, and also tested the period 1957-1996 without the 1956 low outlier. While the computed skew for these periods remained approximately 0.4, the screening value for the high outlier increased and as a result the 1961 event was no longer considered a high outlier. Accordingly, a shortened period of record of 1961-1996 was considered, as there would theoretically no longer be a need to include a low outlier to balance the presence of a high outlier. The results of the MRD analysis for the shortened 1961-1988 were compared with the HEC-FFA analysis for 1961-1996, and the results were similar. HNTB recommended that adoption of the period 1961-1996 would better represent the current hydrology.

However, from the updated period of record analysis, the Kansas City District determined that the 1957-1996 analysis with a skew of 0.400 would be the best representation of the Basin flow-frequency relationship. Additionally, the 1957-1996 time period would have no low or high outliers in the adopted data. Kansas City District and HNTB both agreed that as a result of this analysis, no alterations or updates of the Blue River Basin SWMM model would be warranted. Therefore, the computed SWMM 1995 and SWMM 2015 flow-frequency relationships remained unchanged for design and related study purposes.

2.3 2014 Updated Flow Frequency Analysis

Prior to updating frequency curves for the sensitivity analysis, a test to confirm that the 1989 flow frequency curve could be reproduced was conducted. Flow results rounded to three significant digits match exactly. Additional data periods were then analyzed following the same methodology to determine potential shifts in flow frequency curves. Four data periods were considered as follows:

- 1) Feasibility Study 33 year analysis period of 1956 through 1988,
- 2) Full 50 year data period at the time of the Feasibility Study of 1939 through 1988,
- 3) Post 1956 data period of 1957 through 2013, and
- 4) Full 75 year data period from 1939 through 2013.

Table 1 presents the resultant station skews and mean square errors of each data period. Station skew varies widely between the different time periods, but is relatively similar between the Feasibility Study 33 year time period of 1956-1988 and the full 75 year data period of 1939-2013.

TABLE 1: STATION SKEW AND MEAN SQUARE ERROR BY TIME PERIOD

Time Period	Station Skew	Mean Square Error
1956-1988*	0.422	0.203
1939-1988	0.058	0.136
1957-2013	0.197	0.106
1939-2013	0.375	0.105

*The Feasibility Study used an adopted a skew of 0.400

To maintain consistency with the feasibility study, expected probability curves were compared between the four time periods. However, skew was maintained as the station skew for the comparison due to the significant variances between time periods. For reference, tests of using the adopted skew of 0.400 from the 1989 study showed differences of expected frequency flows for the 0.002 ACE event of 32, 13, and 2 percent as compared to the station skew results for the 1939-1988, 1957-2013, and 1939-2013 time periods, respectively. Figure 1 presents a probability plot of the results.

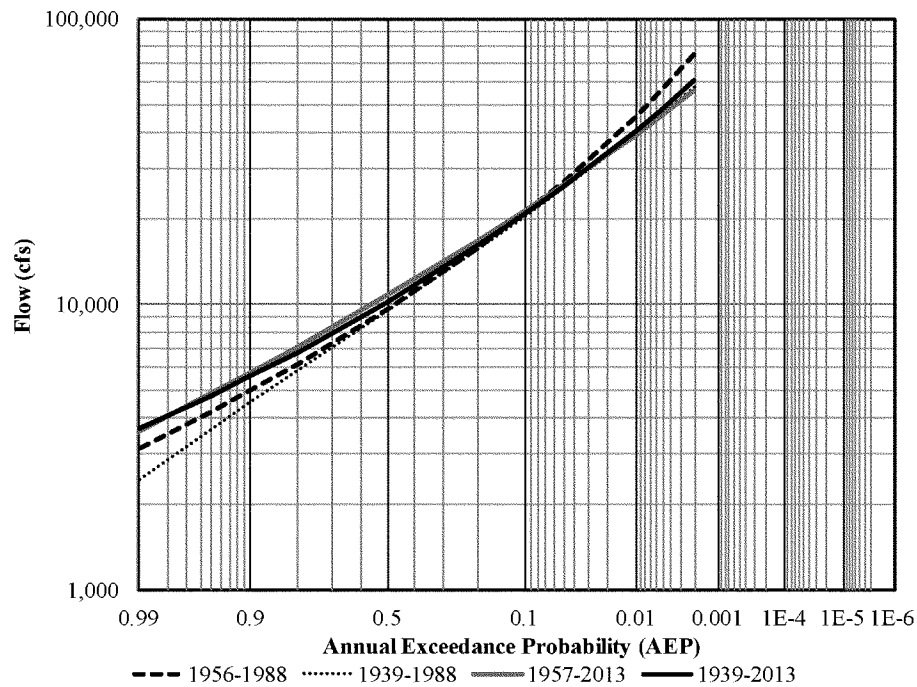


FIGURE 1: FLOW FREQUENCY CURVES FOR THE FOUR TIME PERIODS

As seen in Figure 1, all time periods tested have several differences, although each curve appears to have similar results at a 0.1 ACE event. All three additional time periods appear to have lower expected flows than the feasibility study for flows larger than a 0.1 ACE event. Urbanization effects described as minor in the feasibility report prior to 1956 appear to be essentially negligible when looking at the additional 25 years of record, although a slight increase in 2 year flows may be evident. Most significantly, very small differences in flows exist between the 1939-1988, 1957-2013, and 1939-2013 data periods, with the full data period having the highest 0.002 ACE flow of these three time periods. Additionally, the full data period of 1939-2013 had the most similar station skew to the 1956-1988 data period from the feasibility study. Therefore, the full data period was retained for further analysis.

Percent change for each frequency flow of the 1939-2013 data was computed as compared to the 1989 study both using the station skew of 0.375 and using the 1989 study adopted skew of 0.400 for the 1939-2013 time period. Generally low flows appear to have increased, with no change at a 0.1 ACE event, with flows decreasing at the less frequency events. The largest differences in flow appear for flows exceeding a 0.01 ACE event. Table 2 presents the flow frequency results. To aid compatibility of results, confidence limits and percent change are shown relative to the adopted skew of 0.400 for the full 75 years of record.

TABLE 2: COMPARISON OF UPDATED FLOW FREQUENCIES TO THE FEASIBILITY STUDY

Annual Chance Exceedance	Flow (cfs)				
	Feasibility Study 1956-1988	Station Skew of 0.375 for 1939-2013	Skew of 0.400 for 1939-2013	Confidence Limit (0.05)	Confidence Limit (0.95)
0.002	75,000	60,700	61,800	75,700	45,700
0.005	56,600	48,400	49,100	59,600	37,900
0.01	45,600	40,500	40,900	49,200	32,600
0.02	36,500	33,600	33,800	40,200	27,800
0.05	26,800	25,700	25,800	30,000	22,000
0.1	20,800	20,600	20,600	23,500	18,000
0.2	15,600	15,900	15,900	17,800	14,300
0.5	9,550	10,200	10,200	11,200	9,200

In the 1989 study, flows in 1953 and 1956 tested as low outliers, and the flow of record in 1961 also slightly tested as a high outlier. With the additional period of record, 1961 remained the flood of record but no longer tested as a high outlier, while 1953 and 1956 remained low outliers. Figure 2 presents a probability plot for the 1939-2013 data and confidence limits as compared to the 1989 study curve developed from the 1956-1988 data. As seen in Figure 2 and Table 2, the 1989 study flow frequency curve plots well within the bands of uncertainty of the sensitivity analysis generated from the full 75 years of flow record.

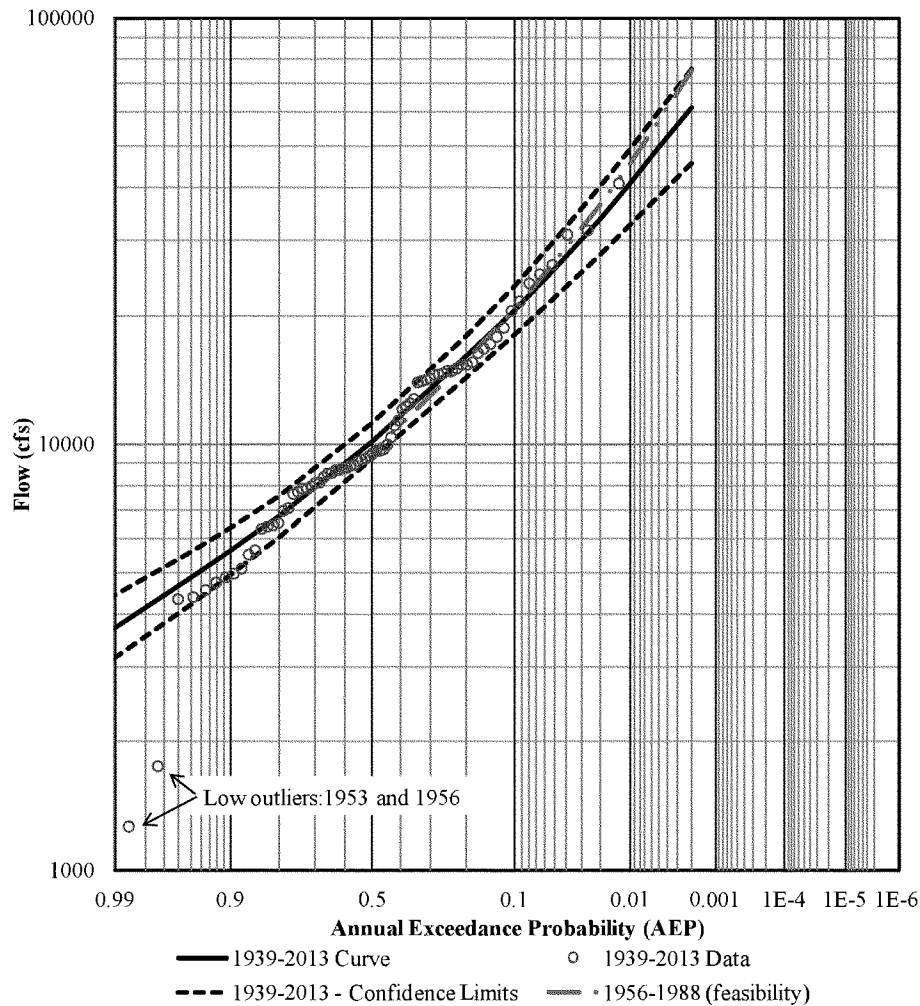


FIGURE 2: FLOW FREQUENCY RESULTS FOR THE 1939-2013 TIME PERIOD

Hydrology studies conducted in 1997 concluded that updates to the SWMM model were not warranted when considering the additional data period of 1989-1996. Accordingly, a last step in the 2014 sensitivity analysis was to test the expected flow frequency curves for this time period and compare it to the 1989 study and sensitivity analysis results. Table 3 presents the results of the comparison using a skew of 0.400 for all three data sets. For reference, station skew was 0.418 for the 1957-1996 data.

