112th Congress, 2d Session – – – – – – – – – – – – House Document 112–131

TO INCREASE THE AUTHORIZED COST OF THE LITTLE CALUMET RIVER, INDIANA, LOCAL FLOOD CONTROL AND RECREATION PROJECT

COMMUNICATION

FROM

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

TRANSMITTING

RECOMMENDED MODIFICATIONS OF THE PROJECT AUTHORIZATION TO INCREASE THE AUTHORIZED COST OF THE LITTLE CALUMET RIVER, INDIANA, LOCAL FLOOD CONTROL AND RECREATION PROJECT

AUGUST 2, 2012.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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

APR 12 2012

Honorable John Boehner
Speaker of the House
of Representatives
U.S. Capitol Building, Room H-232
Washington, D.C. 20515-0001

Dear Mr. Speaker:

The Secretary of the Army recommends modification of the project authorization to increase the authorized cost of the Little Calumet River, Indiana, Local Flood Control and Recreation Project. This modification to the project authorization is consistent with the President's Fiscal Year (FY) 2013 Budget. The Administration supports including in the Fiscal Year 2013 Energy and Water Development Appropriations bill language to increase the authorized cost ceiling for the Little Calumet River project, and providing funds to continue construction of this project.

Increasing the authorized cost of the project is necessary because the estimated project first costs exceed the maximum project cost allowed by Section 902 of the Water Resources Development Act (WRDA) of 1986. The enclosed March 2012 Limited Reevaluation Report (LRR) explains and supports the cost increase. This report also documents that the project remains economically justified and environmentally acceptable. Enclosure 5 provides the legislative language necessary to provide an increase in the authorized cost ceiling.

The authorized project consists of replacing existing spoil-bank levees, constructing new levees and floodwalls, rehabilitating existing pump stations and appurtenant drainage facilities, constructing a flow control structure, and providing non-structural flood proofing, a flood warning system, wetland mitigation and limited recreation features. When completed, the project will reduce damages to more than 8,000 homes and businesses in the communities of Hammond, Munster, Highland, Griffith, and Gary, Indiana predicted to result from a flood with a 0.5-percent chance of occurring in any year (200-year level of flood risk management). The completed project is expected to provide about $62 million annually in flood reduction benefits.

Section 401(a) of WRDA 1986 originally authorized the project at a total cost of $87,100,000, with an estimated first Federal cost of $65,300,000 and an estimated first non-Federal cost of $21,800,000. Section 127 of the Energy and Water Development Appropriations Act of 2006 modified the project to authorize the Secretary of the Army to complete the project at a first cost of $198,000,000, with an estimated Federal cost of $148,500,000 and an estimated non-Federal

cost of $49,500,000. This equates to an updated project first cost of $210,320,000 at October 2011 price levels. The maximum cost for the authorized project, adjusted for allowable inflation in accordance with Section 902, is $253,947,000 (October 2011 price levels).

Changes in the project costs are a result of changed design requirements for levees and floodwalls, design changes for pumping stations, contract modifications, market conditions, unanticipated site conditions, land costs and an extended period of project construction. The substantial cost increase is primarily driven by two factors: First, Post Hurricane Katrina design requirement changes for levees and floodwalls necessitated the redesign of three project reaches. Second, cost increases resulted from modifications to accommodate site specific conditions, including utilities, unanticipated conditions, and alignment changes.

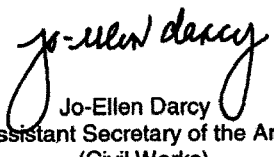
Based on an October 2011 price level, the estimated project first cost is $269,988,000, which includes $4,009,000 for the cost of recreation features. In accordance with the provisions of Section 103(a) of the WRDA of 1986, flood risk management features are calculated at 75 percent Federal and 25 percent non-Federal cost-share (in accordance with the original project authorization). In accordance with the provisions of Section 103(c) of the WRDA of 1986, recreation features are calculated at 50 percent Federal and 50 percent non-Federal cost-share. The Federal share of the project first cost is estimated to be $202,800,000 and the non-Federal share is estimated at $67,188,000. The majority of lands, easements, rights-of-way, relocations, and excavated material disposal areas required for the project have been obtained since initiating construction. The Little Calumet River Basin Commission, the non-Federal cost sharing sponsor, will be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction. The cost of OMRR&R is currently estimated at $3,236,000 per year, which includes the periodic set-up of temporary tieback levees for high level flooding events by the non-Federal sponsor.

The project continues to be economically justified based principally on reduction of residential flood damages. At the October 2011 price level, a 4 percent discount rate, and a 50-year period of economic analysis, the Corps estimates the total equivalent annual costs to be $22,873,000 and total equivalent annual benefits to be $109,255,000. Net benefits are estimated at $86,382,000 and the benefit cost ratio is 4.8 to 1.

A Record of Decision (ROD) was signed for the authorized project in July 1990 based on the Phase I General Design Memorandum and Environmental Impact Statement (EIS) dated June 1982. Supplemental National Environmental Policy Act documents have been completed, including a Supplemental EIS and ROD in 1995. An Environmental Assessment accompanies the LRR. The project requires approximately 385 acres of compensatory mitigation which is about 27 percent complete.

The Office of Management and Budget (OMB) advises that there is no objection to the submission of the report to Congress and concludes that the report recommendation and authorization recommendation are consistent with the policy and programs of the President. A copy of its letter, dated April 10, 2012, is enclosed. I am providing a copy of my letter to the House Committee on Appropriations Subcommittee on Energy and Water Development and the House Committee on Transportation and Infrastructure Subcommittee on Water Resources and Environment. I am also providing an identical letter to the President of the Senate.

Very truly yours,



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

Enclosures

5 Enclosures

1. OMB Clearance Letter, dated, April 10, 2012
2. Letter from Sponsor, Little Calumet River Basin Development Commission, letter of support and commitment to implementing tiebacks, dated March 12, 2012
3. Director's Report, March 19, 2012
4. Little Calumet Flood Risk Management Project (Indiana), Post Authorization Change Report, March 2012
5. Draft Legislative Provision

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

April 10, 2012

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

Dear Assistant Secretary Darcy:

As required by Executive Order 12322, the Office of Management and Budget completed its review of your recommendation to increase the authorized construction cost ceiling of the Little Calumet River, Indiana, Local Flood Control and Recreation Project. Based on our review, we concluded that your recommendation is consistent with the policy and programs of the President.

The Office of Management and Budget does not object to you submitting the Little Calumet Flood Risk Management Project Post Authorization Change Report (March 2012) to Congress to increase the authorized project cost. When you do so, please inform Congress that the Administration supports including language in the Fiscal Year 2013 Energy and Water Development Appropriations bill to increase the authorized cost ceiling for the Little Calumet River project, and providing funds to continue construction of this project.

Sincerely,

Jeffrey D. Zients
Acting Director

Little Calumet River Basin Development Commission

900 Ridge Road Suite H
Munster, Indiana 46321

(219) 595-0599

WILLIAM BAKER, Chairman
Governor's Appointment

ANTHONY BROADNAX, Treasurer
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Governor's Appointment

RON McAHRON
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VACANCY
Governor's Appointment

DAN REPAY
Executive Director

DAVID E. WICKLAND
Attorney at Law

March 12, 2012

Colonel Frederic Drummond Jr.
District Commander
U. S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606

Dear Colonel:

The Little Calumet River Basin Development Commission understands that in Fiscal Year 2012, the Little Calumet River, Indiana Local Flood Control and Recreation Project is due to reach its authorized cost limit under Section 902 of Public law 99-662, as amended. The Commission is writing to express its support for reauthorization of the Project at the new recommended cost level so that the Project may be completed.

One aspect of completing the Project includes the implementation of tiebacks and other system components consistent with the project authorization to provide a levee system capable of providing a 200-year level of flood risk management and to be able to be accredited by Federal Emergency Management Agency (FEMA). The completion of such tiebacks are needed to ensure the design level of flood protection to the communities of Hammond, Munster, and Gary, further reducing threats to life, safety and property in those communities. Two tiebacks are required at the western terminus of the project near the Illinois-Indiana state line in the communities of Hammond and Munster. Upgrading of the tieback levee located in the city of Gary is also required. Plans are under development to implement the three tieback levees that would complete the project levee system to the authorized 200-year level of protection.

The Little Calumet River Basin Development Commission supports the implementation of the appropriate systems required to bring the construction phase of the project to completion and understands that deployment of temporary measures, in systems which utilize both permanent and temporary components, will be their responsibility, as part of their Operation and Maintenance (O&M) responsibilities under the Local Cooperation Agreement.

For questions in regards to this matter, please contact the undersigned at 219-595-0599.

Sincerely,

Daniel C. Repay
Executive Director

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

CECW-ZB

MAR 19 2012

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Little Calumet River, Indiana, Local Flood Control and Recreation Project, Limited Reevaluation Report (LRR) dated March 2012

1. Purpose: Request your review and approval of the Little Calumet River, Indiana, Local Flood Control and Recreation Project, LRR (enclosure 1) which documents the need to modify the project authorization to increase the authorized cost to $270,000,000.

2. Post Authorization Change: Section 401(a) of the Water Resources Development Act (WRDA) of 1986 originally authorized the project at a total cost of $87,100,000. Section 127 of the Energy and Water Development Appropriations Act of 2006 modified the project to authorize the Secretary of the Army to complete the project at a total cost of $198,000,000. The revised estimated total project first cost (without inflation) is $270,000,000 (October 2011 prices), and includes $247,146,000 in sunk costs through September 30, 2011. The revised cost is the result of design changes, post Hurricane Katrina design requirements, construction modifications, inefficient non-federal sponsor funding, and unforeseen additional costs. There are no changes in project location, purpose, or scope. The currently estimated total project cost inflated to the midpoint of scheduled future construction period is $270,793,000. The maximum cost for the authorized project, adjusted for allowable inflation in accordance with Section 902 of the WRDA of 1986, is $253,947,000 (October 2011 price levels); therefore the revised total project cost exceeds the Section 902 limit.

3. Background and Discussion:

a. The authorized project consists of replacing existing spoil-bank levees, constructing new levees and floodwalls, rehabilitating existing pump stations and appurtenant drainage facilities, constructing a flow control structure, and providing non-structural flood proofing, a flood warning system, wetland mitigation and limited recreation features. When completed, the project will reduce damages to more than 8,000 homes and businesses in the communities of Hammond, Munster, Highland, Griffith, and Gary, Indiana, predicted to result from a flood with a 0.5-percent chance of happening in any year (200-year level of flood risk management). The completed project is expected to provide about $86 million annually in flood reduction benefits.

b. The Local Cooperation Agreement with the non-Federal sponsor, the Little Calumet River Basin Development Commission, was executed on August 16, 1990. Funds to initiate construction were appropriated in Fiscal Year (FY) 1990. As of September 2011, project

construction was about 90 percent complete. Remaining construction contracts include tie-back levees along the Illinois-Indiana Stateline, a levee in the Southmoor area, and project mitigation at Hobart Marsh. Total project wetland mitigation requirements are about 27 percent complete.

c. At the October 2011 price level, the estimated total project first cost is $270,000,000, which includes $4,000,000 for the cost of recreation features. The Corps of Engineers Cost Engineering Directory of Expertise completed a Cost and Schedule Risk Analysis for the project and certified the revised total project cost estimate by memorandum dated November 28, 2011. By memorandum dated March 2, 2012, the Acting Chief of Engineers granted an Exclusion from the requirements to conduct a Type I Independent External Peer Review.

d. A total economic update was completed for the subject LRR. The project continues to be economically justified based principally on reduction of residential flood damages. At the October 2011 price level, a 4.0 percent discount rate, and a 50-year period of economic analysis, the estimated total equivalent annual costs are $22,873,000 and total equivalent annual benefits are $109,255,000. Net benefits are estimated at $86,382,000 and the benefit cost ratio is 4.8 to 1.

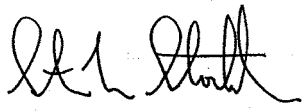
e. In accordance with the cost sharing provisions of Section 103(a) of the WRDA of 1986, flood risk management features are cost-shared at 75 percent Federal and 25 percent, non-Federal (in accordance with the original project authorization). In accordance with the cost sharing provisions of Section 103(c) of the WRDA of 1986, recreation features are cost-shared at 50 percent Federal and 50 percent non-Federal. The Federal share of the project first cost is estimated to be $203,000,000 and the non-Federal share is estimated at $67,000,000. The majority of lands, easements, rights-of-way, relocations, and excavated material disposal areas required for the project have been obtained since initiating construction. The Little Calumet River Basin Commission, 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 $3,240,000 per year.

4. Conclusions. The Chicago District prepared the LRR in accordance with ER 1105-2-100, Appendix G, dated, June 30, 2004, to document the increases in the project cost and recommend an increase in the authorized project cost. The HQUSACE policy compliance review of the LRR concluded that there are no unresolved policy issues and that the project is technically sound, environmentally acceptable, and economically justified. Documentation of Headquarters review is at enclosure 2.

CECW-LRD
SUBJECT: Little Calumet River, Indiana Local Flood Control and Recreation Project; Limited Reevaluation Report (LRR) dated March 2012

5. Recommendation: I recommend that the enclosed LRR be transmitted to Congress as a basis for increasing the authorized project cost of the Little Calumet River, Indiana, Local Flood Control and Recreation Project to $270,000,000 (October 2011 price levels). Documents necessary to coordinate this recommendation with the Office of Management and Budget will be developed in coordination with your staff and provided under separate cover.

FOR THE COMMANDER:



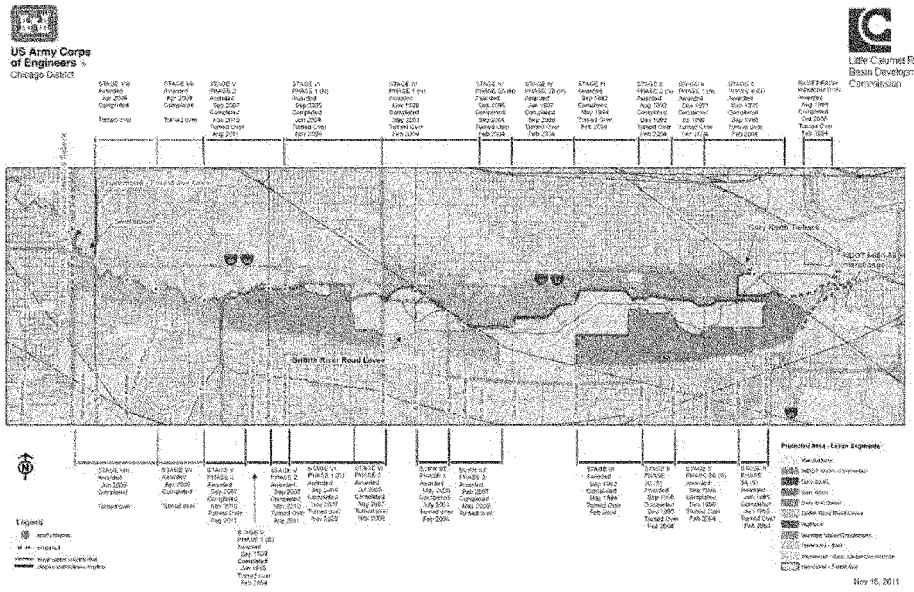
Encls
as

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

Enclosure 5

Sec. ___. The project for flood control, Little Calumet River, Indiana, authorized by section 401(a) of the Water Resources Development Act of 1986 (Public Law 99-662; 100 Stat. 4115), is modified to authorize the Secretary to carry out the project at a total cost of $269,988,000 with an estimated Federal cost of $202,800,000 and an estimated non-Federal cost of $67,188,000.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT



U.S. ARMY CORPS OF ENGINEERS
CHICAGO DISTRICT
111 NORTH CANAL STREET
CHICAGO, ILLINOIS 60606-7206

March 2012

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LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

EXECUTIVE SUMMARY

This Limited Reevaluation Report (LRR) will address the cost increase in the Little Calumet River, Indiana Local Flood Control and Recreation Project. Construction costs are estimated to exceed the maximum project cost limit according to Section 902 of the Water Resources Development Act of 1986 (WRDA86), as amended. The project was originally authorized by Section 401 of WRDA86 and then modified with approval of the 2000 Limited Reevaluation Report as reported by House Appropriations Bill H.R.2419 in November 2005. This report intends to notify Congress of cost increases and recommends that the project's authorization be modified in order to complete construction.

The project's cost estimate has increased from the 2005 authorized cost of $198,000,000 (which equates to $210,320,000 at October 2011 price levels) to $269,988,000. The increase in estimated project costs at constant 2011 price levels is $59,668,000.

Project costs increased due to several reasons including: post Hurricane Katrina design criteria changes; levee and floodwall alignment shifts; modifications to the design floodwall crest due to 2008 flood events; and others as documented within.

The project is currently in the construction phase. Approximately 90 percent of the total project is complete. The project is divided into two reaches. The East Reach, which is mainly in Gary, Indiana, extends from Cline Avenue to I-65. The West Reach extends from the Illinois/Indiana state line to Cline Avenue. The construction of the project is divided into eight stages, totaling over 27 construction contracts. Several contracts are currently in place, including Stage VII and Stage VIII which account for extension of the levee and floodwalls west to the Indiana/Illinois Stateline. There are five contracts that have yet to be awarded, the most prominent being the completion of tie-back levees that will complete the designed level of flood risk management and the Hobart Marsh Mitigation.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

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LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

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Appendix B	Review of Hydrologic and Hydraulics Analysis
Appendix C	Cost Estimating
Appendix D	Levee and Floodwall Cost Increase Details
Appendix E	Computation of FY12 902 Limit

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

1.0 PURPOSE

This Limited Reevaluation Report (LRR) will address the cost increase in the Little Calumet River, Indiana Local Flood Control and Recreation Project. Construction costs are estimated to exceed the maximum project cost limit according to Section 902 of the Water Resources Development Act of 1986 (WRDA86), as amended. The project was originally authorized by Section 401 of WRDA86 and then modified with approval of the 2000 Limited Reevaluation Report as reported by House Appropriations Bill H.R.2419 in November 2005. This report intends to notify Congress of cost increases and recommends that the project's authorization be modified in order to complete construction.

2.0 AUTHORIZED PROJECT

2.1 DESCRIPTION

The project is designed to provide a 0.5% annual exceedance probability (AEP) (200-year) level of flood risk management for areas of Northwest Indiana surrounding the Little Calumet River. The authorized project consists of existing levee replacement, new levees and floodwalls expanding the area of flood risk management, existing pump station rehabilitations, a flow control structure, non-structural flood proofing, a flood warning system, wetland mitigation, and recreation features. The Local Cooperation Agreement (LCA) with the non-Federal sponsor, the Little Calumet River Basin Development Commission (LCRBDC), was executed on August 16, 1990. Funds to initiate construction were appropriated in Fiscal Year (FY) 1990. As of November 2011, project construction was 90 percent complete. Plate 1 includes an overall project map.

2.2 LOCAL COOPERATION

The items of local cooperation identified in the feasibility phase were contained in the report of the Board of Engineers for Rivers and Harbors dated 14 November 1983 as follows:

A. Provide without cost to the United States all lands, easements, and rights-of-way including borrow areas and disposal areas for excavated material determined suitable by the Chief of Engineers and necessary for implementation and maintenance;

B. Hold and save the United States free from damages due to construction and subsequent operation and maintenance of the project, not including damages due to the fault or negligence of the United States or its contractors;

C. Operate and maintain without cost to the United States all project works after completion in accordance with regulations prescribed by the Secretary of the Army;

D. Accomplish without cost to the United States all alterations and relocations or removal of buildings, transportation facilities, storm drains, utilities, and other structures and improvements made necessary by the construction, excluding railroad bridges and approaches thereto and facilities necessary for the normal interception and disposal of local interior drainage at the line of protection;

E. Prior to initiation of construction, prescribe and enforce regulations to prevent obstruction or encroachment which would reduce the project's flood-carrying capacity or hinder maintenance and operation, and control development in the project area to prevent undue increases in the flood damage potential;

F. Prior to initiation of construction, prescribe and enforce regulations to prevent modifications, which would increase flows through existing bridges and culverts;

G. Publicize floodplain information in the areas concerned and provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to insure compatibility between future development and protection levels provided by the project;

H. Implement, operate, and maintain facilities required for the flood-warning plan in accordance with procedures approved by the Secretary of the Army;

I. Operate, maintain, and replace without cost to the United States all recreation and wildlife mitigation facilities of the recommended project;

J. Provide a cash or in-kind contribution for recreation facilities sufficient to bring the non-Federal share of total recreation development costs to 50 percent; and

K. Share in the cost of mitigation features in the same ratio as the non-Federal share of costs for the flood control feature.

These items were modified during project authorization in Water Resources Development Act of 1986 (WRDA86) to include a 25 percent cost-sharing of flood control features by a non-Federal sponsor with a minimum 5 percent cash contribution.

2.3 CURRENT STATUS

The project is currently in the construction phase. Approximately 90 percent of the total project is complete. The project is divided into two reaches. The East Reach, which is mainly in Gary, Indiana, extends from Cline Avenue to I-65. The West Reach extends from the Illinois/Indiana state line to Cline Avenue. The construction of the project is divided into eight stages, totaling over 27 construction contracts. Several contracts are currently in place, including Stage VII and Stage VIII which account for the extension of the levee and floodwalls west to the Stateline. There are five contracts that have yet to be awarded, the most prominent being the completion of tie-back levees that will complete the designed level of flood risk management and the Hobart Marsh Mitigation. A Project Partnership Agreement (PPA) Amendment will be executed to

include the design changes to the tieback levees and update the amounts listed in Section IX of the current Local Cooperation Agreement (LCA) which discusses the 902 limit.

3.0 REMAINING PROJECT SCHEDULE

The project is currently scheduled for completion in 2016 as shown in Figure 1.

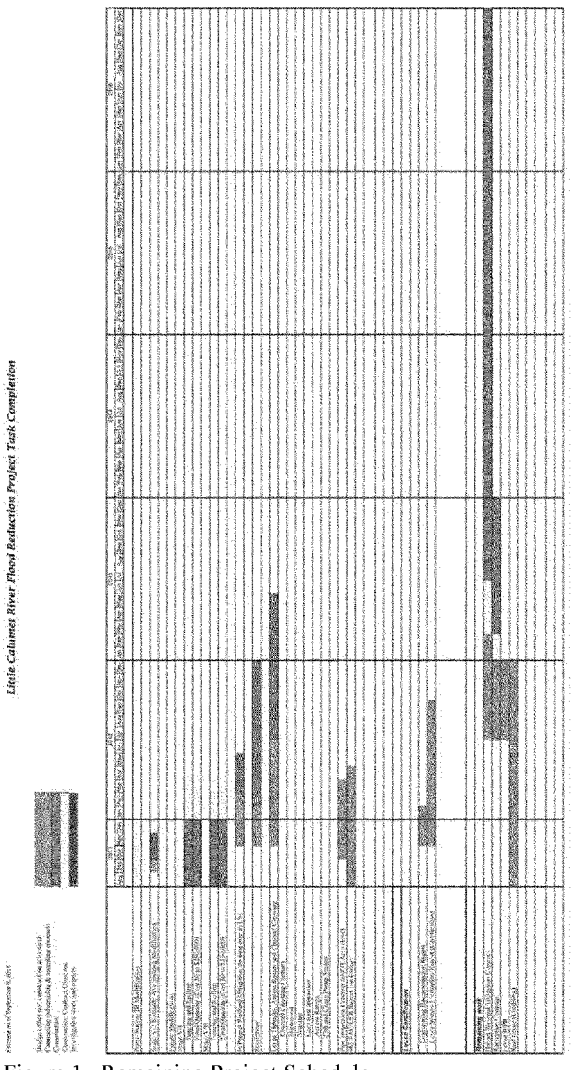


Figure 1. Remaining Project Schedule

4.0 AUTHORIZATION

Congress authorized the Little Calumet River project in Section 401of the Water Resources Development Act of 1986, Public Law 99-662, which reads as follows:

> TITLE IV--FLOOD CONTROL
> SEC. 401. AUTHORIZATION OF PROJECTS.
>
> *(a) Authorization of Construction.--The following works of improvement for the control of destructive floodwaters are adopted and authorized to be prosecuted by the Secretary substantially in accordance with the plans and subject to the conditions recommended in the respective reports designated in this subsection, except as otherwise provided in this subsection:*
>
> *Little Calumet River, Indiana*
> *The project for flood control, Little Calumet River, Indiana: In accordance with plan 3A contained in the Report of the Chief of Engineers, dated July 2, 1984, provided that all of the features of the plan 3A as recommended by and described in the report of the District Engineer are included, at a total cost of $87,100,000, with an estimated first Federal cost of $65,300,000 and an estimated first non-Federal cost of $21,800,000.*

Appropriations bill H.R.2419 was reported under authority of the order of the House of Representatives from November 2005 to modify the project:

> *SEC. 127. The project for flood control, Little Calumet River, Indiana, authorized by section 401(a) of Public Law 99–662 (100 Stat.4115) is modified to authorize the Secretary of the Army to complete the project in accordance with the Limited Reevaluation Report dated August 2000 at a total cost of $198,000,000 with an estimated Federal cost of $148,500,000 and an estimated non-Federal cost of $49,500,000.*

The FY12 902 limit for the Little Calumet River, Indiana Local Flood Control and Recreation Project is $253,947,000. The 902 limit was calculated using the Section 902 Limit Tool that was certified by HQUSACE in November 2010. See *Appendix E – Computation of FY12 902 Limit* for further 902 Limit computation details.

5.0 FUNDING SINCE AUTHORIZATION

Table 1 below summarizes the history of federal funding of this project, by fiscal year, since authorization.

Table 1. Funding History [1]

Fiscal Year	Appropriations Category	Fiscal Year Allocation	Cumulative Allocation
1985	General Investigations	$450,000	$450,000
1986	General Investigations	$360,000	$810,000
1987	General Investigations	$288,000	$1,098,000
1988	General Investigations	$350,000	$1,448,000
1989	General Investigations	$337,000	$1,785,000
1990	Construction General	$2,366,000	$4,151,000
1991	Construction General	$2,703,000	$6,854,000
1992	Construction General	$3,013,000	$9,867,000
1993	Construction General	$10,146,000	$20,013,000
1994	Construction General	$13,842,700	$33,855,700
1995	Construction General	$1,569,600	$35,425,300
1996	Construction General	$3,848,000	$39,273,300
1997	Construction General	$9,639,000	$48,912,300
1998	Construction General	$8,378,000	$57,290,300
1999	Construction General	$5,657,000	$62,947,300
2000	Construction General	$8,061,000	$71,008,300
2001	Construction General	$8,289,000	$79,297,300
2002	Construction General	$5,695,400	$84,992,700
2003	Construction General	$3,542,000	$88,534,700
2004	Construction General	$3,990,000	$92,524,700
2005	Construction General	$4,886,000	$97,410,700
2006	Construction General	$8,435,000	$105,845,700
2007	Construction General	$14,000,000	$119,845,700
2008	Construction General	$14,760,000	$134,605,700
2009	Construction General	$24,000,000	$158,605,700
2010	Construction General	$20,000,000	$178,605,700
2011	Construction General	$10,178,900	$188,784,600

[1] Non-Federal Funding for the Project includes the receipt of approximately $19.7M in Cash, and an estimated $42.8M in LERRDs and In-Kind Services, as of December 2011.

6.0 CHANGES FROM AUTHORIZED PROJECT

6.1 PROJECT SCOPE

There have been no changes to the project scope since the 2000 LRR.

6.2 PROJECT PURPOSES

The authorized project purposes of the Little Calumet River, Indiana Flood Control and Recreation Project are flood risk management and recreation. There has been no change in project purpose since authorization.

6.3 LOCAL COOPERATION

There have been no significant changes in the required items of local cooperation which have affected the total cost of the project.

6.4 LOCATION

The project consists of 22 miles of levees and floodwalls along the Little Calumet River, as well as relocation of seven miles of channel, in NW Indiana. It also includes 16 miles of hiking trails and 385 acres of wetland mitigation. It will protect more than 8,000 homes and businesses in Gary, Griffith, Hammond, Highland and Munster, IN., providing about $62 million annually in flood damage reduction benefits.

6.5 DESIGN CHANGES

In 2000 the Chicago District prepared a Limited Reevaluation Report (LRR) that was referenced in Appropriations bill H.R.2419. Since 2000, the Chicago District has worked toward completing the remaining portions of the East Reach and the entire West Reach of the overall Little Calumet River Project. Since Feature Design Memorandum 5 (FDM 5) for the West Reach Levee System was completed in 1994, new guidance on the construction of levees and floodwalls has been issued by the Corps. The documents establishing this guidance are *EC 1110-2-6066 Engineering and Design DESIGN OR EVALUTION OF I-WALLS* (dated 1 Oct 2007), *Stability Analysis of I-Walls Containing Gaps between the I-Wall and Backfill Soils* (dated 14 Sep 2009), and *PHASE II INTERIM GUIDANCE FOR EVALUATING EXISTING I-WALLS* (dated 25 Oct 2006). This new guidance required the redesign of Stage V Phase 2, Stage VII, and Stage VIII of the West Reach. Once the West and East Reaches are complete the Chicago District is going to initiate levee evaluation for accreditation from FEMA. Current guidance requires all system components, including those constructed before publication of the current guidance, be evaluated as part of the levee evaluation process. A draft Engineering Documentation Report (EDR) was completed in March 2010, but has not been finalized.

Additional design changes since the 2000 LRR include:

- Levee and floodwall alignment shifts to satisfy requests from utility owners and residents to minimize impacts to their utilities and property (such shifting the levee a few feet to allow two trees to remain on a resident's property). Alignment shifts were also caused by

altered site conditions such as erosion of the existing river banks. The changed alignment's area of impact was very similar to that of the original alignment.

- Modifications to the design floodwall crest height near North Drive based on analysis from preliminary high water information from the September 2008 flood event.
- Replacement of a section of levee with floodwall. Existing site conditions would not provide an adequate foundation since the site was once occupied by a municipal dump.
- Installation of significant amounts of geotextile fabric and riprap to help prevent riverbank erosion.
- Pump station outfalls have been modified to incorporate redundant closures or to carry them over the line of flood risk management.
- Modifications to pedestrian bridge designs included requiring the contractor to use stainless steel fasteners, applying bituminous paint to steel parts in contact with treated wood, modifying H-pile installation due to overhead power lines, and changing the abutment height due to the type of prefabricated bridge chosen by the contractor. These changes were due to an error on the part of the designer for not including detail notes on fasteners and paint, differing site conditions, and new information about the product selected that differed from what was in the plans.
- Post Hurricane Katrina design criteria changes, as cited in the previous paragraph.

6.6 COST CHANGES

The project's current cost estimate has increased to $269,988,000. The current authorized cost of $198,000,000, which is referenced to October 2005 price levels, equates to $210,320,000 in October 2011 price levels. Table 2 provides a comparison of the original and re-authorized project costs updated to current price levels, the cost of the project last presented to Congress, and the current recommended cost estimate. The change in costs referenced to constant 2011 price levels is $59,668,000. The reasons for the cost changes, other than price level changes, are itemized in the following paragraphs.

The cost estimate for the remaining work was developed using MII and was based on the latest anticipated scope for each project. Historical cost information from previous Little Calumet River contracts was used when applicable. Contingencies were developed through a formal Cost Schedule Risk Analysis completed by the Cost Engineering Directory of Expertise (Cost-DX).

As a note, the Chicago District is currently reviewing LERDDs and Work-In-Kind documentation to support non-Federal sponsor crediting for completed portions of the project. Values included in the current total project cost estimate are those previously discussed with the Chicago District and submitted by the sponsor for crediting. Pending review of these credits and the supporting documentation, the cost share values for the completed portions of the project could change and subsequently affect the Fully Funded Amount.

Table 2. Changes in Total Project First Costs

Column	A	B	C	D	D-C	E
Project Features	Original Congressionally Authorized Cost Estimate (Oct 1985 Price Level)	Current Congressionally Authorized Cost Estimate (Oct 2005 PL)	Authorized Cost Estimate (Oct 2011 PL)	Recommended Cost Estimate (Oct 2011 PL)	Cost Change (Oct 2011 PL)	Recommended Cost Estimate (Fully Funded)
Lands and Damages	11,725,000	23,181,000	24,499,000	27,901,000	3,402,000	27,901,000
Relocations	8,620,00	18,817,000	19,820,000	16,187,000	-3,633,000	16,187,000
Fish and Wildlife	260,000	5,037,000	5,689,000	8,066,000	2,377,000	8,427,000
Channels & Canals	4,040,000	630,000	678,000	877,000	199,000	890,000
Levees & Floodwalls	39,955,000	78,616,000	85,586,000	109,248,000	23,662,000	109,323,000
Pumping Plants	8,420,000	20,431,000	21,916,000	31,760,000	9,844,000	31,767,000
Recreation	2,500,000	3,649,000	4,003,000	3,938,000	-65,000	3,949,000
Diversion Structures	1,770,000	603,000	695,000	3,510,000	2,815,000	3,510,000
Permanent Operating Equip	20,000	690,000	705,000	1,045,000	340,000	1,045,000
Planning, Engineering & Design	5,870,000	37,448,000	37,625,000	51,037,000	13,412,000	51,128,000
Construction Management	3,920,000	8,898,000	9,104,000	13,192,000	4,088,000	13,439,000
ARRA	-	-	-	3,226,000	-	3,226,000
Total Project Costs	87,100,000	198,000,000	210,320,000	269,988,000	59,668,000	270,793,000

*Costs were developed using the Civil Works Construction Cost Index System and the Consumer Price Index (Planning, Engineering & Design; and Construction Management). Only remaining project costs were adjusted. Project costs that were completed did not have their price level adjusted. See *Appendix C Cost Estimating* for additional details.

Lands and Damages (+$3,402,000)

Land Payments:

- Land acquisition activities are nearly complete for all stages of the Project.
- Estimated Lands and Damages estimate for total project decreased due to review of actual acquisition costs to date.
- Current estimate reflects actual credits to date, an estimate of remaining land acquisition, and a small contingency.
- Changes in design at certain project features have allowed for construction on a smaller real estate footprint

Relocations (-$3,633,000)

Utilities: During the design phase, significant decreases in the number of utilities to be relocated were identified. Detailed verification of the utility lines physical location at the line of flood risk management (levees/floodwall) reduced the overall gas and petroleum pressure pipes crossed.

Fish and Wildlife (+$2,377,000)

Mitigation cost estimates were revised during the development of detailed mitigation plans required for the issuance of state Section 401(Clean Water Act) permits. Coordination is ongoing with state regulatory agencies on the details of the mitigation plans.

Channels & Canals (+$199,000)

Considerable time has passed since the river has been properly cleared of materials which could potentially increase the chances of future flooding along the project. The accumulation of lodged trees, root wads, or other debris that impedes the normal flow of the Little Calumet River could cause future flooding problems during intense rainfall events. USACE determined that a contract will have to be awarded to remove those materials which could cause flooding problems. The construction of ramps will also be included in this contract to allow access so workers can remove dead woody vegetation and other debris from the river and riverbanks

Levees & Floodwalls (+$23,662,000)

An overall cost increase to Levees & Floodwalls resulted from several contract modifications and options that were exercised. The majority of these costs derived from the Stage V Phase 2 contract due to truly unexpected circumstances with the subsurface as well as large cost contract options being exercised. To read details of cost changes for every section of levee and floodwall please refer to *Appendix D – Levee and Floodwall Cost Increase Details*.

Stage VI Phase 1 South (+$1,044,000)

The majority of this cost change was due to a determination that the site of the levee was formerly a municipal landfill and not adequate foundation for a levee.

Stage VI Phase 1 North (+$120,000)

The major cost change for this section was the necessity of adding a geotextile fabric and riprap to prevent erosion of the levee.

Stage VI Phase 2 (+$88,000)

Final quantity overruns/underruns accounted for the majority of this section's cost changes.

Stage V Phase 2 (+$7,849,000)

At the time of the 2000 Little Calumet River LRR, the work done under the current Stage V Phase 2 contract was actually two separate contracts (Stage V Phase 2 and Stage V Phase 3). The original Stage V Phase 2 project consisted of all work from Kennedy Avenue to the Conrail Railroad, the levee on the north side of the Little Calumet River from the Conrail Railroad to Indianapolis Boulevard, and the levee on the south side of the Little Calumet River from Indianapolis Boulevard to Northcote Avenue. The Stage V Phase 3 project consisted of all work north of the Little Calumet River from Indianapolis Boulevard to Northcote Avenue (which during its conception was part of the Woodmar Country Club property and is now part of the Cabala's property). In 2006, the Project Delivery Team was tasked with combining these two designs into one contract. The new, all encompassing Stage V Phase 2 project acted as a means to reduce the overall cost of the project, by eliminating the costs associated with contracting the work out to two individual contractors. The largest cost associated with this section is exercising the option of construction of and acquiring material for two pedestrian bridges. These options, along with several unanticipated site conditions, increased the cost of this section.

Stage VII (+$96,000)

At the time of the 2000 Little Calumet River LRR, the Stage VII design incorporated a shorter length sheet pile wall into a preexisting levee that was constructed by the local sponsor. As a result of the events of Hurricane Katrina, the design for Stage VII was reconfigured to incorporate newly established flood risk management standards from USACE Headquarters. The change in design resulted in a significant increase in the overall cost of this stage of the project.

Stage VIII (+$756,000)

At the time of the 2000 Little Calumet River LRR, the 50% design phase of Stage VIII had been completed. The 100% design was not completed due to a lack of local funding for this project. A 50% design was sufficient to identify the real estate requirements to construct this stage of the project and that description of real estate requirements was provided to the local sponsor and the sponsor acquired the real estate for this project. There was then roughly a ten year gap between the completion of the 50% design and the completion of the 100% design, resulting in numerous alignment changes due to transformations in site condition over that period of time. The 100% design was not accomplished until sufficient local sponsor funds were received. The required modifications to the 50% Stage VIII design resulted in an increase to the overall cost of this stage of the project. At this time Stage VIII construction is complete except for the Southmoor area and the local sponsor cost share is in balance.

Pumping Plants (+$9,844,000)

The preliminary cost estimates turned out to be very low for the pump station rehabilitation projects. Several factors such as time, detail, higher material costs, and higher labor all played a role in the increased design costs. Once designers began working on the actual plans and specifications for the rehab projects, details that needed to be addressed became apparent which increased costs.

Additionally, there were post contract modifications resulting in increases in almost all awarded pump station contracts. Increases were as follows:

DACW27-00-C-0035 Pump 1B ($+157,330)
DACW27-01-C-0001 Pump 1A ($+303,795)
DACW27-01-C-0008 North 5th ($+76,789)
W912P6-08-C-0016 Pump 2A ($+105,319)
W912P6-08-C-0027 Pump 2B ($+763,000)*

* Projected pending equitable adjustment (estimated $700,000) for delay due to a utility upgrade. The other modifications are composed of numerous relatively minor miscellaneous contract changes resulting in a total increase of $1,406,233.

Recreation (-$65,000)

Due to revisions in the levee alignment, the overall length of the recreational trails increased. Per a 2009 request from Little Calumet River Basin Commission, trails west of Calumet Ave. may be excluded. This would result in a decrease of the total length of trails throughout the system.

Floodway Control and Diversion Structures ($2,815,000)

Redesign of the structures resulted in cost increases.

Permanent Operating Equipment (+$340,000)

The technology and sophistication of flood warning systems has increased significantly since completion of the authorization report in 1983, as have the Corps of Engineers guidance and criteria for flood warning/flood preparedness systems for flood control project providing less than a Standard Project Flood (SPF) level of flood risk management. The present system was designed in accordance with the requirements in EM 1110-2-1419, Engineering and Design - Hydrologic Engineering Requirements for Flood Damage Reduction Studies (dated 31 Jan 1995), and ETL 1110-2-540, Hydrologic Aspects of Flood Warning – Preparedness Programs (dated 30 Sept 1996), and incrementally installed within the basin. The system includes automatic reading and reporting precipitation and river stage gages and computerized stage prediction software. The continued advancement in computer technology has already required replacement of much of the originally purchased and installed equipment, along with software updates. This has resulted in an increase of $324,000 for the flood warning system.

Planning, Engineering and Design (+$13,412,000)

Engineering and design costs increased because of three main factors. First, some of the phases which were started and never completed due to gaps in local sponsor funding, needed to be redesigned to meet new Corps design criteria due to lessons learned from Hurricane Katrina. Second, engineering and design during construction was intensive because of differing sites conditions. Third, after the 2008 flood event and the 20-year ongoing construction of the system, there was significant local pressure to accelerate the remaining construction schedules. Discussions addressing the changes in planning, engineering and design costs for three contracts are contained in the following paragraphs.

The contract Stage V Phase 2 consisted of three previous phases that had been started and never finished. There were many details such as utility relocations and utility crossings that were never addressed in the earlier designs. This phase also included levee/floodwall alignments which went through heavily developed urban areas. Levee/floodwall alignments were changed several times during the final design phase to meet the requests of local residents when possible.

The contract Stage VII was designed prior to Hurricane Katrina, but was not constructed due to funding limitations at the time the original design was completed. When funding became available several years later it was post Hurricane Katrina and the Phase II Interim Guidance for Evaluating Existing I-walls (Oct 2006) provided new guidance regarding the analysis of I-walls. There were concerns that the existing design might not meet the new standards in the 2006 Interim Guidance, so the project was redesigned in-

house. There were also oil pipeline crossings that required additional coordination and design that had not been previously addressed.

The contract Stage VIII had been stopped at a 50% level of design and remained inactive for several years due to funding limitations. When the final design was re-initiated, it was determined that many design details, including utility relocations and crossings had not been addressed in the 50% set. This phase also included levee/floodwall alignments which went through fully developed residential areas. These levee/floodwall alignments were changed several times during the final design phase to meet the requests of local residents when possible. Many of the same problems encountered on Stage V Phase 2 were encountered on this project. The design team used lessons learned from that phase to work through these issues and meet schedule constraints.

Construction Management (+$4,088,000)

Construction management costs have increased by $4,016,000 due to the increase in construction scope and costs. In addition, there has been an increase in the number of contacts needed to complete construction. The construction has been divided into smaller segments in order to award contracts to 8A small business contractors.

6.7 PROJECT BENEFITS

The Phase II General Design Memorandum, which defines the current project, was approved in 1990. Subsequent economic evaluations merely indexed the benefits computed in that report. In contrast, mostly in recognition of evolving USACE regulations and guidance governing economic analyses, a major reevaluation of the economics of the project was completed for this LRR as documented in *Appendix A – Economic Reevaluation*. Due to the age of and techniques used in prior economic analyses, it was determined that a completely new flood damage analysis would need to performed in order to be compliant with current USACE guidance. The most significant features of the revised economic analysis are the reanalysis of flood damages using the USACE Hydrologic Engineering Center's Flood Damage Analysis (HEC-FDA) model, development an entirely new structure inventory using county assessor's parcel information, and the inclusion of a "flood damages to vehicles" benefit category. Table 3 shows the calculation of the average annual benefits for the Little Calumet River Levee project, including both benefits accrued during construction and benefits over a 50-year period of analysis. Present worth of benefits was referenced to 2016, the year when construction is scheduled for completion.

Table 3. Accumulated Project Benefits Prior to Baseline (4% FDR, 2011 Price Level)

Year	Periods	% Complete	Accrued Benefits	Present Worth at 2016
1990	26	0	0	0
1991	25	0	0	0
1992	24	0	0	0
1993	23	0	0	0
1994	22	0	0	0
1995	21	17	$ 10,583,000	$ 24,117,000
1996	20	22	$ 13,368,000	$ 29,292,000
1997	19	22	$ 13,368,000	$ 28,165,000
1998	18	29	$ 17,824,000	$ 36,109,000
1999	17	34	$ 21,167,000	$ 41,230,000
2000	16	34	$ 21,167,000	$ 39,645,000
2001	15	34	$ 21,167,000	$ 38,120,000
2002	14	41	$ 25,623,000	$ 44,370,000
2003	13	41	$ 25,623,000	$ 42,664,000
2004	12	41	$ 25,623,000	$ 41,023,000
2005	11	41	$ 25,623,000	$ 39,445,000
2006	10	41	$ 25,623,000	$ 37,928,000
2007	9	41	$ 25,623,000	$ 36,469,000
2008	8	68	$ 41,776,000	$ 57,173,000
2009	7	81	$ 50,131,000	$ 65,969,000
2010	6	88	$ 54,587,000	$ 69,070,000
2011	5	89	$ 55,144,000	$ 67,092,000
2012	4	92	$ 56,939,000	$ 66,611,000
2013	3	94	$ 58,177,000	$ 65,441,000
2014	2	96	$ 59,415,000	$ 64,263,000
2015	1	98	$ 60,653,000	$ 63,079,000
2016	0	100	$ 64,617,000	$ 64,617,000
Total Present Worth of Accrued Benefits During Construction:				$1,061,891,000
Annualized Benefits over 50-yr Period of Analysis (POA):				$64,617,000
Total Present Worth of Benefits over POA:				$1,285,136,000
Sum of Total Present Worth of Accrued and POA Benefits:				$2,347,027,000
Annualized Total Project Benefits				$109,255,000

6.8 PROJECT COSTS

As shown in Table 4 below, the total cost of the project at current October 2011 price level is $421,863,000, which includes $269,988,000 for construction and $151,875,00 for interest during construction (IDC) at the current 4% Federal Discount Rate (FDR). The average annual operation maintenance, repair, replacement and rehabilitation (OMRR&R) costs at current price level were estimated at $3,236,000. The total annualized cost which includes IDC and OMRR&R is $22,873,000 at current price level.

Table 4. Yearly Cost Allocation (2011 PL, 4% FDR)

Periods	Year	Cost Percent by Year	Actual & Scheduled Costs	IDC
26.5	1990	0.900%	$ 2,431,000	$ 3,616,000
25.5	1991	1.112%	$ 3,002,000	$ 4,200,000
24.5	1992	1.211%	$ 3,268,000	$ 4,294,000
23.5	1993	3.977%	$ 10,736,000	$ 13,227,000
22.5	1994	7.069%	$ 19,084,000	$ 22,010,000
21.5	1995	0.839%	$ 2,264,000	$ 2,440,000
20.5	1996	2.188%	$ 5,907,000	$ 5,936,000
19.5	1997	5.154%	$ 13,914,000	$ 13,009,000
18.5	1998	4.290%	$ 11,582,000	$ 10,049,000
17.5	1999	2.439%	$ 6,585,000	$ 5,288,000
16.5	2000	3.215%	$ 8,681,000	$ 6,431,000
15.5	2001	3.453%	$ 9,322,000	$ 6,348,000
14.5	2002	2.617%	$ 7,065,000	$ 4,405,000
13.5	2003	2.682%	$ 7,241,000	$ 4,115,000
12.5	2004	2.277%	$ 6,147,000	$ 3,166,000
11.5	2005	2.256%	$ 6,090,000	$ 2,826,000
10.5	2006	4.664%	$ 12,592,000	$ 5,223,000
9.5	2007	7.575%	$ 20,451,000	$ 7,516,000
8.5	2008	7.339%	$ 19,814,000	$ 6,382,000
7.5	2009	12.254%	$ 33,084,000	$ 9,210,000
6.5	2010	8.438%	$ 22,781,000	$ 5,385,000
5.5	2011	6.351%	$ 17,146,000	$ 3,360,000
4.5	2012	4.380%	$ 11,824,000	$ 2,282,000
3.5	2013	2.408%	$ 6,501,000	$ 957,000
2.5	2014	0.547%	$ 1,478,000	$ 152,000
1.5	2015	0.255%	$ 690,000	$ 42,000
0.5	2016	0.113%	$ 305,000	$ 6,000
Sum Total:		100%	$ 269,988,000	$ 151,875,000
Remaining Cost (FY2012-2016)			$ 20,798,000	$ 3,439,000

6.9 BENEFIT-COST RATIO

A summary of benefit-cost ratios (BCRs) for this project as reported in previously approved decision documents and reports is summarized in Table 5 below. The current BCR is shown in Table 6.

Table 5. Summary of Previously Reported Benefit-Cost Ratio Computations

Approved Document	PL	FDR	BCR
1982 Phase I GDM	1981	7-5/8 %	1.3
1989 Phase II GDM	1988	8-5/8%	2.1
1994 LRR	1993	8 %	1.6
2000 LRR	1999	7-5/8 %	1.7

Table 6. Benefit and Cost Ratio Calculations (4% FDR, 2011 PL)

Total Project Cost without IDC	$ 269,988,000
IDC	$ 151,875,000
Annualized Project Cost w/ IDC	$ 19,638,000
Annualized OMRR&R Cost	$ 3,236,000
Total Annual Project Cost	$ 22,873,000
Total Annual Benefit	$ 109,255,000
BCR Calculation	4.8
Average Annual Net Benefit	$ 86,382,000

Two major factors affect the difference between the previous economic analysis and the current LRR economic analysis: First, the number of structures damaged; and second, the extent of the damage to those structures. In short, this LRR had a more comprehensive structure inventory than its predecessors and made use of more effective analytic tools that were not available to its predecessors. For an expanded explanation on the difference in project benefits please refer to *Appendix A – Economic Reevaluation*.

6.10 REMAINING BENEFITS REMAINING COST RATIO

The remaining benefit-remaining cost ratio of the project was calculated based on the latest Program Development Guidance for FY2011 (EC 11-2-193) as shown in Table 7.

Table 7. Remaining Benefits and Remaining Costs Calculations (4% FDR, 2011 PL)

Remaining Project Cost without IDC	$ 20,798,000
Remaining IDC	$ 3,439,000
Annualized Remaining Project Cost w/ IDC	$1,128,000
Annualized OMRR&R Cost	$ 3,236,000
Total Annual Remaining Project Cost	$ 4,364,000
Total Annual Remaining Benefit	$ 9,472,000
RBRCR Calculation	2.17
Remaining Average Annual Net Benefit	$ 5,108,000

6.11 COST ALLOCATION

There have been no changes in cost allocation since project authorization. The current project purposes are still flood risk management and recreation.

6.12 COST APPORTIONMENT

A comparison of the apportionment of costs between Federal and non-Federal interests for the authorized project and the recommended project, both at current price levels, is given in Table 8.

Table 8. Apportionment of Costs for the Authorized and the Recommended Project

	Federal	Non-Federal	Total
Authorized Project	75.00%	25.00%	
Flood Control (75/25)	$ 154,742,000	$ 51,580,000	$ 206,322,000
Recreation (50/50)	$ 1,999,000	$1,999,000	$ 3,998,000
Total Authorized Project	$ 156,741,000	$ 53,579,000	$ 210,320,000
Recommended Project	75.00%	25.00%	
Flood Control	$ 200,795,000	$ 65,184,000	$ 265,979,000
Structural			
5% Cash		$ (10,571,000)	
Additional Cash Requirement		$ (9,507,000)	
LERRD's		$ (39,407,000)	
In-Kind Service		$ (4,032,000)	
Section 104 credits		$ (1,667,000)	
Non-Structural	$ 6,198,000	$ 2,066,000	
Cash		$ (443,000)	
LERRD's		$ (1,623,000)	
Recreation (50/50)	$ 2,004,500	$ 2,004,5,000	$4,009,000
Cash		$ (1,944,500)	
LERRD's		$ (60,000)	
Total Recommended Project	$ 202,800,000	$ 67,188,000	$ 269,988,000

October 2011 price levels

7.0 ENVIRONMENTAL CONSIDERATIONS

There have been no significant changes in environmental considerations for the project. An Environmental Assessment (EA) was issued in September 2011 to cover three proposed tieback levees that would modify the existing project covered by the 1982 Phase I General Design Memorandum and Final Environmental Impact Statement (EIS) and the 1995 Supplemental EIS. The proposed project modifications consists of design changes for the tieback levees located on the eastern and western limits of the project as authorized. Two of the tieback levees are located near the Illinois-Indiana state line in the communities of Hammond and Munster. The third tieback levee is located in the City of Gary, adjacent to the Ironwood neighborhood, along the northeastern side of the CSX Rail Road (formerly Conrail Rail Road). The three tieback levees will complete the project levee system to the authorized 0.5% AEP (200-year) level of flood risk management and would facilitate Federal Emergency Management Agency (FEMA) certification for the project levee systems.

The District received three response letters from state and Federal agencies. No significant issues were raised that would constitute a change in project formulation or the need for issuing an additional Supplemental Environmental Impact Statement. The EA is still pending, but absent any significant issues the Chicago District anticipates a FONSI to be signed when coordination with all agencies has been finalized.

Project Mitigation

The Little Calumet River Local Flood Protection and Recreation Project in Lake County, Indiana, consists of 22 miles of levees, floodwalls and associated structures that have impacted a total of 312 acres of forested, shrub and emergent wetlands. A significant portion of the project impacts were to forested wetlands. Since the project has an adverse impact to a significant resource, the Corps was required to mitigate for the loss of the wetlands consistent with Principles and Guidelines and Corps regulations. The District constructed 89 acres of wetlands within the project footprint in 2008 and will complete the required mitigation by restoring 385 acres at a site known as Hobart Marsh. Post-project conditions within the project footprint are unsuitable for wetland restoration because of unstable water levels, frequent inundation from low quality water and incompatible adjacent land uses. The Hobart Marsh mitigation area was chosen due to its proximity to the flood control project – it is within the same sub-watershed – and because it connects several designated nature preserves and natural areas administered by the National Park Service, the Indiana Department of Natural Resources and the Shirley Heinze Land Trust.

The Little Calumet River Mitigation Plan is a distinct package of the construction solicitation specifications. It is titled Little Calumet River Flood Control Project Hobart Marsh Area Mitigation (June 27, 2008). The package includes specifications as well as more than 80 pages containing tables identifying acceptable native seed mixes, trees, shrubs and herbaceous plugs for the 12 habitat types and 7 different parcels of land. The text portion of this package identifies the inclusions listed in paragraph (B) of Section 2036 of the Water Resources Development Act of 2007 including the plan for monitoring mitigation activities, the duration of monitoring, the criteria for success, the types and amounts of restoration, the actions to be undertaken to meet the mitigation objectives, actions to be taken if the seeding/plantings fail, and many other items (safety, stewardship, references, quality assurance, etc.).

The remaining mitigation work at Hobart Marsh includes disabling field tiles, repair of gully erosion areas, the eradication of both woody and herbaceous invasive plants, the introduction of native trees, shrubs, herbaceous plant plugs and seeds in each of the restored communities, as well as management and monitoring. Real estate acquisition at Hobart Marsh is complete along with the agricultural field tile survey and the site assessment. The remaining cost for the Hobart Marsh site is estimated to be $4.8M. Construction of the remaining mitigation is expected to be complete in 2018.

8.0 PUBLIC INVOLVEMENT

The land appraisals, project design changes, and construction issues that have caused the increased project costs have been coordinated and discussed with the Little Calumet River Basin

Commission, the City of Gary and area residents, the Indiana Department of Natural Resources, and the Indiana Department of Environmental Management through correspondence, telephone conversations, meetings, and field visits. Local interests are furnishing all lands, easements, and rights-of-way and have sufficient local funding to complete the project based on the current cost estimate and schedule.

9.0 HISTORY

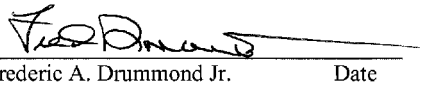
A brief history of the Little Calumet River project, subsequent to authorization, is given in Table 9 below.

Table 9. Brief Project History Since Authorization

Item/Event	Completion
Design Authorization (§101,WRDA 1976)	October 1976
Phase I GDM, Chief of Engineers Report	July 1984
Project Authorization (§401, WRDA 1986)	November 1986
Phase II GDM	April 1989
PCA Executed	August 1990
Construction Started	September 1990
1994 Limited Reevaluation Report	July 1994
PCA Amendment I	May 1999
PCA Amendment II	Apr 2000
2000 Limited Reevaluation Report	November 2000
Congressional Reauthorization (H.R.2419)	November 2005

10.0 RECOMMENDATION

I recommend that this Limited Reevaluation Report be approved and the authorized project cost estimate be modified as described herein.



Frederic A. Drummond Jr. Date
Colonel, U.S. Army
District Engineer

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

Plate 1

Overall Project Map

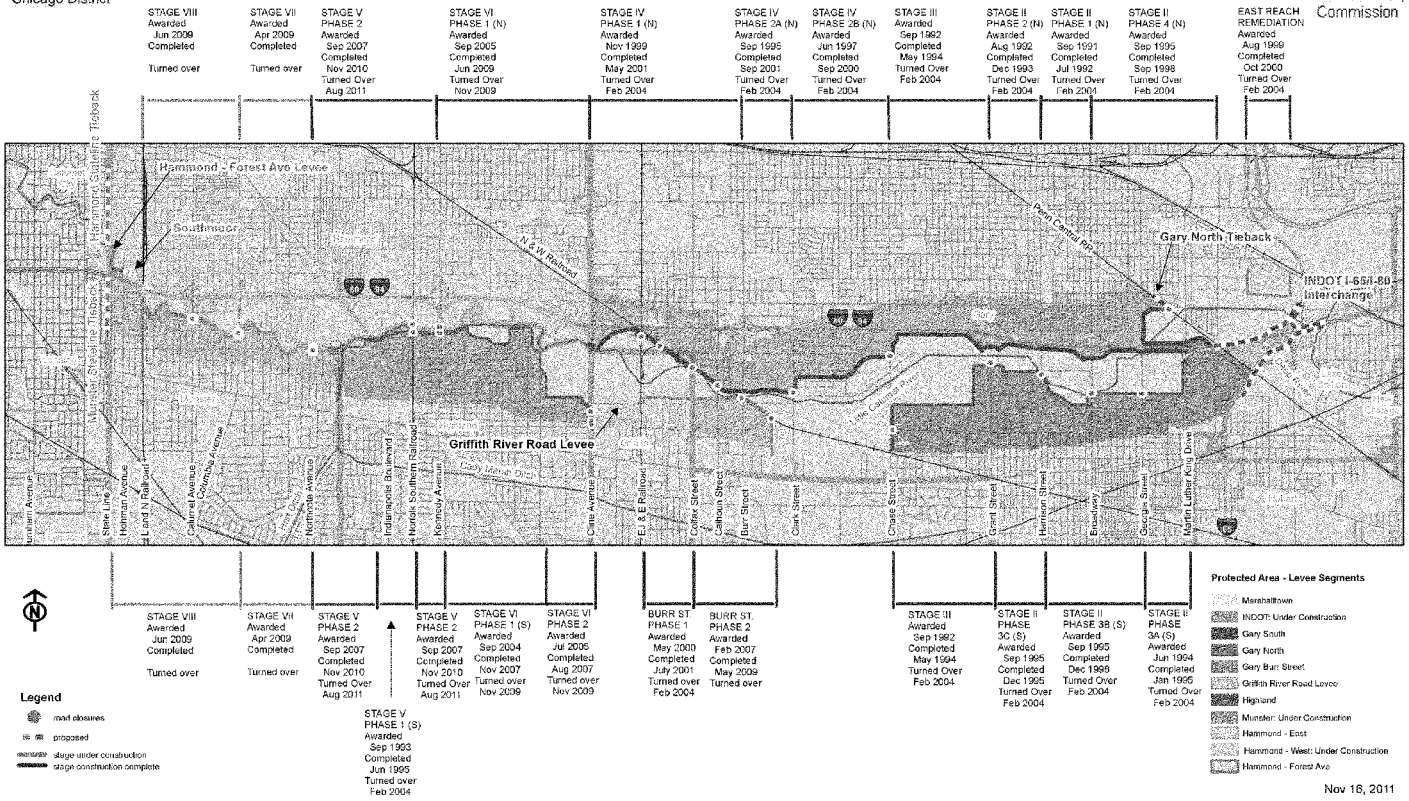
Prepared By:

U.S. Army Corps of Engineers
Chicago District

US Army Corps of Engineers
Chicago District

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

Little Calumet River Basin Development Commission



Nov 16, 2011

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
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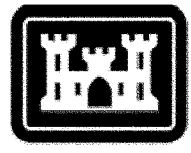
Appendix A

Economic Reevaluation

Prepared By:

U.S. Army Corps of Engineers
Chicago District



March 2012

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LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX A – ECONOMIC ANALYSIS

EXECUTIVE SUMMARY

The purpose of this appendix to the Limited Reevaluation Report (LRR) is to document the current economic evaluation of the project through updates to cost and benefits, and remaining costs and remaining benefits.

A primary distinguishing characteristic of this LRR is that the project is currently 90 percent complete. Many of the flood risk management project features are already functional. The results from this major reevaluation of the economics demonstrate that the project provides substantially more benefits than previously documented when measured using Benefit to Cost Ratio (BCR) and net National Economic Development (NED) benefit criteria.

The Phase II General Design Memorandum (GDM) which defines the project was approved in 1990. In contrast, mostly in recognition of evolving USACE regulations and guidance governing economic analyses, a major reevaluation of the economics of the project is documented in this report. Due to the age of and the techniques used in prior economic analyses, it was determined that a completely new flood damage analysis would need to performed in order to be compliant with current USACE guidance. The most significant features of this economic reevaluation are the reanalysis of flood damages using the USACE Hydrologic Engineering Center's Flood Damage Analysis (HEC-FDA) model, development of an entirely new structure inventory using county assessor's parcel information, and the inclusion of a "flood damages to vehicles" benefit category.

ER 1105-2-100, page G-80, stipulates the preparation of a table displaying the changes in project benefits based upon the authorizing document (Phase II GDM 1990), the benefits last reported to Congress (LRR 1994), and the benefits based on this reevaluations (LRR 2011). The 1994 LRR was the most recent update of economic analysis for the project and was used as a comparison point for this Appendix. The 2000 LRR was indexed from the 1994 LRR, and therefore is not reported here as an independent analysis. The table below contains these four benefit comparisons. The table's footnotes summarize the reasons for changes in the benefit estimates which are described within this appendix. Since the reevaluations were referenced to the project document, the footnotes reference benefit differences based on this comparison. The 1994 LRR was methodologically identical to the authorizing document. While ER1105-2-100, page 80, stipulates BCR be computed for the current price level (October 2011) and the current federal interest rate (4%), additional BCR's are computed based upon the discount rate used for the authorizing document (8-5/8%) and the interest rate used in the 1994 LRR (8%). In addition, project BCR at the interest rate used in preparing budget documentation (7%) is reported in *Table 21*. The price level (PL) has increased by 90 percent for the study area based upon consumer price index changes from 1987 to 2011.

Comment Number	Benefit Category	Phase I GDM July 1982 _1/	Phase II GDM April 1989 _2/	LRR July 1994 _3/	Current LRR March 2012
	Price Level	1980	1987	1993	2011
	Federal Discount Rate	7-5/8%	8-5/8%	8%	4%
1	Residential	6,025	7,639	10,374	55,770
2	Apartments	na	na	na	0
3	Vehicles	na	na	na	2,171
4	Affluence	624	735	499	0
5	CIPS	101	230	261	1,789
6	Emergency costs	31	39	162	1,212
7	Utilities _4/	0	0	52	na
8	Golf courses	145	246	275	241
9	Agricultural	1	2	1	0
	Transportation				
10a	Roadway repair cost	n/a	162	191	0
10b	Roadway repair delays	n/a	1,880	3,373	0
10c	Inundation delays	291	570	763	708
11	Research park (future)	n/a	59	72	0
	Additions to Flood Damage Reduction:				
12	Recreation	n/a	262	468	530
	Land enhancement				
13a	Areas exclusive of IUN	n/a	593	566	593
13b	Fill cost reduction	n/a	954	1,529	954
13c	NED employment benefits	n/a	239	na	0
14	FEMA Insurance Admin Savings_5/	n/a	n/a	na	649
	Total	**$7,219**	**$13,612**	**$18,585**	**$64,617**
	1/ Source: Phase I GDM Economic Appendix Table C-21(p.C-43), p.C-7, p.C-24, p.C-57.				
	2/ Source: Phase II GDM, Economic Appendix Table F-22(p.F-34), p.F-3, p.F-33.				
	3/ Source: Phase II GDM, Economic LRR Table 3(p13).				
	4/ Utilities combined with EmergCost Phase II GDM Table F-22 (p.F-34); documented by FEMA records LRR 1994; combined with CIPS and EmergCost LRR 2011.				
	5/ The per policy FIA admin. Cost disseminated through the Corps for FY2006, the last issued by HQ, is $192. Communities constituting FIA policy impacts are Gary, Hammond, Griffith, Munster and Highland. Based on FEMA NFIP insurance policy report, 3382 policies are credited for this benefit.				

	Comment Table - Phase II GDM to LRR 2011
	The general increase in nominal value due to price level (PL) adjustments is approximately 90 percent. Depending on the benefit category the PL adjustment varies.
1	New damage model used: HEC-FDA. A new structure inventory based upon the County Assessors data was developed. Garages added.
2	Phase II GDM did not analyze apartments. There are only 69 apartment structures in the LRR 2011 inventory and minimal damages were computed, therefore no damage reduction has been reported for this category.
3	Phase II GDM did not analyze vehicle flood damage. LRR 2011 developed, evaluated, and added vehicle flood damage evaluations per HQUSACE, EGM 09-04.
4	Affluence was eliminated from the LRR 2011 due to a lack of real income growth projections in the study area.
5	New damage model used: HEC-FDA. A new structure inventory based upon the County Assessors data was developed. Garages added.
6	Emergency Cost for the LRR 2011 was calibrated based upon study area documented emergency expenses 23 Sept 2008 FEMA Flood Disaster Declaration #1795.
7	Utilities combined with Emergency Costs in Phase II GDM Table F-22 (p.F-34); documented by FEMA records LRR 1994; Re-combined with Emergency Costs for LRR 2011.
8	Two of Four Golf courses in the original analysis are no longer golf courses. One has been sold and redeveloped, the other is out of business.

	Comment Table - Phase II GDM to LRR 2011 - Continued
9	Agricultural has been removed from the LRR 2011 evaluation due to the level of flooding impacts being so small.
10a	Roadway repair delays have been eliminated from the LRR 2011 due an inability to confirm damage levels
10b	Roadway repair delays have been eliminated from the LRR 2011 due an inability to confirm damage levels
10c	Inundation delays have been confirmed by recent flooding events. The project consists of 22 roadway closures which partially offset previous benefits.
11	Research Park future condition damage projections have been eliminated from the LRR 2011 due to a lack of reliability for this projected future development.
12	Recreation is adjusted for price level based upon the HQUSACE User Day Value guidance.
13a	Development expectations post-project remain credible, while fill cost have not changed based upon the cost of land used in the Phase II GDM.
13b	Development expectations post-project remain credible, while fill cost have not changed based upon the cost of land used in the Phase II GDM.
13c	NED employment benefits are eliminated since Lake County, IN no longer meets the eligibility requirements for this benefit claim.
14	The per policy FIA administration cost disseminated through HQUSACE for FY2006, the last issued, is $192. FEMA NFIP insurance policy reports 3,382 active policies.

Project Costs (2011PL, $000's)	Phase II GDM April 1989	LRR July 1994	Current LRR March 2012
Interest Rate	8 5/8%	8%	4%
PROJECT COST TOTALS: (Appendix C)	$269,988	$269,988	$269,988
IDC (Table 19)	$500,955	$437,153	$151,875
TPC + IDC	$770,943	$707,141	$421,863
Annualized Project Cost Before OMRR&R	$67,573	$57,804	$19,638
Annualized OMRR&R Cost (Table 20)	$3,080	$3,099	$3,236
Total Annual Project Cost _1/	**$70,654**	**$60,902**	**$22,873**
Total Annual Project Benefits (Table 18) _2/	**$189,526**	**$174,718**	**$109,255**
Project BCR	**2.68**	**2.87**	**4.78**
Remaining Project Costs (RPC)Totals (Appendix C)	$20,798	$20,798	$20,798
IDC (Table 19)	$7,960	$7,313	$3,439
RPC + IDC	$28,759	$28,111	$24,237
Annualized Project Cost Before OMRR&R	$2,521	$2,298	$1,128
Annualized OMRR&R Cost (Table 20)	$3,080	$3,099	$3,236
Total Annual Project Remaining Cost _1/	**$5,601**	**$5,396**	**$4,364**
Total Annual Project Benefits Remaining (Table 18) _2/	**9,472**	**9,472**	**9,472**
Remaining Project BCR (RBRCR)	**1.69**	**1.76**	**2.17**

_1/ Costs in the table above are influenced by the "interest during construction" cost component.

_2/ Benefits in the table above are influenced by the "accumulated project benefits prior to baseline" benefit component.

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1.0 INTRODUCTION

The purpose of this appendix to the Limited Reevaluation Report (LRR) is to document the current economic evaluation of the project. The LRR is most appropriate process for this purpose since project reformulation is not warranted (ER 1105-2-100, p.D-17).

The Little Calumet River Local Flood Control and Recreation Project is being constructed based on the analysis and design contained in the Little Calumet River Phase II General Design Memorandum (GDM), approved by HQUSACE in June 1990, and the subsequent Feature Design Memorandums (FDMs). Project construction commenced in November 1991 and is projected to be completed in 2016. The project will provide a 0.5% annual exceedance probability (AEP) (200-year) level of flood risk management for areas of Northwest Indiana surrounding the Little Calumet River. The authorized project consists of existing levee replacement, construction of new levees and floodwalls to expand the area of risk management, rehabilitation of existing pump stations, a flow control structure, non-structural flood proofing, a flood warning system, wetland mitigation, and recreation features. The project consists of 22 miles of levees and floodwalls along the Little Calumet River, relocation of seven miles of channel, 17 miles of hiking trails and 750 acres of wetland mitigation.

The Local Cooperation Agreement (LCA) with the non-Federal sponsor, the Little Calumet River Basin Development Commission (LCRBDC), was executed on August 16, 1990. Funds to initiate construction were appropriated in Fiscal Year (FY) 1990. Two prior Limited Reevaluation Reports were completed for this project. In 1994, a LRR was completed to updated project economics in support of the FY1996 budget. In 2000, another LRR was developed due to a projected increase in costs above original project authorization. As a result, Congress reauthorized the project in 2005. As of March 2011, project construction was 90 percent complete.

The LRR relates the history of the project, and the changes which have created the need for the additional documentation at this time. The authorized project purposes of the Little Calumet River, Indiana Local Flood Control and Recreation Project are flood risk management and recreation. There has been no change in project purpose since authorization.

2.0 SCOPE OF ECONOMIC REEVALUATION

The Phase II GDM which defines the project was approved in 1990. The basic economic data and methods which were applied in support of the Phase II GDM date to the early 1980's. A Phase I GDM analysis was reported in 1982, and that analysis was simply added to the 1990 Phase II GDM and supplemented with additional benefit categories. The 1994 LRR was only an update of the earlier analyses and did not include any extensive reanalysis of economic data sets or methods. In contrast, mostly in recognition of evolving USACE regulations and guidance

governing economic analyses, a major reevaluation of the economics of the project is documented in this report. Due to the age of and the techniques used in the prior economic analyses, it was determined that a completely new flood damage analysis would need to performed in order to be compliant with current USACE guidance and to accommodate the USACE Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA) model input requirements.

Previous economic evaluations included a sensitivity analysis, but no explicit considerations for risk and uncertainty. Also, the structure inventory was more than 30 years old and was constructed based on a 25% sample inventory. Given the advent of Geographic Information Systems (GIS) tools and the availability of structure characteristics within the study area from the county assessor's office, the reconstruction of a flood damage assessment using new data and techniques was possible.

This decision was made easier by the fact that both the Phase II GDM and the 1994 LRR showed that the damage to structures benefit category provided two thirds of the total project benefits. In this reevaluation, high attention to this benefit category was prioritized over expending major efforts on other less important benefit categories.

A primary distinguishing characteristic of this LRR is that the project is 90 percent complete. Many of the flood risk management benefits are already being provided by features already constructed and this fact is captured in detail in later sections of this document. The results from this major reevaluation of the economics as documented here demonstrate that the project provides substantially more benefits than previously documented when measured using Benefit to Cost Ratio (BCR) and net National Economic Development (NED) benefit criteria.

The method selected for updating project benefits, is the "Partial Benefit Reanalysis" method cited in ER 1105-2-100, page D-15. The process reported here goes far beyond a mere update using price level indices. Limited indexing is used, but the following items are also included which distinguishes this LRR from previous reevaluations:

1. HEC-FDA is used for the flood damage assessments. This is a serious upgrade in capabilities from the model used in prior evaluations and includes use of the latest residential and commercial depth damage curves promulgated by USACE.
2. A totally new structure inventory was developed which utilized GIS techniques coupled with county assessor's parcel tax data. The only data salvaged from the prior inventory was the first floor elevations of structures wherever possible.
3. Flood damage to vehicles has been estimated for the first time for the study area.
4. Flood damage to residential detached and attached garages has been estimated for the first time for the study area.
5. Flood Insurance Administration (FIA) savings have been estimated for the first time for the study area.
6. The flood damage assessment utilized the latest hydrologic and hydraulic analyses and water surface profiles for the study area.
7. Update of project cost and benefit timing projected for the project.

3.0 REPORT OVERVIEW

The report will follow the flood damage evaluation procedures performed, beginning with the study area profile, damage reaches, and flood conditions considered leading to a discussion of the benefit categories in order of development. The most significant is flood damage to structures, but all benefit categories are discussed. Several additional benefit categories have been added since the last economic evaluation including damage to vehicles, garages and outbuildings and FEMA policy administration cost savings. The order of benefit category presentation will roughly follow the order listed in the table found in the Executive Summary: residential, commercial-industrial-public, emergency costs, utilities, golf courses, agricultural, transportation, research park, recreation, land enhancement, and FEMA policy administration cost. The pre- and post-project damage levels will be contrasted, followed by a brief presentation of project costs, which are more thoroughly presented in other sections of the LRR. The project's remaining benefits and remaining costs are then presented, followed by a comparison of current results to previous benefit levels.

Per Economic Guidance Memorandum (EGM) 12-01, the FY2012 Federal discount rate for project evaluation and formulation of 4% is used wherever a discount rate is needed. The economic life of the project is 50 years, and unless otherwise specified October 2011 Price Level is being reported.

4.0 STUDY AREA

The Little Calumet River passes through the densely populated and heavily industrialized northern portions of Lake and Porter counties in Indiana. The floodplain adjacent to the river contains dense housing along the western reaches of the river from the Illinois-Indiana Stateline east to about Cline Avenue. East of Cline Avenue the floodplain consists of scattered residences and vacant land. The heavy steel, chemical, and associated industries of northern Indiana lie north of the Little Calumet River basin. The project is divided into two reaches. The East Reach, which is mainly in the City of Gary and extends from Cline Avenue to I-65. The West Reach extends from Cline Avenue to the Stateline. The communities benefitting from the project are Hammond, Munster, Highland, Griffith, and Gary. A very small parcel of land on the south bank of the Little Calumet River is part of Calumet Township, outside the community boundaries. *Figure 1* is a project location map including community and township boundaries within the study area.

Table 1 is a select compilation of census data which provides a profile of each of the communities benefitting from the project - Gary, Hammond, Griffith, Munster, and Highland - in reference to population, households, income, and vehicles. The most pronounced feature of this table is the loss of population from the City of Gary and the relative weakened position of Gary in all the categories referenced. The dynamics in this area reveal that the northwest Indiana region is in a transition phase in regard to population levels. Hammond and Gary have both had population declines in the last 10 years while Munster and Griffith showed significant population growth over the past decade. Gains in population in Lake County overall are similarly modest. The data reveal that average housing values can be used to clearly rank community affluence

from highest to lowest: Munster, Highland, Griffith, Hammond, and Gary; with Griffith being at about the average level for Lake County, Indiana.

Figure 1. Study Area Map

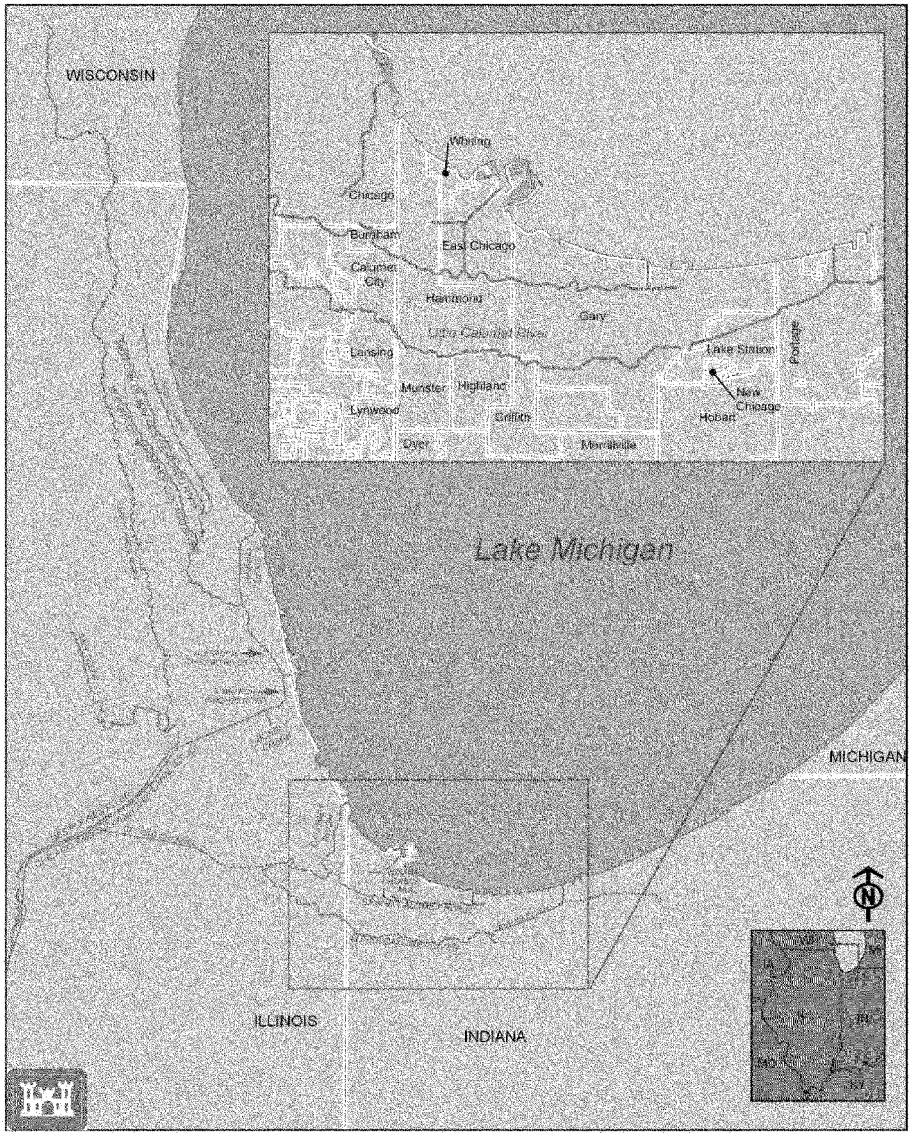


Table 1. Study Area Community Profiles

Community Profile	Gary	Hammond	Griffith	Munster	Highland	Lake County	Indiana
Population							
Population 2010	80,294	80,830	16,893	23,603	23,727	496,005	6,483,802
Population 2000	102,746	83,048	17,334	21,511	23,545	484,564	6,080,485
Population 1990	116,646	84,236	17,916	19,949	23,697	475,594	-- na --
Median Age 2000	33.6	33.9	35.8	42.9	39.8	-- na --	-- na --
Median Age 2009	34.31	33.88	35.57	43.71	40.76	-- na --	-- na --
Race 2009 (percent)							
White	25%	58%	68%	74%	75%	64%	84%
Black	64%	18%	17%	12%	12%	26%	9%
Other	11%	23%	14%	14%	12%	10%	7%
Households							
Household Size 2000	2.66	2.58	2.57	2.62	2.44	-- na --	-- na --
Household size 2009	2.54	2.48	2.47	2.53	2.33	2.63	2.49
Housing Units 2000	43,630	32,026	6,990	8,339	9,925	-- na --	-- na --
Housing Units 2009	41,286	33,647	7,267	9,294	10,560	208,750	2,795,541
Residency 2009 (percent)							
Owner Occupied	46%	56%	59%	79%	70%	71%	72%
Renters	38%	34%	32%	13%	23%	-- na --	-- na --
Vacant	16%	10%	8%	8%	8%	-- na --	-- na --
Median Home Value 2000	$53,400	$78,400	$108,600	$163,800	$123,000	-- na --	-- na --
Median Home Sales Price 2009	$63,875	$86,138	$126,937	$207,031	$150,000	$129,100	$120,200
Median Age of Home 2009	45	50	35	32	34	-- na --	-- na --
Income							
Median Houshold Income 1990	$19,390	$26,883	$36,562	$48,483	$39,437	$30,439	-- na --
Median Houshold Income 2000	$27,295	$35,528	$50,030	$63,243	$51,297	-- na --	-- na --
Median Houshold Income 2009	$34,667	$44,760	$62,320	$81,617	$64,419	$47,054	$45,427
Per Capita Income 2000	$14,383	$16,254	$21,866	$30,952	$24,530	$22,973	$24,044
Individuals Below the Poverty Line 2000	26%	12%	12%	12%	12%	16%	14%
Vehicles							
Vehicles by Household 2009							
No Vehicle	18%	12%	6%	4%	4%	-- na --	-- na --
One Vehicle	46%	43%	36%	30%	36%	-- na --	-- na --
More Than One Vehicle	37%	45%	59%	65%	60%	-- na --	-- na --
Source: www.factfinder2.census.gov		www/americantowns.com					

5.0 DAMAGE REACHES

Damage reaches were defined in HEC-FDA based upon the delineation of both project levee segments and affected community boundaries. Two sets of damage reaches were defined for the damage analyses: a set of twelve (12) reaches for the without and with-project analyses to capture benefits from the construction of the levee system and an additional set of three (3) reaches for the with-project analysis to capture induced project damages attributed to interior drainage behind the levees. *Table 2* provides a listing of the damage reaches entered into HEC-FDA.

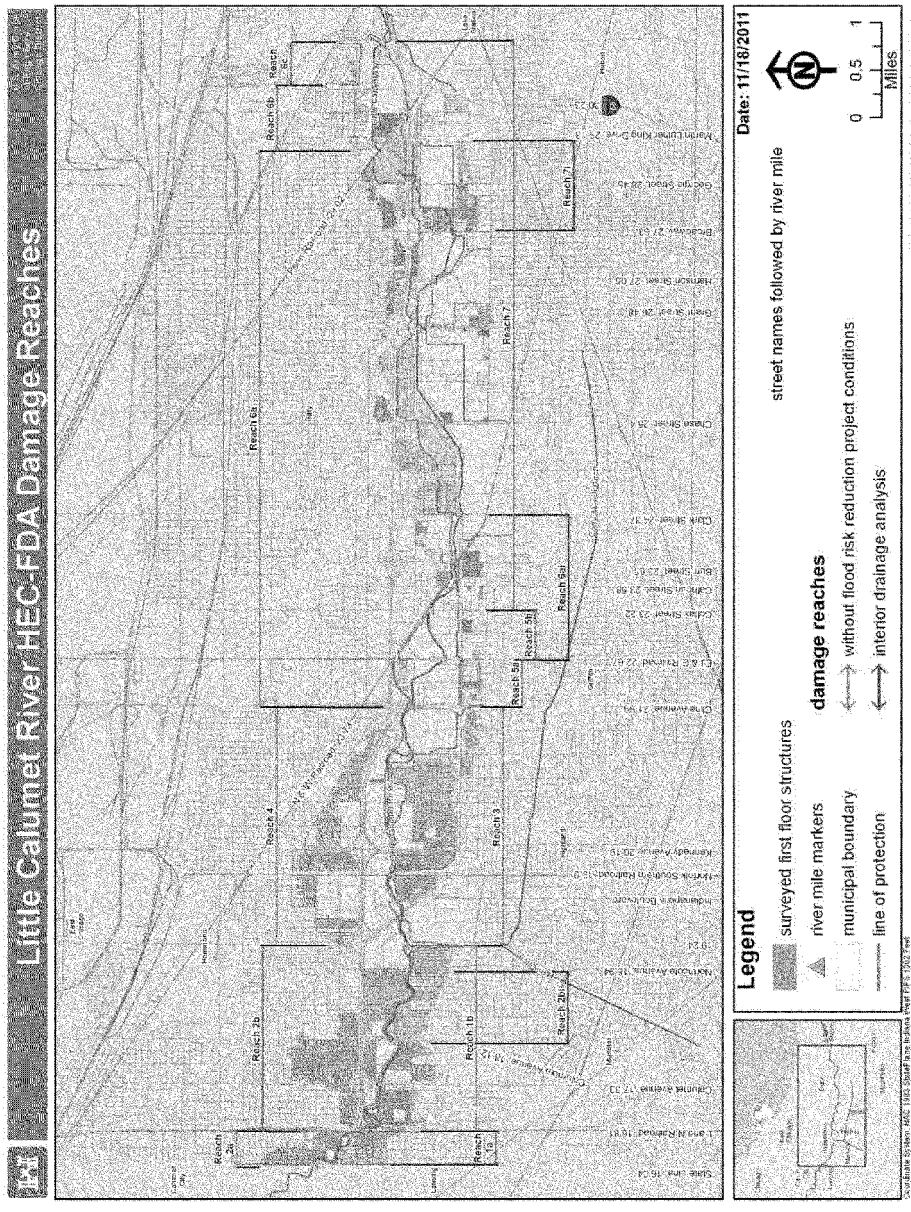
Table 2: Summary of Damage Reaches included in HEC-FDA

Damage Reach	Beginning Station	Ending Station	Bank	Index Location Station	Description
Reach 1a	16.043	16.808	Right	16.043	IL/IN Stateline to L&NRR Munster West South
Reach 1b	16.816	19.238	Right	18.101	L&NRR to Hart Ditch Munster East South
Reach 2a	16.043	16.808	Left	16.043	IL/IN Stateline to L&NRR Hammond West North
Reach 2b	16.816	19.238	Left	18.102	L&NRR to Hart Ditch Hammond East North
Reach 3	19.239	21.985	Right	19.239	Hart Ditch to Cline Ave Highland South
Reach 4	19.239	21.985	Left	19.910	Hart Ditch to Cline Ave Hammond East North
Reach 5a	21.999	22.667	Right	21.999	Cline Ave to EJ&ERR Griffith Gap South
Reach 5b	22.668	23.234	Right	22.668	EJ&ERR to Colfax Ave Griffish Betterment South
Reach 6a	21.990	29.032	Left	23.855	Cline Ave to ConRR Gary North
Reach 6b	29.032	29.706	Left	29.032	ConRR to Marshalltown Gap Gary North
Reach 6c	29.706	30.195	Left	29.706	Marshalltown to I-65 Marshalltown Gary North
Reach 7	23.235	30.195	Right	27.035	Colfax Ave to I-65 Gary South
Interior Drainage Reaches					
Reach 2bi	10.115	19.072	Left	19.072	Hammond Interior Subarea 4 N from FDM 6
Reach 6ai	22.573	24.353	Left	24.363	Gary North Interior Subarea 89 from FDM 3
Reach 7i	27.543	29.137	Right	27.643	Gary South Interior Subarea 2 from FDM 3

These reaches are illustrated in *Figure 2* including the river mile system adopted for the study, the major crossroads and railroads in the study area, the extent of the 0.2% annual exceedance probability (500-year) flood plain, reach labels, and locations of where structure first floor elevations were salvaged from field surveys associated with prior studies. Especially significant in the figure is the location of Interstate Highway 80/94, north of the Little Calumet River. This road is known as the Borman Expressway in this region and is a significant beneficiary of the project.

