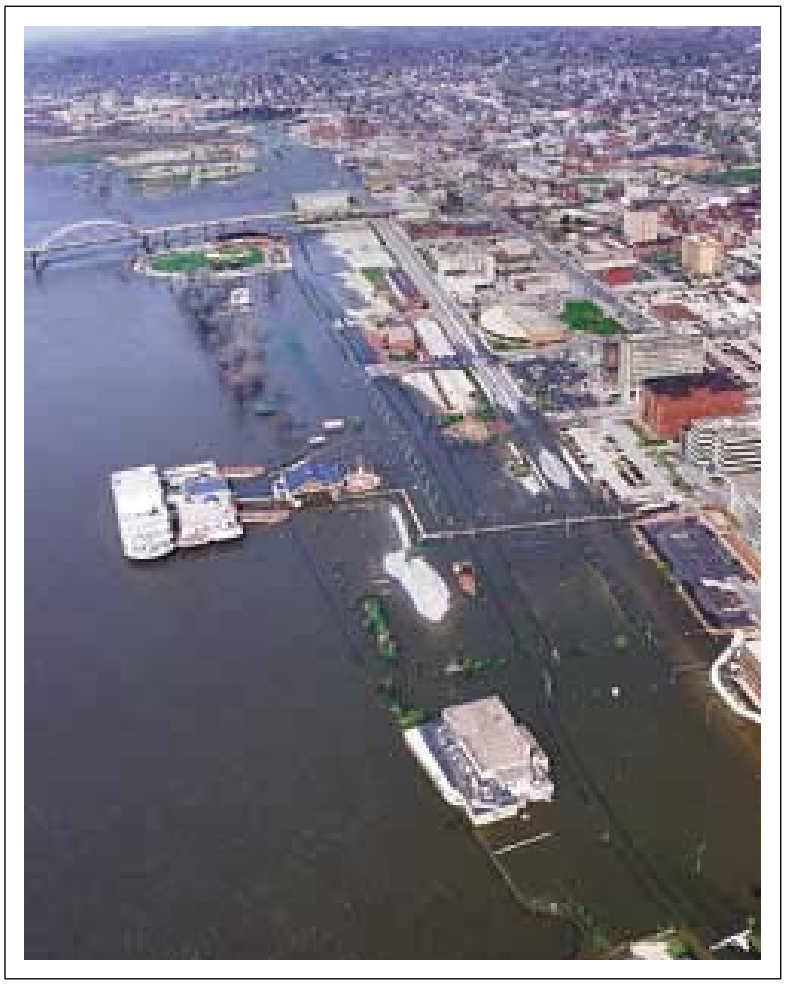
# LIMITED REEVALUATION REPORT
# FOR
# FLOOD DAMAGE REDUCTION

# MISSISSIPPI RIVER AT DAVENPORT, IOWA



**JUNE 2002**

US Army Corps
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Rock Island District

**FINAL**

**DEPARTMENT OF THE ARMY**
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

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## MISSISSIPPI RIVER AT DAVENPORT, IOWA

**JUNE 2002**

**ACKNOWLEDGMENT**

Many members of the Rock Island District assisted in the preparation of the Davenport, Iowa, Limited Reevaluation Report. Primary team members who are familiar with the technical aspects of the plan are listed below:

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US Army Corps of Engineers ®
Rock Island District

**WE'RE PROUD TO SIGN OUR WORK**

## EXECUTIVE SUMMARY

The flood protection project for Davenport, Iowa, was authorized for construction on December 31, 1970, in Public Law 91-611, 91st Congress, substantially in accordance with the recommendations of the Chief of Engineers in House Document No. 92-161, Ninety-Second Congress, 1st session. The approved decision document for the overall project (Phase II GDM, dated February 1982 and approved on June 4, 1982) served as the basis for this Limited Reevaluation Report (LRR).

The benefit-cost ratio in the GDM was 1.17, and the City's share of the $33.9 million project was $13 million based on the Corps policy requiring a 35% local cost share for new start projects. In May 1984, the City declined to participate due to the cost of the project and poor economic conditions at that time. The project was classified as inactive and was scheduled to be deauthorized in April 2002. However, the City of Davenport requested, by a City Council resolution signed May 16, 2001, a Corps of Engineers reconnaissance study and appropriation of Federal funds. Federal funds were made available to initiate a Limited Reevaluation Study (LRS) in September 2001, and the LRS was begun on October 30, 2001.

The limited reevaluation process focused on updating the cost estimate and economics for the entire project (Reaches 1 and 2) that was previously authorized for construction. The LRR shows that there is a strong Federal interest in constructing structural flood damage reduction features to protect the water treatment plant (Reach 1). The benefit-cost ratio for Reach 1 is 4.05. The total estimated cost for Reach 1 is $3,080,260, which would be cost-shared 75% Federal and 25% Non-Federal.