TABLE 3: COMPARISON OF 1989, 1997, AND 2014 FLOW FREQUENCY CURVES

Annual Chance Exceedance	Flow (cfs)			1997	2014
	1989 Feasibility Analysis 1956-1988	1997 Frequency Analysis 1957-1996	2014 Sensitivity Analysis 1939-2013	vs 1989 Percent Change	vs 1989 Percent Change
0.002	75,000	75,300	61,800	0.4%	-17.5%
0.005	56,600	57,600	49,100	1.8%	-13.0%
0.01	45,600	46,800	40,900	2.6%	-10.0%
0.02	36,500	37,800	33,800	3.6%	-7.1%
0.05	26,800	27,900	25,800	4.1%	-3.6%
0.1	20,800	21,800	20,600	4.8%	-0.9%
0.2	15,600	16,500	15,900	5.8%	1.8%
0.5	9,550	10,100	10,200	5.8%	6.4%

A review of the 1957-1996 and 1956-1988 flow frequency curves confirms that the 1997 decision not to update hydrologic models appears reasonable due to minor changes in flow frequencies especially for the 0.002 ACE event. All flows greater than a 0.5 ACE event increased less than 6 percent. However, updated flow frequencies through 2013 also contain the drought conditions of approximately 2001 through 2007, and 2011 to 2012 that impacted the Kansas City area. Due to the larger apparent decrease in the 0.002 ACE event for the 2014 sensitivity analysis, consideration of potential implications to the SWMM model results is warranted.

3.0 Hydrologic Model Sensitivity to Updated Flow and Rainfall Frequencies

Hydrologic Models of the Blue River Basin have been developed by USACE in 1964, 1990, and most recently 2004 and 2007. As a result, multiple versions of hydrologic models are available using multiple transformations, loss methods, and routing techniques. The most detailed modeling effort was conducted in 2007, where HEC-HMS models were coupled to an unsteady HEC-RAS model of the basin streams to more accurately route flows. Running these models was deemed too labor intensive for the sensitivity analysis, however results of the 2007 modeling are referenced and used for comparison. Two separate hydrologic modeling studies following different calibration approaches were developed for the Blue River Basin, specifically a 1990 SWMM Model calibrated to the 1956-1988 flow frequency curve, and a January 2004 HEC-HMS model calibrated to floods occurring in 1998 and 2003. The 1990 analysis was utilized for the feasibility studies, whereas the January 2004 analysis was developed for potential project screening and planning purposes but was not officially finalized or utilized for implementation. In this section, both hydrology studies are described and sensitivity to various changes in basin development, flow frequency, and point precipitation frequency estimates from TP 40 and Atlas 14 are investigated.

3.1 1990 SWMM Model for Urbanization Effects Used for the Feasibility Study

In order to simulate future hydrology of the basin, a SWMM model was developed by the Kansas City District in 1990 and calibrated to reconstitute the trend of the 1989 flow frequency curve. The SWMM model uses parameters such as surface area, ground slope, roughness coefficients,

infiltration rates, and percent of impervious surface, combined with accepted hydraulic and infiltration/runoff equations to develop and route the estimates of basin runoff. Rainfall data for the SWMM model were based upon a 6 hour storm duration for synthetic storm obtained from the U.S. Weather Bureau Technical Paper No. 40, "Rainfall Frequency Atlas of the United States", May 1961. Estimates of future discharges were developed 1995 and for 2015 basin conditions using a Johnson County, Kansas, Planning Commission land use report. The analysis generally matched the 1995 SWMM model results to the flow frequency curve at the 0.5 and 0.002 ACE flows, then utilized Johnson County's development projections for maximum or ultimate urbanization effects to generate the 2015 estimate of discharges. Table 4 presents a summary of the 1995 and 2015 SWMM model flows compared to the 1989 and 2014 flow frequency analysis for data post 1956. For reference, the SWMM 2015 model flow estimates were used in support of the design of the Bannister Road Federal Complex Levee constructed in 1994 immediately upstream of Dodson on the left bank, and for the Dodson and Swope Park Feasibility Studies. The SWMM model was also used in support of the design and construction of the Blue River Channel project approximately 6 miles downstream.

TABLE 4: PROJECTED AND OBSERVED URBANIZATION EFFECTS

Annual Chance Exceedance	Flow (cfs)					
	SWMM 1995 (a)	SWMM 2015 (b)	1989 Flow Freq 1956-1988 (c)	2014 Flow Freq 1956-2013 (d)*		
0.002	73,770	75,100	75,000	63,700	1.02	0.85
0.005	62,000	64,000	56,600	50,400	1.03	0.89
0.01	53,230	55,170	45,600	41,900	1.04	0.92
0.02	46,000	48,000	36,500	34,600	1.04	0.95
0.05	35,000	37,000	26,800	26,400	1.06	0.99
0.1	27,380	29,360	20,800	21,100	1.07	1.01
0.2	20,000	22,000	15,600	16,300	1.10	1.04
0.5	10,600	12,000	9,550	10,500	1.13	1.10

*Flow Frequencies displayed use a skew of 0.400 whereas station skew was 0.222.

A comparison of the 1995 versus 2015 SWMM model projections, or the ratio of (b)/(a) in Table 4, shows that urbanization effects were projected to be more pronounced at a 0.5 ACE flow, and that the effects would be relatively minor at the extreme events. To check for potential observed effects, a similar comparison of flow frequency curves for the 1956-1988 and 1956-2013 time periods was also made as the ratio of (d)/(c) in Table 4. Shifts in flow frequency curves seem to confirm the increasing trend for flows smaller than a 0.05 ACE event, with as much as a 10 percent increase at a 0.5 ACE event. However, as previously discussed, the more extreme flow events are experiencing a downward shift in their ACE. Accordingly, urbanization effects appear to have been adequately considered during the feasibility study.

3.2 NOAA Atlas 14 vs Previous Precipitation Frequency and Duration Comparison

Three separate point precipitation estimates are available for the Blue River basin including: 1) the 1961 TP40 utilized in the feasibility study, 2) the 2002 Kansas City Metropolitan Area completed by

the University of Kansas working with the APWA as utilized in the 2004 and 2007 hydrology studies, and 3) NOAA Atlas 14. Since the most recent HEC-HMS models utilized the 2002 APWA study, the precipitation comparison was focused on changes between the 2002 study and NOAA Atlas 14. Table 5 presents a comparison of the rainfall frequency partial duration series.

TABLE 5: COMPARISON OF PRECIPITATION DEPTHS: ATLAS 14 TO APWA 2002

Duration	APWA 2002 - Point Precipitation Estimates by ACE* (inch)							
	0.99	0.5	0.2	0.1	0.04	0.02	0.01	0.002
15Min	0.74	0.92	1.17	1.36	1.63	1.84	2.06	2.55
1hr	1.32	1.63	2.07	2.42	2.89	3.27	3.66	4.65
2hr	1.63	2.02	2.56	2.99	3.57	4.04	4.52	5.5
3hr	1.81	2.25	2.85	3.33	3.98	4.5	5.04	6.1
6hr	2.15	2.67	3.38	3.94	4.72	5.33	5.96	7.25
12hr	2.5	3.1	3.93	4.58	5.48	6.2	6.93	8.7
1day	2.86	3.55	4.5	5.25	6.28	7.1	7.94	9.7

Duration	NOAA Atlas 14 - Point Precipitation Estimates by ACE* (inch)							
	0.99	0.5	0.2	0.1	0.04	0.02	0.01	0.002
15Min	0.733	0.856	1.06	1.24	1.49	1.68	1.89	2.38
1hr	1.33	1.57	1.96	2.31	2.8	3.19	3.6	4.6
2hr	1.65	1.94	2.43	2.87	3.49	3.99	4.52	5.83
3hr	1.86	2.19	2.76	3.26	3.99	4.59	5.21	6.79
6hr	2.24	2.66	3.38	4.02	4.95	5.71	6.51	8.53
12hr	2.64	3.17	4.07	4.85	5.99	6.91	7.88	10.3
1day	3.1	3.7	4.74	5.63	6.93	7.98	9.07	11.8

Duration	Percent Change by ACE*							
	0.99	0.5	0.2	0.1	0.04	0.02	0.01	0.002
15Min	-0.9%	-7.0%	-9.4%	-8.8%	-8.6%	-8.7%	-8.3%	-6.7%
1hr	0.8%	-3.7%	-5.3%	-4.5%	-3.1%	-2.4%	-1.6%	-1.1%
2hr	1.2%	-4.0%	-5.1%	-4.0%	-2.2%	-1.2%	0.0%	6.0%
3hr	2.8%	-2.7%	-3.2%	-2.1%	0.3%	2.0%	3.4%	11.3%
6hr	4.2%	-0.4%	0.0%	2.0%	4.9%	7.1%	9.2%	17.7%
12hr	5.6%	2.3%	3.6%	5.9%	9.3%	11.5%	13.7%	18.4%
1day	8.4%	4.2%	5.3%	7.2%	10.4%	12.4%	14.2%	21.6%

*NOTE: Precipitation values are partial duration series, with a 1-yr assumed to have an approximate ACE of 0.99.

Previous hydrology studies indicated that the 6 hr duration intensity was a key driver of peak flows in the Blue River basin. Accordingly, the comparison of 6 hr rainfall depths was highlighted in bold text in Table 5. Comparing the two data sets at a 6 hr duration shows an increase in the annual events, minor changes between 0.50 and 0.1 ACE estimates, and increasingly greater change at the

larger events with approximately an 18 percent change at 0.002 ACE frequencies. Changes of this magnitude would be expected to have significant effects on flows in the watershed. Since the 1990 hydrology study was calibrated to a flow frequency curve, whereas the 2004 HEC-HMS model was calibrated to actual events of 1998, 2003, and later 2004, the HEC-HMS model was deemed most appropriate to evaluate potential flow frequency changes as result of NOAA Atlas 14.

3.3 2014 Blue River Watershed Hydrologic Analysis

A draft hydrologic analysis was completed in January of 2004 which utilized point precipitation frequency estimates and a hydrologic model to estimate flow frequencies given a level of basin development as it existed in 2003. Hydrologic modeling for the January 2004 study was accomplished using the HEC-HMS version 2.2.2 software, but was re-ran for the 2014 sensitivity analysis using version 3.5. For reference, basin delineation and parameters were generated in 2004 with the computer program HEC-GeoHMS and USGS 7.5-minute DEM data. The Blue River basin was divided into 19 sub-basins for computation of peak discharges at key locations. Figures 3 and 4 present a schematic of the HEC-HMS model and a map of the Blue River watershed with the sub-basins delineated and labeled, respectively. For reference, the USGS streamgage at Bannister Road is located at the reach node labeled "JINDN" in the HEC-HMS schematic.