The interior drainage reaches do not cover all the levee segments, but only those which had the potential to create interior water profiles which could threaten existing development. This determination was made based on comparing the design interior water heights with ground elevations for the study area. It was decided by the study team that the most direct method to account for the potential of with-project interior flood damages was to isolate this damage source and evaluate it separately, with distinct reaches and a distinct HEC-FDA data deck. Since interior drainage analyses and designs were completed throughout the construction phase of the project and were not necessarily aligned with the levee segment reaches, separating the interior drainage analysis from the levee benefit analysis was more straightforward.

Figure 2. Little Calumet River Damage Reaches in HEC-FDA



6.0 FLOODING SCENARIOS CONSIDERED

Hydraulic input data for the HEC-FDA model was taken from the most current Little Calumet River Hydrologic Engineering Center River Analysis System (HEC-RAS) unsteady flow model for the river stage (exterior) data. Project condition interior stage data was taken from interior drainage analyses presented in Little Calumet River project documents: Feature Design Memorandum (FDM) 3, FDM 6, Burr Street Betterment Levee Design Analysis, and the East Reach Remediation Design Analysis. Additional information regarding the hydrologic and hydraulic analyses performed for this LRR is contained in *Appendix B - Review of Hydrologic and Hydraulics Analysis*.

6.1 FOUR CONDITIONS EVALUATED

Four different conditions were analyzed using HEC-FDA:

- without-project (existing/pre-project) conditions
- without-project conditions assuming Thornton Reservoir operational
- with-project conditions (levee overtopping scenario)
- with-project conditions (interior flooding scenario)

Exterior river stage data was used for the hydrologic and hydraulic input for the first three conditions and interior stage data was used for analyzing the last condition. For both the without-project and without-project with Thornton Reservoir condition models, water surface profiles from HEC-RAS were used (with the appropriate river mile conversions). For the with-project levee overtopping and interior flooding models, the water surface profiles were assumed to be 'level pools' throughout the respective damage reaches, which would be a reasonable assumption for both interior ponding conditions and overtopping breach conditions. Stage data for the interior water surfaces were taken from the stage frequency data from the appropriate interior analyses while stage data for the overtopping analysis was taken from the with-project condition exterior stages for the overtopping location assumed for the damage reach, which is also the reach index location. Levee segments delineated in the HEC-FDA model are shown in *Table 3*.

Table 3. HEC-FDA With-Project Levee Features

List of Levees				
Name	Top of Levee Stage	Damage Reach Names	Stream Name	Description
State Line S	599.00	Reach1a	LCR	State Line Tieback in Munster
Munster East	601.50	Reach1b	LCR	Munster Levee east of Monon RR
State Line N	599.00	Reach2a	LCR	Stateline Tieback Levee in Hammond
Hammond Levee	601.00	Reach2b	LCR	Hammond Levee east of Monon RR west of Hart Ditch
Highland Levee	603.70	Reach3	LCR	Highland Levee
Hammond E E N	603.50	Reach4	LCR	Hammond Levee east of Hart Ditch
Griffith Better	602.20	Reach5b	LCR	Griffith Betterment Levee
Gary North	601.60	Reach6a	LCR	Gary Levee North
Marshalltown Lev	598.10	ReachC	LCR	Marshalltown Levee
Gary South Levee	601.80	Reach7	LCR	Gary Levee South

As referenced above, two without-project conditions were evaluated: with and without Thornton Reservoir. This reservoir is located in Illinois and functions as a flood risk management project which captures high flows from Thorn Creek, a tributary to the Little Calumet River in Illinois. This flow capture affects the flows in the Little Calumet River. The condition is carried throughout this analysis because not only has it been considered in all past evaluations, but it also provides an opportunity to partially reevaluate impacts from capturing Thorn Creek flows, which is an integral component to the proposed Thornton Reservoir component of the Chicagoland Underflow Plan (CUP). The CUP-Thornton Reservoir is currently being constructed and is projected to be fully operational in 2015. This analysis will also inform annual economic updates required as part of the USACE annual budget request.

The baseline condition (i.e., the without-project condition) by which with-project benefits are derived for this LRR assumes that the Thornton Reservoir is in place. This is a reliable assumption given that the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), the non-federal sponsor for the CUP-Thornton Reservoir, constructed a 9,600 acre-feet interim Thornton Transitional Reservoir in 2003 to provide storage of Thorn Creek flows and is currently constructing the CUP-Thornton Reservoir in advance of receiving full federal funding.

6.2 FUTURE CONDITIONS

As in the 1994 LRR, and the 1990 Phase II GDM, future conditions were referenced to 2000 land use conditions without provisions for changes in the future land use, which may affect flood flows. For this LRR, these same conditions are adopted, and no future effects on the Little Calumet River discharge frequency relationships are projected. This determination is supported by the nearly flat historical growth in population in the affected communities, as well as a flat projection in traffic levels within the area through 2040 as prepared by Northeast Indiana Regional Planning Commission (NIRPC), the local regional planning agency. *Figure 3* shows an age breakdown of residential structures associated with the latest residential structure inventory as excerpted from the assessor's data base. Notably, only 5 percent of the structures in the inventory were shown to have been built since 1980, a 30-year time span. Finally, a 2007 report on Indiana demographics included county population projections for the State of Indiana. As excerpted from that report, and shown in *Figure 4*, Lake County, although not projected to decline in population over the 2005 - 2040 time frame, is assigned a projected growth rate of only between 0 - 10 percent.

Figure 3. Residential Structure Inventory Statistics

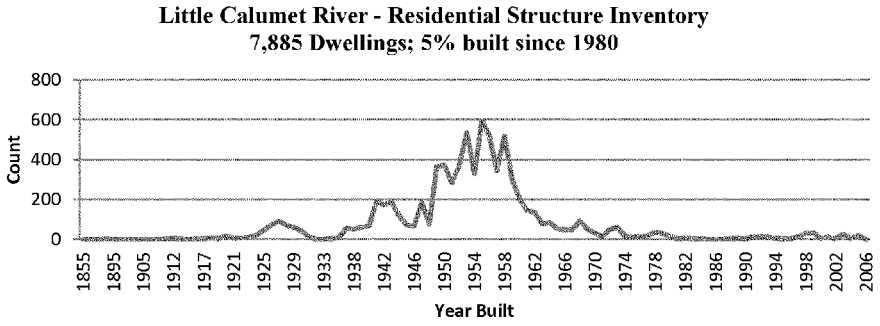
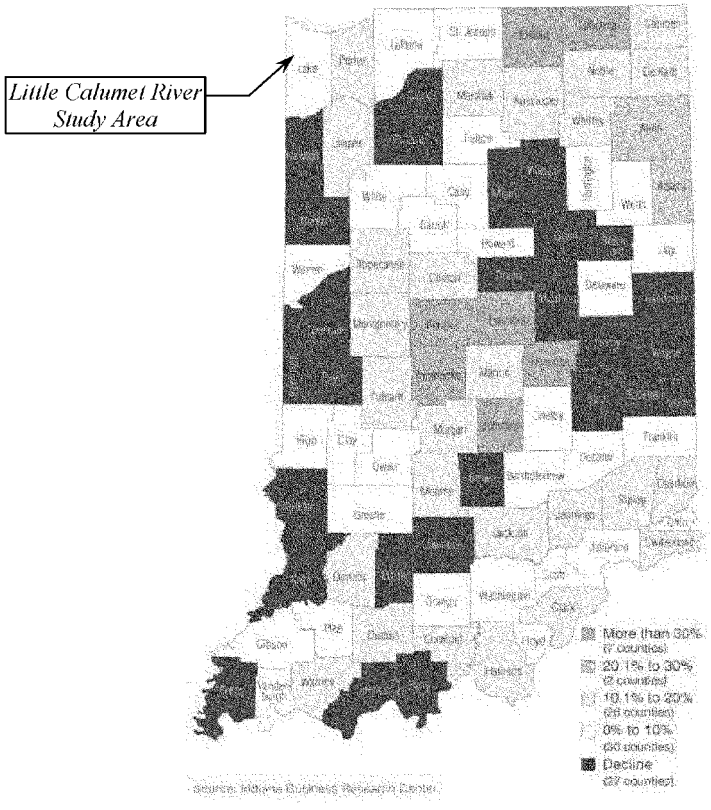


Figure 4. Projected Percent Change in Population 2005 - 2040



7.0 BENEFIT CATEGORIES REEVALUATED

Table 4 displays the results of the current flood risk management benefit reevaluation shown in comparison to those reported in previous decision documents. The table is used here to provide a structure for the following discussion of each benefit category reevaluated.

Table 4. Comparison of Flood Risk Management Benefits ($000)

Benefit Category	Phase I GDM July 1982 _1/	Phase II GDM April 1989 _2/	LRR July 1994 _3/	Current LRR March 2012
Price Level	1980	1987	1993	2011
Federal Discount Rate	7-5/8%	8-5/8%	8%	4%
Residential	6,025	7,639	10,374	55,770
Apartments	na	na	na	0
Vehicles	na	na	na	2,171
Affluence	624	735	499	0
CIPS (Commerical, Industril, Public Structures)	101	230	261	1,789
Emergency costs	31	39	162	1,212
Utilities _4/	0	0	52	na
Golf courses	145	246	275	241
Agricultural	1	2	1	0
Transportation				
Roadway repair cost	n/a	162	191	0
Roadway repair delays	n/a	1,880	3,373	0
Inundation delays	291	570	763	708
Research park (future)	n/a	59	72	0
Recreation	n/a	262	468	530
Land enhancement				
Areas exclusive of IUN	n/a	593	566	593
Fill cost reduction	n/a	954	1,529	954
NED employment benefits	n/a	239	na	0
FEMA Insurance Admin Savings_5/	n/a	n/a	na	649
Total	**$7,219**	**$13,612**	**$18,585**	**$64,617**

1/ Source: Phase I GDM Economic Appendix Table C-21(p.C-43), p.C-7, p.C-24, p.C-57.

2/ Source: Phase II GDM, Economic Appendix Table F-22(p.F-34), p.F-3, p.F-33.

3/ Source: Phase II GDM, Economic LRR Table 3(p13).

4/ Utilities combined with EmergCost Phase II GDM Table F-22 (p.F-34); documented by FEMA records LRR 1994; combined with CIPS and EmergCost LRR 2011.

5/ The per policy FIA admin. Cost disseminated through the Corps for FY2006, the last issued by HQ, is $192. Communities constituting FIA policy impacts are Gary, Hammond, Griffith, Munster and Highland. Based on FEMA NFIP insurance policy report, 3382 policies are credited for this benefit.

7.1 RESIDENTIAL STRUCTURES

As shown in *Table 4*, residential flood damage reduction is the primary category of benefits from the project. That is why emphasis was placed on this benefit category when this reevaluation was developed. As mentioned previously, due to the vintage of the structure inventory data used in prior evaluations, an entirely new structure inventory was developed using county assessor's parcel information on improvements and GIS techniques. The total single-family residential structure inventory contains 7,885 records.

7.1.1 STRUCTURE INVENTORY DATA

The salvageable data item of most value from the earlier studies was the field surveyed first floor elevation of the structures. In previous flood damage assessments, structures were surveyed on a 25 percent sample, and the damage estimates reflect the 25 percent sample surveyed multiplied by four. The sampled structures were identified by address labels; therefore first floor elevations were available for roughly 25 percent of the structures in the previous structure inventory. The structure values were based upon generalized census block data, and they were specified into one of seven structure types associated with one of seven residential depth damage curves. Damage estimates were processed using the Chicago District developed Residential Flood Damage Program (RFDP), which has been superseded by regulations mandating risk and uncertainty be adopted in damage evaluations, and by the development, certification, and widespread use of HEC-FDA. *Table 5* illustrates a sample from the previous structure inventory which indicates, from left to right: sort order, the structure label (address), structure type (code), structure value ($000's), and structure first floor(two decimal number), and miscellaneous information.

Table 5. Sample of Previous Structure Inventory Data

5351	Total					4976	
3032		341M GRAND BLVD.	806	16133	593.81	248 5.17 0	
3045		341M GRAND BLVD.	806	16133	593.81	248 5.17 0	
3058		341M GRAND BLVD.	806	16133	593.81	248 5.17 0	
3071		341M GRAND BLVD.	806	16133	593.81	248 5.17 0	
3514		640, W. 29TH AVE.	405	7519	598.90	249 7.66 0	
3517		640, W. 29TH AVE.	405	7519	598.90	249 7.66 0	
3520		640, W. 29TH AVE.	405	7519	598.90	249 7.66 0	
3523		640, W. 29TH AVE.	405	7519	598.90	249 7.66 0	
4458		100 34TH AVE.	101	7437	598.34	356 11.90 0	
4465		100 34TH AVE.	101	7437	598.34	356 11.90 0	
4813		1001 E. 32ND AVE.	101	8911	595.40	346 12.84 0	
4814		1009 E. 32ND AVE.	101	8911	595.80	346 12.84 0	
4427		1015 271H AVE.	304	9380	600.83	367 11.41 0	
4436		1015 271H AVE.	304	9380	600.83	367 11.41 0	
4445		1015 271H AVE.	304	9380	600.83	367 11.41 0	
4815		1119 E. 32ND CT.	101	8911	597.38	346 12.84 0	
4799		1121 E. 32ND AVE.	101	9782	597.63	342 12.76 0	
4816		1127 E. 32ND CT.	806	8911	597.78	346 12.84 0	
4801		1130 E. 32ND CT.	806	9782	597.88	342 12.76 0	
4817		1135 E. 32ND CT.	806	8911	598.03	346 12.84 0	

7.1.2 AVAILABLE TAX ASSESSOR INFORMATION

Table 6 contains a summary of parcel information available from the Lake County, Indiana tax assessor, of which the highlighted data was used to construct a new structure inventory for this evaluation. In 2006, a database of assessor information for the entire county was obtained for the Grand Calumet River, Indiana Section 312 Feasibility Study. To investigate structure value changes since 2006 and for quality control purposes of other assessor data used in the evaluations, a comparison was made with the most recent data available from the County through their website. This access was used heavily to ascertain an appropriate index for structure value updates and to research and confirm any questions which arose pertaining to the use and interpretation of the 2006 data through GIS.

Table 6. Summary of Available Tax Assessor Information

Structures	12724	Sample
APN		45081910100500000
APN2		**41-49-0407-0017**
OWNER		**NEELY, MARY M**
ADDR		**2981 CLARK RD**
CITY		**GARY**
OFFSET		1888.806274
FF_ELEV		**0**
LWE		**0**
OCC_Name		**1SWB**
Bank		**Left**
Station		**24.227457**
Ground_Level_Elevation		**596.640991**
Struc_Val		**95110**
Year_Const		**1958**

Detached Garage	5510	Sample
PARCEL_ID		313485875
APN		45081910100500000
APN2		**41-49-0407-0017**
OWNER		NEELY, MARY M
ADDR		2981 CLARK RD
CITY		GARY
RM		24.227457
OFFSET		1888.806274
FF_ELEV		0
LWE		0
OCC_Name		**DETGAR**
Bank		**Left**
Station		**24.227457**
Ground_Level_Elevation		**596.640991**
Struc_Val		**6750**

Dwellings	7911	Sample
OBJECTID		38706
PARCEL_NO		1414904070017
DWELLING_NO		**1**
OCC_CODE		1
STORY_CODE		1
STORY_HEIGH		**1**
ROOF_MAT		1
HEAT_SYS_CODE		1
CENTL_AIR_CODE		N
NO_FIN_RMS		6
ATT_CODE		0
ATT_BASE_AREA		0
ATT_FIN_AREA		0
BASE_CODE		3
BASE_AREA		**1219**
BASE_FIN_AREA		0
CRWL_CODE		0
CRWL_AREA		0
FLR_BASE_AREA		1443
FLR_TL_FIN_AREA		1443
TLT_BASE_VAL		92600
ROW_TYP		0
UNFIN_INT_VAL		0
EXT_LIV_UNIT		0
REC_ROOM		0
LOFT		0
FIREPLACE		0
NO_HEAT		0
AIRCON_ADJ		0
NO_ELECT_ADJ		0
PLUMB_ADJ		0
GARAG_ADJ		**0**
EXT_ADJ		2600
TOTAL_BDRMS		3
NO_BAM_RMS		0
NO_DIN_RMS		0
NO_FULL_BTH		1
NO_HLF_BTHS		0
TL_PLMB_FX		5
NO_FRPLC		0
NO_FRPLC_OP		0
NO_STL_FRPLC		0
NO_STL_OP		0
INT_GARAG		**N**
ATT_GARAG		**N**
ATT_CARPORT		N
BASE_GARAG		N
GARAG_CPCT		0
GARAG_SQFT		0
APN2		**41-49-0407-0017**

Improvement	18838	Sample
OBJECTID		83112
PARCEL_NO		1414904070017
BLDNG_NO		1
ID_NO		0
IMPRV_CODE		**DWELL**
HEIGHT		100
CNST_CODE		4
YR_CNST		**1958**
YR_RMDLD		
EFF_CNST_YR		1958
GRD		D+2
COND_CODE		F
NHGHB_CODE		AV
IMPRV_SIZE		0
RPL_COST		**95110**
APPRSL_VAL		51300
PHYDPRC_PRCT		45
OBSDPRC_PRCT		0
PRCT_CMPLT		100
APN2		**41-49-0407-0017**

Buildings	366	Sample
OBJECTID		212
PARCEL_NO		1152600050002
BULDG_NO		1
PRIC_KEY		GCR17
NO_FLOOR		1
TLT_SQ_FT		608
TLT_BS_VAL		41380
PLMB_VAL		0
SPL_VAL		0
EXT_VAL		0
APN2		**15-26-0005-0002**

7.1.3 CHARACTERIZING THE RESIDENTIAL STRUCTURES FOR HEC-FDA

The data item of most value from the earlier studies was the field surveyed first floor elevations of the structures. Aside from the first floor elevations, the other data elements needed to construct a new structure inventory for HEC-FDA were obtained from tax assessor records (i.e., structure type, replacement value net of depreciation, structure location) and from GIS applications (river mile reference, 500-year flood zone mappings). For the new inventory, all property parcels which, wholly or partially, were within the current Federal Emergency Management Agency (FEMA) Zone X designation (500-year) flood mapping were selected for the inventory. For structure type, one of four types were used determined by the number of stories in the structure and if the structure had a basement. These characteristics were part of the assessor data file as displayed under the "Dwellings" header of *Table 6*. The residential depth damage functions as outlined in EGM 04-01, Generic Depth-Damage Relationships for Residential Structures with Basements were used in the economic analysis.

The structure depreciated replacement value was also taken from the tax assessor data as displayed under the "Improvement" header of *Table 6*. Further, in a brief phone conversation with the assessor, it was established that the "Depreciated Replacement Value" listed in the assessor's records had been generated under a contract with Marshall & Swift/Boeckh, LLC. The Lake County assessor has not yet determined who will be providing the depreciated replacement value estimates in the near future. Also, similar to the assessed values, the depreciated replacement values are not generated yearly, but set initially and thereafter adjusted via a trend line analysis relating assessed values to sales values. The depreciated replacement value is estimated via techniques common in the appraiser field. The residential structure inventory data records prepared for HEC-FDA evaluation contain the depreciated replacement values associated with the 2006 assessor's data set (i.e., dwellings). To bring the dwelling values up to current values a random sample comparison was made for roughly one percent of the records (80 records) using the assessor website. The results of this comparison are displayed in *Table 7*. As shown by the table, once the high and low outliers were removed from the sample, the ratio of 2011 to 2006 values on average for the sample was 1.0045. Given that most of the sample values were unchanged over time, and the very small change in the overall values suggested by the average price level ratio, a value of 1.0 was applied to the residential category for 2011 price level update purposes in HEC-FDA.

For structure location along the channel, GIS was used to assign location, left or right bank, and river mile. Location was assigned using dynamic segmentation based on the shortest distance in a straight line to the river. River miles were assigned using linear referencing. Parcels were then assigned a river mile by locating features along a route.

Table 7. Comparison of Residential Depreciated Replacement Values (2006-2011)

APN2	RPL COST	RPL COST ACCESSORI	Ratio	Ratio - Out Lyers Removed
16-27-0119-0023	49030.00	49030.00	1.0000	1.0000
16-27-0122-0014	54090.00	54100.00	1.0002	1.0002
16-27-0165-0026	53250.00	53250.00	1.0000	1.0000
16-27-0168-0017	77220.00	77220.00	1.0000	1.0000
16-27-0192-0010	66110.00	66120.00	1.0002	1.0002
16-27-0208-0004	72590.00	72590.00	1.0000	1.0000
16-27-0216-0020	70130.00	70130.00	1.0000	1.0000
16-27-0226-0016	60540.00	62640.00	1.0347	1.0347
16-27-0234-0025	Not Found	99770.00		
16-27-0259-0009	88110.00	94290.00	1.0701	1.0701
16-27-0261-0015	74260.00	74260.00	1.0000	1.0000
16-27-0263-0036	59610.00	59610.00	1.0000	1.0000
16-27-0276-0011	94530.00	94520.00	0.9999	0.9999
16-27-0288-0011	63490.00	63490.00	1.0000	1.0000
16-27-0303-0004	84620.00	84620.00	1.0000	1.0000
16-27-0318-0005	99020.00	99020.00	1.0000	1.0000
16-27-0334-0001	84620.00	86130.00	1.0178	1.0178
16-27-0364-0001	133460.00	133450.00	0.9999	0.9999
16-27-0665-0022	95570.00	96040.00	1.0049	1.0049
18-28-0042-0015	119210.00	119210.00	1.0000	1.0000
18-28-0049-0005	99790.00	99790.00	1.0000	1.0000
18-28-0056-0040	107580.00	107580.00	1.0000	1.0000
18-28-0058-0048	Not Found	119440.00		
18-28-0099-0017	210750.00	210750.00	1.0000	1.0000
18-28-0103-0001	204520.00	207450.00	1.0143	1.0143
18-28-0138-0006	134090.00	134090.00	1.0000	1.0000
18-28-0152-0014	89470.00	89470.00	1.0000	1.0000
18-28-0167-0031	80250.00	151400.00	1.8866	
18-28-0178-0015	99460.00	99460.00	1.0000	1.0000
18-28-0180-0068	146040.00	146040.00	1.0000	1.0000
18-28-0192-0016	126510.00	129570.00	1.0242	1.0242
18-28-0210-0009	161540.00	158160.00	0.9791	0.9791
18-28-0224-0011	140220.00	141490.00	1.0091	1.0091
18-28-0423-0040	114570.00	101750.00	0.8881	
25-42-0189-0025	Not Found	73170.00		
25-43-0291-0009	52750.00	52750.00	1.0000	1.0000
25-46-0157-0007	Not Found	47360.00		
25-46-0222-0001	Not Found	134640.00		
25-46-0463-0009	69030.00	76700.00	1.1111	1.1111
26-32-0001-0032	54950.00	54950.00	1.0000	1.0000
26-32-0047-0007	61140.00	61140.00	1.0000	1.0000
26-32-0071-0035	122840.00	122840.00	1.0000	1.0000
26-32-0082-0012	150960.00	150960.00	1.0000	1.0000
26-32-0087-0020	92690.00	95430.00	1.0296	1.0296
26-32-0100-0013	91010.00	91010.00	1.0000	1.0000
26-32-0109-0017	96500.00	96500.00	1.0000	1.0000
26-32-0119-0019	72440.00	72440.00	1.0000	1.0000
26-32-0128-0033	90470.00	92800.00	1.0258	1.0258
26-32-0131-0014	84570.00	84570.00	1.0000	1.0000
26-32-0185-0003	56640.00	56640.00	1.0000	1.0000
26-32-0193-0058	81920.00	81920.00	1.0000	1.0000
26-32-0197-0024	45020.00	45020.00	1.0000	1.0000
26-32-0200-0022	50410.00	50410.00	1.0000	1.0000
26-32-0201-0007	49030.00	49030.00	1.0000	1.0000
26-32-0205-0036	50410.00	50410.00	1.0000	1.0000
26-32-0211-0022	74450.00	74450.00	1.0000	1.0000
26-33-0007-0018	104010.00	104010.00	1.0000	1.0000
26-33-0092-0025	89630.00	89630.00	1.0000	1.0000
26-33-0095-0033	60110.00	60110.00	1.0000	1.0000
26-33-0190-0006	50050.00	50050.00	1.0000	1.0000
26-33-0219-0011	65240.00	65240.00	1.0000	1.0000
26-34-0180-0010	283260.00	281210.00	0.9928	0.9928
26-34-0333-0041	97650.00	97650.00	1.0000	1.0000
26-35-0201-0002	93640.00	93640.00	1.0000	1.0000
26-35-0332-0050	128420.00	128420.00	1.0000	1.0000
26-35-0360-0014	45360.00	45360.00	1.0000	1.0000
26-35-0364-0027	53460.00	53460.00	1.0000	1.0000
26-36-0093-0018	67710.00	67710.00	1.0000	1.0000
26-36-0099-0020	113290.00	113290.00	1.0000	1.0000
26-36-0331-0005	54350.00	54350.00	1.0000	1.0000
26-36-0377-0003	54510.00	54520.00	1.0002	1.0002
26-36-0150-0051	92080.00	92080.00	1.0000	1.0000
26-36-0177-0023	55780.00	55780.00	1.0000	1.0000
26-36-0485-0017	102600.00	103870.00	1.0124	1.0124
26-36-0186-0047	80450.00	80460.00	1.0001	1.0001
26-36-0504-0021	72760.00	72760.00	1.0000	1.0000
26-36-0508-0011	74760.00	74760.00	1.0000	1.0000
26-37-0041-0045	206990.00	207810.00	1.0040	1.0040
26-37-0162-0041	74870.00	74870.00	1.0000	1.0000
41-49-0093-0001	39250.00	39250.00	1.0000	1.0000
Average	90956.1333	92267.0000	1.0147	1.0045
StdDev	43367.4828	43100.7176	0.1042	0.0168

7.1.4 STRUCTURE FIRST FLOOR ELEVATION ASSIGNMENTS

The biggest challenges in constructing the new structure inventory were: 1) matching the address label from the previous inventory to the addresses from the assessor's parcel data in order to assign the structure first floor elevations and 2) estimating first floor elevations for those unmatched structures and for those structures which were not part of the original 25 percent inventory. The first issue was addressed by manually assigning, as comprehensively as possible, the original data records to the assessor's parcel addresses. The second issue was addressed through an analytical investigation of the relationship between the first floor elevation and ground elevation. Ground elevation was used as a surrogate to assigning first floor elevations to those structures which did not have surveyed elevations from the previous inventory. The ground elevation was determined for the centroid of each parcel using GIS interpolations of digital surface data. In 2006, surface data was surveyed for the entire state of Indiana. Digital orthophotography is comprised of 6-inch pixel resolution ground orthos for the counties of Dubois, Elkhart, Floyd, Hamilton, Kosciusko, Lake, LaPorte, Marion, Monroe, Perry, Steuben, Tippecanoe and Vanderburgh and a 1-foot pixel resolution ground ortho for the remainder of the State. The Little Calumet River study area is within Lake County.

The assignment of first floor elevations, where needed, was based upon a regression analysis which specified the difference between the ground elevation and the structure first floor elevation as the dependent variable and examined a set of explanatory variables for screening purposes. The final regression results are provided in *Table 8*. These results, also summarized below, were selected from several variations of form and variable sets as measured by the r-squared statistic. All the explanatory variables are significant at the 95% confidence level. The regression set consisted of 1,869 observations which signify the number of matched structure addresses. The matches are from either the previous structure inventory or from a 1986 survey of structures in Gary, Indiana that was performed for flood proofing formulation purposes. Where available, first floor structure elevations were transcribed from these address matches.

Table 8. Structure First Floor Elevation Regression Results

Y= difference between the structure first floor and ground elevation	Coefficient	T Stat
Intercept = set to zero;	N/A	N/A
X1 = B_NB; dummy variable structure with basement (1) or no basement (0);	2.0257	35.08
X2 = Station; river mile station of structure (16.04 – 30.87)	0.207	9.37
X3 = Gary; dummy variable in Gary (1) or not in Gary (0);	-3.245	-5.35
X4= Griffith; dummy variable in Griffith (1) or not in Griffith (0);	-2.658	-4.60
X5 = Hammond; dummy variable in Hammond (1) or not in Hammond (0);	-2.565	-6.44
X6 = Highland; dummy variable in Highland (1) or not in Highland (0);	-3.411	-7.61
X7 = Munster; dummy variable in Munster (1) or not in Munster (0);	-2.822	-7.313
R-Squared = 0.870		

Table 8. Structure First Floor Elevation Regression Results (continued)

SUMMARY OUTPUT		The First Floor Elevation above the Ground Elevation was found to be related to the structure's design in regard to having a basement, and its location along the river and within various municipal boundaries. The basement no basement characteristic has the highest T-Value, and thus explaines the most vairance. The location modifiers are believed to be adjustments necessary and associated with the ground elevation data source.
Regression Statistics		
Multiple R	0.93296545	
R Square	0.870424531	
Adjusted R Square	0.869469938	
Standard Error	1.068212146	
Observations	1869	

ANOVA — Source: Little Calumet FT_ElevationStudy.xls

	df	*SS*	*MS*	*F*	Significance F
Regression	7	14272.59802	2038.943	1786.858	0
Residual	1862	2124.685727	1.141077		
Total	1869	16397.28375			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	Upper 95%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A
B_NB	2.025746576	0.057744592	35.08115	2.1E-207	1.912495641	2.138997511
Station	0.207086756	0.022100957	9.370036	2.02E-20	0.163741502	0.25043201
Gary	-3.24500303	0.60549502	-5.35926	9.4E-08	-4.432523353	-2.057482709
Griffith	-2.65763208	0.577240212	-4.60403	4.42E-06	-3.789737982	-1.525526187
Hammond	-2.56474393	0.398401531	-6.43759	1.54E-10	-3.346104471	-1.783383396
Highland	-3.41112261	0.44774753	-7.61841	4.06E-14	-4.28926244	-2.532982788
Munster	-2.8224667	0.385939655	-7.31323	3.86E-13	-3.579386524	-2.065546876

The first floor elevation above the ground elevation was found to be related to whether or not the structure had a basement and its location along the river and within various municipal boundaries. The basement / no basement characteristic has the highest T-value, and thus explains the most variance. The location modifiers are believed to be necessary adjustments and are associated with either the ground elevation data source or perhaps the source of the field surveyed first floor elevations. In either case, the comparison of ground and surveyed elevations as shown through regression r-squared is very impressive, and permits the application of using ground elevation for estimating first floor elevations with a high degree of confidence.

Additional insight into the relationship between structures with and without basements in regard to first floor elevations is provided by simply comparing the first floor elevations of the two groups from the previous structure inventory. 4,105 total records (2,815 with basements and 1,290 without basements) were compared. The mean first floor elevation difference was 2.4 feet higher for structures with basements versus those without basements. These first floor elevation results are consistent with the results presented in the regression analysis.

7.1.5 RESIDENTIAL GARAGE STRUCTURES

The tax assessor database separated detached garages from the residential structure and separate depreciated replacement values were associated with the detached garages. In addition, attached garages were specified separately, but in a different manner. Depreciated replacement values were also available for attached garages. The value of the garages was not part of the residential structure value assignment, and the depth damage function for a garage would be different than for a residential structure. Therefore, it was decided to include attached and detached garages as

separate structure categories within the inventories. A generic depth damage curve originally developed by the Galveston District was used for this structure category. The garage structures were assigned a first floor elevation intended to be 0.25 of a foot above the ground elevation assigned to the parcel. This approach added 5,510 detached garages and 1,309 attached garages to the residential structure inventory, and makes the structure inventory both more comprehensive and more accurate.

7.2 COMMERCIAL, INDUSTRIAL, AND PUBLIC STRUCTURES (CIPS)

Analogous to the discussion of residential structures, the CIPS structures were assigned a location, value, and first floor elevation. Every effort was made to use available information from secondary sources (mainly the tax assessor records and Google maps) to best identify the nature of the business so an appropriate depth damage function could be assigned. As shown in *Table 4*, the CIPS damage category in previous studies was shown to be a relatively minor benefit category. The complete CIPS structure inventory contains 259 records.

Similar to the residential dwelling structure values, to bring the CIPS depreciated replacement values up to current values a random sample comparison was made for roughly ten percent of the records (30 records) using the assessor website. The results of this comparison are displayed in *Table 9*. As shown by the table, once the outlier is removed from the sample, the ratio of 2011 to 2006 values on average for the sample was 1.36. Given that most of the sample values were right near the 1.36 average, a value of 1.36 was applied to the CIPS category for 2011 price level update purposes in HEC-FDA.

Non-residential depth damage functions being prepared and under development by the USACE Institute for Water Resources (IWR) were made available in a draft report (Solicitation of Expert Opinion Depth-Damage Function Calculations for the Benefit Cost Analysis Tool, DRAFT, October 2008). The functions represent 21 business types. Assignments from this selection were used for roughly 80 percent of the CIPS structures in the inventory. The remaining structures could not be identified sufficiently to make a selection from the 21 business types, so a generic depth damage curve representing a moderate structure and a moderate content damage function was adopted for these structures. This generic curve was selected from a set of generic non-residential depth damage curves developed by the Chicago District for the 1999 Upper Des Plaines River Phase I Feasibility Study, which were in turn based upon an investigation and study of the Galveston District depth damage curves for 21 non-residential structure types. None of the depth damage curves mentioned above are derived from structures with basements, yet the current CIPS inventory indicates 25 of the structures have basements. Given the relatively minor level of CIPS damages and the lack of an available source to meet this basement CIPS depth damage specification, the 25 CIPS structures with basements had their first floor elevation lowered by 1 foot to reflect the additional damages to which structures with basements are subject.

Table 9. Comparison of CIPS Depreciated Replacement Values (2006-2011)

APN2	RPI_COST1 2006	RPI_COST_ACCESSOR1 2011	Ratio	Difference	Ratio
15-26-0387-0001	1,523,080.00	2,102,550.00	1.38	579,470.00	1.38
15-26-0448-0001	888,430.00	1,211,540.00	1.36	323,110.00	1.36
16-27-0009-0012	465,990.00	634,960.00	1.36	168,970.00	1.36
16-27-0192-0002	201,720.00	263,270.00	1.31	61,550.00	1.31
16-27-0193-0002	242,050.00	326,550.00	1.35	84,500.00	1.35
16-27-0399-0001	252,890.00	333,440.00	1.32	80,550.00	1.32
18-28-0041-0004	437,450.00	515,520.00	1.18	78,070.00	1.18
18-28-0168-0007	1,489,350.00	2,059,300.00	1.38	569,950.00	1.38
18-28-0448-0003	360,020.00	461,930.00	1.28	101,910.00	1.28
25-41-0294-0001	939,420.00	1,258,540.00	1.34	319,120.00	1.34
25-43-0290-0001	132,660.00	186,020.00	1.40	53,360.00	1.34
26-32-0090-0031	224,610.00	392,810.00	1.75	168,200.00	1.75
26-32-0090-0035	224,610.00	392,810.00	1.75	168,200.00	1.75
26-32-0121-0012	109,050.00	139,460.00	1.28	30,410.00	1.28
26-33-0192-0001	548,530.00	723,080.00	1.32	174,550.00	1.32
26-33-0199-0008	225,510.00	302,240.00	1.34	76,730.00	1.34
26-34-0349-0001	758,040.00	1,004,490.00	1.33	246,450.00	1.33
[illegible]	99,260.00	7,208,660.00	72.62	7,109,400.00	Outlier
26-34-0352-0012	2,052,770.00	2,766,320.00	1.35	713,550.00	1.35
26-34-0352-0021	294,950.00	395,490.00	1.34	100,540.00	1.34
26-34-0352-0028	415,430.00	566,490.00	1.36	151,060.00	1.36
26-35-0076-0001	98,690.00	120,450.00	1.22	21,760.00	1.22
26-36-0326-0031	276,410.00	365,810.00	1.32	89,400.00	1.32
26-36-0405-0035	123,270.00	167,790.00	1.36	44,520.00	1.36
26-36-0524-0001	3,738,170.00	4,962,250.00	1.33	1,224,080.00	1.33
26-37-0044-0007	84,980.00	113,990.00	1.34	29,010.00	1.34
26-37-0047-0022	5,284,360.00	7,441,670.00	1.41	2,157,310.00	1.41
26-37-0093-0018	2,544,110.00	3,435,270.00	1.35	891,160.00	1.35
26-37-0096-0002	375,620.00	512,350.00	1.36	136,730.00	1.36
41-49-0013-0033	45,680.00	55,470.00	1.21	9,790.00	1.21
			AVG=	532,113.67	
	2006	2011	Average	532,113.67	1.36
			Std Dev	1321632.578	0.12009034

7.3 APARTMENTS

Analogous to the discussion on residential structures, the apartment structures were assigned a location, value, and first floor elevation. A depth damage function for apartment structures was taken from the same IWR draft report used for the CIPS (Solicitation of Expert Opinion Depth-Damage Function Calculations for the Benefit Cost Analysis Tool, DRAFT, October 2008). As shown in *Table 4*, the apartment benefit category was never broken out in previous studies, and there is no evidence that apartments were ever included in previous structure inventories and labeled as such. The complete apartment structure inventory analyzed for this evaluation contains 69 records. The assessor's records indicate 45 of these structures have a basement. Given the minor amount of apartment damages that were expected and the lack of an available source to meet this basement apartment specification, the apartment structures with basements had their first floor elevation lowered by 1 foot to reflect the additional damages to which structures with basements are subject. Given the uncertainty in elevations for this category and the minor level of damages computed using HEC-FDA, flood damages for this category were not included in the benefit calculations as demonstrated in *Table 4*. In hindsight, the apartment structures should have been lumped with the residential damage category, given their minor level of damages calculated.

7.4 AFFLUENCE

Benefits attributed to "Affluence," the increase in content damage estimates based upon the projected increase in real personal property value over time, which in turn is based upon projected increases in real personal income over time, has been discarded for this evaluation. In the past, the Bureau of Economic Analysis, Department of Commerce projected real income changes in a report known as OBERS. This report is no longer being prepared. The last report was published in 1985, so this benefit category is no longer affirmable.

7.5 PASSENGER VEHICLES

The evaluation of flood damage to vehicles was limited to passenger vehicles as referenced in USACE guidance "Economic Guidance Memorandum, 09-04, Generic Depth-Damage Relationships for Vehicles" 22 June 2009. The method used to apply the guidance was based on capturing all the variables which influence the auto inventory for the study area and reflect them in the value applied to a generic auto. One vehicle was assigned per household and was assigned the same homogenized value. The vehicle value is derived in such a way as to capture the influences of vehicle mix, vehicle values, vehicles per household, and vehicle evacuations. This is known as an homogenized application, and permits a great deal of flexibility in easily accommodating any changes to these influences. As shown in *Table 1*, the summary profile of the study area, nearly all of the households own at least one vehicle and roughly half of the households own two or more vehicles.

Table 10 documents the homogenized application adopted for the vehicle damage category evaluations. The upper left of the table displays the distribution of vehicles received from the State of Indiana Bureau of Motor Vehicles, based on registered vehicles in Lake County, Indiana. The distribution was reduced down to the five types specified by EGM 09-04. (Note

that the distribution percentages constructed here for Lake County, Indiana (#/) varies little from that used in the EGM (/#): Pickup Truck (17/21); Sedan (65/62); Sports Car (7/6); Sports Utility Vehicle (5/5); Mini Van (6/6)). Based upon this vehicle type distribution, a homogenized depth damage function was computed which weighted the five separate depth damage functions by the vehicle type percentage. The results are shown in *Table 10*. The vehicle values were similarly homogenized, weighted by the vehicle type percentage. Vehicle values were determined for each type of vehicle at three different value levels: Salvage (assumed to be $2,000), Used (calculated using a known price of all used car sales, and New (determined from pricing at Edmunds.com). A triangular probability distribution of the three values levels was specified in the vehicle depth damage function. The computed vehicles per household for Lake County 2010 value was used to arrive at the number of vehicles associated with the study area. The vehicle per household value is 1.64 based upon Lake County 2010 passenger vehicle registration level of 304,381, and a Lake County 2010 number of households value, estimated from the 2000 level. The 2000 level, based upon a Lake County population growth factor of 1.024 (2000-2010), is 185,915 households. The warning time variable used is the without project warning time of 6 hours or less, which is associated with a vehicle removal rate of 50.5 percent. A total of 7,885 vehicles are part of the structure inventory, one for each single family residential dwelling (apartments were not included in this assignment). The derived homogenized vehicle value based upon the parameter values and methods described above is $7,960 per vehicle. The vehicle inventory population was assigned a single value of $10,000 per vehicle when the inventory records were created. To adjust for the derived target price level of $7,960 a categorical price index value of 0.796 is applied to the vehicle category in HEC-FDA.

The homogenized vehicle value, which captures key parameter values used in the evaluation, was determined by first setting a placeholder value of $10,000 assigned to each vehicle and each residential structure in the HEC-FDA inventory. A target vehicle value was then determined taking into account the actual mean value (the weighted used value in this case, $9,775); the vehicles per household (1.64); and the impact of removing vehicles based upon warning time (49.5 percent). Through simple multiplication of these values, the target value for the homogenized autos in the structure inventory yields $7,960. The vehicle values in the inventory is then simply adjusted by the price level adjustment factor of 0.796 (target value/place holder value = $7,960/$10,000) using the HEC-FDA category-wide price level adjustment feature. It should be noted that this price level adjustment is also applied to the values in the depth damage function used to form the uncertainty distribution. Should changes be required to account for different conditions such as warning time, price levels, or vehicles per households, a new target value can be easily re-computed and a new price level adjustment applied without needing to adjust the structure inventory records. Consistent with the elevations used in the garage damage category, the vehicles were assigned a first floor elevation .25 ft. above the ground elevation of the property parcel.

Table 10. Passenger Vehicle Damage Evaluation Data

VEHICLES BY CATEGORY

Vehicle Category	Frequency	Adjusted Percent of Total	Percent of Total	Lake County Adjusted Percent of Total	Lake County Total	Lake County Vehicle Count
Boat	14		2			
Motor Home	7		1			
Motorcycle	23		4			
Pickup Truck	125	21	20	17	17%	60925
Sedan	369	62	57	65	65%	238934
Sports Car	37	6	6	7	7%	23958
Sports Utility						
Vehicle	31	5	5	5	5%	20075
Mini Van	34	6	5	6	6%	22016
Total	640		100			
	596	100		100	100%	365906

Vehicle Values			
			Weighted
	Salvage	Salvage	Used
1 Sedan	2000		8892.3098
2 Sports	2000		15175.027
3 SUV	2000		12224.717
4 Mini-Van	2000		10463.536
5 Pickup	2000		10024.41
	2000		
Homogenized Value	2000	$2,000	11376
Vehicles per Household			
1.651		$1,629	
Flood Warning Adjustment			
0.495			
Vehicle Price Index	$10,000	Base Index	

HOMONOXIZED
PERCENT DAMAGE TO VEHICLES
Sedans Pickups SUVs Sports Mini Vans

Depth Above Ground	Homogenized Percent Damage	Homogenized Standard Deviation
0.5	5.922	4.5424
1	25.453	3.65
2	43.402	2.9528
3	59.257	2.4948
4	73.018	2.2695
5	84.685	2.6789
6	93.876	3.4933
7	97.813	3.6912
8	99.55	3.7951
9	100	3.8932
10	100	3.8932

PERCENT DAMAGE TO VEHICLES
Sedans Pickups SUVs Sports Mini Vans

Depth Above Ground	Sedans Percent Damage	Sedans Standard Deviation	Pickups Percent Damage	Pickups Standard Deviation	SUVs Percent Damage	SUVs Standard Deviation	Sports Percent Damage	Sports Standard Deviation	Mini Vans Percent Damage	Mini Vans Standard Deviation
0.5	7.6	2.42	5.2	3.02	0	11.28	1.4	19.22	0	9.11
1	28	1.84	20.3	2.53	13.8	8.76	29.2	16.81	17.8	6.82
2	46.2	1.51	34.4	2.33	30.6	6.67	52.8	13.17	38.3	5.33
3	62.2	1.45	47.3	2.38	45.8	5.24	72.2	8.47	56.8	4.88
4	76	1.57	59.6	2.57	59.4	4.78	87.4	3.61	73.3	5.34
5	87.6	1.74	70.7	2.81	71.4	5.36	98.4	6.12	87.8	6.23
6	97	1.92	80.8	3.01	81.8	6.61	100	13.8	100	7.2
7	100	2.06	89.9	3.21	90.6	8.17	100	13.8	100	7.2
8	100	2.06	98	3.32	97.8	9.88	100	13.8	100	7.2
9	100	2.06	100	3.36	100	11.7	100	13.8	100	7.2
10	100	2.06	100	3.36	100	11.7	100	13.8	100	7.2

PERCENTAGE OF RESPONDENTS MOVING AT LEAST ONE VEHICLE TO HIGHER GROUND

Warning of 6 Hours or Less		Warning of Greater than 6 and up to 12		Warning Greater than 12 Hours	
Respondents Moving Vehicles to Higher Ground	Respondents Who Did Not Move Vehicles Respondents Moving Vehicles to Higher Ground	Respondents Moving Vehicles to Higher Ground	Respondents Who Did Not Move Vehicles Respondents Moving Vehicles to Higher Ground	Respondents Moving Vehicles to Higher Ground	Respondents Who Did Not Move Vehicles Respondents Moving Vehicles to Higher Ground
50.5	49.5	80.6	19.4	88.1	11.9

7.6 EMERGENCY COSTS

The original evaluation of emergency costs was much improved by the 1994 LRR which utilized FEMA records concerning a 1990 flood event. The flood affected a small but dense residential portion of the study area known as the Wicker Park neighborhood in the community of Highland. The Wicker Park flooding incident was related to a temporary situation at a nearby construction site which allowed for the high river flows to flood the neighborhood. Flood disaster declaration #885, 28-29 November, 1990 resulted in FEMA assistance to 262 eligible Wicker Park applicants under the housing assistance program for a total of $1.56M broken down by rental assistance (62%), structure repair (32%), emergency shelter (5%), and furniture rental (1%). Assistance under the FEMA individual and family grant program totaled $1.36M for replacing personal property (e.g. washers, dryers, stoves, clothing, etc.). The total for both programs is $2.93M. Gary, Highland, and the State of Indiana were the major recipients under FEMA's public assistance program, receiving a total of $1.5M with the largest reimbursements attributed to public utilities (38%), protective measures (36%), and debris clearance (21%). The "eligible" assistance categories listed above amount to $4.4M in 1990 dollars.

Similarly, this LRR benefits from actual FEMA disaster records from the more recent disaster event beginning on September 12, 2008, flood disaster declaration #1795. The latest flood event affected a much greater portion of the study area then the 1990 flooding incident. *Attachment A – FEMA-1795-DR Preliminary Damage Assessment* contains the "Summary of Damage Assessment Information Used in Determining Whether to Declare a Major Disaster" declared September 23, 2008. This report indicates that over 1,000 residences were impacted; categorized as either destroyed (24), with major damage (558), with minor damage (411) and affected (369). *Table 11* and *Figure 5* display the disposition of $26M in individual "housing assistance" recorded for the disaster from FEMA. In addition, $5.3M in "other needs assistance" under the FEMA individual assistance program was also provided. FEMA's public assistance programs provided $8.9M for debris removal, emergency protective measures, roads and bridges, water control facilities, buildings and equipment, public utilities, parks-recreational facilities-and other items. The "eligible" assistance categories listed above amount to $40.2M in 2008 dollars.

The 2008 declared flood event was estimated to have nearly a 0.2% annual exceedance probability (AEP) (500-year) for many portions of the project area. As reported through the District's Annual Flood Damages Prevented for FY2008, features of the project that were completed at the time of the event prevented an estimated $881M in flood damages.

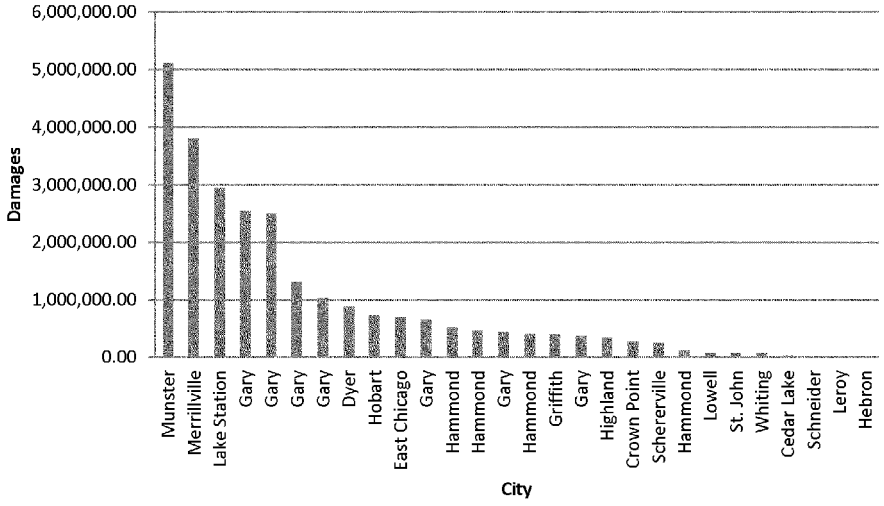
Table 11. 2008 FEMA-1795-DR Assistance by Zip Code

Damages	Zip Code	City
$5,115,642.59	46321	Munster
$3,805,266.72	46410	Merrillville
$2,951,338.80	46405	Lake Station
$2,545,926.76	46409	Gary
$2,497,443.65	46408	Gary
$1,307,058.29	46407	Gary
$1,027,042.26	46404	Gary
$888,761.43	46311	Dyer
$728,781.01	46342	Hobart
$699,375.58	46312	East Chicago
$649,563.80	46406	Gary
$515,288.55	46324	Hammond
$471,392.32	46320	Hammond
$443,260.42	46402	Gary
$411,816.37	46323	Hammond
$390,223.58	46319	Griffith
$379,662.01	46403	Gary
$339,665.32	46322	Highland
$271,275.89	46307	Crown Point
$244,728.02	46375	Schererville
$116,935.86	46327	Hammond
$73,041.94	46356	Lowell
$70,705.17	46373	St. John
$69,659.24	46394	Whiting
$31,489.53	46303	Cedar Lake
$6,832.70	46376	Schneider
$1,928.00	46355	Leroy
$441.17	46341	Hebron
$26,054,546.98		

FEMA explains the intent of "Disaster Assistance" on their web site:

> "Disaster assistance is money or direct assistance to individuals, families and businesses in an area whose property has been damaged or destroyed and whose losses are not covered by insurance. It is meant to help you with critical expenses that cannot be covered in other ways. This assistance is not intended to restore your damaged property to its condition before the disaster. While some housing assistance funds are available through our Individuals and Households Program, most disaster assistance from the Federal government is in the form of loans administered by the Small Business Administration."
> http://www.dema.gov/assistance/process/individual_assistance.shtm

Figure 5. 2008 FEMA-1795-DR Assistance by City



Based upon this latest FEMA disaster record, emergency damages of $35M were asserted as the 1% annual exceedance probability (AEP) (100-year) flood damage level midpoint for the study area under without project conditions. The $35M was apportioned to each reach based upon the level of residential damages computed for each reach from preliminary HEC-FDA damage processing results. For each reach, a distinct "direct damage" function for emergency costs was constructed built upon the 1% AEP (100-year) damage ascription. The direct damage function was constructed such that emergency costs were specified to begin at the 10% AEP (10-year) flood depth at 1% of the 1% AEP (100-year) damage for that reach; and proceed along to the 2% AEP (50-year) flood depth with 10% of the 1% AEP (100-year) damage for that reach; and proceed along to the 1% AEP (100-year) flood depth at 100% of the 1% AEP (100-year) damage for that reach; and extend to a hypothetical depth of flooding for the 0.5% AEP (200-year) at 10 times the 1% AEP (100-year) damage for that reach. Upper and lower uncertainty bounds were set to the next lower and next higher damage levels. The first floor stage per reach was set at 10% ft below the 10% AEP (10-year) flood stage. The direct damage river index was set at the reach index point river mile. *Table 12* displays the worksheet environment for implementing the depth damage emergency cost curves by damage reach.

This damage category was calibrated by using the categorical price index value such that the 10% AEP (100-year) gross emergency damage results estimate the $35M target level established from the FEMA assistance disaster relief records. It should be kept in mind that these emergency cost benefits are less than 2 percent of the total benefits estimated for the project.

Table 12. Emergency Cost Depth Damage Function Worksheet

Struc_Name	Cat_Name	Stream_Name	Occ_Name	Station	Bank	1F_Stage
EMERGRCH2A	EMERGENCY	LCR	EMERGRCH2A	16.044	Left	595.96
EMERGRCH1A	EMERGENCY	LCR	EMERGRCH1A	16.043	Right	595.96
EMERGRCH1B	EMERGENCY	LCR	EMERGRCH1B	18.101	Right	596.77
EMERGRCH2B	EMERGENCY	LCR	EMERGRCH2B	18.102	Left	596.77
EMERGRCH3	EMERGENCY	LCR	EMERGRCH3	19.239	Right	597.59
EMERGRCH4	EMERGENCY	LCR	EMERGRCH4	19.91	Left	596.81
EMERGRCH5A	EMERGENCY	LCR	EMERGRCH5A	21.999	Right	596.47
EMERGRCH5B	EMERGENCY	LCR	EMERGRCH5B	22.668	Right	596.26
EMERGRCH6A	EMERGENCY	LCR	EMERGRCH6A	23.855	Left	595.23
EMERGRCH7	EMERGENCY	LCR	EMERGRCH7	27.035	Right	593.85
EMERGRCH6B	EMERGENCY	LCR	EMERGRCH6B	29.032	Left	592.77
EMERGRCH6C	EMERGENCY	LCR	EMERGRCH6C	29.706	Left	592.76
EMERGRCH2bi	EMERGENCY	LCR	EMERGRCH2bi	19.072	Left	597.4
EMERGRCH6ai	EMERGENCY	LCR	EMERGRCH6ai	24.363	Left	595.18
EMERGRCH7i	EMERGENCY	LCR	EMERGRCH7i	27.643	Right	593.66

		EMERGENCY EXPECTED ANNUAL DAMAGE GOAL SYSTYEM WIDE				
			$35,000,000 100-YEAR EVENT			35000
TRAFFIC EXPECTED ANNUAL DAMAGE GOALS SYSTEM WIDE:						
Target Distribution by Reach Distance:						
Expected Annual Damage 1987:					38.3	
Expected Annual Damage 2011:					72.880384	
CPI - ChicagoGaryKenosha - General					1987	114.5
CPI - ChicagoGaryKenosha - General					2011	217.88
Expected Annul Damage Initial HEC-FDA generic:				EAD - Prelin	0	0.583333333
	EMERGRCH2A	16.044		1074	16.043	16.808
	EMERGRCH1A	16.043		372	16.043	16.808
	EMERGRCH1B	18.101		5236	16.816	19.238
	EMERGRCH2B	18.102		2764	16.816	19.238
	EMERGRCH3	19.239		42666	19.239	21.9856
	EMERGRCH4	19.91		15101	19.239	21.9856
	EMERGRCH5A	21.999		26	21.999	22.667
	EMERGRCH5B	22.668		1	22.668	23.234
	EMERGRCH6A	23.855		174	21.99	29.032
	EMERGRCH7	27.035		143	23.235	30.195
	EMERGRCH6B	29.032		23	29.032	29.706
	EMERGRCH6C	29.706		16	29.706	30.195
				67596		
					100 Year Emergency Damage	
	Stage	0	1.75	2.11	3.22	6.44
	$	0	50	300	5000	50000
	STI.	0	0.5	100	500	1000
	STU	0	300	5000	50000	99999
	Struct	N		0.5		

ResDamageAmt	ReachPercent	ReachPer/Average	TEmergencyCostDistributionWtbyReachLength ($)			
0.765	0.015888514	0.190662169	6	33	556	5561
0.765	0.005503284	0.066039411	2	12	193	1926
2.422	0.077160205	0.925522457	27	163	2711	27111
2.422	0.040889993	0.490679922	14	86	1431	14311
2.7466	0.631191195	7.574294337	221	1326	22092	220917
2.7466	0.223400793	2.680809515	78	469	7819	78190
0.668	0.000384638	0.004615658	0	1	13	135
0.566	1.47938E-05	0.000177525	0	0	1	5
7.042	0.002574117	0.030889402	1	5	90	901
6.96	0.00211551	0.025386118	1	4	74	740
0.674	0.000340257	0.004083082	0	1	12	119
0.489	0.0002367	0.002840405	0	0	8	83
28.2662	1	12	350	2100	35000	350000
	0.083333333				35000	

7.7 UTILITY DAMAGES

The "Utilities" damage category which was valued at $400 annual damage in the Phase I and Phase II GDM, and $52k annual damage in the 1994 LRR (based on FEMA public assistance for this category) has been rolled into the Emergency Cost damage category for this evaluation and not treated separately.

7.8 FLOOD-INDUCED TRANSPORTATION DELAYS

Table 4 indicates that there are three components to the transportation benefit category. This LRR only addresses the "inundation delay" component. The other two components, "roadway repair costs," and "roadway repair delays," have been discarded from this reevaluation since the level of transportation damages attributable to these categories could not be reconfirmed to a degree warranting inclusion in this LRR.

The topic of road damage from flooding is under continued research at USACE-IWR, and may be included in future analyses, but at this point only damages to roadway users through detours and delays caused by flood-induced road closures are considered in this LRR. Clean up costs from floods are captured by the emergency cost damage category.

Traffic delays due to road inundation are substantial and well documented in this study area. Local roads (Grant, 35th, Chase, Columbia, and Northcote) have experienced significant flooding, but the entire Chicago metropolitan region is affected when Interstate Highway 80/94 (Borman Expressway) floods. Flooding closed this expressway for 5 days in 2008 and portions were also closed for several days in 2009. On and off ramps within the study area can flood without the expressway itself actually flooding, which cause significant traffic detours for local residents required to incur additional mileage and time delays.

> The Frank Borman Expressway in northern Lake County is the most heavily traveled Interstate highway in the region and is one of the most heavily used truck routes in the United States.... Between 33% and 40% of the vehicles on the Borman Expressway are trucks and, in particular, five axle single trailer units (semi trailers) hauling freight within the region. The extremely high proportion of interstate semi traffic on the Borman Expressway is indicative of the importance of this link in the national highway system.
> *– NIRPC "Connections 2030 Compliance Amendment" Part I Background, p.I-38*

For this LRR, traffic projections on the Borman Expressway were judged to be the element most important for reevaluating flood-induced transportation damages. The Northern Indiana Regional Planning Commission (NIRPC) provided projections for traffic volumes on the Borman Expressway from 2010 to 2040 in ten year increments. This summary data is provided in *Attachment B - Transportation Inundation Delays*. The projections indicate that no significant increases in traffic levels are being projected for the Borman Expressway over the next 30 years. At the East and West Borman Expressway study area limits, the Stateline and Interstate 65, the 2010 and 2040 total average daily traffic levels are: Stateline (245,745/247,977) and Interstate

65 (211,155/211,943). No adjustment to inundation delay estimates were warranted based on these traffic projections.

Traffic inundation delay estimates were incorporated into HEC-FDA using direct damage functions in a similar fashion as the emergency cost damage estimates. Direct damage functions are intended for use with damage categories for which damages are ascribed outside the HEC-FDA framework. In the case of inundation delays, the damage levels were generated externally using several transportation simulation models leading to the results presented in the 1989 Phase II GDM. The inundation delay impacts are throughout the road system and emanate beyond the study area defined by flooding. The annualized inundation delay damage estimates generated for the Phase II GDM were adjusted for price level to 2011 price levels using the Chicago-Gary-Kenosha Bureau of Labor Statistics (BLS) "private transportation" Consumer Price Index (CPI) line item (2011/1987). For this LRR the target estimate for inundation delay annual damages, 2011price level (PL), is $569.7k x 1.90 or $1,083.5k.

Based upon this update, an annualized inundation delay damage of $1,083.5k was asserted for the study area under without project conditions. The damage was apportioned to each reach in proportion to the length of the reach. For each reach a distinct "direct damage" function was constructed built upon the annualized damage ascription.

The direct damage function was constructed such that emergency costs were specified to begin at the 10% AEP (10-year) flood depth at 1% of the 1% AEP (100-year) damage for that reach, proceed along to the 2% AEP (50-year) flood depth with 5% of the 1% AEP damage for that reach, proceed along to the 1% AEP (100-year) flood depth at 100% of the 1% AEP (100-year) damage for that reach, and extend to a hypothetical depth of flooding for the 0.5% AEP (200-year) at 5 times the 1% AEP (100-year) damage for that reach. Upper and lower uncertainty bounds were set to the next lower and next higher damage levels. The first floor stage per reach was set at 0.1 ft below the 10% AEP (10-year) flood stage. The direct damage river index was set at the reach index point river mile. *Table 13* displays the worksheet environment for implementing the depth damage inundation delay cost curves by damage reach.

This damage category was calibrated by using the categorical price index value such that the expected annual damage for the study area approximated the $1,084k target level established using the price updated Phase II GDM results. It should be kept in mind that these inundation delay benefits are less than 2 percent of the total benefits estimated for the project. Another consideration of the project impact on this category is that the project design contains 22 road closures structures on the local roadways, which have not been captured in this analysis. These project design feature are currently considered to have the same "delay" impact in the with and without project conditions, therefore only flooding to the Borman expressway was considered. The proportion of total inundation delay damages attributed to the local road flooding is roughly 15 percent, leaving 85 percent of the damage reduction nominally assessed for this category as a project benefit.

Table 13. Flood Induced Transportation Delays Depth Damage Function Worksheet

Stream_Na	Occ_Name	Station	Bank	1F_Stage		
LCR	TRAFFICRCII2A	16.044	Left	595.96		
LCR	TRAFFICRCH1A	16.043	Right	595.96		
LCR	TRAFFICRCII1B	18.101	Right	596.77		
LCR	TRAFFICRCH2B	18.102	Left	596.77		
LCR	TRAFFICRCH3	19.239	Right	597.59		
LCR	TRAFFICRCH4	19.91	Left	596.81		
LCR	TRAFFICRCH5A	21.999	Right	596.47		
LCR	TRAFFICRCII5B	22.668	Right	596.26		
LCR	TRAFFICRCH6A	23.855	Left	595.23		
LCR	TRAFFICRCII7	27.035	Right	593.85		
LCR	TRAFFICRCH6B	29.032	Left	592.77		
LCR	TRAFFICRCII6C	29.706	Left	592.76		
LCR	TRAFFICRCH2bi	19.072	Left	597.4		
LCR	TRAFFICRCII6ai	24.363	Left	595.18		
LCR	TRAFFICRCH7i	27.643	Right	593.66		

TRAFFIC EXPECTED ANNUAL DAMAGE GOALS SYSTEM WIDE:						
Target Distribution by Reach Distance:				Final PL Adj.		1.171392616
Expected Annual Damage 1987:					569.7	
Expected Annual Damage 2011:					1083.491314	
CPI - ChicagoGaryKenosha - Private transportation					1987	103.6
CPI - ChicagoGaryKenosha - Private transportation					2010	197.033
Expected Annul Damage Initial HEC-FDA generic:					422.06	2.567149964
	TRAFFICRCH2A	16.044			16.043	16.808
	TRAFFICRCH1A	16.043			16.043	16.808
	TRAFFICRCH1B	18.101			16.816	19.238
	TRAFFICRCII2B	18.102			16.816	19.238
	TRAFFICRCH3	19.239			19.239	21.9856
	TRAFFICRCH4	19.91			19.239	21.9856
	TRAFFICRCH5A	21.999			21.999	22.667
	TRAFFICRCII5B	22.668			22.668	23.234
	TRAFFICRCH6A	23.855			21.99	29.032
	TRAFFICRCH7	27.035			23.235	30.195
	TRAFFICRCH6B	29.032			29.032	29.706
	TRAFFICRCH6C	29.706			29.706	30.195

	Stage	0	1.75	2.11	3.22	6.44
	$	0	100	500	1000	5000
	STL	0	0.5	100	500	1000
	STU	0	500	1000	5000	9999
	Struct	N		0.5		

ReachLeng	ReachPercent	RchPer/Avera	TrafficDelayDistributionWtbyReachLength ($$)			
0.765	0.027064126	0.32476951	83	417	834	4169
0.765	0.027064126	0.32476951	83	417	834	4169
2.422	0.085685377	1.02822452	264	1320	2640	13198
2.422	0.085685377	1.02822452	264	1320	2640	13198
2.7466	0.097169057	1.16602868	299	1497	2993	14967
2.7466	0.097169057	1.16602868	299	1497	2993	14967
0.668	0.023632466	0.28358959	73	364	728	3640
0.566	0.020023915	0.24028699	62	308	617	3084
7.042	0.249131472	2.98957766	767	3837	7675	38373
6.96	0.24623048	2.95476576	759	3793	7585	37927
0.674	0.023844733	0.2861368	73	367	735	3673
0.489	0.017299814	0.20759777	53	266	533	2665
28.2662	1.0000					

7.9 GOLF COURSE DAMAGES

In the earlier economic evaluations, four golf courses were subject to inundation damages (percent of total) – Wicker (20%), Woodmar (36%), Gleason (18%), Griffith (25%). The damage estimates were based upon the physical repairs to the golf course landscaping, fairways, and clean up expenses. Since the last update in 1994, two of the four golf courses are no longer in business. Woodmar Golf Course was filled by approximately 6-feet, adding about $1M to construction cost, and converted to a new Cabela's commercial retail development. The Griffith Golf Course is out of business. The Gleason and Wicker golf courses remain active and will be protected by the project.

For this LRR the annualized damages to golf courses have been reduced by roughly 60 percent to account for the loss of two courses. Price levels are updated to 2011 using the general CPI index for Chicago-Gary-Kenosha using a factor of (2011/1987) = (217.88/114.5) = 1.90. The current updated golf course damage estimate then becomes $132k annual, 1987 price level, and $251.4k, 2011 price level ($330.3 x 0.4 x 1.90). The CIPS structure inventory included damages to golf course buildings and facilities as these structures were contained in the assessor's records. Due to the relative meager level of damages, and the fact that the golf course facilities are part of the CIPS inventory, this benefit category is not otherwise part of the HEC-FDA processing, but is instead treated outside the HEC-FDA framework.

7.10 AGRICULTURAL DAMAGES

Due to the negligible amount of agricultural activity and resulting damages in this benefit category, the agricultural damage category has been excluded for this LRR update and treated as if it were zero.

7.11 RECREATION

The recreation benefit category is treated outside the HEC-FDA framework and was derived using a simple price level adjustment based upon the user day value (UDV) guidance promulgated by HQUSACE. The index for a 60 point UDV (2011/1987) = (8.29/4.10) = 2.02. The Phase II GDM annual benefit estimate of $262k adjust to $530k expected annual benefits in 2011 price levels.

7.12 RESEARCH PARK

This benefit category has been excluded for this LRR since the major premise of a research park planned for the Northwest Indiana University cannot be confirmed. The benefits were originally based upon marginal flood damage reduction benefits projected to a development that was planned, but had not yet been built. Given the current economic climate and the lack of confirming current intentions for the land in question, this benefit category was excluded and treated as if it were zero. It should be kept in mind that this research park benefit category was less than 0.5 percent of the total benefits estimated for the project.

7.13 BENEFIT CATEGORY REEVALUATED – LAND ENHANCEMENT

This benefit remains convincing, although the land values used in the 1989 Phase II GDM appear to be robust in light of the current weakness in the property markets. Commercial and residential land values could not be generalized to be different than those broadly reported and used in the Phase II GDM. An effort to adjust for land pricing could not demonstrate the values reported in the previous report should be altered. This benefit category will be carried along for this LRR as is, without any change to the pricing values reported in 1987.

7.14 NED EMPLOYMENT BENEFITS

As reported in the 1994 LRR, Lake County, Indiana no longer qualifies for the NED employment benefit category, therefore is has been excluded for this LRR update and treated as if it were zero.

7.15 FEMA INSURANCE ADMINISTRATIVE COST SAVINGS

Table 14 reflects the current number of flood insurance policies for all Lake County communities participating in the program. The project area communities benefiting from the project with their corresponding A-Zone policy numbers are: Hammond (2,119), Highland (1,091), Munster (744), Griffith (294), Gary (61); Total (4,309). Griffith has several watercourses which flood, especially the Cady Marsh Ditch and very slight exposure to the Little Calumet flooding areas, therefore the total policy numbers associated with Little Calumet River were scaled down by 15 percent to 3,382. In considering how many policies will no longer be needed as a result of this project, consideration was given to the fact that property owners may still have requirements imposed by their lenders to carry coverage, but most likely at a lower rate, however this is not a subject that one can make general statement about. A property's specific location and mortgage terms are important factors. In recognition of this likelihood, only the Griffith adjusted total A-zone policies will be projected to no longer be required, and the 10 percent of policies outside the A-Zone will not be made part of the FEMA administration cost savings estimate.

The benefit computations use the latest USACE-issued level of administration cost savings per policy from 2006, $192/policy. The numbers of flood insurance policies projected to be no longer required is 3,382. The annual NED savings in this benefit category at $192/policy is $649.3k.

Table 14. FEMA NFIP Insurance Report, Lake County, Indiana

Federal Emergency Management Agency
NFIP Insurance Report
INDIANA

CID	Community Name	Total Premium	V-Zone	A-Zone	No. Policies	Total Coverage	Total Claims Since 1978	Total Paid Since 1978
	[LAKE COUNTY]							
180127	CEDAR LAKE, TOWN OF	$17,150	0	9	25	$4,169,900	4	$748
180128	CROWN POINT, CITY OF	$56,436	0	36	63	$13,124,900	38	$219,579
180129	DYER, TOWN OF	$102,949	0	49	152	$35,940,100	141	$1,796,978
180130	EAST CHICAGO, CITY OF	$8,093	0	2	6	$1,780,100	2	$71,680
180132	GARY, CITY OF	$166,650	0	61	148	$30,642,200	89	$788,360
185175	GRIFFITH, TOWN OF	$366,750	0	294	325	$51,892,400	274	$2,581,712
180134	HAMMOND, CITY OF	$2,121,502	0	2,119	2,209	$257,302,300	465	$1,430,705
185176	HIGHLAND, TOWN OF	$1,208,985	0	1,091	1,181	$156,387,100	802	$9,282,055
180136	HOBART, CITY OF	$37,444	0	23	55	$12,529,200	14	$155,181
180126	LAKE COUNTY *	$248,409	0	258	331	$45,643,400	117	$667,564
180131	LAKE STATION, CITY OF	$72,180	0	49	84	$7,918,100	109	$4,146,732
180137	LOWELL, TOWN OF	$26,028	0	20	28	$4,401,200	7	$66,773
180138	MERRILLVILLE, TOWN OF	$78,555	0	35	110	$22,490,100	126	$884,817
180139	MUNSTER, TOWN OF	$1,064,114	0	744	915	$148,273,600	572	$24,562,301
180140	NEW CHICAGO, TOWN OF	$333	0	0	1	$210,000	0	$0
180142	SCHERERVILLE, TOWN OF	$114,246	0	107	191	$44,615,000	35	$916,851
180143	SCHNEIDER, TOWN OF	$46,256	0	53	55	$5,570,600	13	$40,427
180141	ST. JOHN, TOWN OF	$20,804	0	12	22	$5,241,800	2	$2,923
180313	WHITING, CITY OF	$38,553	0	35	36	$4,916,200	7	$7,517
	County Total :	$5,795,437	0	4,997	5,937	$853,048,200	2,817	$47,622,903

8.0 FLOOD DAMAGE ESTIMATES USING HEC-FDA

The summary damage estimates for the four conditions evaluated using HEC-FDA, as described previously, are displayed in *Table 15*. The aggregate Expected Annual Damages (EAD) for each condition is summarized as:

$70,470,000	Without Project Condition
$62,820,000	Without Project with Thornton Reservoir
$ 928,000	With Project Overbank Damage Residual
$ 192,000	With Project Interior Drainage Damage

Table 15. HEC-FDA Flood Damage Analysis Results

Little Calumet River LRR 2011
Expected Annual Damage by Damage Categories and Damage Reaches
for the Without (Without project condition) Plan and Analysis Year 2010
(Damage in $1,000's)
Plan was calculated with Uncertainty

Stream Name	Stream Description	Damage Reach Name	Damage Reach Description	Damage Categories: APT	CIPS	EMERGENCY	RESIDENTIAL	TRAFFIC	VEHICLE	Total
LCR	Little Calumet River Indiana	Reach 1a	IL/IN Stateline to L&NRR Munster West South	7.05	1.81	46.25	961.90	47.97	8.47	1076.44
		Reach 1b	L&NRR to Hart Ditch Munster East South	1.60	7.20	21.03	263.73	45.81	2.33	361.70
		Reach 2a	IL/IN Stateline to L&NRR Hammond West North	0.00	654.99	219.53	3606.02	177.16	26.79	4684.49
		Reach 2b	L&NRR to Hart Ditch Hammond East North	0.53	261.62	135.90	2169.84	176.79	42.47	2787.15
		Reach 3	Hart Ditch to Cline Ave Highland South	0.00	437.75	1865.69	40902.83	231.75	1885.58	45323.63
		Reach 4	Hart Ditch to Cline Ave Hammond East North	2.79	851.66	0.00	13215.59	216.24	517.46	14803.67
		Reach 5a	Cline Ave to E&ERR Griffith Gap South	0.00	82.36	1.48	21.81	43.26	0.26	149.18
		Reach 5b	E&ERR to Colfax Ave Griffith Betterment South	0.24	0.42	0.09	0.10	38.49	0.00	39.35
		Reach 6a	Cline Ave to ConRR Gary North	0.00	12.00	8.44	166.11	377.30	3.03	568.88
		Reach 6b	ConRR to Marshalltown Gap Gary North	0.65	44.15	5.70	76.14	266.32	2.05	395.01
		Reach 6c	Marshalltown to I-65 Marshalltown Gary North	0.57	0.13	3.30	21.30	56.53	0.82	82.66
		Reach 7	Colfax Ave to I-65 Gary South	0.00	181.23	0.00	15.28	0.00	1.28	197.82
	Total for stream: LCR			13.34	2535.39	2307.41	61415.65	1677.63	2490.55	70469.97

for the Without Thornton Res (without project with Thornton Reservoir) Plan and Analysis Year 2010
(Damage in $1,000's)

Stream Name	Stream Description	Damage Reach Name	Damage Reach Description	Damage Categories: APT	CIPS	EMERGENCY	RESIDENTIAL	TRAFFIC	VEHICLE	Total
LCR	Little Calumet River Indiana	Reach 1a	IL/IN Stateline to L&NRR Munster West South	1.14	0.43	6.92	281.38	7.47	1.50	298.85
		Reach 1b	L&NRR to Hart Ditch Munster East South	0.33	1.18	3.46	52.58	7.31	0.44	65.29
		Reach 2a	IL/IN Stateline to L&NRR Hammond West North	0.00	364.46	60.64	2086.79	53.91	8.94	2574.64
		Reach 2b	L&NRR to Hart Ditch Hammond East North	0.11	170.94	37.44	1126.77	53.82	16.05	1407.13
		Reach 3	Hart Ditch to Cline Ave Highland South	0.00	363.60	1139.09	39638.90	143.39	1751.85	43036.82
		Reach 4	Hart Ditch to Cline Ave Hammond East North	1.59	782.79	0.00	12759.83	143.93	489.61	14177.75
		Reach 5a	Cline Ave to E&ERR Griffith Gap South	0.00	73.68	1.03	16.17	32.12	0.18	123.17
		Reach 5b	E&ERR to Colfax Ave Griffith Betterment South	0.16	0.27	0.06	0.07	28.40	0.00	28.97
		Reach 6a	Cline Ave to ConRR Gary North	0.00	11.26	6.38	150.49	305.43	2.67	485.22
		Reach 6b	ConRR to Marshalltown Gap Gary North	0.52	34.97	4.61	68.46	231.32	1.69	341.56
		Reach 6c	Marshalltown to I-65 Marshalltown Gary North	0.58	0.13	3.33	20.87	57.02	0.82	82.75
		Reach 7	Colfax Ave to I-65 Gary South	0.00	181.12	0.00	15.30	0.00	1.28	197.71
	Total for stream: LCR			4.44	1984.84	1262.95	56226.52	1064.11	2277.04	62819.89

for the Project (with Project (exterior and overtopping)) Plan and Analysis Year 2010
(Damage in $1,000's)

Stream Name	Stream Description	Damage Reach Name	Damage Reach Description	Damage Categories: APT	CIPS	EMERGENCY	RESIDENTIAL	TRAFFIC	VEHICLE	Total
LCR	Little Calumet River Indiana	Reach 1a	IL/IN Stateline to L&NRR Munster West South	0.28	0.51	5.09	29.55	3.98	8.10	47.53
		Reach 1b	L&NRR to Hart Ditch Munster East South	0.35	1.01	2.95	21.64	3.93	3.89	33.78
		Reach 2a	IL/IN Stateline to L&NRR Hammond West North	0.00	6.47	7.66	26.30	6.54	9.12	56.10
		Reach 2b	L&NRR to Hart Ditch Hammond East North	0.10	1.35	8.65	50.03	9.20	17.99	87.32
		Reach 3	Hart Ditch to Cline Ave Highland South	0.00	0.49	9.19	10.31	1.36	3.44	24.79
		Reach 4	Hart Ditch to Cline Ave Hammond East North	1.14	6.37	0.00	26.32	6.83	9.84	50.50
		Reach 5a	Cline Ave to E&ERR Griffith Gap South	0.03	126.34	3.92	65.53	80.02	10.73	286.57
		Reach 5b	E&ERR to Colfax Ave Griffith Betterment South	1.27	0.48	0.02	0.41	2.89	0.16	5.24
		Reach 6a	Cline Ave to ConRR Gary North	0.00	5.37	3.85	19.69	48.23	10.28	87.41
		Reach 6b	ConRR to Marshalltown Gap Gary North	0.87	30.97	3.12	14.96	39.59	8.45	97.97
		Reach 6c	Marshalltown to I-65 Marshalltown Gary North	0.73	0.14	4.79	25.21	71.13	11.13	113.69
		Reach 7	Colfax Ave to I-65 Gary South	0.00	16.16	0.00	12.19	0.00	9.15	37.50
	Total for stream: LCR			4.78	195.68	49.21	302.15	273.70	102.29	927.81

for the Project (Plan added during import of Water Surface Profiles) Plan and Analysis Year 2010
(Damage in $1,000's)

Stream Name	Stream Description	Damage Reach Name	Damage Reach Description	Damage Categories: APT	CIPS	EMERGENCY	RESIDENTIAL	TRAFFIC	VEHICLE	Total
LCR	Little Calumet River Indiana	Reach 20i	Hammond Interior Subarea 4 N from FDM 6	0.00	0.00	0.00	151.03	0.00	2.96	153.99
		Reach 6ai	Gary North Interior Subarea 89 from FDM 3	0.00	0.33	1.28	3.64	31.81	0.47	37.53
		Reach 7i	Gary South Interior Subarea 2 from FDM 3	0.00	0.00	0.00	0.09	0.00	0.00	0.09
	Total for stream: LCR			0.00	0.33	1.28	157.76	31.81	3.43	191.61

It is important to note that along portions of the Little Calumet River; levees had previously existed, which were most pronounced in the densely developed west side of the study area. Throughout the historical phases of the Little Calumet River flood damage reduction evaluations, these existing levees were treated as if they did not exist because they were determined to be of questionable integrity. The conclusion of a November 1981 Technical Report of the Stability of Existing Levees along Little Calumet River Indiana, Attachment C-2 to the Phase I GDM, page 15, reads:

> From an engineering standpoint the existing levee system has been shown to have the potential for failure. Their integrity is questionable when overtopping occurs and the existing vegetation is washed out. Failure of the entire levee section would then occur. Standard underseepage analysis indicates that problems with uplift and piping may exist at some levee sections. Some borings show that through seepage may be a problem as has been shown in the June flood event.
>
> Although the analysis indicates that they are unacceptable, the existing levees have not shown extensive failures. This may be due to the stabilizing influence of the vegetation cover. This has been the case in other levees that have been investigated by the Chicago District. However, historic performance does not guarantee future performance, especially considering the lack of maintenance that is being done by local agencies.

Attachment C – Stability Assessment of Existing Levees displays the cover page and summary from the 1981 stability assessment report. Since the existing levee system was not included in the without project conditions for previous economic evaluations, this explains why the damage results may appear to have an unusually high level of damage in the frequent flooding events. In general the nearly complete Little Calumet River project will provide a 0.5% annual exceedance probability (AEP) (200-year) level of flood risk management, and is anticipated to be extremely effective in reducing future flood damages once completed. However, for the project to fully realize the reported flood risk management benefits into the future, the levee system operations and maintenance plan must be fully implemented and financed including conducting successful road closure exercises and supporting the flood warning system. Even with the completed project, if these operations are not effectively practiced, a residual flooding threat not reflected in the damage estimates reported above will remain.

9.0 SUMMARY OF UPDATED FLOOD BENEFITS

Table 16 presents the expected annual flood damages referenced to 2011 price levels by category for the with- and without-project conditions reported by HEC-FDA along with those categories calculated outside the model. Fully updated project benefits along with categories not related to flood risk reduction (i.e., recreation, land enhancement, flood insurance policy savings) are combined and displayed in *Table 4*. There are limited residual damages with the project due to infrequent levee overtopping, minimal damages from interior drainage, and small portions of the study area which will not be fully protected. These residual damages are displayed by category in *Table 16* and total $1,072,000 when the residual damage from levee overtopping ($980,000) and interior drainage ($192,000) are combined.

Table 16. Summary of Flood Damage Results (2011 PL, $000's)

		HEC-FDA Damage Estimates Results Output Consolidated			
Comment Number	**Benefit Category**	Without Project	WO/Prj W/Thornton	With Project	With Project Interior Damage
	Flood Damage Reduction:				
1	Residential	61,446	56,227	302	155
2	Apartments	13	4	5	0
3	Vehicles	2,491	2,277	102	3
4	Affluence	na	na	na	na
5	CIPS	2,535	1,985	196	0
6	Emergency costs	2,307	1,263	49	1
7	Utilities _4/	na	na	na	na
8	Golf courses	265	242	1	0
9	Agricultural	0	0	0	0
	Transportation				
10a	Roadway repair cost	na	na	na	na
10b	Roadway repair delays	na	na	na	na
10c	Inundation delays	1,678	1,064	325	32
11	Research park (future)	non-Damage	non-Damage	non-Damage	non-Damage
	Additions to Flood Damage Reduction:				
12	Recreation	non-Damage	non-Damage	non-Damage	non-Damage
	Land enhancement				
13a	Areas exclusive of IUN	non-Damage	non-Damage	non-Damage	non-Damage
13b	Fill cost reduction	non-Damage	non-Damage	non-Damage	non-Damage
13c	NED employment benefits	non-Damage	non-Damage	non-Damage	non-Damage
14	FEMA Insurance Admin Savings _5/	non-Damage	non-Damage	non-Damage	non-Damage
	Total	$70,735	$63,062	$980	$192

10.0 BENEFITS ACCRUED DURING PROJECT CONSTRUCTION

As noted previously, the project is currently 90 percent implemented. Per ER 1105-2-100, p.D-17, benefits accrued should be included in the reevaluation benefit computations. *Table 17* displays the present worth computations and results of accrued project benefits (for several pertinent interest rates from previous report evaluations) based on the annualized project benefit estimate. 2011 was set as the baseline for this analysis. The pre base-line benefits claimed are allotted based upon flood damage reduction benefits only, while baseline and post-baseline benefits include flood damage reduction and associated benefit categories of recreation, land enhancement, and flood insurance policy savings. The pre-baseline benefits computed are very sensitive to the interest rate applied, increasing sharply as the interest rate level increases.

Table 17. Accumulated Project Benefits Prior to Baseline (2011PL, $000's)

Year	Period	% Benefit	$ Benefit	Current LRR March 2012 4%	Budget FDR 7%	Phase II GDM April 1989 8.625%	LRR July 1994 8%
1990	26	0	0	0	0	0	0
1991	25	0	0	0	0	0	0
1992	24	0	0	0	0	0	0
1993	23	0	0	0	0	0	0
1994	22	0	0	0	0	0	0
1995	21	17	10,521	24,117	43,821	60,138	53,274
1996	20	22	13,616	29,292	51,731	69,932	62,309
1997	19	22	17,948	28,165	48,347	64,379	57,694
1998	18	29	21,043	36,109	60,245	79,023	71,227
1999	17	34	21,043	41,230	66,861	86,389	78,317
2000	16	34	21,043	39,645	62,487	79,529	72,515
2001	15	34	25,375	38,120	58,399	73,214	67,144
2002	14	41	25,375	44,370	66,069	81,591	75,259
2003	13	41	25,375	42,664	61,747	75,112	69,684
2004	12	41	25,375	41,023	57,707	69,148	64,522
2005	11	41	25,375	39,445	53,932	63,658	59,743
2006	10	41	25,375	37,928	50,404	58,603	55,317
2007	9	41	42,086	36,469	47,106	53,950	51,220
2008	8	68	50,131	57,173	71,779	80,978	77,325
2009	7	81	50,131	65,969	80,500	89,458	85,916
2010	6	88	54,464	69,070	81,921	89,675	86,623
2011	5	89	55,083	67,092	77,343	83,397	81,025
2012	4	92	56,939	66,611	74,636	79,274	77,465
2013	3	94	58,177	65,441	71,269	74,566	73,286
2014	2	96	59,415	64,263	68,024	70,106	69,301
2015	1	98	60,653	63,079	64,898	65,884	65,505
2016	0	100	64,617	64,617	64,617	64,617	64,617
Present Worth Pre-Baseline Benefits:				1,061,891	1,383,843	1,612,620	1,519,289

The Benefit Stream is asserted based upon project completion dates, OMRR&R certification, and Cost Projections. Only at 100 % of Benefits are the non-flood damage reduction benefits added to the FDR benefits.

Table 18 is derived from the results of the accrued benefits derivations displayed in *Table 17*and shows the project's benefits including the pre-base year present value of benefits annualized over a 50-year planning horizon for several pertinent interest rates. As shown in *Table 18*, annualized project benefits increase to $109,255,000 when the pre-baseline benefits are considered at the current 4% federal discount rate. Over a 20-year project construction period, the pre-baseline benefits are substantial, as are the interest during construction costs (IDC), which are presented along with the total project cost in the following section.

Table 18. Accumulated Project Benefits Prior and Post Baseline (2011PL, $000's)

Accumulated Project Benefits Prior to Baseline ($2011, 000's)								
Year	Period		% Benefit	$ Benefit	Current LRR Mar 2012 4%	Budget FDR 7%	Phase II GDM April 1989 8.625%	LRR July 1994 8%
1990	26	0	0	0	0	0	0	0
1991	25	0	0	0	0	0	0	0
1992	24	0	0	0	0	0	0	0
1993	23	0	0	0	0	0	0	0
1994	22	0	0	0	0	0	0	0
1995	21	19	17	10,583	24,117	43,821	60,138	53,274
1996	20	24	22	13,368	29,292	51,731	69,932	62,309
1997	19	24	22	13,368	28,165	48,347	64,379	57,694
1998	18	32	29	17,824	36,109	60,245	79,023	71,227
1999	17	38	34	21,167	41,230	66,861	86,389	78,317
2000	16	38	34	21,167	39,645	62,487	79,529	72,515
2001	15	38	34	21,167	38,120	58,399	73,214	67,144
2002	14	46	41	25,623	44,370	66,069	81,591	75,259
2003	13	46	41	25,623	42,664	61,747	75,112	69,684
2004	12	46	41	25,623	41,023	57,707	69,148	64,522
2005	11	46	41	25,623	39,445	53,932	63,658	59,743
2006	10	46	41	25,623	37,928	50,404	58,603	55,317
2007	9	46	41	25,623	36,469	47,106	53,950	51,220
2008	8	75	68	41,776	57,173	71,779	80,978	77,325
2009	7	90	81	50,131	65,969	80,500	89,458	85,916
2010	6	98	88	54,587	69,070	81,921	89,675	86,623
2011	5	99	89	55,144	67,092	77,343	83,397	81,025
2012	4	99.5	92	56,939	66,611	74,636	79,274	77,465
2013	3	100	94	58,177	65,441	71,269	74,566	73,286
2014	2	100	96	59,415	64,263	68,024	70,106	69,301
2015	1	100	98	60,653	63,079	64,898	65,884	65,505
2016	0	100	100	64,617	64,617	64,617	64,617	64,617
Present Worth Pre-Baseline Benefits:					1,061,891	1,383,843	1,612,620	1,519,289
The Benefit Stream is asserted based upon project completion dates, O&M certification, and Cost Projections.								
Only at 100% of Benefits are the non-flood damage reduction benefits added to the FDR benefits.								