The LRR also shows that there is not a Federal interest in Reach 2 even if Reach 2 is subdivided into smaller reaches. The LRR used 1979 Mississippi River water surface profiles, which are in the order of 2 feet lower than the 1966 Mississippi River water surface profiles, that the GDM used. This is a significant change and means that the floodplain properties are evaluated with significantly lower risk (probability) of flooding than in the GDM analysis. This also results in a reduced total floodplain area (acreage); hence, a somewhat smaller property inventory. Reach 2 only showed a Federal interest in the 1982 GDM because of Area Redevelopment Benefits, which comprised about 40% of the total benefits. This benefit category was included based upon the high and persistent unemployment being experienced at the time of the GDM formulation. This benefit category is not included in the LRR. No further study for Reach 2 is recommended.

Flood damage reduction improvements in Reach 1, Water Treatment Plant, as described in this LRR, are technically, economically, and environmentally feasible and are in the Federal interest. Assuming the City of Davenport, Iowa, wishes to proceed with Reach 1, a cost-shared design agreement (75% Federal and 25% Non-Federal) will be executed for preparation of an Engineering Documentation Report (EDR) to include an Environmental Assessment (EA) to update the 1976 Environmental Impact Statement, and preparation of detailed plans and specifications.

**LIMITED REEVALUATION REPORT**
**FOR**
**FLOOD DAMAGE REDUCTION**

**MISSISSIPPI RIVER AT DAVENPORT, IOWA**

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# LIMITED REEVALUATION REPORT
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# MISSISSIPPI RIVER AT DAVENPORT, IOWA

## 1. GENERAL

**a. <u>Introduction</u>.** The City of Davenport, Iowa, has requested the Corps of Engineers to reevaluate the flood protection project authorized in 1970 to determine if it, or other flood damage reduction alternatives, are feasible based on current conditions. Record flood levels in 1993 were nearly matched in 2001, causing much publicized flood damages and attracting national attention. The baseball stadium, isolated residential areas, commercial/industrial areas, and reaches of the downtown area were flooded. The water treatment plant was threatened by flooding, but remained in service during the flood due to emergency flood-fighting actions. The wastewater treatment plant was unable to keep up with the high water levels, and the City was forced to bypass sanitary sewer flows into the river.

A Davenport City Council resolution, signed May 16, 2001, requested a Corps of Engineers reconnaissance study and appropriation of Federal funds. Federal funds were made available to initiate a Limited Reevaluation Study (LRS) in September 2001.

An LRS was initiated on October 30, 2001, at a cost not to exceed $100,000. The local sponsor will be required to provide a 25% cost share for the study. The local sponsor will be required to provide their cost-share portion following completion of the LRS and execution of a cost-sharing agreement. All subsequent studies and other Preconstruction Engineering and Design (PED) activities will require a 25% local cost share.

In accordance with Corps of Engineers policy for resumption of authorized projects that have not been constructed, an LRS would review the previous proposal for flood protection contained in the 1982 General Design Memorandum (GDM) and establish whether there is continued Federal interest in the project. This includes a determination of whether the project is still economically justified, environmentally acceptable, technically appropriate, and adequately supported by non-Federal interests. The study would review and update previous project assumptions and perform limited surveys, sampling, and application of other techniques to develop a reasonable estimate of project benefits. A Limited Reevaluation Report (LRR) would be produced as the main product of the LRS, and be submitted to the Corps of Engineers Mississippi Valley Division Headquarters (CEMVD) for approval.

Following are brief summaries of activities that could be recommended by the LRR:

- If the project is determined to be unjustified or inappropriate, and there appears to be no Federal interest in reformulating the project, the LRS would be terminated.

- If the project or portions of the project are determined to be justified and appropriate for construction, then PED activities could proceed. A cost-shared design agreement (75% Federal and 25% non-Federal) with the sponsor would be executed for preparation of an Engineering Documentation Report (EDR) and preparation of detailed plans and specifications for those portions of the project as recommended.

- If the project or portions of the project are determined to be unjustified or inappropriate for construction, but there appears to be a Federal interest in reformulating the project to consider other alternatives, a General Reevaluation Study would be recommended to fully evaluate alternatives that may be justified and appropriate. These alternatives would include the broadest range of structural and non-structural alternatives deemed appropriate. A cost-shared design agreement (75% Federal and 25% non-Federal) with the sponsor would be executed for preparation of the General Reevaluation study. The study would result in a General Reevaluation Report (GRR) that would make recommendations for implementation of alternatives that are determined to be in the Federal interest.

**b. Davenport, Iowa, Community.** Davenport, located on the west bank of the Mississippi River in Scott County, is the largest of a group of cities which extends for about 10 miles along both banks of the Mississippi River in Scott County, Iowa, and Rock Island County, Illinois, forming a continuous metropolitan area called the "Quad Cities." Adjacent cities—Bettendorf, Iowa, and Rock Island and Moline, Illinois—all have some level of protection from Mississippi River flooding. The City of Davenport is investigating and utilizing various means of dealing with Mississippi River flooding to include property buyouts, floodplain management, structural protection, relocations, elevating structures, flood proofing modifications to existing structures, flood emergency planning, and this LRS by the Corps of Engineers, Rock Island District.