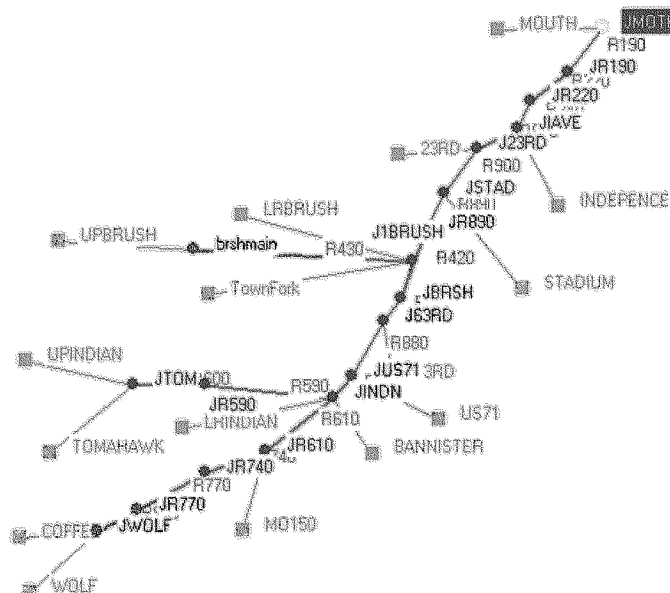


FIGURE 3: SCHEMATIC OF THE 2004 HEC-HMS MODEL

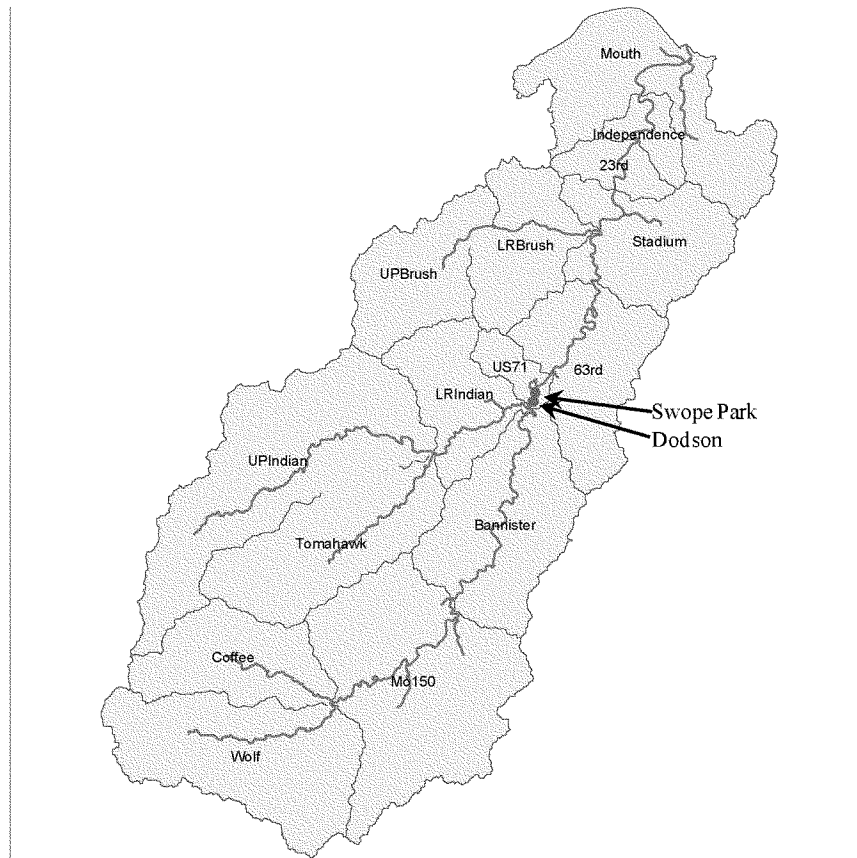


FIGURE 4: BLUE RIVER BASIN WATERSHED DELINEATION

Hypothetical precipitation data was obtained from APWA 2002. A 24-hour storm duration balanced hypothetical rainfall distribution per EM-1110-2-1417 was applied using a 15-minute computational interval in the HEC-HMS model. Clark's method was used to develop a unit hydrograph based on the physical characteristics of each sub-basin. Concentration times were obtained from National Weather Service Flood Advisory Tables. Clark's storage coefficients were estimated for each sub-basin using slopes and lengths calculated from HEC-GeoHMS. Impervious areas were obtained from USGS land-use maps and from the city of Kansas City. Values ranged from 15 percent in the Wolf Creek and Coffee Creek basins to 50 percent in the Brush Creek basin. The initial-constant loss rate method was used to evaluate runoff and infiltration characteristics within the Blue River watershed. Modified antecedent moisture condition (AMC III) loss rates were adopted with an initial infiltration of 0.15 inch and a constant rate of 0.15 inch per hour. While AMCIII is considered to be a reasonable assumption for extreme precipitation events, it may over predict runoff during more normal conditions. Table 6 presents the values used in this study.

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TABLE 6: BLUE RIVER BASIN PARAMETERS AND CLARK UNIT HYDROGRAPH COEFFICIENTS

BASIN	AMC III	CNST	%		STOR	AREA
<u>NAME</u>	<u>INIT</u>	<u>LOSS</u>	<u>IMP</u>	<u>T_c</u>	<u>COEF</u>	<u>SQ MI</u>
MOUTH	0.15	0.15	15	2.9	4.7	25.7
INDEPAVE	0.15	0.15	25	1.9	3.1	4.4
23 RD	0.15	0.15	25	1.8	2.9	5.1
STADIUM	0.15	0.15	24	2.5	4.1	17.9
UPBRUSH	0.15	0.15	50	0.75	1.2	16.0
LRBRUSH	0.15	0.15	44	1.4	2.4	9.5
TOWNFK	0.15	0.15	42	0.9	1.6	5.4
63 RD	0.15	0.15	23	3.7	6.0	19.9
UPINDIAN	0.15	0.15	25	6.0	9.8	39.0
LRINDIAN	0.15	0.15	23	2.3	3.7	13.5
TOMAHAW	0.15	0.15	20	4.1	6.7	24.0
US71	0.15	0.15	22	1.4	2.3	3.7
BANNISTR	0.15	0.15	22	4.6	7.5	25.2
MO150	0.15	0.15	17	3.9	6.4	40.0
COFFEE	0.15	0.15	15	3.3	5.4	16.5
WOLF	0.15	0.15	15	3.7	6.0	29.8

**NOTE: Table 6 is taken directly from the January 2004 draft report*

The "Lag" reach routing method was used to route water through the Blue River basin. Lag times were obtained from the National Weather Service River Forecasting Center. Cross section geometry and channel invert elevations were developed from the HEC-RAS hydraulic model of Blue River which was developed by the Kansas City District. Manning's "n" varies from 0.045 to 0.070 in the overbanks and from 0.030 to 0.040 in the channel, as derived from field investigation and engineering judgment.

TABLE 7: LAG TIMES

<u>REACH</u>	<u>MINUTES</u>
State Line Rd – MO150	105
MO150-Blue Ridge	91
Blue Ridge-Bannister Road	248
Bannister Rd – 63 rd Street	190
63 rd Street – Brush Creek	96
Brush Creek – Stadium Drive	108
Stadium Drive – 23 rd Street	96
23 rd Street – Independence Avenue	90
Independence Avenue- mouth	144

**NOTE: Table 6 is taken directly from the January 2004 draft report*

Model calibration was conducted in 2003 to reproduce the October 4, 1998 and the August 30-31, 2003 storm events over the Blue River basin. Observed flows at the Banister Road stream gage of 14,700 cfs in 1990 and 14,600 cfs in 2003 matched within 2 percent of the hydrologic output following calibration efforts. The primary adjustment for calibration was adjustment of initial

abstractions to 0.7 and 0.75 inches for the 1998 and 2003 models, respectively. For the 2014 study, the model reproduced the 2003 results exactly, however the 1998 calibration could not be easily re-ran. However, upon investigation the model was producing flow results slightly higher than the January 2004 draft report, and time of concentration and storage coefficient values in the model also did not exactly match the values in the report. After updating the model with the time of concentration and storage coefficient values from the January 2004 draft report, the model flow outputs were then slightly lower than the values in the January 2004 draft report. Calibration of the 2003 flood was rechecked, and it was determined that flows matched observed within ~2 percent by adjusting the initial abstraction down from 0.75 to 0.5 inches. The 0.002 ACE event also reasonably matched the updated flow frequency analysis. Therefore, the calibration was considered appropriate for the sensitivity analysis and models were re-run with Atlas 14 precipitation estimates. Detailed modeling was also conducted in 2007 to couple a later version of the HEC-HMS model to an unsteady HEC-RAS model as part of ongoing USACE Blue River studies and a Masters Degree paper (USACE, 2007). Table 8 presents a summary of the HEC-HMS modeling results pre- and post application of NOAA Atlas 14 precipitation, as well as the previous three hydrology study results.

TABLE 8: HYDROLOGIC MODELING FLOW SUMMARY

Annual Chance Exceedance	Flow (cfs)				
	1964 Hydrology	SWMM 2015	2007 HMS/ RAS	2014 HEC- HMS Pre- Atlas 14	2014 HEC- HMS Post- Atlas 14
0.001					84,600
0.002	93,000	75,100	55,700	62,600	75,300
0.005		64,000		-	63,500
0.01	57,000	55,170	42,700	48,600	55,200
0.02	45,000	48,000	35,500	42,600	47,200
0.04		40,000		36,800	39,600
0.1	24,000	29,360	23,800	29,300	30,200
0.2		22,000		23,400	23,400
0.5		12,000	13,800	15,700	15,500

3.4 Hydrologic Modeling Flows Conclusion

Updated flow frequency analysis and recent hydrologic modeling studies suggest a potential downward shift in flow for events larger than a 0.1 ACE as compared to the SWMM 2015 model results from the 1990 study. However, application of the Atlas 14 rainfall to the recent hydrologic model studies appear to bring flow estimates up much closer to the SWMM 2015 results. While the SWMM model was calibrated to the 0.002 ACE flow from the 1989 flow frequency analysis, the HEC-HMS model was calibrated to rainfall events in 1998 and 2003, and for pre-Atlas 14 rainfall closely matches the 0.002 ACE flow from the 2014 flow frequency analysis. Application of Atlas 14 shifts the HEC-HMS model results away from the flow frequency analysis, but is still based on a hydrologic model calibrated to rainfall events, indicating potential for these flows to occur. Figure 5 presents a probability plot summarizing all hydrologic modeling results.