11.0 TOTAL COST OF THE PROJECT

The total project cost summary (TPCS) is presented in Appendix C - Cost Estimating. All costs are presented at October 2011 price levels. Annualized costs required the consideration of interest during construction costs (IDC). *Table 19* displays the 20-year construction cost schedule, the projected cost schedule and the IDC based upon these schedules for several pertinent interest rates. Preconstruction Engineering and Design (PED) costs are considered sunk and were removed from computation of economic costs. Given the project's long construction history, IDC is substantial and extremely sensitive to interest rates rate levels. Annualized costs require the consideration of Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) costs. The estimate of the OMRR&R costs includes typical needs for levees, floodwalls, pump stations, gates, gatewells, closure structures, drainage structures, precipitation gages, recreation facilities, channels, flowage easements, bridges, and other miscellaneous features, such as fences, guardrails and road repairs. Based on the O&M manual, which was finalized in Feb 2011, tasks for each project feature were quantified and assigned an expected frequency. For instance, levee inspections will occur 4 times per year, while pumps are expected to be replaced in 50 years. Costs of both of these items were then annualized. This process was repeated for each task at each segment of the project and summed up to develop the total annual OMRR&R costs.

The flood warning system requires the non-Federal sponsor and local communities to monitor precipitation data and river gages to measure the river stages. Closures structures are to be put in place when the river stages approach pre-determined trigger elevations to allow for sufficient time for the local communities to mobilize and install the closures. Each community that has a

closure(s) is required to take the necessary action to put it in place through an agreement with the non-Federal sponsor. By the request of the Town of Munster an inflatable water bladder is used as a closure and was approved after USACE reviewed its acceptability. Installation time for the water bladder is approximately sixty minutes and is inflated via equipment provided by the local fire department. Another closure in the Cities of Gary, Highland and Hammond uses 3' x 3' x 3' concrete blocks with rubber pads affixed to their bottoms that are installed via front end loaders during appropriate events. Refer to Attachment D for more details. Attachment D also contains a letter from the non-Federal sponsor agreeing the OMRR&R costs.

The primary reason for the increase in OMRR&R costs from the 1994 LRR to the 2011 LRR is the extreme lack of detail and scope in the previous OMRR&R estimates. The vast majority of the project had not yet been constructed and the O&M manuals had not yet been developed, which made estimating those costs much more difficult.

Table 20 summarizes the overall OMRR&R projections for the project including anticipated life-cycle of certain project features along with the annualized cost streams for several pertinent interest rates.

Table 19. Total Cost Schedule and IDC Calculations (2011PL, $000's)

		Total							
		Project	2012 Cost	Prj Cost		IDC	IDC	IDC	IDC
	2011 Project	Cost 2012	PED Estimate	Net of PED	Period	FY2012	Budget FDR	Phase II GDM	Recon 1993
FY	Cost Schedule	Per Schedule	18.600%			4.000%	7.000%	8.625%	8.000%
1990	0.900%	2,431	452	1,979	26.5	3,616	9,907	15,743	13,230
1991	1.112%	3,002	558	2,444	25.5	4,200	11,277	17,707	14,950
1992	1.211%	3,268	608	2,661	24.5	4,294	11,299	17,535	14,872
1993	3.977%	10,736	1,997	8,740	23.5	13,227	34,116	52,332	44,587
1994	7.069%	19,084	3,550	15,535	22.5	22,010	55,658	84,401	72,233
1995	0.839%	2,264	421	1,843	21.5	2,440	6,051	9,073	7,799
1996	2.188%	5,907	1,099	4,808	20.5	5,936	14,439	21,408	18,483
1997	5.154%	13,914	2,588	11,326	19.5	13,009	31,045	45,522	39,472
1998	4.290%	11,582	2,154	9,428	18.5	10,049	23,534	34,134	29,724
1999	2.439%	6,585	1,225	5,360	17.5	5,288	12,155	17,441	15,251
2000	3.215%	8,681	1,615	7,066	16.5	6,431	14,512	20,605	18,092
2001	3.453%	9,322	1,734	7,588	15.5	6,348	14,068	19,767	17,427
2002	2.617%	7,065	1,314	5,751	14.5	4,405	9,588	13,335	11,803
2003	2.682%	7,241	1,347	5,895	13.5	4,115	8,799	12,115	10,765
2004	2.277%	6,147	1,143	5,003	12.5	3,166	6,653	9,070	8,090
2005	2.256%	6,090	1,133	4,958	11.5	2,826	5,837	7,880	7,055
2006	4.664%	12,592	2,342	10,250	10.5	5,223	10,607	14,183	12,747
2007	7.575%	20,451	3,804	16,647	9.5	7,516	15,011	19,885	17,936
2008	7.339%	19,814	3,685	16,128	8.5	6,382	12,537	16,455	14,895
2009	11.077%	29,906	5,562	24,343	7.5	8,325	16,092	20,931	19,014
2009 ARRA	1.177%	3,179	591	2,588	7.5	885	1,710	2,225	2,021
2010	8.438%	22,781	4,237	18,544	6.5	5,385	10,243	13,206	12,038
2011	6.351%	17,146	3,189	13,957	5.5	3,360	6,292	8,042	7,355
2012	4.380%	11,824	2,199	9,625	4.5	2,282	4,208	5,333	4,894
2013	2.408%	6,501	1,209	5,292	3.5	957	1,737	2,183	2,010
2014	0.547%	1,478	275	1,203	2.5	152	272	340	314
2015	0.255%	690	128	561	1.5	42	74	91	84
2016	0.113%	305	57	248	0.5	6	10	13	12
Total	100.000%	$269,988	$50,217	$219,771		$151,875	$347,731	$500,955	$437,153
Target Total Project Cost:		269,988							
Remaining Cost (FY2012-2016)		20,798	3,868	16,930		3,439	6,302	7,960	7,313

Table 20. Estimated Total Project OMRR&R Costs

									Current LRR Mar 2012	Budget FDR	Phase II GDM April 1989	LRR July 1994
								Interest Rate	4%	7%	8.625%	8%
								Present Value	**69,507,516**	**43,188,493**	**35,144,965**	**37,905,908**
								Annualized	**3,235,589**	**3,129,432**	**3,080,472**	**3,098,537**
Year	1year	2year	5 year	10year	20year	30year	50year	Combine				
1	1,752,221							1,752,221	1,718,194	1,693,936	1,681,218	1,686,075
2	1,752,221	1,071,613						2,823,833	2,662,497	2,551,311	2,494,275	2,515,958
3	1,752,221							1,752,221	1,588,567	1,479,549	1,421,834	1,443,538
4	1,752,221	1,071,613						2,823,833	2,461,628	2,228,414	2,113,902	2,157,029
5	1,752,221		2,128,002					3,880,223	3,252,420	2,861,737	2,674,069	2,744,415
6	1,752,221	1,071,613						2,823,833	2,275,913	1,946,383	1,791,535	1,849,305
7	1,752,221							1,752,221	1,357,914	1,128,741	1,023,400	1,062,513
8	1,752,221	1,071,613						2,823,833	2,104,210	1,700,046	1,518,328	1,585,481
9	1,752,221							1,752,221	1,255,467	985,886	867,333	910,934
10	1,752,221	1,071,613	2,128,002	1,372,605				6,324,441	4,357,179	3,325,618	2,881,968	3,041,363
11	1,752,221							1,752,221	1,160,750	861,111	735,066	780,979
12	1,752,221	1,071,613						2,823,833	1,798,687	1,296,957	1,090,552	1,165,376
13	1,752,221							1,752,221	1,073,179	752,128	622,969	669,564
14	1,752,221	1,071,613						2,823,833	1,662,988	1,132,813	924,245	999,122
15	1,752,221		2,128,002					3,880,223	2,197,219	1,454,762	1,169,162	1,271,195
16	1,752,221	1,071,613						2,823,833	1,537,525	989,442	783,299	856,586
17	1,752,221							1,752,221	917,358	573,795	447,453	492,149
18	1,752,221	1,071,613						2,823,833	1,421,529	864,217	663,847	734,384
19	1,752,221							1,752,221	848,149	501,175	379,217	421,939
20	1,752,221	1,071,613	2,128,002	1,372,605	11,587,199			17,911,639	8,336,528	4,787,973	3,568,654	3,993,669
21	1,752,221							1,752,221	784,161	437,745	321,387	361,744
22	1,752,221	1,071,613						2,823,833	1,215,129	659,307	476,814	539,794
23	1,752,221							1,752,221	725,001	382,344	272,376	310,138
24	1,752,221	1,071,613						2,823,833	1,123,455	575,865	404,100	462,787
25	1,752,221		2,128,002					3,880,223	1,484,362	739,527	511,184	588,809
26	1,752,221	1,071,613						2,823,833	1,058,697	502,982	342,475	396,765
27	1,752,221							1,752,221	619,734	291,688	195,636	227,960
28	1,752,221	1,071,613						2,823,833	960,331	439,324	290,248	340,162
29	1,752,221							1,752,221	572,979	254,772	165,802	195,439
30	1,752,221	1,071,613	2,128,002	1,372,605			465,576	6,790,016	2,134,948	922,676	591,483	701,245
31	1,752,221							1,752,221	529,751	222,527	140,517	167,558
32	1,752,221	1,071,613						2,823,833	820,897	335,158	208,473	250,029
33	1,752,221							1,752,221	489,785	194,364	119,089	143,654
34	1,752,221	1,071,613						2,823,833	758,966	292,740	176,682	214,360
35	1,752,221		2,128,002					3,880,223	1,002,782	375,938	223,501	272,733
36	1,752,221	1,071,613						2,823,833	701,707	255,691	149,738	183,779
37	1,752,221							1,752,221	418,670	148,279	85,537	105,590
38	1,752,221	1,071,613						2,823,833	648,767	223,330	126,903	157,561
39	1,752,221							1,752,221	387,084	129,513	72,492	90,526
40	1,752,221	1,071,613	2,128,002	1,372,605	11,587,199			17,911,639	3,804,683	1,237,303	682,195	856,835
41	1,752,221							1,752,221	357,881	113,122	61,437	77,612
42	1,752,221	1,071,613						2,823,833	554,569	170,378	91,149	115,812
43	1,752,221							1,752,221	330,881	98,805	52,068	66,539
44	1,752,221	1,071,613						2,823,833	512,730	148,814	77,249	99,290
45	1,752,221		2,128,002					3,880,223	677,444	191,108	97,719	126,328
46	1,752,221	1,071,613						2,823,833	474,048	129,980	65,469	85,125
47	1,752,221							1,752,221	282,839	75,378	37,398	48,908
48	1,752,221	1,071,613						2,823,833	438,281	113,530	55,485	72,981
49	1,752,221							1,752,221	261,500	65,838	31,695	41,931
50	1,752,221	1,071,613	2,128,002	1,372,605			3,484,309	9,808,749	1,407,548	344,442	163,339	217,339

12.0 TOTAL PROJECT ANNUALIZED BENEFIT AND COST ESTIMATES

The total project annualized benefits and costs, and the total project BCR's at various pertinent interest rates are displayed in *Table 21*.

Table 21. Total Project Benefits and Cost Summary

Project Costs (2011PL, $000's)		Current LRR Mar 2012	Budget FDR	Phase II GDM April 1989	LRR July 1994
Interest Rate		4%	7%	8.625%	8%
FISH & WILDLIFE FACILITIES	$8,402				
CHANNELS & CANALS	$887				
LEVEES & FLOODWALLS	$108,999				
PUMPING PLANT	$31,673				
RECREATION FACILITIES	$3,937				
FLOODWAY CONTROL & DIVERSION STRUCTURE	$3,500				
PERMANENT OPERATING EQUIPMENT	$1,042				
ARRA	$3,216				
CONSTRUCTION ESTIMATE TOTALS:	$161,656				
LANDS AND DAMAGES	$27,818				
RELOCATIONS	$16,139				
PLANNING, ENGINEERING & DESIGN	$50,976				
CONSTRUCTION MANAGEMENT	$13,399				
PROJECT COST TOTALS: (Appendix C)	$269,988	$269,988	$269,988	$269,988	$269,988
IDC (Table 19)		$151,875	$347,731	$500,955	$437,153
TPC – IDC		$421,863	$617,719	$770,943	$707,141
Annualized Project Cost Before O&M		$19,638	$44,760	$67,573	$57,804
Annualized O&M Cost (Table 20)		$3,236	$3,129	$3,080	$3,099
Total Annual Project Cost		$22,873	$47,889	$70,654	$60,902
Total Annual Project Benefits (Table 18)		$109,255	$153,954	$189,526	$174,718
Project BCR		4.78	3.21	2.68	2.87

Remaining Project Costs (2011PL, $000's)		Current LRR Nov 211	Budget FDR	Phase II GDM April 1989	LRR July 1994
(Project Cost FY2012-2016)		4%	7%	8.625%	8%
Remaining Project Costs (RPC)Totals (Appendix C)	$20,798	$20,798	$20,798	$20,798	$20,798
IDC (Table 19)		3,439	6,302	7,960	7,313
RPC + IDC		24,237	27,100	28,759	28,111
Annualized Project Cost Before O&M		$1,128	$1,964	$2,521	$2,298
Annualized O&M Cost (Table 20)		$3,236	$3,129	$3,080	$3,099
Total Annual Project Remaining Cost		$4,364	$5,093	$5,601	$5,396
Total Annual Project Benefits Remaining (Table 22)		9,472	9,472	9,472	9,472
Remaining Project BCR		2.17	1.86	1.69	1.76

Two major factors affect the difference between the previous economic analysis and the current LRR economic analysis: First, the number of structures damaged; and second, the extent of the damage to those structures. Appendix C of the 1982 Phase I General Design Memorandum, page C-12, paragraph 28 states the following:

> *For without project, 1976 land use conditions, there would be an average annual count of 1,649.7 homes with lot flooding, 898.6 homes with basement flooding and 684.5 homes with first floor flooding. With year 2000 land use conditions, there would be an average annual count of 1,740.8 homes with lot flooding, 957.6 homes with basement flooding and 745.5 homes with first floor flooding.*

The current study used Geographical Information Systems (GIS) to indentify homes in the floodplain and their first floor elevation relative to the most recent terrain data. This new information is much more accurate than the prior methods employed for the Little Calumet Flood Control and Recreation Project. This project has approximately 3,300 residential structures with

basement flooding and 3,100 residential structures with first floor flooding. The new analysis represents a threefold increase in damage to structures at both the first floor and basement levels.

The 1994 Limited Reevaluation Report for the Little Calumet River Flood Control Project reported that the average annual benefits (AAB) were $18,585,000 in 1994 price levels. The portion of AAB attributed to residential property was $10,374,000. The Consumer Price Index for All Urban Consumers can be used to move the value of the properties and contents forward to 2011 price levels. This value will allow for some comparable arguments. The October values for the CPI were 149.4 in 1994 and 219.6 in 2011. Converting the 1994 price level residential damages to 2011 price levels yields a benefit of $15,239,406 for residential property. The number of homes affected in the year 2000 would be 3,444 residential structures. The previous study does not project past the year 2000, so 3,444 residential structures are used for the comparison. An approximation of the average annual benefit per home is $4,400 [$15,239,406/3,444].

Taking an average of the AAB from the 2011 HEC-FDA structure detail output file provides a similar calculation as shown above. The value per home in this report is almost 2 to 4 times the value approximated from the 1994 LRR.

Table 22 offers more insight into the residential damages and their values by annual exceedence probability. The more accurate representation of these damages is one of the main differences between the analysis of this report and its predecessors.

Table 22. Structure Damages by Annual Exceedence Probability ($1,000s)

Structure Type	Total Structure Count	Sum of Total Damage at 0.5 Probability	Sum of Total Damage at 0.2 Probability	Sum of Total Damage at 0.1 Probability	Sum of Total Damage at 0.04 Probability	Sum of Total Damage at 0.02 Probability	Sum of Total Damage at 0.01 Probability	Sum of Total Damage at 0.005 Probability	Sum of Total Damage at 0.002 Probability	Structures identified through Risk and Uncertainity	Structures Out of the Floodplain
One Story No Basement	2,393	$800	$915	$1,151	$1,362	$1,517	$1,617	$1,854	$2,093	299	1
One Story with Basement	3,756	$855	$1,067	$1,311	$1,630	$1,850	$2,027	$2,487	$2,951	779	26
Two Story No Basement	680	$308	$339	$392	$460	$493	$522	$561	$615	64	1
Two Story with Basement	1,051	$68	$119	$177	$272	$341	$415	$545	$762	276	13
Apartment	63	$0	$0	$1	$4	$10	$28	$33	$37	0	0
Automobiles	7,877	$915	$1,500	$1,757	$1,929	$2,050	$2,173	$2,645	$3,308	4,149	420
Garages	6,809	$1,676	$1,926	$2,127	$2,489	$2,826	$3,111	$3,985	$4,654	2,107	48
Commercial, Industrial, and Public	285	$30	$62	$91	$118	$131	$136	$164	$199	0	0
Other	24	$2	$5	$9	$11	$12	$13	$23	$23	0	0
Grand Total	22,938	$4,654	$5,933	$7,016	$8,275	$9,230	$10,042	$12,297	$14,642	7,674	509

13.0 REMAINING BENEFITS REMAINING COST RATIO

To determine the remaining costs the costs projected beyond 2011 were added with IDC for the cost stream (computation shown in *Table 19*). These two terms combined were annualized at given interest rates for the 50 year project life and the results are shown in *Table 21*. The complete O&M costs remain, so they are identical to the Total Project O&M costs. It may be appropriate to pro-rate the O&M costs when presenting the remaining benefits and the remaining cost, but for this presentation the complete O&M cost are included in the remaining cost derivation. To determine the remaining benefits, 2011 credited project benefits (89 percent, shown *Table 18*) are subtracted from full projected benefits (100 percent) for an estimated remaining benefit level of $9,472,000 as shown in *Table 18* and *Table 23*. *Table 18* and *Table 23* demonstrate that since this benefit estimate is a constant benefit level projected over the 50 year project life term, the remaining benefit estimate is not sensitive to the interest rate applied, and the annualized result is equivalent to the constant value.

The remaining benefit remaining cost ration (RBRCR) is smaller for the remaining project as compared to the BCR for the entire project due to the entire component of O&M cost used in the remaining cost line item. Outside of these considerations the remaining benefits are 10.9 percent of the annual project benefits; and the remaining cost are 7.7 percent of the remaining TPC. Remaining benefits are larger than remaining cost as a percentage because non flood damage reduction benefits (recreation, FIA cost savings, land enhancement) are credited to the project only upon 100 percent completion. These benefits make up 4.2 percent of the total project benefits. Also the projected benefits credited to project completions have been reduced by 10 percent until project completion due to the operation and maintenance of the project not being finalized and funded. The project design relies on more than a dozen road closure structures which are manually dependent, and the 2008 flooding experience demonstrated that the project is vulnerable in this regard without a funded, prepared, and practiced O&M operation. *Table 21* contains the annualized remaining costs, benefits, and BCR results.

Table 23. Remaining Project Benefits Prior and Post Baseline (2011 PL, $000's)

			Current LRR March 2012	Budget FDR	Phase II GDM April 1989	LRR July 1994
			4%	7%	8.625%	8%
Present Worth of Remaining Benefit Stream				203,487	130,726	108,070
Annualized Remaining Benefit Stream:			**Annual Remaining Benefits**	**9,472**	**9,472**	**9,472**
	1	0	9,472	9,108	8,853	8,720
	2		9,472	8,758	8,274	8,028
	3		9,472	8,421	7,732	7,390
	4		9,472	8,097	7,226	6,804
	5		9,472	7,786	6,754	6,263
	6		9,472	7,486	6,312	5,766
	7		9,472	7,198	5,899	5,308
	8		9,472	6,921	5,513	4,887
	9		9,472	6,655	5,152	4,499
	10		9,472	6,399	4,815	4,142
	11		9,472	6,153	4,500	3,813
	12		9,472	5,916	4,206	3,510
	13		9,472	5,689	3,931	3,231
	14		9,472	5,470	3,674	2,975
	15		9,472	5,260	3,433	2,738
	16		9,472	5,057	3,209	2,521
	17		9,472	4,863	2,999	2,321
	18		9,472	4,676	2,803	2,137
	19		9,472	4,496	2,619	1,967
	20		9,472	4,323	2,448	1,811
	21		9,472	4,157	2,288	1,667
	22		9,472	3,997	2,138	1,535
	23		9,472	3,843	1,998	1,413
	24		9,472	3,695	1,867	1,301
	25		9,472	3,553	1,745	1,197
	26		9,472	3,417	1,631	1,102
	27		9,472	3,285	1,524	1,015
	28		9,472	3,159	1,425	934
	29		9,472	3,037	1,331	860
	30		9,472	2,921	1,244	792
	31		9,472	2,808	1,163	729
	32		9,472	2,700	1,087	671
	33		9,472	2,596	1,016	618
	34		9,472	2,496	949	569
	35		9,472	2,400	887	523
	36		9,472	2,308	829	482
	37		9,472	2,219	775	444
	38		9,472	2,134	724	408
	39		9,472	2,052	677	376
	40		9,472	1,973	633	346
	41		9,472	1,897	591	319
	42		9,472	1,824	553	293
	43		9,472	1,754	516	270
	44		9,472	1,687	483	249
	45		9,472	1,622	451	229
	46		9,472	1,559	422	211
	47		9,472	1,499	394	194
	48		9,472	1,442	368	179
	49		9,472	1,386	344	164
	50		9,472	1,333	322	151

14. ECONOMIC UPDATE PLAN

Since the project is 90 percent complete and the project has a projected completion date of 2016, no future economic update is anticipated, therefore no economic update plan has been formulated.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX A – ECONOMIC ANALYSIS

Attachments to Appendix A

Prepared By:

U.S. Army Corps of Engineers
Chicago District

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX A – ECONOMIC ANALYSIS

Attachment A
FEMA-1795-DR Preliminary Damage Assessment

Prepared By:

U.S. Army Corps of Engineers
Chicago District

Indiana Severe Storms and Flooding – FEMA-1795-DR

Declared September 23, 2008

On September 20, 2008, Governor Mitchell E. Daniels, Jr. requested a major disaster declaration due to severe storms and flooding beginning on September 12, 2008, and continuing. The Governor requested a declaration for Individual Assistance for three counties and Hazard Mitigation for all counties. During the period of September 18-19, 2008, joint Federal, State, and local Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the State and the affected local governments, and that Federal assistance is necessary.[1]

On September 23, 2008, President Bush declared that a major disaster exists in the State of Indiana. This declaration made Individual Assistance requested by the Governor available to affected individuals and households in Lake, LaPorte, and Porter Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.[2]

Summary of Damage Assessment Information Used in Determining Whether to Declare a Major Disaster

Individual Assistance

- Total Number of Residences Impacted:[3] 1,362

Destroyed -	24
Major Damage -	558
Minor Damage -	411
Affected -	369

- Percentage of insured residences:[4] (19%)
- Percentage of low income households:[5] (15%)
- Percentage of elderly households:[6] -
- Total Individual Assistance cost estimate: $15,401,338

Public Assistance - *(Not requested)*

- Primary Impact: N/A
- Total Public Assistance cost estimate: -
- Statewide per capita impact:[7] -
- Statewide per capita impact indicator:[8] $1.24
- Countywide per capita impact: -
- Countywide per capita impact indicator:[9] $3.11

[1] The preliminary damage assessment (PDA) process is a mechanism used to determine the impact and magnitude of damage and resulting needs of individuals, businesses, public sector, and community as a whole. Information collected is used by the State as a basis for the Governor's request for a major disaster or emergency declaration, and by the President in determining a response to the Governor's request (44 CFR § 206.33).

[2] When a Governor's request for major disaster assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (Stafford Act) is under review, a number of primary factors are considered to determine whether assistance is warranted. These factors are outlined in FEMA's regulations (44 CFR § 206.48). The President has ultimate discretion and decision making authority to declare major disasters and emergencies under the Stafford Act (42 U.S.C. § 5170 and § 5191).

[3] Degree of damage to impacted residences:

- Destroyed – total loss of structure, structure is not economically feasible to repair, or complete failure to major structural components (e.g., collapse of basement walls/foundation, walls or roof);
- Major Damage – substantial failure to structural elements of residence (e.g., walls, floors, foundation), or damage that will take more than 30 days to repair;
- Minor Damage – home is damaged and uninhabitable, but may be made habitable in short period of time with repairs; and
- Affected – some damage to the structure and contents, but still habitable.

[4] By law, Federal disaster assistance cannot duplicate insurance coverage (44 CFR § 206.48(b)(5)).

[5] Special populations, such as low-income, the elderly, or the unemployed may indicate a greater need for assistance (44 CFR § 206.48(b)(3)).

[6] Ibid (44 CFR § 206.48(b)(3)).

[7] Based on State population in the 2000 Census.

[8] Statewide Per Capita Impact Indicator for FY08, *Federal Register,* October 1, 2007.

[9] Countywide Per Capita Impact Indicator for FY08, *Federal Register,* October 1, 2007.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX A – ECONOMIC ANALYSIS

Attachment B
Transportation Inundation Delays

Prepared By:

U.S. Army Corps of Engineers
Chicago District

Questions	Respondents					
	IDOT	Cook[1]	Lake	Kenosha	AVG	STD
1. Monitor Roadways for flooding/safety impacts and alert public agencies affected by an event						
Estimated Costs (annual)	$75,000	**$6,480**	$5,000	$3,000	$22,370	$35,116
Or Labor (annual man-days)	150	**15**	10	6	45.25	70
2. Installation and removal of detour signs and road barricades						
Estimated Costs (per flooded roadway)	$1,000	**$585**	$250	$1,000	$709	$314
Or Labor (per flooded roadway)	2	**1.5**	0.5	2	1.50	1
3. Flood Protection and other operation provided during a flood event (includes installation, operation, removal, and disposal)						
a. Sandbagging						
Material Estimated Costs (per instance)	$0	**$11,349**	$0	$0	$2,837	$5,675
And Labor (per instance)	0	*12.7*	0	0	3.18	6
b. Pumping						
Material Estimated Costs (per instance)	$0	**$2,393**	0 (NR)	$0	$798	$1,382
And Labor (per instance)	0	*14.2*	2	0	4.05	7
4. Post flood event roadway clean-up						
a. Street and Gutter Sweeping						
Estimated Costs (per flooded roadway)	$2,500	**$1,000**	$0	$100	$900	$1,158
Or Labor (per flooded roadway)	5	2	0	0.2	1.80	2
b. Cleaning of Drainage Structures						
Estimated Costs (per structure)	$1,000	**$398.56**	$0	$100	$375	$450
Or Labor (per structure)	2	0.75	0	0.2	0.74	1
5. Additional Maintenance activities for scour critical bridges and culverts following a flood event						
a. Inspection costs						
Estimated Costs (per structure)	$1,000	**$170**	$500	$0	$418	$440
Or Labor (per structure)	2	0.3	1	0	0.83	1
b. Scour protection measures						
Estimated Costs (material per structure)	$0	**$3,400**	$0	$0	$850	$1,700
And Labor (per structure)	0	NR	0	0	0.00	0
c. Debris removal on piers/abutments						
Estimated Costs (material per structure)	NR	NR	NR	$0	0.00	0
And Labor (per structure)	10	NR	2	0	4.00	5
6. Roadway repairs following a flood event						
a. Shoulder restoration						
Estimated Costs (material per instance)	$1,000	**NR**	NR	$100	$550	$636
And Labor (per structure)	20	NR	5	1	8.67	10
b. Average condition that trigger shoulder erosion						
Depth (ft)	0.5	NR	NR	0.5	0.50	0
And Velocity (ft/s)	NR	NR	NR	NR		
7. Addressing claims for vehicles trapped in flooded underpasses or otherwise damaged by flood waters						
Estimated Costs (per instance)	$5,000	**NR**	$0	$0	$1,667	$2,887
Or Labor (per instance)	10	NR	0	0	3.33	6

Table 2.9 – Survey of Costs Stemming from Flood Damages to Roads

[1] Bolded values provided on survey form, italicized values estimated assuming a labor rate of $500 per man- day.

I-80/94 Assigned Volumes Year = 2010

								Summations		
Illinois State Line to Calumet Avenue (US-41)										
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak	Westbound	Eastbound	Total
autos	19,257	13,755	39,487	autos	9,677	18,400	41,212	72,499	69,289	
trucks	688	1,076	4,604	trucks	599	807	3,915	6,368	5,321	
semis	6,489	7,630	32,959	semis	6,236	7,362	31,592	47,078	45,190	
Calumet Avenue (US-41) to Indianapolis Boulevard (SR-152/US-41)								125,945	119,800	245,745
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	18,777	15,385	40,098	autos	11,287	18,935	42,424	74,260	72,646	
trucks	504	825	3,597	trucks	504	639	3,130	4,926	4,273	
semis	6,409	7,569	32,328	semis	6,217	7,278	31,128	46,306	44,623	
Indianapolis Boulevard (SR-152/US-41) to Kennedy Avenue								125,492	121,542	247,034
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	18,431	15,822	40,207	autos	11,556	18,619	40,619	74,460	70,794	
trucks	426	698	2,944	trucks	413	545	2,589	4,068	3,547	
semis	6,367	7,522	32,023	semis	6,190	7,251	30,873	45,912	44,314	
Kennedy Avenue to Cline Avenue (SR-912)								124,440	118,655	243,095
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,990	15,435	38,896	autos	11,548	17,496	38,978	71,321	68,022	
trucks	327	536	2,348	trucks	321	407	1,991	3,211	2,719	
semis	6,341	7,481	31,861	semis	6,176	7,217	30,753	45,683	44,146	
Cline Avenue (SR-912) to Burr Street								120,215	114,887	235,102
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,714	16,397	38,736	autos	13,123	18,358	40,079	71,847	71,560	
trucks	247	354	1,547	trucks	335	429	1,972	2,148	2,736	
semis	6,298	7,394	31,131	semis	6,147	7,224	30,343	44,823	43,714	
Burr Street to Grant Street								118,818	118,010	236,828
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	15,484	15,683	37,170	autos	12,746	17,225	38,857	68,337	68,828	
trucks	239	348	1,516	trucks	320	385	1,902	2,103	2,607	
semis	6,270	7,360	30,922	semis	6,139	7,186	30,184	44,552	43,509	
Grant Street to Broadway (SR-53)								114,992	114,944	229,936
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	13,936	14,404	35,099	autos	11,974	15,776	36,656	63,439	64,406	
trucks	186	269	1,201	trucks	224	275	1,362	1,656	1,861	
semis	6,193	7,275	30,447	semis	6,083	7,119	29,764	43,915	42,966	
Broadway (SR-53) to I-65 Connector Ramps								109,010	109,233	218,243
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	12,712	13,942	33,806	autos	11,804	14,877	34,964	60,460	61,645	
trucks	186	265	1,217	trucks	189	244	1,162	1,668	1,595	
semis	6,145	7,220	30,045	semis	6,036	7,049	29,292	43,410	42,377	
								105,538	105,617	211,155

I-80/94 Assigned Volumes Year = 2020

Illinois State Line to Calumet Avenue (US-41)								Summations		Total
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak	Westbound	Eastbound	% of 2010
autos	17,131	10,561	31,949	autos	6,424	16,402	34,664	59,641	57,490	
trucks	661	983	4,594	trucks	543	862	3,906	6,238	5,311	
semis	6,287	5,741	28,978	semis	4,170	6,978	28,332	41,006	39,480	
Calumet Avenue (US-41) to Indianapolis Boulevard (SR-152/US-41)								106,885	102,281	209,166
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.8512
autos	16,156	10,804	31,519	autos	6,800	16,156	34,396	58,479	57,352	
trucks	478	722	3,390	trucks	426	613	2,785	4,590	3,824	
semis	6,182	5,682	28,503	semis	4,131	6,849	27,785	40,367	38,765	
Indianapolis Boulevard (SR-152/US-41) to Kennedy Avenue								103,436	99,941	203,377
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.8233
autos	15,992	11,393	33,160	autos	6,739	16,500	35,719	60,545	58,958	
trucks	366	584	2,744	trucks	349	505	2,404	3,694	3,258	
semis	6,121	5,642	28,226	semis	4,096	6,791	27,477	39,989	38,364	
Kennedy Avenue to Cline Avenue (SR-912)								104,228	100,580	204,808
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.8425
autos	15,370	11,242	32,692	autos	6,613	15,488	34,617	59,304	56,718	
trucks	320	509	2,407	trucks	283	411	1,965	3,236	2,659	
semis	6,107	5,621	28,084	semis	4,076	6,746	27,299	39,812	38,121	
Cline Avenue (SR-912) to Burr Street								102,352	97,498	199,850
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.8501
autos	15,564	11,849	34,065	autos	6,719	16,670	36,938	61,478	60,327	
trucks	173	263	1,714	trucks	250	355	1,238	2,150	1,843	
semis	5,869	5,419	26,520	semis	3,921	6,214	24,528	37,808	34,663	
Burr Street to Grant Street								101,436	96,833	198,269
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.8372
autos	13,612	10,709	30,454	autos	6,304	14,317	32,662	54,775	53,283	
trucks	127	205	941	trucks	184	255	1,251	1,273	1,690	
semis	5,826	5,372	26,257	semis	3,902	6,154	24,289	37,455	34,345	
Grant Street to Broadway (SR-53)								93,503	89,318	182,821
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.7951
autos	12,072	9,899	28,290	autos	6,172	13,110	30,540	50,261	49,822	
trucks	115	175	820	trucks	125	181	863	1,110	1,169	
semis	5,773	5,316	25,793	semis	3,883	6,113	24,012	36,882	34,008	
Broadway (SR-53) to I-65 Connector Ramps								88,253	84,999	173,252
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			0.7938
autos	11,431	10,529	29,644	autos	6,523	12,617	30,417	51,604	49,557	
trucks	141	224	1,061	trucks	138	190	912	1,426	1,240	
semis	5,794	5,341	25,832	semis	3,911	6,120	23,927	36,967	33,958	
								89,997	84,755	174,752
										0.8276

I-80/94 Assigned Volumes Year = 2030

								Summations		Total
Illinois State Line to Calumet Avenue (US-41)										
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak	Westbound	Eastbound	% of 2010
autos	17,755	11,728	33,906	autos	7,251	17,265	35,465	63,389	59,981	
trucks	806	1,225	5,298	trucks	713	1,120	5,013	7,329	6,846	
semis	7,002	7,042	32,348	semis	4,970	8,083	32,352	46,392	45,405	
								117,110	112,232	229,342
Calumet Avenue (US-41) to Indianapolis Boulevard (SR-152/US-41)										0.9333
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,489	11,946	33,237	autos	7,565	16,855	34,691	61,672	59,111	
trucks	576	888	3,982	trucks	533	773	3,405	5,446	4,711	
semis	6,874	6,963	31,861	semis	4,926	7,925	31,685	45,698	44,536	
								112,816	108,358	221,174
Indianapolis Boulevard (SR-152/US-41) to Kennedy Avenue										0.8953
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,292	12,593	35,323	autos	7,629	17,159	36,433	64,208	61,221	
trucks	425	706	3,146	trucks	440	619	2,938	4,277	3,997	
semis	6,794	6,921	31,562	semis	4,890	7,843	31,375	45,277	44,108	
								113,762	109,326	223,088
Kennedy Avenue to Cline Avenue (SR-912)										0.9177
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	15,996	12,597	35,374	autos	7,521	16,365	35,618	63,967	59,504	
trucks	367	610	2,725	trucks	353	499	2,377	3,702	3,229	
semis	6,773	6,895	31,175	semis	4,867	7,794	31,406	44,843	44,067	
								112,512	106,800	219,312
Cline Avenue (SR-912) to Burr Street										0.9328
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,388	13,452	37,320	autos	7,721	17,932	38,725	67,160	64,378	
trucks	203	314	1,407	trucks	299	419	1,998	1,924	2,716	
semis	6,403	6,654	29,444	semis	4,680	7,004	27,509	42,501	39,193	
								111,585	106,287	217,872
Burr Street to Grant Street										0.9200
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	14,184	12,091	33,259	autos	7,284	15,286	33,628	59,534	56,198	
trucks	147	236	1,035	trucks	218	292	1,393	1,418	1,903	
semis	6,343	6,598	29,101	semis	4,659	6,914	27,151	42,042	38,724	
								102,994	96,825	199,819
Grant Street to Broadway (SR-53)										0.8690
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	12,727	11,390	25,207	autos	7,172	14,188	32,156	49,324	53,516	
trucks	133	205	911	trucks	146	207	992	1,249	1,345	
semis	6,294	6,521	28,589	semis	4,633	6,861	26,872	41,404	38,366	
								91,977	93,227	185,204
Broadway (SR-53) to I-65 Connector Ramps										0.8486
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	12,090	12,198	33,108	autos	7,613	13,713	32,046	57,396	53,372	
trucks	161	257	1,181	trucks	158	215	1,029	1,599	1,402	
semis	6,316	6,550	28,722	semis	4,674	6,875	26,789	41,588	38,338	
								100,583	93,112	193,695
										0.9173

I-80/94 Assigned Volumes Year = 2040

								Summations		Total
Illinois State Line to Calumet Avenue (US-41)								Westbound	Eastbound	% of 2010
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	18,255	12,694	34,653	autos	8,162	17,930	36,845	65,602	62,937	
trucks	998	1,476	6,114	trucks	892	1,344	6,006	8,588	8,242	
semis	7,701	8,281	35,898	semis	6,039	9,026	35,663	51,880	50,728	
								126,070	121,907	247,977
Calumet Avenue (US-41) to Indianapolis Boulevard (SR-152/US-41)										1.0091
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,596	12,916	33,666	autos	8,525	17,167	35,596	63,178	61,288	
trucks	706	1,060	4,363	trucks	608	911	3,907	6,129	5,426	
semis	7,550	8,180	35,231	semis	5,980	8,848	34,739	50,961	49,567	
								120,268	116,281	236,549
Indianapolis Boulevard (SR-152/US-41) to Kennedy Avenue										0.9576
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,462	13,695	35,939	autos	8,743	17,510	37,559	66,096	63,812	
trucks	532	839	3,432	trucks	533	701	3,291	4,803	4,525	
semis	7,464	8,135	34,911	semis	5,952	8,745	34,374	50,510	49,071	
								121,409	117,408	238,817
Kennedy Avenue to Cline Avenue (SR-912)										0.9824
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	16,515	13,780	36,572	autos	8,715	17,129	37,149	66,867	62,993	
trucks	443	701	2,959	trucks	429	574	2,680	4,103	3,683	
semis	7,434	8,094	34,738	semis	5,924	8,704	34,170	50,266	48,798	
								121,236	115,474	236,710
Cline Avenue (SR-912) to Burr Street										1.0068
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	17,239	14,906	39,294	autos	8,883	14,560	41,229	71,439	64,672	
trucks	227	359	1,597	trucks	350	481	2,185	2,183	3,016	
semis	6,722	7,813	32,248	semis	5,701	7,619	29,911	46,783	43,231	
								120,405	110,919	231,324
Burr Street to Grant Street										0.9768
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	14,905	13,568	34,778	autos	8,382	16,230	35,593	63,251	60,205	
trucks	168	269	1,151	trucks	252	317	1,453	1,588	2,022	
semis	6,660	7,753	31,740	semis	5,679	7,491	29,466	46,153	42,636	
								110,992	104,863	215,855
Grant Street to Broadway (SR-53)										0.9388
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	13,699	12,837	33,247	autos	8,197	15,452	34,753	59,783	58,402	
trucks	153	232	1,020	trucks	166	231	1,074	1,405	1,471	
semis	6,596	7,665	31,225	semis	5,645	7,442	29,254	45,486	42,341	
								106,674	102,214	208,888
Broadway (SR-53) to I-65 Connector Ramps										0.9571
Westbound	am peak	pm peak	off peak	Eastbound	am peak	pm peak	off peak			
autos	13,292	13,660	35,192	autos	8,609	15,056	34,791	62,144	58,456	
trucks	185	288	1,319	trucks	178	236	1,114	1,792	1,528	
semis	6,619	7,693	31,407	semis	5,694	7,458	29,152	45,719	42,304	
								109,655	102,288	211,943
										1.0037

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX A – ECONOMIC ANALYSIS

Attachment C
Stability Assessment of Existing Levees

Prepared By:

U.S. Army Corps of Engineers
Chicago District

US Army Corps
of Engineers
Chicago District

Technical Report

NOVEMBER 1981

STABILITY ASSESSMENT

OF

EXISTING LEVEES

ALONG

LITTLE CALUMET RIVER

INDIANA

ATTACHMENT C-2

SUMMARY

The Chicago District investigated the level of protection of the existing levees that have been built along the Little Calumet River by the local municipalities of Hammond, Munster and Highland, Indiana. These levees were constructed and modified over a period of many years. Modifications usually consisted of raising the crest elevation above the opposite levee. For most of the system, construction materials and techniques could not be ascertained from the owners. The levees presently are densely overgrown with vegetation, including large trees, have steep side slopes, and have not been maintained according to acceptable standards. No flanking levees have been provided. They are not of uniform crest elevation and are discontinuous in several locations.

The levee system partially protects some 7,504 residential units composed of a population of 27,000. Many of the homes are within 50 feet of the levees. In the event of failure, property damage would be large with a possibility of loss of human life.

Geotechnical investigations wee conducted to determine the structural integrity of the levees. Sections are composed of weak, cohesionless strata overlain by cohesive soils which are potentially unsafe if overtopped during a flood event.

The analysis indicates that the structural integrity of the levee system cannot be guaranteed and based upon the loss potential from failure, the levees should be considered to not provide acceptable protection. the economic analysis for the Little Calumet River, Indiana flood damage reduction study should therefore be performed assuming the levees to be inadequate.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX A – ECONOMIC ANALYSIS

Attachment D
Supporting Documentation of OMRR&R Costs

Prepared By:

U.S. Army Corps of Engineers
Chicago District

Little Calumet River Basin Development Commission

900 Ridge Road Suite H
Munster, Indiana 46321

(219) 595-0599

WILLIAM BAKER, Chairman
Governor's Appointment

ANTHONY BROADNAX, Treasurer
Governor's Appointment

TOM WICHLINSKI, Secretary
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RON McAHRON
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Governor's Appointment

DAN REPAY
Executive Director

DAVID E. WICKLAND
Attorney at Law

March 12, 2012

Colonel Frederic Drummond Jr.
District Commander
U. S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606

Dear Colonel:

The Little Calumet River Basin Development Commission understands that in Fiscal Year 2012, the Little Calumet River, Indiana Local Flood Control and Recreation Project is due to reach its authorized cost limit under Section 902 of Public law 99-662, as amended. The Commission is writing to express its support for reauthorization of the Project at the new recommended cost level so that the Project may be completed.

One aspect of completing the Project includes the implementation of tiebacks and other system components consistent with the project authorization to provide a levee system capable of providing a 200-year level of flood risk management and to be able to be accredited by Federal Emergency Management Agency (FEMA). The completion of such tiebacks are needed to ensure the design level of flood protection to the communities of Hammond, Munster, and Gary, further reducing threats to life, safety and property in those communities. Two tiebacks are required at the western terminus of the project near the Illinois-Indiana state line in the communities of Hammond and Munster. Upgrading of the tieback levee located in the city of Gary is also required. Plans are under development to implement the three tieback levees that would complete the project levee system to the authorized 200-year level of protection.

The Little Calumet River Basin Development Commission supports the implementation of the appropriate systems required to bring the construction phase of the project to completion and understands that deployment of temporary measures, in systems which utilize both permanent and temporary components, will be their responsibility, as part of their Operation and Maintenance (O&M) responsibilities under the Local Cooperation Agreement.

For questions in regards to this matter, please contact the undersigned at 219-595-0599.

Sincerely,

Daniel C. Repay
Executive Director

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206

30 August 2010

Construction-Operations Branch

Mr. Dan Repay
Executive Director
Little Calumet River Basin
Development Commission
6100 Southport Road
Portage, Indiana 46368

SUBJECT: Little Calumet River – Permit for Project Modification Request 2010-01, Town of Munster Bridge Closure Revisions, Munster, IN

Dear Mr. Repay:

This letter is in response to a request from the Little Calumet River Basin Development Commission (LCRBDC) to have the U.S. Army Corps of Engineers, Chicago District review designs prepared by the Town of Munster to revise the closure required for three bridges for the Munster Levee (Northcote, Columbia, and Calumet). The request was originally transmitted to our office March 8, 2010 and final documents provided on August 27, 2009.

The Corps has reviewed the final documents submitted and approves the requested revision to the closure system from earthen or sandbag closures to water bladder closures for the 3 bridges. The Corps will update the Project O&M Manual and Flood Handbook based on this change, to be provided under separate letter.

If you have any questions, please contact Mr. William Rochford at (312) 846-5450 or me at your convenience.

Sincerely,

Shamel Abou-El-Seoud, P.E.
Chief, Construction-Operations Branch

Encl:
Town of Munster Bridges Revised Closure submittal

cf: Jim Mandon, Village of Munster

Rochford, William A LRC

From: Bev Paris [bparis@munster.org]
Sent: Friday, August 27, 2010 10:33 AM
To: Rochford, William A LRC; Jim Mandon
Cc: Dan Repay; Schmidt, Joel L LRC; Ackerson, Rick D LRC
Subject: RE: Permit No. 10-01 - Munster Street Closures (Water Bladder)

Bill,

We will alert the employees at 594 at all three bridges. We will mobilize (staging) at 595 at all three bridges. We will install the aqua barrier at Northcote at 598, we will install the aqua barrier at Columbia at 596 and install the aqua barrier at Calumet at 598.

Jim Knesek

-----Original Message-----
From: Rochford, William A LRC [mailto:William.A.Rochford@usace.army.mil]
Sent: Thursday, August 26, 2010 3:59 PM
To: Jim Mandon; Bev Paris
Cc: Dan Repay; Schmidt, Joel L LRC; Ackerson, Rick D LRC
Subject: RE: Permit No. 10-01 - Munster Street Closures (Water Bladder)

Hi Jim

Thanks for the responses provided. I inadvertently missed asking about the response levels for the bridges at Calumet and Columbia, since most of the focus has been on Northcote. The Flood Warning Plan recommends the
following:

Columbia
- Alert @ 594.0
- Mobilize @ 595.0
- Install @ 596.0

Calumet
- Alert @ 596.5
- Mobilize @ 597.5
- Install @ 598.5

Can you indicate your levels for these two bridges as well?

We noted that your response levels are generally earlier than the Corps has recommended, which is fine. For the Alert phase, you may also consider information from precip as reported by the Road Closure Alert System that was provided.

Thanks,

Bill Rochford

Office: (312) 846-5450
Mob (BB): (312) 259-3476
william.a.rochford@usace.army.mil

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

From: Jim Mandon [mailto:jmandon@munster.org]
Sent: Wednesday, August 25, 2010 8:28 PM
To: Bev Paris; Rochford, William A LRC
Cc: Dan Repay
Subject: RE: Permit No. 10-01 - Munster Street Closures (Water Bladder)

The bladders will be hauled to the bridges on trailers.

From: Bev Paris
Sent: Wednesday, August 25, 2010 3:56 PM
To: 'Rochford, William A LRC'; Jim Mandon
Cc: Dan Repay
Subject: RE: Permit No. 10-01 - Munster Street Closures (Water Bladder)

Bill,

This is the information you requested on the aqua barriers.

- Narrative indicating the location where the bladders will be used for street closures:
The Town of Munster purchased three (3) aqua barriers to close off the bridge decks to prevent flooding at Northcote Bridge, Columbia Bridge and Calumet Bridge. The aqua barriers will be used in place of sandbags or dirt closures. The size of these aqua barriers are:
Northcote Bridge - 6ft high x 13.5 ft wide x 41 ft long; Columbia Bridge - 6 ft high x 13.5 ft wide x 54 ft long; and Calumet Avenue Bridge - 4 ft high x 9 ft wide x 76 ft long.

- Indicate the location where the bladders will be kept for storage
The aqua barriers are stored at the Public Works Garage (508 Fisher St) on pallets in a secured area.

- Indicate how they will be moved to the locations
When the gauge at Northcote Bridge reaches the 595 level, Public Works crews will stage the aqua barriers, sandbags and sand at Northcote Bridge, Columbia Bridge and Calumet Bridge.

- Which department will install the bladders
At the 598 level on the gauge at Northcote Bridge, Public Works crews will set up aqua barriers with help from the Fire Department and CERT Team members at the Northcote Bridge, Columbia Bridge and Calumet Bridge.

- What equipment is needed (pumps, etc.)
Equipment needed to set up aqua barriers: front-end loader or backhoe, fire engine with 2 1/2 inch hose and dump truck.

- How long will it take to install after materials brought on site
The aqua barrier will be set in place at each bridge deck and filled with water with the use of a fire engine. Once the aqua barriers are filled with water, sandbags will be used to seal any gaps. After the sandbags are in place, sand will be dumped on both sides of one aqua barrier at each bridge deck. Estimated time to install aqua barriers and sandbags at Northcote Bridge - 60 minutes; Columbia Bridge - 70 minutes; and Calumet Bridge - 70 minutes.

- Provide the technical data of the bladders
This material is contained in the attachment.

- Provide sketches of the dimensions for each location to be installed (height, length, width)
This material is contained in the attachment.

- Indicate the timing of when to mobilize and install (currently based on the gage at the Northcote Bridge, the Flood Warning Plan indicates Alert @ 595.5, Mobilize @ 596.5, and Install @ 597.5). The previous document had some reference to inches from some unknown location.
At 594 on the Northcote gauge, employees are notified to report back to work if after hours or on the weekend. At 595 Public Works crews will stage aqua barriers, sandbags and sand at each bridge deck. At 598 Public Works crews, Fire Dept and CERT members will close each bridge deck with a aqua barrier, sandbags and sand.

Jim Knesek
.
-----Original Message-----
From: Rochford, William A LRC [mailto:William.A.Rochford@usace.army.mil]
Sent: Monday, August 16, 2010 1:42 PM
To: Jim Mandon
Cc: Dan Repay; Bev Paris
Subject: Permit No. 10-01 - Munster Street Closures (Water Bladder)

Hi Jim,

Per our discussions last week, the Corps needs a complete submission with the following items addressed before we can approve of the request for the water bladders. The previous message indicated the requirements.

Specifically, please include:
- Narrative indicating the location where the bladders will be used for street closures:
The Town of Munster purchased three (3) aqua barriers to close off the bridge decks to prevent flooding at Northcote Bridge, Columbia Bridge and Calumet Bridge. The aqua barriers will be used in place of sandbags or dirt closures. The size of these aqua barriers are:
Northcote Bridge - 6ft high x 13.5 ft wide x 41 ft long; Columbia Bridge - 6ft high x 13.5 ft wide x 54 ft long; and Calumet Avenue Bridge - 4 ft high x 9 ft wide x 76 ft long.

- Indicate the location where the bladders will be kept for storage
The aqua barriers are stored at the Public Works Garage (508 Fisher St) on pallets in a secured area.

- Indicate how they will be moved to the locations
When the gauge at Northcote Bridge reaches the 595 level, Public Works crews will stage the aqua barriers, sandbags and sand at Northcote Bridge, Columbia Bridge and Calumet Bridge.
- Which department will install the bladders
- What equipment is needed (pumps, etc.)
- How long will it take to install after materials brought on site
- Provide the technical data of the bladders
- Provide sketches of the dimensions for each location to be installed (height, length, width)
- Indicate the timing of when to mobilize and install (currently based on the gage at the Northcote Bridge, the Flood Warning Plan indicates Alert @ 595.5, Mobilize @ 596.5, and Install @ 597.5). The previous document had some reference to inches from some unknown location.

Please let me know if you have any questions.

Thanks

Bill Rochford

Office: (312) 846-5450
Mob (BB): (312) 259-3476
william.a.rochford@usace.army.mil

-----Original Message-----
From: Rochford, William A LRC
Sent: Friday, July 30, 2010 11:33 PM
To: 'Bev Paris'
Cc: 'Dan Repay'
Subject: RE: Attached Image

Bev, Jim,

The photos provided do not satisfy the additional information requested in the previous message from April 30. Please see attached.

Bill Rochford

Office: (312) 846-5450
Mob (BB): (312) 259-3476
william.a.rochford@usace.army.mil

-----Original Message-----
From: Bev Paris [mailto:bparis@munster.org]
Sent: Tuesday, July 27, 2010 3:59 PM
To: Rochford, William A LRC
Subject: FW: Attached Image

Bill

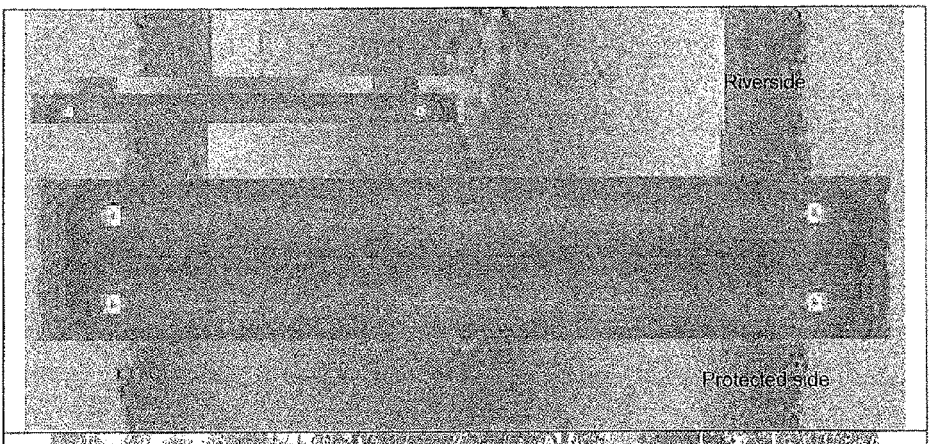
This is the information you requested on the bridge closures at Columbia and Calumet Ave for the aqua barriers. As soon as the Army Corp approves the aqua barriers, we will order the aqua barriers. Attached are the pictures, you can contact me if you have any questions.

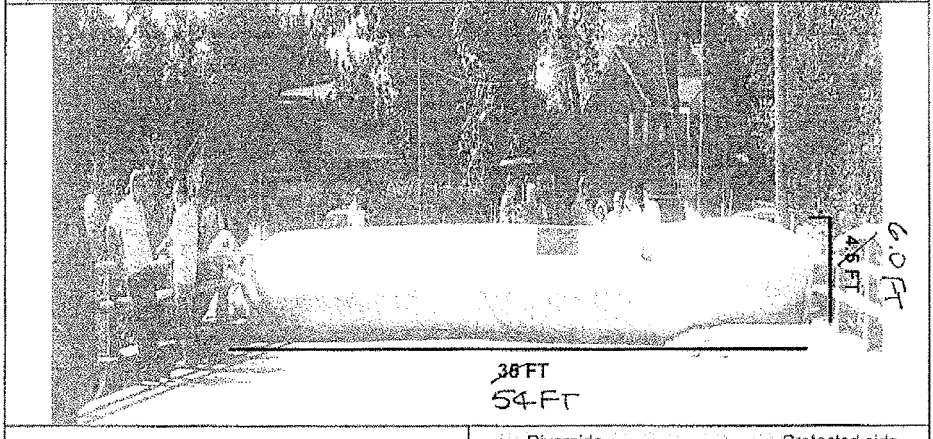
Jim Knesek
Town of Munster
219-836-6970

This email has been scanned by the MessageLabs Email Security System.
For more information please visit http://www.messagelabs.com/email

COLUMBIA AVE

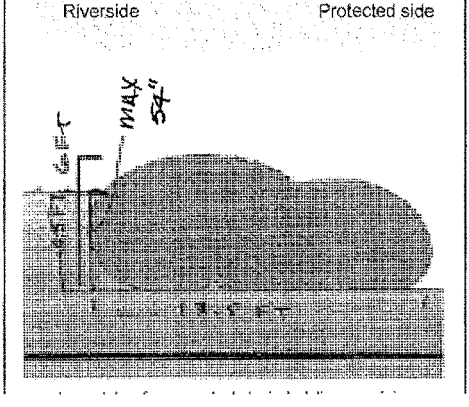
~~Northcote~~ Ave (S) Closure





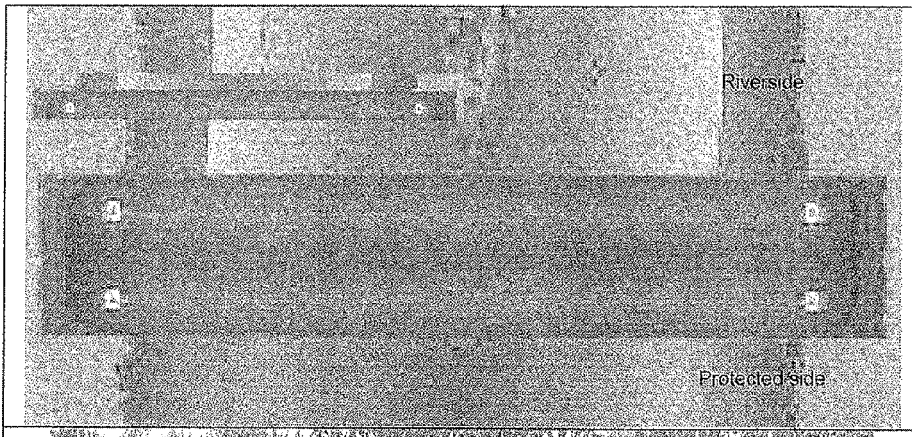
Levee Segment: Munster Levee

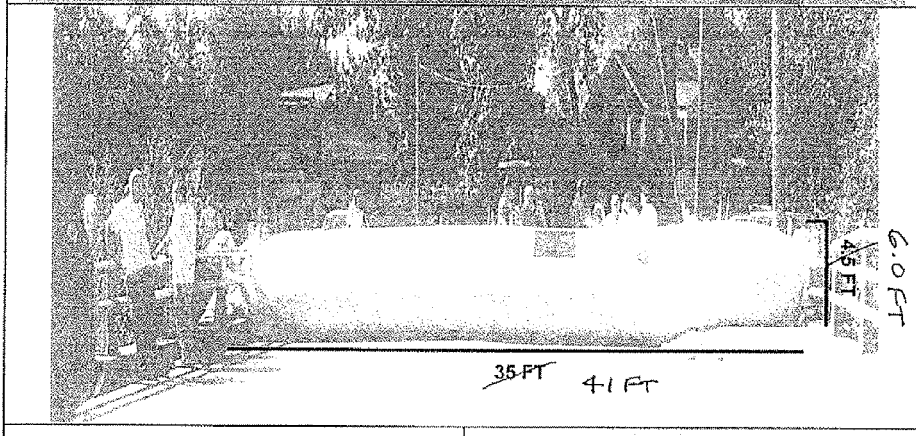
Closure Name: ~~Northcote~~ COLUMBIA Ave (S)
Closure Type: Water Bladder
Invert Elevation:
598.0 ft NGVD29
Materials Required: 1 bladder and ~~#~~ 250 sandbags
Est. Time to Install: ~~60~~ min.



Northcote Ave (S) Closure

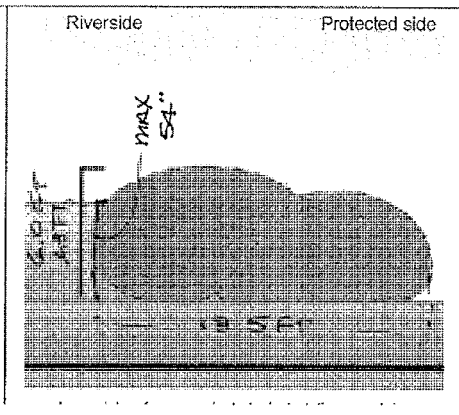
U.S. Army Corps of Engineers Chicago District

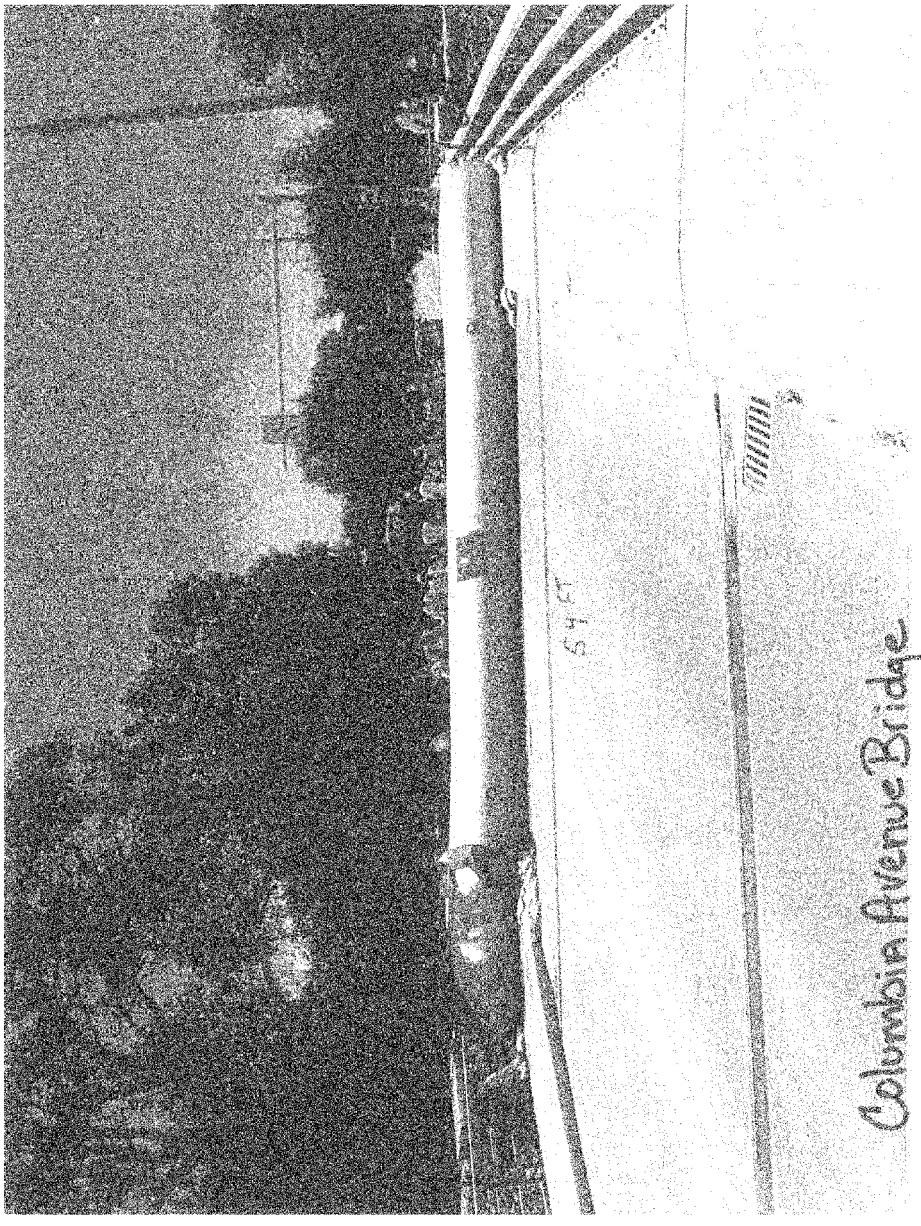




Levee Segment: Munster Levee

Closure Name: Northcote Ave (S)
Closure Type: Water Bladder
Invert Elevation:
598.5 ft NGVD29
Materials Required: 200
1 bladder and # sandbags
Est. Time to Install: 60 min.




54 FT
Columbia Avenue Bridge

Calumet Avenue Bridge
100 SANDBAGS TO FILL CAGES / 598 NGU029 / INSTALL TIME 60 MIN

WIPP™ System
Product Specification

1.1 WIPP™ Product Description

WIPPs™ are water inflated barriers used to control invasive floodwater. A WIPP™ is a single tube device which utilizes a patented inner restraint baffle/diaphragm stabilization system.

1.2 Specification

A water-inflated temporary barrier shall consist of the following:

1) **The water inflated barrier will consist of a self contained, single tube with an inner restraint baffle(s)/diaphragm(s) stabilization system. The water-inflated barrier must have the ability to stand alone, without any additional external mechanical or gravitational stabilization devices, as a positive water barrier and water management system.**
2) The water-inflated barrier shall be produced from heavy gauge polyvinyl chloride (PVC) reinforced with polyester. The PVC fabric used to create the inflatable barrier will be infield repairable utilizing a vinyl adhesive and patch material.
3) The water-inflated barrier must maintain mechanical stability in addition to providing anti rolling when exposed to uneven hydrostatic pressure from either side
4) The self-contained water inflated barrier shall have threaded fill ports and drain ports for rapid inflation and draining.
5) Method for connecting the individual units together will consist of overlapping the end of the units a specific length which will create a watertight connection. No other devices or methods for connecting the barriers are required.

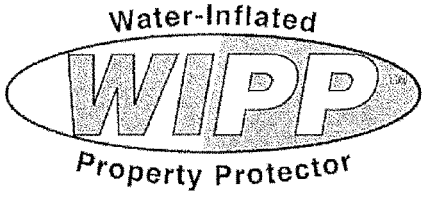
1.3 Barrier size requirements

The water-inflated temporary barrier height shall be determined as follows:

1) Static water height conditions shall not exceed 75% of the properly filled height of the barrier.
2) Dynamic water height conditions shall not exceed stated value during hydrodynamic installation procedures (See dynamic installation instructions for complete list of requirements).
3) Installation site criteria are required for assessment of all relevant factors.

Excess slope, high water velocities, dynamic loads resulting from wave actions, mounting surface irregularities, and changes in interrelated hydrological conditions can increase the required water inflated barrier height verses retention height requirements.

The WIPP System when properly used is a temporary barrier against surface water. Due to the unknown variables involved with the complex task of preventing floodwater from entering a facility, Hydro-Solutions, Inc. accepts not responsibility for floodwater infiltration under or around a properly inflated WIPP System. The WIPP System cannot prevent water from migrating underneath the system via cracks, crevices, pipes, etc., and/or porous soil conditions. Preparations should be made prior to a flood event and the installation of the WIPP System to make sure any area where water can infiltrate is properly sealed.



WIPP System™ Material Specifications

22 oz Vinyl Coated Polyester

Weight	22 oz/per square yard	
Fabric Polyester plain weave	1300 / 1300 denier	
Grab Tensile (warp x fill)	450x525 lbs/1 inch	5100*
Tongue Tear (warp x fill)	150x130 lbs	5134*
Adhesion (heat seal)	10 lbs/1 in	5970*
Cold Crack	-30° degrees F	
Treatments	Anti-Mildew, U.V. Pigment	

***Test method: US Federal, STD 191**
Primary color: Royal Blue
Alternative Colors: Yellow, Orange, Black, White

30oz Vinyl Coated Polyester

Weight	30oz./ per square yard	
Fabric Polyester plain weave	12(2) X 12(2) Full Panama 1500/1500 denier	
Grab Tensile(warp x fill)	822x767 lbs / 1inches	5100*
Tongue Tear(warp x fill)	244x233 lbs.	5134*
Adhesion	22 lbs/2inches	5970*
Cold Crack	-30 degrees F	
Treatments	Anti-Mildew, U.V. Pigment	

***Test method: US Federal, STD 191**
Primary color: Royal Blue
Alternative Colors: Orange, Yellow,Black, White

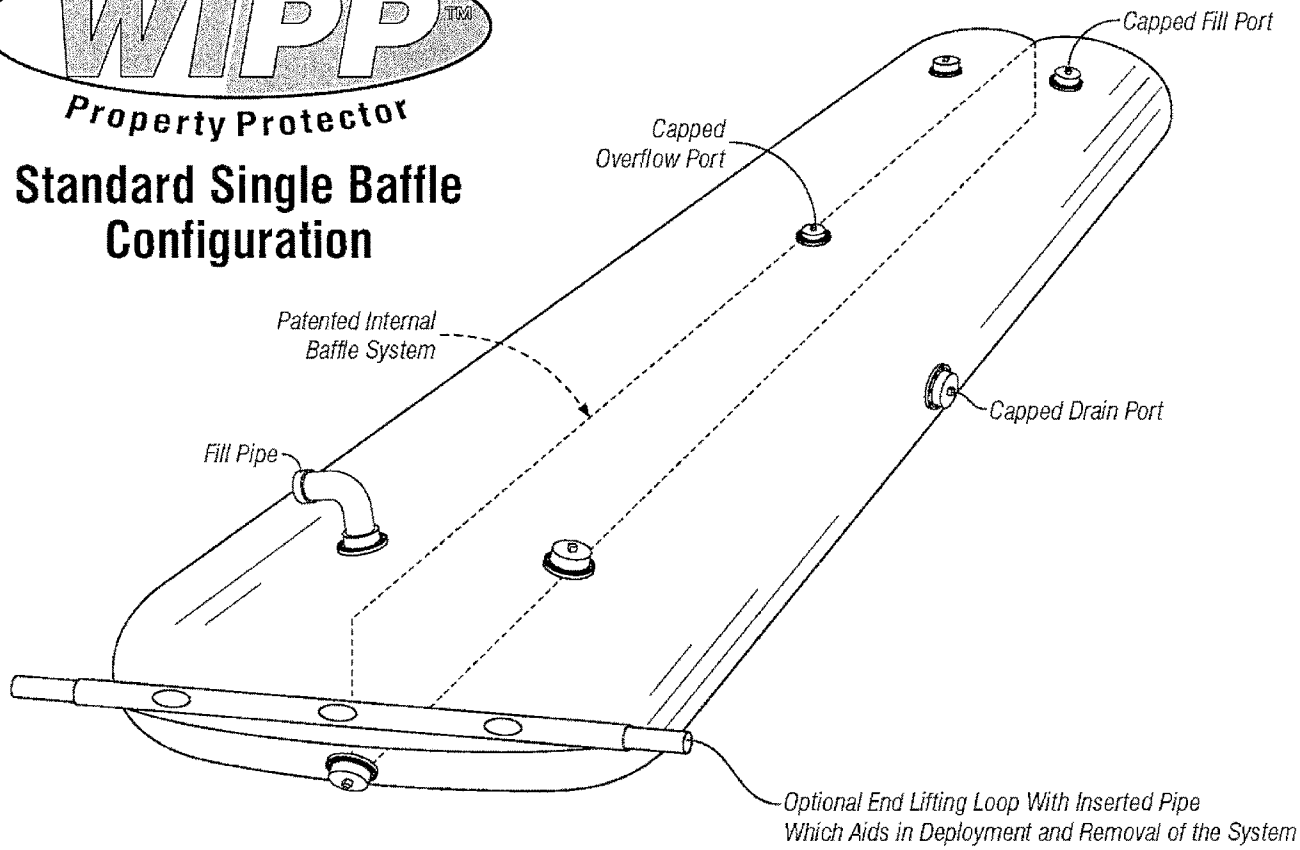
The vinyl material used for manufacturing this product will not leach or become hazardous to the aquatic environment under normal conditions.

Water-Inflated

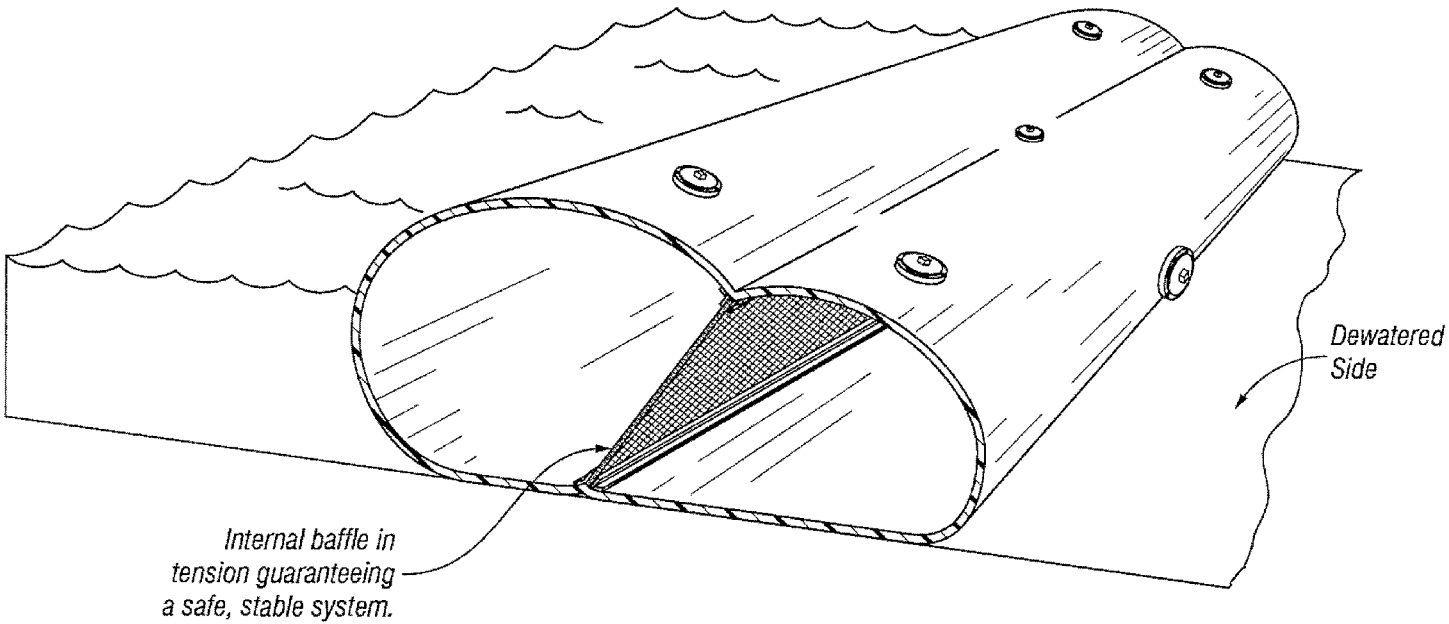
WIPP™

Property Protector

Standard Single Baffle Configuration



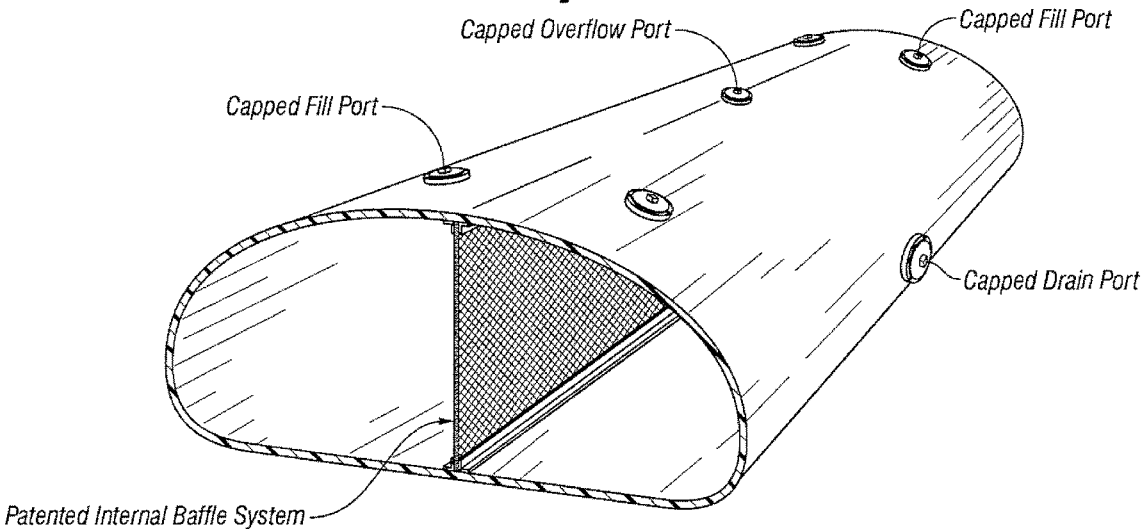
Inflated Water-Inflated WIPP™ Property Protector **stabilized.**



Water-Inflated

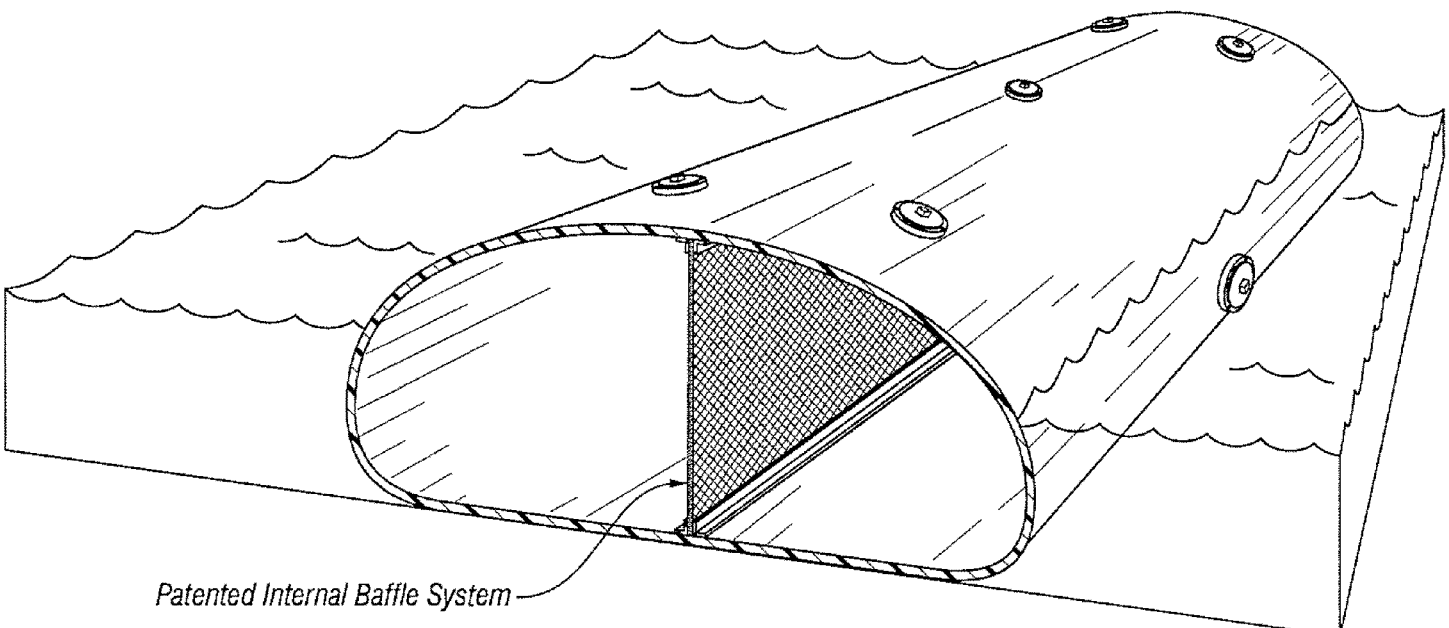
WIPP™

Property Protector

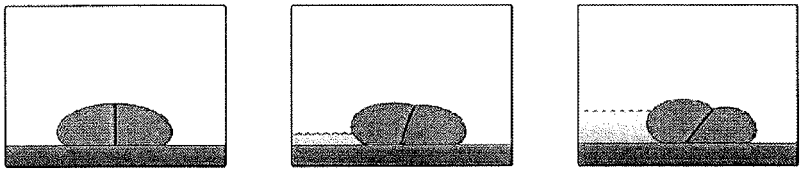


All external and internal components are welded together. This one-piece construction principle eliminates the problems associated with detached internal or external components which may become misplaced.

Inflated Water-Inflated WIPP™ Property Protector exposed to water on both sides.

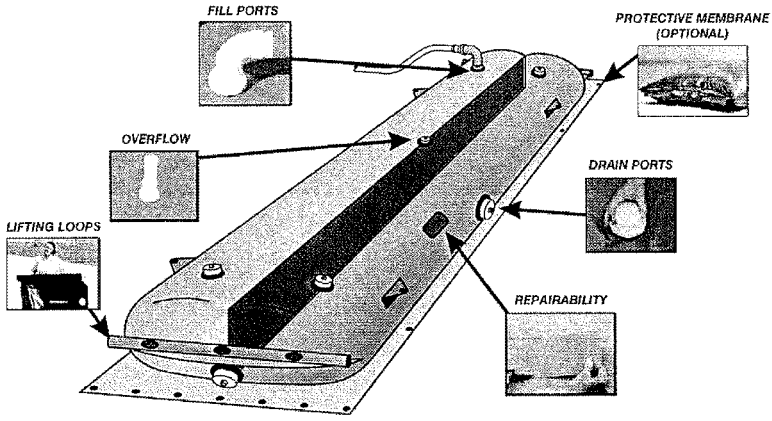


The Patented Baffle Makes the Difference



System prior to flooding. Baffle shifts to stabilize the unit. Protected site. Baffle has stabilized.

Unique Accessories Make Installation A Snap



Fill port with adapter: Each unit will contain the appropriate number of female threaded fill ports and hose adapters. Available in: ¾", 2", 3", and 4" inner diameter.

Drain ports: Each unit will be equipped with the appropriate number of drain ports and plugs. Available in: 2", 3", 4", and 8" inner diameter.

Overflow fitting: The overflow fitting provided will allow for proper inflation and over inflation protection.

Lifting loop: End loops are available and act as an aid in the installation and removal process.

Protective membrane: Optional outer membrane which provides additional protection to the barrier from rough terrain and debris.

Repairability: The external vinyl membrane is repairable in wet or dry conditions. A repair kit, with instructions, is provided with each order.

The WIPP™, Spil-Stop™, and Insta Tank™ have standard sizes and accessories. All accessories are interchangeable on all inflatable systems. Each inflatable system can be custom built for your unique application.

Made in the U.S.A.

www.wippsystem.com
800-245-0199

Hydrological Solutions, Inc.
Harnessing the Power of Water

7/21/2010

CELRC-TS- DH

MEMORANDUM FOR THE RECORD

SUBJECT: State Line Closures in Hammond and Munster

References

USACE Chicago District, Little Calumet River Flood Control Project, Engineering Documentation Report, March 2010

Engineering Technical Letter 1110-2-570 (Draft), Certification of Levee Systems for the National Flood Insurance Program, 12 September 2007

44 Code of Federal Regulations 65.10, Mapping of Protected Levee Systems, August 1986

Background

1. The Corps of Engineers – Chicago District (LRC) completed an Draft Engineering Documentation Report (March 2010) that describes alternatives for completing the project with 200 year protection on the north and south side of the river in the vicinity of the Indiana-Illinois state line. Three alternatives were presented in the report: rehabilitate and raise the Illinois levees in Calumet City and Lansing to the 200 year level of protection, construct a tieback along State Line Road in Hammond and Munster, or move the line of protection to the east to the NICTD railroad embankment. The report recognizes that the tiebacks along Stateline Road was the only alternative that met the requirements of the authorization and accomplished the necessary protection (200 year) within project authorized limits. The Local Sponsor (Little Calumet River Basin Development Commission) and the communities of Hammond and Munster have all expressed dissatisfaction with the alternatives presented in the report. The north-south tiebacks along State Line Road were not favored due to disruption to the community and high estimated real estate and construction costs. The tiebacks along the NICTD Railroad embankment were not desired because they left portions of Hammond and Munster west of the railroad embankment without 200 year protection. This alternative also would have left a number of properties in Hammond vulnerable to flooding at frequencies less than the 100 year event. Metropolitan Water Reclamation District (MWRD) issued a report in January of 2010 and found no economic justification for the proposed Illinois levee project in Calumet City and Lansing, reducing the likelihood these levees will provide an adequate project tieback in the near future.

2. After discussions with the Little Calumet River Basin Development Commission (LCRBDC) and Hammond and Munster, the Corps of Engineers has investigated the possibility of temporary closure tiebacks on Stateline Road to provide protection to the authorized level (200 year protection). LRC, LCRBDC and the communities of Hammond and Munster are currently considered several closure methods for State Line Road in Hammond and Munster. The three

most feasible methods currently being considered are concrete blocks, aqua barriers, and large geofabric bags filled with sand. The closures will be installed by the LCRBDC, community or contractor (per a formal agreement) so local resources will need to be available to install the closure as described in an operations plan.

3. The Southmoor area is on the north side of the river in Hammond between the NICTD Railroad and Hohman Avenue. This portion of the current construction contract has been temporarily suspended to determine an appropriate design approach since there is strong opposition to a permanent tieback on the state line to the originally adopted crest height (601.0 ft NGVD 29). Because of the excessive length, temporary tieback closures will likely need to be reduced to the lowest possible crest elevation to meet the minimum protection level for both the project authorization and for levee accreditation. The proposed crest elevation in the Southmoor area is also 601.0 (NGVD 29) as adopted from previous superiority analyses and this provides 4.8 ft and 3.6 feet of freeboard for the 100 year and 200 year flood stage, respectively based on current LRC modeling.

Purpose

4. The purpose of this memorandum is to establish the minimum closure crest elevation, a minimum action levels for installing the closure, and minimum installation time for installing the Stateline closures in Hammond and Munster and in the Southmoor area. Once established, this information will be used to guide discussions between LRC, LCRBDC, and the communities of Hammond and Munster.

Assumptions

5. To facilitate concise documentation of the hydrology and hydraulic considerations, the following assumptions have been made for establishing the design criteria of the tieback closures at the Stateline and for the line of protection in the Southmoor area.

a. The Calumet City Levee and Lansing Levee may provide additional lead time for the installation of the closures on the state line; however, relying on these levees for protection presents an unacceptable risk since these levees are not inspected by the Corps of Engineers. The criteria for 'when' and 'how quickly' the closure must be installed will be established assuming no additional protection provided by these levees.

b. A detailed analysis of the most appropriate closure method will be made based on the information presented in this memorandum and through discussion with the LCRBDC and communities on the resources available to meet these minimum criteria.

c. The closures proposed will be designed to be structural parts of the system during operation as required by the CFR 65.10.

d. Once designed, the closures will meet all necessary structural requirements for certification described in ETL 1110-2-570 and will be subject to all current operational analysis described in ETL 1110-2-570 or as superseded, including closure exercises.

e. The completed closure plan will include backflow prevention or provisions, including detailed instructions, to prevent backflow from sewers or any other gravity pipelines.

f. Dimensions of the tiebacks are based on a survey completed on 17 and 25 June 2010.

g. The entire closures will be installed east of the Indiana-Illinois Stateline in Hammond and Munster.

h. Based on the short lead time later described in this memorandum, the minimum time required to substantially complete the closure will be 8 hours or less. The resources required to accomplish this is beyond this scope of this memorandum.

Design Crest Elevations at the State Line and Southmoor area

6. The protection elevation of 599.0 feet (NGVD 29) at the Stateline will provide 2.0 feet freeboard for the 200 year flood event (597.0 ft NGVD 29) and 3.2 feet of freeboard for the 100 year flood event (595.8 ft NGVD 29). Corps of Engineers current evaluation criteria requires risk and uncertainty rather than minimum freeboard requirements. A risk and uncertainty analysis has been completed to demonstrate that this crest elevation exceeds the minimum threshold for providing both 100 and 200 year protection. The attached memorandum describes the risk and uncertainty performed (Attachment 7).

7. Based on the same analysis, the protection elevation in the Southmoor area has been determined to be 599.2 ft (NGVD 29), which will provide 1.9 feet of freeboard for the 200 year event and 3.0 feet of freeboard for the 100 year event. The reduced protection elevation will allow consideration of alternatives that will be less intrusive and will potentially be more acceptable to the affected residents. A temporary sandbag closure is also being considered in the Southmoor area.