**c. Description of Study Area.** The City of Davenport is located in east-central Iowa on the right bank of the Mississippi River from approximate River Mile 477 to River Mile 485 in Scott County, Iowa. There are about 88,500 square miles of Mississippi River drainage area upstream of the city. The city population is about 98,359 in an area of about 66 square miles. The authorized project would protect about 1,700 acres in the Mississippi River floodplain. More than 75% of the Davenport area in the Mississippi River floodplain is developed for industrial, commercial, residential, and recreational activity. U.S. Highways 61 and 67 and three major railroads pass through the protected area. The project areas are shown on plate X2 in Appendix E. The study area is divided into two main separable units. The smaller unit, Reach 1, surrounds the water treatment plant, which is located about one mile upstream of the larger unit, Reach 2 (see plate R1-1). Reach 2

extends from Le Claire Street or the Government Bridge at the upstream end to Interstate 280 at the downstream end (see plates R2-1 through R2-6 in Appendix E).

## 2. DESCRIPTION OF AUTHORIZED PROJECT

The Davenport flood protection project consists essentially of levees, floodwalls, closure structures, recreation features, preservation of a wetland, and interior flooding control items amounting to certain sewer work, numerous gated gravity outlets, and three permanent pumping stations. The project is a cooperative effort between the Federal Government and the City of Davenport. The Federal role consists mainly of planning, funding, and contracting for the construction of the various features. The basic responsibilities of the local interests are to provide planning input, provide right-of-way, maintain and operate the completed works, and bear certain initial costs related to utility alterations, recreation development, and sewer modification.

A Phase I General Design Memorandum (GDM) was completed in August 1976 and approved on May 2, 1978. A Phase II GDM recommending revisions to the project was completed in February 1982 and approved on June 4, 1982. The benefit-cost ratio in the GDM was 1.17, and the City's share of the $33.9 million project was $13 million based on the Corps policy requiring a 35% local cost share for new start projects. In May 1984, the City declined to participate due to the cost of the project and poor economic conditions at that time. The project was classified as inactive and was scheduled to be deauthorized in April 2002. However, the City of Davenport requested, by a City Council resolution signed May 16, 2001, a Corps of Engineers reconnaissance study and appropriation of Federal funds. Federal funds were made available to initiate a Limited Reevaluation Study (LRS) in September 2001.

## 3. AUTHORIZATION

The flood protection project for Davenport, Iowa, was authorized for construction on December 31, 1970, in Public Law 91-611, 91st Congress, substantially in accordance with the recommendations of the Chief of Engineers in House Document No. 92-161, Ninety-Second Congress, 1st session. A post-authorization change report (PAC) based on the Davenport, Iowa, Phase I General Design Memorandum (GDM), dated August 1976, recommended expansion of recreational development, revisions in the areas provided protection, channel improvement in lieu of a reservoir on Blackhawk Creek, and mitigation and enhancement of fish and wildlife features. The flood control aspects of the PAC were approved on November 29, 1977. The mitigation and enhancement of fish and wildlife, or more specifically the preservation of Nahant Marsh, were made the subject of a special post-authorization change report (SPAC) that was submitted to the Office of the Chief of Engineers (OCE) on January 13, 1978. The Phase I GDM for Davenport, Iowa, with the exception of the Nahant Marsh feature, was approved by OCE on May 2, 1978. The availability of the final Environmental Impact Statement (EIS) was published in the

*Federal Register* on March 3, 1978. A Phase II GDM recommending revisions to the project was completed in February 1982 and approved on June 4, 1982.

## 4. FUNDING SINCE AUTHORIZATION

Table 1 provides a funding history, by fiscal year, indicating the category in which funds have been appropriated for the Davenport, Iowa, project.

**Table 1. Funding History**

| Fiscal Year | Costs | Category |
|---|---|---|
| | | |
| Previous Years | $1,400,000 | General Investigation |
| 1982 | 90,000 | General Investigation |
| 1983-2000 | None | |
| 2001 | 100,000 | General Investigation |
| 2002 | None | |
| **TOTAL** | **$1,590,000** | **General Investigation** |

## 5. CHANGES IN SCOPE OF AUTHORIZED PROJECT

There have been no changes in scope from the authorized project. Some design changes were necessary due to changes since 1982, and these changes are discussed in Paragraph 8, CHANGES IN LOCATION OF PROJECT, and Paragraph 13, DESIGN CHANGES.

## 6. CHANGES IN PROJECT PURPOSE

There have been no changes in purpose from the authorized project. The authorized project included recreational features in Reach 2. The LRR has updated the cost estimate of these recreational features, but due to the limited time and budget for the LRR, the economic analysis does not address recreational features.

## 7. CHANGES IN LOCAL COOPERATION REQUIREMENTS

The project, as authorized in 1970, required the City of Davenport to provide the lands necessary for construction of the project, but did not require any cash cost share. As a result of the Water Resources Development Acts (WRDAs) of 1986 and 1996, local sponsors are required to provide a cash contribution in addition to all lands, easements, rights-of-way, relocations, and disposal areas (LERRD). Although the project was authorized prior to the initiation of cost sharing in WRDA 1986, cost sharing is required because project construction was not initiated prior to April 30, 1986. WRDA 1996

requires a 25% local cost share for the project since the project was authorized prior to October 12, 1996. The local cost share must include a minimum cash contribution of 5%; all lands, easements, rights-of-way, relocations, and disposal areas; and any additional cash contributions necessary to bring the total local cost share amount to 25% of the total project cost. The local sponsor is also required to operate and maintain the project.