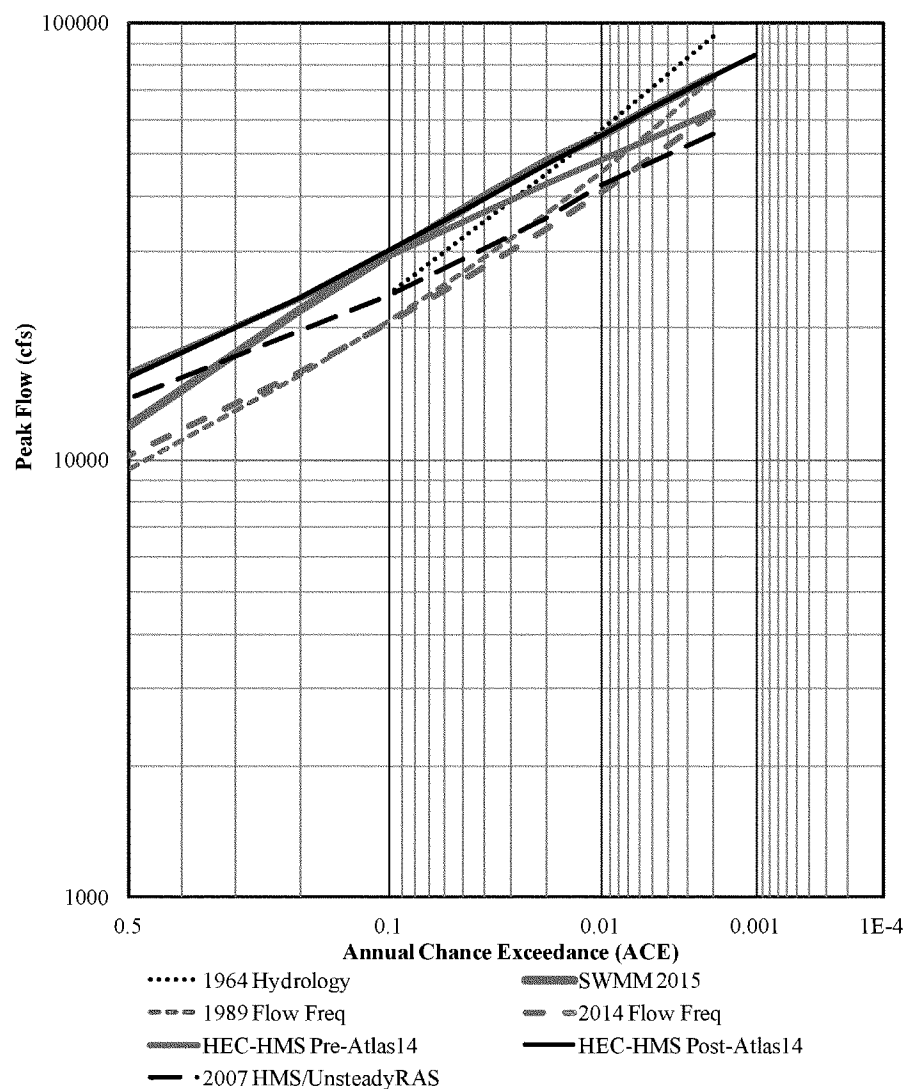


FIGURE 5: PROBABILITY PLOT SUMMARIZING ALL HYDROLOGY STUDIES

Taking into account the uncertainty of these analyses, the overlap of the available flow frequency 90-percent confidence bands was determined. The overlap region gives an indication of the level of agreement between the flow frequency analysis and the analysis using the point precipitation confidence limits from NOAA Atlas 14. Figure 6 presents the comparison of all studies and 90 percent confidence limits.

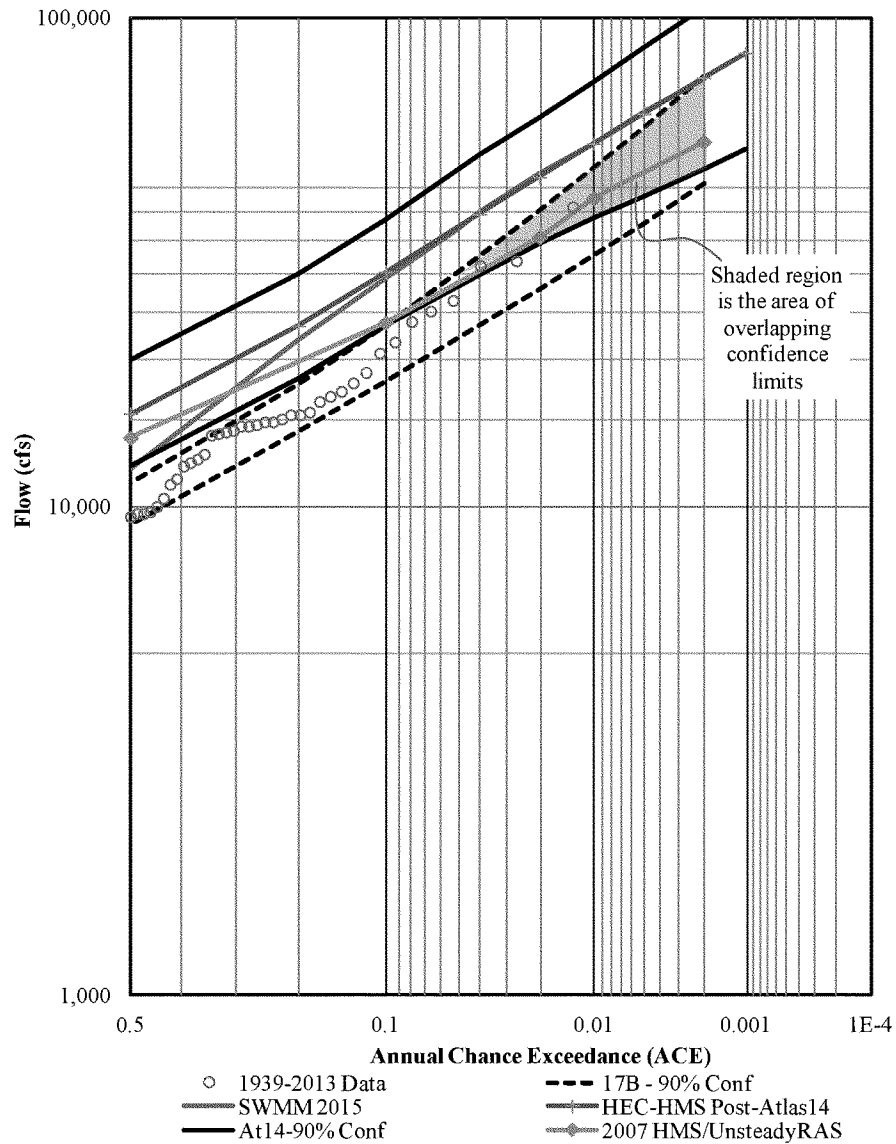


FIGURE 6: CONFIDENCE LIMIT COMPARISON

As seen in Figure 6, areas of agreement between the confidence limits of the flow frequency analysis and HEC-HMS model using the NOAA Atlas 14 precipitation confidence limits are the greatest above approximately a 0.04 ACE event. For events smaller than a 0.04 ACE flood, the upper

confidence limit of the flow frequency analysis appears to generally track the lower confidence limit from NOAA Atlas 14, likely due in part to application of AMCIII loss rates. SWMM 2015 flows match closer to the flow data for flows smaller than a 0.1 ACE. Considering the scatter in results, and how closely the post-Atlas14 values appear to track the SWMM 2015 flows, additional updates to the SWMM 2015 flows do not appear to be warranted at this time.

4.0 Hydraulic Sensitivity Analysis

Because flow updates were not considered necessary, hydraulic investigations initially focused on whether any recent shifts in the stage versus flow relationship have been observed since the 1990's hydraulic study. Figure 7 presents a plot of streamflow measurements versus stage. As seen in the figure, no apparent shift in the stage versus flow relationship has been observed based on data from 2000 to 2013 compared to data from the 1980's through the 1990's.

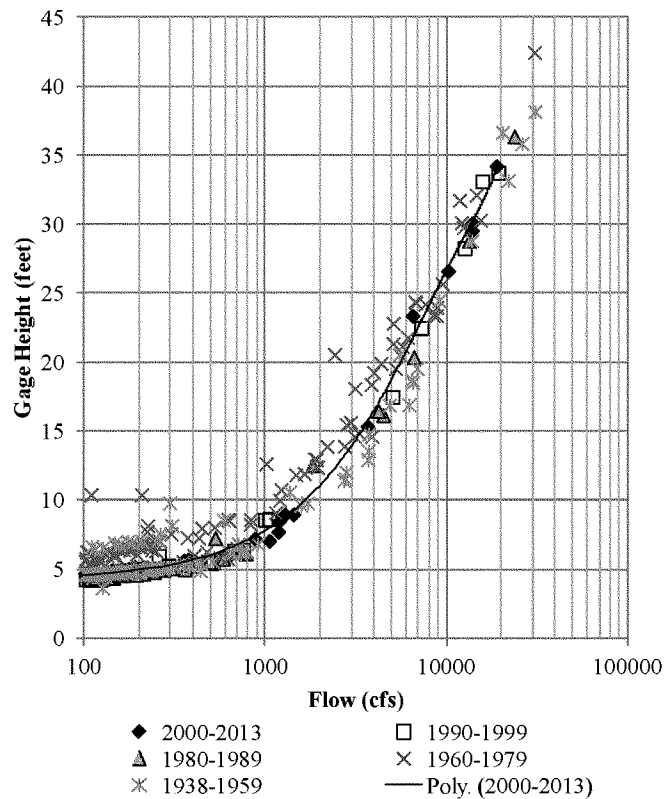


FIGURE 7: STAGE TRENDS FROM USGS STREAMFLOW MEASUREMENTS AT BANNISTER ROAD

A final check was made to determine the hydraulic sensitivity if using the post Atlas 14 flows from the HEC-HMS model and comparing to the results from water surface generated from the SWMM 2015 flows. A simplified approach was adopted by plotting the computed water surface profiles at an index point to develop a rating curve. Figure 8 presents the rating curve for river mile 20.4 at the Dodson Project. To ensure comparability of results, elevations for both datasets were calculated from the rating curve equation. Table 9 presents summary comparing water surface elevations pre and post Atlas 14 if updates to the flows were to be made, with a 0.1 ACE event highlighted as that is approximately where damages start. Stage differences are minor, less than 0.2 feet, for flows larger than a 0.1 ACE event. Stage differences are the greatest at a 0.5 ACE event. However, these flows are ten feet below top of bank and as previously noted SWMM 2015 flows match closer to the flow frequency data. The likely potential effect of not updating flows would be a very slight if measurable underestimation of damages at a 0.1 ACE event. These minor stage changes reinforce the decision that no updates to the water surface profiles are warranted.

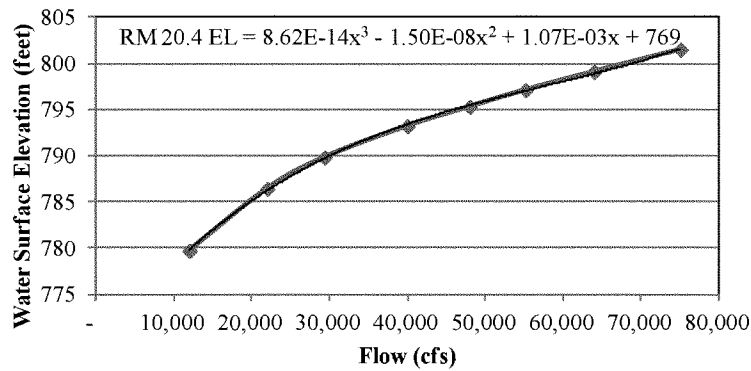


FIGURE 8: RATING CURVE MADE FROM WATER SURFACE PROFILES AT RM 20.2 (ADJACENT TO DODSON)

TABLE 9: COMPARISON OF WATER SURFACE ELEVATION PRE/POST ATLAS 14

Annual Chance Exceedance	SWMM 2015 (cfs)	HEC-HMS Atlas 14 (cfs)	WS EL RM 20.4 (feet)	WS EL Curve w/ SWMM (feet)	WS EL Curve w/ Atlas 14 (feet)	Change in WS EL (feet)
0.002	75,100	75,300	801.5	801.27	801.32	0.06
0.005	64,000	63,500	799.1	798.64	798.53	-0.10
0.01	55,170	55,200	797.1	796.85	796.86	0.01
0.02	48,000	47,200	795.3	795.33	795.15	-0.18
0.04	40,000	39,600	793.2	793.32	793.20	-0.11
0.1	29,360	30,200	789.8	789.67	790.01	0.34
0.2	22,000	23,400	786.4	786.20	786.93	0.73
0.5	12,000	15,500	779.7	779.83	782.30	2.47

5.0 Discussion and Conclusions

The hydrology of the Blue River Basin has been studied extensively by USACE and other agencies such as the USGS, the Federal Emergency Management Agency (FEMA), and the City of Kansas City, Missouri. Potential downward shifts of the more extreme flows less frequent than a 0.1 ACE event and an upward shift in the more frequent events began to become apparent in the mid 2000's and have been discussed at length by USACE and agency partners. Decisions at the time leaned towards the seemingly conservative approach of not adjusting hydrology downward for ongoing levee design heights or the City's floodplain management activities. Consideration of updated point precipitation estimates from NOAA Atlas 14 now appear to have confirmed that the SWMM 2015 flows produced by the 1990 hydrology study and subsequently used for several Blue River projects still provide a reasonable estimate of flow frequencies and water surface profiles for the Blue River.