Munster Closure Tieback

8. The Munster tieback closure will begin where the continuation of Stateline Road intersections the I-80 / 94 embankment and will continue to just south of Beverly Place, where it ties to elevation 599.0 ft (NGVD 29). The total closure tieback length is 2660 feet long. The tieback will have an average height of approximately 1.5 feet between Station 00+00 and 10+00 (near the intersection of Adelaide Place). Between Station 10+00 and

26+60 the average height is just less than 1 foot. The Munster closure tieback layout and profile are shown in Attachments 1 and 2.

Hammond Closure Tieback

9. The Hammond tieback closure will begin on the western end of the Forest Avenue Levee and will continue to the north for approximately 3120 feet, where it ties to elevation 599.0 ft (NGVD 29) near Ind Illi Parkway. The closure will have an average height of three feet between the Forest Avenue and Lawndale Street (Station 21+70), and will have a maximum height of just greater than 4 feet near 172nd Street (Station Station 02+60). The height of the closure steadily decreased between Stations 21+70 and 31+20. The Hammond closure tieback layout and profile are shown in Attachments 3 and 4.

Lead Time and Response

10. Hydrographs from both the synthetic events (24 hour duration) and the September 2008 flood event show that the lead time for installing the closure can be very short. During the September 2008 flood event, Thornton Reservoir was in place as well as most project features, with the exception of the Hart Ditch Control Structure. A plot of the nearby USGS gage and the basin rainfall shows nearly simultaneous and rapid stage increases as a result intense rainfall. A plot of the 100 year, 24 hour synthetic event with all project features shows similar river response to heavy rainfall (Attachments 5 and 6).

11. High river stages can also be reached from longer duration rainfall events or events that occur in sequence, where a response to observed river stages is appropriate. The Flood Warning Manual establishes alert, warning and installation of other closures based on approximately 3 feet, 2 feet and 1 foot below the closure elevation, respectively. This secondary criterion will be adopted as an appropriate response for longer duration river rises.

Stateline in Hammond

12. Assuming no overbank flanking protection from Illinois, the 25 year event could potentially inundate portions of the Stateline area in Hammond. Since both observed and synthetic events show near simultaneous rainfall and stage increases, the installation for Hammond tieback closure will need to proceed from alert, mobilize to installation based on the forecast of rainfall of 5 inches of rainfall or greater in any 24 hour period or the forecast of 4 inches or more of rainfall with previous rainfall. 5 inches of rainfall corresponds to slightly less than the 25 year rainfall. Regardless of either forecasted or actual rainfall, the following alert, mobilize and installation should be followed for longer duration events (greater than 24 hours) with slower rising river conditions.

Level	**Little Calumet River (Muster Gage)**
Alert	592.0 ft NGVD (11.3')
Mobilize	593.0 ft NGVD (12.3')
Installation	594.0 ft NGVD (13.3')

Stateline in Munster

13. Backflow potential from Illinois to Indiana into Munster does not occur until flood stages are near the 200 year level (597.0 ft NGVD 29). While freeboard protection in this area is important due to inherent uncertainty, the high closure elevation allows additional time for installation. Regardless of either forecasted or actual rainfall, the following alert, mobilize and installation should be followed for longer duration events (greater than 24 hours) with slower rising river conditions.

Level	**Little Calumet River (Muster Gage)**
Alert	594.0 ft NGVD (13.3')
Mobilize	595.0 ft NGVD (14.3')
Installation	596.0 ft NGVD (15.3')

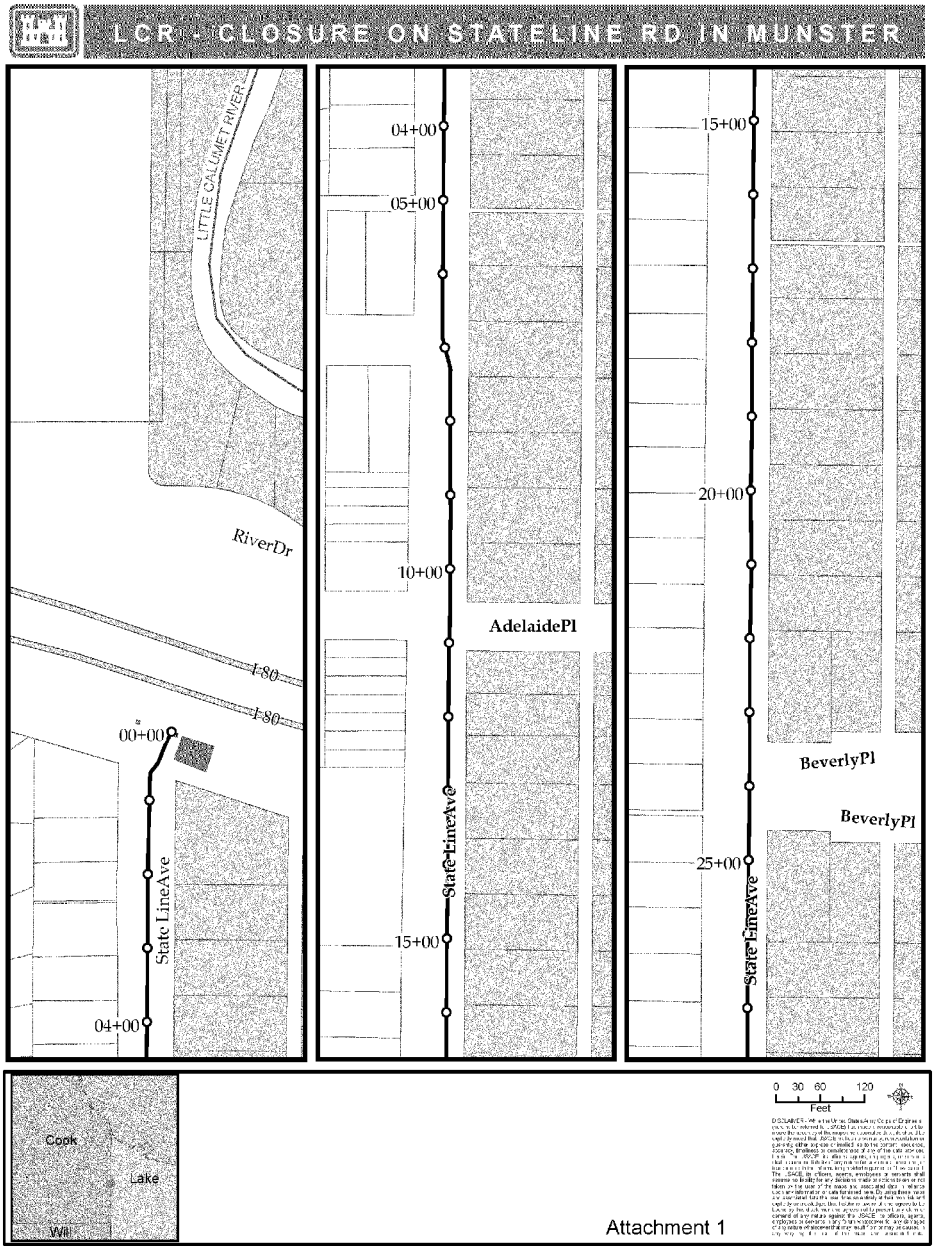
Southmoor Area

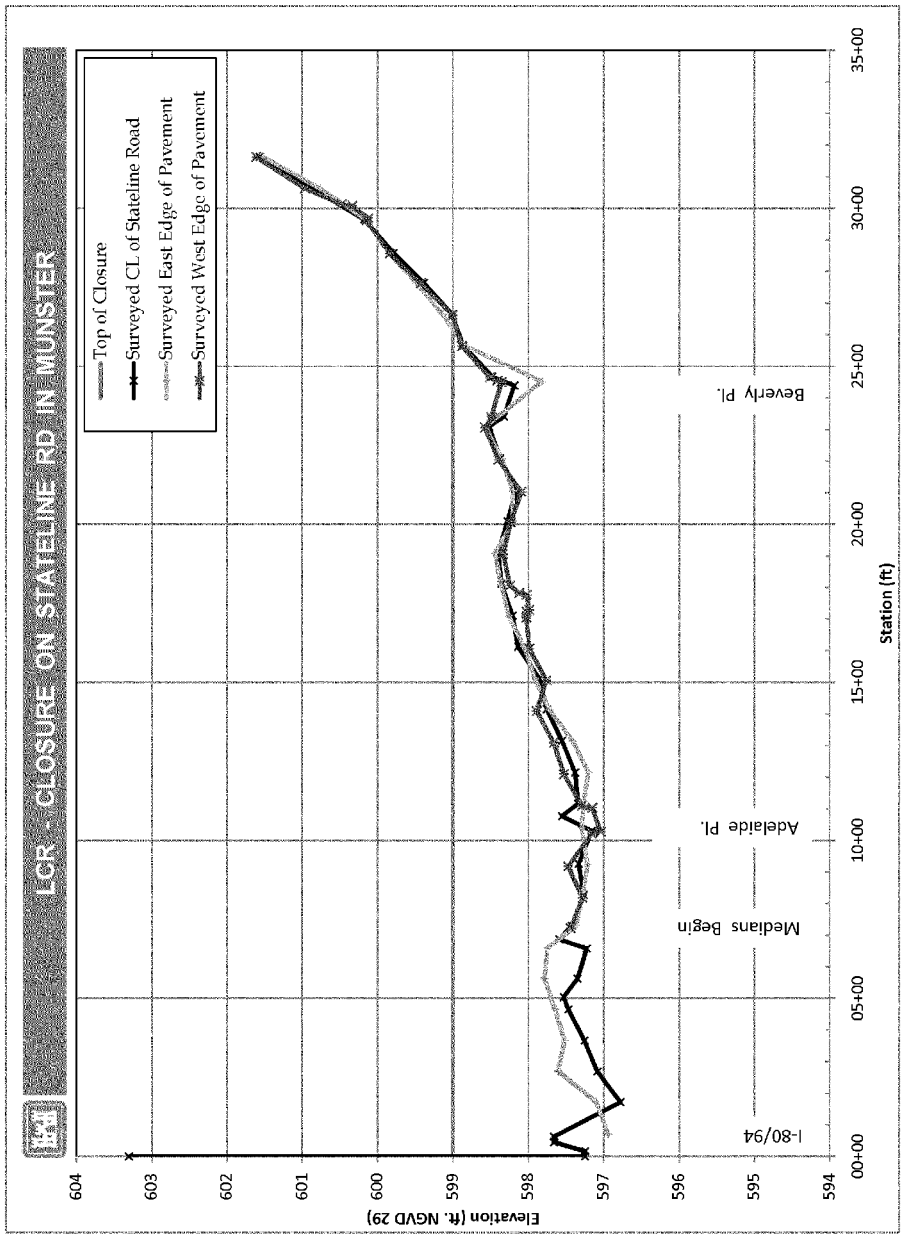
14. Due to tieback constraints at the Stateline, several alternatives are being considered for the Southmoor area. All of these alternatives include a line of protection up to 599.2 ft (NGVD 29). Alternative 2 includes a 100 foot wide, 3 foot high sandbag closure. Alternative 3 includes a 200 foot wide, 3 foot high sandbag closure. The sandbag closures are intended to avoid construction in locations where it is not desired by local property owners. If a closure is used in this location, regardless of either forecasted or actual rainfall, the following alert, mobilize and installation should be followed for longer duration events (greater than 24 hours) with slower rising river conditions.

Level	Little Calumet River (Muster Gage)
Alert	594.0 ft NGVD (13.3')
Mobilize	595.0 ft NGVD (14.3')
Installation	596.0 ft NGVD (15.3')

15. Please contact Mr. Joel Schmidt (x 5475) or Mr. Rick Ackerson (x 5511) of the Hydraulic and Environmental Engineering Section if you have further questions.

Jay A. Sommer, P.E.
Chief, Hydraulic and Environmental
Engineering Section


LCR - CLOSURE ON STATELINE RD IN MUNSTER
LITTLE CALUMET RIVER
RiverDr
I-80
I-80
00+00
04+00
State LineAve
04+00
05+00
10+00
15+00
AdelaidePl
State LineAve
15+00
20+00
25+00
BeverlyPl
BeverlyPl
State LineAve
Cook
Lake
Wil
0 30 60 120
Feet
Attachment 1



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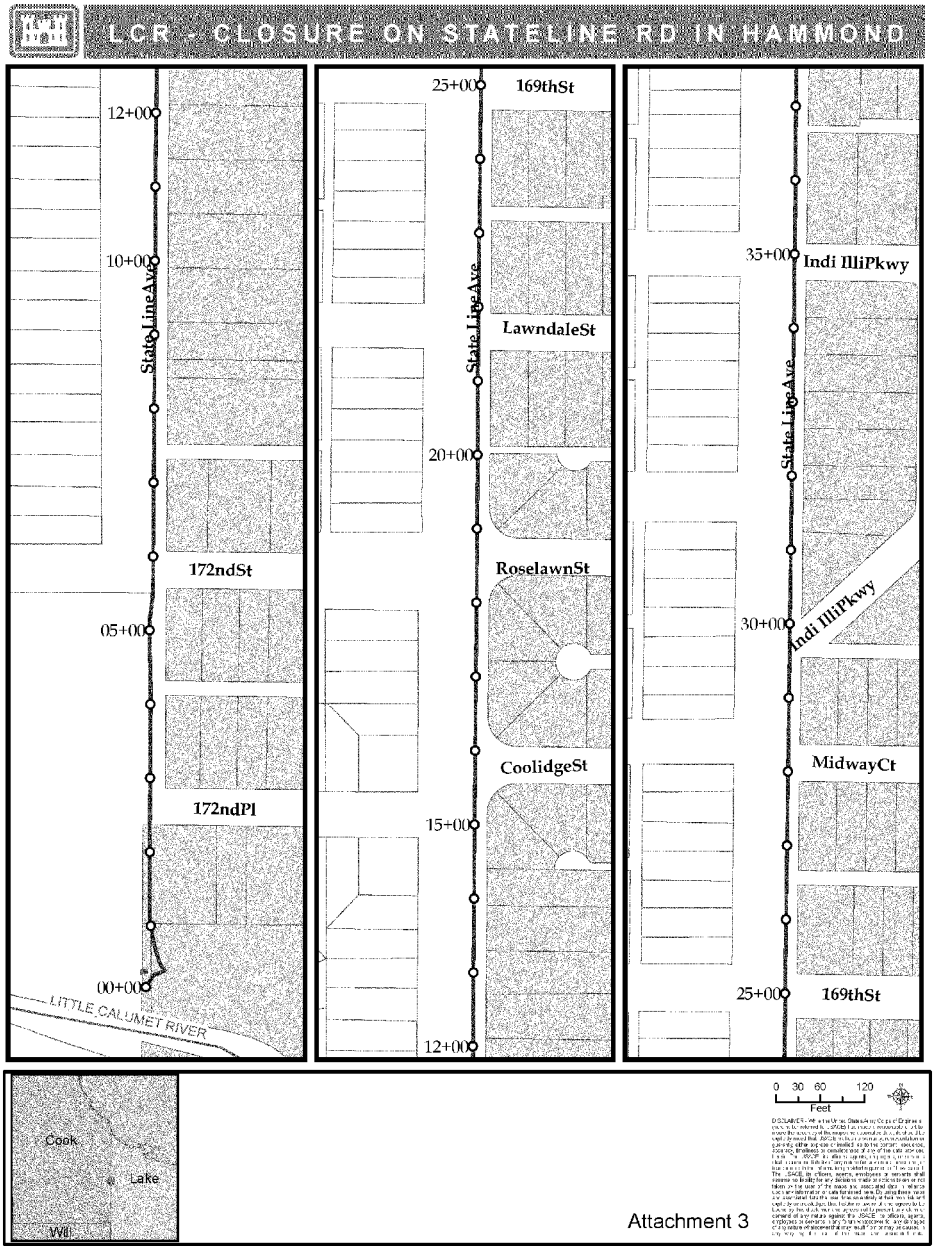
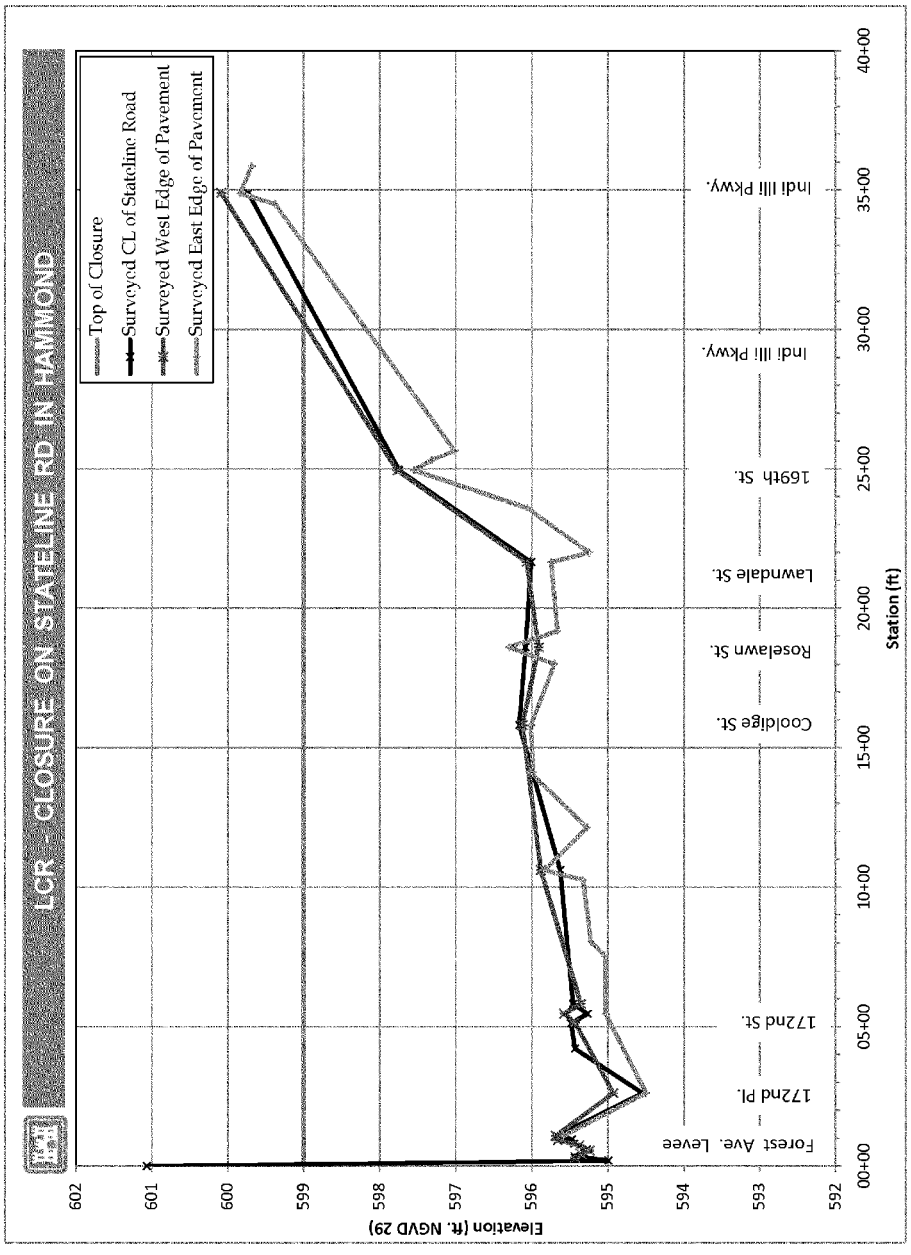

LCR - CLOSURE ON STATELINE RD IN HAMMOND
12+00
10+00
State Line Ave
172nd St
05+00
172nd Pl
00+00
LITTLE CALUMET RIVER
25+00
169th St
State Line Ave
Lawndale St
20+00
Roselawn St
Coolidge St
15+00
12+00
35+00
Indi Illi Pkwy
State Line Ave
30+00
Indi Illi Pkwy
Midway Ct
25+00
169th St
Cook
Lake
Will
0 30 60 120
Feet
Attachment 3



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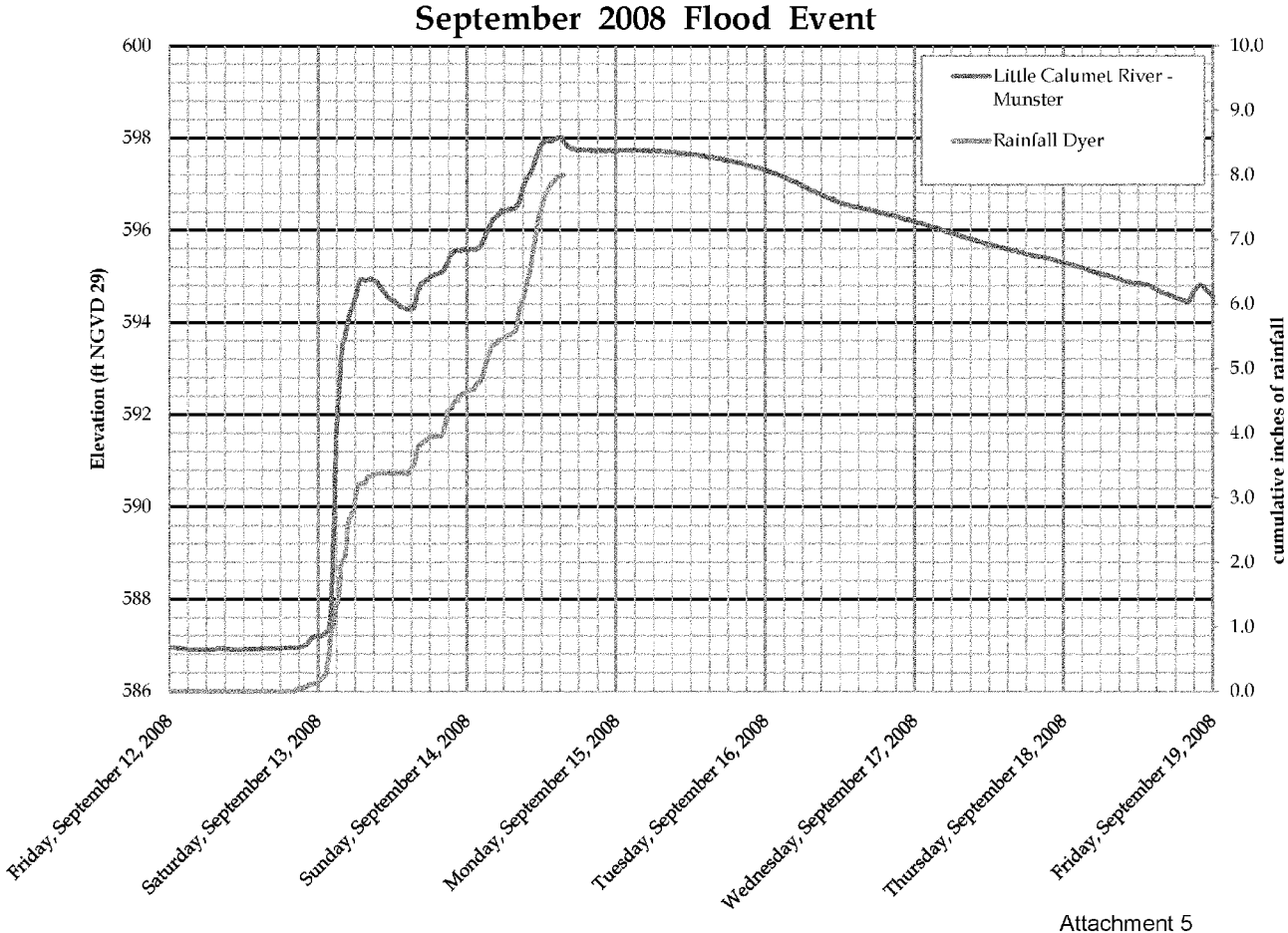
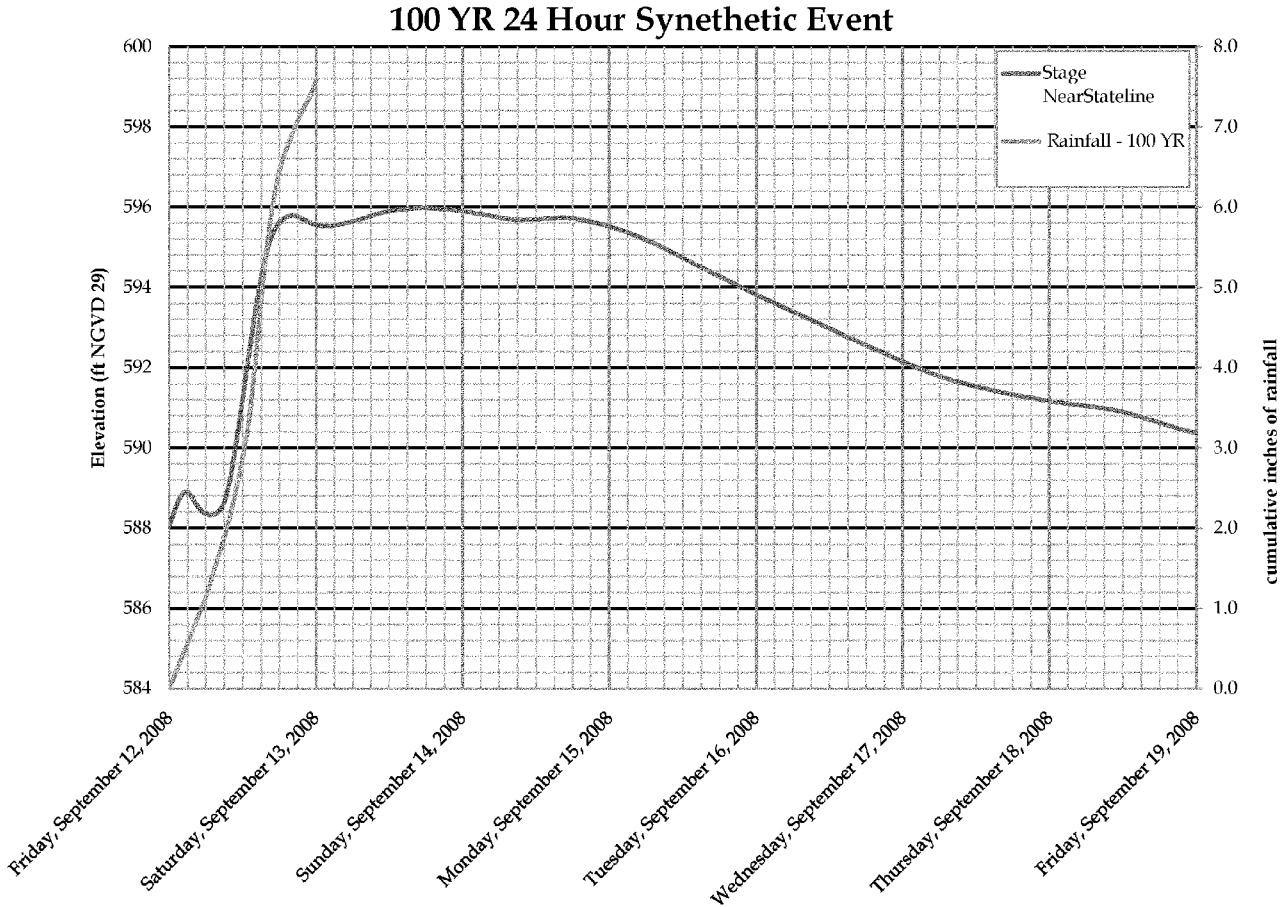


Attachment 5



Attachment 6

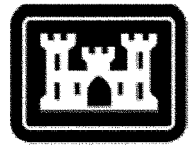
LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

Appendix B

Review of Hydrologic and Hydraulic Analyses

Prepared By:

U.S. Army Corps of Engineers
Chicago District



March 2012

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CELRC-TS-DH

OCT 07 2011

MEMORANDUM FOR CELRC-PM-PM

SUBJECT: Little Calumet River Flood Control Project – 2011 Limited Re-evaluation Report – Summary of HH Inputs for HEC-FDA Analysis

1. A request was made by PM-PM to provide HH input information for the 2011 Little Calumet River Flood Control Project Limited Re-evaluation Report (LRR) for the HEC-FDA (Hydrologic Engineering Center - Flood Damage Analysis) economic analysis.

2. Hydraulic input data for the HEC-FDA model was taken from the most current Little Calumet River HEC-RAS (Hydrologic Engineering Center - River Analysis System) unsteady flow model for the river stage (exterior) data. Project condition interior stage data was taken from interior drainage analyses presented in Little Calumet River project documents Feature Design Memorandum (FDM) 3, FDM 6, Burr Street Betterment Levee Design Analysis, and the East Reach Remediation Design Analysis.

3. Four different conditions were analyzed using HEC-FDA; the without project (existing/pre-project) condition, the without project condition assuming that the Thorn Creek Reservoir (hypothetical condition) is in place, the Corps Levee Project condition (levee overtopping condition) and Corps Levee Project condition (interior flooding condition). Exterior river stage data was used for the H & H input for the first three conditions and interior stage data was used for analyzing the last condition.

4. The Little Calumet River HEC-RAS unsteady flow model has a long history of development and updating over the years. The original unsteady flow model (UNET) was developed for FDM 5 based on steady state HEC-2 hydraulic models and HEC-1 hydrology models developed for FDM 2, and also previous to that were used for the Phase I and Phase II General Design Memorandums (GDM). The UNET model was later updated during the East Reach Remediation Design Analysis and later an update was performed in 2002 when the UNET model was updated using Bulletin 70/71 precipitation in lieu of the previous TP-40 rainfall data along with other updates. In 2005, the model was converted to HEC-RAS and updated with new bridge data mostly in Illinois. Further updates were made in 2011 and provided to FEMA for their preliminary physical map revision of the Little Calumet River and portions of Burns Ditch and Deep River. The March 2011 version of the model that was presented to FEMA was the basic modeling used as the basis for the exterior stage data for input into the HEC-FDA.

5. The river miles for the HEC-FDA damage data was based on the UNET model river mile stationing for the reason that UNET had unique stationing that could represent

the full project with one reach, which was preferable for the HEC-FDA analysis. Also, GIS information for the HEC-FDA model had previously been developed based

on the UNET stationing and was readily available. The UNET stationing had to be changed for areas east of Hart Ditch during the model conversion in 2005 to HEC-RAS due to river stationing requirements specific to HEC-RAS. The maximum water surface stage data from the latest HEC-RAS modeling was converted back to the UNET stationing for the HEC-FDA analysis for the areas east of Hart Ditch.

6. For the without project and without project with Thorn Creek Reservoir condition models, the water surface profiles were used (with the appropriate river mile conversions). For the Project overtopping and Project interior models, the water surface profiles were assumed to be 'level pools' thoughout the damage reach, which would be a reasonable assumption for interior ponding conditions and overtopping breach conditions. Stage data for the interior water surfaces were taken from the stage frequency data from the appropriate interior analyses and stage data for the overtopping analysis was taken from the project condition exterior stages for the overtopping location assumed for the damage reach, which would also be the index location.

7. Levee overflow elevation information for the HEC-FDA model was taken from design documents and as-built plan data.

8. Consideration for setting the boundary limits for the HEC-FDA damage reaches as based on the river modeling was determined by community and also by the separate levee segments for the project levee overtopping condition. When the determination of damage reaches was first considered, setting the damage reach limits with consideration of the interior subareas was also to be included, but with more than 30 interior subareas, it was decided that including all of these in one analysis in one model was inordinately too complex and unnecessary. It was decided to make a separate project condition interior analysis HEC-FDA model based on interior subareas for computing damages from interior flooding.

9. Regarding the HEC-FDA input data for the interior analysis model, the relevant interior drainage analyses were reviewed in more detail. It was determined that most of the analyses for the interior subareas indicated insignificant structural damage either by consideration of the design stage as compared to the topography or some description in the write up such as "no structures flooded", "minimal street ponding" or some equivalent, etc in the design conclusions.

10. Regarding the risk and uncertainty input data for the HEC-FDA model, it should be noted that, through the project reach, in general, there are no unique stage-discharge relationships. Due to such manmade features as Hart Ditch and Burns Ditch and the very flat topography throughout the project, there are flow splits and flow reversals that undermine the ability to use a unique stage/discharge relationship that can be used on a consistent basis for a risk and uncertainty analysis. The Little Calumet River Flood Control Project Risk and Uncertainty Analyses performed for the State Line and the proposed East End tieback at the Penn Central Railroad were reviewed to determine the risk and uncertainty parameters for the HEC-FDA risk and uncertainty H&H input data for the LRR. A graphical analysis was used based on the water surface profiles with a 10 year period of record selected. The state line analysis presented a justification for this method and period of record selection. This same method was also used for the project interior analysis and project overtopping.

11. Figures 1-4 present the water surface profiles used in the FDA analysis. Figures 3 and 4 present the "flat pool" water surface profiles as noted in paragraph 6 above. Not all the profiles are used in damage computations. Damages are only computed for the designated reaches in the lower table on Figure 5. These are the limits of the interior subareas that remained after the screening process described in paragraph 9. Figure 6 presents the damages for the remaining interior areas. Figures 7 through 12 presents tabular water surface data for the without project condition as an example.

12. Please contact Mr. Rick Ackerson of the Hydraulic and Environmental Engineering Section at extension 5511 if you have further questions.

Jay A. Stemmler, P.E
Chief, Hydraulic and Environmental
Engineering Section

Without Project

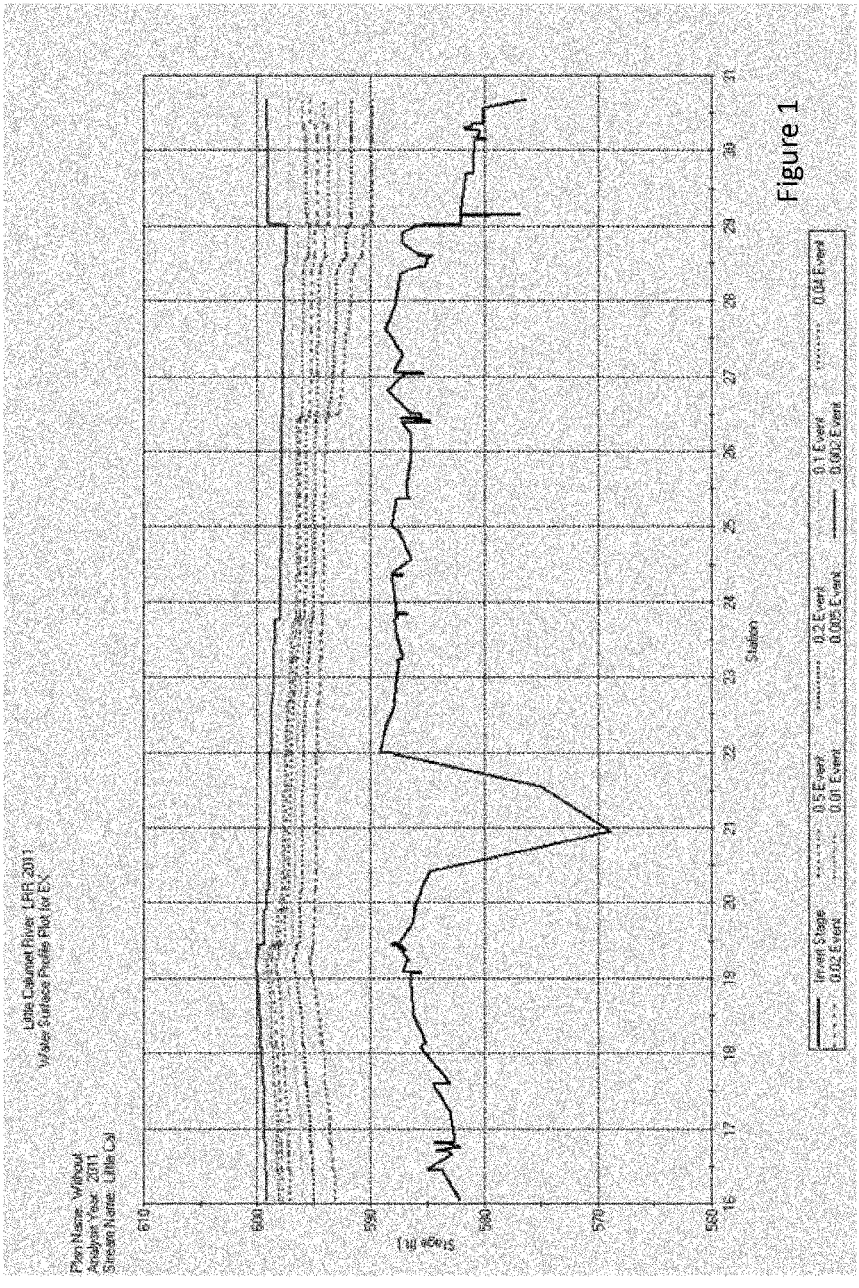


Figure 1

Without Project with Thornton Reservoir

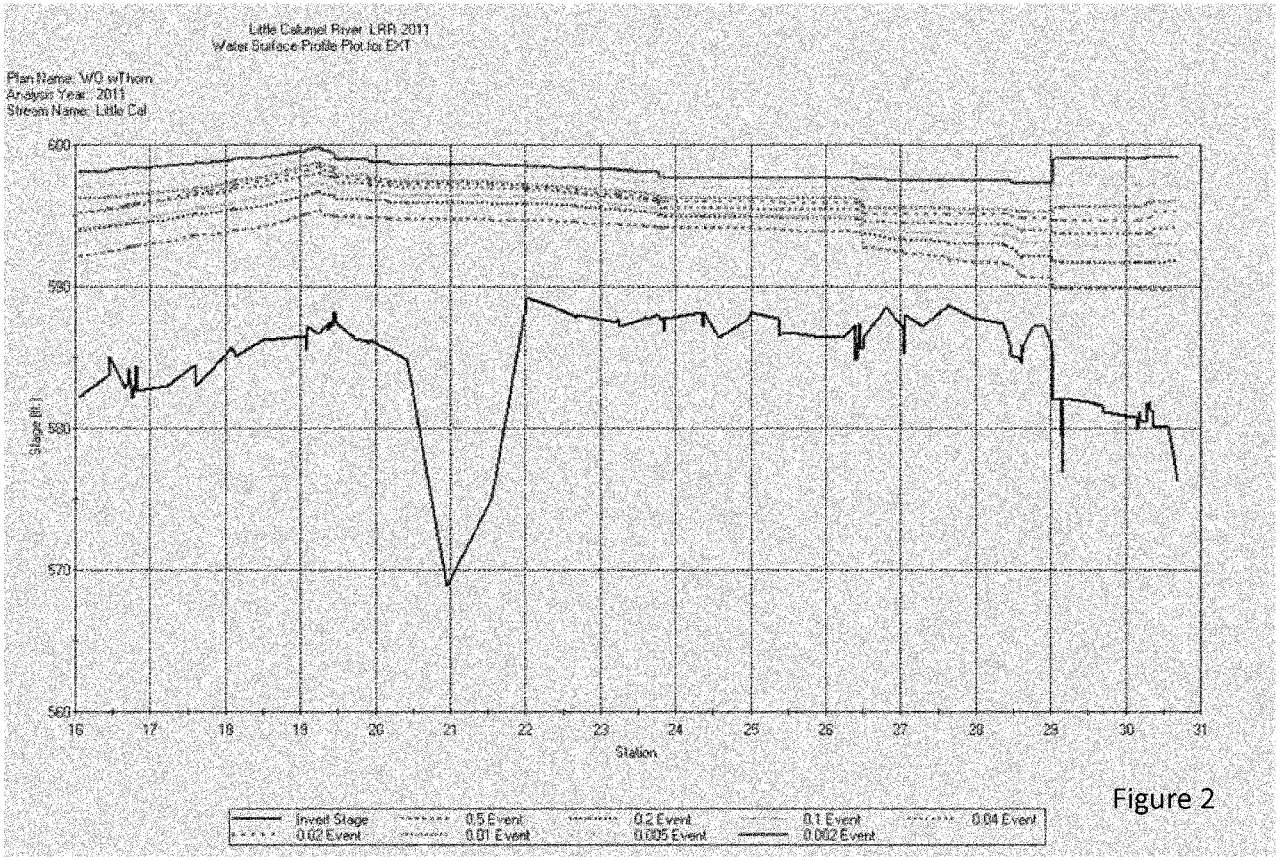


Figure 2

Project (Overflow)

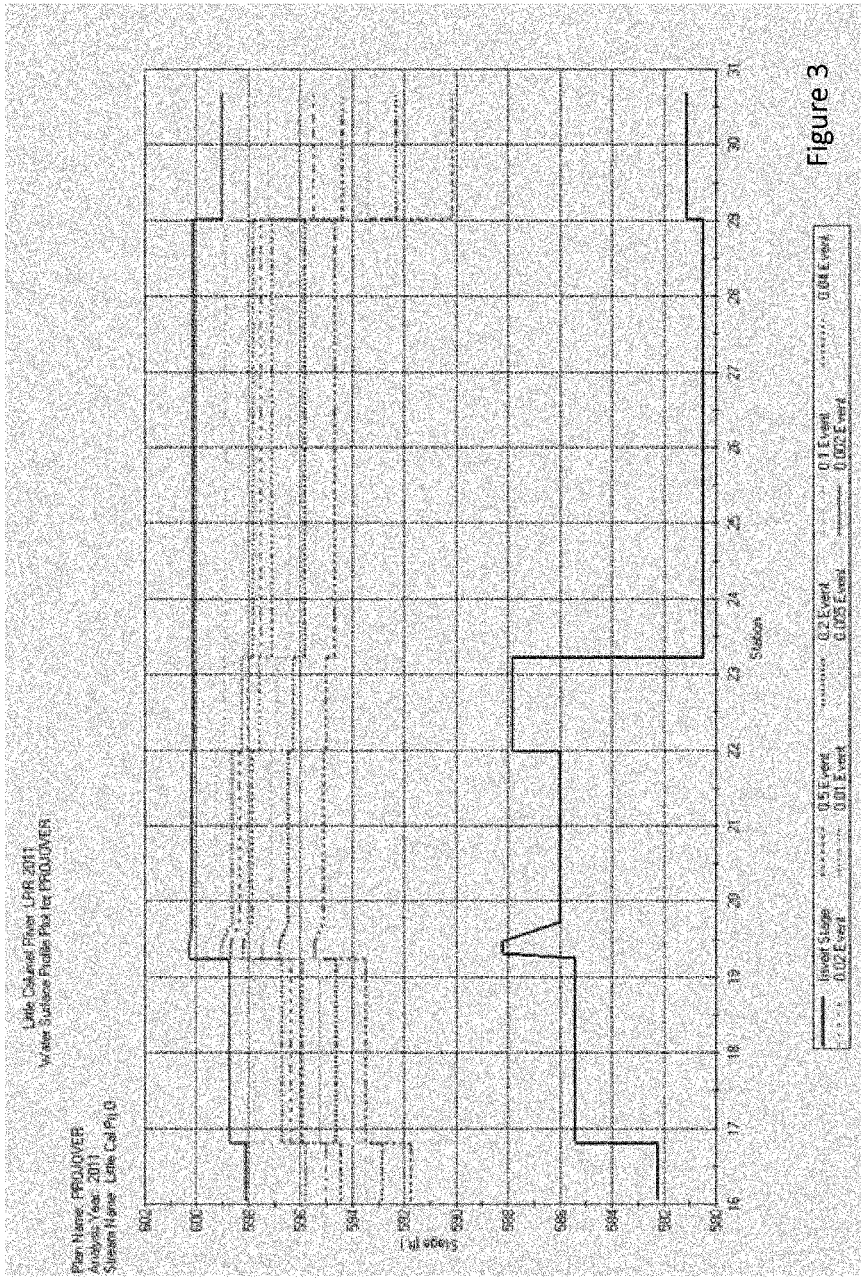


Figure 3

Project (Interior)

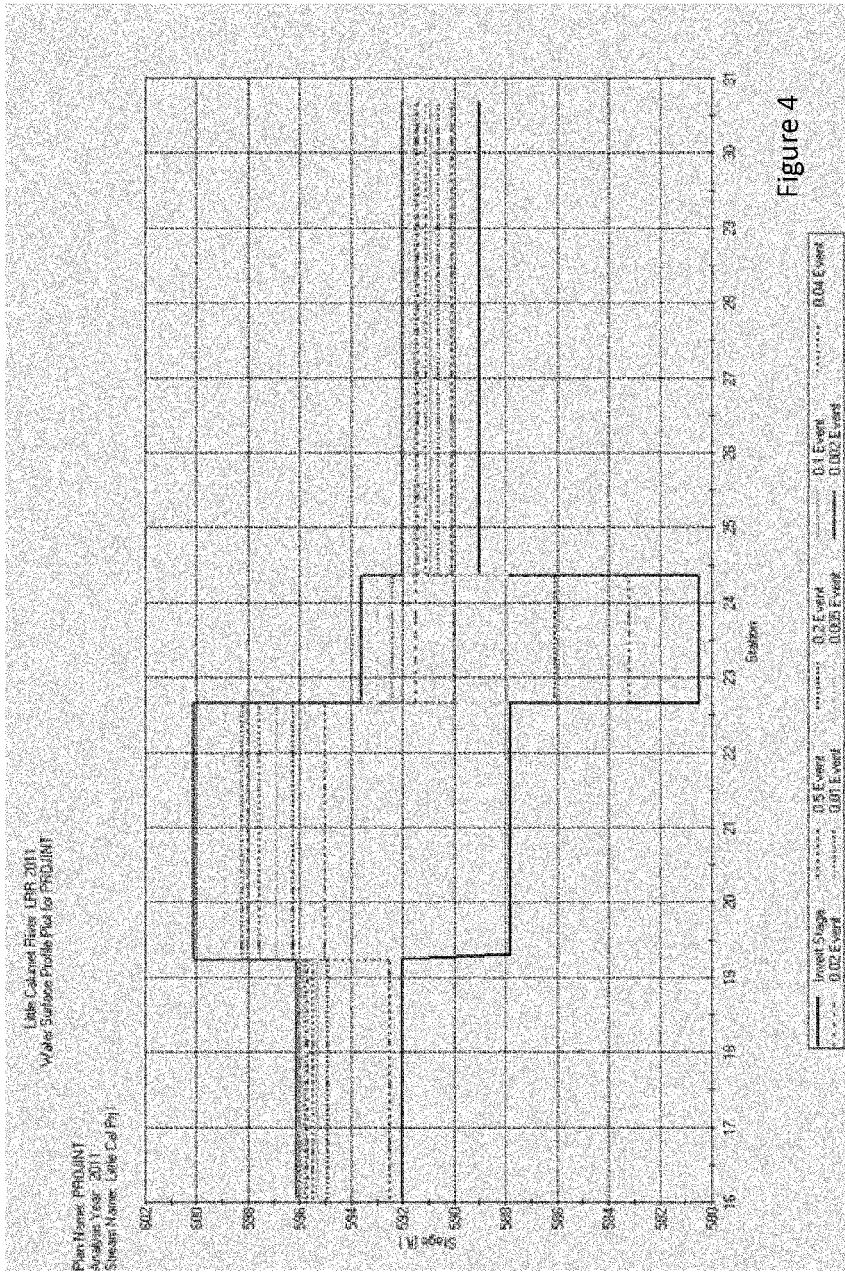


Figure 4

Reach Definition Interior Areas (based on Exterior Reaches)

Little Calumet River LRR 2011
List of All Damage Reaches
(by Index Location Station)

Stream Name	Damage Reach Name	Beginning Station	Ending Station	Bank	Index Location Station	Description
LCR	Reach2b	16.816	19.239	Left	18.102	L&NRR to Hart Ditch Hammond East North
LCR	Reach6a	21.990	29.032	Left	23.855	Cline Ave to ConRR Gary North
LCR	Reach7	23.235	30.195	Right	27.035	Collax Ave to I65 Gary South

Reach Definition Interior Areas (based on Interior Subareas)

Little Calumet River LRR 2011
List of All Damage Reaches
(by Index Location Station)

Stream Name	Damage Reach Name	Beginning Station	Ending Station	Bank	Index Location Station	Description
LCR	Reach2b	18.115	19.072	Left	19.072	Hammond Interior subarea 4N from FDM 6
LCR	Reach6a	22.673	24.363	Left	24.363	Gary North subarea 89 from FDM 3
LCR	Reach7	27.643	29.137	Right	27.643	Gary South subarea 2 from FDM 3

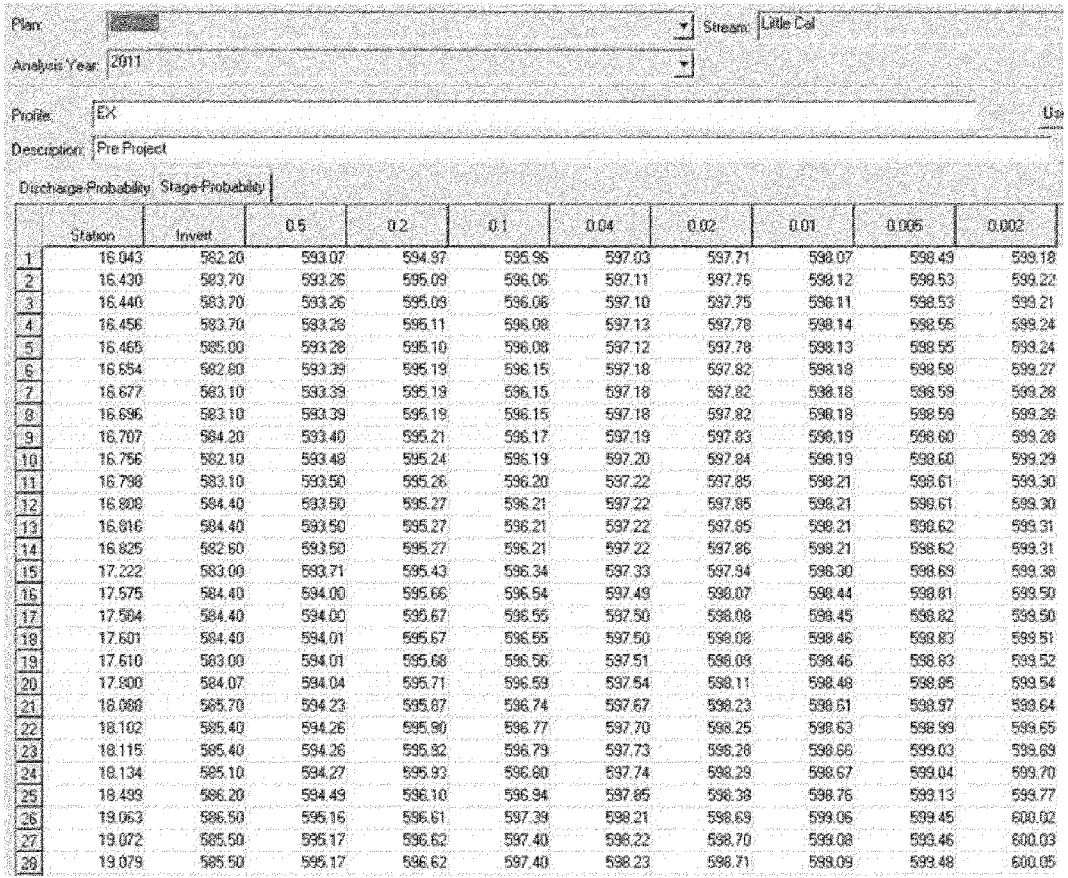
Figure 5

Little Calumet River LRR 2011
Expected Annual Damage by Damage Categories and Damage Reaches
for the Project (Plan added during import of Water Surface Profiles) Plan and Analysis Year 2010
(Damage in $1,000's)
Plan was calculated with Uncertainty

Stream Name	Stream Description	Damage Reach Name	Damage Reach Description	Damage Categories			
				APT	CIPS	EMERGENCY	RESIDENTIAL
LCR	Little Calumet River Indiana	Reach2b	L&NRR to Hart Ditch Hammor	0.00	0.00	0.00	267.89
		Reach6a	Cline Ave to ConRR Gary Nortl	0.00	0.00	0.00	1.51
		Reach7	Colfax Ave to I65 Gary South	0.00	0.00	0.00	4.97
	Total for stream: LCR			0.00	0.00	0.00	274.37

Stream Name	Stream Description	Damage Reach Name	Damage Reach Description	TRAFFIC	VEHICLE	Total
LCR	Little Calumet River Indiana	Reach2b	L&NRR to Hart Ditch Hammor	0.00	0.32	268.21
		Reach6a	Cline Ave to ConRR Gary Nortl	0.00	0.05	1.56
		Reach7	Colfax Ave to I65 Gary South	0.00	0.00	4.97
	Total for stream: LCR			0.00	0.37	274.74

Figure 6



Plan: [redacted] Stream: Little Cal

Analysis Year: 2011

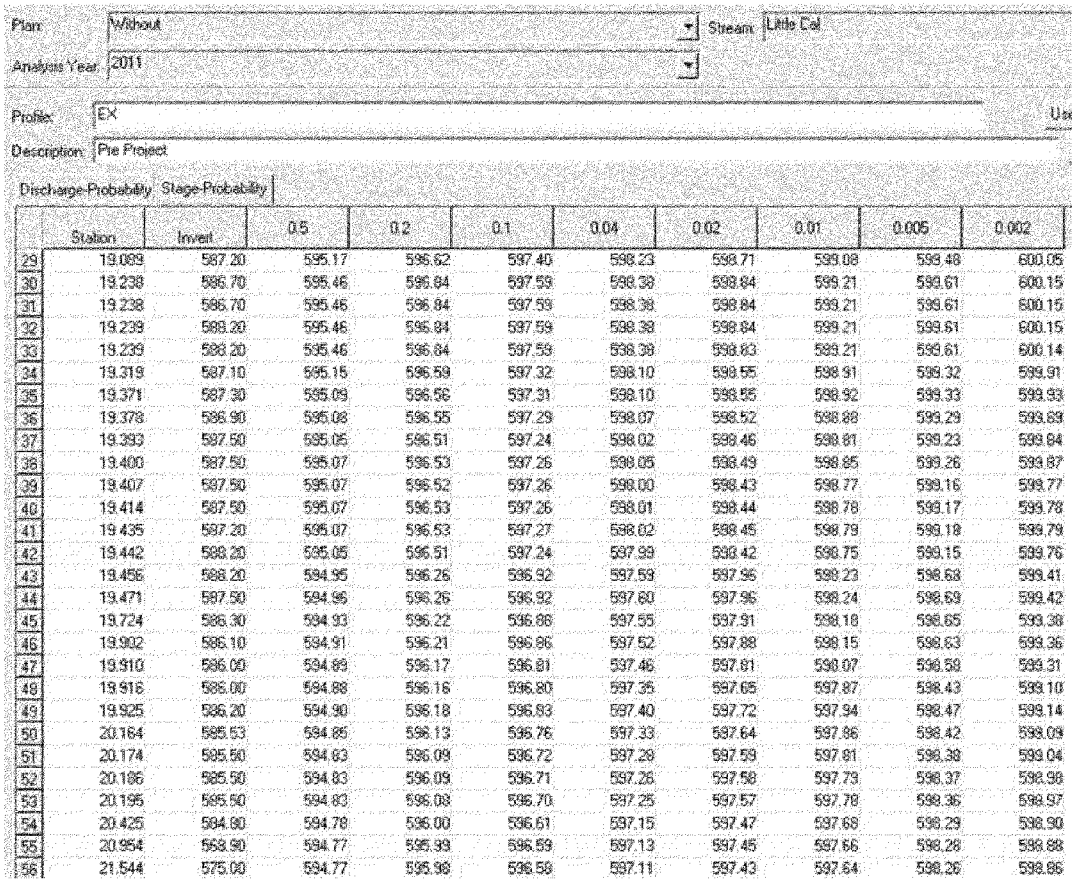
Profile: EX

Description: Pre Project

Discharge Probability | Stage Probability

	Station	Invert	0.5	0.2	0.1	0.04	0.02	0.01	0.005	0.002
1	16.043	582.20	593.07	594.97	595.96	597.03	597.71	598.07	598.49	599.18
2	16.430	583.70	593.26	595.09	596.06	597.11	597.76	598.12	598.53	599.22
3	16.440	583.70	593.26	595.09	596.06	597.10	597.75	598.11	598.53	599.21
4	16.456	583.70	593.28	595.11	596.08	597.13	597.78	598.14	598.55	599.24
5	16.465	585.00	593.28	595.10	596.08	597.12	597.78	598.13	598.55	599.24
6	16.654	582.80	593.39	595.19	596.15	597.18	597.82	598.18	598.59	599.27
7	16.677	583.10	593.39	595.19	596.15	597.18	597.82	598.18	598.59	599.28
8	16.696	583.10	593.39	595.19	596.15	597.18	597.82	598.18	598.59	599.28
9	16.707	584.20	593.40	595.21	596.17	597.19	597.83	598.19	598.60	599.28
10	16.756	582.10	593.48	595.24	596.19	597.20	597.84	598.19	598.60	599.29
11	16.798	583.10	593.50	595.26	596.20	597.22	597.85	598.21	598.61	599.30
12	16.800	584.40	593.50	595.27	596.21	597.22	597.85	598.21	598.61	599.30
13	16.816	584.40	593.50	595.27	596.21	597.22	597.85	598.21	598.62	599.31
14	16.825	582.60	593.50	595.27	596.21	597.22	597.86	598.21	598.62	599.31
15	17.222	583.00	593.71	595.43	596.34	597.33	597.94	598.30	598.69	599.38
16	17.575	584.40	594.00	595.66	596.54	597.49	598.07	598.44	598.81	599.50
17	17.584	584.40	594.00	595.67	596.55	597.50	598.08	598.45	598.82	599.50
18	17.601	584.40	594.01	595.67	596.55	597.50	598.08	598.46	598.83	599.51
19	17.610	583.00	594.01	595.68	596.56	597.51	598.09	598.46	598.83	599.52
20	17.800	584.07	594.04	595.71	596.59	597.54	598.11	598.48	598.85	599.54
21	18.088	585.70	594.23	595.87	596.74	597.67	598.23	598.61	598.97	599.64
22	18.102	585.40	594.26	595.90	596.77	597.70	598.25	598.63	598.99	599.65
23	18.115	585.40	594.26	595.92	596.79	597.73	598.28	598.66	599.03	599.69
24	18.134	585.10	594.27	595.93	596.80	597.74	598.29	598.67	599.04	599.70
25	18.499	586.20	594.49	596.10	596.94	597.85	598.38	598.76	599.13	599.77
26	19.063	586.50	595.16	596.61	597.39	598.21	598.69	599.06	599.45	600.02
27	19.072	585.50	595.17	596.62	597.40	598.22	598.70	599.08	599.46	600.03
28	19.079	585.50	595.17	596.62	597.40	598.23	598.71	599.09	599.48	600.05

Figure 7



Plan: Without | Stream: Little Cal

Analysis Year: 2011

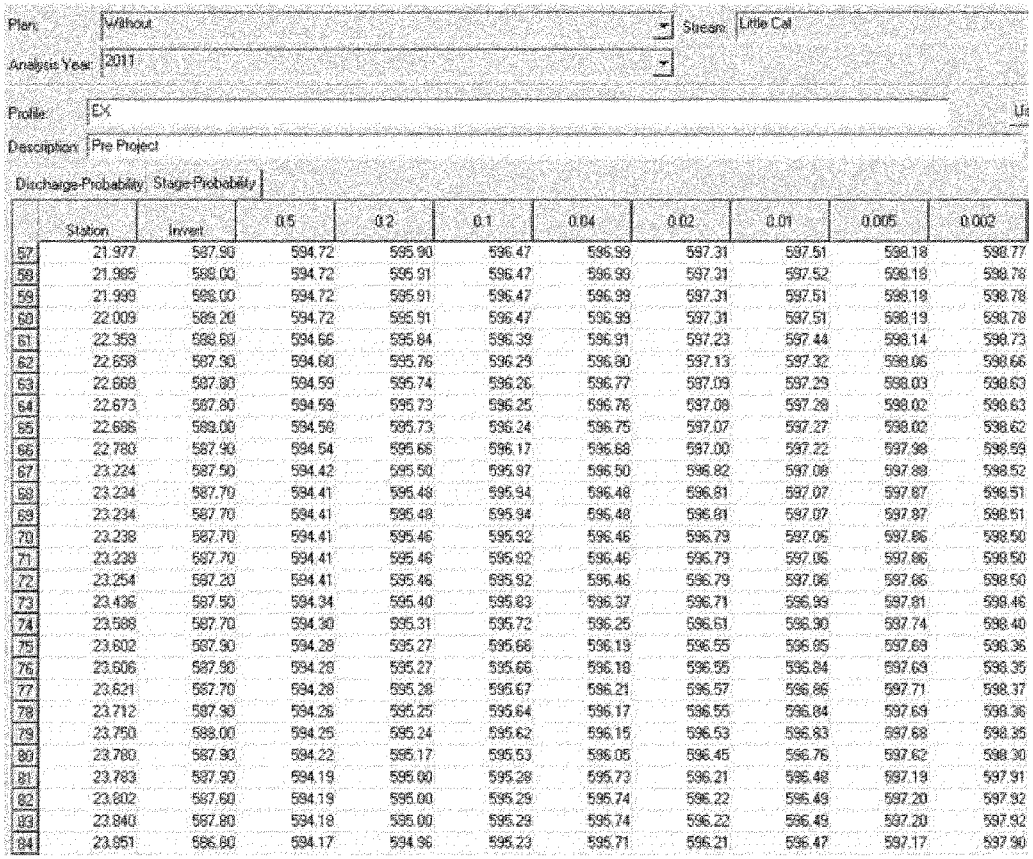
Profile: EX

Description: Pre Project

Discharge-Probability | Stage-Probability

	Station	Invert	0.5	0.2	0.1	0.04	0.02	0.01	0.005	0.002
29	19.089	587.20	595.17	596.62	597.40	598.23	598.71	599.08	599.48	600.05
30	19.238	586.70	595.46	596.84	597.59	598.38	598.84	599.21	599.61	600.15
31	19.238	586.70	595.46	596.84	597.59	598.38	598.84	599.21	599.61	600.15
32	19.239	588.20	595.46	596.84	597.59	598.38	598.84	599.21	599.61	600.15
33	19.239	588.20	595.46	596.84	597.59	598.38	598.83	599.21	599.61	600.14
34	19.319	587.10	595.15	596.59	597.32	598.10	598.55	598.91	599.32	599.91
35	19.371	587.30	595.09	596.56	597.31	598.10	598.55	598.92	599.33	599.93
36	19.378	586.90	595.08	596.55	597.29	598.07	598.52	598.88	599.29	599.89
37	19.393	587.50	595.05	596.51	597.24	598.02	598.46	598.81	599.23	599.84
38	19.400	587.50	595.07	596.53	597.26	598.05	598.49	598.85	599.26	599.87
39	19.407	587.50	595.07	596.52	597.26	598.00	598.43	598.77	599.16	599.77
40	19.414	587.50	595.07	596.53	597.26	598.01	598.44	598.78	599.17	599.78
41	19.435	587.20	595.07	596.53	597.27	598.02	598.45	598.79	599.18	599.79
42	19.442	588.20	595.05	596.51	597.24	597.99	598.42	598.75	599.15	599.76
43	19.456	588.20	594.95	596.26	596.92	597.59	597.96	598.23	598.63	599.41
44	19.471	587.50	594.96	596.26	596.92	597.60	597.96	598.24	598.69	599.42
45	19.724	586.30	594.93	596.22	596.86	597.55	597.91	598.18	598.65	599.38
46	19.902	586.10	594.91	596.21	596.86	597.52	597.88	598.15	598.63	599.36
47	19.910	586.00	594.89	596.17	596.81	597.46	597.81	598.07	598.58	599.31
48	19.918	586.00	594.88	596.16	596.80	597.35	597.65	597.87	598.43	599.10
49	19.925	586.20	594.90	596.18	596.83	597.40	597.72	597.94	598.47	599.14
50	20.164	585.53	594.86	596.13	596.76	597.33	597.64	597.86	598.42	599.09
51	20.174	585.50	594.83	596.09	596.72	597.29	597.59	597.81	598.38	599.04
52	20.186	585.50	594.83	596.09	596.71	597.26	597.58	597.79	598.37	598.98
53	20.195	585.50	594.83	596.08	596.70	597.25	597.57	597.78	598.36	598.97
54	20.425	584.80	594.78	596.00	596.61	597.15	597.47	597.68	598.29	598.90
55	20.954	583.90	594.77	595.99	596.59	597.13	597.45	597.66	598.26	598.88
56	21.544	575.00	594.77	595.98	596.59	597.11	597.43	597.64	598.26	598.86

Figure 8



Plan: Without Stream: Little Cal

Analysis Year: 2011

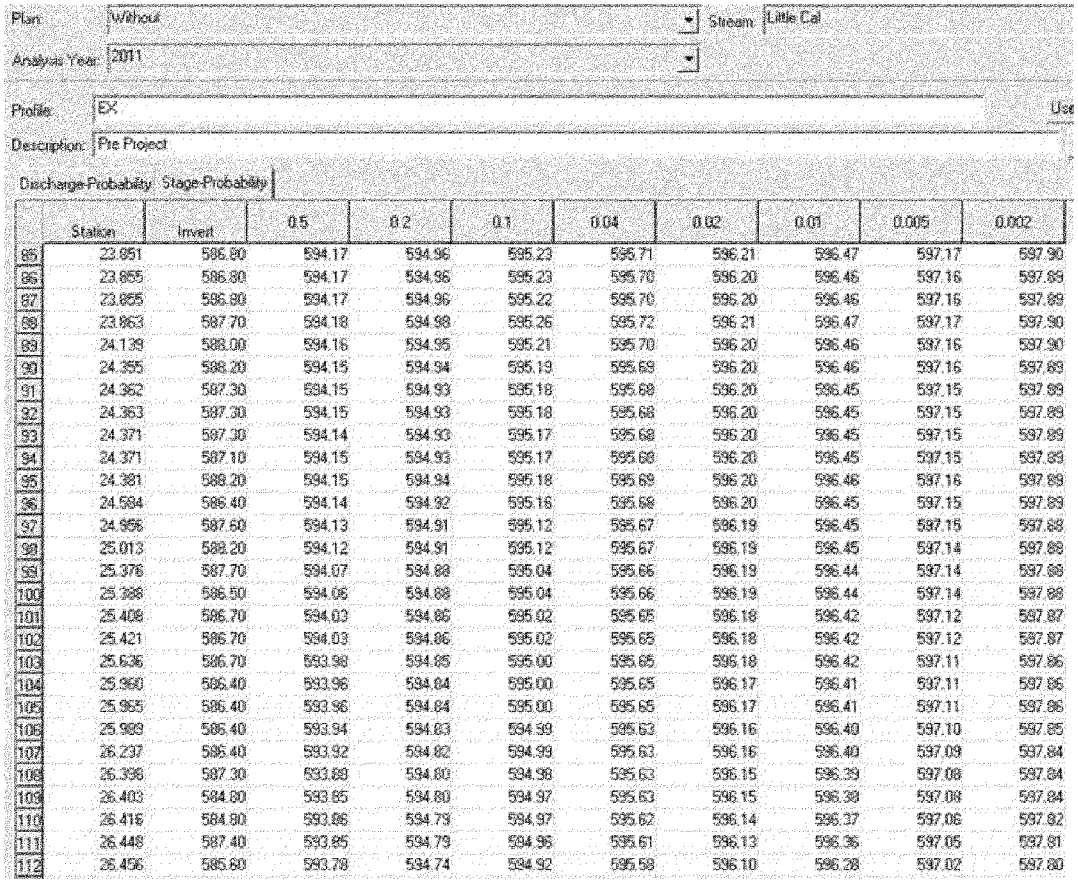
Profile: EX

Description: Pre Project

Discharge-Probability Stage-Probability

	Station	Invert	0.5	0.2	0.1	0.04	0.02	0.01	0.005	0.002
57	21.977	587.90	594.72	595.90	596.47	596.99	597.31	597.51	598.18	598.77
58	21.985	588.00	594.72	595.91	596.47	596.99	597.31	597.52	598.19	598.78
59	21.999	588.00	594.72	595.91	596.47	596.99	597.31	597.51	598.19	598.78
60	22.009	588.20	594.72	595.91	596.47	596.99	597.31	597.51	598.19	598.78
61	22.359	588.60	594.66	595.84	596.39	596.91	597.23	597.44	598.14	598.73
62	22.658	587.90	594.60	595.76	596.29	596.80	597.13	597.32	598.06	598.66
63	22.668	587.80	594.59	595.74	596.26	596.77	597.09	597.29	598.03	598.63
64	22.673	587.80	594.59	595.73	596.25	596.76	597.09	597.28	598.02	598.63
65	22.686	588.00	594.58	595.73	596.24	596.75	597.07	597.27	598.02	598.62
66	22.780	587.90	594.54	595.66	596.17	596.68	597.00	597.22	597.98	598.59
67	23.224	587.50	594.42	595.50	595.97	596.50	596.82	597.09	597.88	598.52
68	23.234	587.70	594.41	595.48	595.94	596.48	596.81	597.07	597.87	598.51
69	23.234	587.70	594.41	595.48	595.94	596.48	596.81	597.07	597.87	598.51
70	23.238	587.70	594.41	595.46	595.92	596.46	596.79	597.05	597.86	598.50
71	23.239	587.70	594.41	595.46	595.92	596.46	596.79	597.06	597.86	598.50
72	23.254	587.20	594.41	595.46	595.92	596.46	596.79	597.06	597.86	598.50
73	23.436	587.50	594.34	595.40	595.83	596.37	596.71	596.99	597.81	598.46
74	23.588	587.70	594.30	595.31	595.72	596.25	596.61	596.90	597.74	598.40
75	23.602	587.90	594.28	595.27	595.66	596.19	596.55	596.85	597.69	598.36
76	23.606	587.90	594.28	595.27	595.66	596.18	596.55	596.84	597.69	598.35
77	23.621	587.70	594.28	595.28	595.67	596.21	596.57	596.86	597.71	598.37
78	23.712	587.90	594.26	595.25	595.64	596.17	596.55	596.84	597.69	598.36
79	23.750	588.00	594.25	595.24	595.62	596.15	596.53	596.83	597.68	598.35
80	23.780	587.90	594.22	595.17	595.53	596.05	596.45	596.76	597.62	598.30
81	23.783	587.90	594.19	595.00	595.29	595.73	596.21	596.48	597.19	597.91
82	23.802	587.60	594.19	595.00	595.29	595.74	596.22	596.49	597.20	597.92
83	23.840	587.80	594.18	595.00	595.29	595.74	596.22	596.49	597.20	597.92
84	23.851	586.80	594.17	594.96	595.23	595.71	596.21	596.47	597.17	597.90

Figure 9



Plan: Without Stream: Little Cal

Analysis Year: 2011

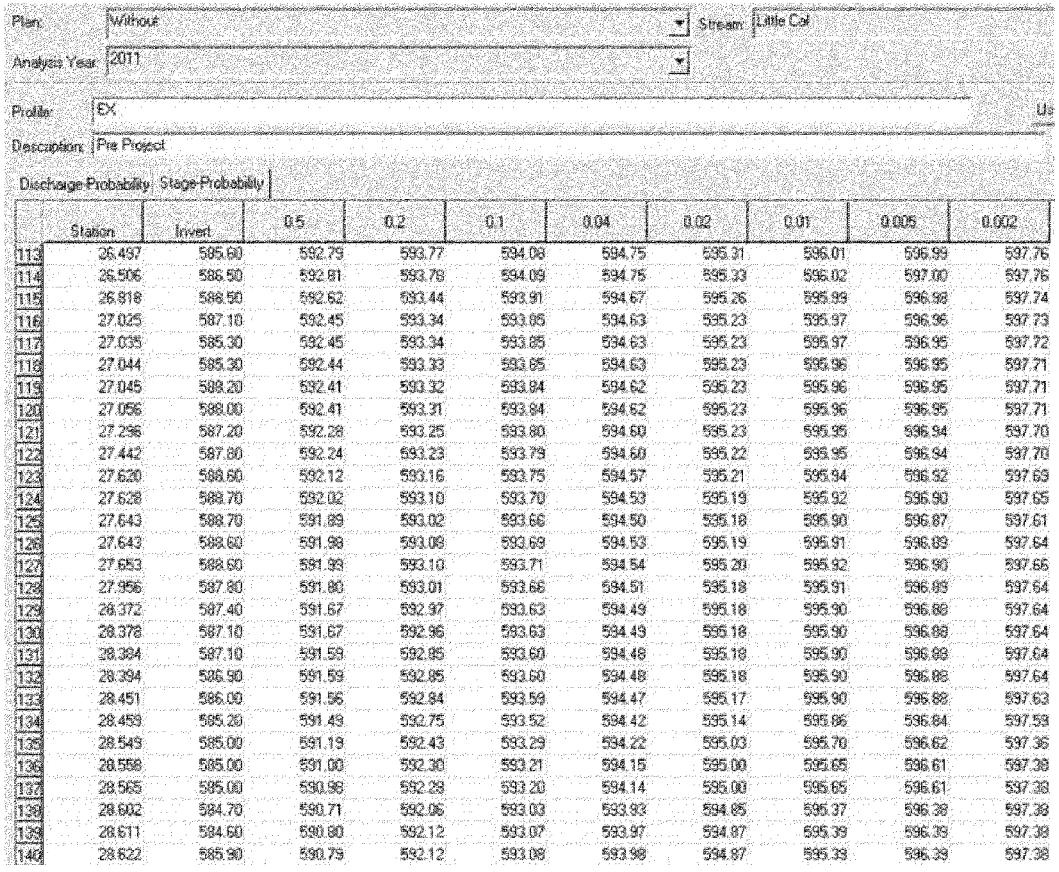
Profile: EX Use

Description: Pre Project

Discharge-Probability Stage-Probability

	Station	Invert	0.5	0.2	0.1	0.04	0.02	0.01	0.005	0.002
85	23.851	586.80	594.17	594.96	595.23	595.71	596.21	596.47	597.17	597.90
86	23.855	586.80	594.17	594.96	595.23	595.70	596.20	596.46	597.16	597.89
87	23.855	586.80	594.17	594.96	595.22	595.70	596.20	596.46	597.16	597.89
88	23.863	587.70	594.18	594.98	595.26	595.72	596.21	596.47	597.17	597.90
89	24.139	588.00	594.16	594.95	595.21	595.70	596.20	596.46	597.16	597.90
90	24.355	588.20	594.15	594.94	595.19	595.69	596.20	596.46	597.16	597.89
91	24.362	587.30	594.15	594.93	595.18	595.68	596.20	596.45	597.15	597.89
92	24.363	587.30	594.15	594.93	595.18	595.68	596.20	596.45	597.15	597.89
93	24.371	587.30	594.14	594.93	595.17	595.68	596.20	596.45	597.15	597.89
94	24.371	587.10	594.15	594.93	595.17	595.68	596.20	596.45	597.15	597.89
95	24.381	588.20	594.15	594.94	595.18	595.69	596.20	596.46	597.16	597.89
96	24.584	586.40	594.14	594.92	595.16	595.68	596.20	596.45	597.15	597.89
97	24.956	587.60	594.13	594.91	595.12	595.67	596.19	596.45	597.15	597.88
98	25.013	588.20	594.12	594.91	595.12	595.67	596.19	596.45	597.14	597.88
99	25.376	587.70	594.07	594.88	595.04	595.66	596.19	596.44	597.14	597.88
100	25.388	586.50	594.06	594.88	595.04	595.66	596.19	596.44	597.14	597.88
101	25.408	586.70	594.03	594.86	595.02	595.65	596.18	596.42	597.12	597.87
102	25.421	586.70	594.03	594.86	595.02	595.65	596.18	596.42	597.12	597.87
103	25.636	586.70	593.98	594.85	595.00	595.65	596.18	596.42	597.11	597.86
104	25.960	586.40	593.96	594.84	595.00	595.65	596.17	596.41	597.11	597.86
105	25.965	586.40	593.96	594.84	595.00	595.65	596.17	596.41	597.11	597.86
106	25.989	586.40	593.94	594.83	594.99	595.63	596.16	596.40	597.10	597.85
107	26.237	586.40	593.92	594.82	594.99	595.63	596.16	596.40	597.09	597.84
108	26.396	587.30	593.88	594.80	594.98	595.63	596.15	596.39	597.08	597.84
109	26.403	584.80	593.85	594.80	594.97	595.63	596.15	596.38	597.08	597.84
110	26.416	584.80	593.86	594.79	594.97	595.62	596.14	596.37	597.06	597.82
111	26.448	587.40	593.85	594.79	594.96	595.61	596.13	596.36	597.05	597.81
112	26.456	585.60	593.78	594.74	594.92	595.58	596.10	596.28	597.02	597.80

Figure 10



Plan: Without | Stream: Little Cal

Analysis Year: 2011

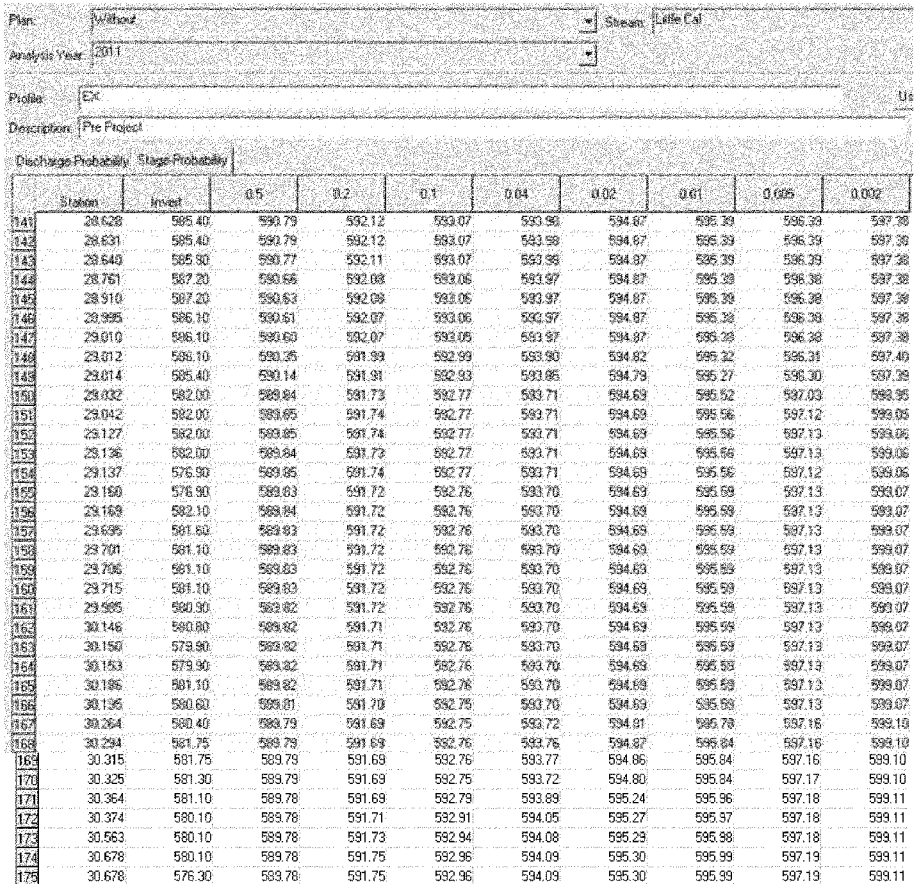
Profile: EX | Us

Description: Pre Project

Discharge Probability | Stage Probability

	Station	Invert	0.5	0.2	0.1	0.04	0.02	0.01	0.005	0.002
113	26.497	585.60	592.79	593.77	594.08	594.75	595.31	595.01	595.99	597.76
114	26.506	586.50	592.81	593.79	594.09	594.75	595.33	595.02	597.00	597.76
115	26.818	586.50	592.62	593.44	593.91	594.67	595.26	595.99	596.98	597.74
116	27.025	587.10	592.45	593.34	593.85	594.63	595.23	595.97	596.96	597.73
117	27.035	585.30	592.45	593.34	593.85	594.63	595.23	595.97	596.95	597.72
118	27.044	585.30	592.44	593.33	593.85	594.63	595.23	595.96	596.95	597.71
119	27.045	588.20	592.41	593.32	593.84	594.62	595.23	595.96	596.95	597.71
120	27.056	588.00	592.41	593.31	593.84	594.62	595.23	595.96	596.95	597.71
121	27.296	587.20	592.28	593.25	593.80	594.60	595.23	595.95	596.94	597.70
122	27.442	587.80	592.24	593.23	593.79	594.60	595.22	595.95	596.94	597.70
123	27.620	588.60	592.12	593.16	593.75	594.57	595.21	595.94	596.92	597.69
124	27.628	588.70	592.02	593.10	593.70	594.53	595.19	595.92	596.90	597.65
125	27.643	588.70	591.89	593.02	593.66	594.50	595.18	595.90	596.87	597.61
126	27.643	588.60	591.98	593.09	593.69	594.53	595.19	595.91	596.89	597.64
127	27.653	588.60	591.99	593.10	593.71	594.54	595.20	595.92	596.90	597.66
128	27.956	587.80	591.80	593.01	593.66	594.51	595.18	595.91	596.89	597.64
129	28.372	587.40	591.67	592.97	593.63	594.49	595.18	595.90	596.88	597.64
130	28.378	587.10	591.67	592.96	593.63	594.49	595.18	595.90	596.88	597.64
131	28.384	587.10	591.59	592.85	593.60	594.48	595.18	595.90	596.89	597.64
132	28.394	585.90	591.59	592.85	593.60	594.48	595.18	595.90	596.88	597.64
133	28.451	586.00	591.56	592.84	593.59	594.47	595.17	595.90	596.88	597.63
134	28.459	585.20	591.49	592.75	593.52	594.42	595.14	595.86	596.84	597.59
135	28.549	585.00	591.19	592.43	593.29	594.22	595.03	595.70	596.62	597.36
136	28.558	585.00	591.00	592.30	593.21	594.15	595.00	595.65	596.61	597.38
137	28.565	585.00	590.98	592.28	593.20	594.14	595.00	595.65	596.61	597.38
139	28.602	584.70	590.71	592.06	593.03	593.93	594.85	595.37	596.38	597.38
139	28.611	584.60	590.80	592.12	593.07	593.97	594.87	595.39	596.39	597.38
140	28.622	585.90	590.79	592.12	593.08	593.98	594.87	595.39	596.39	597.38

Figure 11



	Station	Invert	0.5	0.2	0.1	0.04	0.02	0.01	0.005	0.002
141	28.628	585.40	590.79	592.12	593.07	593.98	594.87	595.39	596.39	597.38
142	28.631	585.40	590.79	592.12	593.07	593.98	594.87	595.39	596.39	597.38
143	28.648	585.90	590.77	592.11	593.07	593.98	594.87	595.39	596.39	597.38
144	28.761	587.20	590.66	592.08	593.06	593.97	594.87	595.38	596.38	597.38
145	28.910	587.20	590.63	592.08	593.06	593.97	594.87	595.39	596.38	597.38
146	28.995	586.10	590.61	592.07	593.06	593.97	594.87	595.38	596.38	597.38
147	29.010	586.10	590.60	592.07	593.05	593.97	594.87	595.39	596.38	597.38
148	29.012	586.10	590.35	591.99	592.99	593.90	594.82	595.32	596.31	597.40
149	29.014	585.40	590.14	591.91	592.93	593.85	594.79	595.27	596.30	597.39
150	29.032	582.00	589.84	591.73	592.77	593.71	594.69	595.52	597.03	599.95
151	29.042	582.00	589.85	591.74	592.77	593.71	594.69	595.56	597.12	599.08
152	29.127	582.00	589.85	591.74	592.77	593.71	594.69	595.56	597.13	599.06
153	29.136	582.00	589.84	591.73	592.77	593.71	594.69	595.56	597.13	599.06
154	29.137	576.90	589.85	591.74	592.77	593.71	594.69	595.56	597.12	599.06
155	29.150	576.90	589.83	591.72	592.76	593.70	594.69	595.59	597.13	599.07
156	29.169	582.10	589.84	591.72	592.76	593.70	594.69	595.59	597.13	599.07
157	29.695	581.60	589.83	591.72	592.76	593.70	594.69	595.59	597.13	599.07
158	29.701	581.10	589.83	591.72	592.76	593.70	594.69	595.59	597.13	599.07
159	29.706	581.10	589.83	591.72	592.76	593.70	594.69	595.59	597.13	599.07
160	29.715	581.10	589.83	591.72	592.76	593.70	594.69	595.59	597.13	599.07
161	29.595	580.90	589.82	591.72	592.76	593.70	594.69	595.59	597.13	599.07
162	30.146	580.80	589.82	591.71	592.76	593.70	594.69	595.59	597.13	599.07
163	30.150	579.90	589.82	591.71	592.76	593.70	594.69	595.59	597.13	599.07
164	30.153	579.90	589.82	591.71	592.76	593.70	594.69	595.59	597.13	599.07
165	30.186	581.10	589.82	591.71	592.76	593.70	594.69	595.59	597.13	599.07
166	30.196	580.60	589.81	591.70	592.75	593.70	594.69	595.59	597.13	599.07
167	30.264	580.40	589.79	591.69	592.75	593.72	594.81	595.78	597.16	599.10
168	30.294	581.75	589.79	591.69	592.76	593.76	594.87	595.84	597.16	599.10
169	30.315	581.75	589.79	591.69	592.76	593.77	594.86	595.84	597.16	599.10
170	30.325	581.30	589.79	591.69	592.75	593.72	594.80	595.84	597.17	599.10
171	30.364	581.10	589.78	591.69	592.79	593.89	595.24	595.96	597.18	599.11
172	30.374	580.10	589.78	591.71	592.91	594.05	595.27	595.97	597.18	599.11
173	30.563	580.10	589.78	591.73	592.94	594.08	595.29	595.98	597.18	599.11
174	30.678	580.10	589.78	591.75	592.96	594.09	595.30	595.99	597.19	599.11
175	30.678	576.30	589.78	591.75	592.96	594.09	595.30	595.99	597.19	599.11

Figure 12

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

Appendix C

Cost Estimating

Prepared By:

U.S. Army Corps of Engineers
Chicago District

March 2012

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Little Calumet River – Indiana Local Flood Control and Recreation Project
Limited Reevaluation Report

APPENDIX C: COST ENGINEERING

ESTIMATE

1. The estimates for the remaining projects are based on the current plans and specifications when available and vary in their stage of design. For the remaining portion of the active projects (Stage V-II, Pump 2B, Stage VII and Stage VIII), in order to avoid duplication of costs the end of FY11 was used as a cutoff. The construction progress reports were then used to determine what had been obligated with the remaining being entered into the MII estimate. The remaining costs also includes projected outstanding modifications. Actuals for all projects (including current ongoing projects) were obtained from Project Management and entered into the Total Project Cost Summary in the Spent thru 1-Oct-2011 (Column K).

2. Project cost estimates were prepared as though the Government were a prudent and well-equipped contractor estimating the project. This methodology is present throughout all the construction cost estimates. The estimates are developed in as much detail as can be assumed based on the best information available at this time.

3. The estimates adhere to guidance as specified in ER 1110-2-1150, ER 1110-2-1302 and ETL 1110-2-573.

4. The estimates adhere to the civil works work breakdown structure and were internally verified for quality control addressing cost, schedule and risk issues as practical. Estimates were developed based on scope of work. Record of assumptions, methodologies, concerns, and unknowns are maintained within the MII software for each project.

5. The baseline cost estimates for all portions of the estimate were based on the current price level for November 2011.

SCHEDULE

1. The estimated time to construct each project varies. In general, the construction duration of each project was determined based on the production rates of the largest and most significant features of the project. A project construction schedule was developed using Microsoft Project to substantiate the construction duration assumptions. Often a disconnect with probable durations was noticed when compared to MII durations that normally don't take into account multiples of the same crew working on one task. MII durations normally work on assumption of one crew completing all the work in one task item, which can lead to large unrealistic durations. In this case as a correction the production rates were multiplied by a whole number to reflect more than one crew working, thus task durations were reduced to realistic amount.