## 8. CHANGES IN LOCATION OF PROJECT

**a. Project Reaches.** The LRS did not include any major changes in location of the recommended 1982 project. Significant design changes that were incorporated into the LRS are described in Paragraph 13, DESIGN CHANGES. The LRS study process did sub-divide the 1982 project plan into sub-reaches to assist in gaining a greater understanding of where project flood damage reduction costs and benefits of implementation are located. This sub-dividing process involved coordination with the City to segment the overall project into reaches that are of specific interest. The following sub-reaches have been designated:

- Reach 1 – Water Plant. This reach includes the recommended 1982 project plan referred to as the Water Treatment Plant Protection Unit. Reach 1 provides flood protection to the water treatment plant located near Mississippi River Mile 482 (see plate R1-1). Reach 1 includes the Iowa-American Water Plant running from Lindsay Harbor on the upstream end to immediately downstream of the plant near the intersection of Mississippi Drive with River Drive.

- Reach 2 – Government Bridge to Interstate 280. This reach represents the 1982 project plan referred to as the Mississippi River Protection Unit/Main Reach. Reach 2 has been subdivided into three reaches.

- Reach 2A – Government Bridge to Main Street. This reach includes the upstream levee project tie-offs under the Third Street and Government Bridge (railroad span) and continues downstream along River Drive to Iowa Street, then crossing River Drive and the I&M Rail Link tracks and continuing downstream to Perry Street where the levee/floodwall turns toward the river and continues along the riverfront to Main Street (see plate R2-1).

- Reach 2B – Main Street to Marquette Street. This reach includes the alignment from Main Street starting immediately downstream of the boat ramp and continues downstream past Le Claire Park, John O'Donnell Stadium, under the Centennial Bridge, and downstream to Marquette Street (see plates R2-1 and R2-2).

- Reach 2C – Marquette Street to Interstate 280. This reach includes the alignment from Marquette Street downstream through Crescent Park continuing

to the Credit Island causeway. At this location, the levee alignment enters Credit Island and continues along the northwest side of the island adjacent to the Credit Island Slough until reaching the downstream tip of the island. At this location, the levee crosses the river's entrance to the slough and continues along Concord Street to the Interstate 280 roadway embankment. The Interstate 280 embankment serves as the downstream tie-off to high ground (see plates R2-2 through R2-6).

**b. Alternate Levee Tie-Offs.** To further facilitate the LRR study process of identifying where the project flood damage reduction costs and benefits of implementation are located, alternate levee tie-offs to high ground were located in coordination with the City of Davenport. The alternate tie-off locations include both Reach 1 and Reach 2. In Reach 2, the alternate tie-offs correspond with the sub-reach divisions.

- Reach 1 – Village of East Davenport Tie-Off. During major Mississippi River floods, the City of Davenport has provided emergency sandbag dike measures to guard against flooding in the areas immediately landward (north) of River Drive adjacent to Mound Street within the Village of East Davenport. The opportunity to provide permanent flood protection measures for this area as part of the Reach 1 plan was investigated. A concept alignment, tie-off Option B, was developed and is shown on plate R1-B. The Village of East Davenport tie-off alignment departs from the Iowa-American Water Plant tie-off shown on plate R1-A at the north corner of water plant building this is being incorporated into the floodwall alignment. The Village of East Davenport floodwall first crosses the existing walk/bike trail and then crosses the access roadway to Lindsay Harbor. At this point, the tie-off runs easterly along the walk/bike trail until it turns north across the I&M Rail Link tracks and River Drive. From this point, an earth embankment will provide tie-off to high ground within Lindsay Park. The Village of East Davenport tie-off requires two additional trail closure structures, a major highway closure structure at River Drive, and at least two additional sanitary sewer valvewells as compared to the water plant tie-off alignment. The concept plan also includes an interior drainage pumping station adjacent to the Lindsay Harbor access road. The pumping station would provide for the discharge of accumulated overland and storm sewer drainage during high Mississippi River conditions. A pump station capacity in the range of 15,000 gallons per minute was assumed for cost development purposes.

- Reach 2 – Main Street Tie-Off. At the junction of Reaches 2A and 2B, a tie-off to high ground in downtown Davenport was identified along Main Street and crossing over and along River Drive to Brady Street (see plate R2-A). This alternate tie-off allows for separable portions of the project to be evaluated for benefit-to-cost analysis purposes. For example, if only the Reach 2A portion of the project were to be built, to provide full flood protection, the levee would need to tie-off downstream at the Main Street tie-off location. Correspondingly, if the Reaches 2B and 2C portions of the project were to be built, an alternate

upstream tie-off at Main Street would be needed. Roadway and railroad closures would be provided at Beiderbecke Drive, the I&M Rail Link tracks, River Drive, Main Street and Second Street. Accommodations would also be needed to provide access into the new city parking ramp along River Drive at Main Street. Concept costs to construct the Main Street tie-off were developed and are included in Paragraph 14 and Appendix C.