6.0 References

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- U.S. Weather Bureau (1961). Technical Paper No. 40, Rainfall Frequency Atlas of the United States. U.S. Dept. of Commerce, Washington, D.C.

From: [Clemetson, Douglas J \(Doug\) NWO](#)
To: [Bitner, Chance J NWK](#)
Subject: RE: Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED)
Date: Tuesday, May 13, 2014 12:31:42 PM

Classification: UNCLASSIFIED
 Caveats: NONE

Looks good Chance!

-----Original Message-----
 From: Bitner, Chance J NWK
 Sent: Tuesday, May 13, 2014 12:04 PM
 To: Clemetson, Douglas J (Doug) NWO
 Subject: RE: Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED)

Classification: UNCLASSIFIED
 Caveats: NONE

It was due to them being curvy lines in excel instead of straight, I agree they should be straight. Take a look at it now that I have straightened the lines. Thanks,

Chance

-----Original Message-----
 From: Clemetson, Douglas J (Doug) NWO
 Sent: Monday, May 12, 2014 2:36 PM
 To: Bitner, Chance J NWK
 Subject: RE: Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED)

Classification: UNCLASSIFIED
 Caveats: NONE

On figure 6, it appears that there are extra curves or bumps, especially on the black and blue lines. Is that due to fitting a spline curve to the data?
 Might be better to connect the dots with straight lines or insert extra points to make it smooth.

Otherwise, looks good.

-----Original Message-----
 From: Bitner, Chance J NWK
 Sent: Monday, May 12, 2014 1:41 PM
 To: Clemetson, Douglas J (Doug) NWO
 Subject: RE: Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED)

Classification: UNCLASSIFIED
 Caveats: NONE

Doug,

I really appreciate you squeezing this review in for us. I attached the updated document. Let me know if these changes look ok to you.

Thank you,

Chance

-----Original Message-----

From: Clemetson, Douglas J (Doug) NWO
Sent: Monday, May 12, 2014 10:37 AM
To: Bitner, Chance J NWK
Subject: RE: Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Chance,

I agree with your results and conclusions.

Just have a couple minor comments:

1. Page 10, first paragraph, line 3 - "0.5 percent AEP" should be "0.5 AEP" or "50 percent AEP"
2. Page 11, Last paragraph, line 2 - same as comment 1.
3. Figure 5 & 6. Recommend plotting with log scale on y-axis.

Doug.

Douglas J. Clemetson, P.E.
Chief, Hydrology Section
Omaha District
US Army Corps of Engineers
1616 Capitol Avenue
Omaha, NE 68102-4901
402-995-2340

-----Original Message-----

From: Bitner, Chance J NWK
Sent: Thursday, May 08, 2014 9:44 AM
To: Clemetson, Douglas J (Doug) NWO
Subject: Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Doug,

I attached the draft of what we have so far on the Blue River Hydrology sensitivity analysis and would appreciate your thoughts on the approach, conclusions, etc. Please give me a call if you have any questions. I really appreciate the assistance.

Respectfully,

Chance Bitner, PE
Chief, Hydrology and Hydraulics Section
US Army Corps of Engineers, Kansas City District
601 E. 12th Street

Kansas City, MO 64106
816-389-3482 work
816-585-4808 cell

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Bitner, Chance J NWK
To: [Otero, William NWK](#)
Subject: RE: Dodson - Final Review (UNCLASSIFIED)
Date: Monday, May 12, 2014 1:41:00 PM
Attachments: 20140512_SensitivityAnalysis_BlueRiverHydrology.pdf
 RE Blue River Hydrology - Sensitivity Analysis (UNCLASSIFIED).msg

Classification: UNCLASSIFIED
 Caveats: NONE

See attached, also incorporated three comments from Doug Clemetson (attached email). I think I am ready to add a cover memo and route for signatures if you agree with Dougs comments.

Thanks for your review comments. Respectfully,

Chance

-----Original Message-----

From: Otero, William NWK
 Sent: Friday, May 09, 2014 1:46 AM
 To: Bitner, Chance J NWK
 Subject: RE: Dodson - Final Review (UNCLASSIFIED)

Classification: UNCLASSIFIED
 Caveats: NONE

Chance,
 The document looks fine to me. I think the information is presented in a well organized way. My only additional suggestions are on Section 3.4:

Suggestion #1 - Page 17

Instead of:

"To account for uncertainty of the analysis, a comparison of the available flow frequencies and overlap was conducted to check the level of agreement between the various studies and 90 percent confidence from the flow frequency analysis and using the point precipitation confidence limits from NOAA Atlas 14."

I suggest:

"Taking into account the uncertainty of these analyses, the overlap of the available flow frequency 90-percent confidence bands was determined. The overlap region gives an indication of the level of agreement between the flow frequency analysis and the analysis using the point precipitation confidence limits from NOAA Atlas 14."

Suggestion #2 - Page 18, Figure 6

"I think the overlap region symbol should be included in the explanation (legend) of the graph. If not the plot should be annotated (textbox and arrow) providing some details about the overlap region."

Respectfully,
 William

-----Original Message-----

From: Bitner, Chance J NWK
 Sent: Thursday, May 08, 2014 9:06 AM

To: Otero, William NWK
 Subject: RE: Dodson - Final Review (UNCLASSIFIED)

Classification: UNCLASSIFIED
 Caveats: NONE

Thanks William, responses to your comments are below. Note that I also beefed up section 3.4 to address Brad Birds question from yesterday about why it is ok to depart from the flow data, if you could pay special attention to that section on your backcheck I'd appreciate it. Also, pay special attention to how I treated your comment about use of "yr" vs "AEP" nomenclature.

The file is re-posted in the folder and is also attached for ease of reference.

Thanks,

Chance

Page 1: I changed this text: "Hydrologic studies of the Blue River"... "were originally documented" to "Hydrology of the Blue River"... "was originally documented"

The next sentence seemed to read ok now with this change, but I could still tweak it if needed

"basin" was changed to "Blue River watershed" as suggested.

The sentence regarding SWMM model calibration was replaced with the sentence you proposed "The SWMM model was calibrated to match the flow produced by an event with an annual exceedance probability of 0.2% based on the 1989 flow-frequency analysis."

Page 5: "reasonable" was changed to "similar".

Page 7: comment on use of "%" vs "percent", I did a control F and changed 3 instances of the "%" to "percent" for consistency. I did still use "%" in tables and for one name of a document in the references as that is the name of the document (65% Design Report).

Page 8 etc: use of ft³/sec was switched to cfs for consistency in the document, the first "cfs" was also spelled out on page 4 as "cubic feet per second (cfs)". In the table, the labels were switched from "Flows in ft³/sec" to "Flow (cfs)".

Page 10-11: reference to EPA SWMM model: sentence was deleted and the word "basin" in the previous sentence was replaced with "SWMM": "In order to simulate future hydrology of the basin, a SWMM model was developed by the Kansas City District in 1990 and calibrated to reconstitute the trend of the 1989 flow frequency curve. The SWMM model..."

Page 11: I used your second suggested tweak to the extreme event sentence as: "the more extreme flow events are experiencing a downward shift in their AEP"

Page 12 tables - "yr" nomenclature: I agree we should avoid using "1-yr" etc nomenclature to the extent feasible, but I am running in an issue resolving this in that both Helena and myself used partial duration instead of annual maximum, so the Atlas would give different values for this on the 2-yr to ~50-yr (partial duration) vs 1/2 to ~1/50 AEP (annual maximum) and also wouldn't give a 1-yr for annual maximum, just 1/2, 1/5, 1/10, etc. Since the nomenclature comes straight off the atlas I am leaning towards leaving it, or just calling a 1-yr a 0.99 AEP and footnoting these are partial duration - for now I went with the AEP nomenclature with footnotes, not sure I like that though. The alternative would be to re-run all of the models with the annual maximums...

To potentially resolve, I altered the last sentence before the tables as follows: "Table 5 presents a

comparison of the rainfall frequency partial duration series." Adjusted nomenclature, and added a footnote to the table. Please double check

Page 13 - changes made

Page 14 - APWA reference was corrected, and the EM was added to the reference list.

Page 15 - two "-" removed and "percent" left as is for consistency

Page 16: sentence tweaked to "Updated flow frequency analysis and recent hydrologic modeling studies suggest a potential downward shift in the average frequency for events exceeding a 10 percent AEP as compared to the SWMM 2015 model results." And CWMM was corrected to SWMM.

-----Original Message-----

From: Otero, William NWK

Sent: Wednesday, May 07, 2014 11:47 PM

To: Bitner, Chance J NWK

Subject: Dodson - Final Review (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Chance,

I went over your responses and read the full document again. I agree with your responses and with the way you incorporated the information I requested into the document. I placed some minor editorial comments in a PDF file named 20140424_SensitivityAnalysis_BlueRiverHydrology_OteroMiscComments.pdf and located under:

P:\ED-HH\BlueRiver\2014PACR_DodsonSwopeSensitivityAnalysis

I don't think any of my observations are of great significance but if the report will keep going up the ladder we should make sure the whole document is consistent in the use of abbreviations, acronyms, and nomenclature.

If you have any questions call me at 816-399-5048 or my cell phone.

Respectfully,
William

PS

The easiest way to go through my observations is to open the COMMENTS tools in Adobe and click on each comment. The comments on the list serve as document hyperlinks. See attached image.