QUALIFICATIONS

1. The structure of the cost estimate is planned that all tasks are logical and in accordance with appropriate plan of construction and understanding of the project scope. A unit cost for each task is developed in an effort to increase the accuracy of the estimate and includes consideration given to site specific conditions as they pertain to constructability, bidability, and operability issues. Lump sum unit cost and unit pricing is used only to report items with limited or no design specified. The assumptions for these allowances are documented in the estimates and are based on experience and consultation with project teammates. As design scope evolves, it is anticipated that these lump sum costs will be better defined.

2. Unit prices for some items were used from previous Little Calumet projects, in particular recreation trail work.

3. The unit prices for the features in the estimates are prepared based on calculated quantities for individual construction tasks. Each task is then priced as accurately as possible in MII.

4. The estimated costs developed for these projects are fair and reasonable to a well-equipped contractor and include overhead costs and profit. Actual crew sizes, equipment and production rates that contractors have achieved previously on similar types of projects were implied in developing the unit costs for the work items that appear in these estimates.

5. All estimates include the latest Davis-Bacon Wage rates and Service contract rates as can be found at http://www.wdol.gov/.

6. All projects reference the Region II Equipment Database in MII.

7. Overhead costs for the estimates were calculated based on historical information for similar projects within the Chicago District. The Job Office Overheads were calculated based on the construction duration and schedule. These items primarily include field administration and offices, as well as quality control personnel, surveying, and government submittal costs.

8. Profit of approximately 9% is included in each estimate at this time.

PROJECT ASSUMPTIONS & CONCERNS

1. Included in the TPCS are the costs for WBS 01 Lands and Damages and 02 Relocations. The costs shown in the TPCS are an estimate of the latest costs and match what is currently being used in various Resource Management documents. The Local Sponsor

has submitted documentation for some of these costs which are currently being evaluated by USACE to see if they are creditable toward the project based on the Local Cooperation Agreement. The Local Sponsor is also seeking backup for all other work completed that may be creditable and will be submitting that in the near future. Again, this information will need to be reviewed to verify if it can be credited toward the project.

CONTINGENCY & ESCALATION

1. Construction cost contingencies are used to forecast the risk associated with the individual features of the project. They are intended to cover the costs of unforeseen issues and items during design and construction.

2. Since the Total Projected Cost exceeds $40M, a formal Cost Schedule Risk Analysis was performed to determine the contingency for the remaining work. This resulted in a 28% contingency which is included in the TPCS.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX C – COST ESTIMATING

Total Project Cost Summary Sheet
And Cost Certification

Prepared By:

U.S. Army Corps of Engineers
Chicago District

LITTLE CALUMET RIVER- INDIANA LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REAVLUATION REPORT
USACE - CHICAGO DISTRICT

COST ENGINEERING DX - TPCS ATR CERTIFICATION

The Little Calumet River, Indiana Local Flood Control and Recreation Project, Limited Revaluation Report for Chicago District has undergone a successful Cost Agency Technical Review (ATR). The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies in accordance with ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

The Cost-DX has reviewed the current total project cost estimate for the Little Calumet River, Indiana Local Flood Control and Recreation Project and understands that the District is currently reviewing LERRDs and WIK documentation to support non-Federal sponsor crediting for completed portions of the project. Values included in the current total project cost estimate are those previously discussed with the District and submitted by the sponsor for crediting. Pending review of these credits and the supporting documentation, the cost share values for the completed portions of the project could change and subsequently affect the Fully Funded Amount.

As of 28 November 2011, the Walla Walla District, Cost Engineering Directory of Expertise (DX) for Civil Works, certifies the estimated total project cost of the Little Calumet River Limited Reevaluation Report with estimated values of:

FY 2012 Price Level:	$22,842,000
Fully Funded Amount:	$270,793,000 (including spent costs)

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project controls and implementation procedures.

11-28-11
Date

for **Kim C. Callan, PE, CCE, PMI**
Chief, Cost Engineering
Walla Walla District

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: Little Calumet River
LOCATION: Lake County, Indiana

DISTRICT: Chicago District
POC: CHIEF, COST ENGINEERING

PREPARED: 28/11/2011

This Estimate reflects the scope and schedule in report; Limited Re-evaluation Report

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (SK)	CNTG (SK)	CNTG (%)	BASE COST TOTAL (SK)	ESC (%)	COST (SK)	CNTG (SK)	FIRST COST TOTAL ($K)	Spent Thru: 1-Oct-11 ($K)	L	FULLY FUNDED PROJECT ESTIMATE COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
06	FISH & WILDLIFE FACILITIES	$4,781	$1,339	28%	$6,120		$4,781	$1,339	**$6,120**	1946		$5,063	$1,418	$8,427
09	CHANNELS & CANALS	$685	$192	28%	$877		$685	$192	**$877**			$696	$195	$890
11	LEVEES & FLOODWALLS	$5,841	$1,635	28%	$7,476		$5,841	$1,635	**$7,476**	101772		$5,899	$1,652	$109,323
13	PUMPING PLANT	$1,033	$289	28%	$1,322		$1,033	$289	**$1,322**	30438		$1,039	$291	$31,767
14	RECREATION FACILITIES	$544	$152	28%	$696		$544	$152	**$696**	3242		$552	$155	$3,949
15	FLOODWAY CONTROL & DIVERSION STF									3510				$3,510
20	PERMANENT OPERATING EQUIPMENT									1045				$1,045
	ARRA									3226				$3,226
	CONSTRUCTION ESTIMATE TOTALS:	$12,884	$3,608		**$16,492**		$12,884	$3,608	**$16,492**	145,179		$13,249	$3,710	**$162,138**
01	LANDS AND DAMAGES		-			-				$27,901				$27,901
02	RELOCATIONS		-			-				$16,187				$16,187
30	PLANNING, ENGINEERING & DESIGN	$3,093	$866	28%	$3,959		$3,093	$866	**$3,959**	47078		$3,164	$886	$51,128
31	CONSTRUCTION MANAGEMENT	$1,868	$523	28%	$2,391		$1,868	$523	**$2,391**	10801		$2,061	$577	$13,439
	PROJECT COST TOTALS:	$17,845	$4,997	28%	**$22,842**		$17,845	$4,997	**$22,842**	247,146		$18,474	$5,173	$270,793

_____ CHIEF, COST ENGINEERING,

_____ PROJECT MANAGER,

_____ CHIEF, REAL ESTATE,

_____ CHIEF, PLANNING,

_____ CHIEF, ENGINEERING,

_____ CHIEF, OPERATIONS,

_____ CHIEF, CONSTRUCTION,

_____ CHIEF, CONTRACTING,

_____ CHIEF, PM-PB,

_____ CHIEF, DPM,

ESTIMATED FEDERAL COST:	74.4%	**$201,446**
ESTIMATED NON-FEDERAL COST:	25.6%	**$69,347**
ESTIMATED TOTAL PROJECT COST:		**$270,793**

O&M OUTSIDE OF TOTAL PROJECT COST:

**** CONTRACT COST SUMMARY ****

PROJECT: Little Calumet River
LOCATION: Lake County, Indiana
This Estimate reflects the scope and schedule in report; Limited Re-evaluation Report

DISTRICT: Chicago District
POC: CHIEF, COST ENGINEERING

PREPARED: 28/11/2011

Estimate Prepared: 28-Nov-11
Effective Price Level: 1-Oct-11

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

WBS NUMBER	Civil Works Feature & Sub-Feature Description	RISK BASED COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	FULLY FUNDED PROJECT ESTIMATE COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	ACTIVE PROJECTS													
11	LEVEES & FLOODWALLS	$2,132	$597	28%	$2,729		$2,132	$597	$2,729	2012Q2		$2,132	$597	$2,729
13	PUMPING PLANT	$670	$188	28%	$858		$670	$188	$858	2012Q2		$670	$188	$858
14	RECREATION FACILITIES													
	CONSTRUCTION ESTIMATE TOTALS:	$2,802	$785	28%	**$3,587**		$2,802	$785	$3,587			$2,802	$785	$3,587
01	LANDS AND DAMAGES			28%										
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$70	$20	28%	$90		$70	$20	$90	2012Q2		$70	$20	$90
2.0%	Planning & Environmental Compliance	$56	$16	28%	$72		$56	$16	$72	2012Q2		$56	$16	$72
8.5%	Engineering & Design	$238	$67	28%	$305		$238	$67	$305	2012Q2		$238	$67	$305
2.0%	Engineering Tech Review ITR & VE	$56	$16	28%	$72		$56	$16	$72	2012Q2		$56	$16	$72
2.0%	Contracting & Reprographics	$56	$16	28%	$72		$56	$16	$72	2012Q2		$56	$16	$72
3.0%	Engineering During Construction	$84	$24	28%	$108		$84	$24	$108	2012Q2		$84	$24	$108
2.0%	Planning During Construction	$56	$16	28%	$72		$56	$16	$72	2012Q2		$56	$16	$72
2.0%	Project Operations	$56	$16	28%	$72		$56	$16	$72	2012Q2		$56	$16	$72
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$280	$78	28%	$358		$280	$78	$358	2012Q2		$280	$78	$358
2.0%	Project Operation:	$56	$16	28%	$72		$56	$16	$72	2012Q2		$56	$16	$72
2.5%	Project Management	$70	$20	28%	$90		$70	$20	$90	2012Q2		$70	$20	$90
	CONTRACT COST TOTALS:	$3,880	$1,086		**$4,966**		$3,880	$1,086	$4,966			$3,880	$1,086	**$4,966**

Filename: LCR LRR TPCS 28_11_11 final.xlsx
TPCS

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Little Calumet River
LOCATION: Lake County, Indiana
This Estimate reflects the scope and schedule in report; Limited Re-evaluation Report

DISTRICT: Chicago District PREPARED: 28/11/2011
POC: CHIEF, COST ENGINEERING

Estimate Prepared: 28-Nov-11
Effective Price Level: 1-Oct-11

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	FULLY FUNDED PROJECT ESTIMATE Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	FUTURE PROJECTS													
06	FISH & WILDLIFE FACILITIES	$4,781	$1,339	28%	$6,120		$4,781	$1,339	$6,120	2015Q3	5.9%	$5,063	$1,418	$6,481
09	CHANNELS & CANALS	$685	$192	28%	$877		$685	$192	$877	2013Q1	1.6%	$696	$195	$890
11	LEVEES & FLOODWALLS	$3,709	$1,039	28%	$4,748		$3,709	$1,039	$4,748	2013Q1	1.6%	$3,767	$1,055	$4,822
13	PUMPING PLANT	$363	$102	28%	$465		$363	$102	$465	2013Q1	1.6%	$369	$103	$472
14	RECREATION FACILITIES	$544	$152	28%	$696		$544	$152	$696	2013Q1	1.6%	$552	$155	$707
	CONSTRUCTION ESTIMATE TOTALS:	$10,082	$2,823	28%	**$12,905**		$10,082	$2,823	$12,905			$10,447	$2,925	$13,372
01	LANDS AND DAMAGES			28%										
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$252	$71	28%	$323		$252	$71	$323	2012Q2	0.2%	$253	$71	$323
2.0%	Planning & Environmental Compliance	$202	$57	28%	$259		$202	$57	$259	2012Q2	0.2%	$202	$57	$259
8.5%	Engineering & Design	$857	$240	28%	$1,097		$857	$240	$1,097	2012Q2	0.2%	$859	$241	$1,100
2.0%	Engineering Tech Review ITR & VE	$202	$57	28%	$259		$202	$57	$259	2012Q2	0.2%	$202	$57	$259
2.0%	Contracting & Reprographics	$202	$57	28%	$259		$202	$57	$259	2012Q2	0.2%	$202	$57	$259
3.0%	Engineering During Construction	$302	$85	28%	$387		$302	$85	$387	2015Q3	13.2%	$342	$96	$438
2.0%	Planning During Construction	$202	$57	28%	$259		$202	$57	$259	2015Q3	13.2%	$229	$64	$293
2.0%	Project Operations	$202	$57	28%	$259		$202	$57	$259	2012Q2	0.2%	$202	$57	$259
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$1,008	$282	28%	$1,290		$1,008	$282	$1,290	2015Q3	13.2%	$1,141	$319	$1,460
2.0%	Project Operation:	$202	$57	28%	$259		$202	$57	$259	2015Q3	13.2%	$229	$64	$293
2.5%	Project Management	$252	$71	28%	$323		$252	$71	$323	2015Q3	13.2%	$285	$80	$365
	CONTRACT COST TOTALS:	$13,965	$3,910		**$17,875**		$13,965	$3,910	$17,875			$14,594	$4,086	**$18,680**

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TPCS

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX C – COST ESTIMATING

Authorized Cost Increase Computation

Prepared By:

U.S. Army Corps of Engineers
Chicago District

Column	A	B	C	D	D-C	E
Project Features	Original Congressionally Authorized Cost Estimate (Oct 1985 Price Levels)	Current Congressionally Authorized Cost Estimate (Oct 2005 Price Levels)	Authorized Cost Estimate (Oct 2011 PL)	Recommended Cost Estimate (Oct 2011 PL)	Cost Change (Oct 2011 PL)	Recommended Cost Estimate (Fully Funded)
Lands and Damages	11,725,000	23,181,000	24,499,000	27,901,000	3,402,000	27,901,000
Relocations	$8,620,00	18,817,000	19,820,000	16,187,000	-3,633,000	16,187,000
Fish and Wildlife	260,000	5,037,000	5,689,000	8,066,000	2,377,000	8,427,000
Channels & Canals	4,040,000	630,000	678,000	877,000	199,000	890,000
Levees & Floodwalls	39,955,000	78,616,000	85,586,000	109,248,000	23,662,000	19,323,000
Pumping Plants	8,420,000	20,431,000	21,916,000	31,760,000	9,844,000	31,767,000
Recreation	2,500,000	3,649,000	4,003,000	3,938,000	-65,000	3,949,000
Diversion Structures	1,770,000	603,000	695,000	3,510,000	2,815,000	3,510,000
Permanent Operating Equip	20,000	690,000	705,000	1,045,000	340,000	1,045,000
Plng, Engineering & Design	5,870,000	37,448,000	37,625,000	51,037,000	13,412,000	51,128,000
Construction Management	3,920,000	8,898,000	9,104,000	13,192,000	4,088,000	13,439,000
ARRA				3,226,000	3,226,000	3,226,000
Total Project Costs	87,100,000	198,000,000	210,320,000	269,988,000	59,668,000	270,793,000

2006 Cost Indices	2011 Cost Indices	Multiplier for converting 2006 Price Levels to 2011 Price Levels	Project Expenditures up to 30 Sep 2004 (No Escalation applied)
249.30	277.67	1.11380666	11,604,000
646.72	752.31	1.16327004	12,672,000
634.08	730.7	1.15237825	755,000
641.81	753.62	1.17421044	355,000
655.37	765.97	1.16875963	37,312,000
645.52	756.55	1.17200087	11,800,000
645.52	756.55	1.17200087	1,593,000
634.08	730.7	1.15237825	0
645.52	756.55	1.17200087	600,000
197.50	219.59	1.11185823	35,864,000
197.50	219.59	1.11185823	7,053,000

**Costs were developed using the Consumer Price Index. All other costs were developed using the Civil Works Construction Cost Index System. Expenditures up to 30 Sep 2004 were used because although the Current Authorized Cost is in FY06, the cost that was submitted in legislation was from FY05. Only remaining project costs were adjusted. Project costs that were completed did not have their price level adjusted.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT
APPENDIX C – COST ESTIMATING

MII Summary Report

Prepared By:

U.S. Army Corps of Engineers
Chicago District

Little Calumet River
Limited Reevaluation Report
Only remaining payment/work is shown in MII. Actual expenditures are included in the TPCS

Estimated by	LRC
Designed by	LRC
Prepared by	David E. Druzbicki, Chicago District
Preparation Date	10/7/2011
Effective Date of Pricing	10/7/2011
Estimated Construction Time	1,460 Days

Date	Author	Note
10/7/2011	D.Druzbicki	Used 902 estimate as basis for LRR. New scope/costs for anticipated projects (Tiebacks, Southmoor and Hobart Marsh Mitigation).
11/22/2011	GSC	Revised estimate per Dr. Checks comments. Revisions include:1) DBA/SCA labor rate updates.
11/23/2011	AT	Switched to 2009 equipment manual
11/29/2011	D.Druzbicki	Actuals not included in MII, will be shown on TPCS. MII doesn't include escalation, contingency, PED or CM those are also added in the TPCS.

Description	Quantity	UOM	ProjectCost
Project Summary			12,883,480
001 Active Projects	1.0	LS	2,801,799
11 Levees and Floodwalls	1.0	LS	2,132,002
001 LCR Stage 8	1.0	LS	749,660
002 LCR Stage 7	1.0	LS	1,331,107
LCR Stage 5 2	1.0	LS	51,235
13 Pumping Plant	1.0	LS	669,797
007 Pump Station 2B	1.0	LS	669,797
002 Future Projects	1.0	LS	10,081,681
06 Fish and Wildlife	1.0	LS	4,780,930
Hobart Marsh Mitigation	1.0	LS	4,780,930
09 Channels and Canals	1.0	LS	684,511
Channel Clearing	1.0	LS	684,511
11 Levees and Floodwalls	1.0	LS	3,709,259
27th and Chase	1.0	LS	293,718
Levee Tieback and Access Ramps	1.0	LS	1,791,351
Southmoor LRB	1.0	LS	1,624,190
13 Pumping Plant	1.0	LS	363,295
27th and Chase	1.0	LS	363,295
14 General Recreation	1.0	LS	543,685
Recreation Trail Completion	1.0	LS	543,685

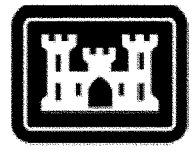
LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

Appendix D

Levee and Floodwall Cost Increase Details

Prepared By:

U.S. Army Corps of Engineers
Chicago District



March 2012

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Levees & Floodwalls (+$18,039,000)

This appendix contains detailed information on the cost changes for several of the levee and floodwall sections in the Little Calumet River Local Flood Protection and Recreation Project. In the descriptions you will find the major contract modifications that occurred during construction of the project.

Stage VI Phase 1 South (+$1,044,000)

For the contract Stage VI Phase 1 South, the following details each contract change that has been completed during construction under this contract and its associated cost:

- A quantity correction for stripped materials was needed due to a typographical error in Amendment 0001 to the Solicitation for bid from which this contract resulted. The quantity of Bid Item 0004, "Stripped Material" should have read as 16,000 CY, instead of 1,600 CY. This change resulted in an increase of $230,400.00 to the contract.

- During construction it was determined that an area of the project approximately 1,440 feet long was formerly used as a municipal landfill. Since the landfill would not provide an adequate foundation for the levee, it was determined that the flood protection design should be changed from an earthen levee to a steel sheet pile wall. This change resulted in an increase of $644,539.60 to the contract.

- During construction the sizes of both catch basin CD 183 and manhole MH 192, as specified in the original plans, were not large enough to accommodate the number and size of pipes to be tied into these structures. Therefore, the alignment of the proposed sewer was redesigned to minimize conflicts with underground utilities (sanitary sewer and gas lines) as well as minimize impact to the residents of 81st Street. This subsequent change also resulted in changing the work required at manhole MH190 and manhole MH191. This change resulted in an increase of $58,862.97 to the contract.

- The electrical power and control wiring for the North Drive Station pumps was revised to allow the new pumps to be easily removed for maintenance. The new design allows pump removal without exposing personnel to the hazards of entering the wet well to disconnect the electrical feed and control wiring prior to lifting the pumps. This change resulted in an increase of $85,648.24 to the contract.

- Demolition of the existing Grace Street Pump Station outlet structure was required to allow for the placement of the levee in this area. The outlet structure was modified to discharge into the North Drive Pump Station discharge basin. The inlet pipe to the new North Drive Pump Station was plugged to prevent storm water from backing up into the incomplete wet well. This change resulted in an increase of $18,293.68 to the contract.

- At the North Drive Pump Station, two float switches, related conduit and wiring, and the necessary programming of the pump controllers to allow proper back-up controls were

needed to meet manufacturer's recommendations. This change resulted in an increase of $26,763.00 to the contract.

- Potential areas of seepage and subsidence were observed on the lower half of the land side of the levee. An equitable adjustment was provided to the Contractor to perform levee seepage testing, to complete the associated reporting, and to restore the area in question. This change resulted in an increase of $15,919.00 to the contract.

- Final quantities overruns/underruns resulted in an increase of $61,534.66 on this contract.

Contract changes that resulted in a cost savings:

- the deletion of a Government Field Office (-$14,500.00)
- a variance for pump discharge elbows (-$3,630.00)
- liquidated damages (-$20,748.00)
- and a recheck of the final quantities overruns/underrun (-$57,712.98)

The total contract change amount for the Stage VI Phase 1 South will be $1,044,370.17.

Stage VI Phase 1 North (+$120,000.00)

For the contract Stage VI Phase 1 North, the following details each contract change during construction under this contract and its associated cost:

- Geotextile fabric was placed under riprap along the river bank from Station 7N 10+30 to 18+00 and Station 8N 3+50 to 19+05 to prevent erosion of the levee. This change resulted in an increase of $45,918.00 to the contract.

- During construction debris was discovered in the steel sheet pile driving line. The Contractor removed and properly disposed of all debris and obstructions and backfilled and compact the trench with blended satisfactory fill and existing backfill. This change resulted in an increase of $35,599.73 to the contract.

- The Contractor fabricated and installed an access ladder on the north face of Gatewell Structure 175 as well as created a swale around Catch Basin 175. This change resulted in an increase of $5,257.29 to the contract.

- An additional section of the river bank, approximately 228 feet long, was covered with Geotextile fabric and riprap to prevent erosion of the levee. This change resulted in an increase of $89,040.00 to the contract.

- The Kennedy Apartments Pump Station outlet piping was modified from a 24 inch ductile iron pipe to a 36 inch diameter reinforced concrete pipe to match existing pipe. This change resulted in an increase of $32,329.00 to the contract.

- In August of 2007, temporary earthen berms were constructed during a period of high river elevation predictions at the Kennedy Apartment Pump Station and Structure 173. This change resulted in an increase of $12,489.90 to the contract.

- During construction, a large portion of the levee on this project displayed major cracking along the crest, on the side slopes and at the toe. The Government determined that it was necessary to investigate the impervious fill zone, satisfactory fill zone and the foundation zone of the levee to determine if the levee was constructed in accordance with the requirements of the contract plans and specifications. In some areas the construction conformed to contract requirements and the Contractor was compensated for the examination and restoration of these areas. This change resulted in an increase of $24,622.58 to the contract.

Contract changes that resulted in a cost savings:

- Deletion of Bids Items 0013AA and 0013AB (-$35,610.41)
- Kennedy Apartments Pump Station Outlet Revision (-$2,520.00)
- Final quantities overrun/underrun (-$87,377.30)

The total contract change amount for the Stage VI Phase 1 North was $119,748.79.

Stage VI Phase 2 (+$88,000.00)

For the contract Stage VI Phase 2, the following details each contract change during construction under this contract and its associated cost:

- During construction the Contractor encountered debris in the alignment of the overflow weir. To remove the debris, the Contractor excavated a five foot wide, 80 foot long and 11 foot deep trench. The Contractor then tested the debris per landfill requirements, stockpiled the debris for disposal to a landfill, and backfilled the trench with satisfactory material. This change resulted in an increase of $22,778.25 to the contract.

- Installation of the new I-Wall and access ramp to the levee prevented the drainage of precipitation from the area immediately east of the I-Wall. To alleviate this drainage problem, the Contractor added fill as needed, graded the area toward Cline Avenue and removed an old NIPCSO access road. This change resulted in an increase of $9,332.75 to the contract.

- The types of gates used at Ramp 3 and Liable Road were changed from an A-Frame Gate to a Double-Leaf Gate. This changed was needed because the original specification package did not address the need for wider gates at these locations. This change resulted in an increase of $1,598.86 to the contract.

- Final quantities overruns/underruns resulted in an increase of $75,742.45 to the contract.

Contract changes that resulted in a cost savings:

- Deletion of a Government Field Office (-$20,024.57)
- Performance and payment bond adjustment (-$1,238.00)

The total contract change amount for the Stage VI Phase 2 is $88,189.74.

Stage V Phase 2 (+$7,849,000.00)

During the time of the 2000 Little Calumet River Limited Reevaluation Report, the work done under the current Stage V Phase 2 contract was actually two separate contracts (Stage V Phase 2 and Stage V Phase 3). The original Stage V Phase 2 project consisted of all work from Kennedy Avenue to the Conrail Railroad, the levee on the north side of the Little Calumet River from the Conrail Railroad to Indianapolis Boulevard, and the levee on the south side of the Little Calumet River from Indianapolis Boulevard to Northcote Avenue. The Stage V Phase 3 project consisted of all work north of the Little Calumet River from Indianapolis Boulevard to Northcote Avenue (which during its conception was part of the Woodmar Country Club property and is now part of the Cabala's property). In 2006, the Product Development Team was tasked with combining these two designs into one contract. The new, all encompassing Stage V Phase 2 project acted as a means to reduce the overall cost of the Little Calumet River, Indiana Local Flood Control and Recreation Project, by eliminating the costs associated with contracting the work out to two individual contractors.

For the Stage V Phase 2 contract, the following details each contract change that has been completed during construction under this contract and its associated cost:

- The contract drawings and specifications did not require safety cages for the two ladders at the 96 inch gate well structure. OSHA regulations required safety cages because the ladders are over 20 feet in length. The Contractor also placed lifting holes in the steel pipe piles at unacceptable locations. However, the specifications did not provide any guidance on lifting hole locations and as a result 3/8 inch steel plates were welded to 148 sheet pile to correct the problem. These change resulted in an increase of $35,715.93 to the contract.

- Contract Options 0035AA through 0035AG were exercised, which included all supplies and services to construct the pedestrian bridge east of Kennedy. This change resulted in an increase of $502,491.56 to the contract.

- During construction the Contractor encountered obstruction while driving sheet piling for the Hart Ditch I-Wall from Stations 5S 28+00 to Station 5S 26+00. Excavation along the Hart Ditch I-Wall alignment was then performed to remove the obstructions from the driving path of the sheet pile. This change resulted in an increase of $27,211.50 to the contract.

- The United States Geological Survey requested that the USGS Gauging Station building along Hart Ditch at Station 5S 29+50 be demolished. The structure was removed to three

feet below existing grade and the area was then backfilled with satisfactory material. This change resulted in an increase of $17,524.55 to the contract.

- The contract drawings for the proposed I-Wall construction for the area just north of North Drive and east of Conrail RR had utilized topographical information that did not match the existing topography. When the centerline of the I-Wall was staked out by the Contractor it was found that the wall would be located in the side slope of an existing berm where scour and erosion had already taken place. In order to meet the actual site conditions, the North Drive I-Wall from Station 6S 4+59 to Station 6S 7+23 required longer steel sheet piling sections for deeper embedment and an increase in size of the concrete wall cross sections. This change resulted in an increase of $338,295.03 to the contract.

- In preparation for the construction of the floodwall between Station 5S 27+00 and Station 5S 31+50, the Contractor preformed the required clearing and grubbing operations. With the vegetation removed and numerous depressions left behind from the removal of tree stumps, there developed a greater concern that erosion could take place (which would eventually lead to the potential failure of the I-Wall). A riprap blanket with Geotextile fabric was installed for slope stabilization to prevent further erosion and loss of streambank from occurring in this area (along Hart Ditch). In addition, at the previously mentioned stretch of I-Wall, it was determined that riprap needed to be placed from Station 6S 4+00 to Station 6S 14+50 to help prevent further scouring along the newly constructed I-Wall. These change resulted in an increase of $337,736.60 to the contract.

- During construction the Contractor notified the Government that the overhead power lines would be an obstruction to their pile driving process for the North Drive I-Wall near Kennedy Avenue. The local utility company stated that these are main feeder lines and could not be temporarily removed to allow construction of the sheet pile wall. Also during construction, it was determined that the I-Wall presented a traffic hazard to the adjacent roadway. The I-Wall was then redesigned to better match the Contractor's pile driving equipment, allowing the power lines to remain in place during operations, and for the I-Wall to be built flush to the ground to prevent the traffic hazard near Kennedy Avenue. This change resulted in an increase of $62,715.90 to the contract.

- Prior to the award of this contract, the Government planned on issuing a modification to complete construction of the Cabela's property gatewell. Cabela's Development designed and built a 36 inch gatewell within the existing levee along the north side of the Little Calumet River. Cabela's gatewell was built to elevation 601.0 feet to match the height of the existing levee. This contract included removing this existing levee and constructing the 5N levee at elevation 604.7 feet. The Government made an agreement with Cabela's and their consultant to design the gatewell to an elevation of 604.7 feet. This change resulted in an increase of $91,771.17 to the contract.

- The existing discharge pipe from the Baring Avenue Pump Station was four feet lower than shown on the plans provided to the Contractor. Also, a previously unknown overflow discharge pipe was found coming from the Baring Avenue Pump Station when

it was severed by the Contractor's sheetpiling installation operations. A solution was designed that entailed building a typical gatewell into the floodwall which connected to the existing pump station and a 42 inch RCP discharge pipe and headwall outlet from the gatewell to the river. This change resulted in an increase of $228,767.71 to the contract.

- Two design notes were missing from drawing S-110 of the plans. The notes stated that for the pedestrian bridges (the one east of Kennedy Avenue and the one west of Indianapolis Boulevard) "that the contractor shall make all decking connections with stainless steel fasteners and apply bituminous paint to all structural members in contact with ACQ treated wood." This change resulted in an increase of $4,707.39 to the contract.

- A gravel seam was observed at the bottom of two inspection trenches along South River Road. The gravel was found to be about two inches thick with sand underneath. Seepage and stability were reanalyzed for this area and it was determined there were issues with piping. A clay cutoff wall was installed from Station 5N 13+00 to Station 5N 18+00 and from Station 5S 6+00 to Station 5S 23+00 to help prevent high gradients from developing and causing sand boils. This change resulted in an increase of $197,326.31 to the contract.

- During construction, the Contractor exposed an underground abandoned pump station within the proposed levee footprint. In order to maintain the requirements for the levee foundation, it was decided to remove the concrete structure and backfill with clay. This change resulted in an increase of $19,325.73 to the contract.

- Contract Options 0034AA through 0034AH were exercised; which included all supplies and services to construct the pedestrian bridge west of Kennedy Avenue; as well as Contract Options 0038AA through 0043AC; which included the North Conrail Railroad Closure, the South Conrail Railroad Closure, the Utility Corridor I-Wall for 6N East, the Utility Corridor I-Wall for 6N West, the Utility Corridor I-Wall for 6S East and the Utility Corridor I-Wall for 6S West. This change resulted in an increase of $2,246,107.49 to the contract.

- For the pedestrian bridge west of Kennedy Avenue, the Contractor was asked to make all decking connections with stainless steel fasteners and apply bituminous paint to all steel members with ACQ treated wood deck. This change was request due to a concern that the ACQ would react with the steel in the bridge and standard steel fasteners which would accelerate the deterioration of the steel. This change resulted in an increase of $3,764.18 to the contract.

- During construction, the Contractor discovered various pipe obstructions in the ground below the proposed levee footprint. The Contractor removed and plugged a total of 28 pipes. This change resulted in an increase of $19,263.10 to the contract.

- The Contractor identified a meander in the river at approximately Station 5N 16+50 that was eroding into the existing bank. The scour reached a point within six to eight feet of

the proposed levee toe. It was determined that without erosion protection, the foundation of the levee would be compromised. Riprap and Geotextile fabric were placed to prevent erosion from occurring. This change resulted in an increase of $71,407.92 to the contract.

- Due to exclusion of the volume of stripping in the original quantity for Bid Item 0008AB, impervious fill, the quantity was changed from 116,000 CY to 149,063 CY. This resulted in an increase of $869,556.90 to the contract.

- Due to space limitations beneath the existing overhead power lines above the northern abutment of the pedestrian bridge located west of Indianapolis Boulevard, the Contractor was instructed to splice the H-piles to perform installation and avoid interference with the overhead utility lines. This change resulted in an increase of $60,773.19 to the contract.

- After the September 2008 Little Calumet River flood event, it was recommended that the floodwall elevation be raised by 0.90 feet to an elevation of 603.0 feet between Northcote Avenue and the Walnut Street Pump Station. However, this portion of the floodwall had already been constructed by the Contractor to the planned elevation of 602.1 feet. Therefore, cast in place concrete was placed on the landside face and top of the recently constructed steel sheet pile flood wall to raise the top elevation to the desired elevation. This change resulted in an increase of $219,000.50 to the contract.

- During construction the Contractor encountered loose organic material near the south wing wall of the control structure up to a depth of 581.5 feet. Further analysis indicated that leaving the material in place would cause potential issues with stability and settlement. The Contractor was instructed to remove all organic and unsuitable material down to a clay layer and backfill the area with compacted impervious fill. Then approximately 47 tons of bedding stone and 142 tons of riprap were placed from the south edge of the gabion mattress up to the I-Wall around Station 5S 3+70 to prevent any potential for further erosion. This change resulted in an increase of $68,570.80 to the contract.

- The Hart Ditch Control Structure has had many blockages caused by floating trees and other debris getting caught in the narrow control structure. To prevent future occurances, the top of the north levee at Station 5N 3+60 was widened by five feet for a span of 25 feet and a reinforced concrete pad with a graded crushed gravel base was placed at the crest of the north tie-back berm to the concrete control structure. This would allow tracked equipment access to remove unwanted debris from the control structure. This change resulted in an increase of $24,382.18 to the contract.

- During construction, the Contractor encountered an unknown existing headwall where a new gatewell was to be constructed. The Contractor removed this previously unknown headwall from the footprint of the Kennedy Pump Station Gatewell. A 24 inch clay pipe coming in from the north was embedded into a new section of reinforced concrete piping at the north wall of the gatewell to withstand the stresses of the wall construction. A 48

inch reinforced concrete pipe coming in from the north was cut flush with the interior of the gatewell wall. This change resulted in an increase of $6,036.85 to the contract.

- The rehabilitated Indianapolis Pump Station has the capacity to pump large amounts of water, a problem that could cause surges in the water level inside the chambers. To correct this potential issue, vent stacks were added to the gatewell to alleviate potential water levels. This change resulted in an increase of $13,079.92 to the contract.

- While driving piling on the southwest utility corridor an unknown existing eight inch pipeline was discovered. The pipe was then hot-tapped and determined to be abandoned. A total of eight feet of the pipeline (four feet of pipeline of either side of the floodwall centerline) were removed with concrete placed into the end of each pipe to create a seal. This change resulted in an increase of $72,572.66 to the contract.

- In accordance with FAR 52.211-18 VARIATION IN ESTIMATED QUANTITY, a modification was required for the adjustment of the quantities of unit-priced CLINS to reflect the actual quantities of work performed. This modification resulted in an increase of $40,945.40 to the contract.

- During construction, a drainage pipe, whose existence was previously unknown to the local municipalities, was discovered in Wicker Park. In order to maintain drainage at Wicker Park, a stub of new 18" CMP, a precast manhole, new 18" reinforced concrete pipe, headwall, rubber check valve and riprap were installed. This modification resulted in an increase of $200,000.00 to the contract.

- During construction, a discrepancy was discovered between the specifications and the design intent of the levee. Overbuilt sections of levee above the tolerances allowed in the specifications were thus reduced to the elevations shown in the revised contract drawings. Three areas were identified that required modifications including reducing the levee elevation from 5S 60+00 to 5S 70+00 to an elevation of 6037 ft (NGVD 1929), reducing the levee elevation from 5N 2+30 to 5N 2+80 to an elevation of 602.1 ft (NGVD 1929), and reducing the levee elevation from 6N 22+00 to 6N 24+50 to an elevation of 603.5 ft (NGVD 1929). The Contractor was also required grade to transition 50 ft of the levee before and after that stations listed above from the new elevation to the existing as-built elevation in the field. This modification resulted in an increase of $75,000.00 to the contract.

- Modifications to the North Drive I-Wall were deemed necessary. This modification resulted in an increase of $62,478.84 to the contract.

- Actual topsoil, stripping, ditch excavation, spoil bank excavation, satisfactory fill and clay fill quantities resulted in overruns based on final site surveys. This modification resulted in an increase of $1,917,435.27 to the contract.

- During installation of two 54-inch diameter flared end sections, the contractor had to over-excavate to get the end sections properly installed. This over-excavation caused a

stability issue with the existing side slope of the ditch adjacent to Kennedy Ave. In order to stabilize the ditch, grouted riprap was installed in the over-excavated area to restore the ditch side slope. This modification resulted in an increase of $20,456.37 to the contract.

Contract changes that resulted in a cost savings:

- Fencing and gate changes (-$54,886.58)
- Deletion of the Northcote Sandbag closure (-$30,990.00)
- Removal of 109 feet of 96 inch reinforced concrete pipe for the Indianapolis Boulevard Pump Station (-$10,080.40)
- Change in the levee footprint from Station 5S 6+40 to Station 5S 6+83 (-$4,263.17)

The total completed contract change amount for Stage V Phase 2 is $7,749,472.98.

One additional contract change is pending. The amount listed below is estimated and subject to change.

- Repairs to the railroad closure are required. This modification will result in an increase of $100,000 to the contract.

The total for these pending contract changes is $100,000.

The total contract change amount for the Stage V Phase 2 will be $7,849,472.98.

Stage VII (+$96,000.00)

During the time of the 2000 Little Calumet River Limited Reevaluation Report, the Stage VII design incorporated a shorter length sheet pile wall into a preexisting levee that was constructed by the local sponsor. As a result of the events of Hurricane Katrina, the design for Stage VII was reconfigured to incorporate newly established flood protection standards from USACE Headquarters. The change in design resulted in a significant increase in the overall cost of this stage of the Little Calumet River, Indiana Flood Control and Recreation Project.

The following details each contract change during construction under this contract and its associated cost:

- While excavating the existing northern berm, the Contractor discovered an unknown, existing manhole buried in the berm. The manhole was for an existing, live 12 inch combined sewer line shown on the plans. The casting was cut off by the Contractor's dozer and was not reusable. The Contractor was then required to completely remove and replace the existing brick riser down to the top of the concrete manhole structure to the top of the new frame/lid to elevation of 598.65 feet. This change resulted in an increase of $1,936.53 to the contract.

- During construction, there was a variation in quantity of CLIN 0011AB "Bedding Stone over 2,200 Tons" from 440 net tons to 2,300 net tons. This variation in quantity resulted in an increase of $82,658.40 to the contract.

- During construction, it was discovered that southern floodwall tie-in to Stage 5 Phase 2 needed to be altered to meet the actual conditions found in the field. The existing concrete floodwall from Stage 5 Phase 2 was stopped short of the start of Stage 7 leaving only sheet pile exposed. In order to correct this issue, the Contractor modified the existing steel sheet piles and installed approximately eight feet of additional floodwall to match the Stage 5 Phase2 floodwall. This modification resulted in an increase of $11,875.03 to the contract.

The total contract change amount for Stage VII is $96,469.96.

Stage VIII (+$756,000.00)

During the time of the 2000 Little Calumet River Limited Reevaluation Report, the 50% design phase of Stage VIII had been completed. The design was not completed due to a lack of local funding for this project and a 50% design was sufficient to facilitate the real estate requirements to construct this stage of the Little Calumet River, Indiana Local Flood Control and Recreation Project. There was then roughly a ten year gap between the completion of the 50% design and the completion of the 100% design, resulting in numerous alignment changes due to transformations in site condition over that period of time. The required modifications to the 50% Stage VIII design resulted in an increase to the overall cost of this stage of the Little Calumet River, Indiana Flood Control and Recreation Project.

The following details each contract change during construction under this contract and its associated cost:

- Contract Options 0008AA through 0009AF and Contract Options 0034AB, 0037AB, 0038AB, 0039AB, 0040AB, 0041AB, 0042AB, 0046AB, and 0048AB were exercised, allowing construction of Option Area N-1. This change resulted in an increase of $1,184,565.00 to the contract.

- During review of the Contractor's proposal for a pre-cast I-Wall at NR3, near Columbia Avenue, it became apparent that the details for terminating the I-Wall at the gatewell structures were absent from the contract plans. New details were added to the revised sheet to show how to connect the precast I-Wall alternative to the gatewell structures. This change resulted in an increase of $24,528.33 to the contract.

- An existing concrete water main valve box and connected water mains were found in the footprint of the planned levee and sheet pile cutoff wall. The levee and sheet pile cutoff wall were realigned in order to avoid conflicts with the valve box and the pipes. This change resulted in an increase of $16,192.75 to the contact.

- An existing 36 inch pipe, to be connected to Drain Outlet N3-5, was found by the Contractor to be 20 feet closer to Columbia Avenue than expected. Constructing Drain Outlet N3-5 directly in line with the existing 36 inch pipe would likely undermine the existing road embankment and bridge. N3-5 was constructed in the location shown on

the contract drawings and the 36 inch pipe was connected with additional pipe and two supporting structures to complete the path to the gatewell at this location. This change resulted in an increase of $22,324.36 to the contract.

- During construction seepage of floodwater into the landside of an existing railroad embankment near Manor Drive was discovered. An additional 65 feet of levee was added to the start of South Reach 2, shifting alignment to the north so that it tied into the existing railroad embankment directly opposite of where the Reach S1B levee tied in. Forty four feet of sheet pile cutoff wall was installed through the existing railroad embankment to an elevation of 600.0 feet. Under this change, the last 100 feet of Reach S1B levee and a maintenance access ramp were also changed to avoid an existing power pole and its guy wires. This change resulted in an increase of $52,418.33 to the contract.

- After installation of the steel sheet pile, it was realized that the contract did not address covering the typical sheet pile lifting holes used during transport and installation. Since the holes would still be within the free-board elevation for flood protection, it was determined that each sheet pile lifting hole would be covered and sealed with a minimum 4 inch square, 3/8 inch thick steel plate. This change resulted in an increase of $64,447.84 to the contract.

- During construction the project designers provided new details for the I-Wall terminations at Calumet Avenue Basin and at the northwest, southwest and southeast tie-in points at the proposed concrete parapet wall along Calumet Avenue. These new details were necessary due to an oversight in the design process. It was also determined during construction that the precast panel cap depth of 20 inches was not sufficient for the width of the PZC 13 sheet pile sections, nor did it take into account any slight variation in alignment that usually occurs during sheet pile driving. The precast panel cap depth was changed from 20 inches to 24 inches. This change resulted in an increase of $20,201.32 to the contract.

- During construction, the Contractor discovered that the landside levee side slope would extend into the pavement of Manor Avenue. This was due to road widening performed after the drawings were completed. It was decided to use a levee/retaining wall combination because there was a lack of adequate space to realign the levee. This change in site condition resulted in an increase of $128,171.61 to the contract.

- During construction the Contractor observed unstable soil conditions and seepage while digging two pot holes. Due to safety, stability and seepage concerns in constructing a deep inspection trench, it was decided to use a steel sheet pile cutoff wall instead of continuing with an inspection trench. This change resulted in an increase of $145,859.00 to the contract.

- A modification for the Contractor to accelerate the work so that all work was completed 24 calendar days sooner than required by the original contract, as awarded, was issued to make up for 27 lost work days that resulted from events and causes beyond the

Contractor's control (strike and weather delays). As a result of this change there was an increase of $288,824.22 to the contract.

- During a field inspection, it was found that the roof elevation for Gatewell N3-4 was built at El 601. However, this elevation does not allow for enough clearance in order to open the sluice gate adequately. Therefore, the roof height was increase by 4 feet from elevation 601' to 605'. As a result of this modification there was an increase of $50,575.42 to the contract.

- A modification was issued for miscellaneous changes to fences and railings. As a result of this modification there was an increase of $18,429.29 to the contract.

Contract changes that resulted in a cost savings:

- Deletion of Option Area N-1 (-$1,257,547.09)

The total contract change amount for Stage VIII is $758,990.38.

One additional contract change is pending. The amount listed below is estimated and subject to change.

- Bonds Reduction. This modification will result in a decrease of $2,754.00 to the contract.

The total contract change amount for the Stage VIII will be $756,236.38.

LITTLE CALUMET RIVER, INDIANA
LOCAL FLOOD CONTROL AND RECREATION PROJECT
LIMITED REEVALUATION REPORT

Appendix E

Computation of FY12 902 Limit

Prepared By:

U.S. Army Corps of Engineers
Chicago District

March 2012

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Determining the Section 902 Limit

Section 902 of the Water Resources Development Act (WRDA) of 1986 defines the maximum amount that a project may cost. This is often called the 902 Limit or Project Cost Cap. It is, "The maximum project cost limit imposed by Section 902 is a numerical value specified by law which must be computed in a legal manner (ER 1105-2-100, Appendix G)."

The maximum project cost includes the authorized cost (adjusted for inflation), the current cost of any studies, modifications, and action authorized by WRDA 86 or any later law, and 20 percent of the authorized cost (without adjustment for inflation). The cost of modifications required by law is to be kept separate and added to other allowable costs. These three components equal the maximum project cost allowed by section 902.

The total project cost is the cost of all work associated with preconstruction engineering and design and construction, including real estate and appropriate credit provisions of Section 104 of the WRDA of 1986. The project was authorized at a cost of $87,100,000 in the Section 401, WRDA 86, Public Law 99-662. The project was reauthorized at a cost of $198,000,000 in the Nov. 2005 Appropriations bill H.R.2419.

The authorized cost may be increased from the price level in the authorizing document to include inflation. The construction component of the authorized cost will be updated to account for historical inflation using the Civil Works Construction Cost Index System (EM 1110-2-1304).

The real estate component of the authorized cost will be updated to account for historical inflation based on changes to the Consumer Price Index, specifically, the unadjusted percentage changes reflected under the "Rent, residential" expenditure category.

The maximum project cost limit imposed by Section 902 is a numerical value specified by law which was computed in a legally supportable manner. It is not an estimate of the current cost of the project. The limit on project cost was computed including an allowance for inflation through the construction period and adding an additional 20 percent.

Using the Section 902 Limit Tool that was certified by HQUSACE in November 2010, the following tables as described in ER 1105-2-100 Appendix G were developed to determine the project's current 902 limit. The following tables shown were generated output from the certified tool. Table G-1 shows the methodology used to calculate the annual inflation factors associated with the construction component of the project. Table G-2 shows the methodology use to calculate the annual inflation factors associated with the real estate component of the project. Table G-3 shows the methodology used to escalate the authorized cost to current price levels based on the current estimated project schedule which includes actual obligations to date. Table G-4 illustrates the methodology used to calculate the new Section 902 maximum limit for the Little Calumet River Local Flood Control and Recreation Project. A project cost increase fact sheet is provided including information from Table G-5 that shows implementation status at the time estimated total costs exceed the 902 Limit.

Input Data for 902 Limit Tool

Project Name:	**Little Calumet River**
Date Prepared:	**11/30/2011**
Total Authorized Cost:	$198,000
Authorized Cost for Construction	$174,819
Authorized Cost for Real Estate	$23,181
Date of Authorized Price Level:	10/1/2005
First Year of Expenditure:	10/1/1985
Current Cost Estimate	$269,988
Current Cost for Construction	$242,087
Current Cost for Real Estate	$27,901
Current Fully Funded Cost	$270,793
Date of Current Price Level:	10/1/2011
Costs of modifications specified by	
Project Purpose:	11 - LEVEES & FLOODW

Date of EM 1110-2-1304 Used	9/30/2011
Type of CWCCIS Used	Quarterly Purpose
Date of Real Estate Index Used	11/30/2011
Type of Real Estate Index Used	CUURA207SEHA,CUUSA207SEHA, Chicago-Gary-Kenosha, IL-IN-WI

INDEX INPUTS

Fiscal Year	CWCCIS Index	Rent-Residential
FY 06	644.640	242.000
FY 07	669.920	247.000
FY 08	697.520	256.905
FY 09	721.640	264.409
FY 10	726.980	268.806
FY 11	753.700	272.712
FY 12	776.910	275.094

EXPENDITURE INPUTS

Fiscal Year	Construction Expenditures	Real Estate Expenditures
FY 86	$2,033.00	
FY 87	$241.00	
FY 88	$397.00	
FY 89	$329.00	
FY 90	$2,122.00	$12.00
FY 91	$2,741.00	$215.00
FY 92	$3,596.00	$2,222.00
FY 93	$10,462.00	$2,669.00
FY 94	$6,646.00	$974.00
FY 95	$6,223.00	$1,541.00
FY 96	$8,116.00	$242.00
FY 97	$10,257.00	$885.00
FY 98	$8,886.00	$168.00
FY 99	$3,469.00	$627.00
FY 00	$11,417.00	$1,160.00
FY 01	$9,841.00	$228.00
FY 02	$5,132.00	$136.00
FY 03	$4,729.00	$127.00
FY 04	$3,768.00	$77.00
FY 05	$5,587.00	$100.00
FY 06	$10,436.00	$100.00
FY 07	$9,475.00	$100.00
FY 08	$15,631.00	$100.00
FY 09	$17,735.00	$58.00
FY 10	$38,135.00	$35.00
FY 11	$10,225.00	$53.00

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 (h)	One Half rate of (i)	Tot Allow Inflat for (j)
Date of Price Level			10/1/2005						
Authorized Estimate			174.819	644.640		1			
First Fiscal year			FY 06		0.03922		1	1.01961	1.01961
1st Qtr, 2nd yr		FY 07		669.920		1.03922			
Second Fiscal year			FY 07		0.0412		1.03922	1.0206	1.06062
1st Qtr, 3rd yr		FY 08		697.520		1.08203			
Third Fiscal year			FY 08		0.03458		1.08203	1.01729	1.10074
1st Qtr, 4th yr		FY 09		721.640		1.11945			
Fourth Fiscal year			FY 09		0.0074		1.11945	1.0037	1.12359
1st Qtr, 5th yr		FY 10		726.980		1.12773			
Fifth Fiscal year			FY 10		0.03675		1.12773	1.01838	1.14845
1st Qtr, 6th yr		FY 11		753.700		1.16918			
Sixth Fiscal year			FY 11		0.03079		1.16918	1.0154	1.18718
1st Qtr, 7th yr		FY 12		776.910		1.20518			

INDEX SOURCE: EM 1110-2-1304, 30 Sep 2011
b. Date of the authorized cost and the beginning date of following fiscal years.
c. These entries are the fiscal years.
d. These are the index numbers from the referenced publications and must all be expressed with the same base year.
e. This column equals the index at the beginning of the next year, divided by the index at the beginning of the year, minus one.
f. The cumulative inflation rate equals the index (column (d)) at the beginning of the year divided by the index of the first line of the table.
g. The allowed inflation rate equals the cumulative rate through the beginning of the FY (equals one for the first FY after project authorization) times one plus 1/2 of the rate of inflation through the beginning of the FY. For the remaining balance, it equals the cumulative rate to the beginning of the next fiscal year.
h. These are the cumulative rates through the beginning of the FY. They are the amounts in column (f) one-half line above.
i. This is one plus 1/2 the rate of inflation during the fiscal year, 1 + 1/2 x column (e)
j. The total inflation is the product of the last two entries.
k. The inflation rate for the remaining balance is the last entry in column (f).

Table G-2 (ER 1105-2-100 Appendix G)									
CPI Index(s)									
Item		(b)	(c)	Index (d)	Yearly Inflat Rate (e)	Cumul Inflat Rate (f)	Cumul rate to Begin (h)	One Half rate of (i)	Tot Allow Inflat for (j)
Date of Price Level			10/1/2005						
Authorized Estimate			23,181	242.000		1			
First Fiscal year			FY 06		0.02066		1	1.01033	1.01033
1st Qtr, 2nd yr		FY 07		247.000		1.02066			
Second Fiscal year			FY 07		0.0401		1.02066	1.02005	1.04113
1st Qtr, 3rd yr		FY 08		256.905		1.06159			
Third Fiscal year			FY 08		0.02921		1.06159	1.0146	1.0771
1st Qtr, 4th yr		FY 09		264.409		1.0926			
Fourth Fiscal year			FY 09		0.01663		1.0926	1.00831	1.10168
1st Qtr, 5th yr		FY 10		268.806		1.11077			
Fifth Fiscal year			FY 10		0.01453		1.11077	1.00727	1.11884
1st Qtr, 6th yr		FY 11		272.712		1.12691			
Sixth Fiscal year			FY 11		0.00873		1.12691	1.00437	1.13183
1st Qtr, 7th yr		FY 12		275.094		1.13675			

INDEX SOURCE: Consumer Price Index for All Urban Consumers: Selected Areas, U.S. Department of Labor, Bureau of Labor Statistics, (BLS). Percentage change reflected under the "Rent, residential" category for Chicago Metropolitan Area was used.
b. Date of the authorized cost and the beginning date of following fiscal years.
c. These entries are the fiscal years.
d. These are the index numbers from the referenced publications and must all be expressed with the same base year.
e. This column equals the index at the beginning of the next year, divided by the index at the beginning of the year, minus one.
f. The cumulative inflation rate equals the index (column (d)) at the beginning of the year divided by the index of the first line of the table.
g. The allowed inflation rate equals the cumulative rate through the beginning of the FY (equals one for the first FY after project authorization) times one plus 1/2 of the rate of inflation through the beginning of the FY. For the remaining balance, it equals the cumulative rate to the beginning of the next fiscal year.
h. These are the cumulative rates through the beginning of the FY. They are the amounts in column (f) one-half line above.
i. This is one plus 1/2 the rate of inflation during the fiscal year, 1 + 1/2 x column (e)
j. The total inflation is the product of the last two entries.
k. The inflation rate for the remaining balance is the last entry in column (f).

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 86	$2,033.00	$2,033.00	$0	0.840	0.00	$1,468.10	$0.00	$1,468.10	$0.00
FY 87	$241.00	$241.00	$0	0.100	0.00	$174.03	$0.00	$174.03	$0.00
FY 88	$397.00	$397.00	$0	0.164	0.00	$286.69	$0.00	$286.69	$0.00
FY 89	$329.00	$329.00	$0	0.136	0.00	$237.58	$0.00	$237.58	$0.00
FY 90	$2,134.00	$2,122.00	$12	0.877	0.04	$1,532.37	$9.97	$1,532.37	$9.97
FY 91	$2,956.00	$2,741.00	$215	1.132	0.77	$1,979.37	$178.63	$1,979.37	$178.63
FY 92	$5,818.00	$3,596.00	$2,222	1.485	7.96	$2,596.79	$1,846.11	$2,596.79	$1,846.11
FY 93	$13,131.00	$10,462.00	$2,669	4.322	9.57	$7,554.95	$2,217.49	$7,554.95	$2,217.49
FY 94	$7,620.00	$6,646.00	$974	2.745	3.49	$4,799.30	$809.23	$4,799.30	$809.23
FY 95	$7,764.00	$6,223.00	$1,541	2.571	5.52	$4,493.83	$1,280.31	$4,493.83	$1,280.31
FY 96	$8,358.00	$8,116.00	$242	3.353	0.87	$5,860.83	$201.06	$5,860.83	$201.06
FY 97	$11,142	$10,257	$885	4.237	3.17	$7,407	$735	$7,406.92	$735.28
FY 98	$9,054	$8,886	$168	3.671	0.60	$6,417	$140	$6,416.87	$139.58
FY 99	$4,096	$3,469	$627	1.433	2.25	$2,505	$521	$2,505.08	$520.93
FY 00	$12,577	$11,417	$1,160	4.716	4.16	$8,245	$964	$8,244.59	$963.76
FY 01	$10,069	$9,841	$228	4.065	0.82	$7,107	$189	$7,106.51	$189.43
FY 02	$5,268	$5,132	$136	2.120	0.49	$3,706	$113	$3,705.99	$112.99
FY 03	$4,856	$4,729	$127	1.953	0.46	$3,415	$106	$3,414.97	$105.52
FY 04	$3,845	$3,768	$77	1.556	0.28	$2,721	$64	$2,721.00	$63.97
FY 05	$5,687	$5,587	$100	2.308	0.36	$4,035	$83	$4,034.56	$83.08
FY 06	$10,536	$10,436	$100	4.311	0.36	$7,536	$83	$7,683.95	$83.94
FY 07	$9,575	$9,475	$100	3.914	0.36	$6,842	$83	$7,257.00	$86.50
FY 08	$15,731	$15,631	$100	6.457	0.36	$11,288	$83	$12,424.76	$89.49
FY 09	$17,793	$17,735	$58	7.326	0.21	$12,807	$48	$14,389.83	$53.09
FY 10	$38,170	$38,135	$35	15.753	0.13	$27,539	$29	$31,626.77	$32.53
FY 11	$10,278	$10,225	$53	4.224	0.19	$7,384	$44	$8,765.93	$49.84
Balance to complete	$50,530	$34,458	$16,072	14.234	57.60	$24,883	$13,353	$29,989	$15,179
Total	$269,988	$242,087	$27,901	100.00	100.00	$174,819	$23,181	$188,677	$25,032

a. The total of column (a) is the current working estimate of project cost at the current price level, less the cost of any modifications required by law. The entries for all years from authorization to the current year are the actual obligations made that year. The balance to complete is the remaining cost at current price levels.
b. Column (b) is the construction component of the cost in column (a).
c. Column (c) is the real estate component of column (a). Column (b) plus column (c) must equal column (a).
d. Column (d) is the percent distribution of the construction cost in column (b). It must total 100 percent.
e. Column (e) is the percent distribution of the real estate cost in column (c). It must total 100 percent.
f. The total of column (f) is the construction component of the authorized cost, from the authorizing legislation. The yearly entries are the distribution of the total by the percentage distributions in column (d).
g. The total of column (g) is the real estate component of the authorized cost. The yearly entries are the distribution of the total by the percentage distributions in column (e). The total of column (f) and the total of column (g) must equal the cost in the authorizing legislation.
h. The entries in column (h) are the amounts in column (f) increased by the appropriate inflation factor which is derived from the Corps of Engineers CWCCIS index. Table G-1 would contain a computation of appropriate construction inflation factors .
i. The entries in column (i) are the amounts in column (g) increased by the appropriate real estate inflation factor, which is derived from the CPI index. Table G-2 would contain a computation of the appropriate real estate inflation factors.

Table G-4 (ER 1105-2-100 Appendix G)		
MAXIMUM COST INCLUDING INFLATION THROUGH CONSTRUCTION		
	FY 11	**Thousands Dollars (000's)**
Line 1		
a.	Current Project estimate at current price levels:	$269,988
b.	Current project estimate, inflated through construction:	$270,793
c.	Ratio: Line 1b / line 1a	1.0030
d.	Authorized cost at current price levels:	$213,709
	(Column (h) plus (i) from table G-3)	
e.	Authorized cost, inflated through construction:	$214,347
	(Line c x Line d)	
Line 2	Cost of modifications required by law:	$0
Line 3	20 percent of authorized cost:	$39,600
	.20 x (table G-3, columns (f) + (g)	
Line 4	Maximum cost limited by section 902:	$253,947
	Line 1e + line 2 + line 3	

Notes:
a. Line 1a is the current project cost estimate.
b. Line 1b requires the current project cost estimate including inflation through the construction period. This is required each year by the annual budget guidance EC. This cost estimate will be developed by the appropriate cost engineering element. The ratio of this inflated project estimate to the current project estimate is used to inflate the totals of column (h) and (i) from Table G-1 to determine the authorized cost including inflation through the construction period.
c. Line 1c is the ratio of the current estimate including inflation through construction to the current estimate.
d. Line 1d is the authorized cost at current prices. It is the total of columns (h) and (i) from Table G-1.
e. Line 1e is the authorized cost including inflation through construction. It is computed as the authorized cost at current price levels times the ratio on line 1c.
f. Line 2 is the cost of any modifications required by law. This is the total cost and includes actual obligations and future obligations including inflation through construction.
g. Line 3 is 20 percent of the cost specified in the authorizing legislation. The authorized cost is the total of columns (f) and (g) in Table G-8.1.
h. Line 4 is the maximum project cost, including inflation through the construction period, allowed by Section 902. It is the total of lines 1e, 2, and 3.

PROJECT COST INCREASE FACT SHEET
(ER 1105-2-100 Appendix G Exhibit G-11)

1. Name of Project: Little Calumet River, Local Flood Control and Recreation Project

2. Section and Law That Authorized or Modified the Project:
Water Resources Development Act of 1986, November 1986 (original authorization)
Appropriations bill H.R.2419, November 2005 (reauthorization)

3. Section 902 Limit on Project Cost:

a.	Authorized Project Cost: (1 Oct 2005 Price Level):	$198,000,000
b.	Price level increases from date of authorized cost:	$16,347,000
c.	Current cost of modifications required by law:	$0
d.	20% of line 3a:	$39,600,000
e.	Maximum project cost limited by Section 902:	$253,947,000

4. Current Project Cost Including Inflation Through Construction: $270,793,000

5. Computation of Percentage Increase:

a.	Current estimate: (Line 4)	$270,793,000
b.	Less total of lines 3a, b and c:	$56,446,000
c.	Subtotal:	$214,347,000
d.	Percentage increase: (Line 5c/3a)	108.26%

6. Explain cost indices used in 3b; whether national or regional for real estate, and single state or two state average for construction:
Construction cost were updated for historical inflation by applying composite index listed in Table A-1, Quarterly Cost Indexes by CWBS Feature Code of EM 110-2-1304, Civil Works Construction Cos Index System (CWCCIS) 30 Sep 2011. The real estate component of the authorized cost was updated to account for historical inflation based on changes to the Consumer Price Index as published monthly by the U.S. Department of Labor, Bureau of Labor Statistics, (BLS). Because this project was located in a metropolitan area specifically identified in Table 17 of the BLS publication (Consumer Price Index for All Urban Consumers: Selected Areas), the percentage change reflected under the "Rent, residential" category will be the appropriate index.

7. Explain increases in 3c; Legislation requiring the modification, and how accommodated.
N/A

8. Explain reasons for cost changes other that inflation:
Since the development of the 2000 Limited Reevaluation Report new guidance on the construction of levees and floodwalls has been issued by the Corps. The documents establishing this guidance are EC 1110-2-6066 Engineering and Design DESIGN OR EVALUTION OF I-WALLS, Stability Analysis of I-Walls Containing Gaps between the I-Wall and Backfill Soils, and PHASE II INTERIM GUIDANCE FOR EVALUATING EXISTING I-WALLS . This new guidance required the redesign of Stage V Phase 2, Stage VII, and Stage VIII of the West Reach.

Additional design changes since the 2000 Limited Reevaluation Report have also been a factor in the increase in the project costs.

9. Explain any changes in benefits and provide current BCR.
The Little Calumet River project has submitted for a LLR with a limited economic analysis. The BCR at a discount rate of 7% is 3.21. The RBRCR is 6.67 at 7%. Changes in project benefits can be attributed, but are not limited to: to the use of HEC-FDA as the damage model with a more accurate structure inventory; previous project BCRs did not include damages to vehicles, which were included in the analysis of the LRR.

10. Provide detailed explanation of the status of the project.
From Table G-5 (ER 1105-2-100, Appendix G), the Little Calumet River Local Flood Control and Recreation Project has one PCA with multiple contracts, and has one or more contracts awarded with future contracts, the project status is such that LRC is continuing implementation of the project until the award of the next contract will require funds in excess of the 902 limit. LRC is in the process of submitting a LRR that will support legislation to permit the authorization committees to consider inclusion of the legislative proposal in a biennial WRDA in time to prevent a break in project implementation. A PPA Amendment will be executed to include the design changes to the tieback levees and update the amounts listed in Section IX of the LCA which discusses the 902 limit.

FINDING OF NO SIGNIFICANT IMPACT
PROPOSED MODIFICATIONS
LITTLE CALUMET RIVER LOCAL FLOOD CONTROL AND RECREATION PROJECT, LAKE COUNTY, INDIANA

PURPOSE AND NEED

An Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers (USACE) for the Little Calumet River Local Flood Protection and Recreation Project in order to fully consider alternatives to proposed design changes for specific elements of the project. The proposed project modifications consists of design changes for the tieback levees located on the eastern and western limits of the project as authorized. Two of the tieback levees are located near the Illinois-Indiana state line in the communities of Hammond and Munster. The third tieback levee is located in the City of Gary, adjacent to the Ironwood neighborhood, along the northeastern side of the CSX Railroad (formerly Conrail Railroad). The three tieback levees will complete the project levee system to the authorized 0.5% annual exceedance probability (AEP) (200-year) level of flood risk management and would facilitate Federal Emergency Management Agency (FEMA) certification for the project levee systems.

In order to meet new requirements contained in recent USACE/FEMA regulations for levee certification, a risk analysis was performed for the levee systems that comprise the Little Calumet River Local Flood Protection and Recreation Project. The analysis considered the level of flood risk management provided by the levees located along the Little Calumet River and confirmed that tie back levees would be necessary at the Illinois/Indiana state line for certification of the levee systems. Further, new USACE guidance required that the eastern tie back at the CSX Railroad would need to be enhanced for the levee system to meet current criteria.

AUTHORITY

The Phase I and Phase II GDM Feasibility Studies were authorized under Section 101 of the Water Resources Development Act (WRDA) of 1976. The project was authorized under section 401 of the Water resources Development Act of 1986 as amended.

LOCAL SPONSOR

The project's non-Federal sponsor is the Little Calumet River Basin Development Commission.

ALTERNATIVES CONSIDERED

USACE considered two alternatives to address the needed design changes for the tieback levees that required additional documentation under the National Environmental Policy Act (NEPA).

- **No Action Plan.** Under this alternative, no changes would be made to the existing authorized plan as identified in the 1982 Environmental Impact Statement (EIS) for the construction of flood control levees, floodwalls and tieback levees between the Illinois-Indiana state line and the CSX Railroad (formerly Conrail Railroad) on the East side of Gary, Indiana near the Ironwood subdivision. The 1982 plan has been modified during project construction to include: interior drainage features, including ponding areas; levee alignment changes; selected design changes for levees and floodwalls; and changes in the location of and specification for recreation features. Under the no-action plan, the levee systems will not be fully functional to the design level, which could result in levee flanking or bypass for a large flood event. The potential for flanking puts the life, health and safety of area residents at risk. Also, without adequate tieback levees, the levee systems could not be certified by the FEMA.

- **Modified Design Plan.** The Modified Design Plan includes design changes to the Hammond Stateline Tieback Levee, the Munster Stateline Tieback Levee and the Gary Ironwood Tieback Levee to accommodate changed conditions and changed requirements. The Hammond and Munster Stateline Tieback Levees will be composed of permanent structures floodwalls or similar structures that would connect temporary flood fight structures (such as concrete blocks or temporary water bladders) to existing embankments. The temporary flood control features would be installed along State Line Road and extend to high ground both north and south of the Little Calumet River. These features are needed to complete the Stage VIII levee segment and to provide design level of flood risk management to the residents in the communities of Hammond and Munster. On the east end of the project, the Gary Ironwood Tieback Levee would include a connection to the existing seal embankment along the CSX Railroad with a sheet pile cutoff through the railroad embankment and the continuation of the seal embankment on the northeast side of the railroad. The seal embankment would consist of a clay embankment constructed onto the face of the existing railroad.

RECOMMENDED PLAN

The Modified Design Plan is the Recommended Plan. The Plan includes design changes to the Hammond and Munster Stateline Tieback Levees and the Gary Ironwood Tieback Levee to accommodate changed conditions and changed requirements.

The Hammond Stateline Tieback Levee would be constructed on the north side of Interstate 80/94 along Stateline Road. The tieback was designed as a combination of both permanent and temporary features. The permanent section of the Hammond Stateline Tieback Levee would be located near Forest Avenue in Hammond and would consist of a short segment of floodwall approximately 115 feet in length extending from a tie in with the existing Forest Avenue Levee, north to just south of 172nd Place. The temporary portion of the Hammond Stateline Tieback Levee, consisting of 3 foot high concrete blocks would be installed on Stateline Road prior to or during flood events by the City of Hammond.

The Munster Stateline Tieback Levee would be constructed on the south side of Interstate I-80/94 near the continuation of Stateline Road. The Munster Stateline Tieback Levee was designed as a combination of both temporary and permanent features. The permanent portion of the Munster Stateline Tieback Levee will consist of a 10 foot long concrete pad that will tie into the existing Interstate-80/94 embankment and provide a connection between that embankment and the temporary portion of the tieback levee. The temporary portion of the Munster Stateline Tieback Levee will consist of a series of temporary water bladders that would be installed and inflated on Stateline Road prior to or during flood events by the City of Munster.

On the east end of the project, the Gary Ironwood Tieback Levee will connect into the existing seal embankment a with a sheet pile cutoff through the railroad embankment. The seal embankment would consist of a clay embankment constructed onto the face of the existing railroad embankment. The seal embankment will extend approximately 925 feet from the cutoff wall northwards to a high ground tie-in. The new embankment would be located adjacent to the Ironwood neighborhood.

ENVIRONMENTAL COMPLIANCE

An Environmental Assessment (EA) was prepared for the proposed project modifications. The project is in full compliance with appropriate statues, executive orders and regulations, including the National Historic Preservation Act of 1966, Fish and Wildlife Coordination Act, Endangered Species Act of 1973, Section 10 of Rivers and Harbors Act of 1899, Clean Air Act, Indiana Endangered Species, National Environmental Policy Act of 1969, as amended, Executive; Executive Order 12898 (Environmental Justice), Executive Order 11990 (Protection of Wetlands), Executive Order 11988 (Floodplain Management), and the Clean Water Act, and the U.S. Army Corps of Engineers Operational and Management regulations (33CFR 200, 335-338).

Along with direct and indirect effects, cumulative effects were assessed following the guidance provided by the Presidents' Council on Environmental Quality. The increment of effect from the proposed project when compared to cumulative effects of past, present, and reasonably foreseeable future actions is considered minor.

CONCLUSION

In accordance with the National Environmental Policy Act of 1969 and Section 122 of the River and Harbor and Flood Control Act of 1970, the U.S. Army Corps of Engineers, Chicago District has assessed the environmental impacts associated with this project. The assessment process indicates that this project would not cause significant effects on the quality of the human environment in the areas of construction. The findings indicate that that the proposed action is not a major Federal action significantly affecting the quality of the human environment. Therefore, I have determined that an Environmental Impact Statement (EIS) is not required.

Frederic A. Drummond, Jr.
Colonel, U.S. Army
District Commander

Date: 03/12/13 FAD

ENVIRONMENTAL ASSESSMENT
FOR
PROPOSED MODIFICATIONS
LITTLE CALUMET RIVER FLOOD CONTROL AND RECREATION PROJECT
LAKE COUNTY, INDIANA

U.S. Army Corps of Engineers
Chicago District, Planning Branch
111 N. Canal Street Room 600
Chicago, Illinois 60606-7206

March 2012

ENVIRONMENTAL ASSESSMENT
FOR
PROPOSED MODIFICATIONS
LITTLE CALUMET RIVER FLOOD CONTROL AND RECREATION PROJECT
LAKE COUNTY, INDIANA

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SECTION 1- PURPOSE AND NEED

PURPOSE

This Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers (USACE) for the Little Calumet River Local Flood Protection and Recreation Project in order to fully consider alternatives to proposed design changes for specific elements of the project. The proposed project modifications consist of design changes for the tieback levees located on the eastern and western limits of the project as authorized. Two of the tieback levees are located near the Illinois-Indiana state line in the communities of Hammond and Munster. The third tieback levee is located in the City of Gary, adjacent to the Ironwood neighborhood, along the northeastern side of the CSX Railroad (formerly Conrail Railroad). The three tieback levees will complete the project levee system to the authorized 0.5% annual exceedance probability (AEP) (200-year) level of flood risk management and would facilitate Federal Emergency Management Agency (FEMA) certification for the project levee systems (Plate 1).

Levee systems are constructed to a selected design level, corresponding to a physical elevation. In order to provide the required level of flood risk management to residents and structures, physical flood control features such as levees, floodwalls, seal embankments and temporary structures are constructed to the design level. The physical features need to terminate or tie-in into natural high ground that is at or above the design level in order to assure that flood flows will not bypass or flank the structure. The completion of the tieback levees will ensure the design level of flood risk management to the communities of Hammond, Munster and Gary, further reducing threats to life, safety and property in those communities.

NEED

In order to meet new requirements contained in recent USACE/FEMA regulations for levee certification, a risk analysis was performed for the levee systems that comprise the Little Calumet River Local Flood Protection and Recreation Project. The analysis considered the level of flood risk management provided by the levees located along the Little Calumet River and confirmed that tie back levees would be necessary at the Illinois/Indiana stateline for certification of the levee systems. Further, new USACE guidance required that the eastern tie back at the CSX Railroad would need to be enhanced for the levee system to meet current criteria.

The original plan for the Munster and Hammond Stateline Tiebacks in the authorizing document (1982 Phase I General Design Memorandum) called for the construction of a concrete floodwall along the Illinois-Indiana state line. Subsequent changes in the watershed, including the construction of levees in Calumet City and Lansing in Illinois, and the completion of the Thorn Creek Reservoir Project in Illinois modified the

watershed hydrology and hydraulics and lowered water levels on the western end of the flood risk management project. Consequently, a large permanent floodwall along the Illinois-Indiana state line was no longer required to complete the project.

Coordination with Illinois and Indiana has been an on-going effort by USACE during detailed project design. The USACE design considered floodway requirements in both Illinois and Indiana. According to the State of Illinois Department of Natural Resources Office of Water Resources (IDNR-OWR) the Calumet City and Lansing Levees were permitted in 1983 with a top elevation not to exceed 598.0 ft (NGVD 29). This elevation is above the current regulatory and USACE modeled 1% annual exceedance probability (100 year) flood elevation. We have been informed by IDNR-OWR that the permits issued to construct these levees authorizes the communities to maintain, and restore if necessary, the levees to their originally permitted elevation as a maintenance activity. Previous design analyses indicated that the levees in Calumet City and Lansing could serve as tieback levees for the Indiana project. However, recent evaluations of those levees indicated that they could not be certified as part of the Little Calumet River project due to their physical condition. Consequently, the Hammond and Munster Stateline Tieback levees were redesigned to accommodate changed conditions in the watershed, and to complete the project (Plates 2-4).

A seal embankment tieback was constructed at the eastern end of the project in the late 1990s as a portion of Stage II-4 (Plate 1). The existing seal embankment is situated on the southwest side of the CSX Railroad (formerly Conrail Railroad) west of Martin Luther King Drive (Plate 5). New levee certification requirements required extension of the seal to the northeast side of the Railroad embankment, as well as installation of a flow cutoff through the embankment. The inclusion of the Gary Ironwood Tieback Levee completes the levee system. In addition, the non-Federal sponsor will pursue an easement from Indiana Department of Transportation (InDOT) for portions of Interstate I-80/94 (shown on Plate 1) that will certify that the elevation of the embankment is consistent and that will not be modified in the future. This easement will provide certification of high ground for the Gary Levee system.

USACE evaluated the potential impacts to significant resources that could occur with the implementation of these three levee tiebacks as the NEPA compliance document was developed. The potentially affected environment at each of the three proposed tieback locations was considered, as well as the extent and potential impact of the proposed structures. Based on this evaluation it was determined that an EA would be the appropriate National Environmental Policy Act (NEPA) compliance document for these small modifications.

A Record of Decision (ROD) was signed for the authorized project in July 1990 based on the Phase I General Design Memorandum and Environmental Impact Statement (EIS) dated June 1982. During the review process, the District was required to complete additional planning analyses. The project was authorized in the Water Resources Development Act of 1986. Upon completion of the additional documentation and analysis, the agency executed the ROD. A copy of the ROD is

included with this EA The ROD summarizes the authorized plan, which included the flood control features such as levees, floodwalls, pump stations, non-structural measures, as well as recreation features and fish and wildlife mitigation.

USACE has completed a number of supplemental NEPA documents, including a Supplemental EIS in 1995. The ROD for the Supplemental EIS was signed in June 1995. The triggers for the additional NEPA documents were often based on changes in the footprint or design of the project that constituted a variation from the 1982 EIS. NEPA documents have addressed borrow sites, alignment changes, and other modifications that were required because of changes made by the project team, non-Federal sponsor or other entities. For example, improvements to area roadways and interstates necessitated changes in the project footprint and designs that were not anticipated during the feasibility study. The development of an EA for the modifications to the design of the tieback levees is consistent with the decision-making process used throughout the implementation of the flood risk management project.

AUTHORITY

The Phase I and Phase II GDM Feasibility Studies were authorized under Section 101 of the Water Resources Development Act (WRDA) of 1976. The project was authorized under section 401 of the Water resources Development Act of 1986 as amended.

LOCAL SPONSOR

The project's non-Federal sponsor is the Little Calumet River Basin Development Commission.

SECTION 2 - ANALYSIS OF ALTERNATIVES, INCLUDING THE RECOMMENDED PLAN

USACE considered two alternatives to address the needed design changes for the tieback levees that required additional documentation under NEPA. The two alternatives, the 'No-Action Plan' and the 'Modified Design Plan' are described in the following paragraphs.

- **No Action Plan.** Under this alternative, no changes would be made to the existing authorized plan as identified in the 1982 Environmental Impact Statement for the construction of flood control levees, floodwalls and tieback levees between the Illinois-Indiana state line and the CSX Railroad (formerly Conrail Railroad) on the East side of Gary, Indiana near the Ironwood subdivision. The 1982 plan has been modified during project construction to include: interior drainage features, including ponding areas; levee alignment changes; selected design changes for levees and floodwalls; and changes in the location of and specification for recreation features. Under the no-action plan, the levee systems will not be fully functional to the design level, which could result in levee flanking or bypass for a large flood event. The potential for flanking puts the life, health and safety of area residents at risk. Also, without adequate tieback levees, the levee systems could not be certified.

- **Modified Design Plan.** The Modified Design Plan includes design changes to the Hammond Stateline Tieback Levee, the Munster Stateline Tieback Levee and the Gary Ironwood Tieback Levee to accommodate changed conditions and changed requirements. The Hammond and Munster Stateline Tieback Levees will be composed of permanent structures floodwalls or similar structures that would connect temporary flood fight structures (such as concrete blocks or temporary water bladders) to existing embankments. The temporary flood control features would be installed along State Line Road and extend to high ground both north and south of the Little Calumet River. These features are needed to complete the Stage VIII levee segment and to provide design level of flood risk management to the residents in the communities of Hammond and Munster. On the east end of the project, the Gary Ironwood Tieback Levee would include a connection to the existing seal embankment along the CSX Railroad with a sheet pile cutoff through the railroad embankment and the continuation of the seal embankment on the northeast side of the railroad. The seal embankment would consist of a clay embankment constructed onto the face of the existing railroad.

RECOMMENDED PLAN

The Modified Design Plan is the Recommended Plan. The Recommended Plan includes design changes to the Hammond and Munster Stateline Tieback Levees and the

Gary Ironwood Tieback Levee to accommodate changed conditions and changed requirements.

The Hammond Stateline Tieback Levee would be constructed on the north side of Interstate 80/94 along Stateline Road (Plate 3). The tieback was designed as a combination of both permanent and temporary features. The permanent section of the Hammond Stateline Tieback Levee would be located near Forest Avenue in Hammond and would consist of a short segment of floodwall approximately 115 feet in length extending from a tie in with the existing Forest Avenue Levee, north to just south of 172nd Place (Plate 4). The floodwall will tie into the landside slope of the existing levee. Trees located on the landside of the levee would be removed to comply with vegetation requirements associated with levees. The presence of the existing structures will largely limit visibility of this short wall to the general public. No trees or shrubs can be planted within 15 ft of either side of the permanent floodwall. The temporary tieback levee consists of 3-foot high concrete blocks. The temporary portion of the Hammond Stateline Tieback Levee would be installed on Stateline Road prior to or during flood events by the City of Hammond. Installation would occur when the water level of the Little Calumet River reached a critical elevation. Flood responses will be guided by a Flood Warning and Response Plan, and river level data from the U. S. Geological Survey (USGS) gage located near Hohman Avenue. The temporary blocks would tie into the permanent floodwall just south of 172nd Place and continue north to 169th St. for a length of approximately 2,500 feet when assembled (Plate 5). When not in use, the blocks would be stored off site.

The Munster Stateline Tieback Levee would be constructed on the south side of Interstate I-80/94 near the continuation of Stateline Road (Plate 6). The Munster Stateline Tieback Levee was designed as a combination of both temporary and permanent features. The permanent portion of the Munster Stateline Tieback Levee will consist of a 10 foot long concrete pad that will tie into the existing Interstate-80/94 embankment and provide a connection between that embankment and the temporary portion of the tieback levee (Plate 7). The temporary portion of the Munster Stateline Tieback Levee will consist of a series of temporary water bladders that would be installed and inflated on Stateline Road prior to or during flood events by the City of Munster. Installation would occur when the water level of the Little Calumet River reached a critical elevation. Flood responses will be guided by a Flood Warning and Response Plan, and river level data from the USGS gage located near Hohman Avenue. The temporary water bladders would tie into a permanent structure just south of Interstate I-80/94 for a length of approximately 2,600 feet when assembled (Plate 8). When not in use, the temporary water bladders would be stored off site.

The Stateline Tieback Levees will need to be installed along Stateline Road when Calumet River stages approach the 2 % AEP (50 year) level for Hammond and the 1% AEP (100 year) level for Munster, in order to allow for sufficient time for the local communities to mobilize and install the temporary closures. Installation time for both of the temporary tieback levees is approximately six hours. The Town of Hammond has indicated that they will store and install the concrete blocks that will be used for the

temporary portion of the Hammond Stateline Tieback. Town of Munster has utilized inflatable water bladders at several road closure locations for the Little Calumet River Project. Based on their experience with the road closures, the Town of Munster has requested that inflatable water bladders be used for the temporary portion of the Munster Stateline Tieback, and was approved after USACE reviewed its acceptability. The bladders will be inflated with Munster Fire Department fire equipment. Water used to inflate the bladders will be disposed of appropriately when the bladders are dewatered.

The Little Calumet River Local Flood Control and Recreation Project includes a Flood Warning and Response Plan that is implemented by the non-Federal Sponsor and individual communities. The Flood Warning System for the Little Calumet River project includes key river levels associated with various activities, as well as river levels associated with each road closure. The use of precipitation data, river levels and trigger levels in the response plan will facilitate decisions by the non-Federal sponsor and communities to implement road closures as well as the Stateline Tieback Levees.

On the east end of the project, the Gary Ironwood Tieback Levee will connect into the existing seal embankment with a sheet pile cutoff through the railroad embankment. The seal embankment would consist of a clay embankment constructed onto the face of the existing railroad embankment. The seal embankment will extend approximately 925 feet from the cutoff wall northwards to a high ground tie-in. The new embankment would be located adjacent to the Ironwood neighborhood (Plate 9). A typical cross section and detail on the seal embankment is contained in Plate 10.

The Stateline Tieback Levees and the Gary Ironwood Tieback Levee have been designed to meet the applicable requirements in the Code of Federal Regulations, Section 65.2 (CFS §65.2) for levee certification. Requirements include formal operations plans for closures with provisions for periodic operation, flood warning systems, and periodic inspections. USACE, as a Federal Agency with responsibility for levee design and certification may certify that the levee design, including closures has been adequately designed and constructed. This certification would include the O&M of the Stateline Tieback Levees and all road closures.

The Hammond and Munster Tieback Levees are proposed at an elevation of 599.0, or one foot greater than the levees permitted in Illinois. This additional one foot (between 598.0 and 599.0) is within the levee risk and uncertainty and will establish the level of flood risk management consistent with the 0.5% (200 year) authorized level and within the geographic limits of the authorized project. USACE' numerical modeling does not indicate any impacts in Illinois. This evaluation has been not been limited to the proposed tiebacks, but rather the entire project.

COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES

The modified design plan is in full compliance with appropriate statues, executive orders and regulations, including the National Historic Preservation Act of 1966, Fish

and Wildlife Coordination Act, Endangered Species Act of 1973, Section 10 of Rivers and Harbors Act of 1899, Clean Air Act, Indiana Endangered Species, National Environmental Policy Act of 1969, as amended, Executive; Executive Order 12898 (Environmental Justice), Executive Order 11990 (Protection of Wetlands), Executive Order 11988 (Floodplain Management), and the Clean Water Act.

SECTION 3 -AFFECTED ENVIRONMENT

PROJECT AREA

The Little Calumet River Local Flood Control and Recreation Project extends from the Illinois-Indiana state line eastwards into Gary. The project terminates near the intersection of the Little Calumet River/Burns Ditch with Interstate I-65. This EA addresses two distinct portions of the project area located near the eastern and western limits of the constructed project (Plate 1). The flood risk management portion of the project is approximately 90% complete.

The western portion of the project area (Plate 2) lies approximately 8 miles south of Lake Michigan, in NW ¼ of Section 13, T36N R10W of the 2nd principal meridian, and is shown on the Calumet City (Indiana) USGS 7.5' topographic quadrangle map. The Hammond and Munster Stateline Tieback Levees will be located in the communities of Hammond and Munster near and within the existing State Line Road highway right-of-way which is located in the regulatory floodplain of the Little Calumet River adjacent to the Illinois-Indiana state line. The permanent portion of the Munster Stateline Tieback Levee is located in well-maintained grassed urban areas near and including the landside slope of the Forest Avenue Levee for the Hammond Stateline Tieback Levee. The permanent portion of the Munster Stateline Tieback Levee is located in the Interstate I-80/94 right-of-way. Plate 2 shows the full extent of the Hammond and Munster Stateline Tieback Levees as well as the protected communities.

Normal traffic flow on Stateline Road will be disrupted when the temporary portions of the two tieback levees are installed. Flood events that would require the installation of the temporary tiebacks are expected to be infrequent, with an annual exceedance probability of less than 2 percent per year. During flood events, the installation of the temporary closure will substantially reduce the risk of roadway flooding that would have resulted from flanking of the flood risk management project.

The eastern portion of the project area (Plate 1) lies approximately four miles south of Lake Michigan, in W ½ of Section 15, T36N R8W of the 2nd principal meridian, and is shown on the Gary (Indiana) USGS 7.5' topographic quadrangle map. The Gary Ironwood Tieback Levee is located along the northeast face of the CSX RR adjacent to the Ironwood neighborhood in the City of Gary, Indiana. Plate 9 shows the residential areas that are protected by the flood risk management project. Existing roadways either parallel the CSX RR embankment or terminate near the embankment. Traffic disruption from the Gary Ironwood Tieback Levee is expected to be minimal.

CLIMATE

Summer is typically characterized by moderately high humidity and temperatures between 78°F and 92°F. Overnight temperatures in summer can drop to around 65°F,

but can remain well above 70°F. Annual precipitation averages about 38 inches. Severe thunderstorms and summer rain arises from short-lived hit-or-miss storms rather than prolonged rainfalls. The average winter produces an average of 38.0 inches of snow, ranging between 9.8 and 89.7 inches. Snow tends to fall in light accumulations of around 2 inches, but larger accumulations do occur as lake effect weather sporadically inundates the area. Extended periods of temperatures below 32°F are not uncommon in January and February. Temperatures can be expected to drop below 0°F on 15 days throughout the winter season. Although not common, temperatures even in the middle of winter can surpass 50°F.

Average wind speeds range from 8 mph in late summer to 12 mph in spring months. Northwest Indiana experiences microclimatic effects because of Lake Michigan, especially during the summer. Very often during the summer a local lakeshore breeze pulls much cooler air into the area than the usual hot air of the Plains States, but the effect may be so local that only the immediate shoreline is much cooler than parts of the region further inland.