- Reach 2 – Marquette/Sturdevant Streets Tie-Off. Similar to the Main Street tie-off, an alternate tie-off at the junction of Reaches 2B and 2C was also conceptually developed. The Marquette/Sturdevant Streets tie-off is located along the west side of Marquette Street until it crosses River Drive. At this point, the tie-off follows the alignment of the Oscar Mayer floodwall along River Drive continuing downstream to Sturdevant Street. At Sturdevant Street, the tie-off turns northerly along the eastside of Sturdevant Street crossing over Rockingham Road and ties-off into high ground between Second and Third Streets (see plate R2-B). This tie-off location allows for Reaches 2B and 2C to be evaluated separately for benefit-to-cost analysis purposes, or a combination of Reaches 2A and 2B with a downstream tie-off at the Marquette/Sturdevant Streets location. As the recommended 1982 level-of-protection is 4.5 feet higher than the existing Oscar Mayer floodwall, the concept costs for this tie-off include a replacement of the existing floodwall.

## 9. HYDROLOGY AND HYDRAULICS

The drainage area of the Mississippi River at Davenport, Iowa, is 88,500 square miles. The discharge-frequency values that the 1982 project design water surface profiles are based upon were developed for the "Generalized, Regionalized Flow Frequency Study on the Mississippi River from Guttenberg, Iowa, to Hamburg Bay, Illinois," dated March 1966. Table 2 compares these design flow-frequency values to the subsequently published "Upper Mississippi River, Water-Surface Profiles, River Mile 0.0 to River Mile 847.5," prepared for the Upper Mississippi River Basin Commission (UMRBC) by the Corps of Engineers, dated November 1979. The UMRBC 1979 results are currently the Upper Mississippi River flood data that are used for regulatory purposes. The ongoing Upper Mississippi River System Flow Frequency Study, with target completion date March 2003, will again update the Upper Mississippi River flow frequency values and water surface profiles. The results of this ongoing study are not finalized, but it is anticipated that the flood information will not significantly change in the Davenport reach of the Mississippi River from that published in 1979. Table 2 also shows high water mark elevations for the summer 1993 and spring 2001 flood events, along with the 1966 and 1979 probabilistic values for the 200-year design flood elevation. In comparison, the 1979 profiles are approximately 2.2 feet lower than the 1966 profiles for the 200-year flood event throughout the Davenport project.

**Table 2. 200-Year Design Flow-Frequency and Water Surface Elevation Comparisons**

| Mississippi River Mile (RM) | 1966 Profiles | 1966 Profiles | 1979 Profiles | 1979 Profiles | 1993 Flood | 2001 Flood |
|---|---|---|---|---|---|---|
| | 200-Year Discharge | 200-Year Elevation | 200-Year Discharge | 200-Year Elevation | 260,000 cfs | 280,000 cfs |
| | Cu ft/sec | (MSL 1912 adj.) | Cu ft/sec | (MSL 1912 adj.) | (MSL 1912 adj.) | (MSL 1912 adj.) |
| | | | | | | |
| **RM 482.0** Centennial Bridge | 389,000 | 568.5 | 330,000 | 566.3 | 565.0 | 564.5 |
| | | | | | | |
| **RM 484.0** Water Plant | 389,000 | 570.7 | 330,000 | 568.5 | 567.0 | 566.5 |

## 10. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

A final Environmental Impact Statement (EIS), dated August 1976, for the Davenport, Iowa Local Flood Protection project was completed by the Rock Island District and filed with the U.S. Environmental Protection Agency (EPA) on March 3, 1978. To comply with the Clean Water Act, a Section 404(b)(1) Evaluation Report was filed with the EPA on April 2, 1979 as Supplemental Information to the Final EIS. Section 401 Certification was issued in a October 24, 1978, letter from the Iowa Department of Environmental Quality. To comply with the Fish and Wildlife Coordination Act, the EPA and the Fish and Wildlife Service (FWS) were contacted during the EIS process and during the formulation of the Phase II GDM. Their letters are included in those documents, and some of their comments are addressed below.

No new potential environmental impacts within the project reaches have been discovered since the 1976 EIS was completed. Reaches 1 and 2A would have minimal environmental impacts, and the FWS and EPA would be contacted during the Environmental Assessment process to ensure that they have no new environmental concerns for Reach 1. If Reaches 2B and 2C were to move forward for further study and implementation, additional environmental studies would need to be completed, as discussed in the 1982 GDM and below, in order to address previously identified FWS concerns.

**a. <u>Reaches 1 and 2A</u>.** These reaches are located in developed areas within the City of Davenport with very low potential for endangered species, aquatic ecosystem, or wildlife habitat impacts. In addition, these reaches mainly utilize floodwalls, rather than levees, and the embankments for these floodwalls would consist of clay material taken from an existing borrow area, rather than sand taken from the Mississippi River.