Classification: UNCLASSIFIED

Caveats: NONE

Classification: UNCLASSIFIED

Caveats: NONE

Classification: UNCLASSIFIED

Caveats: NONE

Appendix H

Chief's Report and Feasibility Drawings



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
 WASHINGTON, D.C. 20310-2600

REPLY TO
 ATTENTION OF

CECW-P (1105-2-10a)

DEC 3 0 2003

SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on the study of flood damage reduction improvements on the Blue River at the Swope Park Industrial Area, Kansas City, Missouri. It is accompanied by the report of district and division engineers. These reports are in response to a resolution adopted September 19, 1984, by the Committee on Public Works and Transportation of the House of Representatives, requesting review of the report of the Chief of Engineers on the Blue River, vicinity of Kansas City, Missouri and Kansas, published as House Document 332, 91st Congress, 2d Session, and other pertinent reports, to determine whether any modifications of the recommendation contained therein are advisable at the present time with particular reference to the Blue River from 75th Street upstream. Preconstruction engineering and design activities for this project will be continued under the cited authority.
2. The reporting officers recommend a plan which consists of construction of approximately 1,215 meters of reinforced concrete floodwall and approximately 869 meters of compacted earthen levee, as well as construction of an interior drainage system consisting of 1,030 feet of reinforced concrete pipe and a 1-hectare interior storm water retention pond. A rolling-gate closure would be constructed at the existing 75th Street entrance to the industrial park. The project also includes fish and wildlife mitigation consisting of planting of hardwood trees along the Blue River Parkway and excavating a small wetland riverward of the levee at a location just upstream of the Swope Park Industrial Area.
3. Based on October 2003 price levels, the estimated first cost of the recommended plan is \$14,987,000. Based on the cost sharing principles specified by the Water Resources Development Act (WRDA) of 1986, as amended by Section 202 of WRDA 1996, 65 percent (\$9,742,000) of the project first cost would be Federal and 35 percent (\$5,245,000) would be non-Federal. Total average annual charges, based on a discount rate of 5.625 percent and a 50-year period for economic analysis, are estimated to be \$946,000, including \$21,000 for operation, maintenance, replacement, repair, and rehabilitation (OMRR&R). The average annual economic benefits are estimated to be \$1,399,000, with net annual benefits of \$453,000.

CECW-P

SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri

The benefit-to-cost ratio is 1.5 to 1.0. The plan is the national economic development (NED) plan.

4. The plan selected by the reporting officers is estimated to be over 90 percent reliable in protecting the Swope Industrial Park and access corridor from a flood which has a 1-percent chance of occurrence in any year (100-year flood) and 64-percent reliable in protecting against a flood with 0.2-percent chance of occurrence in any year (200-year flood). The plan would reduce total expected flood damages from a 100-year flood by more than 92 percent. The project would also reduce the threat to loss of life and reduce health and safety services disruptions. A change in the primary industrial area access from the northwest to the southwest side is consistent with the sponsor's newly developed access plan for the Industrial area. Several features of the plan are designed to minimize effects of the project on the environment, including constructing the floodwall over levee for the most part and aligning the floodwall close to the industrial area and other developed properties. Unavoidable impacts would be fully compensated for by creation of a 0.16 hectare wetland riverward of the levee, selected riparian plantings surrounding the wetland and extending along the left bank of the river for over 1 kilometer, and hardwood trees planted along the Blue River Parkway.

5. Washington level review indicates that the plan recommended by the reporting officers is technically sound, economically justified, and environmentally and socially acceptable. The plan conforms with essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other administrative and legislative policies and guidelines. Also, the views of interested parties, including Federal, State and local agencies, have been considered.

6. I concur in the findings, conclusions, and recommendation of the reporting officers. Accordingly, I recommend that flood damage reduction improvements for the Swope Park Industrial Area, Kansas City, Missouri, be authorized generally in accordance with the reporting officers' recommended plan, and with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost-sharing, financing, and other applicable requirements of WRDA 1986, as amended by Section 202 of WRDA 1996. Also, this recommendation is subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies, and that it shall be responsible for the following items of local cooperation:

a. Provide a minimum of 35 percent, but not to exceed 50 percent, of total project costs as further specified below:

(1) Enter into an agreement which provides prior to construction 25 percent of preconstruction engineering and design (PED) costs;

(2) Provide during the first year of construction any additional funds needed to cover the non-Federal share of PED costs;

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SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri

(3) Provide during construction a cash contribution equal to 5 percent of total project costs allocated to flood control;

(4) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, and maintenance of the project;

(5) Provide or pay to the Federal Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(6) Provide during construction any additional cash as necessary to make its total contribution equal to 35 percent of total project costs;

b. Grant the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon land that the local sponsor owns or controls for access to the project for the purpose of inspection and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project;

c. Assume responsibility for OMRR&R of the completed project, including mitigation features, without cost to the Federal Government, in a manner compatible with the project authorized purposes and in accordance with applicable Federal and State laws and specific directions prescribed by the Federal Government in the operation and maintenance manual and any subsequent amendments thereto;

d. Hold and save the Federal Government free from all damages arising from the construction and OMRR&R of the project and any project related betterments, except for damages due to the fault or negligence of the Federal Government or its contractors;

e. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs;

f. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way necessary for the construction, operation, and maintenance of the project. Except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Federal Government determines to

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SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri

be subject to the navigation servitude without prior specific written direction by the Government;

g. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, or maintenance of the project;

h. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA;

i. Prevent future encroachments on project lands, easements, and rights-of-way which might interfere with the proper functioning of the project;

j. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987, Public Law 100-17, and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for the construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

k. Comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, PL 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army;" and all applicable federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 [revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)];

l. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to flood control that are in excess of 1 percent of the total amount authorized to be appropriated for flood control;

m. Comply with the floodplain management requirements of Section 402 of WRDA 1986, as amended (33 U.S.C. Section 701b-12);

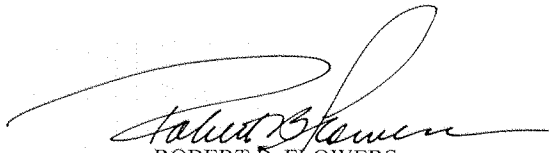
n. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized; and

CECW-P

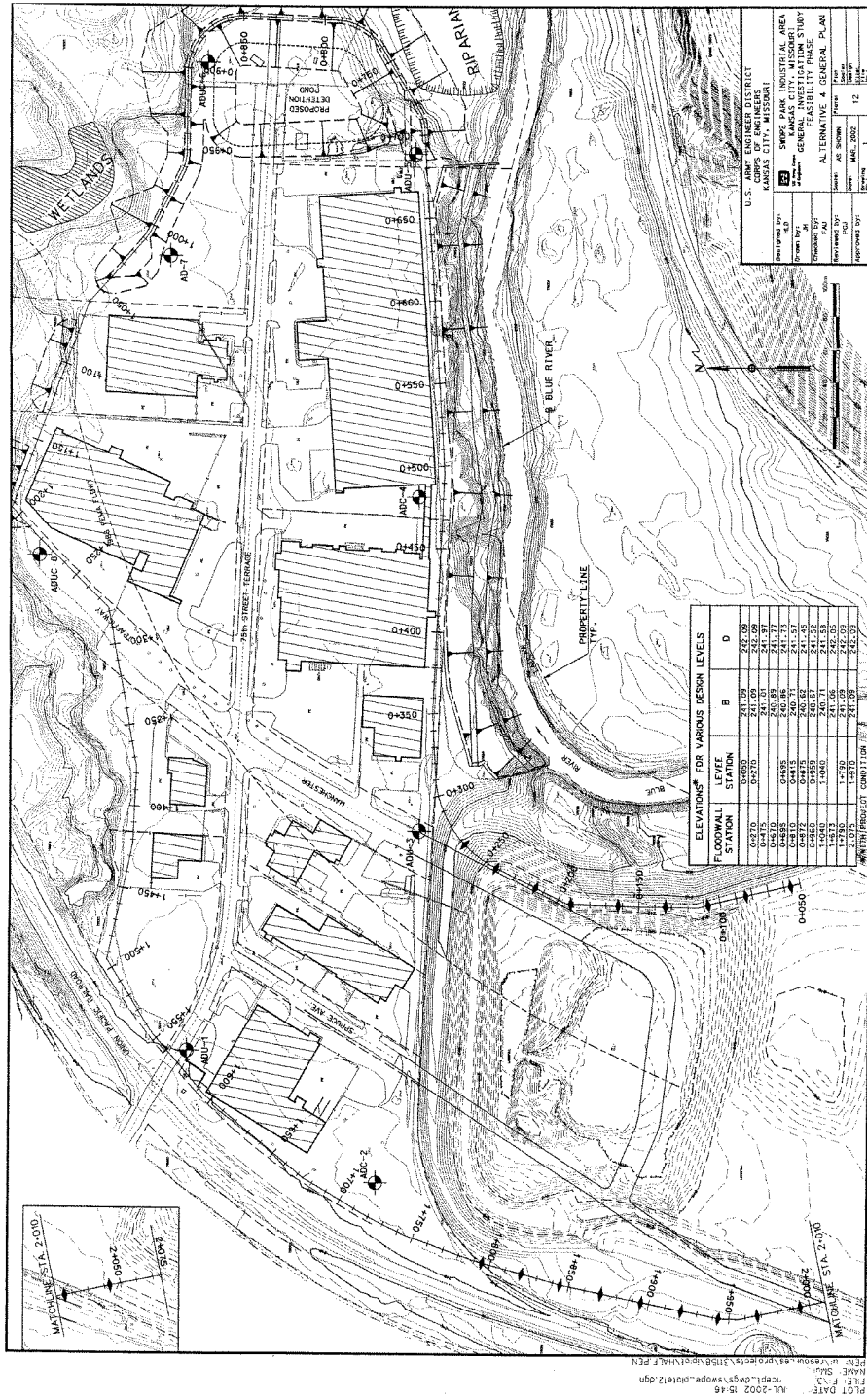
SUBJECT: Swope Park Industrial Area, Blue River, Kansas City, Missouri

o. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms.

7. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor (the City of Kansas City, Missouri), the State of Missouri, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