HYDROLOGY

The Little Calumet River was modified and urbanized over the past five or more decades as the watershed was modified from natural areas to farmland to suburban/urban land use. Within much of the West Reach of the Little Calumet River, homes and businesses are built immediately adjacent to the river. An irregular, vegetated spoil bank levee protects much of this portion of the river greatly constricting the natural floodplain. This portion of the river is influenced by significant influx of stormwater and combined sewer flow from numerous pump stations located along the river. Within much of the East Reach of the Little Calumet River land use is typified by open expanses of farmland, wetland and park, although there are some significant developments that were constructed within the past several decades. There are no wetlands within the footprint of the tieback levees. This section of the river has limited slope and slow flow conditions during dry weather periods. However, vast areas of the reach can be inundated during flood events due to the limited slope in the adjacent floodplain and adjacent areas.

Several sections of the river were deepened and straightened during the 20th century as the spoil bank levees were constructed. Modifications in the watershed, including the alternation of major tributaries including Hart Ditch, Burns Ditch and Deep River significantly altered the characteristics of the river during normal and flood conditions. Other flood management measures in the watershed, including the completion of the Thorn Creek Transitional Reservoir in Illinois and the Calumet City and Lansing Levees have further modified the hydrology of this watershed.

AIR AND WATER QUALITY

Air and water quality in the project area are typical of what would be expected in a densely populated area. Air quality is categorized as moderate to good. Most of the

impacts to air quality in this area are due to the large number of cars and trucks driven on the extensive road system in the Chicago and northern Indiana metropolitan area.

Water quality within the project area does not meet applicable water quality standards because of the continued combined sewer overflows, agricultural run-off, and municipal waste effluent. The Little Calumet River is on the Indiana Department of Environmental Management (IDEM) 303(d) list of impaired waterways. Any water body that does not meet or is not expected to meet the State's water quality standards is considered impaired and is placed on the 303(d) list in accordance with the Clean Water Act. Impaired waterways include waters that fail to meet any narrative, numeric, chemical, physical, or biological standard/criteria. Probable sources identified by IDEM in the Integrated Water Monitoring and Assessment Report (2008) include combined sewer overflows (CSOs) and nonpoint sources.

The project lies within areas that meet National Ambient Air Quality Standards (NAAQS) for ozone (1 hour and 8 hours) and Particulate Matter (10 micrometers and 2.5 micrometers) and sulfur dioxide. Information from the Indiana Department of Environmental Management's website for Ozone and Fine Particulate Non-Attainment Designations indicates that the tieback levees are located in Attainment Areas with a Maintenance Plan.

AQUATIC COMMUNITIES

The Little Calumet River basin is heavily urbanized with homes and businesses built immediately adjacent to the river. The floodplain is greatly reduced by irregular, vegetated spoil-built levees. Portions of the river have been straightened and deepened by dredging and channelization. The poor water quality and lack of habitat have limited aquatic communities. The dominant species are the central mud minnow, common carp, creek chub, brown bullhead, green sunfish, and bluegill. There are no wetlands within the footprint of the tieback levees.

TERRESTRIAL COMMUNITIES

The western project areas in the communities of Munster and Hammond are located in well-maintained lawn areas or in the right-of-way for public roads (Stateline Road and Interstate I-80/94). These areas do not support any native plant communities.

The footprint of the Gary Ironwood Tieback Levee will be located on the CSX RR embankment, adjacent to the Ironwood neighborhood in the City of Gary. The project area does not currently support any stable native species. Wooded areas adjacent to the CSX RR embankment are dominated by a dense thicket of non-native shrubs including, white mulberry (*Morus alba*), cottonwood (*Populus deltoides*), and box elder (*Acer negundo*). The adjacent old field is highly degraded and dominated by upland non-native grasses, predominantly brome (*Bromus* spp.), fescue (*Festuca* spp.), and blue grass (*Poa* spp.). A review of historic aerial photographs indicates that the field once included what appear to be residential structures. Field reconnaissance by USACE staff

identified remnant asphalt and confirmed that there are no wetlands, ditches or swales within the project footprint. The field investigation report is included in Appendix 2, Correspondence.

The three project areas include suitable habitat for common "urban" wildlife species, including fox and gray squirrel, opossum, cottontail rabbit, striped skunk, mice, red fox, bats, and eastern moles. Typical resident birds include English sparrow, starling, robin, herring gull, Canada geese, mallard, pigeon, cardinal, chickadee, red winged blackbird, purple martin, grackle, and blue jay.

NATURAL AREAS

The western limit of the project lies approximately two miles east of Wampum Lake Woods, part of the Forest Preserve District of Cook County, Illinois. This park includes a range of protected vegetation zones, and provides a resting and feeding area for a variety of wildlife, including a large number of birds during spring and fall migrations. There are no natural areas near the eastern end of the project near Martin Luther King Drive. The project area is not managed as a natural area.

THREATENED AND ENDANGERED SPECIES

The project area is suburban residential. It is within the range of the federally endangered Indiana Bat (*Myotis sodalist)* the Karner blue butterfly (*Lycaeides Melissa samuelis),* the threatened Pitcher's thistle (*Cirsium pitcheri*), and the candidate eastern massasauga rattlesnake (*Sistrurus catenatus catenatus).* However, the project area contains no habitat likely to be used by threatened or endangered species with the possible exception of migratory avian species. Indiana Department of Natural Resources and US Fish and Wildlife Service concurred with this assessment. (Appendix 2, Correspondence).

ARCHEOLOGICAL AND HISTORIC PROPERTIES

MUNSTER

The Sallborn Barn & Kaske House (listed 1998), are the only structures within the Town of Munster that are currently listed on the National Register Of Historic Places. This property is not located near the project area.

The proposed project is within the existing State Line Road highway right-of-way within the flood plain. It has been disturbed by filling, paving, and grading. It contains no intact archaeological material.

HAMMOND

Hammond, Indiana contains four structures that are listed on the National Register of Historic Places, the Dell Plain House and Garden (listed 1998), the Northern States Life Insurance Company (listed 2010), the S. S. Clipper (listed 1983), and the State Bank of Hammond (listed 1984). A number of Historic Districts located near the project area

are listed on the National Register of historic Places. These include the Forest-Ivanhoe Residential Historic District (listed 2010), the Forest-Southview Residential Historic District (listed 2010), and two historic districts that are in the process of being nominated to the National Register of Historic Places, the Ind-Illi Park Historic District, and the Roseland Forest Heights Historic District

The presence of the existing structures on the property will largely restrict the visibility of this wall to the general public. The proposed floodwall will not have an adverse affect on the adjacent historical properties.

The proposed project is within the existing State Line Road highway right-of-way within the flood plain. It has been disturbed by filling, paving, and grading. It contains no intact archaeological material.

GARY

There are numerous properties listed on the National Register of Historic Places located throughout Gary. However, none of them are located near the project area

The project area consists of a seal embankment and cutoff within an existing railroad easement. The proposed construction zone has been disturbed by filling, grading, and construction. It contains no intact archaeological material.

LAND USE HISTORY

MUNSTER

The Munster area was first settled by Jacob Munster who opened a general store in 1860. Munster was incorporated as a town in 1907. The town remained primarily a farming community until the 1940s. Munster is now an upper-middle class bedroom community for Chicago and Gary areas. Surrounding towns include Hammond, Dyer, and Highland, Indiana, and Lansing, Illinois.

The project area is adjacent to a part of Munster that developed in the 1950 to1960s' as residential housing for the growing middle-class. The area remains residential.

HAMMOND

German immigrants began settling the Hammond area after 1847. The community was first called Hohman, after an early settler. Later it was called State-Line, because of its location. The area remained sparsely settled until 1869 when the George H. Hammond meat-packing plant was built. This opened the area to additional industry and the population increased rapidly as people were drawn to the area for jobs. The name of the community was officially changed to Hammond, after the town's largest employer and was incorporated in 1884. It soon became a regional industrial center. Although industry remains economically important to Hammond, the area has also evolved into a bedroom community for the greater Chicago metropolitan area. Towns surrounding Hammond include Dyer, Munster, and Gary, Indiana.

The project area is in a section of Hammond that was an early semi-rural residential area of large estates in the 1920s. Since the 1940s the area has experienced a lot of residential infill making it more urban. The area remains residential.

GARY

The project area was farmland until it was developed as a bedroom community for Gary in the 1950's when it was annexed. The project area is adjacent to an existing railroad embankment. The project area is bordered on the west by Highland and Griffith Indiana.

To the north of the railroad embankment and project area is Ironwood Park. Aerial photos dating to1951 show the area to be heavily developed with what appears to be a large apartment complex. The area was re-developed as Ironwood Park in the late 1960s'.

SOCIAL SETTING

MUNSTER

Demographics. Munster is 7.6 square miles in size. It has a racially and ethnically mixed upper middle-class population of 23,600 (2010). The town remains a bedroom community for the surrounding communities and the greater Chicago metropolitan area. In 2009 the median home value for Munster was $172,700.00 and the median household income was approximately $87,000.00.

Recreational Resources. Within Munster there are 22 parks that provide baseball diamonds, soccer fields, basketball and tennis courts for public use. Picnic shelters, jogging and hiking trails, and fishing areas are also provided by the Munster Park system. The historic Kaske House Museum is located in Heritage Park.

HAMMOND

Demographics. The Town of Hammond has a racially and ethnically mixed middle-class population of 80,830 (2010). The community is 24.8 square miles in size. The median household income of Hammond is $47,100 (2010). The median home value is $75,500.00.

Recreational Resources. Hammond contains a total of 32 public parks that provide baseball diamonds, soccer fields, basketball and tennis courts for public use. Picnic shelters, jogging and hiking trails, ice skating rinks and cross-country skiing areas are also provided by the Hammond Park system. The park system operates 4 outdoor public swimming pools. Wolf Lake Park provides boating and fishing opportunities. Lake Front Park is located on the Lake Michigan shoreline and has a marina for boaters and is also the home of the Horseshoe Casino.

GARY

Demographics. In 2010 Gary's population was estimated 85,444; of that number, 10.2% were white non-Hispanic, 84.3% were African-American. Approximately 32.8% of the city's people lived below the poverty level in 2006. Median household income is $32,317 (2010), and home ownership rate was almost 54.8%. Median home value is $69,100 (2010)

Recreational Resources. There are 58 parks in the Gary park system. These parks provide baseball diamonds, soccer fields, basketball and tennis courts, as well as a number of swimming pools for public use. Picnic shelters, jogging and hiking trails, and fishing areas are also provided by the Gary Park system. Northeast of Gary additional recreational facilities are provided by Indiana Dunes National lake Shore.

ENVIRONMENTAL JUSTICE

USEPA's geographic information system environmental justice tracker, EJAssist, indicates that all three tieback levees are located in communities living with EJ concerns. Meetings held by the non-Federal Sponsor, the Little Calumet River Basin Commission in 2011 included presentations by USACE representatives on elements of the project, including the tieback levees. Further, the implementation of the tieback levees will complete the flood risk management project levees to the design level, thus protecting residents of these communities.

HAZARDOUS, TOXIC AND RADIOACTIVE WASTE (HTRW)

An HTRW investigation of the Little Calumet River Tieback project areas was completed 17 May 2011 as an update to previous HTRW investigations conducted between 1994 and 2005. This investigation also included access ramp sites which were previously planned to be constructed concurrently with the tiebacks. However, construction of the access ramps has been postponed until a future date. All discussions of access ramp sites in the HTRW report may be disregarded, as they are not pertinent to the tieback project discussed in this document. Database search results indicate that there is little potential for HTRW and non-HTRW conditions resulting from federal or state regulated facilities within the ASTM established search distances from the tieback sites. A site visit showed the western project areas to be clean, well-maintained, and free of garbage or other HTRW. The Ironwood Park Tieback site showed a great deal of debris from open dumping. All garbage and debris in the construction path shall be cleared and properly disposed of by the contractor in accordance with all appropriate environmental regulations. No HTRW investigation can wholly eliminate uncertainty regarding the potential for HTRW associated with a project area. The HTRW investigation is intended to reduce, but not eliminate, uncertainty regarding the potential for HTRW in connection with a project area. The HTRW Report for the tieback levees is included as Appendix 3.

SECTION 4 - ENVIRONMENTAL CONSEQUENCES

IMPACTS OF "NO ACTION" PLAN

The "no action" plan could result in risks to the health and safety of residents in the communities of Hammond, Munster and Gary, as well as flood impacts to residential, and commercial properties in those communities. These impacts could occur if the Little Calumet River Local Flood Control and Recreation Project levees were flanked in the tieback locations and floodwaters inundated the areas that will be protected by the tieback levees. In the Hammond/Munster area, the area between the Illinois-Indiana state line and the NICTD RR embankment to the east would be exposed to potential flooding. Along the east end of the Project, portions of the City of Gary would be exposed to potential flooding if the existing sealed RR embankment was undermined during a flood event. Community cohesion, tax revenues, property values, and public facilities could also be adversely affected. Further, existing flood control measures in the area would fail to meet required standards enacted by USACE following levee failures during Hurricane Katrina in 2005.

GENERAL IMPACTS (SECTION 122 OF PUBLIC LAW 91-611)

Section 122 of Public Law 91-611 identified 17 potential areas of impact that are required to be considered as part of an impact analysis of proposed projects. The proposed plan would not adversely affect community cohesion, tax revenues, property values, or desirable community or regional growth. No farms, people, businesses or industrial activity would be displaced or disrupted. Impacts of the remaining 17 areas follow:

- SOCIAL IMPACTS

Impacts on natural resources, man-made resources, and employment will be temporary. Employment could increase slightly during construction, and the region's labor force should provide the necessary workers. There will be no significant adverse effect to public facilities or services. During construction, increased traffic congestion would be localized and intermittent. Any aesthetic degradation would be temporary, either during construction, or during the implementation of temporary tieback levees. The project would have no significant adverse impact on human health or welfare or to municipal or private water supplies.

- AIR QUALITY IMPACTS

The proposed action would cause temporary increases in exhaust emissions from machinery and equipment during construction. These impacts would be minimal because of emission and dust controls required by the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and local restrictions. USACE specifications (CW-04130 Construction Specifications for Environmental Protection, July 1978) are

included in contracts to provide protection for the local environment. Construction and operation of the project would not result in significant or long-term adverse impacts to air quality. The project would involve only a de minimis discharge of airborne pollutants, and is therefore in compliance with the Clean Air Act Conformity Rule. Construction activities are likely to occur approximately 8 hours per day, five to six days per week for the duration of the construction contract.

- NOISE IMPACTS

The proposed action will cause temporary increases in noise from machinery and equipment during construction. These impacts will be temporary and will not result in significant or long-term adverse impacts. Construction activities are likely to occur approximately 8 hours per day, five to six days per week for the duration of the construction contract. USACE will work with the communities of Gary, Hammond and Munster to address any noise concerns raised by residents during the period of construction.

- WATER QUALITY IMPACTS

The project will have no significant long-term impact on the quality of water of the Little Calumet River and will comply with all applicable water quality standards. The project does not involve construction in water or promote development in the floodplain. Neither Section 401 or 404 of the Clean Water Act apply to this project because the project will not involve discharges to the waters of the United States (Section 401) and will not involve disposal of dredged or fill material in the Nation's waters (Section 404). There are no wetlands located within the footprint of the three tieback levees.

ENVIRONMENTAL JUSTICE

Executive Order 12898 (Environmental Justice)-A search of the EPA Environmental Justice database indicates that the communities of Hammond, Munster and Gary live with EJ concerns. Implementation of the Recommended Plan will serve to reduce flood risks to the residents of the three communities. Any adverse impacts to those communities during construction or operations are temporary in nature.

AQUATIC AND TERRESTRIAL IMPACTS

An investigation of habitat types and wildlife in the modified design area indicate that the modifications will have no impact to aquatic resources. Minor negative impacts to terrestrial resources will occur to highly disturbed urban areas made up primarily of non-native trees and shrubs as well as mowed opportunistic herbaceous vegetation which are predominantly turf grass. Field reconnaissance confirmed that the project footprints will not impact any significant natural resources. The three tiebacks are located in urban/suburban areas including road and railroad right-of-way. Twenty four hundred feet of the western tie back levees, (Hammond Stateline Tieback Levee and the

Munster Stateline Tieback Levee) are placed upon existing roads and therefore have minimal impact to terrestrial resources. The permanent portion of the Hammond Stateline Tieback Levee will consist of a 115 foot section floodwall will be constructed in an area dominated by cultivated grasses and non-native woody shrubs and trees. The Hammond Stateline Tieback Levee will tie into the Forest Avenue levee on the landward side of the levee. Trees growing on the levee slope impact the integrity of the levee and could result in levee failure and will have to be removed. No trees will be planted within 15 feet of the permanent portion of the Hammond Stateline Tieback Levee.

The Gary Ironwood Tieback Levee is located on land that was previously developed with various buildings that were ultimately demolished and the ground was leveled. The tieback levee will impact turf grass, and opportunistic non-native trees and shrubs under a transmission line right -of-way that parallels a railroad track.

The revised draft EA was sent to the U. S. Environmental Protection Agency, U. S. Fish and Wildlife Service and the Indiana DNR, Department of Fish and Wildlife. USACE will continue to coordinate with Indiana DNR and U.S. Fish and Wildlife Service as detailed designs on the Tieback Levees are completed. Necessary permits will be obtained.

EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)-The project will not affect wetlands since there are no wetlands within the project modifications footprint.

EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT)-The project modifications will help reduce the risk of flood loss and will not promote development in the floodplain.

THREATENED AND ENDANGERED SPECIES IMPACTS

Endangered Species-Although the project is within the known range of the Federally endangered Indiana Bat (*myotis* sodalist) and the Karner blue butterfly (*Lycaeides melissa samuelis*), and the threatened Pitcher's thistle (*Cirsium pitcher*) and Mead's milkweed (*Asclepias meadii*), there is no habitat present for these species within the project modification area. Therefore it has been determined that the project would not affect Federal or state-listed threatened or endangered species, or habitat likely to be used by such species. A copy of this draft EA was sent to the US Fish and Wildlife Service and the Indiana DNR. Indiana DNR and the US Fish and Wildlife Service have concurred with this determination.

ARCHAEOLOGICAL AND HISTORIC IMPACTS

National Historic Preservation Act of 1966-A review of the National Register of Historic Places indicates several recently listed historic districts in the city of Hammond are adjacent to the project area. Since the majority of the proposed construction in the City of Hammond will be temporary and only visible when in use during periods of

potential flooding, it will have no adverse impact on archaeological or historic properties. The 115 feet of permanent floodwall is somewhat hidden from view by existing structures and landscape. A copy of this draft EA has been sent to the Indiana State Historic Preservation Office (SHPO). In a letter dated February 29, 2012, the SHPO concluded that the proposed Hammond Stateline Tieback Levee would not diminish the historic properties. (Appendix 2, Correspondence).

HTRW IMPACTS

An HTRW investigation of the three tieback levee areas was completed 17 May 2011 as an update to previous HTRW investigations conducted between 1994 and 2005. Database search results indicate that there is little potential for HTRW and non-HTRW conditions resulting from federal or state regulated facilities within the ASTM established search distances and the proposed project is not expected to cause disturbance or release of hazardous, toxic, or radioactive waste. A field inspection of the three tieback levee locations provided no evidence of dumping or HTRW in the well-maintained project area for the Munster and Hammond Stateline Tieback Levees. Field inspection at the Gary Ironwood Tieback Levee project area found evidence of illegal dumping. All debris will be removed by the contractor and disposed of appropriately. No impacts from HTRW are expected at the three tieback levee locations.

CUMULATIVE EFFECTS

ASSESSMENT OF CUMULATIVE EFFECTS

Consideration of cumulative effects requires a broader perspective than an examination of the direct and indirect effects of a proposed action. It also requires that reasonably foreseeable future impacts be assessed in the context of the past and present effects to importance resources. Often it requires consideration of a larger geographic area than just the immediate project area. One of the most important aspects of cumulative effects assessment is that it requires consideration of how actions by others (including those actions completely unrelated to the proposed action) have and will affect the same resources. In assessing cumulative effects, the key determinate of importance or significance is whether the incremental effects of the proposed action will alter the sustainability of resources when added to other present and reasonably foreseeable future actions.

Cumulative environmental effects for the proposed infrastructure project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (USEPA, EPA 315-R-99-002, May 1999). This guidance provides an eleven-step process for identifying and evaluating cumulative effects in NEPA analysis.

The overall cumulative impact of the project is considered to be beneficial environmentally, socially, and economically.

SCOPING

In this environmental assessment, the cumulative effects issues and assessment goals are established, the spatial and temporal boundaries are determined, and reasonably foreseeable future actions are identified. Cumulative effects are assessed to determine if the sustainability of any of the resources is adversely affected with the goal of determining the incremental impact to key resources that would occur should the proposal be permitted. The spatial boundary for the assessment encompasses the parkland and the associated facilities and surrounding streets served by the infrastructures to be improved. The temporal boundaries are:

- Past-1845, when settlement and development of the area began.
- Present-2011, when the selection plan was being developed.
- Future-2062, the year used for determining project life end.

Projecting reasonably foreseeable future actions is difficult at best. Clearly, the proposed action is reasonably foreseeable, however, the actions by others that may affect the same resources are not as clear. Projections of those actions must rely on judgment as to what are reasonable based on existing trends and where available, projections from qualified sources. Reasonably foreseeable does not include unfounded or speculative projections. In this case, reasonably foreseeable future actions include:

- Increased growth in water consumption.
- Continued urban land use surrounding the project area.
- Continued application of environmental requirements such as the Clean Water Act.

CUMULATIVE EFFECTS ON GEOLOGY AND SOILS

The topography and soils of the project areas have been affected by filling, excavations, construction, and the burial of utilities. The proposed project would not alter the existing soil chemistry or geology.

CUMULATIVE EFFECTS ON WATER QUALITY AND AQUATIC COMMUNITIES

The project would have no adverse effects on water quality or aquatic communities in the Little Calumet River. While the project areas are all located within the regulatory floodplain, they are not located within the regulatory floodway. No wetlands, ditches or swales are located in the project areas of the three tieback levees. The implementation of the tieback levees will not affect the water quality of the river or surrounding areas and will not impact aquatic communities. The Hammond and Munster Stateline Tieback Levees consist primarily of temporary measures with a very limited footprint associated with the permanent structures. The permanent portion of the Hammond Stateline Tieback Levee will abut the landside of the Forest Avenue Levee and extend towards stateline road through grassed areas. This tieback will not impact any aquatic

communities or riverine water quality. The permanent portion of the Munster Stateline Tieback Levee is a ten foot long concrete pad located on the south side of Interstate I-80/94, and will not impact any aquatic communities or riverine water quality. The Gary Ironwood Tieback Levee is located along an existing RR embankment, and will not impact any aquatic communities or riverine water quality.

With regard to mitigating the impacts of the entire Little Calumet River Local Flood Protection and Recreation Project as discussed in prior NEPA documents, USACE has constructed 89 acres of wetlands within the project footprint in 2008 and will complete the required mitigation by restoring 385 acres at a site known as Hobart Marsh. Remaining mitigation work at Hobart Marsh includes disabling field tiles, repair of gully erosion areas, the eradication of both woody and herbaceous invasives, the introduction of native trees, shrubs, herbaceous plant plugs and seed in each of the restored communities, as well as management and monitoring. Real estate acquisition at Hobart Marsh is complete along with the agricultural field tile survey and the site assessment. The remaining cost for the Hobart Marsh site is estimated to be $4.8M. Construction of the remaining mitigation is expected to be complete in 2018.

Drain tile surveys were completed for the Hobart Marsh site in 2008. USACE is finalizing plans and specifications for the Hobart Marsh Mitigation Contract. Construction of the mitigation, including the establishment period is expected to take 5 years. Post-construction monitoring is scheduled for an additional 5 years. USACE has been coordinating an extension for completion of the mitigation requirements with Indiana DNR and Indiana Department of Environmental Management (IDEM). Record flooding in 2008 focused the attention of USACE and the non-Federal sponsor on completing the flood control portions of the project. During the October 2008 flood event, the existing spoilbank levee in the City of Munster breached, resulting in the inundation of significant portions of the community.

CUMULATIVE EFFECT OF TERRESTRIAL RESOURCES

Study of existing habitats and native species within the project area indicates that the relatively small modifications for this project will have no long-term adverse or cumulative effects to terrestrial resources, including habitats, native flora or fauna.

CUMULATIVE EFFECTS ON LAND USE

Although past projects have had adverse affects on land use in the project area, land use will not be adversely affected by this project. The Hammond and Munster Stateline Tieback Levees will be installed in well-maintained grassed areas and or along the existing rights-of-way for Stateline Road and Interstate I-80/94. Impacts to Stateline Road will be limited to the duration of the installation of the temporary tieback levees. The temporary portions of the Hammond and Munster Stateline Tieback Levees will be installed during flood events, when river levels reach a trigger elevation. There will be no long term cumulative effect on the land use associated with the Hammond and Munster Stateline Tieback Levees.

The Gary Ironwood Tieback Levee will be installed along the CSX RR embankment adjacent to an open field in the Ironwood neighborhood of the City of Gary. The footprint of the seal embankment will be within the RR right-of-way, therefore, no change in land use will be associated with the construction of the seal embankment/tieback levee and therefore there will be no cumulative adverse effect on the land use.

CUMULATIVE EFFECTS ON AESTHETIC VALUES

The Hammond Stateline Tieback Levee is located adjacent to several historical districts. However, since the majority of the tieback levee is temporary, and would be implemented for short durations during periods of potential flooding. The project will have no cumulative adverse effects on the visual setting of the project area. The permanent portion of the tieback levee is a short floodwall that is hidden from the neighborhood by existing structures. The permanent portion of the tieback levee has minimal cumulative adverse impacts on the visual setting of the project area.

CUMULATIVE EFFECTS ON PUBLIC FACILITIES

The existing conditions of public facilities will not be altered by the project. The project will have no long-term cumulative adverse effects on public facilities.

CUMULATIVE EFFECTS SUMMARY

Along with direct and indirect effects, cumulative effects of the proposed project were assessed following the guidance provided by the Presidents' Council on Environmental Quality (Table 1). There have been numerous effects to resources from past and present actions, and reasonably foreseeable future actions can also be expected to produce both beneficial and adverse effects. Additional long term adverse impacts to significant resources are not expected to occur. In this context, the effects of the proposed project are relatively minor.

Table 1 - Environmental Impact Summary

Potential Impact Area	Past Actions	Proposed Direct Impacts		Cumulative Impact
		Construction	Operation	
Geology & Soils	adverse	No Impact	No Impact	No Impact
Hydrology	adverse	No Impact	No Impact	No Impact
Water Quality	major adverse	No Impact	No Impact	No Impact
Sediment Quality	major adverse	No Impact	No Impact	No Impact
Aquatic Resources	major adverse	No Impact	No Impact	No Impact
Terrestrial Resources	adverse	minor negative impact	No Impact	No Impact
Land Use	adverse	No Impact	No Impact	No Impact
Aesthetics	No impact	No Impact	minor negative impact	No Impact
Archaeology/Historic	No Impact	No Impact	No Impact	No Impact

SECTION 5 - COORDINATION

RECIPIENTS

The following elected officials, agencies and interested parties received a copy of this environmental assessment:

ELECTED OFFICALS

Honorable Richard Lugar
United States Senator
175 West Lincolnway, Suite G-1
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Honorable Richard Lugar
United States Senator
306 Hart Senate Office Building
Washington, DC 20510

Honorable Dan Coats
United States Senate
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Indianapolis, IN 46204

Honorable Dan Coats
United States Senate
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Washington, DC 20510

Honorable Peter Visclosky
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United States Representative
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Honorable Mitch Daniels
Governor of Indiana
206 State House
Indianapolis, IN 46204

Honorable Earl Harris
Representative -State of Indiana
200 W. Washington St.
Indianapolis, IN 46204-2786

Honorable Don Stevenson
Representative -State of Indiana
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Indianapolis, IN 46204-2786

Honorable Frank Mrvan
Senator-State of Indiana
200 W. Washington, St.
Indianapolis, IN 46204-2786

Honorable Lonnie Randolph
Senator-State of Indiana
200 W. Washington, St.
Indianapolis, IN 46204-2786

Honorable Sue Landske
Senator-State of Indiana
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Indianapolis, IN 46204-2786

AGENCIES and INTERESTED PARTIES

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U.S. Fish and Wildlife Service
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ATTN: Elizabeth McCloskey

IDEM Northwest Regional Office
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Merrillville, IN 46410

ATTN: Hala Kuss

IDEM
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Mail Code 61-50
Indianapolis, IN 46204-2251
Attn: Marty Maupin

Indiana DNR
Division of Water
100 N. Water St.
Michigan City, IN 46360
ATTN: Steve Davis

Indiana DNR
Division of Water
402 W. Washington, Room W273
Indianapolis, IN 46204
ATTN: Christine Kiefer

Indiana DNR
Division of Historic Preservation and History
402 W. Washington, Room W274
Indianapolis, IN 46204
ATTN: James Glass

Northwestern Indiana Regional Planning Commission
900 Ridge Rd Suite H
Munster, IN 46321
ATTN: Steve Strains

NON-FEDERAL SPONSOR

Little Calumet River Basin Development Commission
900 Ridge Rd Suite H
Munster, IN 46321
ATTN: Dan Repay, Director

APPENDIX 1
PROJECT MAPS

Plate Number	Title
Plate 1	Little Calumet River Local Flood Protection and Recreation Project, Limited Reevaluation Report
Plate 2	Hammond and Munster Stateline Tiebacks
Plate 3	Hammond Stateline Tieback
Plate 4	Hammond Stateline Tieback - Permanent Wall Detail
Plate 5	Hammond Stateline Tieback - End of Temporary Wall Detail
Plate 6	Munster Stateline Tieback
Plate 7	Munster Tieback Wall – Concrete Pad Detail
Plate 8	Munster Tieback, End of Temporary Water Bladder Detail
Plate 9	Gary Ironwood Tieback
Plate 10	Gary Ironwood Tieback Detail

Little Calumet River, Indiana
Local Flood Control And Recreation Project
Limited Reevaluation Report

US Army Corps of Engineers
Chicago District

Little Calumet River Basin Development Commission

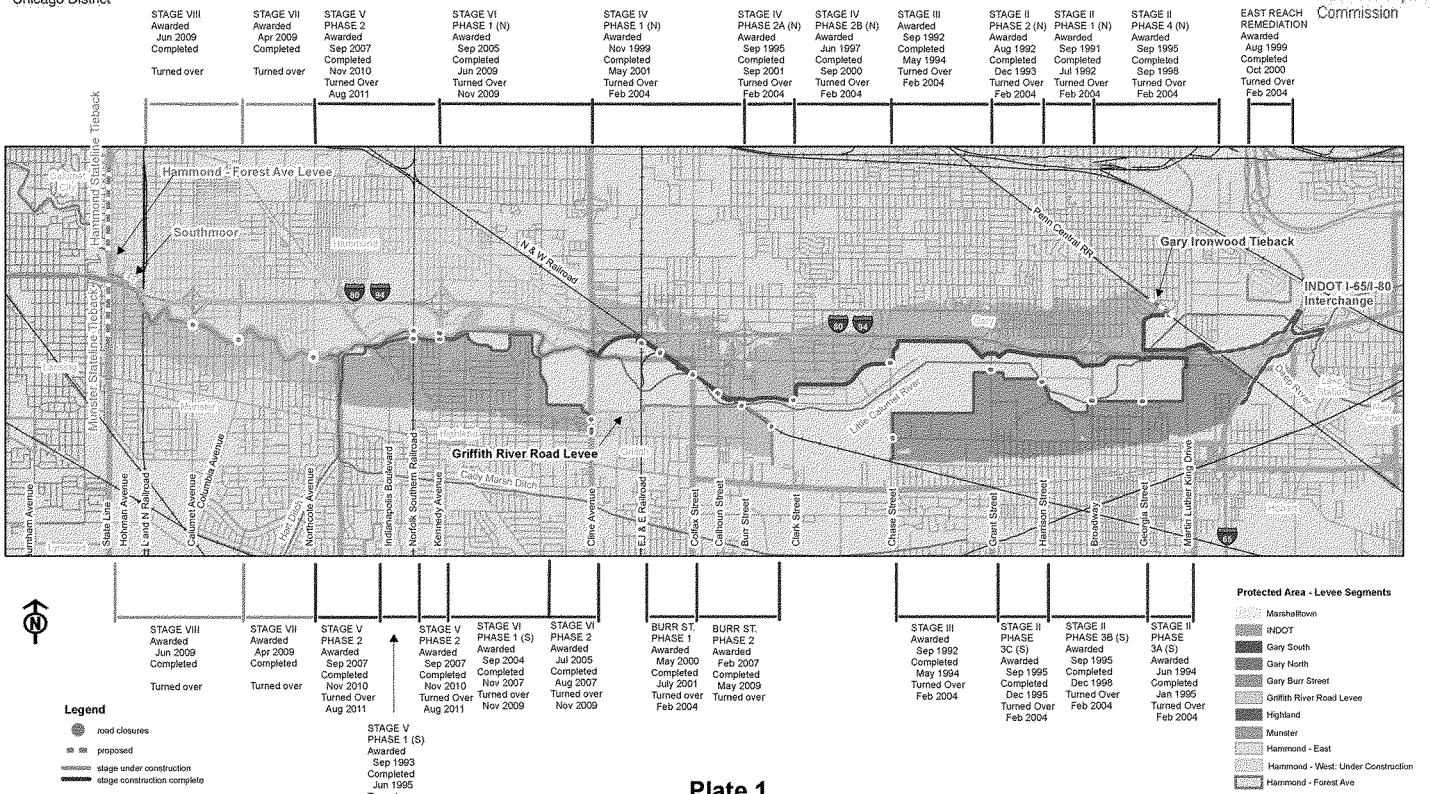
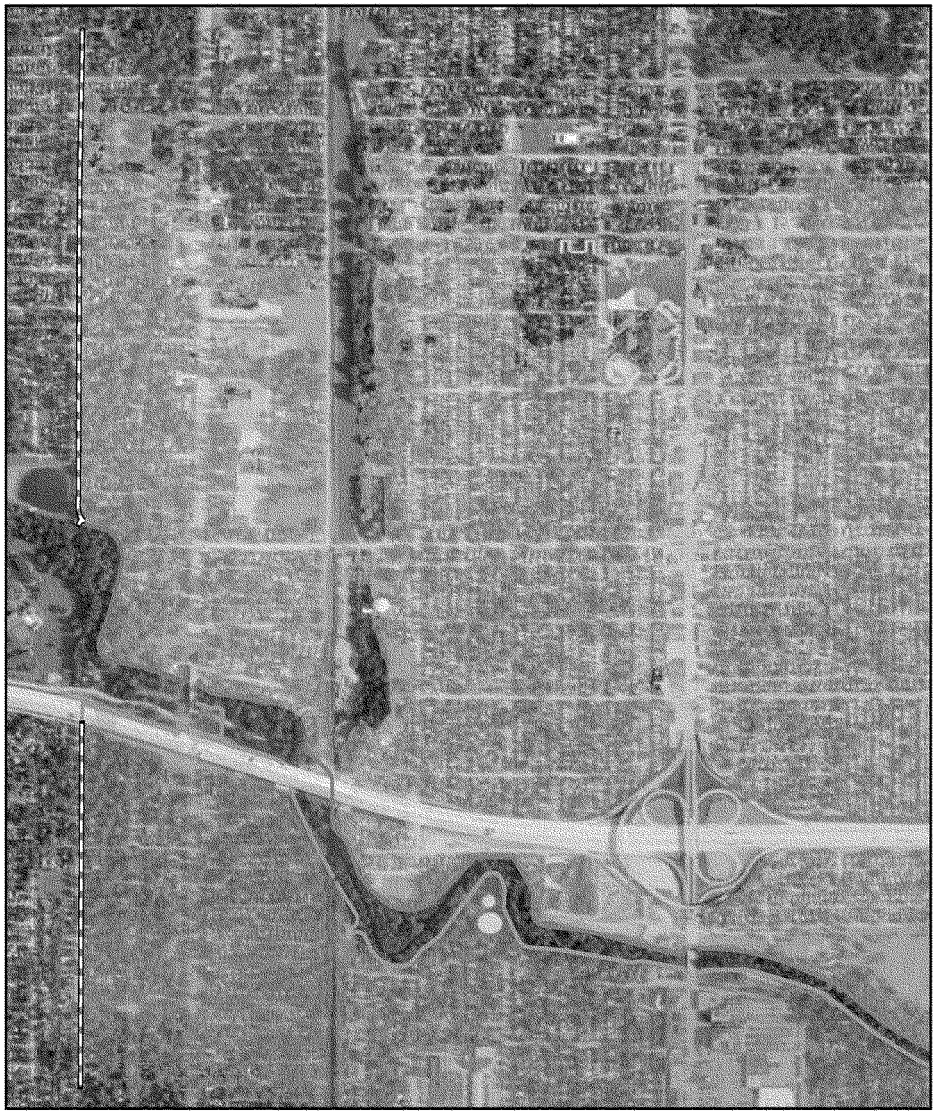


Plate 1

November 16, 2011

Hammond & Munster Stateline Tiebacks

U.S. Army Corps of Engineers Chicago District



Legend

- Road Closures

Protected Area - Levee Segments

- Marshalltown
- INDOT
- Gary South
- Gary North
- Gary Burr Street
- Griffith River Road Levee
- Highland
- Munster
- Hammond
- Forest Ave
- dashed line - under construction

Proposed Closures

- Hammond & Munster Tieback

Date: 3/9/2012

N
W E
S

1 IN = 1,200 FT

Coordinate System: GCS North American 1983
Datum: North American 1983

Path: J:\Working\StatelineTiebacks.mxd

Plate 2

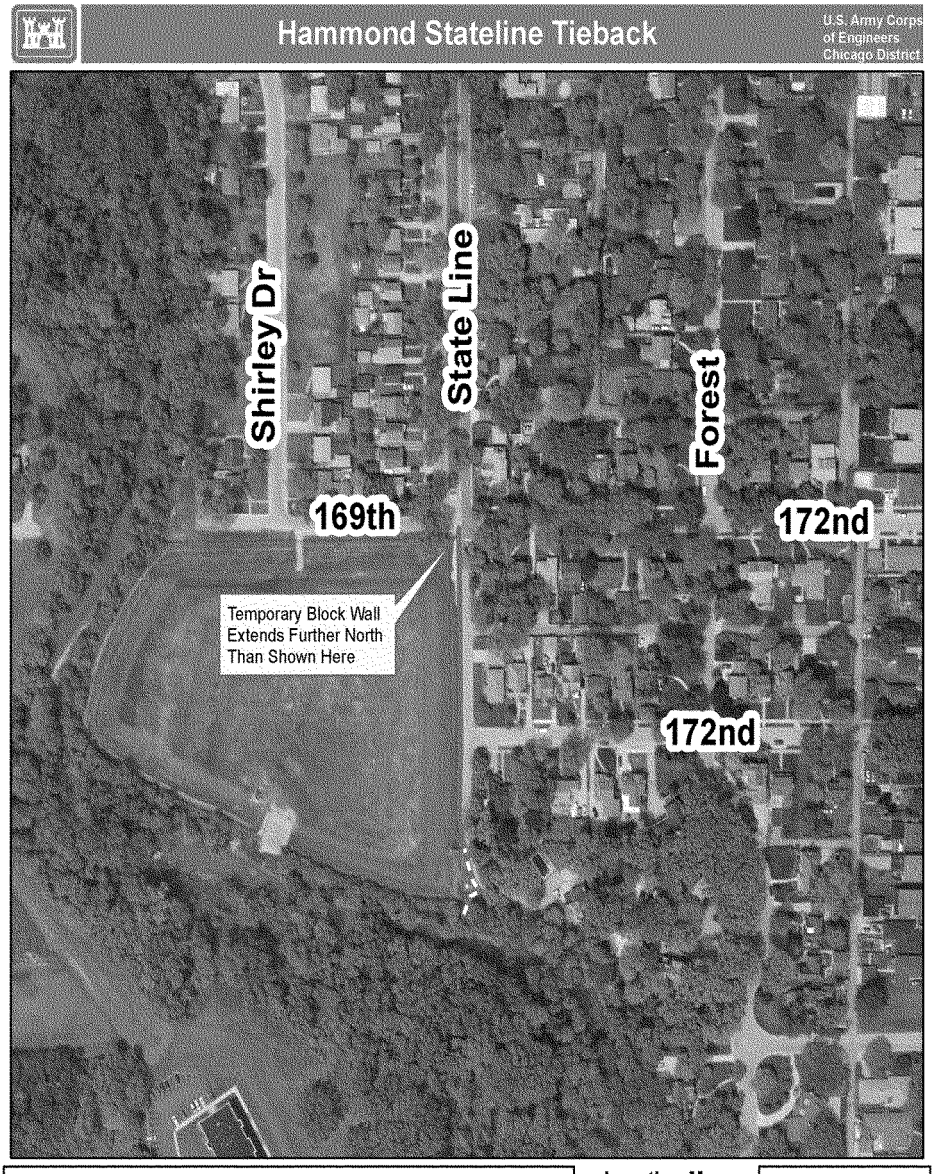
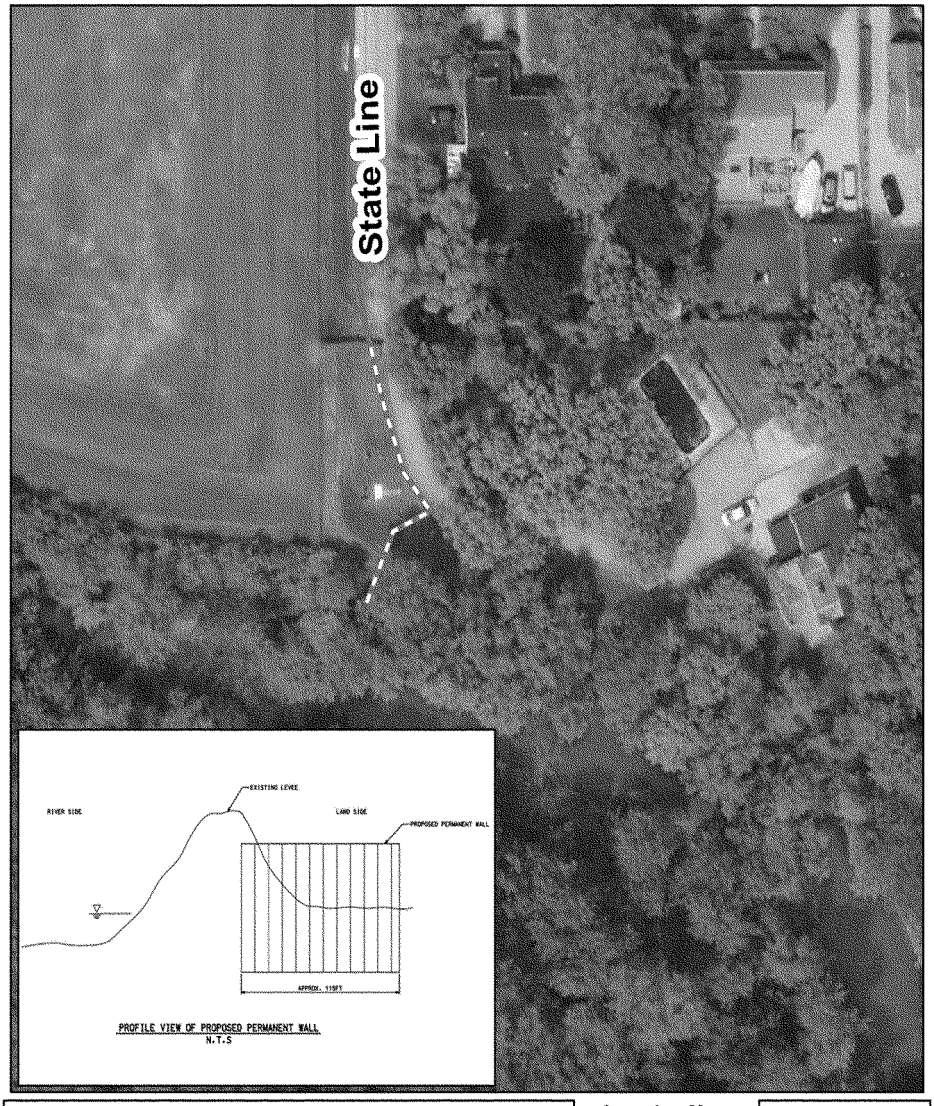

Hammond Stateline Tieback
U.S. Army Corps of Engineers Chicago District
Shirley Dr
State Line
Forest
169th
172nd
172nd
Temporary Block Wall Extends Further North Than Shown Here
Legend
Permanent Concrete/SSP Floodwall
Temporary Block Wall
Location Map
Lake Michigan
Cook
Lake
Date: 3/5/2012
N
W
E
S
1 in = 200 feet
Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983
Path: J:\MXD\LittleCalumet\Hammond Stateline Tieback.mxd

Plate 3

Hammond Stateline Tieback - Permanent Wall Detail

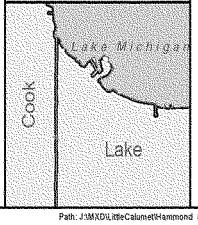
U.S. Army Corps of Engineers
Chicago District



Legend

- Permanent Concrete/SSP Floodwall
- Temporary Block Wall

Location Map



Date: 3/9/2012

N
W E
S

1 in = 50 feet

Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983

Plate 4

Path: J:\MXD\LittleCalumet\Hammond Stateline Tieback - Permanent Wall Detail.mxd

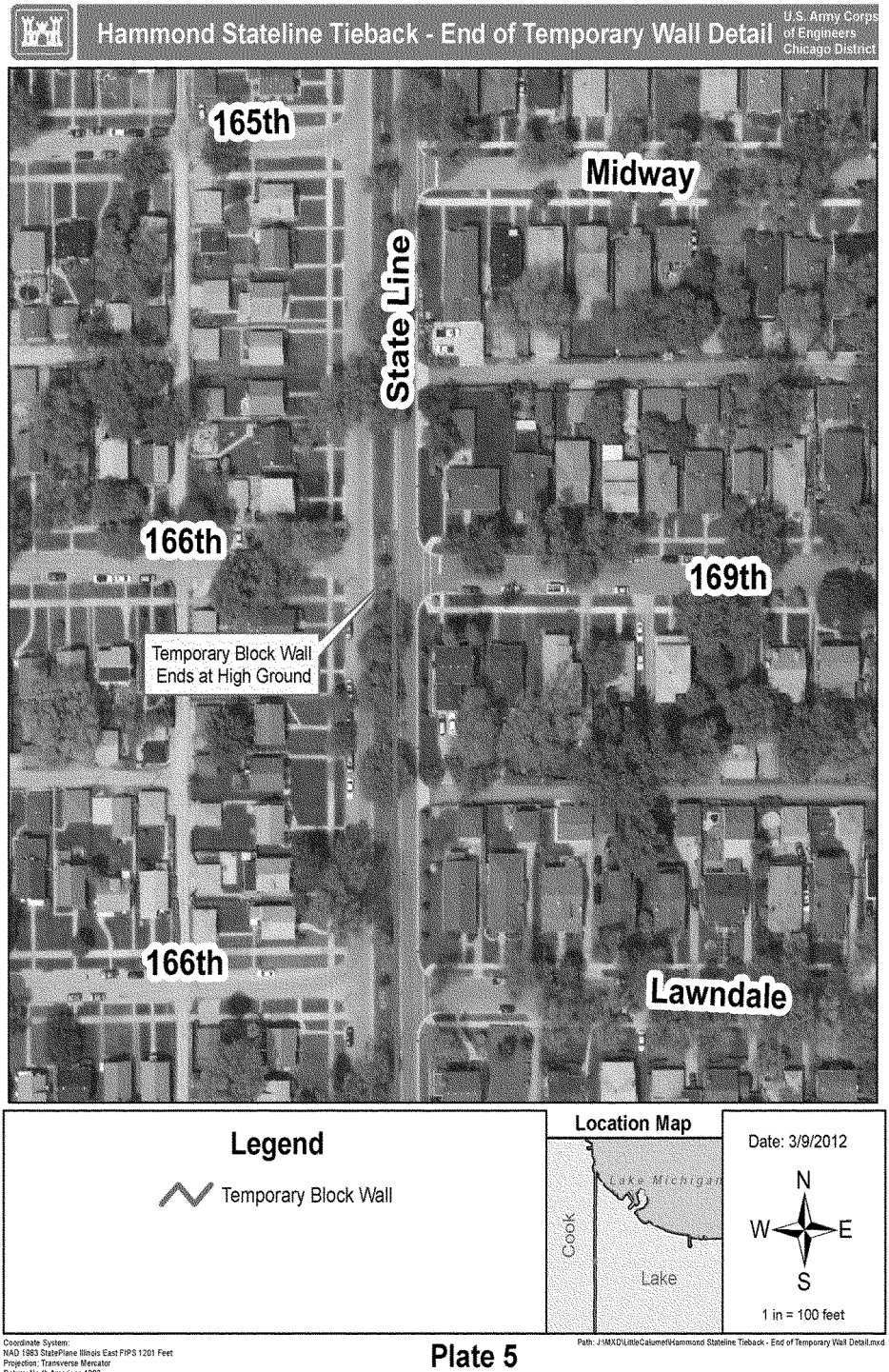

Hammond Stateline Tieback - End of Temporary Wall Detail
U.S. Army Corps of Engineers Chicago District
165th
Midway
State Line
166th
169th
Temporary Block Wall Ends at High Ground
166th
Lawndale
Legend
Temporary Block Wall
Location Map
Lake Michigan
Cook
Lake
Date: 3/9/2012
N
W
E
S
1 in = 100 feet
Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983
Path: J:\MXD\LittleCalumet\Hammond Stateline Tieback - End of Temporary Wall Detail.mxd

Plate 5

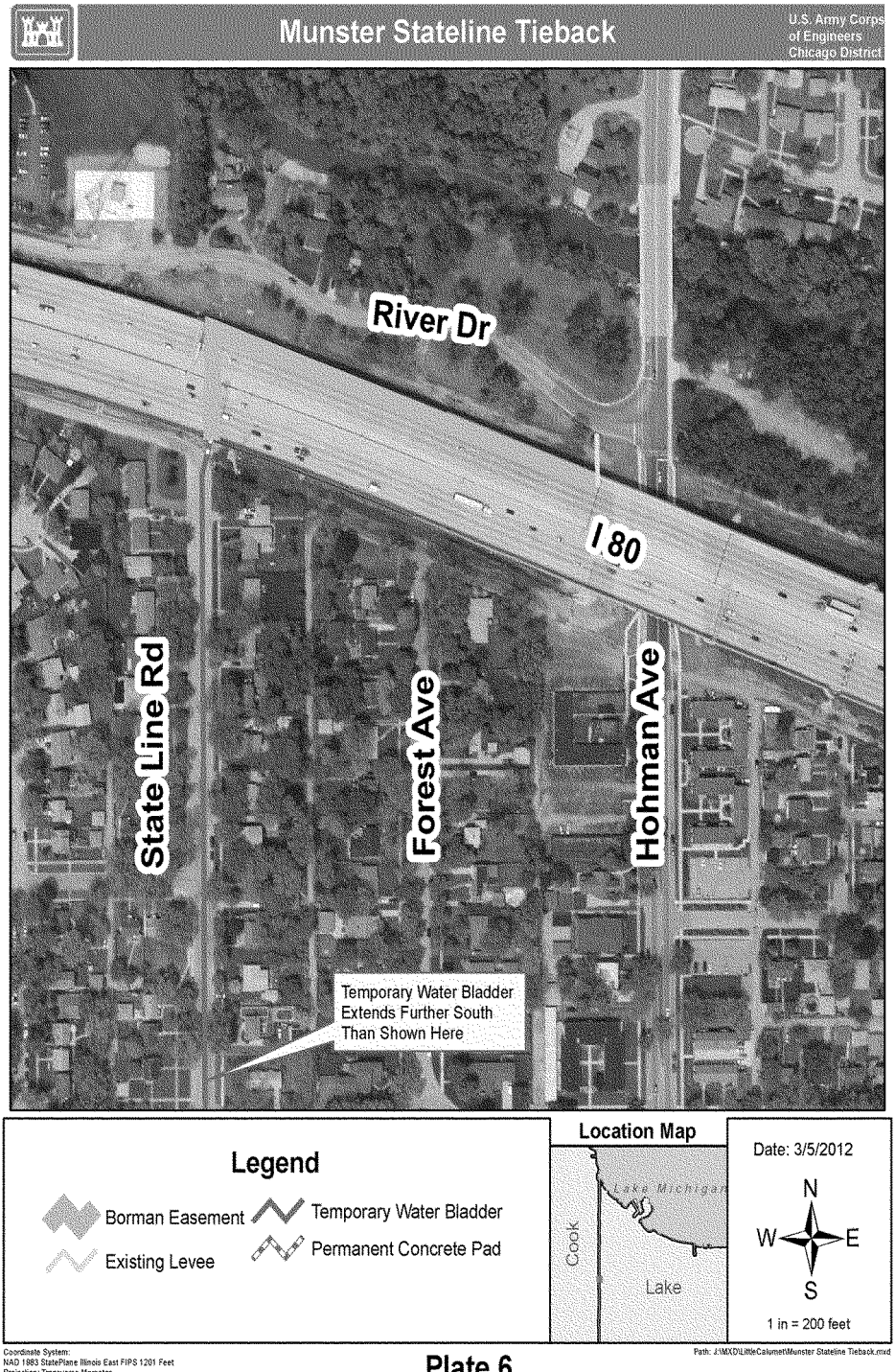
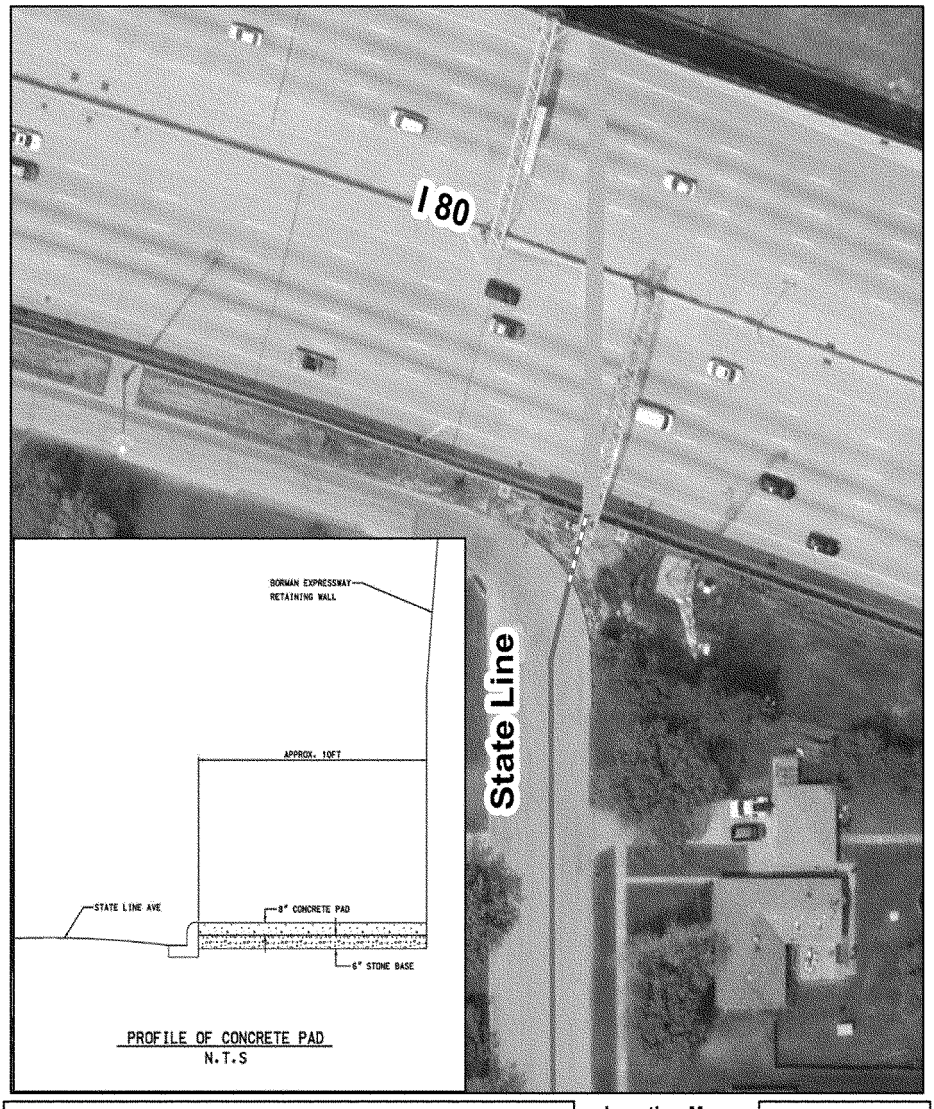

Munster Stateline Tieback
U.S. Army Corps of Engineers Chicago District
River Dr
I 80
State Line Rd
Forest Ave
Hohman Ave
Temporary Water Bladder Extends Further South Than Shown Here
Legend
Borman Easement
Existing Levee
Temporary Water Bladder
Permanent Concrete Pad
Location Map
Lake Michigan
Cook
Lake
Date: 3/5/2012
N
W
E
S
1 in = 200 feet
Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983
Path: J:\MXD\LittleCalumet\Munster Stateline Tieback.mxd

Plate 6

Munster Stateline Tieback - Concrete Pad Detail

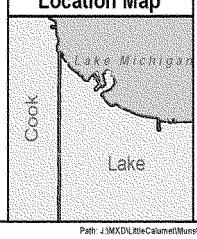
U.S. Army Corps of Engineers
Chicago District



Legend

- Borman Easement
- Existing Levee
- Temporary Water Bladder
- Permanent Concrete Pad

Location Map



Date: 3/9/2012

N
W E
S

1 in = 50 feet

Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983

Plate 7

Path: J:\MXD\LittleCalumet\Munster Stateline Tieback - Concrete Pad Detail.mxd

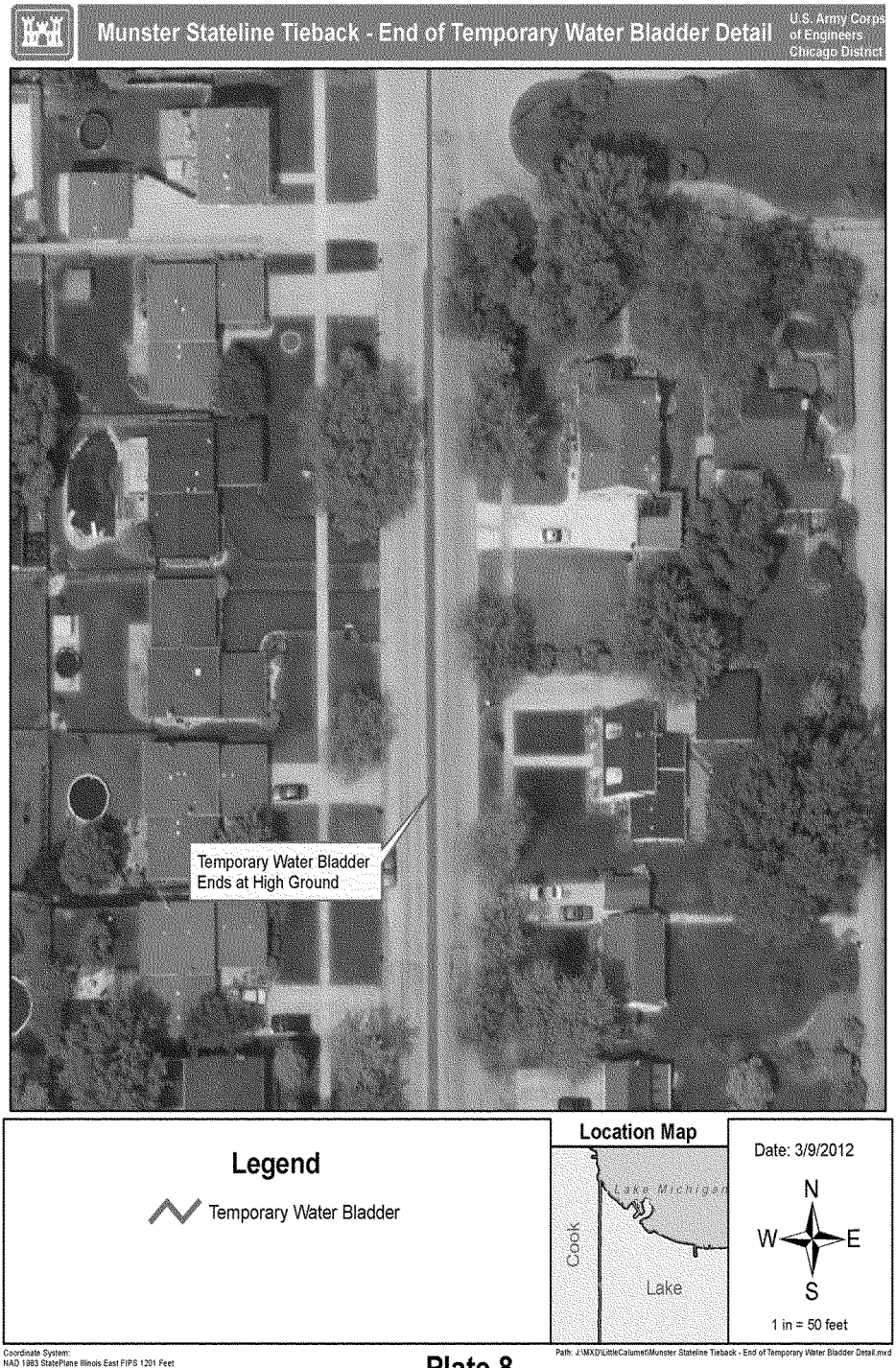
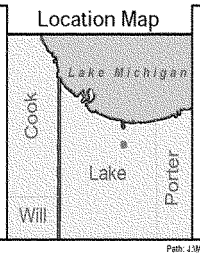

Munster Stateline Tieback - End of Temporary Water Bladder Detail
U.S. Army Corps of Engineers Chicago District
Temporary Water Bladder Ends at High Ground
Legend
Temporary Water Bladder
Location Map
Lake Michigan
Cook
Lake
Date: 3/9/2012
N
W
E
S
1 in = 50 feet
Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983
Path: J:\MXD\LittleCalumet\Munster Stateline Tieback - End of Temporary Water Bladder Detail.mxd

Plate 8

Legend

- Existing Seal Embankment
- Proposed Steel Sheet Pile Cut-Off Wall
- Proposed Seal Embankment
- Existing Levee

Location Map



Date: 3/9/2012

N
W E
S

1 in = 300 feet

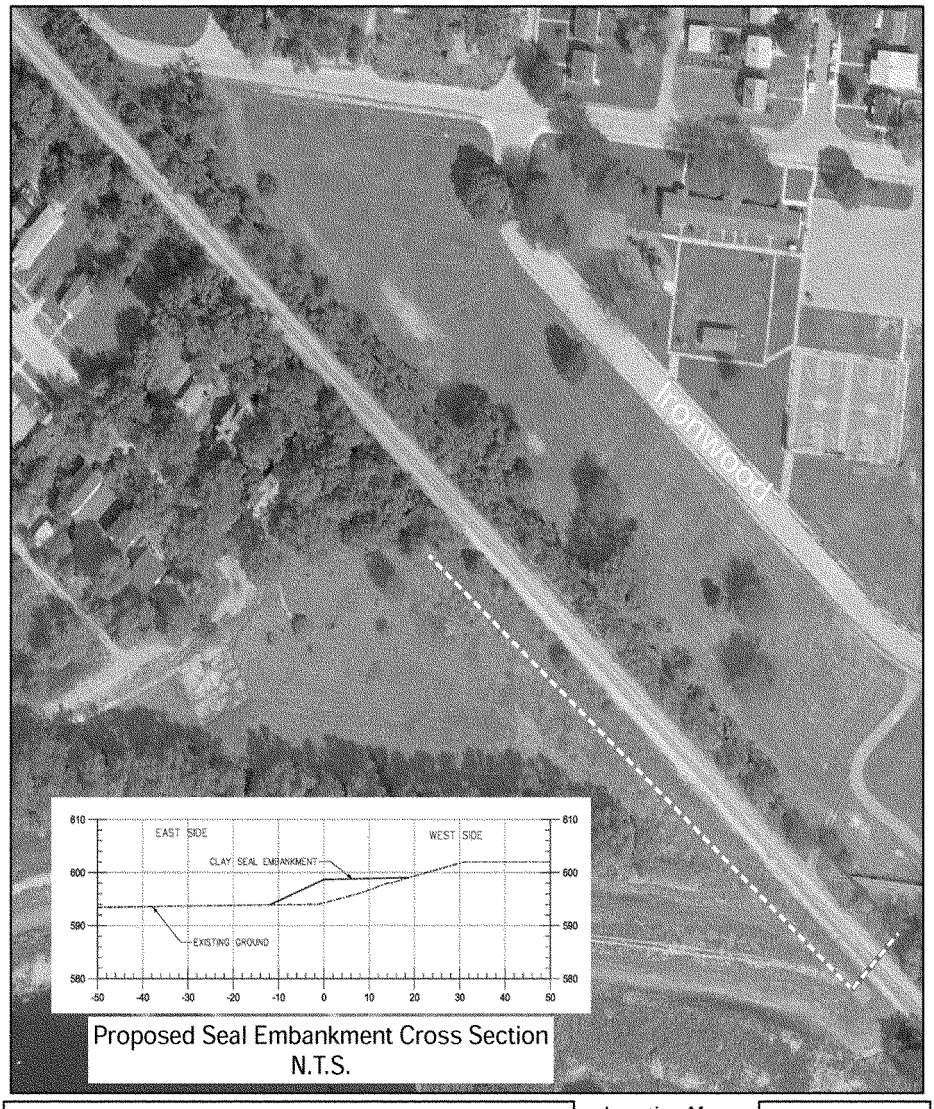
Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983

Plate 9

Path: J:\MXD\LittleCalumet\Gary Ironwood Tieback.mxd

Gary Ironwood Tieback - Detail

U.S. Army Corps of Engineers
Chicago District

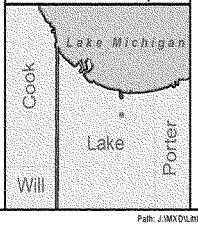


Proposed Seal Embankment Cross Section
N.T.S.

Legend

- Existing Seal Embankment
- Proposed Steel Sheet Pile Cut-Off Wall
- Proposed Seal Embankment
- Existing Levee

Location Map



Date: 3/9/2012

N
W
E
S

1 in = 125 feet

Coordinate System:
NAD 1983 StatePlane Illinois East FIPS 1201 Feet
Projection: Transverse Mercator
Datum: North American 1983

Plate 10

Path: J:\MXD\LittleCalumet\Gary Ironwood Tieback - Detail.mxd

APPENDIX 2
CORRESPONDENCE

Correspondence

Indiana Department of Natural Resources

THIS IS NOT A PERMIT

State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife

Early Coordination/Environmental Assessment

DNR #: ER-15937 **Request Received:** August 30, 2011

Requestor: US Army Corps of Engineers, Chicago District
Peter Bullock
111 North Canal Street, Suite 600
Chicago, IL 60606-7206

Project: Proposed project modifications, 3 tieback levees, for the Little Calumet River Flood Control Project

County/Site info: Lake

The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

Regulatory Assessment: This proposal may require the formal approval of our agency pursuant to the Flood Control Act (IC 14-28-1) for any proposal to construct, excavate, or fill in or on the floodway of a stream or other flowing waterbody which has a drainage area greater than one square mile. Please submit more detailed plans to the Division of Water's Technical Services Section if you are unsure whether or not a permit will be required.

Natural Heritage Database: The Natural Heritage Program's data have been checked. To date, no plant or animal species listed as state or federally threatened, endangered, or rare have been reported to occur in the project vicinity.

Fish & Wildlife Comments: We were not able to adequately assess impacts to fish, wildlife, and botanical resources resulting from the project with the information provided. If further environmental review is needed, we recommend submitting more information, such as the construction limits, amount of tree removal required, amount of fill, dimensions of the levees and floodwalls, and the amount of wetland impacts required.

Avoid areas of concern to fish, wildlife, and botanical resources to the greatest extent possible. Be prepared to demonstrate avoidance, minimization, and mitigation of impacted resources. Following are recommendations for potential impacts identified in the proposed project area:

1) Bank Stabilization
Restore disturbed streambanks using bioengineering bank stabilization methods. The following is a link to a USDA / NRCS document that outlines many different bioengineering techniques for streambank stabilization: http://directives.sc.egov.usda.gov/17553.wba (Choose Handbooks; Title 210 Engineering; National Engineering Handbook; Part 650 Engineering Field Handbook. Choose Chapter 16 from next window). Revegetate disturbed banks with native trees, shrubs, and herbaceous plants. Stream bank slopes after project completion should be restored to stable-slope steepness (not steeper than 2:1).

2) Riparian Habitat
Avoid, if possible, then minimize impacts to the forested riparian corridor and streambank of the Little Calumet River in the north portion of the Hammond and Munster site.

Impacts that remove trees from a non-wetland, riparian area require mitigation. When one or more acres of non-wetland forest are removed, replacement is at a 2:1 ratio based on area. If less than one acre of non-wetland forest is removed in a rural setting, replacement is at a 1:1 ratio based on area. If less than one acre of non-wetland forest

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Early Coordination/Environmental Assessment

is removed in an urban setting, the mitigation requirement involves planting five trees, at least 2 inches in diameter-at-breast height, for each tree which is removed that is ten inches or greater in diameter-at-breast height (5:1 mitigation based on the number of large trees). A native riparian forest mitigation plan should use at least 5 canopy trees and 5 understory trees or shrubs selected from the Woody Riparian Vegetation list (copy enclosed) or an approved equal. A native riparian forest mitigation plan for impacts of less than one acre in an urban area may involve fewer numbers of species, depending on the level of impact. Additionally, a native herbaceous seed mixture should be planted consisting of at least 10 species of grasses, sedges, and wildflowers selected from the Herbaceous Riparian Vegetation list (copy enclosed) or an approved equal.

3) Wetland Habitat
Avoid, if possible, then minimize tree removal and impacts to the wetlands located in the area surrounding the Ironwood Tieback site.

Due to the presence or potential presence of wetlands on site, we recommend contacting and coordinating with the Indiana Department of Environmental Management (IDEM) 401 program and also the US Army Corps of Engineers (USACE) 404 program. Impacts to wetlands should be mitigated at the appropriate ratio. For more information, see http://www.in.gov/legislative/register/20061213-IR-312060562NRA.xml.pdf.

Construct an exclusion/drift fence around work areas and access pathways prior to the inclusive dates March 1-June 30, to prevent reptiles and amphibians located near the area from entering the area while searching for suitable nest sites and through normal movement later during construction. Any reptile or amphibian, regardless of species, found within the construction boundary prior to or during construction should be relocated to the other side of the drift fence and away from the work area.

All exposed soil areas should be stabilized with temporary or permanent vegetation by November 1. Between November 1 and April 1 all exposed soils idle for longer than 7 days should be stabilized with erosion control blankets or with a bonded fiber matrix hydro-mulch. Sites should be protected from seasonal flooding by keeping traffic areas covered with stone and soil stockpiles seeded, stable and contained with silt fencing.

Fish, wildlife, and botanical resource losses as a result of this project can be minimized through implementation of the following measures.
1. Revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes as soon as possible upon completion; low endophyte tall fescue may be used in the ditch bottom and side slopes only.
2. Minimize and contain within the project limits inchannel disturbance and the clearing of trees and brush.
3. Do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife.
4. Do not cut any trees suitable for Indiana bat roosting (greater than 3 inches dbh, living or dead, with loose hanging bark) from April 1 through September 30.
5. Do not use broken concrete as riprap.
6. Appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized.
7. Seed and protect disturbed stream banks and slopes that are 3:1 or steeper with erosion control blankets (follow manufacturer's recommendation for installation); seed and apply mulch on all other disturbed areas.

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DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife

Early Coordination/Environmental Assessment

8. Inspect structural erosion and sediment control practices daily and repair as necessary until all construction is complete and disturbed areas are permanently stabilized.
9. Do not excavate or place fill in any riparian wetland.
10. Embankment slopes after project completion should consists of a stable-slope steepness (not steeper than 2:1).
11. Fill material must be clean, uncontaminated, and free of metal, bricks, blocks, other large debris.

Contact Staff: Christie L. Stanifer, Environ. Coordinator, Fish & Wildlife
Our agency appreciates this opportunity to be of service. Please do not hesitate to contact the above staff member at (317) 232-4160 or 1-877-928-3755 (toll free) if we can be of further assistance.

Date: September 30, 2011

J. Matthew Buffington
Environmental Supervisor
Division of Fish and Wildlife

Attachments: A - General Information

Herbaceous Riparian Vegetation

Common Name	Scientific Name	Size / Class	Indicator
Hog-Peanut	*Amphicarpaea bracteata*	herbaceous vine	FAC
Ground-Nut	*Apios americana*	herbaceous vine	FACW
Panicled Aster	*Aster lanceolatus*	wildflower	FACW
Side-Flowering Aster	*Aster lateriflorus*	wildflower	FACW-
False Nettle	*Boehmeria cylindrica*	wildflower	OBL
Blue-Joint Grass	*Calamagrostis canadensis*	grass	OBL
Emory's Sedge	*Carex emoryi*	sedge	OBL
Shoreline Sedge	*Carex hyalinolepis*	sedge	OBL
Lakebank Sedge	*Carex lacustris*	sedge	OBL
Larger Straw Sedge	*Carex normalis*	sedge	FACW
Hairy-Fruit Sedge	*Carex trichocarpa*	sedge	OBL
Fox Sedge	*Carex vulpinoidea*	sedge	OBL
Wild or Streambank Chervil	*Chaerophyllum procumbens*	wildflower	FAC+
Wood-Reed	*Cinna arundinacea*	grass	FACW
Honewort	*Cryptotaenia canadensis*	wildflower	FAC
American Beakgrain	*Diarrhena americana*	grass	FACU
Wild Cucumber	*Echinocystis lobata*	herbaceous vine	FACW-
Canada Wild Rye	*Elymus canadensis*	grass	FAC-
Virginia Wild Rye	*Elymus virginicus*	grass	FACW-
Riverbank Wild Rye	*Elymus riparius*	grass	FACW
Spotted Joe-Pye-Weed	*Eupatorium maculatum*	wildflower	OBL
Boneset	*Eupatorium perfoliatum*	wildflower	FACW+
White Snakeroot	*Eupatorium rugosum*	wildflower	FACU
White Avens	*Geum canadense*	wildflower	FAC
Fowl Manna Grass	*Glyceria striata*	grass	OBL
False Sunflower	*Heliopsis helianthoides*	wildflower	FAC-
Bottlebrush Grass	*Hystrix patula*	grass	FACU
Orange Jewelweed	*Impatiens capensis*	wildflower	FACW
Yellow Jewelweed	*Impatiens pallida*	wildflower	FACW
Soft Rush	*Juncus effusus*	rush	OBL
Wood Nettle	*Laportea canadensis*	wildflower	FACW
Rice Cut Grass	*Leersia oryzoides*	grass	OBL
White Grass	*Leersia virginica*	grass	FACW
Great Blue Lobelia	*Lobelia siphilitica*	wildflower	FACW+
American Bugleweed	*Lycopus americanus*	wildflower	OBL
Virginia Blue Bells	*Mertensia virginica*	wildflower	FACW
Hairy Sweet-Cicely	*Osmorhiza claytonii*	wildflower	FACU
Switch Grass	*Panicum virgatum*	grass	FAC+
Wild Blue Phlox	*Phlox divaricata*	wildflower	FACU
Clearweed	*Pilea pumila*	wildflower	FACW
Green-Headed Coneflower	*Rudbeckia laciniata*	wildflower	FACW+
Three-Lobed Coneflower	*Rudbeckia triloba*	wildflower	FAC-
Clustered Black-Snakeroot	*Sanicula odorata*	wildflower	FAC+
Dark Green Bulrush	*Scirpus atrovirens*	bulrush	OBL

Wool-Grass	*Scirpus cyperinus*	bulrush	OBL
River Bulrush	*Scirpus fluviatilis*	bulrush	OBL
Drooping Bulrush	*Scirpus pendulus*	bulrush	OBL
Soft-Stem Bulrush	*Scirpus validus*	bulrush	OBL
Cup-Plant	*Silphium perfoliatum*	wildflower	FACW-
Late Goldenrod	*Solidago gigantea*	wildflower	FACW
Prairie Cordgrass	*Spartina pectinata*	grass	FACW+
American Germander	*Teucrium canadense*	wildflower	FACW-
Blue Vervain	*Verbena hastata*	wildflower	FACW+
Wingstem	*Verbesina alternifolia*	wildflower	FACW

Woody Riparian Vegetation

Common name	Species name	Region 3 status	Type of plant	Tree, Shrub, Vine	Region (N, C, S)	Coefficient of Conservatism	Comment
Box Elder	Acer negundo	FACW-	Large Understory Tree	T	N, C, S	1	
Black Maple	Acer nigrum	FAC	Large Canopy Tree	T	N, C, S	6	
Red Maple	Acer rubrum	FAC	Large Canopy Tree	T	N, C, S	5	
Silver Maple	Acer saccharinum	FACW	Large Canopy Tree	T	N, C, S	1	
Sugar Maple	Acer saccharum	FACU	Large Canopy Tree	T	N, C, S	4	
Ohio Buckeye	Aesculus glabra	FAC+	Large Understory Tree	T	N, C, S	5	
Indigobush	Amorpha fruticosa	FACW-	Medium Shrub	S	S	3	
Black Chokeberry	Aronia melanocarpa	FACW-	Medium Shrub	S	N, C, S	8	
Purple Chokeberry	Aronia prunifolia	FACW	Medium Shrub	S	N	8	
Common Paw Paw	Asimina triloba	FAC	Small Understory Tree	T	N, C, S	6	
River Birch	Betula nigra	FACW	Small Canopy Tree	T	N, S	2	
American Hornbeam	Carpinus caroliniana	FAC	Medium Understory Tree	T	N, C, S	5	
Bitternut Hickory	Carya cordiformis	FAC	Large Canopy Tree	T	N, C, S	5	
Pecan	Carya illinoensis	FACW	Large Canopy Tree	T	S*	4	Extreme southwestern counties
Shellbark Hickory	Carya laciniosa	FACW	Large Canopy Tree	T	N, C, S	8	
Shagbark Hickory	Carya ovata	FACU	Large Canopy Tree	T	N, C, S	4	
Sugarberry	Celtis laevigata	FACW	Large Understory Tree	T	S	7	
Hackberry	Celtis occidentalis	FAC-	Large Canopy Tree	T	N, C, S	3	
Buttonbush	Cephalanthus occidentalis	OBL	Medium Shrub	S	N, C, S	5	
Redbud	Cercis canadensis	FACU	Small Understory Tree	T	N, C, S	3	
Alternate-leaf Dogwood	Cornus alternifolia	FACU-	Small Understory Tree	T	N, C, S	8	
Pale Dogwood (formerly Silky Dogwood)	Cornus obliqua	FACW+	Medium Shrub	S	N, C, S	5	
Roughleaf Dogwood	Cornus drummondii	FAC-	Medium Shrub	S	N, C, S	2	
Flowering Dogwood	Cornus florida	FACU-	Small Understory Tree	T	N, C, S	4	Susceptible to dogwood anthracnose
Gray Dogwood	Cornus racemosa	FACW-	Medium Shrub	S	N, C, S	2	
Red-osier Dogwood	Cornus sericea	FACW	Medium Shrub	S	N	4	
Hazelnut	Corylus americana	FACU-	Medium Shrub	S	N, C, S	4	
Cockspur Hawthorn	Crataegus crus-galli	FAC	Small Understory Tree	T	N, C, S	4	

Downy Hawthorn	Crataegus mollis	FACW-	Small Understory Tree	T	N, C, S	2	
Dotted hawthorn	Crataegus punctata		Small Understory Tree	T	N, C, S	2	Okay in floodplains; not in extreme southwestern counties
Persimmon	Diospyros virginiana	FAC	Medium Understory Tree	T	S	2	
American Beech	Fagus grandifolia	FACU	Large Canopy Tree	T	N, C, S	8	
Honey Locust	Gleditsia triacanthos	FAC	Small Canopy Tree	T	N, C, S	1	
Kentucky Coffeetree	Gymnocladus dioicius	FACU	Large Canopy Tree	T	N, C, S	4	
Witch Hazel	Hamamelis virginiana	FACU	Small Understory Tree	T	N, C, S	5	
Smooth Hydrangea	Hydrangea arborescens	FACU-	Small Shrub	S	N, C, S	7	
Common Winterberry	Ilex verticillata	FACW+	Medium Shrub	S	N, C, S	8	
Butternut (White Walnut)	Juglans cinerea	FACU+	Small Canopy Tree	T	N, C, S	5	Scattered within range; susceptible to butternut canker
Black Walnut	Juglans nigra	FACU	Large Canopy Tree	T	N, C, S	2	
Spicebush	Lindera benzoin	FACW-	Medium Shrub	S	N, C, S	5	
Sweet Gum	Liquidambar styraciflua	FACW	Large Canopy Tree	T	S	4	
Tuliptree	Liriodendron tulipifera	FACU+	Large Canopy Tree	T	N, C, S	4	
Wild Sweet Crabapple	Malus coronaria		Medium Understory Tree	T	N, C, S		
Common Moonseed	Menispermum canadense	FAC	Low Vine	V	N, C, S	3	
Black Gum	Nyssa sylvatica	FAC	Large Understory Tree	T	N, C, S	5	
Hop Hornbeam	Ostrya virginiana	FACU-	Medium Understory Tree	T	N, C, S	5	
Virginia Creeper	Parthenocissus quinquefolia	FAC-	Vine	V	N, C, S	2	
Common Ninebark	Physocarpus opulifolius	FACW-	Small Shrub	S	N, C, S	7	
American Sycamore	Platanus occidentalis	FACW	Large Canopy Tree	T	N, C, S	3	
Eastern Cottonwood	Populus deltoides	FAC+	Large Canopy Tree	T	N, C, S	1	
Swamp Cottonwood	Populus heterophylla	OBL	Large Canopy Tree	T	N, S	8	Scattered within its range
Quaking Aspen	Populus tremuloides	FAC	Small Canopy Tree	T	N	2	
American Plum	Prunus americana	UPL	Small Understory Tree	T	N, C, S	4	Also along riverbanks
Black Cherry	Prunus serotina	FACU	Small Canopy Tree	T	N, C, S	1	
Common Hop-tree	Ptelea trifoliata	FACU+	Medium Shrub	S	N, C, S	4	
White Oak	Quercus alba	FACU	Large Canopy Tree	T	N, C, S	5	
Swamp White Oak	Quercus bicolor	FACW+	Large Canopy Tree	T	N, C, S	7	
Southern Red Oak	Quercus falcata	FACU-	Med.-Lg. Canopy Tree	T	S*	5	Far southern and southwestern counties
Shingle Oak	Quercus imbricaria	FAC-	Medium Canopy Tree	T	N, C, S	3	

Overcup Oak	Quercus lyrata	OBL	Medium Canopy Tree	T	S*	7	Extreme southwestern counties
Bur Oak	Quercus macrocarpa	FAC-	Large Canopy Tree	T	N, C, S	5	
Swamp Chestnut Oak	Quercus michauxii	FACW	Med.-Lg. Canopy Tree	T	S*	7	Far southern and southwestern counties
Chinkapin Oak	Quercus muehlenburgii	UPL	Med.-Lg. Canopy Tree	T	N, C, S	4	Also along well-drained riverbanks
Pin Oak	Quercus palustris	FACW	Small Canopy Tree	T	N, C, S	3	
Northern Red Oak	Quercus rubra	FACU	Large Canopy Tree	T	N, C, S	4	
Shumard Oak	Quercus shumardii	FACW-	Large Canopy Tree	T	C, S	7	
Post Oak	Quercus stellata	FACU-	Sm.-Med. Canopy Tree	T	S*	5	Seasonally swampy woods in SW counties
Staghorn Sumac	Rhus typhina		Large Shrub	S	N	2	
Pasture Gooseberry	Ribes cynosbati	FACW	Small Shrub	S	N, C, S	4	
Carolina Rose	Rosa carolina	FACU-	Small Shrub	S	N, C, S	4	
Peachleaf Willow	Salix amygdaloides	FACW	Small Canopy Tree	T	N	4	
Sandbar Willow	Salix interior	OBL	Medium Shrub	S	N, C, S	1	
Black Willow	Salix nigra	OBL	Large Understory Tree	T	N, C, S	3	
Elderberry	Sambucus canadensis	FACW-	Medium Shrub	S	N, C, S	2	
Bristly Greenbriar	Smilax hispida	FAC	Vine	V	N, C, S	3	
American Bladdernut	Staphylea trifolia	FAC	Medium Shrub	S	N, C, S	5	
Bald Cypress	Taxodium distichum	OBL	Large Canopy Tree	T	S*	10	Only in Vanderburgh, Posey, Warrick, Knox, Gibson Co.
American Basswood	Tilia americana	FACU	Large Canopy Tree	T	N, C, S	5	
American Elm	Ulmus americana	FACW-	Large Canopy Tree	T	N, C, S	3	Susceptible to Dutch elm disease; typically grows as a small understory tree
Slippery Elm	Ulmus rubra	FAC	Large Canopy Tree	T	N, C, S	3	
Nannyberry	Viburnum lentago	FAC+	Medium Shrub	S	N	5	
Black Haw	Viburnum prunifolium	FACU	Medium Shrub	S	N, C, S	4	
Riverbank Grape	Vitis riparia	FACW-	Vine	V	N, C, S	1	
Prickly ash	Zanthoxylum americanum		Medium Shrub	S	N	3	

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State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife

Early Coordination/Environmental Assessment

DNR #: ER-15937-1 **Request Received:** March 6, 2012

Requestor: US Army Corps of Engineers, Chicago District
Peter Bullock
111 North Canal Street, Suite 600
Chicago, IL 60606-7206

Project: Draft Supplemental EA for addition of 3 tieback levees for the Little Calumet River Flood Control Project (Munster, Hammond, and Gary)

County/Site info: Lake

The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

Regulatory Assessment: This proposal may require the formal approval of our agency pursuant to the Flood Control Act (IC 14-28-1) for any proposal to construct, excavate, or fill in or on the floodway of a stream or other flowing waterbody which has a drainage area greater than one square mile. Please submit more detailed plans to the Division of Water's Technical Services Section if you are unsure whether or not a permit will be required.

Natural Heritage Database: The Natural Heritage Program's data have been checked.
To date, no plant or animal species listed as state or federally threatened, endangered, or rare have been reported to occur in the project vicinity.

Fish & Wildlife Comments: We were not able to adequately assess impacts to fish, wildlife, and botanical resources resulting from the project with the information provided. If further environmental review is needed, we recommend submitting more information, such as the construction limits, amount of tree removal required, amount of fill, dimensions of the levees and floodwalls, and the amount of wetland impacts required.

Avoid and minimize impacts to fish, wildlife, and botanical resources to the greatest extent possible, and compensate for impacts. The following are recommendations that address potential impacts identified in the proposed project area:

1) Bank Stabilization:
Restore disturbed streambanks using bioengineering bank stabilization methods. The following is a link to a USDA / NRCS document that outlines many different bioengineering techniques for streambank stabilization: http://directives.sc.egov.usda.gov/17553.wba (Choose Handbooks; Title 210 Engineering; National Engineering Handbook; Part 650 Engineering Field Handbook. Choose Chapter 16 from next window). Revegetate disturbed banks with native trees, shrubs, and herbaceous plants. Stream bank slopes after project completion should be restored to stable-slope steepness (not steeper than 2:1).

2) Riparian Habitat/Cooridor:
Avoid, if possible, then minimize impacts to the forested riparian corridor and streambank of the Little Calumet River in the north portion of the Hammond and Munster site.