**b. <u>Reaches 2B and 2C</u>.** The 1982 General Design Memorandum (GDM) states that the levees for these project reaches would utilize sandy material hydraulically dredged from the Mississippi River and silty material dredged from Credit Island slough. The FWS

stated, in a letter dated 24 July 1978, that two endangered and one proposed threatened mussel species could be found in this reach of the Mississippi River. The endangered species were the fat pocketbook pearly mussel, *Potamilus capax*, and the Higgins' eye pearly mussel, *Lampsilis higginsi*, and the proposed threatened species was the spectacle case, *Cumberlandia monodonta*. The FWS requested at that time that additional mussel sampling be conducted to determine whether any threatened or endangered species were present in the proposed dredging sites. The 1982 GDM states that the mussel sampling would be conducted as soon as funds became available and that the results would be provided to the FWS to render an opinion concerning project impacts on the threatened and endangered mussel species. Future coordination with the FWS would be necessary if dredging were to take place in the Mississippi River as part of this flood protection project.

The FWS also wrote a letter dated June 5, 1979, to express their concern that aquatic impacts could occur through contamination of the water column from heavy metals and chemical residues in sediment to be stirred up during dredging of the Mississippi River for levee fill material. Six bottom samples were gathered in November 1978 and analyzed by the Iowa State Hygienic Laboratory, and the results showed that no parameters were found to be at toxic concentrations, although some were higher than the recommended limits. If dredging were to take place as part of this flood protection project, additional sampling would be done to evaluate current conditions.

**c. <u>Reach 2C</u>.** In addition to the issues related to river dredging discussed above, Reach 2C has additional potential environmental impacts that would need to be addressed further if flood protection were to be constructed along this reach.

A request to initiate formal consultation in accordance with Section 7 of the Endangered Species Act was sent to the FWS on May 25, 1978. The FWS responded in a letter dated July 24, 1978. The letter stated that the proposed project will not jeopardize the continued existence of the bald eagle and no further consultation is necessary for this species. The bald eagle uses the large trees on Credit Island as daytime roosts. The FWS requested that the southern portion of Credit Island be protected from development to help protect this species.

Wetlands are potentially located along portions of the levee within Credit Island. The 1982 GDM states that 11 acres of bottomland hardwoods in the central portion of the island and 3 acres within the downstream portion of the island are frequently flooded. A wetland delineation would need to be completed along this portion of Reach 2C to determine the location and extent of any Federal and State jurisdictional wetlands for mitigation purposes.

Credit Island slough would be gated at the downstream end and have a closure structure and pump station installed. This would transform the slough into a temporary pond during flood events when the structure would be closed. Blackhawk Creek enters the slough after flowing through the City of Davenport and would have the potential to concentrate urban runoff and create water quality impacts within the slough during floods, although internal

drainage would be removed during flooding with a pumping station at the downstream end of Credit Island.

Wildlife habitat would be negatively impacted by the placement of levees between the Crescent Railroad Bridge and Interstate 280. This area is the only portion of the project with the potential for wildlife usage. Any habitat located at the site of the new levees would be lost through construction of the levees, and wildlife would be restricted from moving to and from the river by the placement of the levees between upland habitat and the river. The 1982 GDM states that approximately 20 acres of wildlife habitat, mainly on Credit Island, would be lost through levee construction. The GDM also states that areas along the constructed levees would be landscaped with trees and shrubs to mitigate for vegetation losses associated with levee construction.

The construction of the levees would further restrict water movement from moderate and high water conditions to Nahant Marsh. The marsh was to be acquired by the City of Davenport and preserved as compensatory wetland mitigation for the wetland impacts associated with levee construction. The Rock Island District prepared a "Special Report for Fish and Wildlife Mitigation and Enhancement" in October 1977 to address ways to enhance the marsh for mitigation purposes. Since then, the City of Davenport and allied organizations, most notably River Action, Inc., have secured control of and are in the process of enhancing the marsh and allowing for public access. If compensatory wetland mitigation were to be required as part of this flood protection project, the various wetland regulatory agencies would need to be contacted to determine whether or not the original mitigation plan is still appropriate.

## 11. NATIONAL HISTORIC PRESERVATION ACT COMPLIANCE

Archeological consultation and field investigations conducted in support of the original project were completed prior to the formal implementation of 36 CFR Part 800, the Federal regulations implementing Section 106 of the National Historic Preservation Act (NHPA). Results of the archeological field surveys were submitted to Federal, State, and local interests for comment. Consultation did not include relevant federally recognized Tribes as required by the current regulations (36 CFR 800.4). The National Park Service concurred with the field methods and negative results of the investigations by letter dated July 9, 1976 (H22-[RMR]PI). In addition, an archeological survey was conducted within Le Claire Park in 1997 and no historic properties were documented (R&C#: 970400057).

The Corps sought a National Register of Historic Places (NRHP) eligibility determination for Le Claire Park and Credit Island by letter dated May 1980, and it was determined by the State Historical Society of Iowa (SHSI) that both properties were ineligible for the NRHP. Furthermore, the SHSI notified the Corps, by letter dated August 25, 1980, that the Le Claire Park bandshell would not be impacted by the project and so an eligibility determination was not required.

Further study and/or revision of any of the alternatives proposed as part of the original project will require re-coordination with consulting parties pursuant to 36 CFR 800.4. The consulting parties list will minimally include the State Historical Society of Iowa, relevant federally recognized Tribes, and local historical societies. It is likely that additional archeological survey will be required for any ground disturbance activities on Credit Island or elsewhere in Reach 2C. The remaining reaches will require re-coordination and determination of effect to potentially significant historic properties not previously evaluated such as the historic floodwall and John O'Donnell Stadium.