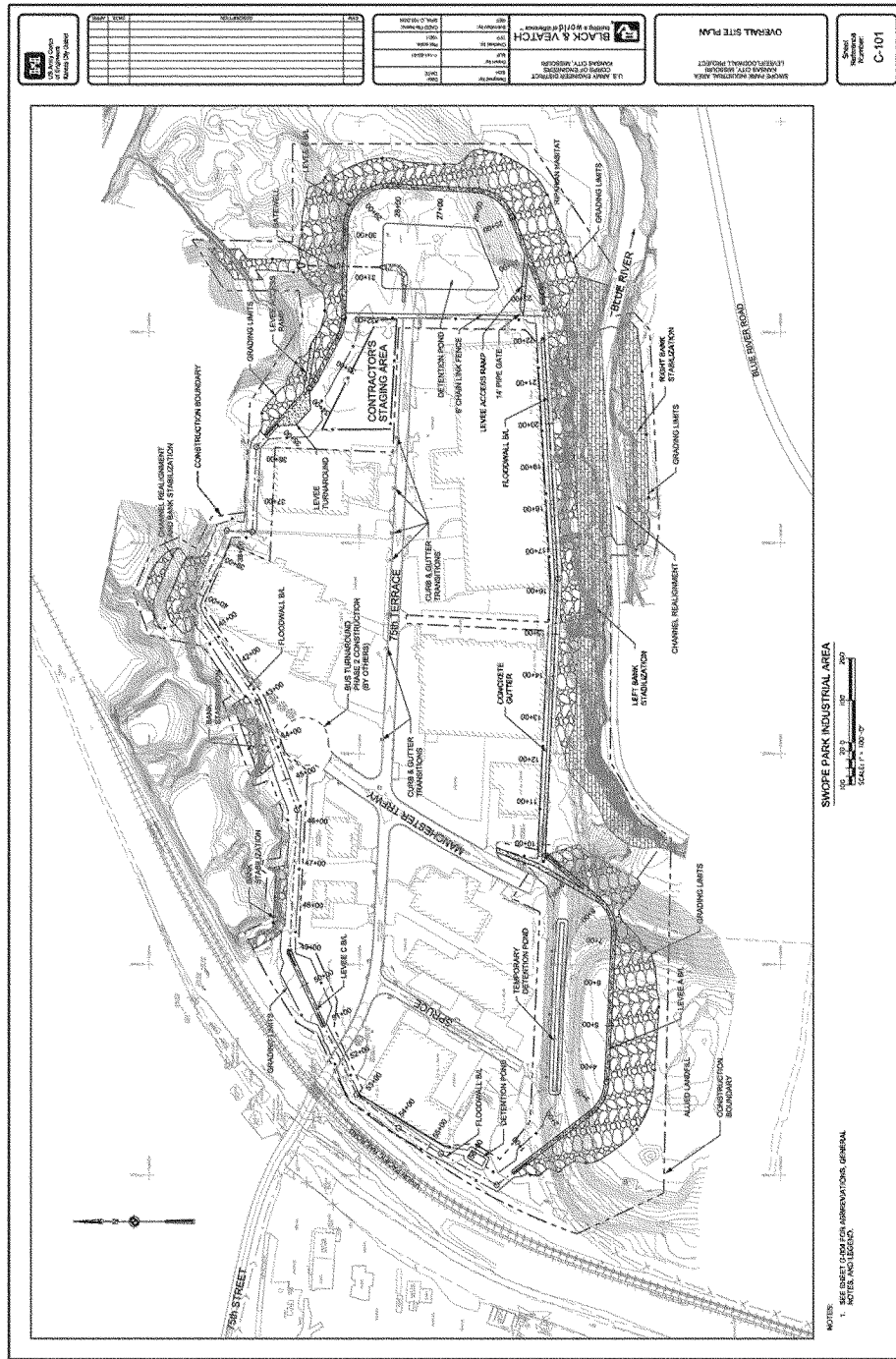


ROBERT B. FLOWERS
Lieutenant General, U.S. Army
Chief of Engineers



Appendix I

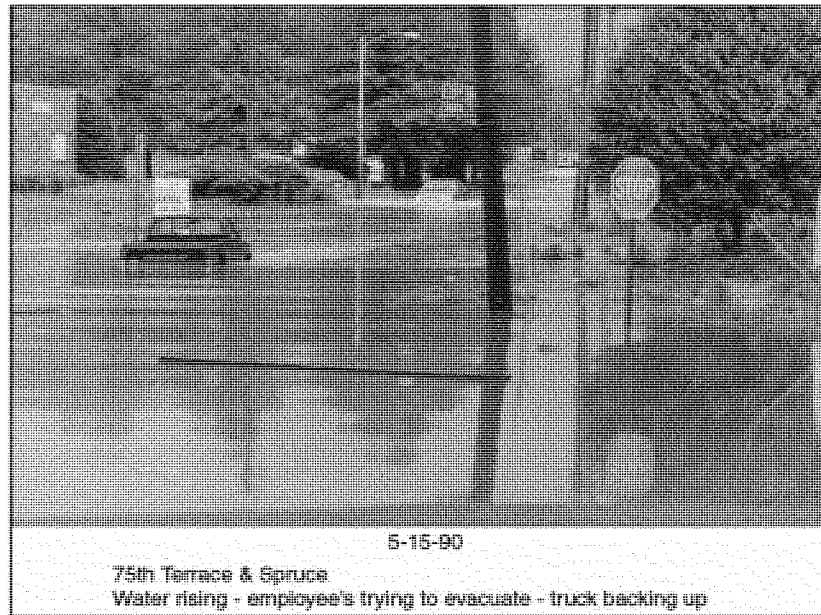
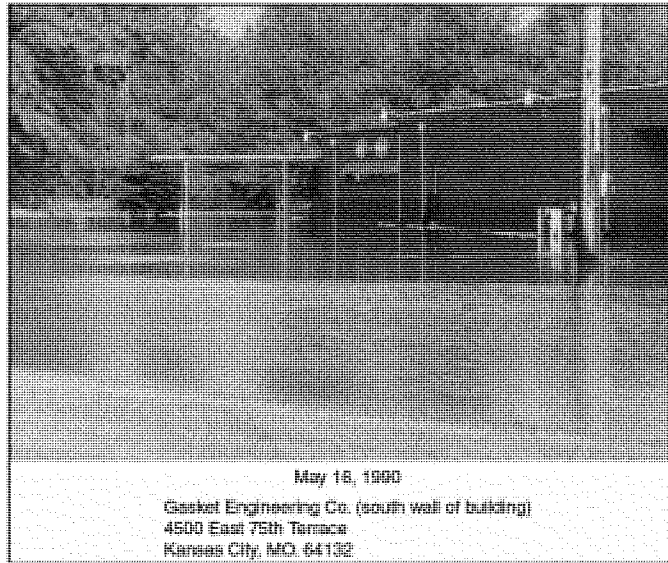
Current Drawings Overview

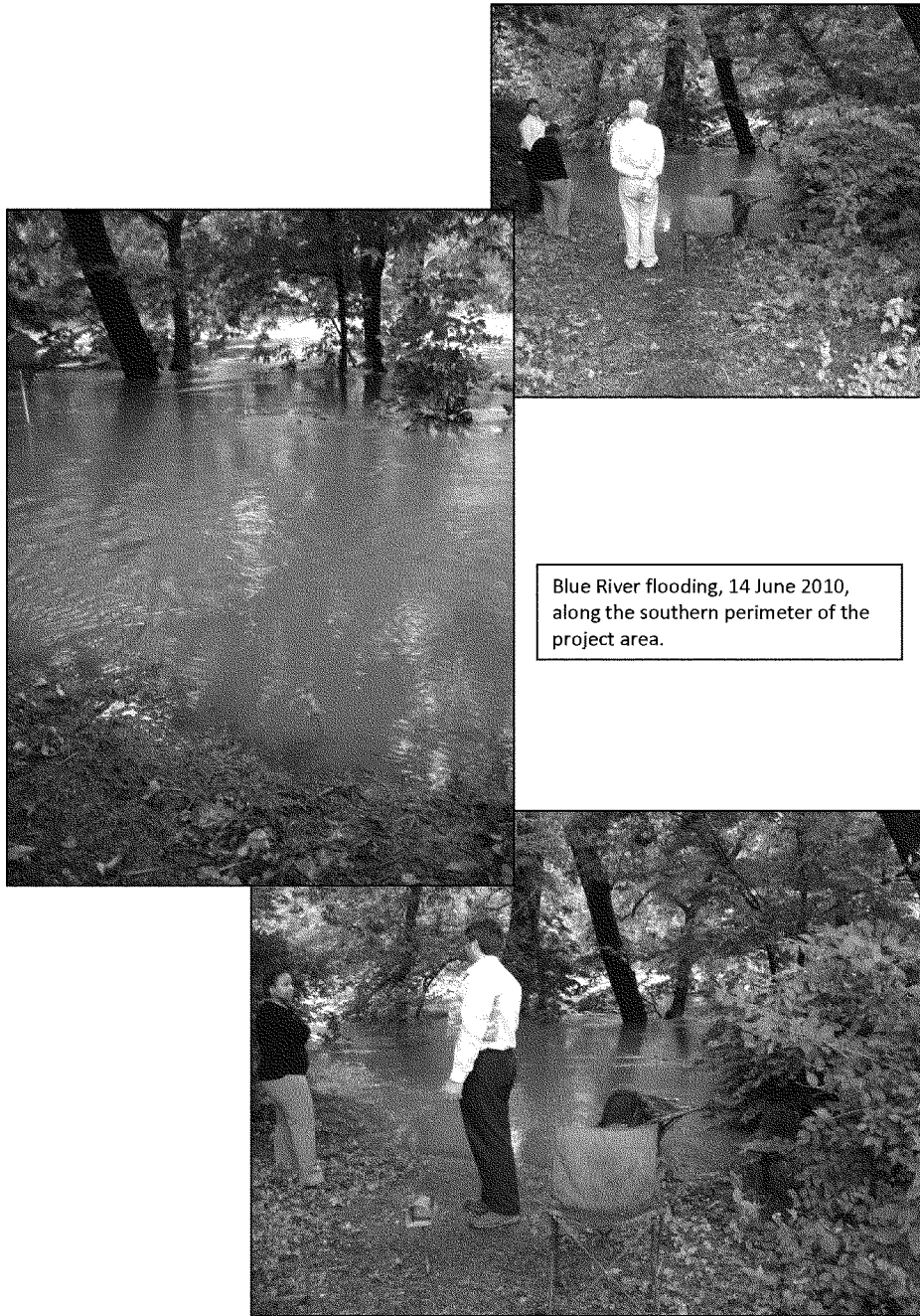


Appendix J

Project Feature Photographs and Descriptions

2. Prior Flooding





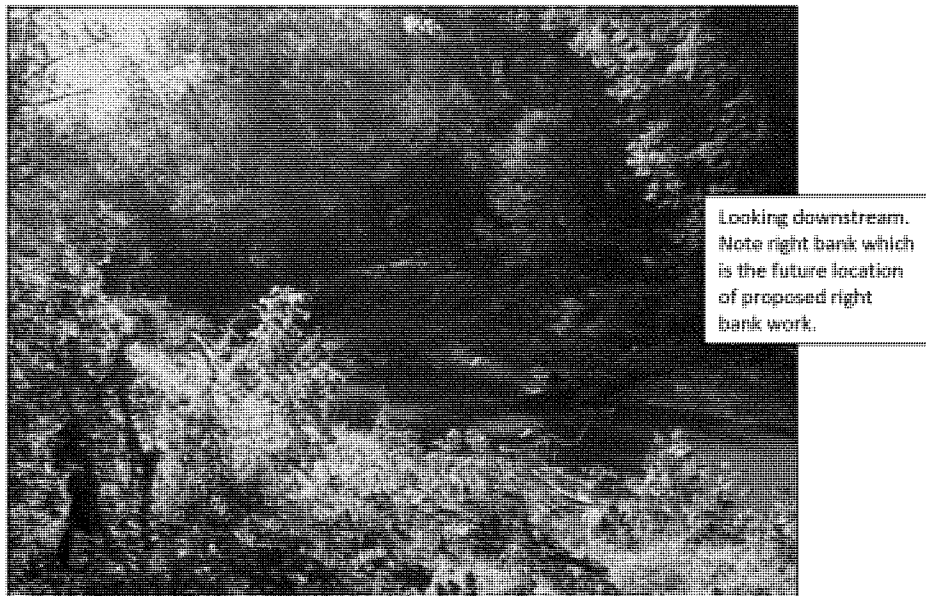
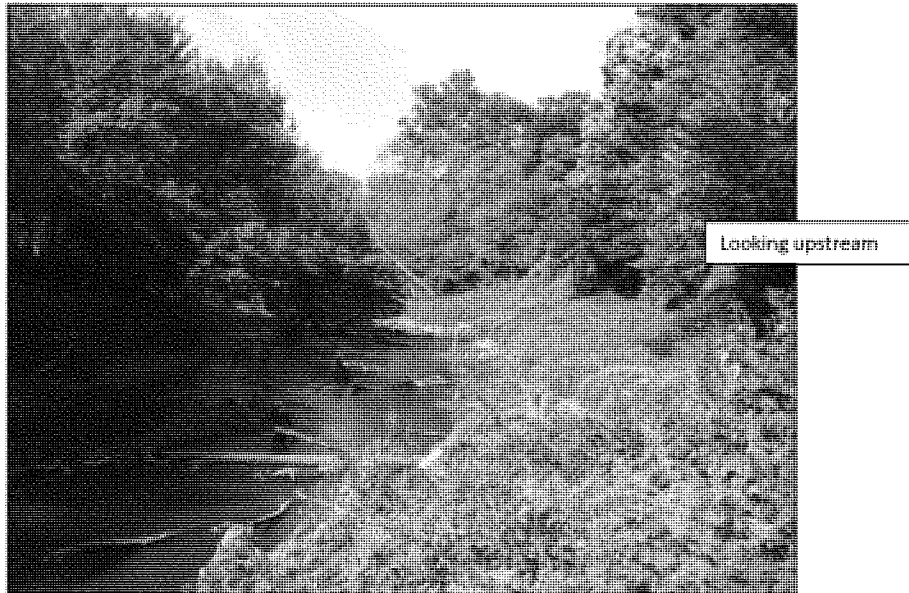
J-5

3. Project Entrance Area. The street is 75th St. Terrace that runs east/west through the project. Note the railroad crossing just to the left of the field of view.