Impacts that remove trees from a non-wetland, riparian area require mitigation. When one or more acres of non-wetland forest are removed, replacement is at a 2:1 ratio based on area. If less than one acre of non-wetland forest is removed in a rural setting, replacement is at a 1:1 ratio based on area. If less than one acre of non-wetland forest is removed in an urban setting, the mitigation requirement involves planting five trees, at

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State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife

Early Coordination/Environmental Assessment

least 2 inches in diameter-at-breast height, for each tree which is removed that is ten inches or greater in diameter-at-breast height (5:1 mitigation based on the number of large trees). A native riparian forest mitigation plan should use at least 5 canopy trees and 5 understory trees or shrubs selected from the Woody Riparian Vegetation list or an approved equal. A native riparian forest mitigation plan for impacts of less than one acre in an urban area may involve fewer numbers of species, depending on the level of impact. Additionally, a native herbaceous seed mixture should be planted consisting of at least 10 species of grasses, sedges, and wildflowers selected from the Herbaceous Riparian Vegetation list or an approved equal. The plant lists were included in our previous letter, dated September 30, 2011.

Impacts to the riparian corridor will occur due to the construction of a permanent concrete floodwall. The wall appears to extend about halfway down the slope embankment and terminates near the top of a concrete outfall structure (with wingwalls). Riparian habitat, especially forested habitat, acts as a corridor for wildlife to move through. This corridor is even more important in urban areas where surrounding habitat is scarce and allows animals to travel between fragmented forested and wetland habitats. Tree removal within the riparian corridor will create a gap in the canopy cover. In addition, the wall placement could impede wildlife movement through the corridor. Efforts should be made to ensure wildlife can still move through the area unimpeded.

3) Dewatering:
It is not clear where water used within the temporary water bladder levee will be discharged. If water is to be discharged into the river, it must be clean water and the following should be incorporated into the project plans:
A) Do not dewater directly into the stream. Dewater into a sediment bag, into a roll off box, and onto a riprap apron or similar system.
B) Dewatering pumps should incorporate filters or bypasses to avoid injuring or killing fish and other aquatic organisms.

4) Reptile/Amphibian Impacts:
Construct an exclusion/drift fence around work areas and access pathways prior to the inclusive dates March 1-June 30, to prevent reptiles and amphibians located near the area from entering the area while searching for suitable nest sites and through normal movement later during construction. Any reptile or amphibian, regardless of species, found within the construction boundary prior to or during construction should be relocated to the other side of the drift fence and away from the work area.

5) Wetland Habitat:
The recently submitted information concludes wetlands are not to be impacted; however, based on the National Wetlands Inventory map, wetlands occur in the project area along the north bank of the river. Due to the presence or potential presence of wetlands on site, we recommend contacting and coordinating with the Indiana Department of Environmental Management (IDEM) 401 program and also the US Army Corps of Engineers (USACE) 404 program. Impacts to wetlands should be mitigated at the appropriate ratio (see http://www.in.gov/legislative/register/20061213-IR-312060562NRA.xml.pdf).

Avoid, if possible, then minimize tree removal and impacts to the wetlands located in the area surrounding the Ironwood Tieback site and the area in which the permanent concrete floodwall is proposed along the north bank of the river, near State Line Road.

A wetland delineation report, mitigation, bank stabilization, and revegetation plan should be submitted with the Construction in a Floodway permit application (if required).

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DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife

Early Coordination/Environmental Assessment

All exposed soil areas should be stabilized with temporary or permanent vegetation by November 1. Between November 1 and April, 1 all exposed soils idle for longer than 7 days should be stabilized with erosion control blankets or with a bonded fiber matrix hydro-mulch. Sites should be protected from seasonal flooding by keeping traffic areas covered with stone and soil stockpiles seeded, stable and contained with silt fencing.

Additional measures that should be implemented to avoid, minimize, or compensate for impacts to fish, wildlife, and botanical resources, include the following:
1. Revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes as soon as possible upon completion; low endophyte tall fescue may be used in the ditch bottom and side slopes only.
2. Minimize and contain within the project limits inchannel disturbance and the clearing of trees and brush.
3. Do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife.
4. Do not cut any trees suitable for Indiana bat roosting (greater than 3 inches dbh, living or dead, with loose hanging bark) from April 1 through September 30.
5. Do not use broken concrete as riprap.
6. Appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized.
7. Seed and protect all disturbed streambanks and slopes that are 3:1 or steeper with erosion control blankets (follow manufacturer's recommendations for selection and installation) or use an appropriate structural armament; seed and apply mulch on all other disturbed areas.
8. Do not excavate or place fill in any riparian wetland.
9. Inspect structural erosion and sediment control practices daily and repair as necessary until all construction is complete and disturbed areas are permanently stabilized.
10. Embankment slopes after project completion should consist of a stable-slope steepness (not steeper than 2:1).
11. Fill material must be clean, uncontaminated, and free of metal, bricks, blocks, other large debris.

Contact Staff: Christie L. Stanifer, Environ. Coordinator, Fish & Wildlife
Our agency appreciates this opportunity to be of service. Please do not hesitate to contact the above staff member at (317) 232-4160 or 1-877-928-3755 (toll free) if we can be of further assistance.

Date: March 9, 2012

J. Matthew Buffington
Environmental Supervisor
Division of Fish and Wildlife

Correspondence

U.S. Environmental Protection Agency

Bullock, Peter Y LRC

From:	Sedlacek.Michael@epamail.epa.gov
Sent:	Wednesday, September 07, 2011 1:38 PM
To:	Bullock, Peter Y LRC
Cc:	Pelloso.Elizabeth@epamail.epa.gov; mmaupin@idem.in.gov; Elizabeth_McCloskey@fws.gov
Subject:	EPA Questions over Little Calumet River Supplemental Draft EA

Dear Peter,

EPA is in receipt of the "Second Supplemental Environmental Assessment for Proposed Modifications – Little Calumet River Flood Control Project, Lake County, Indiana." In order to ensure transparency and understanding of the proposal and to provide substantive comments back to the U.S. Army Corps of Engineers (USACE), EPA requests that you provide additional information and responses to the following questions. Many of the following issues will address information that is currently missing from the EA document . EPA requests that you provide this information in a response to our office and also by incorporating it into a revised supplemental EA.

1. Please provide additional information on the purpose and need for the proposal (both no action and your preferred alternative proposal). EPA assumes this will require further discussion of flooding (number of events, type and duration of flooding, etc.) history with regard to the proposals at hand.

2. From the submitted information, it is not clear what a tieback is/consists of. Please provide additional descriptive narrative information on what a tieback is and how it provides "improved flood control".

3. Several locations in the document (Section 2) use the term "tieback floodwall." Is a tieback a floodwall? As noted in #2, please clarify.

4. Please provide a plan and profile drawing(s), to scale, of an example tieback.

5. Please provide a detailed location description/map for each of the levees – their location was not clear in the document provided. Additionally – the document references a third tieback levee "in Gary in the Ironwood neighborhood." EPA is unclear of the specific location of this proposed levee.

6. Graphic Enclosure "Map 1" does not clearly pinpoint the locations of each levee. In order to ensure EPA understands the project locations, please provide additional (zoomed in) maps of each levee showing their specific start and end location; please ensure local roads and streams/rivers are noted. Please also ensure that revised maps have legends. Please ensure the legends include notations on any of the graphics (such as the green dots on Map 1).

7. What is the length (linear feet) of each tieback levee? What is the base footprint (length x width; square feet) of each tieback levee?

8. Please provide an electronic copy of the "Feature Design Memorandum 5" as referenced on page 3 of the document.

9. Page 4 of the document states "On the west end of the project north of the river, a floodwall is proposed to tie a temporary closure along State Line Road into the existing levee embankment." What does this mean?

10. In our phone conversation today, 9-7-2011, you mentioned that the tieback levees are required by FEMA regulations. What is the purpose and need for FEMA certification?

11. How does the construction of the proposed tiebacks allow for this FEMA certification?

12. Page 9 of the document states "The project will have no significant long-term impact on the quality of water in the community. Clean Water Act - Section 401 and Section 404, and Section 10 of the Rivers and Harbors Act of 1899 apply since there is no construction within navigable waters. Clean Water Act -The project will involve discharges to the waters of the United States, therefore Section 401 water quality certification is required, and a Section 404(b)(1) evaluation has been prepared." These statements are contradictory. Will there be a discharge of fill material into Waters of the U.S.?

13. Since there will be discharges of fill material to Waters of the U.S., where, specifically, are those discharges located? What is the proposed acreage of impact to Waters of the U.S.?

14. Please provide EPA with a copy of the Section 404(b)(1) evaluation that was prepared by USACE.

15. In our phone conversation on 9/7/2011, you indicated that an EIS/ROD is associated with this project, therefore making it a connected action. EPA would like a copy of the ROD.

Thank you for your prompt attention to these questions/concerns. I hope to hear back from you soon.

Sincerely,

Mike Sedlacek
Environmental Scientist
U.S. EPA Region 5
NEPA Implementation Section
Phone: (312) 886-1765
Email: sedlacek.michael@epa.gov

Bullock, Peter Y LRC

From: Bullock, Peter Y LRC
Sent: Friday, September 16, 2011 9:56 AM
To: 'Sedlacek.Michael@epamail.epa.gov'
Subject: Little Calumet River Supplemental Draft EA (UNCLASSIFIED)
Attachments: Floodwall example.docx; Little Cal Sup EA 2011.docx

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Dear Mr. Sedlacek:

Thank you for your comments on the August 2011supplemental Environmental Assessment (EA) for the Little Calumet River Flood Control Project. The Little Calumet River Flood Control Project started the study phase in the early 1970's and the project has been under construction since the early 1980s. The project is 95 percent finished and is comprised of approximately 24 miles of levees along an 11 mile stretch of the Little Calumet River in Indiana. There have been 8 NEPA documents generated for this project including 3 EISs and 5 EAs. The August 2011 draft EA was prepared to address tieback levee modifications required as a result of the lessons learned from the flooding caused by Hurricane Katrina. There are 3 tieback levees with this project. The Hammond and Munster levees are in the same location as the tieback levees discussed in 1982 EIS. The 3rd tieback levee, in the Ironwood Neighborhood of Gary has been extended 925 feet on the north side of the Conrail railroad tracks since the railroad embankment can no longer be used as the tieback for this reach of the project.

The Little Calumet River flows through densely populated portions of the cities of Hammond, Gary, Munster, and Highland Indiana where it has repeatedly caused extensive flood damages to intensely developed areas within the floodplain. The Little Calumet River Flood Control Project was designed to alleviate this reoccurring flood threat. The No Action alternative is required by NEPA as part of the alternative analysis. The Preferred Alternative finishes the project to current Federal standards and allows for the required FEMA certification.

A tieback levee ties the levee system into high ground and preventing flood waters from going around the end of a levee system. A tieback levee can consist of either an earthen levee or a concrete floodwall. These proposed tieback levees vary in length (the Munster Tieback floodwall is roughly 3600 ft., the Hammond Tieback floodwall is roughly 4200 ft., and the Ironwood Tieback levee is roughly 925 ft. More specific dimensions and footprints of these proposed tieback levees will not be available until the project is in the design phase. Maps 3 and 4 in the EA identify the footprint of the tieback levees. An example of a tieback floodwall is attached to this email.

The modified tieback levees are required for FEMA certification. FEMA certification exempts property owners living behind these levees from the required flood insurance. In order to be certified the levee system must provide a 1- percent-annual-chance flood event (sometimes called the 100-year flood) level of protection (required for federally constructed levees). Additional information is available in the FEMA issued Procedure Memorandum No. 34 designed to clarify the levee system certification requirements. The construction of the

proposed tiebacks will prevent floodwaters from bypassing the ends of the Little Calumet River levee system and will provide the level of flood protection required by FEMA. The floodwall mentioned on page 4 refers to the need for a floodwall to close a temporary closure in the existing levee system.

I would like to thank you for pointing out the conflicting statements on page 9. The project will not involve discharges into the waters of the US and no 401 or 404 permits will be required. This has been corrected in the draft EA, a copy of which is included with this letter.

The document you've requested "Feature Design Memorandum #5", is comprised of 5 volumes and takes up approximately 8 inches of shelf space. It is not available electronically however you're welcome to visit our offices to review it if you wish. A copy of the requested ROD is not available.

If you have any additional questions, comments or concerns please contact me. I am Sincerely,

Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 2 6 2011

REPLY TO THE ATTENTION OF:

E-19J

Peter Bullock
U.S. Army Corps of Engineers – Chicago District
Planning Branch
111 North Canal Street, 6th Floor
Chicago, Illinois 60606-7206

Re: Draft Supplemental Environmental Assessment for Addition of Three Tieback Levees for Flood Control on the Little Calumet River, Munster, Hammond, and Gary, Lake County, Indiana

Dear Mr. Bullock:

The U.S. Environmental Protection Agency (EPA) has reviewed the referenced draft Supplemental Environmental Assessment (EA) prepared by the U.S. Army Corps of Engineers (USACE) pursuant to our authorities under the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), Section 309 of the Clean Air Act, and Section 404 of the Clean Water Act.

The proposed project involves constructing three tieback levees; these are described by USACE as earthen or concrete levees that extend from a main levee to an upland area located above the floodplain. The three tieback levees are proposed to be installed adjacent to the Little Calumet River, in the towns of Munster, Hammond, and Gary, in Lake County, Indiana. Construction of these three proposed tieback levees is expected to protect local populations from flooding. This EA is a supplement to a 1982 Environmental Impact Statement (EIS) entitled "Little Calumet River Flood Control Project" as specified by USACE in a September 16, 2011, e-mail (email) to Mike Sedlacek of my staff.

On September 7, 2011, Mike Sedlacek contacted you via e-mail to request additional information on levee locations, including better location maps, clarification on levee descriptions, and additional information about previous construction associated with the current tieback levee proposal. Your email response on September 16, 2011, included additional maps and additional

technical information. Thank you for your response. At this time, however, we request more complete information on the proposed project in order to conduct a complete and thorough review of the proposed project under NEPA. Based on our review of both the Supplemental EA and your September 16, 2011, email, we have additional comments on the proposed project. Those comments are as follows:

Compliance With the National Environmental Policy Act

The purpose of NEPA is to promote informed decision making by federal agencies and to ensure that federal agencies consider environmental effects that include, among others, impacts to social, cultural and economic resources, as well as natural resources. NEPA is to be utilized as a means to an informed decision-making process.

EPA is concerned that environmental impacts may not be adequately identified in the EA. Specifically, EPA is concerned that the EA does not reference that the proposed project is a connected action to the 1982 EIS. Council on Environmental Quality (CEQ) guidance indicates that "EISs that are more than 5 years old should be carefully re-examined to determine if the criteria in 40 CFR § 1502.9 compel preparation of an EIS supplement."[1] Furthermore, the EA does not explicitly indicate whether or not there are "substantial changes to the proposed action that are relevant to environmental concerns."[2] USACE should clearly describe how the current EA relates to the 1982 EIS, and describe whether substantial changes have occurred in the project or local conditions. If warranted, USACE should consider whether producing a supplemental EIS, in lieu of an EA, is appropriate to satisfy this requirement. USACE's reasons for preparing an EA or a supplemental EIS should be included.

In your email, you indicated that "a copy of the requested Record of Decision (ROD) is not available." EPA is concerned by this statement, as the ROD for the 1982 EIS will provide us with more guidance as to what USACE's overarching plan is for the Little Calumet River Flood Protection Project, and how the EA fits into the "big picture" of the 1982 EIS. Additionally, the EA did not discuss cumulative effects, and should discuss past, present, and proposed/potential future actions relating to the Little Calumet Flood Control project.

Modified flow regimes and altered predator-prey relationships may occur as a direct result of flood-control projects. CEQ recommends all Federal agencies consider the potential impacts to natural processes (e.g. natural flood-plain processes).[3] The EA, as reviewed, does not consider such potential impacts and EPA recommends it be modified to include a concise description of the intensity of effects that are to occur. Such examples include geographic extent or duration

[1] Source: NEPA's 40 Most Asked Questions, Question 32.

[2] Including previously-issued IDEM Section 401 Water Quality Certification(s) and mitigation requirements for previous construction associated with the project.

[3] Source: Council on Environmental Quality. (1993). *Incorporating Biodiversity Considerations Into Environmental Impact Analysis Under the National Environmental Policy Act.*

and frequency of specific impacts, such as construction, Environmental Justice (EJ) concerns, flooding, or biodiversity.[4] Additionally, we were unable to identify, in the EA, what the existing land use is at the exact locations where the proposed tieback levees will be built. Please describe the current land use for those locations.

Missing Consultation Records and List of Preparers

EPA recommends attaching consultation documents regarding historic resources (Indiana Historic Preservation Office), wetlands[5] (U.S. Army Corps of Engineers and Indiana Department of Environmental Management (IDEM)), and endangered species (U.S. Fish and Wildlife Service (USFWS) and Indiana Department of Natural Resources (IDNR)), with the EA. Also, please provide, in the appendices, a list of staff who prepared the EA.

Adequacy of Documentation

EPA recommends spelling out all acronyms that are used within the EA. Two such acronyms (FEMA and MWRD) can be found on page 3 without explanation. Additionally, the resolution of Map 1 is low, with a scale too large for appropriate locating of the levees, and the map does not contain a legend. Please provide a better quality map with a legend in future NEPA documents. Information on levee number three, which is described as being in the Ironwood neighborhood of Gary, should include its specific location relative to existing streets, parks, and railroads. Additionally, maps 1 and 3 do not clearly indicate where the third levee is located, in reference to city streets.

EPA is unclear as to why no alternatives to the proposed project, other than the "no build" alternative, were studied. If additional alternatives were considered, the EA should describe them and the reasons why they were dropped from detailed analysis. The "no action" alternative should include additional information on potential implications/repercussions.

Aquatic Resources

The EA states on page 5 that water quality standards in the area are not being met, yet page 9 of the EA states that "The project would comply will [*sic*] all applicable water quality standards." We request that USACE explain, in further detail, whether or not water quality standards will be met in the project area as a result of implementation of this project.

We do not concur with USACE's conclusion that this project will have "no adverse effects on water quality or aquatic communities in Lake Michigan or any of its tributaries" or to any "significant resources," such as wildlife and wetlands. In an email from Liz McCloskey of USFWS, dated September 15, 2011, to Mike Sedlacek, it was indicated that based on her recent field research, USACE has not constructed required wetland mitigation at Hobart Marsh per requirements of a previously-issued IDEM Section 401 Water Quality Certification for wetland

[4] Source: 40 CFR § 1508.27

impacts associated with the original Little Calumet River flood control project. Per EPA's consultation with USFWS, mitigation design was completed in 2008, but mitigation was never constructed.

We are aware that some mitigation was installed along the river in Gary, but has not been monitored or maintained. Due to the lack of full implementation of mitigation for previous water quality and water resource impacts associated with this project, we do not agree that the proposed project does not have cumulative effects, as its purpose and need is inextricably related to the 1982 EIS.

Our review of the locations of the proposed tieback levees and discussions with USFWS have indicated that wetlands appear to be present along the proposed Gary tieback levee #3 (along the railroad tracks). The EA indicates that no wetlands are present, thus there will be no discharges into waters of the United States. We do recommend, however, that due to conflicting information from both USFWS and the EA, that USACE conduct a wetland delineation. Additionally, we recommend that USACE not predict IDEM concurrence on wetland determination, as was the situation in the EA.

Air Quality

The EA does not discuss how this project complies with applicable National Ambient Air Quality Standards (NAAQS). Specifically, the EA does not mention that the proposed project areas are in compliance for ozone (1 and 8 hour), Particulate Matter - 10 micrometers (PM_{10}), Particulate Matter - 2.5 micrometers ($PM_{2.5}$), and sulfur dioxide (SO_2) NAAQ standards. The "Air Quality" section of the EA states that air quality in the proposed project area is categorized as "moderate to good," however, no explanation is given as to where this data used for NAAQS determination came from.

Threatened and Endangered Species

Please provide a list of Indiana state threatened and endangered species that can be found in the project area and information on whether or not they will be detrimentally affected by the proposed project; such a determination should come from USFWS and/or IDNR. We also recommend that USACE not predict that USFWS or IDNR will issue concurrence on Federal and state threatened and endangered species, as was the case in the EA.

Environmental Justice

EPA's geographic information system environmental justice tracker, EJAssist, indicates all three tieback levees are located in communities living with EJ concerns. Please explain what methods have been used to notify residents in communities living with EJ concerns, and whether or not public information sessions/meetings have been held in affected EJ communities. Similarly,

please describe if any public meetings have been held, in or near the project site, for the general public.

Noise

Please explain, in greater detail, during what hours of any given week, construction will occur on the three proposed tieback levees (e.g. weekdays from 8 a.m.-5 p.m.). Additionally, we recommend USACE explain what noise mitigation will occur during the construction phase, if applicable.

EPA is available to discuss these comments to the draft EA at your convenience. Please feel free to contact Mike Sedlacek of my staff at 312-886-1765, or by email at sedlacek.michael@epa.gov to discuss these comments.

Sincerely,

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc: Liz McCloskey, U.S. Fish and Wildlife Service
Marty Maupin, Indiana Department of Environmental Management
Paul Leffler, U.S. Army Corps of Engineers – Chicago District, Regulatory Branch

Bullock, Peter Y LRC

From: Sedlacek.Michael@epamail.epa.gov
Sent: Thursday, December 08, 2011 1:52 PM
To: Bullock, Peter Y LRC
Subject: Little Calumet River SDEA

Peter,

In closing for the Little Calumet River project, EPA would appreciate a copy of the FONSI for our internal files. A scanned copy via email would be best, however, a CD or paper copy via US mail will work good as well:

Mike Sedlacek
77 W. Jackson Blvd
Mail Code E-19J
Chicago, IL 60604

We look forward to working with your agency in the future on other EA projects.

Sincerely,

Mike Sedlacek
Environmental Scientist
U.S. EPA Region 5
NEPA Implementation Section
Phone: (312) 886-1765
Email: sedlacek.michael@epa.gov

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION # : FW-22241

STREAM : Little Calumet River

APPLICANT : Little Calumet River Basin Development Commission
Dan Gardner, Executive Director
6100 Southport Road
Portage, IN 46368-6409

AUTHORITY : IC 14-28-1 with 312 IAC 10 and IC 14-29-1 with 312 IAC 6

DESCRIPTION : In total, approximately 10.3 miles of earthen levee, concrete I-wall and sheet piling wall will be constructed on the north and south overbanks of the river for flood control along the riverside areas of Hammond, Munster, and Highland. The earthen levee will have a top width of 10', crest elevations varying from 600.5' to 604.1' National Geodetic Datum of 1929 (NGVD), and streamward and landward slopes varying from 2.5:1 and 3.5:1. The concrete I-wall and sheet piling wall will have crest elevations varying from 600.5' to 604.1' (NGVD). Portions of the levee will provide access to vehicles for normal maintenance, inspection, and flood fighting, and will have a designated recreation trail that will be continuous from Cline Avenue to Hohman Avenue. Other construction activities within the floodway includes a proposed control structure in the river about 350' east of the Northcote Avenue crossing. The control structure will be rectangular in shape and made of concrete. Details of the project are contained in information and plans received at the Division of Water on August 31, 2001, October 15, 2002, February 20, 2003, May 2, 2003, and July 28, 2003.

LOCATION : DOWNSTREAM: Along both banks, beginning at the Indiana/Illinois state line and continuing upstream (east) to the State Road 912/Cline Avenue river crossing near Hammond, North Township, Lake County
NE¼, NW¼, NW¼, Section 13, T 36N, R 9W, Calumet City, IL-IN Quadrangle
UTM Coordinates: Downstream 4603230 North, 456215 East
UPSTREAM: near Highland, North Township, Lake County
NE¼, NE¼, NE¼, Section 22, T 36N, R 9W, Highland Quadrangle
UTM Coordinates: Upstream 4601530 North, 463940 East

APPROVED BY : _____
James J. Hebenstreit, P.E., Assistant Director
Division of Water

APPROVED ON : February 27, 2004

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

ENCLOSURE NO. 9

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW- 22241

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State Law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indiananpolis, IN 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies.These agencies include, but are not limited to:

Agency	Telephone Number
Lake County Drainage Board	(219) 755-3755
US Army Corps of Engineers, Detroit District	(313) 226-2218
Indiana Department of Environmental Management	(317) 233-8488 or (800) 451-6027
Local city or county planning or zoning commission	

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. Michael W. Neyer, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, IN 46204

Telephone: (317) 232-4160, Toll Free: (877) 928-3755
FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW- 22241

PERMIT VALIDITY : This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by February 27, 2006 the permit will become void and a new permit will be required in order to continue work on the project.

This permit becomes effective 18 days after the "MAILED" date shown on the first page. If both a petition for review and a petition for a stay of effectiveness are filed before this permit becomes effective, any part of the permit that is within the scope of the petition for stay is stayed for an additional 15 days.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 31, 2001, October 15, 2002, February 20, 2003, May 2, 2003 and July 28, 2003. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes as soon as possible upon completion
(2)	appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized
(3)	seed and protect all disturbed streambanks and slopes that are 3:1 or steeper with erosion control blankets (follow manufacturer's recommendations for selection and installation) or use an appropriate structural armament; seed and apply mulch on all other disturbed areas
(4)	implement the Habitat Mitigation Plan on file at the Division of Water and dated August 2001
(5)	construction of Project Stages V, VII, VIII (North and South for each Stage), as shown on the plans entitled "Little Calumet River, Indiana, Flood Control Project, West Reach Plan & Profile Sheets, Cline Ave to Indiana/Illinois State Line" that were received at the Division of Water on October 15, 2002, shall not begin until all lands needed to meet the habitat mitigation requirements, as detailed in the Habitat Mitigation Plan dated August 2001, are acquired
(6)	within 90 days of mitigation property acquisition the applicant must grant a legal conservation easement that protects all habitat replacement areas in perpetuity from disturbance; the development of the easement must be coordinated with the environmental biologist and a DNR attorney
(7)	each mitigation site must be monitored and success criteria evaluated until the mitigation site is complete and determined to be successful, as described in the Habitat Mitigation Plan on file at the Division of Water and dated August 2001

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW- 22241

(8) a monitoring report must be submitted to the Division of Water, 402 West Washington Street, Rm W264, Indianapolis, IN 46204, by December 31 of each year; reports must be submitted even if work has not been initiated on site to monitor the initiation, progress, and success of each mitigation site; the report must include a narrative that describes the activity accomplished to date and identifies upcoming activity scheduled to complete the plan, appropriate pictures of vegetative plantings, acres planted, number planted, list of species planted, and estimated survival for each mitigation site

(9) do not leave felled trees, brush, or other debris in the floodway *

(10) upon completion of the project, remove all construction debris from the floodway *

(11) construction of Project Stages V, VII, and VIII (North and South for each Stage), as shown on the plans entitled "Little Calumet River, Indiana, Flood Control Project, West Reach Plan & Profile Sheets, Cline Ave to Indiana/Illinois State Line" that were received at the Division of Water on October 15, 2002, shall not begin until all construction contracts have been awarded for the completion of the Burr Street Betterment Levee

(12) construction of the control structure, part of Project Stage 5 Phase 2, as shown on the plans entitled "Little Calumet River, Indiana, Local Flood Protection, Hart Ditch Control Structure, Hammond, Indiana, Munster, Indiana" and dated May 27, 1998 that were received at the Division of Water on May 2, 2003, shall not begin until all of the levee segments along the Little Calumet River east of the control structure, including the Burr Street Betterment Levee permitted under Application # FW-19784 and the levees along Hart Ditch permitted under Application # FW-22313, are built

(13) by this Certificate of Approval, the project and its appurtenant works are recognized and approved by the Department of Natural Resources as a Flood Control Project under IC 14-28-1-29; this approval is conditioned upon the Little Calumet River Basin Development Commission owning, operating, and maintaining the project in perpetuity and in accordance with the above-referenced project plans and resolution or agreement on file at the Division of Water

(14) as a condition of the Department's approval of the project as a Flood Control Project under IC 14-28-1-29, ownership of or interest in all lands subject to flooding as a result of this project must be secured prior to operation of the project; within 6 months of completion of the project, submit a letter to the Division of Water confirming title or interest in all lands subject to flooding as a result of the project

(15) the U.S. Army Corps of Engineers must certify that the constructed levee will perform as the intended flood control structure and submit "as-built" plans with any documentation of any field or geotechnical anomalies to the Division of Water for consideration within 6 months of completion of the project

(16) * NOTE: for regulatory purposes, the floodway is defined as: that shown on PANEL 7 of the City of Hammond Flood Boundary and Floodway Map dated March 16, 1981; that area inundated by the 100-year frequency flood as shown on PANEL 8 of the City of Hammond Flood Boundary and Floodway Map dated March 16, 1981; that area inundated by the 100-year frequency flood as shown on Town of Highland Flood Boundary and Floodway Map dated December 15, 1983; and that shown on PANELS 1 and 2 of the Town of Munster Flood Boundary and Floodway Map dated May 16, 1983; until such time when a final Letter of Map Revision (LOMR) is obtained from the Federal Emergency Management Agency (FEMA) which would supersede the existing floodway at the site

THE TRUST for PUBLIC LAND

CONSERVING LAND FOR PEOPLE

FOR IMMEDIATE RELEASE
May 7, 2005

TPL brings long-awaited land protection project to a close

CONTACTS
Chris Slattery, Trust for Public Land, (312) 427-1979
John Bacone, Indiana Dept. of Natural Resources (317) 232-4054
Dan Gardner, Little Calumet River Basin Development Commission (219) 763-0696
Justin Kitsch, U.S. Rep. Peter Visclosky (202) 225-2461

HOBART, IN. – The Trust for Public Land (TPL), a national non-profit conservation organization, announced today that a multi-year project to protect and save nearly 400 acres in and around Hobart – land that lay in the path of the Chicago region's development wave -- is now complete.

Now mostly farmland, the Hobart Marsh property eventually will be transformed by the U.S. Army Corps of Engineers into perpetually protected open space that will be returned to the pristine condition it was in before settlers first arrived in Northwest Indiana.

The project's completion marks a long-term cooperative effort that involved Congressman Pete Visclosky, the Trust for Public Land, the U.S. Army Corps of Engineers, the Indiana Department of Natural Resources, the Little Calumet River Basin Development Commission, local officials and local conservation leaders.

"This project is important in so many ways to so many people, officials and activists alike," said Chris Slattery, president of TPL's Chicago office. "We thank Congressman Visclosky for being the driving force behind the project, along with the landowners, public agency officials, local volunteers and private donors who played a role in this partnership project to create a significant new nature park just 35 miles from Chicago."

A Brief History

The land protection project got its start in the late 1980s when the federal government charged the Little Calumet commission with completing an unprecedented $190 million flood control project that is still underway today. Congressman Visclosky was crucial in securing the federal dollars for this work. When complete, some 6,000 structures between Interstate 65 and the Illinois border -- including many homes and businesses -- will no longer be threatened by what is now the Little Calumet River's flood plain.

"Now that the Hobart Marsh acquisition is finalized, it is time for all parties to move ahead as quickly as possible," Congressman Visclosky said. "This flood control project needs to move faster in order to provide the relief to those stuck in the flood plain."

The flood control project required re-working land along the banks of Little Calumet River. In some cases, this meant removing wetlands. Required to replace those wetlands, the commission searched for suitable land, eventually deciding that the best place to accomplish their goals was in the Hobart Marsh region.

Because the area already is home to roughly 1,000 protected acres, local conservation leaders and officials quickly realized the needs of the Little Calumet River Basin Development Commission also benefited those hoping to expand and connect the protected land into a larger system threatened by piecemeal development of smaller farms in the area. The IDNR also saw the benefit and agreed to take over and manage the newly-acquired lands.

After encountering several challenges in their attempts to purchase the land, officials asked TPL, a national organization with decades of experience in securing land for public use, to make the Hobart Marsh land buys a reality.

-- MORE --

"It's safe to say that without TPL's help, the wetland mitigation portion of our project would've been much more difficult, if not impossible, to accomplish," said Dan Gardner, executive director of the Little Calumet River Basin Development Commission.

Today, tomorrow and beyond

John Bacone, who directs the Indiana Department of Natural Resource's nature preserves division, said restoring the land means removing farm drain tiles, along with non-native plants that may be growing there. Native Midwest prairie plants will be planted, along with savannahs of native burr oak trees. Even the immediate future, -- a continuation of farming -- will be helpful to later restoration efforts.

"It means the land won't be sitting empty, allowing harmful weeds and other plants we don't want to overtake the area while we plan for the land's future restoration," Bacone said. "At some point, we envision the possible development of hiking trails that snake throughout this region so the public an experience nature at its best."

The Hobart Marsh land adds to the region's existing protected land bank, and helps form a ring of open space that will increase the local quality of life, restore many acres of wetlands and help fulfill a regional goal to create a greenbelt along Lake Michigan's southern shore. The former EJ&E railroad line, which has been converted to Lake County's Oak Savanna Bike Trail, also connects the new land to Hobart's Robinson Lake Park, offering easy access to the new nature sites.

The Trust for Public Land specializes in conservation real estate, applying its expertise in negotiations, public finance, and law, to protect land for people to enjoy as parks, greenways, community gardens, urban playgrounds, and wilderness. Regional accomplishments include the protection of Plum Island near Starved Rock State Park in Illinois, numerous city parks in Chicago and the protection of various properties within the Hoosier National Forest in Southern Indiana. Nationwide, TPL has helped protect more than two million acres. To learn more visit www.tpl.org

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAR 0 8 2012

REPLY TO THE ATTENTION OF:

E-19J

Peter Bullock
U.S. Army Corps of Engineers – Chicago District
Planning Branch
111 North Canal Street, 6th Floor
Chicago, Illinois 60606-7206

Re: Environmental Assessment for Proposed Modifications, Little Calumet River Flood Control Project, Lake County, Indiana

Dear Mr. Bullock:

The U.S. Environmental Protection Agency (EPA) has reviewed the referenced Environmental Assessment (EA) prepared by the U.S. Army Corps of Engineers (USACE) pursuant to our authorities under the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), Section 309 of the Clean Air Act, and Section 404 of the Clean Water Act.

The proposed project involves constructing three tieback levees; these are described by USACE as earthen or concrete levees that extend from a main levee to an upland area located above the floodplain. The three tieback levees are proposed to be installed adjacent to the Little Calumet River, in the towns of Munster, Hammond, and Gary, in Lake County, Indiana. Construction of these three proposed tieback levees is expected to protect local populations from flooding. This EA is a supplement to a 1982 Environmental Impact Statement titled *Little Calumet River Flood Control Project* as specified by USACE in a September 16, 2011 e-mail to Mike Sedlacek of my staff.

On September 26, 2011, EPA provided comments over an earlier version of the above document, titled, *draft supplemental environmental assessment for addition of three tieback levees for flood control on the Little Calumet River, Munster, Hammond, and Gary, Lake County, Indiana.* We provided comments over compliance with the National Environmental Policy Act, missing consultation records and list of preparers, adequacy of documentation, aquatic resources, air quality, threatened and endangered species, environmental justice, and noise.

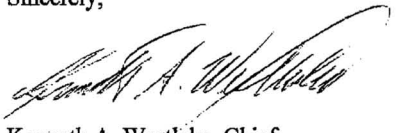
We are satisfied that many of our concerns have been addressed in the EA. We would like to, however, reiterate our original comment over missing consultation records. We were unable to locate consultation records from U.S. Fish and Wildlife Service and Indiana Department of Natural Resources that clearly indicated as to whether or not any state-listed and/or Federally-listed threatened and endangered species will be impacted by the proposed project. We encourage USACE to collaborate with those agencies to satisfy the Endangered Species Act and NEPA's procedural requirements of identifying any potential impacts to state-listed and/or Federall-listed threatened and endangered species.

Additionally, Indiana Department of Natural Resources' Division of Historic Preservation and Archaeology (IDNR-DHPA) has not concurred with a finding of no impact to historical and/or archaeological resources. In a letter from IDNR-DHPA to USACE, dated September 28, 2011, it was indicated that a determination could not be made because more information was needed. Additional information was sent to IDNR-DHPA on October 12, 2011; however, a reply from IDNR-DHPA was not published in the EA. Please attach any such documentation to the Finding of No Significant Impact (FONSI) determination.

USACE should also include in the FONSI determination flood maps that show whether or not the proposed project will increase the frequency and/or severity of flooding of the Little Calumet River in local areas near Munster, Hammond, and Gary (such as Lansing, Illinois).

EPA is available to discuss these comments to the EA at your convenience. Please feel free to contact Mike Sedlacek of my staff at 312-886-1765, or by email at sedlacek.michael@epa.gov to discuss these comments.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc: Liz McCloskey, U.S. Fish and Wildlife Service
Marty Maupin, Indiana Department of Environmental Management
Christine Kiefer, Indiana Department of Natural Resources
James Glass, Indiana Department of Natural Resources

Correspondence

U.S. Fish and Wildlife Service

United States Department of the Interior
Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

March 8, 2012

Colonel Frederic A. Drummond
District Engineer
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, Suite 600
Chicago, Illinois 60606-7206

Attn: Susanne J. Davis, Chief, Planning Branch

Dear Colonel Drummond:

The U.S. Fish and Wildlife Service has reviewed the Revised Environmental Assessment for the proposed modification to the Little Calumet River Flood Control and Recreation Project in Hammond, Munster, and Gary, Lake County, Indiana, which was provided with your email of March 6, 2012. The project consists of the construction of tieback walls along State Line Road in Hammond and Munster at the west end of the flood control project and at the CSX Railroad in Gary at the east end of the project. We believe this document adequately assesses the impacts of the proposed project and have no objections to the project as proposed.

ENDANGERED SPECIES

The proposed project is within the range of the Federally endangered Indiana bat (Myotis sodalis) and Karner blue butterfly (Lycaeides melissa samuelis) and the threatened Pitcher's thistle (Cirsium pitcheri) and Mead's milkweed (Asclepias meadii). However, there is no habitat for any of these species at the proposed project sites, so we concur with your determination that the proposed project is not likely to adversely affect these endangered and threatened species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. However, should new information arise pertaining to project plans or a revised species list be published, it will be necessary for the Federal agency to reinitiate consultation.

Thank you for the opportunity to review this document. For further discussion please contact Elizabeth McCloskey at (219) 983-9753 or elizabeth_mccloskey@fws.gov.

Sincerely,

Elizabeth S. McCloskey Acting
for Scott E. Pruitt
Supervisor

cc: U.S. EPA Region V, NEPA Implementation Branch, E-19J, Chicago, IL
Christie Stanifer, Indiana Division of Water, Indianapolis, IN
Marty Maupin, IDEM, Office of Water Quality, Indianapolis, IN

United States Department of the Interior
Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

September 26, 2011

Colonel Frederic Drummond
District Engineer
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Colonel Drummond:

The U.S. Fish and Wildlife Service (FWS) has reviewed the Draft Environmental Assessment for proposed modifications to the West Branch Little Calumet River Flood Control and Recreation Project, which was provided under a cover letter from Mrs. Susanne J. Davis, Chief of the Planning Branch, on August 26, 2011. Although we will provide comments specific to the proposed new project features later in this letter, we wish to take this opportunity to express concerns about the lack of required mitigation for wetland losses associated with the entire West Branch levee project. There have been a number of levee and floodwall alignment modifications through the years since construction began in 1990 and numerous acres of wetlands have been impacted, but only a minor amount of mitigation has been accomplished even though construction of the project is almost completed.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U.S. Fish and Wildlife Service's Mitigation Policy.

When the project was originally designed in the early 1980's, mitigation and habitat enhancement were part of the preferred project, which was designated as Plan 3A. The FWS and the Chicago District worked together on the development of the mitigation and enhancement plan utilizing the FWS's Habitat Evaluation Procedures (HEP), and the plan was included in the 1982 Phase 1 General Design Memorandum and Draft Environmental Impact Statement. An excerpt from the Phase 1 GDM describing the mitigation and enhancement plan is provided as Enclosure

No. 1.

The project which was authorized by the Water Resources Development Act of 1986 was a reduced version, Plan 3B, of the original proposal but included the HEP mitigation without the proposed enhance measures (Enclosure No. 2). The mitigation was supposed to be done concurrently with the levee construction, but that did not happen.

The State of Indiana, through the Departments of Natural Resources and Environmental Management (IDNR and IDEM), did not accept the HEP mitigation proposal because it was not in-kind and did not replace wetlands; instead, the HEP plan consisted of wood duck boxes, creation of potholes in existing wetlands, creation of herbaceous buffer strips, and landscaping the new levees with shrubs and trees. By letter of November 1, 1989, IDEM requested at least 1:1 mitigation for the wetland losses (69.2 acres of wetland impacts at that time due to the levee footprint) (Enclosure No. 3) and the Little Calumet River Basin Development Commission (LCRBDC), the local sponsor, committed to creating 69.2 acres of wetland during the estimated 8 year project construction life (Enclosure No. 4).

Construction of levees in Gary began in 1990, with the Chicago District Corps of Engineers and the LCRBDC signing a Local Cooperation Agreement that included provisions for "preserving land designated as wetlands; and construction of fish and wildlife mitigation and enhancement measures" (Enclosure No. 5).

On October 15, 1992, we requested information on the construction schedule for the project mitigation features (Enclosure No. 6), but we can find no record of a response until we received an undated letter from the Chicago District on July 20, 1993 (Enclosure No. 7). That 1993 letter states that the first mitigation construction contract would be awarded in April 1994. However, that did not occur because IDNR had requested additional mitigation under Indiana's Flood Control Act (Enclosure No. 8).

Because of the requirements of IDNR and IDEM, the Chicago District decided to redesign the mitigation plan and did so between 1993 and 2001, when a revised plan dated August 2001 was accepted by all the natural resources agencies, including the FWS. This Plan addressed impacts to 114 acres of forested wetlands, 16 acres of scrub-shrub wetlands, 26 acres of emergent wetlands, and 53 acres of upland non-wooded habitats, with mitigation ratios varying from 1:1 to 3:1 for the wetland impacts. Most of the mitigation was proposed for lands in Hobart Marsh, where 355 acres were purchased, after it was determined that project lands along the West Branch Little Calumet River were unsuitable to be used for wetland mitigation due to the degree of flooding.

However, 115 acres in 2 locations along the river in Gary were deemed suitable to be used for mitigation and were planted and repaired as necessary between 2002 and 2008. These sites are on the west side of Chase Street south of the river, basically from West 35th Avenue extended south to the Norfolk Southern Railroad tracks, and north of the river east of Clark Street within the old Tolleston Club community. These sites were accepted as completed by the Chicago

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
718 North Walnut Street
Bloomington, Indiana 47404
(812) 334-4261 FAX 334-4273

IN REPLY REFER TO:

October 15, 1992

Colonel David M. Reed
U.S. Army Engineer District
Chicago
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Colonel Reed:

This letter refers to the construction schedule for the mitigation features that are to be included in the Little Calumet River flood control project in Lake County, Indiana. We met with Mr. Paul Whitman, of your staff, on site October 5 and 6, 1992 to inspect potential mitigation sites and levees which have been recently constructed. Those inspections revealed several tracts of land which have excellent wetland restoration potential. Most were inside the proposed levee system and are currently being farmed. Some of those agricultural fields are currently surrounded by spoil piles and restoring them to wetlands would only require a water-control structure at the outlet to the Little Calumet River. We also inspected levees which have been constructed and a section which is under construction in a wetland area. We are concerned that wetland losses are occurring but no mitigation to replace those losses is occurring concurrently, nor do we know what the schedule is for that replacement. We recommend that some of the aforementioned agricultural areas be restored immediately so that wetland losses are mitigated as they occur. We would also appreciate the schedule for the construction of the remainder of the project's mitigation features.

Thank you for your assistance, and if you have any questions please contact me or Scott Pruitt of my staff, at (812) 334-4261.

Sincerely yours,

Scott Pruitt

for David C. Hudak
Supervisor

cc: U.S. EPA Region V, Aquatic Resources Section, 5WQD, Chicago, IL
Director, Indiana Division of Fish & Wildlife, Indianapolis, IN
IDNR, Division of Outdoor Recreation, Indianapolis, IN
IDEM, Division Water Management, Indianapolis, IN

ENCLOSURE NO. 6

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO, ILLINOIS 60606-7206

REPLY TO
ATTENTION OF:
Project & Program
Management Division
Project Management Branch

Mr. David C. Hudak
Supervisor
US Fish and Wildlife Service
Bloomington Field Office (ES)
718 North Walnut Street
Bloomington, Indiana 47404

Dear Mr. Hudak:

We would like to advise you on the status of implementing the fish and wildlife mitigation features of the Little Calumet River, Indiana Flood Control and Recreation Project in Lake County, Indiana. We are revising the mitigation plan for the project to conform with the State of Indiana requirements and will be distributing a draft Supplemental Environmental Impact Statement (SEIS) describing this mitigation plan in September 1993. We have scheduled award of the first mitigation construction contract for April, 1994. This contract will construct mitigation features in the Gary area of the project, which is also the area where we are constructing some levee segments. This schedule is dependent upon both Federal and State funds being appropriated for Fiscal Year 1994. You will receive the draft SEIS when it is distributed in September for review and comment.

We appreciate the cooperation which you and your staff have provided to us these several years in developing a first rate mitigation and enhancement plan on this project. Unfortunately we are announcing that Mr. Paul Whitman will be leaving us for another Federal agency. Mr. Whitman has been a valuable asset on this project but the remaining staff will continue to work with you.

Sincerely,

Richard E. Carlson

Richard E. Carlson
Deputy District Engineer for
Project Management

ENCLOSURE NO. 7

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO, ILLINOIS 60606-7206

REPLY TO
ATTENTION OF

September 13, 1993

Environmental and Social
Analysis Branch

Mr. David Hudak
U.S. Fish and Wildlife Service
620 South Walker Street
Bloomington, Indiana 47403

Dear Mr Hudak:

This letter has been prepared to update your agency on the status of the Little Calumet River Supplemental Environmental Impact Statement (SEIS). The need for an SEIS was previously coordinated with your agency in a letter dated December 5, 1991. Numerous project changes were discussed in that letter. Originally, the project had a net loss of 69.2 acres of wetlands. A reanalysis of the project shows a much greater loss of wetlands than previously estimated (see table 1 of the enclosed attachment). These wetland losses were based on two different data sources and then averaged: habitat mapping contracted by the Chicago District for the previous EIS and National Wetland Inventory (NWI) Mapping. It is interesting to note that even though the Chicago District's mapping (scale 1:2400) and the NWI mapping (scale 1:100000) are based on aerial photography of different scales and flight years, the total estimated wetland loss is very consistent. However, there is quite a difference in the acreages of the types of wetland habitats impacted. Since we have no reason to believe that one mapping system is more accurate than the other, we felt it was appropriate to average the two estimates to use in determining the amount of wetland mitigation necessary.

About a year ago Paul Whitman and Rich Carlson, of our office, met with representatives of the Indiana Department of Natural Resources (IDNR) and the project sponsor (Little Calumet River Basin Commission) to discuss wetland mitigation requirements that the IDNR had recently placed on the project construction permits. These requirements specified that wetland losses for the project had to be mitigated in-kind in the following ratios:

1:1 for emergent wetland
1:2 for shrub wetland
1:3 for forested wetland

Table 1 lists the acres of mitigation required, by wetland type, to meet the IDNR requirements. The Chicago District and local sponsor agreed to try to meet these mitigation requirements, to the extent possible, on project lands. Mr. Whitman then spent several days in the field with Keith Poole (IDNR), Scott Pruit (U.S. Fish and Wildlife Service) and Marty Maupin (Indiana Department of Environmental Management) looking at the locations of

proposed project changes and possible wetland mitigation areas. They looked at about five parcels of existing project lands, two of which showed particular promise for wetland restoration/creation due to their large size and existing topography. Mr. Whitman has done some preliminary wetland layout design on these two parcels and has come up with the following (see attached plate):

1) Area 2 (west of Chase St.) - surface elevation across the site varies from 590 to 600 feet. We propose placing a water control structure with permanent weir elevation of 590.5 in the existing ring levee. Approximately 16.9 acres would maintain a 0-2" water depth. Approximately 100.6 acres (between elevation 590.5 and 593) would seasonally flood. The entire site would be planted with flood-tolerant trees and shrubs (117.5 acres). Areas that had previously been specified as forbland in earlier mitigation plans would be moved to higher areas at the south edge of the property (elevation 593 to 600).

2) Area 3a (east of Chase St. and north of 35th St.) - surface elevation across this site varies from 587.3 to 591. We propose placing a water control structure in the existing ring levee with a permanent weir set at an elevation of 589. Approximately 122.5 acres would maintain a 0-21" water depth. Most of this area is expected to revert to emergent wetland without any active planting, as it was historically wetland and wetland plant seed has been documented to lie dormant for decades waiting for the right conditions to germinate. The area between elevation 589 and 591 (83.3 acres) would be planted with flood-tolerant tree and shrub species, as it would be expected to flood seasonally.

3) Area 4 (west of Georgia St.) - surface elevation varies from 589.8 to 590.5. This agricultural area receives frequent flooding and is surrounded by shrub and forested wetland. The area (9.7 acres) would be allowed to succeed to shrub wetland and could possibly be supplemented with wetland shrub plantings.

This plan would provide approximately 122.5 acres of emergent wetland and 210.5 acres of shrub and forested wetland. Though the total acreage (331.0) is slightly higher than that required by the IDNR (317.6), it does not quite meet the in-kind replacement requirement. The existing topography simply will not accommodate the successful planting of more acres of trees and shrubs on these two sites. Most of the other project mitigation features have not changed and are summarized on the attachment.

At this time I ask that you review this mitigation plan and provide our office with your comments. These comments will be considered in the SEIS. Questions concerning this plan should be directed to Ms. Barbara Williams at 312-353-6464. You may also wish to note that Mr. Whitman has left our agency to take a position with the Bureau of Land Management and will no longer be working on this project. I thank you for your assistance in this matter.

Sincerely,

Philip R. Bernstein
Chief, Planning Division

District in 2008 but have not been turned over to the LCRBDC and have not been maintained.

Our biologist visited the 2 sites on September 1, 2011. As shown in Photograph No. 1, the Chase Street site is being invaded by common reed and eastern cottonwoods, with some areas also being invaded by hybrid cattails. Photograph No. 2 shows part of the Tolleston Club mitigation site, where purple loosestrife and shrub willows are invading. In addition, the old city streets at Tolleston Club were left in place, and ORVs are running on them and on the levee, where the barriers to vehicle traffic have all been removed, thus allowing unimpeded vehicle access to the recreation trail along the top of the levee and to the mitigation land south of the levee. As you may know, Chase Street is closed at the floodwall and levee north of the river, but vehicles continue to use the street by simply driving over the levee along the recreation trail.

The IDNR Construction in the Floodway permit, issued on February 27, 2004, required that the LCRBDC "implement the Habitat Mitigation Plan on file at the Division of Water and dated August 2001" and that "construction of Project Stages V, VII, VIII (north and South for each Stage) ... shall not begin until all lands needed to meet the habitat mitigation requirements, as detailed in the Habitat Mitigation Plan dated August 2001, are acquired" (Enclosure No. 9). Purchase of the 355 acres of Hobart Marsh mitigation lands was completed in May 2005 with the assistance of The Trust for Public Land (Enclosure No. 10).

The mitigation project at Hobart Marsh has since been designed by the Chicago District, with the assistance of biologists from the FWS and IDNR, but has never been implemented. The land is owned by the Indiana Division of Nature Preserves, but remains as croplands and unrestored and unmanaged bur oak savannas.

The Section 401 Water Quality Certification for the flood control project was issued by IDEM to the Chicago District on September 29, 2005, and included the following Specific Conditions (Enclosure No. 11):

1. Implement the mitigation plan as described in the application received October 8, 2004 (referred to collectively herinafter as the "mitigation plan"), and as modified by the conditions of this certification. The wetland(s) created or restored pursuant to the mitigation plan shall be referred to herinafter as the "mitigation wetland" or "mitigation wetlands."
2. Complete all activities necessary to complete all wetland mitigation activities within seven (7) years of the effective date of this certification, unless IDEM grants written extension upon request. These activities include excavation, grading, installation of hydrologic controls, and planting.
4. Monitor the wetland mitigation areas between Clark Street and Chase Street annually to determine whether they are achieving the success criteria contained in Project Specific Condition 7 of this certification and complete corrective actions as are necessary to ensure the mitigation wetland will achieve success within the required period. [These include that the mitigation wetlands be free of purple loosestrife and common reed.]

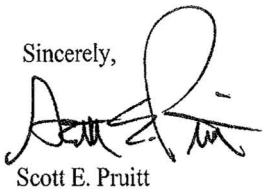
There is only 1 year left of the 7 years allowed by the IDEM WQC for completion of the mitigation activities. The Chicago District is aware of this based upon a letter sent to the LCRBDC on January 8, 2010 (Enclosure No. 12).

The tie-back levees and walls discussed in the draft EA provided on August 26, 2011 are likely the final construction activities for this project, which was authorized 25 years ago and started construction 21 years ago. However, this document does not provide adequate information about the floodwalls and the levee. For example, there already is a tie-back levee along the railroad track in Gary between Martin Luther King Jr. Drive and Georgia Street (Photograph No. 3). No mention is made of this existing levee and the document does not even indicate which side of the railroad grade will be affected by the new levee. North of the railroad is Ironwood Park, which is not mentioned in the document. If the levee will be on the north side of the railroad, will it be constructed on park land, or is the area between Ironwood Circle and the railroad outside of the park? There currently is no levee along the north side of the West Branch Little Calumet River between the railroad and M.L. King Jr. Drive, so the Ironwood community is apparently considered high enough to not be flooded. Therefore, what neighborhood is the new levee supposed to protect? How many acres will be impacted by the new levee? On page 6 it is indicated that the "project area consists of public highway right-of-way and the railroad easement", but there is no public highway in the vicinity. The Water Quality Impacts section on page 9 states: "Clean Water Act - Section 401 and Section 404, and Section 10 of the Rivers and Harbors Act of 1899 apply since there is no construction in navigable waters": is this supposed to state "do not apply"? Then the next sentence states: "Clean Water Act - The project will involve discharges to the waters of the United States, therefore Section 401 water quality certification is required, and a Section 404(b)(1) evaluation has been prepared"; but no such evaluation is included in the document. If there are impacts to wetlands, they will need to be mitigated.

Therefore, the U.S. Fish and Wildlife Service is again expressing the concerns we stated in our letter of October 15, 1992 (Enclosure No. 6): "We are concerned that wetland losses are occurring but no mitigation to replace those losses is occurring concurrently, nor do we know what the schedule is for that replacement. ... We would also appreciate the schedule for the construction of the remainder of the project's mitigation features." We believe that the required mitigation should long since have taken place and that the limited mitigation that was installed in Gary must be managed to control invasive species and ORV damage; without management the Federal investment in that Gary mitigation will be lost.

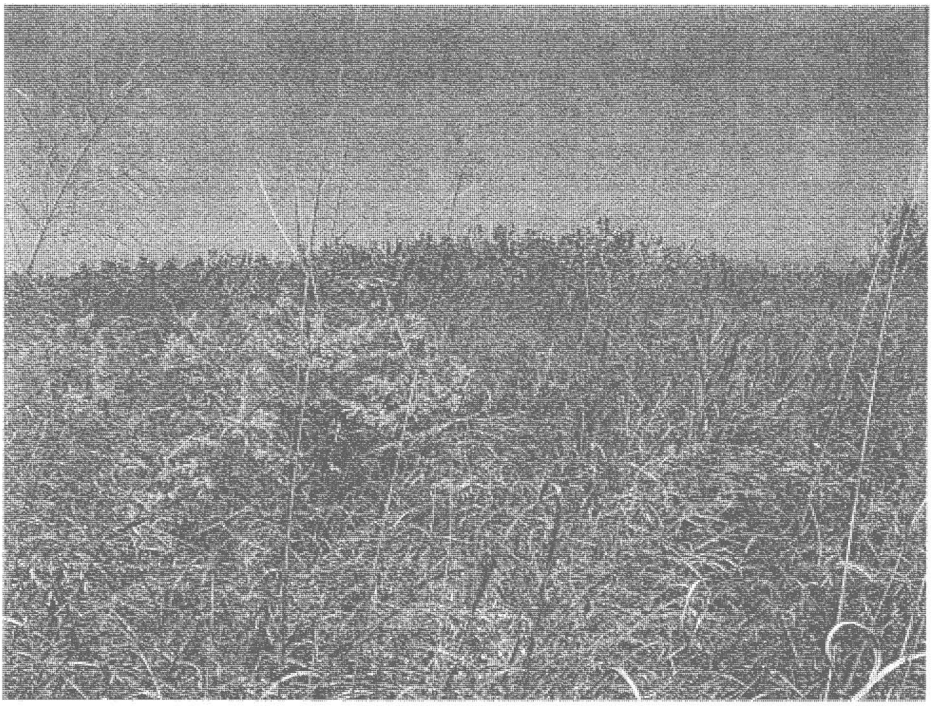
We look forward to your reply and to the advancement of the required mitigation in Hobart Marsh.

Sincerely,



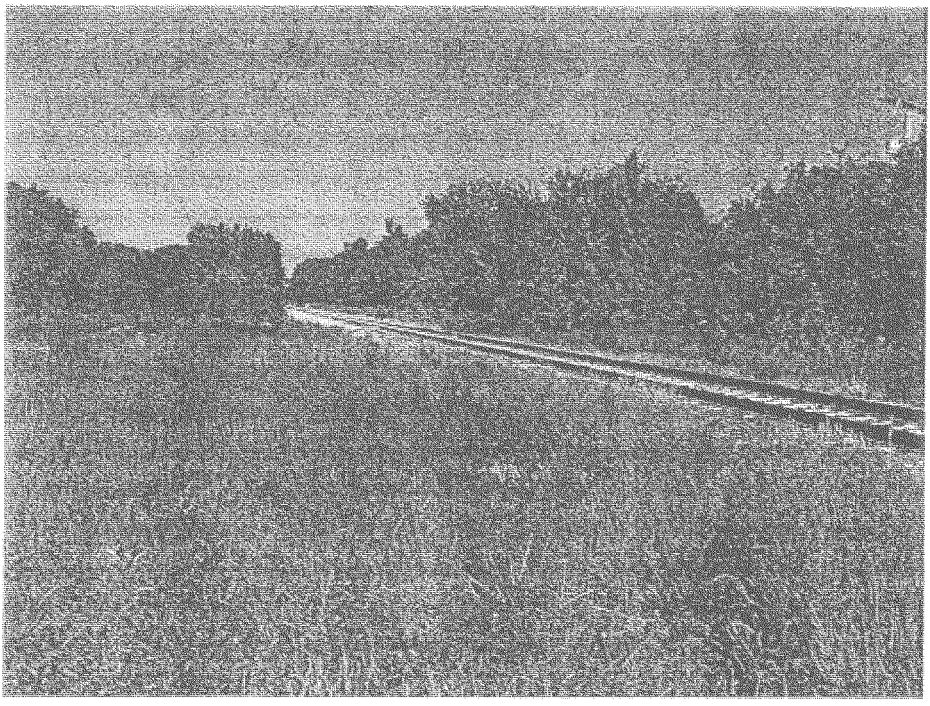
Scott E. Pruitt
Supervisor

cc: U.S. EPA Region V, Watersheds & NPS Programs Branch, WW-16J, Chicago, IL
U.S. EPA Region V, NEPA Implementation Section, E-19J, Chicago, IL
Christie Stanifer, Indiana Division of Water, Indianapolis, IN
John Bacone, Indiana Division of Nature Preserves, Indianapolis, IN
Marty Maupin, IDEM, Office of Water Quality, Indianapolis, IN



Photograph No. 1. Looking across the mitigation mesic prairie on the west side of Chase Street, with common reed and sapling eastern cottonwood invading the site.

Photograph No. 2. Looking across the mitigation area on the east side of Clark Road, with purple loosestrife and shrub willow invading the site.



Photograph No.3. Looking northwest from the junction of the levee with the railroad along the existing tie-back levee adjacent to the southwest side of the railroad.

SECTION IV - MITIGATION AND ENHANCEMENT MEASURES

HABITAT EVALUATION PROCEDURES (HEP)

208. As part of the EQ planning for the project, the wetlands and adjacent areas along the Little Calumet River corridor were delineated and classified. Their habitat value was evaluated as part of the baseline Habitat Evaluation Procedures (HEP) analysis. All aspects of the HEP analysis and all assumption made were done jointly by the HEP evaluation team which con-sisted of two biologists from the Chicago District and one biologist from the U.S. Fish and Wildlife Service, Bloomington Field Office. As a result of the evaluation it became evident that there were opportunities available which could immensely improve the habitat value of the wetlands. Their existing value was found to range from poor to excellent for the terrestrial evaluation species which used the wetland cover types. The range of habitat value was primarily due to the past human disturbances which had occurred in the wetland areas.

209. The species models contained in the Terrestrial Habitat Evaluation Criteria Handbook, Little Calumet River, Indiana and used for the HEP analysis identified limiting factors for the evaluation species. Measures which could eliminate certain of these limiting factors and which could be implemented in a practical manner were included in plans 1 and 3 (plan 3A was later assumed to be the same as plan 3) as enhancement measures. All plans were then evaluated using HEP and measured against the without project future condition to deterimine their net impact in terms of Average Annual Habitat Units (AAHU's). In order to quantify the EQ benefits provided by the enhancement measures, plans 1 and 3 were also evaluated without the enhancement measures. Results of HEP analysis are contained in the Fish and Wildlife Coordination Act Report, attachment 2 to the DEIS.

MITIGATION DETERMINATION

210. The tentatively selected plan, plan 3A, results in the loss of 74.4 acres of riparian deciduous forested wetland on existing levees, 21.6 acres of deciduous forested wetland, 2.0 acres of shrub wetland and 2.5 acres of herbaceous wetland or a total loss of 101.5 acres of wetland vegetation. This loss occurs west of Cline Avenue which was designated as Impact Segments 1 and 2 for the HEP analysis. East of Cline Avenue, in Impact Segment 3, the construction of the set-back levees results in the loss of 4.0 acres of deciduous forested wetland, 35.3 acres of shrub wetland and 3.8 acres of herbaceous wetland for a total loss of 43.1 acres. The total loss of wetland throughout the project area is 144.6 acres, and represents a 10.4% loss of the 1396 acres of wetland in the project area.

211. In order to determine the mitigation required for this loss, target species were selected by the evaluation team. The species selected were muskrat, green heron, blue-winged teal, wood duck and woodcock. Their

selection was based on their use of resource category one habitats or wetlands (as determined by the U.S. Fish and Wildlife Service) their regional scarcity and significance and their loss of AAHU's as measured by the HEP analysis. Management or enhancement measures that would improve the carrying capacity of the wetlands for these species include: creation of open water for the green heron, muskrat, blue-winged teal and wood duck; placement of nest boxes for the wood duck; creation and/or maintenance of existing grassy uncultivated areas near water or creation of nesting areas in water for the blue-winged teal; and maintenance of shrub areas and creation of herbaceous openings for the woodcock.

212. The evaluation team felt that the increase in habitat value in the existing wetlands as a result of the wetland enhancement measures could compensate for the loss of wetlands. This type of mitigation woud be in-kind, it could be accomplished totally on project lands, it would not require any purchase of additional land, and appears to be the most efficient and cost effective method to mitigate for project losses. There was, however, a need to be able to make a distinction between those management measures that would be required for mitigation and those that could be claimed as enhancement or as EQ benefits. This was needed for both cost apportionment purposes and to measure the net EQ contribution of the plan. It was decided to use Plan 3 AAHU data for the 5 species. The loss of AAHU's for the plan without the enhancement or EQ measures total-led -548.13, which would have to be compensated for. For the plan with the EQ measures the AAHU's for the species was 1593.87. This is a net increase in 2,142.0 AAHU's. Of this 2,142.00 gained with the EQ measures 548.13 AAHU's or 25.6 percent would be required for mitigation and the remaining 1,593.87 AAHU's or 74.4 percent would be EQ benefits. The evaluation team felt that this was a reasonable method in which to determine the mitigation requirements given the unique situation.

213. No "traditional analysis" was used to determine mitigation needs, primarily because no method was available that would allow for the distinction to be made between mitigation and enhancement or quantify the two separately. The lack of a traditional analysis to supplement the HEP determination of mitigation is not considered critical becasue the HEP results were determined in a joint, coordination-intensive effort by biologists from the Chicago District and the U.S. Fish and Wildlife Service in which all assumptions and decisions were agreed upon throughout the analysis.

IMPLEMENTATION PLAN

214. Subsequent to the above determination, a plan to implement these measures on specific areas within project lands was determined. Information contained in attachment D-1, Wildlife Management Technical Papers, and consultation with biologists from the Indiana Department of Natural Resources was used in developing this plan. Details of the plan are contained in the Fish and Wildlife Coordination Act Report, attachment 2 to the EIS.

COST APPORTIONMENT

215. Costs developed by the U.S. Fish and Wildlife Service for the management measures as described in the Coordination Act Report are summarized in table D-16. The Federal and non-Federal cost apportionment is shown in table D-17.

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604-1797

REPLY TO
ATTENTION OF

Environmental and Social
Analysis Branch

13 APR 1988

Mr. Dave Hudak
Bloomington Field Office
U.S. Fish and Wildlife Service
718 North Walnut Street
Bloomington, Indiana 47401

Dear Mr. Hudak:

The Chicago District Corps of Engineers is currently in the process of preparing the Phase II General Design Memorandum (GDM) on the Little Calumet River Flood Control Project. Both plan 3A and 3B will be covered in the Phase II GDM. During this phase of planning, the wildlife mitigation features are being designed and specific sites for the mitigation features have been chosen. As you know, the mitigation features proposed for this project include installation of Wood Duck nest boxes, creation of potholes and creating or maintaining forbland buffer strips. The proposed locations for these features are shown on the enclosed tables. A brief generalized description of each type of mitigation feature proposed follows.

The Wood Duck boxes are to be located along the Little Calumet River or over open water at the pothole sites. The potholes range in size from 0.5 acres to 3.0 acres, averaging 1.0 acre, with one large hole being created in HW-4. The holes will be excavated mechanically to a depth of five feet in the center. The existing forbland areas will be maintained by burning or mowing. The forb buffer strips to be created are located in areas adjacent to the river. The new levees constructed east of Cline Avenue will be landscaped with native grasses, shrubs and trees to provide additional wildlife habitat.

In addition to the mitigation measures described above, the Phase I GDM (1982) stated that a water control structure was to be built at the Penn Central Railroad tracks. The purpose of the water control structure was to stablize water levels in wetlands adjacent to the river and to prevent the proposed river dredging

ENCLOSURE NO. 2

from draining any adjacent wetlands. However, in 1984 a large portion of the proposed dredging was completed without authorization resulting in the draining of wetland HW-7. In order to mitigate for the wetland losses resulting from the dredging of the river, several mitigation features have been added. A deep marsh habitat will be created along the south side of the river at the HW-7 site. The acreage of wetland to be created has not been finalized yet but will be approximately 20 acres. Plant communities to be created include wet prairie/sedge meadow, erect emergent, floating emergent and submerged aquatic. Plant species typical of each wetland commumity will be planted at the site after regrading is completed. Adjacent to this wetland area, a mud flat will be created. This area will be bermed to allow water levels to be manipulated in order to create a foraging area for migrating shorebirds. The entire site will be managed by Indiana University Northwest staff. A permanent water control structure will be installed at the Penn Central Railroad tracks as described in the Phase I GDM, as well. The creation of wetland at the HW-7 site and the installation of the water control structure are included in both plans 3A and 3B.

We would like your comments on the location and design of the mitigation and enhancement features proposed for plans 3A and 3B by 13 May. If you have any further questions please contact Ms. Sue Elston of the Environmental and Social Analysis Branch at (312) 353-886-0451.

Sincerely,

for Richard E. Carlson
Chief, Planning Division

Enclosures

Attachment

Table 1. Comparison of Direct Wetland Acreage Impact Estimates Using Two Different Wetland Base Maps*

Wetland Type	Corps Habitat Mapping	NWI Mapping	Average	Acres of Mitigation Required**
Forested	69.6	50.1	59.85	179.6
Shrub	43.2	19.0	31.1	62.2
Emergent	53.3	98.2***	75.75	75.8
TOTAL	166.1	167.3	166.8	317.6

* Corps mapping based on 1976-78 photography at a scale of 1:2400; NWI mapping based on late 1970's-early 1980's photography at a scale of 1:100000; Indirect hydrologic impacts on wetland acreages within the boundaries of ponding areas 2-9 are not included.

** Based on IDNR required mitigation ratios of 1:1 for emergent, 1:2 for shrub, and 1:3 for forested wetlands.

*** Includes aquatic bed and unconsolidated bottom NWI wetland categories.

Current Mitigation and Enhancement Plans for the Little Calumet River Project

1. The number of wood duck boxes will remain the same, but many will be redistributed from locations shown on the Feature Design Memorandum 2 (FDM2) plates to the two new wetland mitigation areas (2 and 3a).

2. The number/acreage of potholes will remain the same, but one or two, as shown on the FDM2 plates, may have to be relocated. A map showing these locations should be included in the SEIS.

3. The number/acreage of forblands will remain the same, but several areas will have to be relocated from their current position on the FDM2 plates because they are currently located in the new wetland mitigation areas (2 and 3a) or have succeeded to the point where they are no longer dominated by herbaceous species. A map showing these locations should be included in the SEIS.

4. Areas near and on the landward side of the levee will still be landscaped, to the extent practicable, with trees and shrubs.

5. The deep wetland area located at the south side of Gleason Park, west of Broadway, has been dropped from the plan, as the property owner (Gary Parks Department) opposes it due to its own golf course/driving range development plans. It has been determined that their proposed plan is incompatible with a mitigation area at that location.

6. Over 330 acres of emergent, shrub, and forested wetlands will be created on exiting agricultural lands or other easements currently owned by the project sponsor, between the proposed levee and the river. This will be accomplished as described in the attached letter in order to satisfy IDNR construction permit requirements. A more detailed drawing showing this plan should be included in the SEIS.

7. Placement of a low-flow structure near Conrail railroad crossing by other.
Structure is currently in-place and set at an elevation of 588.5.

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206

REPLY TO
ATTENTION OF

Planning Branch
Environmental Formulation Section

U.S. Fish and Wildlife Service
620 S. Walker St.
Bloomington, IN 47403
ATTN: Scott Pruitt

13 DEC 2011

~~November 29, 2011~~

Dear Mr. Pruitt:

The Chicago District appreciates your concern and comments and is happy to provide you with the information requested in your letter (September 26, 2011) regarding the draft environmental assessment.

The Chicago District appreciates the Service's interest in the condition of the mitigation projects that were constructed along the Little Calumet River near Chase Street and Clark Street. As part of our own commitment to environmental stewardship, portions of previous mitigations will be reevaluated and efforts will be made to rectify the existing shortcomings. Once complete, these elements of the project will be turned over to our non-Federal sponsor, the Little Calumet River Basin Development Commission for Operation and Maintenance.

The existing levee along the southwest side of the railroad between Martin Luther King Jr Drive and Georgia St does not extend far enough along the railroad embankment to serve as an engineered tieback for the eastern end of the project. The proposed tieback levee would be along the northeast side of the railroad and cross under the railroad tracks to tie into the existing levee for a continuous line of protection. The proposed tie-back levee would be constructed on the railroad easement between the railroad embankment and Ironwood Circle. The Corps' preliminary plan is to build the proposed levee up against the side of the railroad embankment as a seal embankment. This type of embankment was also utilized at Martin Luther King Drive (south of I-80/94 and on the west side of the street) in Stage II.

The proposed tie-back levee is not protecting any new area, it is necessary to provide an engineered connection between the existing railroad embankment and the Corps level and to prevent possible end-around flooding into the Ironwood neighborhood. The tieback levee would be constructed of of clay, overlain with 6 inches of topsoil, and vegetated with turf grass. The structure will be fairly similar in appearance to what is there now; however, the existing RR embankment will be cleared of all trees and shrubs. The construction will all take place on previously disturbed soils. The Ironwood Park will not be adversely affected by the construction of the tie-back levee.

We regret the Water Quality Impacts section mentioned the need for Section 401 and Section 404 documentation. This was a mistake on our part and we wish to clarify that no additional permits are required for the tieback levees project. This error has been corrected in the draft EA.

Except for the required tieback levees, construction of the levee project is essentially completed and no additional wetland losses are occurring or projected at this time.

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206

A schedule for the construction of the remainder of the project's mitigation features has been drafted and is included with this letter. This schedule is dependent on the availability of funding.

Please feel free to contact the Chicago District if you have any additional questions or concerns, addressing your comments to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. Questions may be directed to Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

/S/

Susanne J. Davis, P. E.
Chief of Planning Branch

Enclosure

MFR: Letter response to Fish and Wildlife Service.

cc: LCRBD Commission
cc IDNR
cc IDEM
cc: IN-1
cc: US EPA

Bullock PM-PL-E 11/28/11
Fleming PM-PL-E 11/29/11
Samara PM-PM DMS 11/29/11
Davis PM-PL

Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Year 7
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
In Project Mitigation
Prepare Contract Documentation
Request for Proposal
Contractor Selection
Contract Award
Contract NTP
Construction Duration
Final Inspection
Turnover wetland to LS
Hobart Marsh Wetland Mitigation
Coordinating final plan
Prepare Contract Documentation
Request for Proposal
Contractor Selection
Contract Award
Contract NTP
Submittals
Construction Duration
Final Inspection
Turnover Wetland to LS
Year 8
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Hobart Marsh Wetland Mitigation
Coordinating final plan
Prepare Contract Documentation
Request for Proposal
Contractor Selection
Contract Award
Contract NTP
Submittals
Construction Duration
Final Inspection
Turnover Wetland to LS

Honorable Peter Visclosky
Representative in Congress, 1st Indiana District
7895 Broadway
Suite A
Merrillville, IN 46410

Honorable Peter Visclosky
Representative in Congress, 1st Indiana District
2313 Rayburn House Office Building
Washington, DC 20515

Kenneth Westlake, Chief
Environmental Review Branch
U.S. EPA ME-19J
77 West Jackson
Chicago, IL 60604

U.S. Fish and Wildlife Service
620 S. Walker St.
Bloomington, IN 47403
ATTN: Scott Pruitt

IDEM
100 N. Senate Ave.
Mail Code 61-50
Indianapolis, IN 46204-2251
ATTN: Mart Maupin

Indiana DNR
Division of Water
402 W. Washington Room W273
Indianapolis, IN 46204
ATTN: Christine Kiefer

Little Calumet River Basin Development Commission
900 Ridge Road
Suite H
Munster, IN 46321

Sue Davis

Planning Chief

Technical Services Division

SUBJECT:- Little Calumet Flood Control Ironwood Tie Back Levee Wetland Determination Investigation

Chief Davis,

The following is a summary of our staff members field notes and findings (attached) related to the area on the North/East side of the Railroad embankment for the proposed flood control levee Ironwood Tie Back project in Gary, Indiana. Several maps and aerials were produced by the District GIS specialist, and nothing in those maps or aerials indicated any water feature in the subject area. Therefore, it was determined that an on-site investigation was necessary. Gene Fleming, Chief of Planning visited the site with Greg Moore of the Planning Division, along with Mike Machalek, Senior Project Manager of the Regulatory Branch, chosen as he participated in the working group for both the Midwest and the Northcentral/Northeast Supplements of the Wetland Delineation Manual. In summary, we concluded that there are no wetlands, ditches or swales present in the proposed Ironwood Tie Back project area. Furthermore, it is our conclusion that there was most likely an aerial photo interpretation error, wherein either a shadow signature from the tree line on the railroad embankment, or older photos showing an asphalt alley from the former apartment complex, was mis-interpreted to be a channel or ditch. Attached are Mr. Machalek's field notes and the concurrent photographs from his March 1, 2012 site visit between the hours of 1pm and 3pm.

Sincerely,

Jeesa Beal

Chief, Regulatory Branch

01 MAR 12

1:15 PM
JD

Little Calumet Flood Control Levee

USACE - Mike Machalek, Dave Fleming, Greg Moore

We looked at the NE side of the RR Tracks SW of the park near the intersection of Kentucky Ave and 24th Ave in Gary, IN.

We started at the North end of the park at 24th Ave. and work our way SE. We started at 24th Ave. and Vermont St. (Photo 1). I took a photo (2)^{W} of the start of the levee work area, looking towards the RR embankment. Standing on 24th Ave., I took a photo (3)^{SE} down along the side of the RR embankment where they are proposing to fill. The trees growing on the railroad embankment were mostly Acer negundo (Box Elders). There was a shallow depression in the landscape running parallel to the tracks (15' wide x ≤1' deep), which was most likely the result of borrow material for the RR embankment. Both this area and the adjacent open field was dominated by upland grasses, (Photo 4)^{SE}. I also took a photo (5)^{NW} of the RR embankment. About 100 yards off of 24th Ave, the shallow depression goes flat and disappears, so no topographic change from the park starting at Kentucky Ave. to the RR tracks. (Photo 6)^{SE}. We walked in another 100', and I took a photo (7)^{SE} + (8)^{NW}, of old field areas and dry woods.

We walked another 100+ towards the river, and it was still all level ground with upland species, and no ditch or wetlands were present (Photo 9)^{SE} + (Photo 10)^{NW}
At one point I came upon the old asphalt piece that was the alley. (Photos 11+12). Based on the 1950's aerial, this area along the RR tracks used to be the alley leading to the back of the old housing complex.
The embankment was dominated by staghorn sumac in the central portion of the property.
We got up on the RR embankment, and I took a photo (13)^{NE} of the small ecotone present, and another one (Photo 14)^{E}.
I then took a photo (15)^{SE} looking down the RR tracks where the walkway to the pump station comes up, and a photo (16)^{S} of where the levee ties into the RR track embankment.

Conclusion: - There are no wetlands, channels, ditches, or any other Waters of the U.S. in the proposed project area on the east side of the RR tracks.

PHOTO 2

PHOTO 4

PHOTO 1

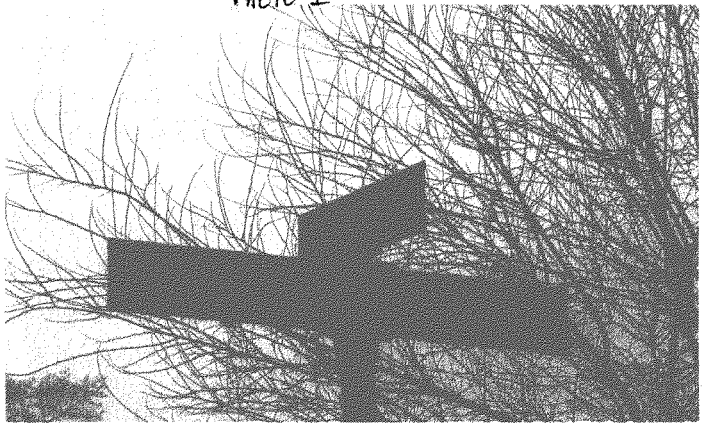


PHOTO 3

LITTLE CALUMET FLOOD CONTROL LEVEE

01 MARCH 2012

PHOTO 6

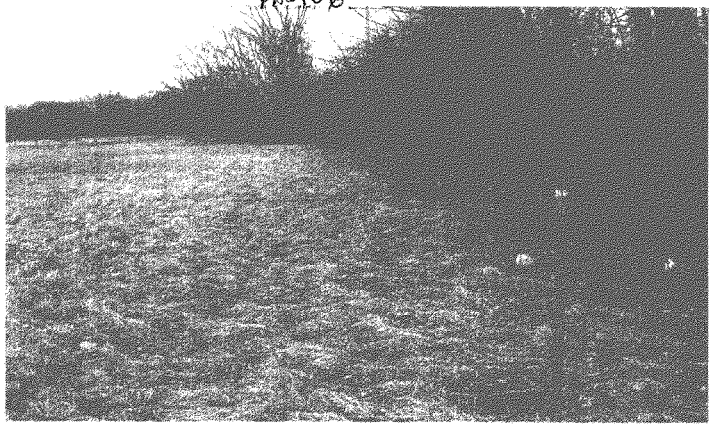


PHOTO 8

PHOTO 5

PHOTO 7

LITTLE CALUMET FLOOD CONTROL LEVEE

01 MARCH 2012

PHOTO 10

PHOTO 12

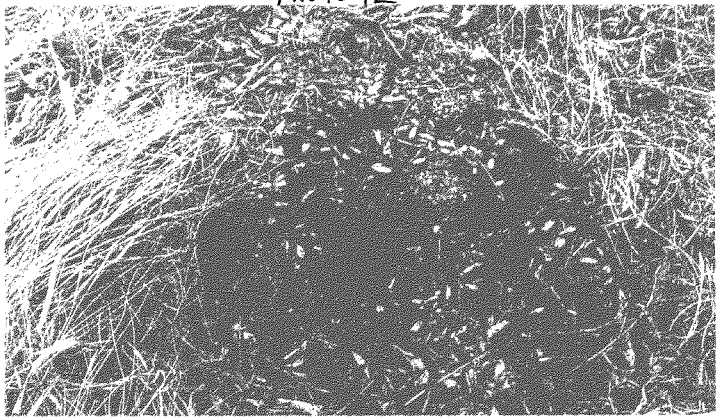


PHOTO 9

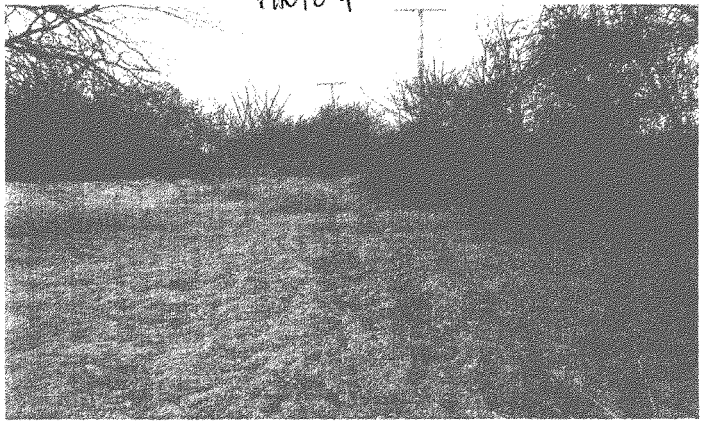
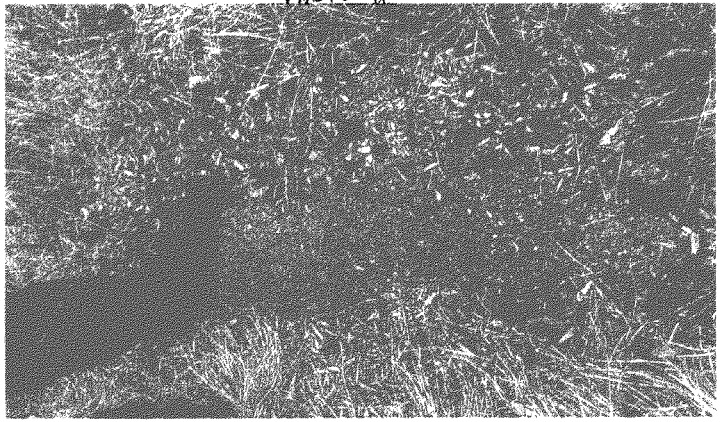


PHOTO 11



LITTLE CALUMET FLOOD CONTROL LEVEE

01 MARCH 2012

PHOTO 14

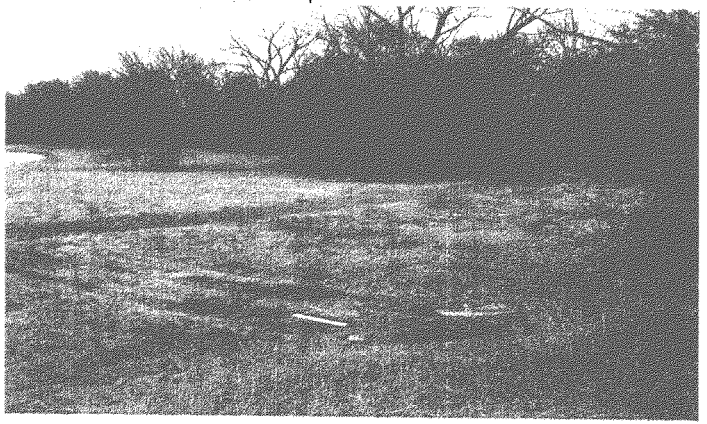


PHOTO 16

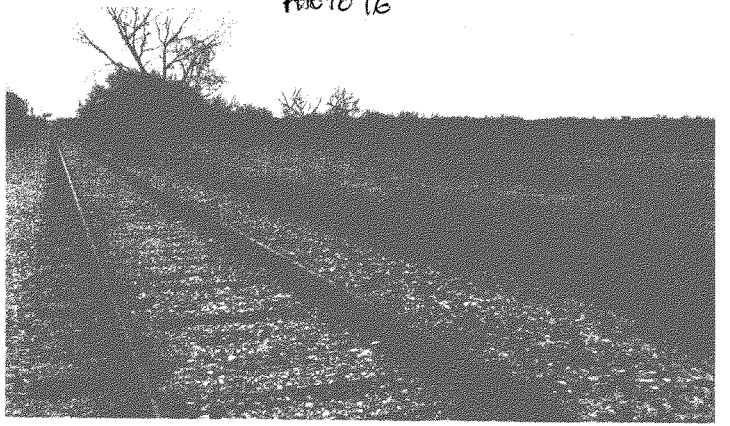
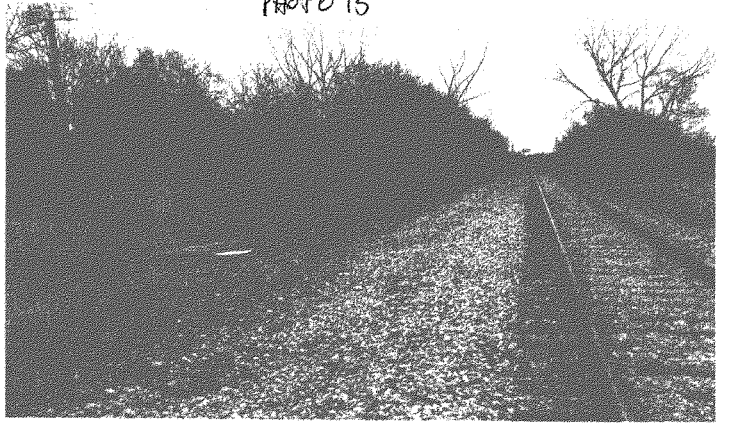


PHOTO 13

PHOTO 15



LITTLE CALUMET FLOOD CONTROL LEVEE

01 MARCH 2012

Correspondence

Indiana Department of Environmental Management

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

105 South Meridian Street
P.O. Box 6015
Indianapolis 46206-6015
Telephone 317/232-8603

November 1, 1989

Mr. Dan Gardner
Little Calumet River Basin Development Commission
8149 Kennedy Avenue
Highland, Indiana 46322

Re: Little Calumet River Flood Control Project

Dear Mr. Gardner:

This office is currently reviewing a request by the Chicago District, U.S. Army Corps of Engineers for Water Quality Certification for the Little Calumet River Flood Control Project. According to information supplied to us by the Chicago District, the project will result in a net loss of 69.2 acres of wetland. Regardless of whether a project is proposed by a government entity or private entity this office is opposed to net wetland losses and requires, through a condition on the Water Quality Certification, mitigation for wetland losses. We have been informed by the Chicago District that a condition on their Water Quality Certification requesting mitigation for wetland losses would result in extensive delays. Specifically, time would be required for design and approval of the mitigation plan and appropriation of federal funds by Corps of Engineers hierarchy in Washington. Corps estimates put this delay at least at several months.