## 12. REAL ESTATE

The Davenport flood protection project is located in Scott County, Iowa. This LRR addresses two reaches and their various subreaches. The City of Davenport, Iowa, is the proposed sponsor.

The real estate interest required for Reach 1 (Iowa-American Water Plant) is a Levee/Floodwall Easement over 0.82 acre. The estimated cost of Lands, Easements, Rights-of-Way, Relocations and Dredge Placement Sites (LERRD) for this reach is $209,000.

The real estate interests required for each sub-reach in Reach 2 are summarized as follows: A Levee/Floodwall Easement would be acquired over 0.10 acre for Sub-Reach 2A (Government Bridge to Main Street). The estimated cost of LERRD for this sub-reach is $86,000. For the Main Street Tie-Off, a permit would be required over 0.01 acre and a Levee/Floodwall Easement would be required over 0.47 acre. The estimated cost of LERRD for the Main Street Tie-Off is $114,000. For Sub-Reach 2B (Main Street to Sturdevant/Marquette Streets), a permit would be required over 0.20 acre and a Levee/Floodwall Easement would be required over 6.72 acres. The estimated LERRD cost is $713,000. For the Sturdevant/Marquette Streets Tie-Off, a permit would be required over 0.18 acre and a Levee/Floodwall Easement would be required over 2.60 acres. It is projected that two businesses and three residential properties would be displaced due to this project feature. The estimated cost of LERRD, including Public Law 91-646 Relocation Assistance payments, is $1,115,000. For Sub-Reach 2C, Marquette Street to Interstate 280, a Levee/Floodwall Easement would be required over 46.9 acres. The estimated cost of LERRD for this sub-reach is $1,922,000.

In accordance with the level of study, a gross appraisal was not prepared at this time; however, one will be prepared during subsequent feasibility-level Preconstruction Engineering and Design (PED) activities. As instructed, temporary staging areas were not included in any of the above reaches. However, such areas readily exist throughout the project reaches. All permanent real estate needs and temporary work and staging areas related to construction activities will be further defined by follow-on project reports. Regarding possible Hazardous, Toxic, and Radiological Waste (HTRW) concerns, all lands were valued as clean. A draft Project Cooperation Agreement (PCA) will be prepared during the feasibility study.

Table 3 summarizes the LERRD costs (including severance damage and contingencies).

**Table 3. Estimated LERRD Costs (Including Severance Damage and Contingencies)**

| Acres | Estimated Tracts | Estate | Non-Federal | Federal | Total |
|---|---|---|---|---|---|
| ***REACH 1*** (IOWA-AMERICAN WATER PLANT) | | | | | |
| 0.82 acre | 6 | Levee/Floodwall Easement | $161,000 | $48,000 | **$209,000** |
| ***REACH 2 – SUBREACH 2A*** (GOVERNMENT BRIDGE TO MAIN STREET) | | | | | |
| 0.10 acre | 4 | Levee/Floodwall Easement | $54,000 | $32,000 | **$86,000** |
| ***REACH 2 – MAIN STREET TIE-OFF*** | | | | | |
| .01 acre | 1 | Permit | $1,500 | | |
| 0.47 acre | 1 | Levee/Floodwall Easement | $104,500 | $8,000 | **$114,000** |
| ***REACH 2 – SUBREACH 2B*** (MAIN STREET TO STURDEVANT/MARQUETTE STS) | | | | | |
| 0.20 acre | 1 | Permit | $15,000 | | |
| 6.72 acres | 1 | Levee/Floodwall Easement | $682,000 | $16,000 | **$713,000** |
| ***REACH 2 – STURDEVANT/MARQUETTE STREETS TIE-OFF*** | | | | | |
| 0.18 acre | 1 | Permit | $13,500 | | |
| 2.60 acre | 8 | Levee/Floodwall Easement | $1,027,000* | $75,000 | **$1,115,000** |
| * Includes Relocation Assistance (PL 91-646) | | | | | |
| ***REACH 2 – SUBREACH 2C*** (MARQUETTE ST TO INTERSTATE 280) | | | | | |
| 46.9 acres | 3 | Levee/Floodwall Easement | $1,898,000 | $24,000 | **$1,922,000** |

In summary, the LERRD totals, including contingencies and severance damages, for each reach are as follows:

| | Non-Federal | Federal | Total |
|---|---|---|---|
| REACH 1 | $161,000 | $48,000 | $209,000 |
| REACH 2 | $3,795,500 | $155,000 | $3,950,500 |

## 13. DESIGN CHANGES

The scope of the LRS did not allow for extensive reformulation of the recommended 1982 project alignment or feature details. As presented in Paragraph 9, HYDROLOGY AND HYDRAULICS, the 1966 design flood profiles for the 200-year Mississippi River flood event have been revised downward by the UMRBC 1979 flood profiles. As shown in Table 2, these reductions are approximately 2.2 feet throughout the project. The LRS did not change the design levee/floodwall heights to reflect these reductions in Mississippi River flood profiles. For the LRS study process, the cost estimates for the recommended 1982 project as designed were updated using an Engineering News Record (ENR) construction cost index factor for inflating construction costs from 1982 to 2002 price levels with no adjustments in quantities or design related to a lower design flood height.