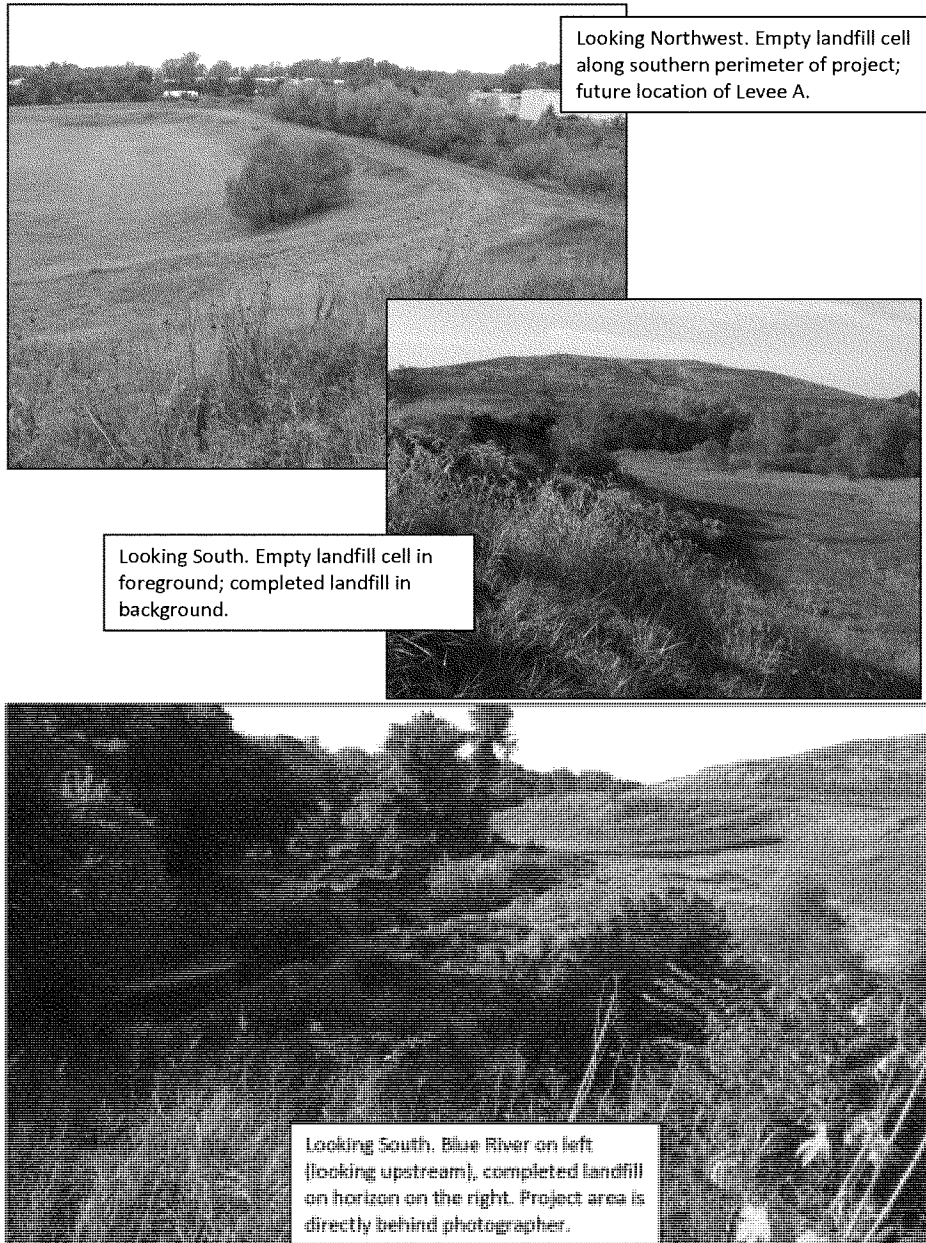


J-6

4. Blue River Near Project Area. Note the steep highly vegetated banks.

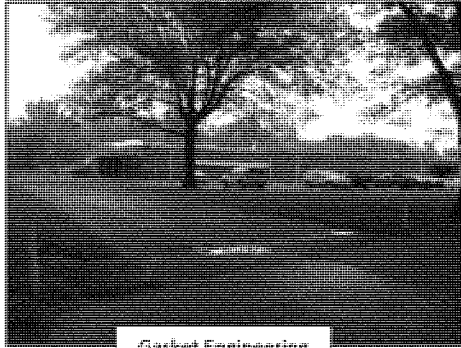


5. Landfill Area near Southern Perimeter.

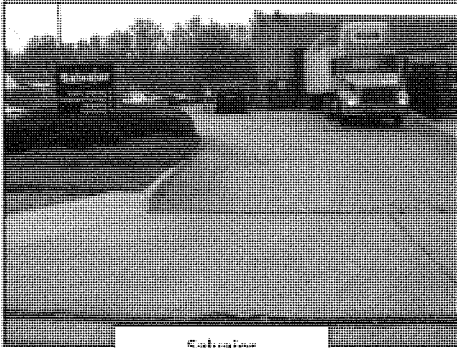


J-8

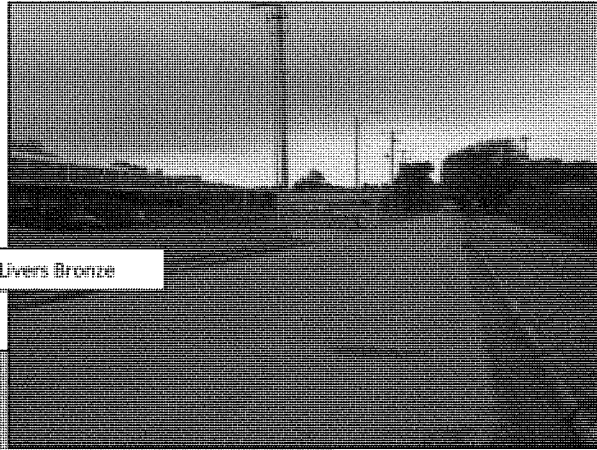
6. Swope Park Industrial Area Businesses and Buildings.



Gasket Engineering



Salvage

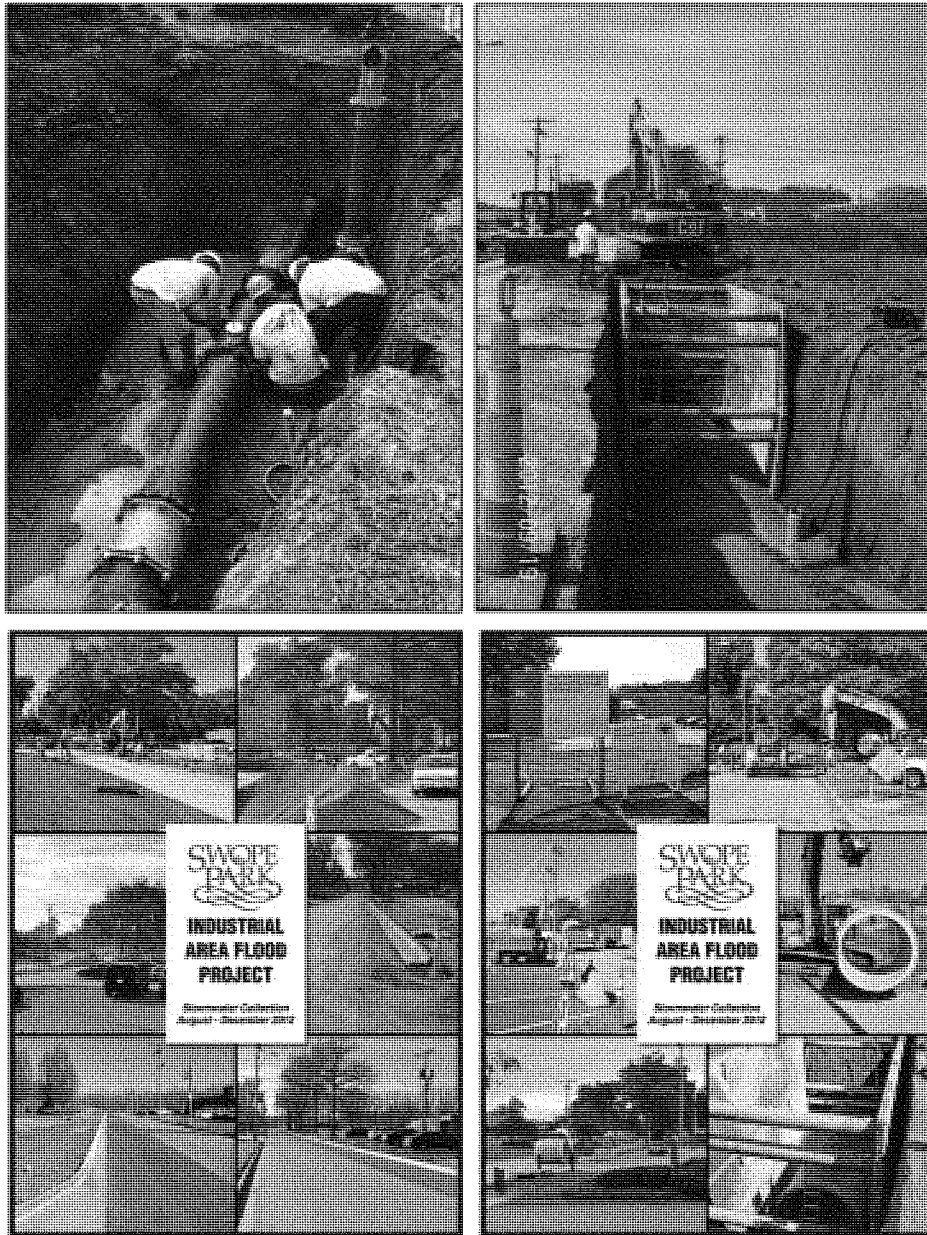


Livers Bronze



Trinity Biotech

7. Completed Construction, Interior Drainage System



J-10