It will be impossible to approve the Little Calumet River Flood Control Project without mitigation for wetland losses. A solution to the problem lies with the Little Calumet River Basin Development Commission. It is our understanding that upon completion of the project the Little Calumet River Basin Development Commission will assume responsibility for maintenance and management of the project area. If the Little Calumet River Basin Development Commission would make a written commitment to create at least 69.2 acres of wetland within the project area, this office would have Water Quality Certification and the project could proceed. The wetlands could be created

ENCLOSURE NO. 3

over a period of several years and could be tied into recreation plans. The Indiana Department of Environmental Management, the Indiana Department of Natural Resources and the U.S. Fish and Wildlife Service would help in developing the mitigation plan.

If you have any questions contact Mr. Marty Maupin at 317/243-5035.

Sincerely,

Charles B. Bardonner

Charles B. Bardonner
Assistant Commissioner
Office of Water Management

cc: U.S. Fish and Wildlife Service
Indiana Department of Natural Resources
Ms. Rose Austin, Chicago District
U.S. Army Corps of Engineers

Little Calumet
River Basin Development Commission

8149 Kennedy Avenue Highland, Indiana 46322 (219) 923-1118

November 7, 1989

Mr. Charles B. Bardonner
Assistant Commissioner
Office of Water Management
IN Dept. of Environmental Management
105 South Meridian Street
P. O. Box 6015
Indianapolis, IN 46206-6015

Re: Water Quality Certification for the Little Calumet River Flood Control/Recreation Project

Dear Mr. Bardonner:

I am writing you in response to your November 1, 1989 letter identifying a major obstacle to the Little Calumet River Project receiving state Water Quality Certification without mitigation of some 69.2 acres of wetlands. These wetlands are identified as being lost due to the levee construction of the project.

The Little Calumet River Basin Development Commission, the non-Federal project sponsor, believes strongly in the flood control, recreation and environmental benefits of the project and believes any delay to the earliest Federal construction start would be tragic. Some 20 years of efforts have yielded a cost effective plan that protects some 8,950 residences and businesses as well as almost 800 acres of natural/wetlands along the river. We believe that the over $14 million of State of Indiana appropriations dating back to 1975 affirms a strong commitment to the project.

Toward this end, the Development Commission board, at its November 2nd monthly meeting, approved the sending of this letter to resolve the outstanding issue to the project receiving the Water Quality Certification.

ENCLOSURE NO. 4

The Little Calumet River Basin Development Commission commits to identifying, planning and creating; in cooperation with the staffs of the Indiana Department of Natural Resources, the U. S. Fish and Wildlife Service, and the Indiana Department of Environmental Management, at least 69.2 acres of wetlands to offset projected losses of a like number of wetlands due to the project construction. These wetlands will be created over the project construction life, estimated to be eight years from construction start. The Development Commission is responsible for the project's maintenance and operation after cnstruction, and as such is able and appropriate to make this commitment.

I trust this will satisfy your objection to approving Water Quality Certification for the Little Calumet River Project. Please call me if additional information is needed. We look forward to your response.

Sincerely,

Dan Gardner
Executive Director

/sjm
cc: CPT Richard Thompson, U.S.C.O.E.
Ms. Rose Austin, U.S.C.O.E.
Dave Hudak, U.S. Fish and Wildlife Service
Jerry Pagac, IDNR
Richard Wawrzyniak, IDNR
Marty Maupin, IDEM

LOCAL COOPERATION AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE LITTLE CALUMET RIVER BASIN DEVELOPMENT COMMISSION
FOR CONSTRUCTION OF THE
LITTLE CALUMET RIVER, INDIANA LOCAL FLOOD PROTECTION
AND RECREATION PROJECT

THIS AGREEMENT, entered into this 16 day of August, 1990, by and between the DEPARTMENT OF THE ARMY (hereinafter referred to as the "Government"), acting by and through the Assistant Secretary of the Army (Civil Works), and the Little Calumet River Basin Development Commission (hereinafter referred to as the "Commission"), acting by and through its Chairperson,

WITNESSETH, THAT:

WHEREAS, construction of the Little Calumet River, Indiana Local Flood Protection and Recreation Project at the Little Calumet River between the Illinois - Indiana State line and the Consolidated Rail Corporation Railroad crossing in Gary, Indiana (hereinafter referred to as the "Project", as defined in Article I.a. of this Agreement), was authorized by Section 401 of the Water Resources Development Act of 1986 (P.L. 99-662), to be constructed substantially in accordance with Plan 3A contained in the Report of the Chief of Engineers, dated June 2, 1984; and,

WHEREAS, Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, specifies the cost sharing requirements applicable to the Project; and,

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended, provides that the construction of any water resources project by the Secretary of the Army shall not be commenced until each non-federal interest has entered into a written agreement to furnish its required cooperation for the project; and,

WHEREAS, on 1 June, 1988, the Assistant Secretary of the Army (Civil Works) approved a credit with an estimated value of $1,667,200 for the Little Calumet River Basin Development Commission toward the Commission's share of project cost in accordance with Section 104 of the Act; and,

WHEREAS, the Commission does not qualify for a reduction of the maximum non-Federal cost share pursuant to the guidelines which implement Section 103(m) of the Water Resources Development Act of 1986, Public Law 99-662, published in 33 C.F.R., sections 241.1 - 6, entitled "Flood Control Cost-Sharing Requirements Under the Ability to Pay Provision"; and,

ENCLOSURE NO. 5

(ATTACHMENT B)

WHEREAS, the Commission has the authority and capability to furnish the cooperation hereinafter set forth and is willing to participate in cost-sharing and financing in accordance with the terms of this Agreement;

NOW, THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

a. The term "Project" shall mean the structural and non-structural flood control measures at Little Calumet together with construction of recreation hiking trails throughout the project area with the construction of associated recreation support areas within the project ravine corridor and at the borrow site in the town of Schererville; construction of disposal facilities; preserving land designated as wetlands; and construction of fish and wildlife mitigation and enhancement measures, as generally described in the Little Calumet Phase II, General Design Memorandum dated September 1986, and approved June 1990.

b. The term "structural flood control features of the Project" shall mean staged construction of replacing existing berms with new levees along the north and south banks of the Little Calumet River between the Illinois - Indiana State line and Cline Avenue in the towns of Munster, Highland and Griffith and the city of Hammond; replacing one storm water pumping station and modifying pumping stations owned by the Hammond Sanitary District, the town of Highland, and the Gary Sanitary District; relocation of Indianapolis Boulevard bridge owned by the Indiana Department of Highways; construction of a water control structure on the Little Calumet River near the confluence of Hart Ditch; constructing of new levees in the city of Gary between Cline Avenue and the Consolidated Rail Corporation near the Martin Luther King, Jr. Drive at an alignment similar to that as shown in the Phase II General Design Memorandum for the Authorized Plan; modifying the channel between Illinois - Indiana State line and Indianapolis Boulevard and between Chase Street and the Consolidated Rail Corporation in the city of Gary with associated highway crossing relocations at Chase Street, Grant Street, Georgia Street, Borman Expressway (Interstate Highway 80/94);

c. The term "non-structural flood control features of the Project" shall mean providing flood damage protection to the interior of a structure up to the design level of protection by: permanently or during emergencies sealing all points of entry of flood waters into the structures; raising the structure above its existing first floor elevation; constructing ring levees to protect structures; and/or temporary or permanent evacuation.

d. The term "total project costs" shall mean all costs incurred by the Commission and the Government directly related to

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

September 29, 2005

VIA CERTIFIED MAIL 7002 0510 0002 5827 8144

Mr. Gregory Moore
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, Suite 600
Chicago, IL 60606-7206

Dear Mr. Moore:

Re: Section 401 Water Quality Certification
Project: Little Calumet River Flood Control Project
IDEM No.: 2004-596-45-MTM-A
County: Lake

Office of Water Quality staff has reviewed your application for Section 401 Water Quality Certification dated October 14, 2004, and received October 18, 2004. According to the application, you are seeking after-the fact authorization for existing impacts and authorization for existing and future impacts to wetlands and other waters associated with the construction of 22 miles of levees and floodwalls. The project requires impacts to approximately 156 acres of wetlands by clearing, excavation, or fill. As mitigation for the impacts you will restore hydrology to 400 acres of hydric soil. Mitigation areas include an 89 acre field and a 58 acre field on the south side of the Little Calumet River just west of Chase Street in Gary, Lake County. You will also purchase, protect, and enhance both upland and wetland areas in the Hobart Marsh area. Any shortfall of hydric soil mitigation acreage from the aforementioned mitigation sites will be made up through the restoration of a maximum of 200 acres in an existing agricultural field located south of the Little Calumet River between Chase and Grant Streets. The project boundaries for the impacts are along the Little Calumet River from Hohman Avenue in Hammond to just east of Indiana Street in Gary, Lake County.

We have also reviewed a request for a modification to an existing Section 401 Water Quality Certification No. 2003-170-45-MTM-B by the Indiana Department of Transportation (INDOT) for impacts to waters of the State of Indiana associated with the I-80/94 Expressway construction project. The impacts included 0.16 acres of wetland impacts that resulted from INDOT rebuilding a portion of a Little Calumet River Flood Control levee as part of their construction project. The wetlands, as agreed to by you in correspondence dated

March 15, 2005, to Greg Kicinski, INDOT, will be mitigated by the Corps of Engineers as part of the Little Calumet River Flood Control Project mitigation. IDEM issued Section 401 Water Quality Certification No. 2003-170-45-MTM-B for the I-80/94 Expressway construction project in correspondence dated August 9, 2005.

Based on available information, it is the judgment of this office that the proposed project will comply with the applicable provisions of 327 IAC 2 and Sections 301, 302, 303, 306, and 307 of the Clean Water Act if the recipient of the certification complies with the conditions set forth below. Therefore, subject to the following conditions, the Indiana Department of Environmental Management (IDEM) hereby grants Section 401 Water Quality Certification for the project described in your application received October 18, 2004. Any changes in project design or scope not detailed in the application described above or modified by the conditions below are not authorized by this certification.

GENERAL CONDITIONS:

The recipient of the certification shall:

1. Deposit any dredged material in a contained upland disposal area to prevent sediment runoff to any waterbody. Dispose of all dredged and excavated material according to the requirements of 329 IAC 10, governing Solid Waste Land Disposal Facilities. Your project information may be forwarded to the IDEM Office of Land Quality, Industrial Waste Section for review. Sampling may be required to determine if the dredged sediment is contaminated. Failure to properly dispose of contaminated sediment may result in enforcement action against you.

2. Install erosion control methods prior to any soil disturbance to prevent soil from leaving the construction site. Appropriate erosion control methods include, but are not limited to, straw bale barriers, silt fencing, erosion control blankets, phased construction sequencing, and earthen berms. Monitor and maintain erosion control structures and devices regularly, especially after rain events, until all soils disturbed by construction activities have been permanently stabilized.

3. Clearly mark the construction limits at the project site during construction.

4. Allow the commissioner or an authorized representative of the commissioner (including an authorized contractor), upon the presentation of credentials:

   a. to enter the property of the recipient of the certification;
   b. to have access to and copy at reasonable times any records that must be kept under the conditions of this certification;
   c. to inspect, at reasonable times, any monitoring or operational equipment or method; collection, treatment, pollution management or discharge facility or device; practices required by this certification; and any mitigation wetland site;

d. to sample or monitor any discharge of pollutants or any mitigation wetland site.

5. Complete all approved discharges no later than five (5) years of the date of issuance of this Section 401 Water Quality Certification. The applicant may request a one (1) year extension to the Section 401 Water Quality Certification by submitting a written request ninety (90) days prior to the deadline stated above. The written request shall contain an account of which discharges and mitigation have been completed and list the reasons an extension is requested.

PROJECT SPECIFIC CONDITIONS:

The recipient of the certification shall:

1. Implement the mitigation plan as described in the application received October 8, 2004, (referred to collectively hereinafter as the "mitigation plan"), and as modified by the conditions of this certification. The wetland(s) created or restored pursuant to the mitigation plan shall be referred to hereinafter as the "mitigation wetland" or "mitigation wetlands."

2. Complete all activities necessary to complete all wetland mitigation activities within seven (7) years of the effective date of this certification, unless IDEM grants a written extension upon request. These activities include excavation, grading, installation of hydrologic controls, and planting.

3. For all wetland mitigation areas submit annual monitoring reports of the mitigation wetland to this office by December 31 of each year until released from monitoring by this office. These reports shall contain information concerning what steps the recipient of the certification has taken to create the mitigation wetlands and whether the wetland is achieving each of the success criteria outlined in Project Specific Condition 7. The reports shall include the following:

   a. The IDEM identification number.
   b. As-built plans (in the first year's report).
   c. Discussion of hydrology at the mitigation site.
   d. Discussion of plant community development at the mitigation wetland site.
   e. Discussion of methods or means used to determine compliance with the success criteria.
   f. Photographs representative of the mitigation wetland site and sampling points.
   g. Identification of any problems with meeting the success criteria.
   h. Recommendations for correcting any problems identified.
   i. Wetland delineation for the mitigation wetland in the final report.

4. Monitor the wetland mitigation areas between Clark Street and Chase Street annually to determine whether they are achieving the success criteria contained in Project Specific Condition 7 of this certification and complete corrective actions as are necessary to ensure the mitigation wetland will achieve the success within the required period. These corrective actions may include additional grading, plantings, or relocation of the mitigation wetland, along with extended monitoring. Describe in the monitoring reports any corrective actions taken to ensure success of the mitigation site.

5. Monitor all wetland mitigation areas for a minimum period of three (3) years. In order to be released from monitoring, the recipient of the certification must demonstrate to IDEM, through monitoring reports, that the success criteria specified in Project Specific Condition 7 have been met for two (2) consecutive years within a five (5) year period. Once the recipient of the certification believes it has met this requirement, they may submit a proposed final monitoring report to IDEM and suspend monitoring unless notified otherwise by IDEM. If IDEM determines that the success criteria have not been met, then the recipient of the certification shall resume monitoring. If IDEM confirms that the success criteria have been met, then the recipient of the certification may permanently discontinue monitoring after it receives written notification of this determination from IDEM.

6. Include separate wetland delineations for the mitigation wetlands between Chase Street and Clark Street; Hobart Marsh; and the Project Area mitigation wetlands in the final monitoring report. The delineation must be conducted on-site using the hydrology and vegetation parameters from the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January 1987). The delineation report must include data sheets and a survey, map or drawing with area measurements (in acres) of all mitigation wetland boundaries.

7. Ensure that the wetland mitigation between Clark Street and Chase Street meets all of the following success criteria for two consecutive years within five (5) years of the creation of the wetland:

   a. Greater than 50% of the dominant vegetation species must be classified as hydrophytic.
   b. The hydrology at the mitigation wetland site must meet the wetland hydrology criteria contained in the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987).
   c. The combined surface area coverage of reed canary grass (*Phalaris arundinacea*) and cattail (*Typha spp.*) shall not cover more than 15% of the mitigation wetland.
   d. The mitigation wetland is free of the following exotic species: *Lythrum salicara* (purple loosestrife), *Phragmites australis* (common reed) *and Myriophyullum spicatum* (water milfoil).

e. No more than 20% of the surface area coverage of the mitigation wetland may be open water, bare ground or a combination of the two. Open water and bare ground are defined as areas with less than 10% vegetative cover.

8. For the Project Area and Hobart Marsh mitigation areas, monitor them annually to determine whether they are achieving the success criteria contained in Project Specific Condition 9 of this certification and complete corrective actions as are necessary to ensure the mitigation wetland ill achieve the success within the required period. These corrective actions may include additional grading, plantings, or relocation of the mitigation wetland, along with extended monitoring. Describe in the monitoring reports any corrective actions taken to ensure success of the mitigation site.

9. Ensure that the Hobart Marsh mitigation wetlands meet all of the following success criteria for two consecutive years within five (5) years of the creation of the wetland:

a. Greater than 50% of the dominant vegetation species must be classified as hydrophytic.
b. The hydrology at the mitigation wetland site must meet the wetland hydrology criteria contained in the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987).
c. The combined surface area coverage of reed canary grass (*Phalaris arundinacea*) and cattail (*Typha spp.*) shall not cover more than 15% of the mitigation wetland.
d. The mitigation wetland is free of the following exotic species: *Lythrum salicara* (purple loosestrife), *Phragmites australis* (common reed) *and Myriophyullum spicatum* (water milfoil).
e. Native vegetation excluding cattail (*Typha spp.*) must cover at least 70% of the mitigation wetland site.
f. No more than 10% of the surface area coverage of the mitigation wetland may be open water, bare ground or a combination of the two. Open water and bare ground are defined as areas with less than 10% vegetative cover.
g. At the end of the sixth full growing season the vegetation inventory data in seeded areas shall yield mean C and FQI values of 3.5 and 35, respectively, at the transect level and mean quadrat levels generally shall be rising steadily. It shall also be documented that no less than 35% of the species seeded are present in the landscape

10. At the end of the monitoring period, ensure there is a combined minimum of 400 acres of wetland mitigation on hydric soils between Chase Street and Clark Street mitigation areas; the Project Area mitigation areas and the Hobart Marsh mitigation area. A minimum of 60 acres mitigation wetland, of the required 400 hundred acres of mitigation wetland, shall be established on the Project Area mitigation areas and a minimum of 100 acres shall be established in the Hobart Marsh mitigation area.

11. Protect all areas upon which a mitigation wetland is to be created or restored with a conservation easement or deed restriction. These areas shall be protected as wetlands for a minimum period of fifty (50) years and the discharge of pollutants, including fill material, in them or their excavation shall be prohibited. A copy of the signed and recorded modification to the deed shall be filed with this office within sixty (60) days of the recipient of the certification's release from monitoring requirements.

12. Remove any temporary causeway or other structures used to facilitate construction or access upon completion of construction activities.

13. Install silt fence or other erosion control measures around the perimeter of any wetlands and/or other waterbodies to remain undisturbed at the project site.

14. Allow no construction equipment, temporary run-arounds, coffer dams, causeways, or other such structures to enter or be constructed within the stream, unless specifically stated, depicted, or detailed in the aforementioned correspondence and project plans.

A modification of this Section 401 Water Quality Certification is required from this office if any of the aforementioned items are needed for project construction.

This certification does not relieve the recipient of the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency or person. You may wish to contact the Indiana Department of Natural Resources at 317-232-4160 (toll free at 877-928-3755) concerning the possible requirement of natural freshwater lake or floodway permits. In addition, you may wish to contact IDEM's Stormwater Permits Section at 317-233-1864 concerning the possible need for a 327 IAC 15-5 (Rule 5) permit if you plan to disturb greater than one (1) acre of soil during construction.

This certification does not:
(1) authorize impacts or activities outside the scope of this certification;
(2) authorize any injury to persons or private property or invasion of other private rights, or any infringement of federal, state or local laws or regulations;
(3) convey any property rights of any sort, or any exclusive privileges;
(4) preempt any duty to obtain federal, state or local permits or authorizations required by law for the execution of the project or related activities; or
(5) authorize changes in the plan design detailed in the application.

Failure to comply with the terms and conditions of this Section 401 Water Quality Certification may result in enforcement action against the recipient of the certification. If an enforcement action is pursued, the recipient of the certification could be assessed up to $25,000 per day in civil penalties. The recipient of the certification may also be subject to criminal

liability if it is determined that the Section 401 Water Quality Certification was violated willfully or negligently.

This certification is effective eighteen (18) days from the mailing of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 18-day period. If a petition for review and a petition for stay of effectiveness are filed within this period, any part of the certification within the scope of the petition for stay is stayed for fifteen (15) days, unless or until an Environmental Law Judge further stays the certification in whole or in part.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

1. You must petition for review in writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.

2. You must file the petition for review with the Office of Environmental Adjudication (OEA) at the following address:

   Office of Environmental Adjudication
   100 North Senate Avenue
   IGCN Room N1049
   Indianapolis, IN 46204

3. You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day that the OEA offices are closed during regular business hours, you may file the petition the next day that the OEA offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to OEA; the date that the envelope containing the petition is postmarked if it is mailed by United States mail; or, the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Identifying the certification, decision, or other order for which you seek review by number, name of the applicant, location, or date of this notice will expedite review of the petition.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, the petitioner will, and any other person may, obtain notice of any prehearing conferences, preliminary hearings, hearings, stays, and any orders disposing of the proceedings by requesting copies of such notices from OEA.

If you have procedural questions regarding filing a petition for review you may contact the Office of Environmental Adjudication at 317-232-8591.

If you have any questions about this certification, please contact Mr. Marty Maupin, Project Manager, of my staff at 317- 233-2471, or you may contact the Office of Water Quality through the IDEM Environmental Helpline (1-800-451-6027).

Sincerely,

Martha Clark Mettler, Chief
Watershed Planning Branch
Office of Water Quality

Enclosure - Sample Deed Restriction

cc: Liz McCloskey, USFWS
Jomary Crary, IDNR

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO, IL 60606-7206

REPLY TO
ATTENTION OF

8 January 2010

Environmental and
Social Analysis Branch

Mr. Ron McAhron
Acting Director
Little Calumet River Basin Development Commission
6100 Southport Road
Portage, Indiana 46386

RE: USACE response to comments from a 7 December 2009 e-mail from LCRBDC Acting Director Ron McAhron (attached).

Dear Mr. McAhron,

In response to a conversation that I recently had with Imad Samara regarding the above-mentioned e-mail, we are writing this letter to clarify the USACE position regarding project mitigation.

The Little Calumet River Flood Control Project received IDEM 401 Water Quality Certification and IN-DNR floodway construction permits based upon the present mitigation plan. Without those certifications and permits, the project could not have been authorized to proceed. Failure to implement the approved mitigation plan will place us in violation of those certifications and permits, as well as in violation of NEPA and USACE Guidance.

The 401 Water Quality Certification waiver, dated 29 September 2005, requires mitigation to be completed by the end of September 2012 to avoid receiving a letter of violation. It is not possible to complete 355 acres of habitat mitigation in two years. The 401 Water Quality Certification states in part:

1. Implement the mitigation plan *as described* in the application received October 8, 2004, (referred to collectively hereinafter as the "mitigation plan"), and as modified by the conditions of this certification. The wetland(s) created or restored pursuant the mitigation plan shall be referred to hereinafter the "mitigation wetland" or "mitigation wetlands."

ENCLOSURE NO. 12

2. Complete all activities necessary to complete all wetland mitigation activities within seven (7) years of the effective date of this certification, unless IDEM grants a written extension upon request. These activities include excavation, grading, installation of hydrologic controls, and planting.

The IN-DNR Construction Permit, dated 27 February 2004, prohibited construction of west reach Project Stages V-N&S, VII-N&S and VIII-N&S prior to acquisition of all mitigation land and a commitment to implement the present mitigation plan. That permit states in part:

4 implement the Habitat Mitigation Plan on file at the Division of Water and dated August 2001.

5 construction of Project Stages V, VII, VIII (North and South for each Stage), as shown on the plans entitled "Little Calumet River, Indiana, Flood Control Project, West Reach Plan & Profile Sheets, Cline Ave to Indiana/Illinois State Line" that were received at the Division of Water on October 15, 2002, shall not begin until all lands needed to meet the habitat mitigation requirements, as detailed in the Habitat Mitigation Plan dated August 2001, are acquired.

In accordance with USACE Guidance, the approved mitigation plan resulted from years of good-faith negotiations among the Indiana Department of Natural Resources, the Indiana Department of Environmental Management, the U.S. Fish and Wildlife Service and the Little Calumet River Basin Development Commission, as well as the National Park Service, The Nature Conservancy and local conservation entities.

That Guidance requires compliance with the Fish and Wildlife Coordination Act (FWCA) as well as coordination with other Federal agencies and entities at the state and local levels. That coordination resulted in USFWS approval of the present mitigation plan, as well as broad concurrence by both local and national conservation agencies.

USACE guidance further requires that all mitigation lands be acquired prior to project construction and that mitigation measures be carried out before any construction or at least concurrently with other project features.

The Local Sponsor has already spent nearly $3 million dollars to acquire 355 acres of mitigation land at Hobart. The LCRBDC acquired those acres and was intimately involved in the years of negotiations that lead up to that acquisition. We have contracted and completed a field tile survey on all of those acres in preparation for subsequent mitigation. We are currently coordinating with the National Park Service on water drainage issues between USACE mitigation and NPS properties. USACE position is that we need to start to implement project mitigation soon to avoid falling further behind in the project schedule.

So that we may more succinctly address your desire to move ahead with our Little Calumet River mitigation obligation, we will schedule a conference call with you to initiate discussion on how best to move ahead with this important component of the flood control project. In anticipation of that conference call, we believe that it would be useful for you to provide a specific outline of any plans that you might have with respect to this issue to help us respond to them directly. If you have any questions or would like any further information, please contact Greg Moore of my staff at 312/846-5586 or at gregory.moore@usace.army.mil.

Sincerely,

Susanne J. Davis, P.E.
Chief of Planning Branch

Attachment:

9 December 2009 e-mail from LCRBDC Acting Director Ron McAhron seeking a revision to the Little Calumet River Flood Control Project mitigation at Hobart.

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

Can you have you mitigation guy give me a call so we can get together on the current committments? I would like to revisit the package with IDEM and our F&W guys and then have our folks look at options.

I agree opening the LCA would be a big deal but we may both need it.

Thanks

Ron McAhron
rmcahron@dnr.in.gov
Office (317) 232-1557
Cell (317) 696-9307

----- Original Message -----
From: Samara, Imad LRC <Imad.Samara@usace.army.mil>
To: McAhron, Ron
Sent: Mon Dec 07 09:32:57 2009
Subject: Follow up

I would also like to set up a meeting with you may in Indi to discuss how we move forward on wetland mitigation. I know in the scheme of things this is not a high priority but I feel if your ideas may result in LCA amendment we need to start soon.

Imad N Samara
Project Manager
USACE, Chicago District
Chicago, IL 60606
(W) 312-846-5560
(F) 312-353-4256
(Cell) 312-860-0123

Correspondence

Indiana State Historic Preservation Office

DNR Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Historic Preservation & Archaeology•402 W. Washington Street, W274 · Indianapolis, IN 46204-2739
Phone 317-232-1646•Fax 317-232-0693 · dhpa@dnr.IN.gov

February 29, 2012

Peter Bullock
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, 6th Floor
Chicago, Illinois 60606-7206

Federal Agency: U.S. Army Corps of Engineers, Chicago District

Re: Additional information regarding the Hammond floodwall tieback levee in regards to the proposed modifications to the 1982 Little Calumet Flood Control EIS (DHPA #12236)

Dear Mr. Bullock:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated October 12, 2011 and received on October 17, 2011, with subsequent materials dated and received on February 14, 2012; for the above indicated project in Gary, Hammond, and Munster, Lake County, Indiana.

Thank you for providing the requested materials. As previously stated, no currently known archaeological resources eligible for inclusion in the National Register of Historic Places have been recorded within the proposed project area. No archaeological investigations appear necessary provided that all project activities remain within areas disturbed by previous construction. Please be advised that archaeological resources may exist underneath modern development.

If any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations.

In regard to buildings and structures within the probable area of potential effects, we previously identified the Indi-Illi Park Historic District and the Roselawn-Forest Heights Historic District, both of which are in the process of being nominated to the National Register of Historic Places. In addition, we noted the Forest-Ivanhoe Residential Historic District, which was listed in the National Register of Historic Places on March 31, 2010; and the Forest-Southview Residential Historic District, listed in the National Register on September 23, 2010.

It is our understanding that the scope of work includes both temporary and permanent floodwalls. In the Hammond portion of the project, a temporary, removable floodwall would be placed on the pavement of Stateline Road during anticipated flood events. In addition, a permanent tieback floodwall will be constructed along the existing back property line of 7243 Forest Avenue, a contributing resource to the National Register listed Forest-Ivanhoe Residential Historic District. The proposed tieback floodwall to be constructed adjacent to 7243 Forest Avenue will extend 150 feet along the Illinois/Indiana state line from the existing levee on the south side of the property north to the actual end of the street (Forest Ave.) It will be constructed of steel, approximately 4 ft high, and have a rock facing for aesthetics.

However, based on the information provided to our office, we do not believe the characteristics that qualify the above identified historic properties for inclusion in the National Register will be diminished as a result of this project.

Bullock, Peter Y LRC

From: Padgett, Kim Marie [KPadgett@dnr.IN.gov]
Sent: Monday, October 17, 2011 3:39 PM
To: Bullock, Peter Y LRC
Subject: 1982 Little Calumet Flood Control EIS - Hammond Floodwall Tieback Levee

This notice is to inform you that your submission was received by the Indiana Division of Historic Preservation and Archaeology, the State Historic Preservation Office (SHPO) on October 17, 2011. Please know that we strive to respond to all review requests within 30 days or less. If you have not received a letter from the SHPO after 30 days and would like to request an update on the status of your review, please contact Chad Slider at cslider@dnr.in.gov or 317-234-5366. Please note that consultants working for INDOT/FHWA should contact the INDOT Cultural Resources Office with questions or status requests. Thank you.

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206

REPLY TO
ATTENTION OF

Planning Branch
Environmental Formulation Section

DNR
Division of Historic Preservation and Archaeology
402 W. Washington St.
W274
Indianapolis, IN 46204-2739
Attn. Dr. James Glass

Dear Dr. Glass: October 12, 2011

The Chicago District is happy to provide you with the information requested in your letter (September 28, 2011) regarding the Hammond floodwall tieback levee.

The Hammond, Indiana tieback levee is planned as a combination of both a temporary floodwall and a permanent floodwall. The temporary floodwall will be made out of 3 foot high concrete blocks that will resemble the concrete Jersey barriers used along highways. The temporary wall will not be in-place all the time, but would be place on the pavement of Stateline road only during flood events. When not in use, the blocks would be stored off site. During a major flood event when the river reaches a critical stage the City of Hammond would be notified that it is time to put the temporary floodwall in-place. The temporary blocks would be placed from just south of 172nd Place and continue north to 169th St. for a length of approximately 2400 ft when assembled, and on the south end would tie into a planned permanent section of floodwall

The permanent section of flood wall will be located at 7243 Forest Ave. Hammond, IN 4 6324. This wall will extend along the existing back property line for approximately 115 feet from the existing Forest Ave. levee, north to just south of 172nd Place. The permanent floodwall will be four feet high, and be comprised of steel sheet pile with a precast concrete face attached for aesthetics. The presence of the existing structures on the property will largely restrict the visibility of this wall to the general public.

No trees or shrubs can be planted within 15 ft of either side of the permanent floodwall. A map of this floodwall is included.

Please contact us if you have any additional questions or concerns, addressing your comments to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. Questions may be directed to Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

for Susanne J. Davis, P. E
Chief of Planning Branch

Enclosure

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206

MFR: Response to Indiana SHPO letter.

Bullock PM-PL-E 10/12/11

Fleming PM-PL-E

Samara PM-PM

Davis PM-PL-E 10/13/11
for

Hammond Tiebacks

U.S. Army Corps of Engineers Chicago District

Legend

- Road Closures

Protected Area - Levee Segments

- Marshalltown
- INDOT
- Gary South
- Gary North
- Gary Burr Street
- Griffith River Road Levee
- Highland
- Munster
- Hammond
- Forest Ave
- dashed line - under construction

Closure Proposed

- Permanent Floodwall
- Temporary Floodwall

Date: 10/12/2011

N
W E
S

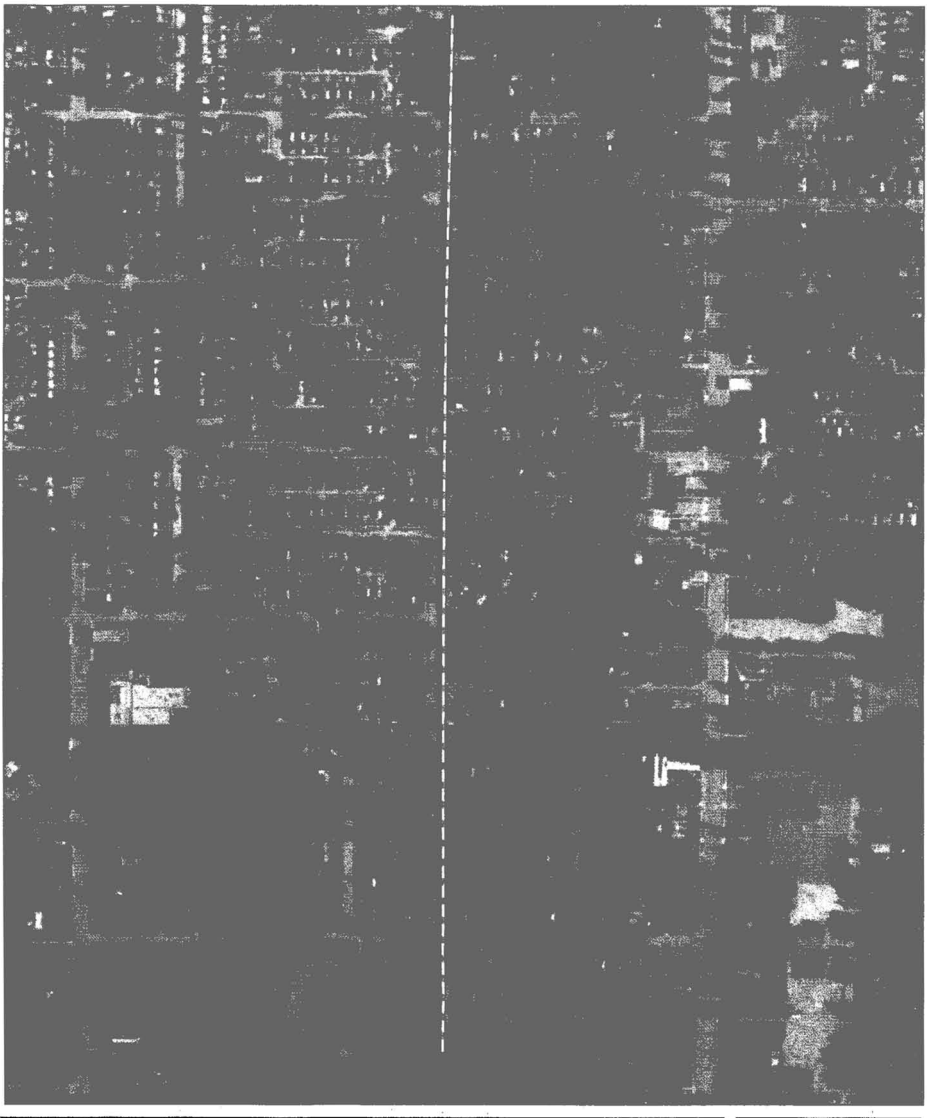
1 IN = 100 FT

Coordinate System: GCS North American 1983
Datum: North American 1983

Path: J:\Working\StatelineTiebacks.mxd

Hammond Tiebacks

U.S. Army Corps of Engineers
Chicago District



Legend

- Road Closures

Protected Area - Levee Segments

- Marshalltown
- INDOT
- Gary South
- Gary North
- Gary Burr Street
- Griffith River Road Levee
- Highland
- Munster
- Hammond
- Forest Ave
- dashed line - under construction

Closure Proposed

- Permanent Floodwall
- Temporary Floodwall

Date: 10/12/2011

N
W E
S

1 IN = 550 FT

Coordinate System: GCS North American 1983
Datum: North American 1983

Path: J:\Working\StatelineTiebacks.mxd

DNR Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Historic Preservation & Archaeology•402 W. Washington Street, W274 · Indianapolis, IN 46204-2739
Phone 317-232-1646•Fax 317-232-0693 · dhpa@dnr.IN.gov

September 28, 2011

Peter Bullock
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, 6th Floor
Chicago, Illinois 60606-7206

Federal Agency: U.S. Army Corps of Engineers, Chicago District

Re: Environmental Assessment for proposed modifications to the 1982 Little Calumet Flood Control EIS (DHPA #12236)

Dear Mr. Bullock:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated August 26, 2011 and received on August 30, 2011, for the above indicated project in Gary, Hammond, and Munster, Lake County, Indiana.

In terms of archaeology, no currently known archaeological resources eligible for inclusion in the National Register of Historic Places have been recorded within the proposed project area. No archaeological investigations appear necessary provided that all project activities remain within areas disturbed by previous construction. Please be advised that archaeological resources may exist underneath modern development.

If any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations.

In regard to buildings and structures within the probable area of potential effects, we have identified the following districts [per the 1997 *Lake County Interim Report* and the State Historic Architectural and Archaeological Research Database (SHAARD) www.in.gov/dnr/historic/4505.htm.] which are in the process of being nominated to the National Register of Historic Places:

Indi-Illi Park Historic District, roughly bounded on the north by Locust Street, on the east by Hohman Avenue, on the south by 169th Street, and on the west by State Line Avenue, Hammond (IHSSI Site #089-090-49001-113).

Roselawn-Forest Heights Historic District, roughly bounded on the north by 169th Street, on the east by Hohman Avenue, on the south by 172nd Street, and on the west by State Line Avenue, Hammond, (IHSSI Site #089-090-50001 -153).

In addition, we noted the following districts in the probable area of potential effects that are listed in the National Register of Historic Places:

Forest-Ivanhoe Residential Historic District , roughly bounded by 172nd Place to the north; Hohman Avenue to the east; and the Little Calumet River to the west, listed March 31, 2010.

Forest-Southview Residential Historic District ,roughly bounded by 165th Street, Locust Street, Hohman Avenue, and State Line Avenue, Hammond, listed September 23, 2010.

Based on the information provided to our office, we were not able to assess the potential effects on identified historic properties as a result of constructing the three tieback levees. To enable us to provide views on the effects 36 C.F.R. § 800.4(d)(2) for your agency, please provide the following information:

1) What portion of the project will be visible from historic properties? What will be the depth and height of the proposed tieback levees to be constructed?

2) What type and materials will be used to construct the tieback levees? If available, please provide information on the aesthetic appearance of the levees.

3) Will vegetation or other landscape features be altered or removed as part of the project modification?

4) Please provide plans and elevation drawings of the proposed tieback levees, if available.

Once the indicated information is received, the Indiana SHPO will resume identification and evaluation procedures for this project. Please keep in mind that additional information may be requested in the future.

A copy of the revised 36 C.F.R. Part 800 that went into effect on August 5, 2004, may be found on the Internet at www.achp.gov for your reference. If you have questions about archaeological issues please contact Cathy Draeger-Williams at (317) 234-3791 or cdraeger-williams@dnr.IN.gov. If you have questions about buildings or structures please contact Chad Slider at (317) 234-5366 or cslider@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA #12236.

Very truly yours,

James A. Glass, Ph.D.
Deputy State Historic Preservation Officer

JAG:CDW:CWS:cws

Bullock, Peter Y LRC

From:	Bullock, Peter Y LRC
Sent:	Tuesday, February 14, 2012 10:21 AM
To:	'cslider@dnr.IN.gov'
Cc:	Davis, Susanne J LRC; Fleming, Eugene J LRC; Samara, Imad LRC; Mills, Natalie R LRC; Cunningham, Matthew W LRC
Subject:	DHPA #12236 Hammond Floodwall (UNCLASSIFIED)
Attachments:	3-IMG-20120213-00103.jpg; 6-North-20120213-00109.jpg; 7-North-20120213-00122.jpg; 8-North-20120213-00112.jpg

Classification: UNCLASSIFIED
Caveats: NONE

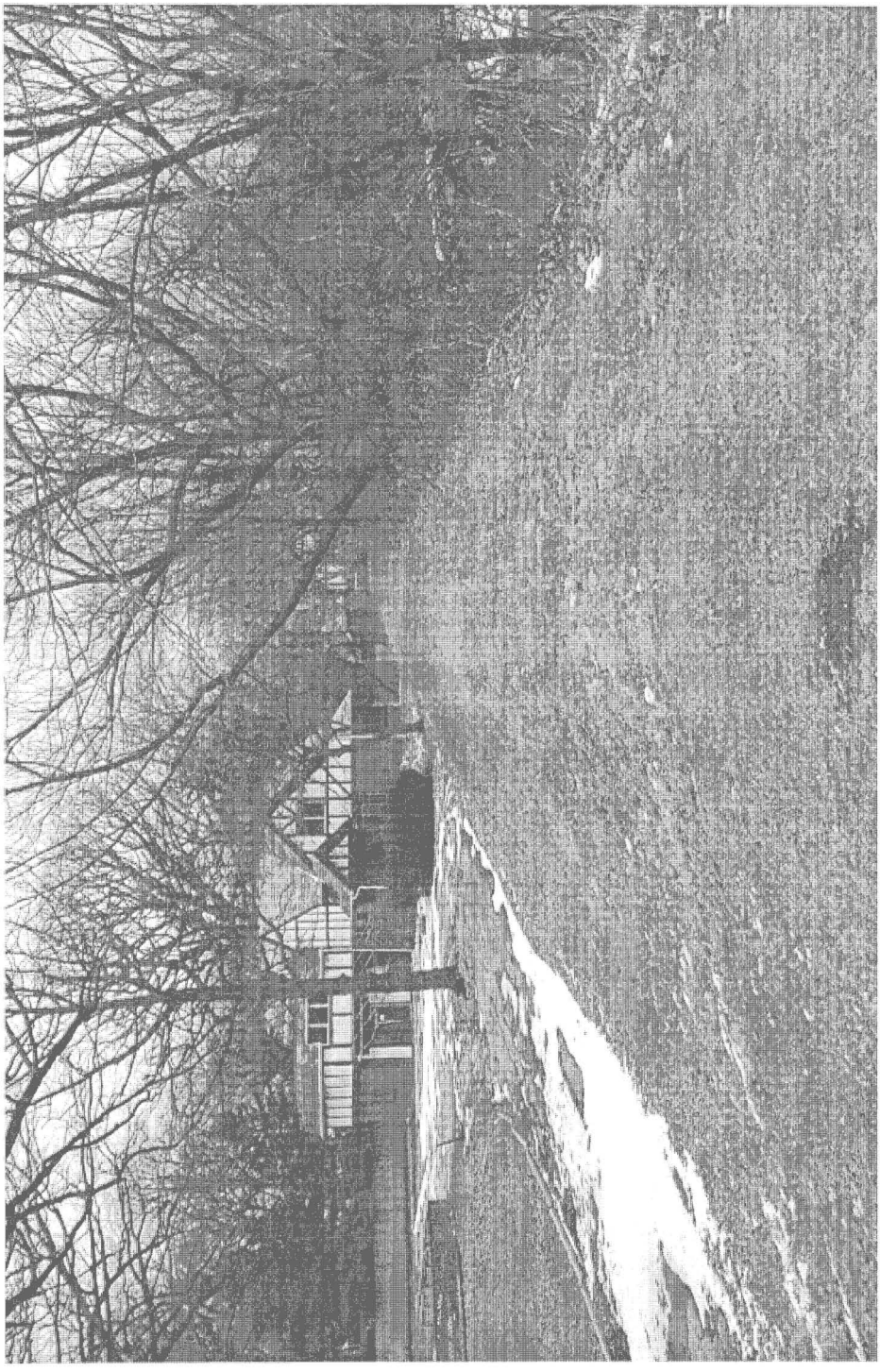
Classification: UNCLASSIFIED
Caveats: NONE

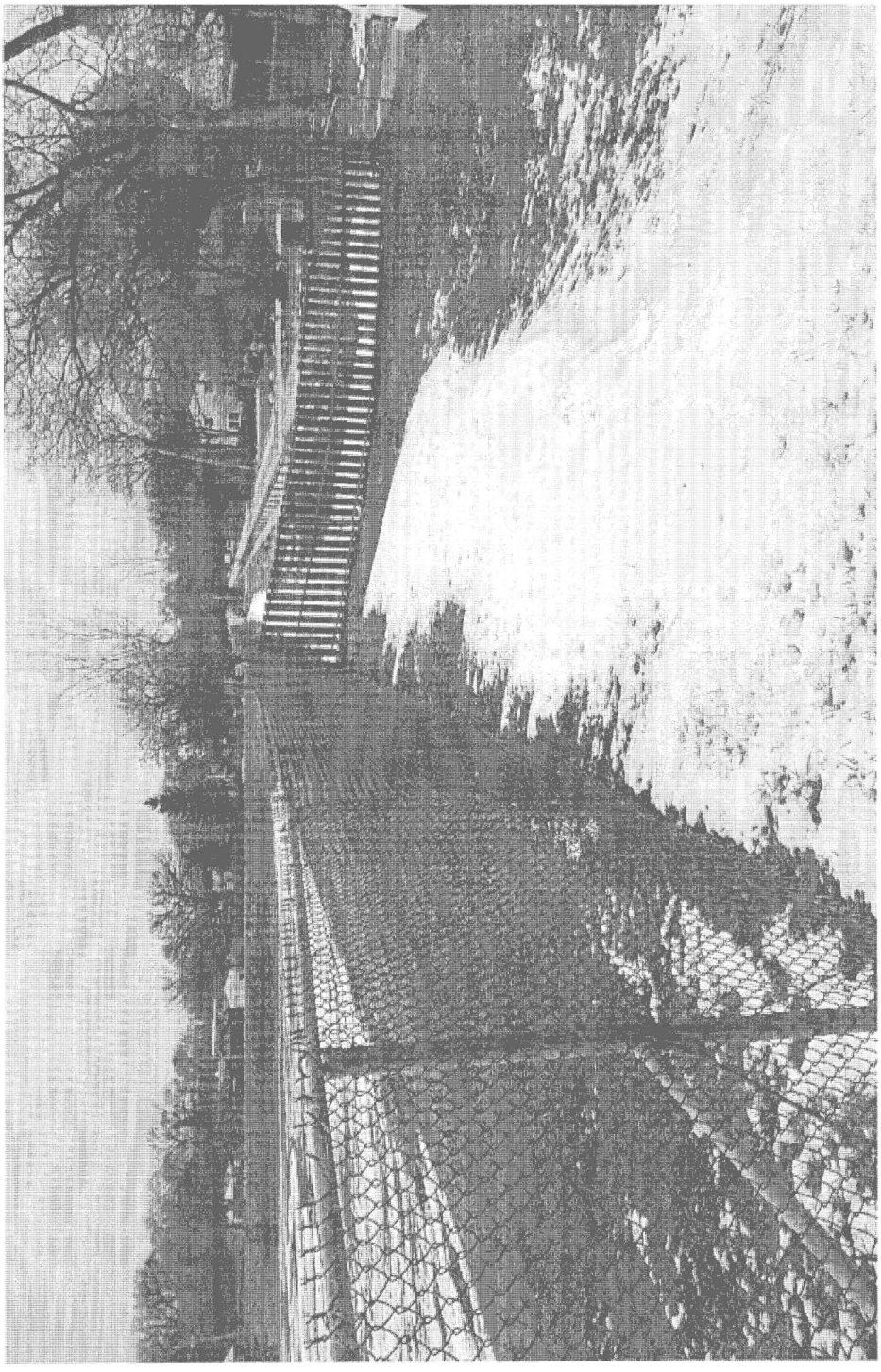
Mr. Slider, Here are the photos requested by your office showing the location of floodwall planned for the property at 7243 Forest Ave. The floodwall will located just east of the existing chain link fence and extend for approximately 150 feet along the Illinois/Indiana state line from the existing levee on the south side of the property north to the actual end of the street (Forest Ave.). The wall be steel, approximately 4 ft high, but facing the house it will have a concrete facing with an impressed design to make it resemble rock.

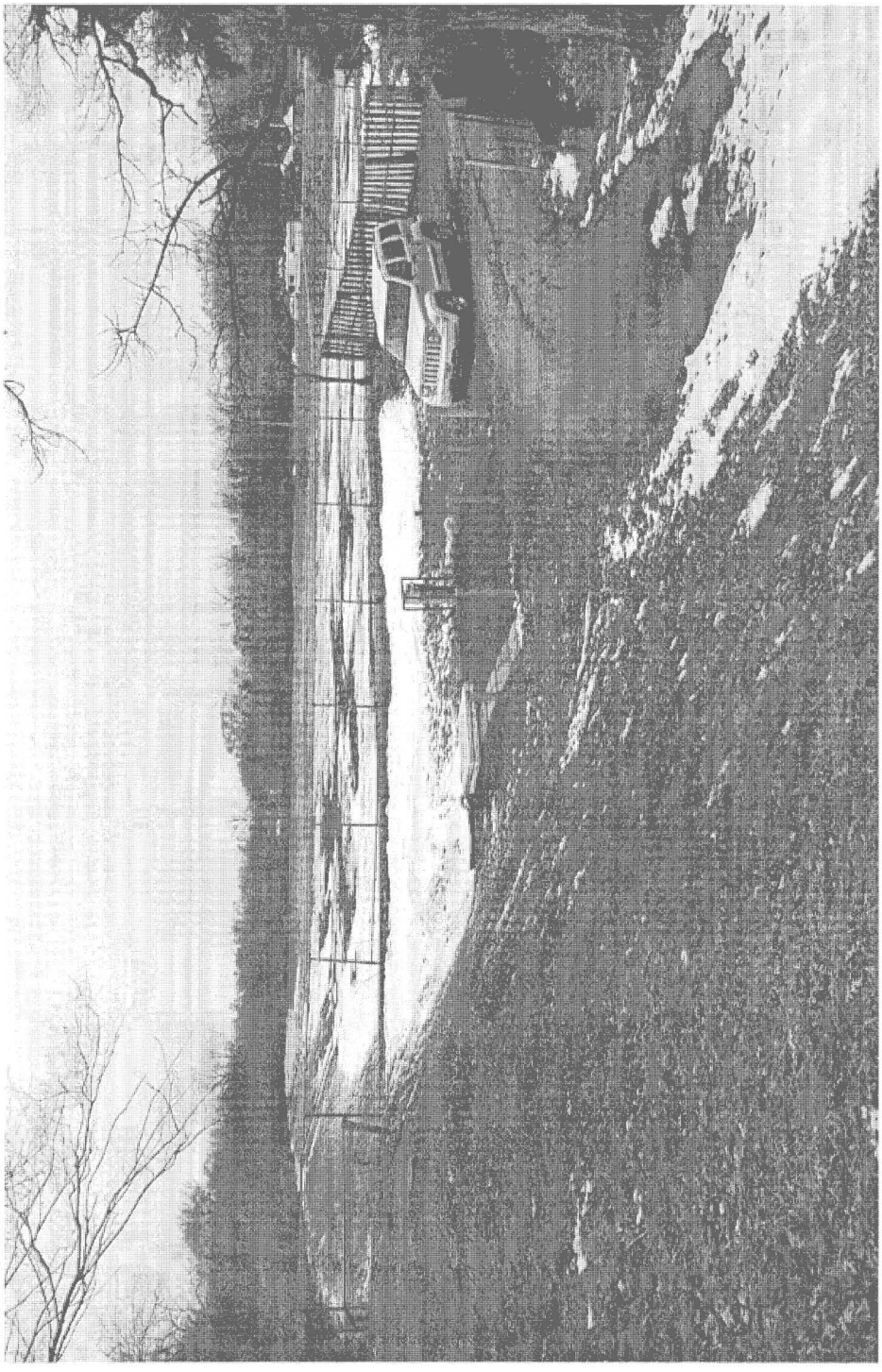
Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

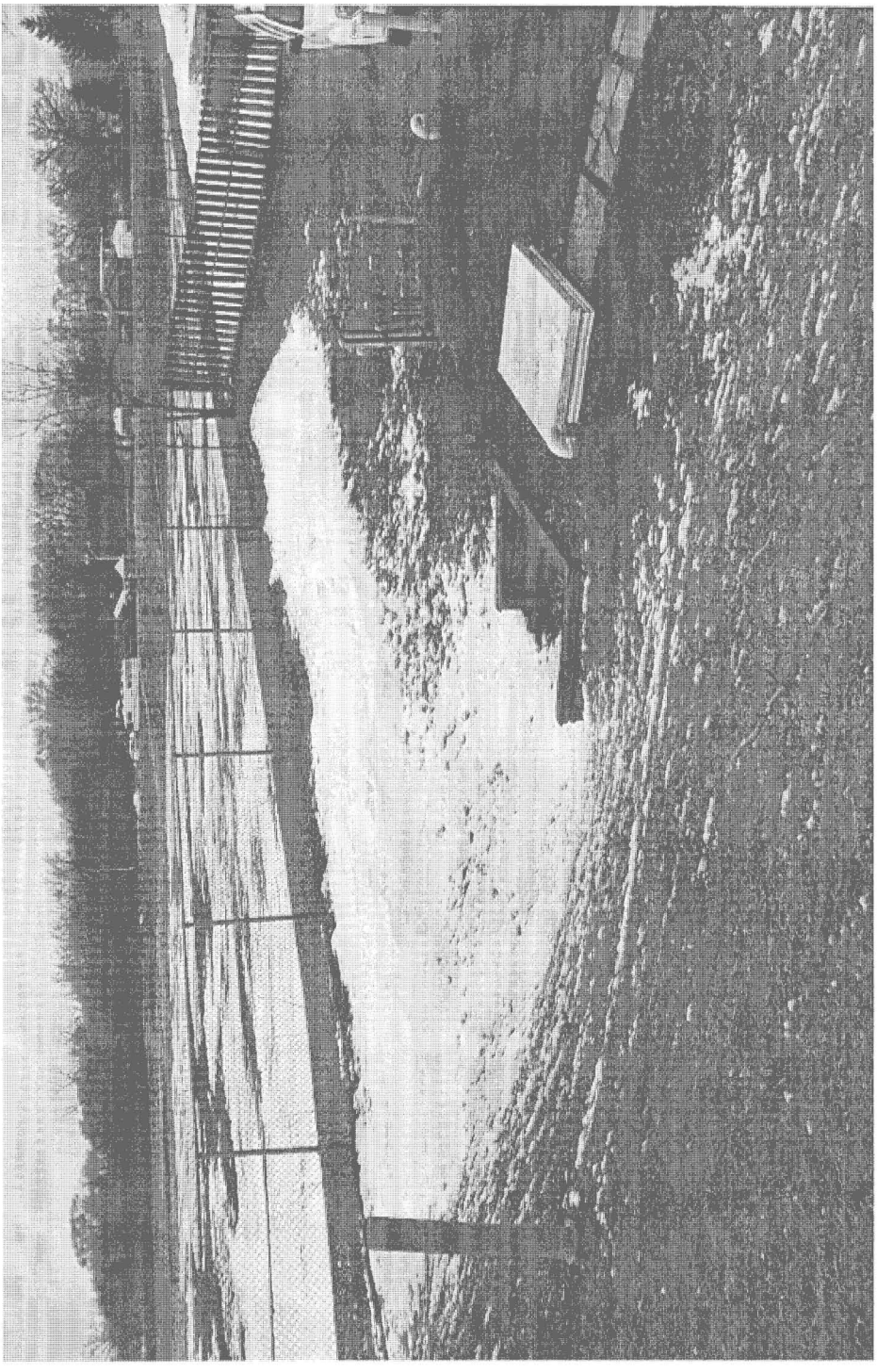
Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE









APPENDIX 3
HTRW

CELRC-TS-HE

MAY 17 2011

MEMORANDUM FOR CELRC-PM-PM (Samara)

SUBJECT: HTRW Update for Little Calumet River Tieback & Access Ramps Project

1. This document covers an HTRW Update performed by TS-DH in preparation of the Little Calumet River Levee Tiebacks and Access Ramps project. Previous HTRW investigations in these areas were last conducted between 1994 and 2005. No significant HTRW issues were identified in the current project areas by these previous investigations.

2. An EDR database search of the eastern project sites and online database search of western sites revealed a number of LUST, RCRA, and other remediation sites within the ASTM-established search distances. Upon further research of these regulated sites, none are believed to pose an HTRW risk to the project.

3. During an April 29, 2011 site visit, significant debris from illegal open dumping was found at the Ironwood Park tieback site and at the access ramp location on the west side of Georgia Street. All garbage and debris in the construction path shall be cleared and properly disposed of by the contractor. The west Georgia Street access ramp entrance may require a gate or other security measures to prevent the site attracting illegal dumping once the project is completed.

4. If there are any questions regarding this HTRW investigation, please contact Jennifer Raber at (312) 846-5504, jennifer.r.raber@usace.army.mil.

Jay A. Semmler, P.E.
Chief, Hydraulic & Environmental
Engineering Section

UPDATED HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) AND NON-HTRW INVESTIGATION

LITTLE CALUMET RIVER LOCAL FLOOD PROTECTION LEVEE TIEBACKS & RIVER ACCESS RAMPS PROJECT

Hydraulic and Environmental Engineering Section (TS-DH)
U.S. Army Corps of Engineers, Chicago District

May 2011

UPDATED HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) AND NON-HTRW INVESTIGATION
LITTLE CALUMET TIEBACKS & RIVER ACCESS RAMPS

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INTRODUCTION

Previous HTRW investigations for the work areas included in the Little Calumet River Local Flood Protection Levee Tiebacks & Access Ramps project were conducted between 1994 and 2005. The Ironwood Park area was investigated as a part of Stage II, Phase 4 in an HTRW investigation in March 1998. The vicinity of the western tieback sites and ramps was investigated most recently in a 2005 HTRW Update, which was an update to the original 1994 HTRW Investigation for the LCR West Reach.

ASTM Standard E 1527 for a Phase I Environmental Site Assessment indicates that a Phase I investigation meeting or exceeding standard guidelines should be updated if after a period of six months or more, according to judgment of the user, environmental conditions in connection with the property could have changed since the previous evaluation. Given the known site conditions and the amount of time that has passed since previous site investigations were performed, TS-DH concluded that the HTRW report should be updated through a site visit and new database search.

The purpose of this document is to discuss the hazardous, toxic, and radioactive waste (HTRW) investigation update for the LCR Tiebacks project. Non-HTRW environmental issues are also investigated. This text will describe the methods employed while conducting the investigation, and identify any associated environmental issues. It is the ultimate goal of this report to provide conclusions and recommendations regarding potential HTRW impacts associated with proposed construction.

AUTHORITY

Engineer Regulation (ER) 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works projects, requires that a site investigation be conducted as early as possible to identify and evaluate potential HTRW problems. According to ER 1165-2-132, non-HTRW issues that do not comply with the federal, state, and local regulations should be discussed in the HTRW investigation along with HTRW issues. Therefore, HTRW and non-HTRW issues identified are discussed in this report.

No HTRW investigation can wholly eliminate uncertainty regarding the potential for HTRW associated with a project area. Performance of the HTRW investigation is intended to reduce, but not eliminate, uncertainty regarding the potential for HTRW in connection with a project area, and this practice recognizes time and cost constraints.

GUIDANCE

Primary guidance for the investigation was the U.S. Army Corps of Engineer's Engineering Regulation (ER) 1165-2-132. The objective of ER 1165-2-132 is to outline procedures to facilitate early identification and appropriate consideration of HTRW

problems. This investigation, therefore, identifies potential HTRW problems and discusses resolutions and/or provides recommendations regarding the HTRW problems identified.

Supplemental guidance was provided by the Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process (Designation: E 1527-94) prepared by American Society for Testing of Materials (ASTM). These standards include a record review, site reconnaissance, interviews, database searches, and report preparation guidelines.

According to ER 1165-2-132, non-HTRW environmental issues that do not comply with federal, state and local regulations should be discussed in the HTRW investigation along with HTRW issues. For example, solid waste is a non-HTRW issue that was considered. Therefore, non-HTRW and HTRW issues identified are discussed in this report.

LAWS AND REGULATIONS

Federal

The definition of HTRW according to ER 1165-2-132, page 1, paragraph 4(a) is as follows: "Except for dredged material and sediments beneath navigable waters proposed for dredging, for purposes of this guidance, HTRW includes any material listed as a 'hazardous substance' under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 et seq (CERCLA). (See 42 U.S.C. 9601(14).) Hazardous substances regulated under CERCLA include 'hazardous wastes' under Sec. 3001 of the Resource Conservation and Recovery Act, 42 U.S.C. 6921 et seq; 'hazardous substances' identified under Section 311 of the Clean Air Act, 33 U.S.C. 1321, 'toxic pollutants' designated under Section 307 of the Clean Water Act, 33 U.S.C. 1317; 'hazardous air pollutants' designated under Section 112 of the Clean Air Act, 42 U.S.C. 7412; and 'imminently hazardous chemical substances or mixtures' on which EPA has taken action under Section 7 of the Toxic Substance Control Act, 15 U.S.C. 2606; these do not include petroleum or natural gas unless already included in the above categories. (See 42 U.S.C. 9601(14).)"

As stated in the definition of hazardous substance in the Environmental Statutes, 1988 Edition, the term does not include petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance under the definition. Underground Storage Tanks (USTs) are federally regulated under 40 CFR Part 280, which includes technical standards and corrective action requirements for owner and operators of USTs.

State

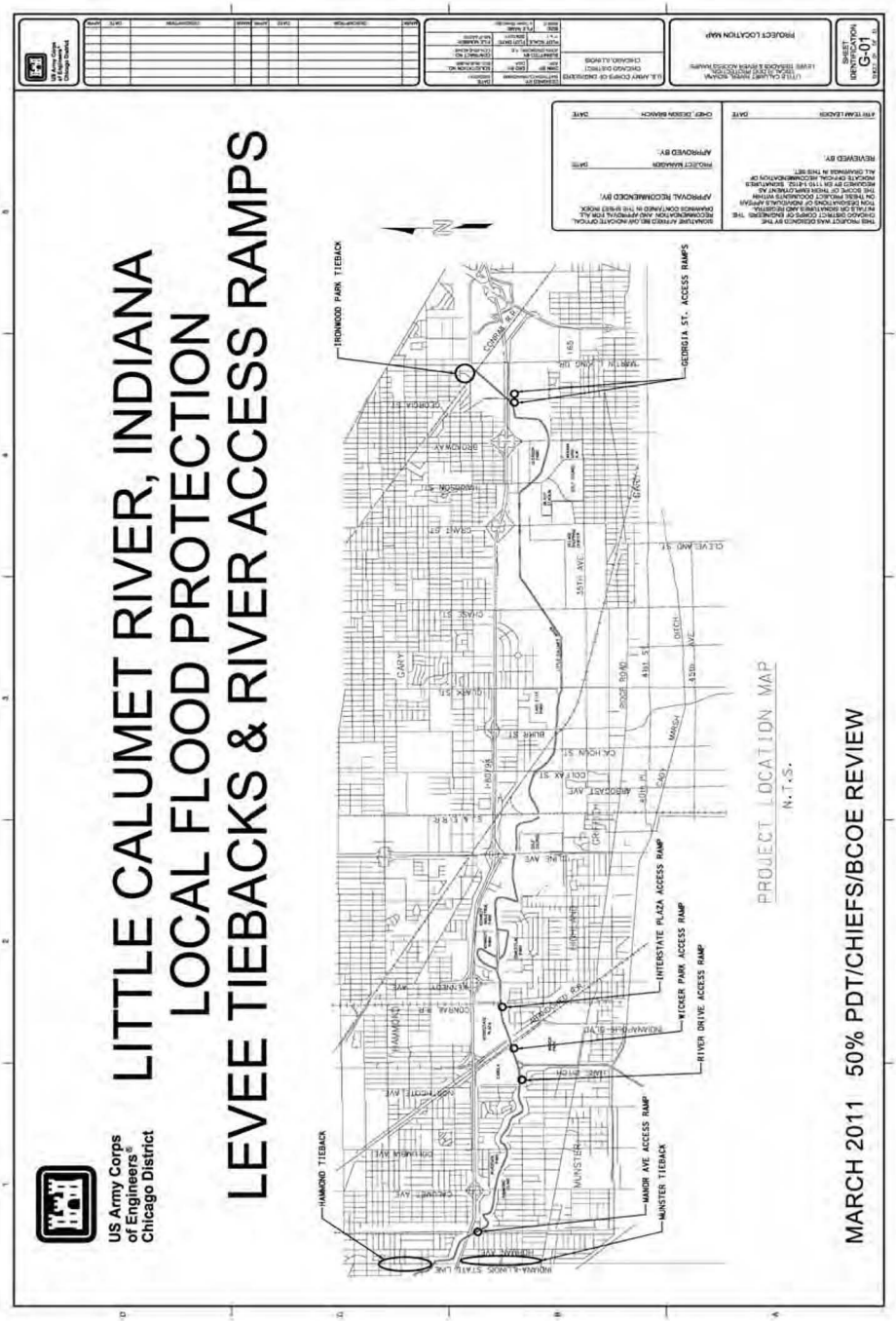
The regulations for the State of Indiana were examined to determine possible impacts of USTs on the project area. Indiana regulates USTs under Indiana Administrative Code,

Title 13, Article 23, Underground Storage Tanks. In addition to this state regulation, the Indiana Department of Environmental Management (IDEM) publishes a LUST manual to provide an instructive guide to leaking tank owner's/operator's responsibilities. These guidelines are intended for use in conjunction with the state and federal regulations. Additionally, a search was carried out for Landfill, Hazardous Waste Disposal, and members of the Indiana Voluntary Remediation Site Program (VCP) List.

SITE DESCRIPTION

This HTRW investigation covers levee tiebacks and access ramps to be constructed in various locations along the Little Calumet River levee system in northwest Indiana (see Figure 1). The eastern tieback is located along a set of railroad tracks near the Ironwood pump station. The site is near a park, and is not densely developed. The western tiebacks are located along State Line Road, both north and south of the river. These are located in residential areas. The ramps are all located adjacent to the river, and the local setting varies with each ramp.

Figure 1: Levee Tiebacks and Access Ramps Location Map



PROJECT DESCRIPTION

The Little Calumet River Tieback & River Access Ramps project consists of floodwall construction along State Line Road in Hammond, water bladder installation along State Line Road in Munster, clay seal embankment and cutoff wall construction along a set of railroad tracks in Gary. River access ramps are also to be constructed at Georgia Street (Gary), Interstate Plaza (Highland), Wicker Park (Highland), River Drive (Munster), and Manor Avenue (Munster).

GENERAL METHODS

This assessment relies primarily on the location of regulated sites within the immediate vicinity of the project area identified in the database search, a review of existing information, and information gathered during a site visit. The following sections contain information that was gathered in accordance with ER 1165-2-132. The information was obtained from:

- Review of existing information.
- Database search performed by Environmental Data Resources, Inc. (EDR) for eastern work areas.
- Database search utilizing USEPA EnviroMapper and IndianaMap.org for western work areas.
- Observations made during a site visit on April 29, 2011.

REVIEW OF EXISTING INFORMATION

The Ironwood Park area was investigated as a part of Stage II, Phase 4 in an HTRW investigation from March 1998. This investigation pre-dated use of comprehensive EDR Database Searches, relying instead upon information provided by USEPA, IDEM, and other governmental entities. The report referenced a 1993 site visit, which noted roadside dumping in the vicinity. No other HTRW sites or concerns were noted for the area where construction is currently being proposed.

The vicinity of the western tieback sites and ramps was investigated most recently in a 2005 HTRW Update, which was an update to the original 1994 HTRW Investigation for the LCR West Reach. This investigation did utilize an EDR Database Search, which revealed a number of sites of potential concern, although all sites were concluded to not pose an HTRW concern to the project.

Numerous illegal and previously unidentified dumps have been encountered during construction of various stages of the Little Cal project. A review of project files indicated that none of the illegal dumps were located on or near any of the tieback or ramp sites being investigated.

EDR DATABASE SEARCH

A search of available environmental records was conducted utilizing Environmental Database Resources, Inc. (EDR) services for the Ironwood Park Tieback and Georgia Street Access Ramp sites. EDR searched federal and state databases using the minimum search distances issued in the ASTM E 1527-00 guidelines. The standard search radii were extended by ½ mile to cover the ramps and the tieback sites. Table 1 notes the recommended ASTM search distance for federal and state databases.

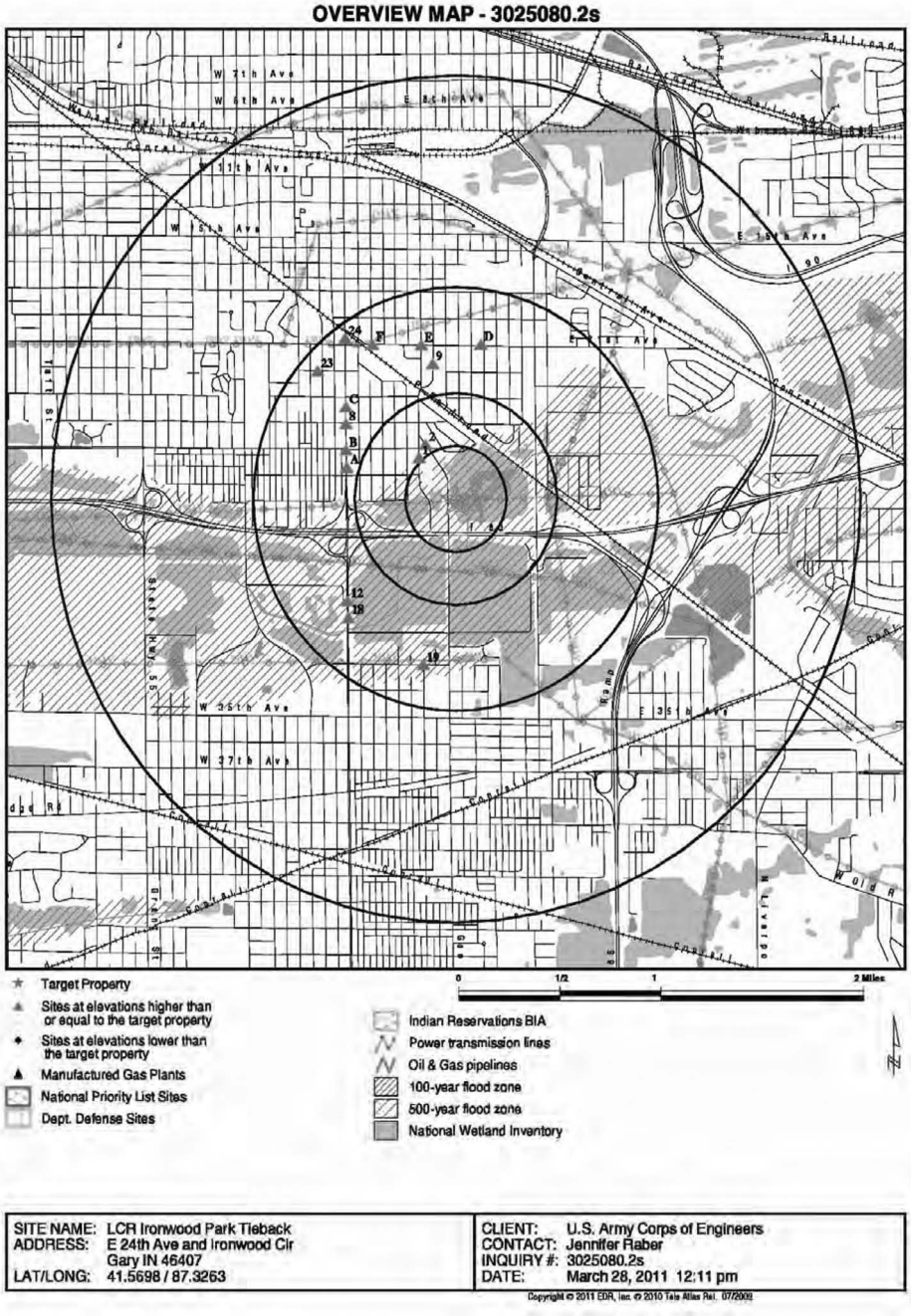
Table 1: Minimum Search Distance for Federal and State Database Searches

Database	Approximate Minimum Search Distance (mi)
Federal NPL Site List	1.0
Federal CERCLIS List	0.5
Federal CERCLIS NFRAP site list	Property and Adjoining Properties
Federal RCRA CORRACTS Facilities List	1.0
Federal RCRA non-CORRACTS TSD Facilities List	0.5
Federal RCRA Generators List	Property and Adjoining Properties
Federal ERNS List	Property Only
State Equivalent NPL	1.0
State Equivalent CERCLIS	0.5
State Landfill/Solid Waste Disposal Site Lists	0.5
State LUST Lists	0.5
State registered UST List	Property and Adjoining Properties

The EDR overview map displaying the project area and the search results are given in Figure 2. Additional "orphan" sites were returned by the search, but were not mapped due to poor or inadequate address information. These site locations were verified using online maps, and sites falling within the recommended minimum search distance are included in the discussion of results below.

Sites identified in the EDR search were further investigated by searching the online IDEM Virtual File Cabinet for relevant reports, data, and correspondences.

Figure 2: EDR Overview Map



CERCLIS

The Comprehensive Environmental Response, Compensation, and Liability, Information System (CERCLIS) contains data on any potential hazardous waste site that has been reported by states, municipalities, private companies, or private persons pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The CERCLIS database indicates the stages of evaluation and remediation that have been completed for any given site. The CERCLIS database includes the National Priority List (NPL), which identifies over 1,200 sites for priority cleanup under the Superfund program, and the CERCLIS-No Further Remedial Action Planned (NFRAP) List, which includes a listing of sites that have been removed from CERCLIS, for various reasons. The database search located one CERCLIS site and one CERCLIS-NFRAP sites within the search distance, summarized in Table 2, below. No NPL sites were located within the search distance.

Table 2: CERCLIS Search Results

Map ID	Database	Site Name	Proximity to Site (Address)	Status
F20-22	CERCLIS, Brownfields	Bear Brand Hosiery Company	½ - ¾ mile NW (205 E 21st St)	1996 drum and contaminated soil removal; 2008 brownfield grant application for UST removal, asbestos abatement
Orphan	CERC-NFRAP	Topo Site #15C #83, Topo Site #15D #84	½ mile SW (26th St & Virginia, 27th St & Maryland)	1983 report of household trash; **NFRAP**

The Bear Brand Hosiery Company site is a former hosiery manufacturing plant which has been vacant for over 35 years. USEPA removed drums and contaminated soil from the site in 1996. As of November 2008, the site owner had applied for a USEPA Brownfields grant for UST removal and asbestos abatement for building demolition. This site does not appear to pose an HTRW risk to the project.

The Topo Sites were investigated in 1983, and showed only household trash to be present. Following this investigation, the sites were given NFRAP status, and do not pose an HTRW risk.

RCRIS

The Resource Conservation and Recovery Information System (RCRIS) lists sites which generate, transport, store, and/or dispose of hazardous waste defined by the Resource Conservation and Recovery Act (RCRA). The RCRIS database includes RCRA Corrective Action Report (CORRACTS), which identify hazardous waste handlers with RCRA corrective action activity; RCRA treatment, storage, and disposal facilities (TSDFs), and RCRA conditionally exempt small quantity generators (CESQGs), RCRA small quantity generators (SQGs), and large quantity generators (LQGs) facilities. The

database search located two RCRA-CESQG facilities within the search distance, summarized in Table 3 below. No SQG, LQG, RCRIS CORRACTS or RCRA TSDF sites were located within the search distance.

Table 3: RCRIS Search Results

Map ID	Database	Site Name	Proximity to Site (Address)	Status
9	RCRA-CESQG, Manifest	St John Homes Apartments	¼ - ½ mile NW (3173 Carolina St)	Historic SQG, current CESQG; Violations noted
C10-11	RCRA-CESQG, Drycleaners	Midtown Laundry Cleaners	½ - ¾ mile W (2337 Broadway)	2001 administrative violation

The St. John Homes Apartments site was listed as a historic SQG and current CESQG. Several violations were found. The site also returned manifest records for generation of lead-containing hazardous waste in 2006. The records did not reveal any information that would suggest this site poses an HTRW concern.

The Midtown Laundry Cleaners was listed as a CESQG, and also turned up in the Drycleaners database. The facility had one administrative violation in 2001. The site does not appear to pose an HTRW concern.

Several other RCRA-CESQG, RCRA-NonGen, and Manifest records were also returned with no violations, which are not an HTRW concern.

ERNS

The Emergency Response Notification System (ERNS) database lists information on reported releases of oil and hazardous substances. The database search yielded no ERNS reports on the subject property.

LUST/UST

The underground storage tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). A listing of underground storage tanks (UST) was obtained from the Indiana Department of Environmental Management (IDEM). The database search located five LUST facilities (one of which was also an UST) within the recommended search distances. See Table 4 for a summary of information obtained from the database search.

Table 4: LUST/UST Search Results

Map ID	Database	Site Name	Proximity to Site (Address)	Status
D14	LUST	Ali Gas & Mini Mart / Marathon Food Mart	¼ - ½ mile N (1001 E 21st Ave)	Tank registration violations, 2010 gasoline leak; **GW not impacted**
A5	LUST	0213 Clark Service Station	½ - ¾ mile W (2569 S Broadway)	1986 gasoline leak contaminating soil and GW; remediation underway, GW below remediation criteria
Orphan	LUST, UST	Shell Station 3168-14 / Gas 4 Less	½ - ¾ mile W (2389 Broadway)	1999 gasoline, diesel leak; soil impacted, GW unknown; low priority
19	LUST	Fire Station #10	¼ - ½ mile S (3300 Virginia)	1992 gasoline, heating oil leak; **GW not impacted**, low priority cleanup
18	LUST	Lovely Mobil Inc.	¼ - ½ mile W (3077 Broadway)	1992/1996 gasoline leak impacting soil, GW; site remediated, **NFA 2005**

The IDEM Virtual File Cabinet was searched for additional details on the LUST sites. Of the five sites, only the Lovely Mobil Inc. site has received NFA. Investigations of the Ali Gas & Mini Mart site and Fire Station #10 concluded that groundwater has not been impacted, and therefore these pose no concern to the project. Ongoing remediation and monitoring at the Clark Service Station has shown GW to be below the remediation criteria for the site. Information regarding contamination the Shell Station is incomplete, as the property owner has failed to fully characterize impacts from the LUST. However, the site is listed as a low priority for cleanup, which combined with the fact that it is located approximately ½ mile or more from the project site, indicates this site does not pose an HTRW concern to the project.

Other Databases

Various other databases are searched that include supplemental information to the above databases, including: CERCLA consent decrees, National Priority list deletions, Nuclear Regulatory Commission's database of sites possessing radioactive materials, Superfund Liens, PCB Activity Database, Department of Defense sites, Toxic Chemical Release Inventory, FIFRA/TSCA tracking system, oil and gas pipelines, electric transmission lines, sensitive receptors, flood zone data, the national wetlands inventory, and others. The search of these databases returned several sites, summarized in Table 5, below.

Table 5: Other Search Results

Map ID	Database	Site Name	Proximity to Site (Address)	Status
2	SWRCY	New View Disposal Service	¼ mile W (2485 Ellis Ave)	**Unknown**
D15	Brownfields	1022 E 21st St	¼ - ½ mile N (1022 E 21st St)	Former gas station, possible USTs remaining as of 2008
12	SCP	INDOT Merriville	¼ - ½ mile W (30th & Broadway)	**Unknown**

The New View Disposal Service was found in the SWRCY database, which is a list of Indiana recycling facilities. No further details could be found on this site. New View Disposal Service was flagged for further investigation in a site visit.

The 1022 E 21st St site was listed in the state Brownfields database. A 2008 site investigation indicated the site was a former gas station, which may possibly have USTs remaining underground. As the 2008 investigation and other records show no LUST history at the site, it does not appear to pose an HTRW risk.

The INDOT Merriville site was listed in the State Cleanup Section database. No further details could be found on this site, and it was therefore flagged for further investigation in a site visit.

ONLINE DATABASE SEARCH

A new EDR Database Search was not obtained for the tieback and ramp sites on the western end of the project area, as a database search had been obtained and reviewed for this area somewhat recently (2005). The IndianaMap.org GIS mapping website was reviewed for new or previously unidentified regulated sites near the work sites. The mapping tool included many categories of regulated sites, including LUSTs, USTs, voluntary remediation program sites, brownfields, corrective action sites, cleanup sites, institutional controls, manufactured gas plants, old landfills, solid waste landfills, tire waste sites, open dump waste sites, construction demolition waste sites, restricted waste sites, and industrial waste sites. USEPA EnviroMapper website was utilized to search for CERCLIS regulated sites and Brownfields, but no additional sites were found. The IDEM Virtual File Cabinet was also searched for updated information on sites identified in the 2005 database search, as well as further details on sites identified by the IndianaMap website. Sites of potential concern are summarized in Table 6, below.

Table 6: Online Database Search Results

Database	Site Name	Proximity to Site	Status
Sites in vicinity of Hammond Tieback			
LUST	Meiers Amoco / Amoco Service Station 18523	<¼ mile E (6906 Hohman Ave)	1991 LUST; remediation, monitoring underway; GW exceeds RISC industrial closure levels for benzene as of Jan 2011; GW flow to NE
LUST	Marathon Unit #3181	½ mile NE (220 165th St)	**NFA 2001**
Sites in vicinity of Munster Tieback			
LUST	Munster Car Wash	<¼ mile E (111 Ridge Rd)	**NFA 1999**
RCRA-CESQG	Pride Cleaners	<¼ mile E (132 Ridge Rd)	2002 administrative violation
LUST, RCRA	Phillips Petroleum	¼ - ½ mile E (323 Ridge Rd)	**GW impacted by gasoline, MTBE; GW flow to NW**
LUST	Speedway #7680	<¼ mile E (444 Ridge Rd)	1994 LUST; Remediation underway; GW impacts limited to one well N of site
UST	Tri-City Plaza Partnership	<¼ mile E (8 Beverly Pl)	**UST removed 1992**
Sites in vicinity of Manor Ave Ramp			
State Cleanup	Melody Cleaners Hammond 2	½ mile NW (7501 Calumet Ave)	GW impacted by PCE, TCE, VOCs; flows to NW, E
VRP	Monon Rail Yard	<¼ mile NE (173rd St to I-80/94, btw Lyman & Harrison Aves)	Former rail yard with diesel ASTs; **VRP completion 1997**
Sites in vicinity of River Drive Ramp			
LUST, State Cleanup	Woodmar County Club	½ mile N (1818 177th St)	2003 fuel oil leak; extent of soil/GW impacts not known due to inadequate site assessment
Sites in vicinity of Wicker Park Ramp			
VRP, Inst Controls	Burger King	<¼ mile N (7843 Indianapolis Blvd)	Former gas station (1983); **VRP completion 2009**
LUST, UST	Pilot Travel Centers #031	¼ mile SE; ¼ mile SW of Interstate Plaza Ramp (8150 Indianapolis Blvd)	1994, 1995 LUSTs resulting in GW contamination; remediation, monitoring underway
Sites in vicinity of Interstate Plaza Ramp			
IN Spills	KMART #4148	¼ - ½ mile W (7925 Indianapolis Blvd)	Determined not a concern in prev HTRW; no further info found
IN Spills	(Unnamed)	¼ - ½ mile E (7900 Kennedy Ave)	Determined not a concern in prev HTRW; no further info found

One unremediated LUST, Meiers Amoco, was located in the vicinity of the Hammond tieback. This site is currently undergoing remediation and monitoring of contaminated groundwater. Benzene levels remain above RISC industrial closure levels at the site. A January 2011 monitoring report indicated groundwater at the site is flowing to the northeast, away from the tieback project site. It is therefore unlikely that contaminated groundwater originating from this site will be encountered in construction.

A number of sites were identified in the vicinity of the Munster tieback, including a Phillips Petroleum LUST that has impacted area groundwater. However, because the Munster tieback is currently planned to consist of water bladders to be filled in an emergency (no earthwork is required), no subsurface contamination from these sites will be encountered during construction.

One state cleanup site, Moody Cleaners Hammond 2, is located in the vicinity of the Manor Avenue access ramp. Groundwater has been impacted by PCE, TCE, and VOCs. However, the Moody Cleaners site is located north of the Little Calumet River, whereas the Manor Avenue ramp will be located on the south side of the river. Because the two sites are hydraulically separated, groundwater contamination from Moody Cleaners poses little HTRW risk to the project. Likewise, a LUST and state cleanup site, Woodmar Country Club may have impacted groundwater (a full site assessment has yet to be completed) in the vicinity of the River Drive access ramp, but the two sites are hydraulically separated (Woodmar is to the north of the river, the access ramp is to the south).

One LUST site, Pilot Travel Centers #031, is located in the vicinity of both the Wicker Park ramp and the Interstate Plaza ramp. This site was identified in previous HTRW, and determined to be not a concern, but the IDEM Virtual File Cabinet was searched for any updated information. A January 18, 2011 Corrective Action Plan Addendum for the site showed that groundwater monitoring has been underway since 1997. Samples taken from the monitoring well on the eastern edge of the property has been under the RISC remedial action levels for BTEX and MTBE since 2000. This site is not considered to pose an HTRW risk to the project.

Two additional IN Spills sites were identified in the vicinity of the Interstate Plaza ramp in the 2005 EDR Database Search. These sites were determined to not be a concern in the 2005 HTRW Update, and no additional information could be found for these sites as part of this investigation.

SITE VISIT

The PDT including environmental engineering personnel conducted a site visit on November 19, 2010. The purpose of the visit was to acquaint team members with the project sites and examine the sites for evidence of any HTRW or non-HTRW concerns that may not have been revealed in the database search.

The sites of the Hammond and Munster tiebacks, and River Drive access ramp were visited and found to be located in well-kept residential areas. The Wicker Park access ramp area was visited and was found to be located in a public nature area / park. No signs of dumping or HTRW were found in these locations. The Manor Avenue and Interstate Plaza ramp locations were not visited due to time constraints. Because of their close proximity to the other western ramp and tieback sites, it is believed conditions at these sites are similar to those that were visited, and are unlikely to present any HTRW concerns.

The Georgia Street access ramps locations were visited. The ramp area on the east side of the road was clear and open, with no development in the immediate vicinity other than I-80/94. Some minimal garbage was on the site, as might be expected along a busy roadway. The ramp area on the west side of Georgia Street was also visited. An access road to the river already exists, but has not been maintained for some time. The road was extremely overgrown with vegetation, and could not be accessed by car. A great deal of debris from open dumping, including tires, construction debris, and household garbage was found along the access road (see Figure 3). It does not appear that any dumping has occurred recently, due to the inaccessibility of the road. The Ironwood Park tieback location was also visited. The site is adjacent to a park in a residential area. A great deal of debris from open dumping was found around the existing pump station and in areas along the railroad tracks that are near the pump station and its maintenance road (see Figure 4).

Two sites returned in the EDR database search which were flagged for further investigation were visited. An attempt was made to locate the INDOT Merriville state cleanup site. The intersection of 30th and Broadway was visited, but no obvious cleanup site was found. A driving range which appeared to be out of business was located on the north side of the intersection (see Figure 5), and a wetland area was to the south. The New View Disposal Service site was found to be located on a small property in an economically distressed residential area. A garbage truck and a number of dumpsters were on the property (see Figure 6). However, no actual garbage or waste was seen on the site, and it appears the site is used for equipment storage only. These two sites do not appear to pose an HTRW concern for the project.

Figure 3: Dumping Debris at Georgia Street Access Ramp (West)

Figure 4: Dumping Debris at Ironwood Park Tieback Site

Figure 5: Driving Range in vicinity of INDOT Merriville Site

Figure 6: New View Disposal Service

FINDINGS AND CONCLUSIONS

This updated HTRW investigation was performed to determine if the proposed Little Calumet River tiebacks and ramps project will have an impact on any HTRW occurrences that may exist in the surrounding areas, and if HTRW problems will have an impact on the implementation of the project.

Database search results indicate that there is little potential for HTRW and non-HTRW conditions resulting from federal or state regulated facilities within the ASTM established search distances. An EDR database search of the eastern project sites and online database search of western sites revealed a number of LUST, RCRA, and other remediation sites. Upon further research of these regulated sites, none are believed to pose an HTRW risk to the project.

A site visit showed the western project areas to be clean, well-maintained, and free of garbage or other HTRW. The western project areas (Georgia Street access ramps and Ironwood Park Tieback) showed a great deal of debris from dumping. All garbage and debris in the construction path shall be cleared and properly disposed of by the contractor in accordance with all appropriate environmental regulations. The western Georgia Street access ramp entrance may require a gate or other security measures to prevent the site attracting illegal dumping once the project is completed.

No HTRW investigation can wholly eliminate uncertainty regarding the potential for HTRW associated with a project area. The HTRW investigation is intended to reduce, but not eliminate, uncertainty regarding the potential for HTRW in connection with a project area.

REFERENCES

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