The LRS process did allow for design changes that were obviously required or readily desired by the local sponsor to be conceptually accounted. The design changes that were incorporated into the LRS include the following:

- Reach 1 – Water Plant. Capital improvements at the Iowa-American Water Plant since the recommended 1982 alignment was established cause some conflict (see plate R1-1). Three new treatment and distribution process buildings have been constructed on or riverward of the 1982 levee alignment. In coordination with the City and the water company, the LRR levee alignment has been revised at the upstream and downstream tie-off ends to include all new facilities within the line-of-protection (see plate R1-A). In addition, reconstruction of the riverfront walk/bike trail in Reach 1 has been included in the project costs as the construction activities would destroy the existing trail. Also, the recreational features associated with the riverfront walk/bike trail at the downstream corner have been identified to be relocated. These features include a gazebo and sculptures of two boys viewing the Mississippi River. These features, added since 1982, will be relocated immediately downstream of the new levee alignment on city property which continues to overlook the river.

- Reach 2A – Rhythm City Casino. Riverboat gaming has brought a new, prominent addition to the Davenport riverfront since the recommended 1982 project. It is important that the proposed flood protection facilities not impair access to the riverboat, including access via the planned skywalk bridge which

will extend from the area north of River Drive southward, across River Drive and the railroad to the riverfront. The levee/floodwall in this reach will need to accommodate these facilities with some type of access through the line-of-protection. Thus, a line item was added to the Reach 2A cost estimate to account for this added feature.

- Reaches 2B and 2C – Bix Beiderbecke Drive. The recommended 1982 project included a roadway extension of Bix Beiderbecke Drive from Gaines Street at John O'Donnell Stadium downstream to the Credit Island Causeway Entrance (see plates R2-1 through R2-4). This new roadway was to be located on top of the new levee embankment, thus requiring a 30-foot-wide top width on the levee embankment. In coordination with the City, this roadway extension has been deleted from the project, thus allowing for the levee top width to be reduced to a 12-foot width. A revised levee alignment would shift the levee slightly landward from Gaines Street to Marquette Street, running adjacent to the recent Bix Beiderbecke roadway that runs through this reach (see plates R2-A and R2-B). The earthwork quantity reductions associated with this design change have been incorporated into the updated project cost estimate.

## 14. COSTS

**a. Changes in Total Project First Costs.** Total project reach and alternate tie-off costs are summarized in Table 4. The detailed project cost estimate information is located in Appendix C - Cost Tables. As discussed in Paragraph 13, DESIGN CHANGES, the cost estimates for the recommended 1982 project as designed were updated using an Engineering News Record construction cost index factor for inflating construction costs from 1982 to 2002 price levels. Engineering News Record (ENR) publishes a Construction Cost Index (CCI) that is widely used in the construction industry for cost updating purposes. The CCI index has both a materials and labor component associated with it.

The original Davenport Local Flood Protection Phase II General Design Memorandum (GDM) is dated February 1982. The original GDM cost estimate was manually developed based upon unit costs. As the GDM cost estimate does not exist in an electronic form, the estimate was re-created in an Excel spreadsheet. To update the costs, an ENR CCI factor of 3728 for the original GDM (February 1982), and the current ENR CCI factor of 6462 (February 2002) were utilized to update the original GDM cost estimate numbers. Design changes as described in Paragraph 13 were incorporated into the cost estimate spreadsheet in Appendix C to capture the impacts to the costs. These cost revisions were incorporated as either quantity adjustments or lump sum line items. The ENR CCI price level factor from February 1982 to February 2002 of 73% primarily produced the updated construction costs for the LRS.

Real estate interests for the project rights-of-way were updated by Real Estate Division personnel for the lands required for the flood protection components of the project. These costs are summarized in Paragraph 12 and are included in the Appendix C project cost

update spreadsheet. Since the recreational components of the project are not included in the scope of the LRS, the recreational real estate land costs were simply price indexed based upon the ENR factor. If follow-on studies occur, these recreational real estate costs will need to be further developed. In addition, any costs pertinent to environmental mitigation costs have been removed from the cost estimate. Again, if follow-on studies occur, the mitigation costs will need to be further developed to include the issues of continued use of the Nahant Marsh properties for satisfying mitigation requirements.

Planning, engineering, and design costs associated with implementing the various components of the project were established at 20% of the costs of construction features. The 20% value is indicative of planning, engineering, and design costs associated with recent projects in the Rock Island District. Supervision and administration costs were established at 10% of construction costs. Again, the 10% value is indicative of recent construction contract supervision and administration project costs.

**Table 4. Summary of Feature Costs**

| Identifier | Reach/Tie-Off | Reach/Tie-Off Cost* | Stand-Alone Project Cost** |
|---|---|---|---|
| *A* | Reach 1 – Water Plant | $3,080,260 | $3,080,260 *(A)* |
| *B* | Reach 1 – Added Cost for Village of East Davenport Tie-Off | $1,630,200 | $4,710,460 *(A + B)* |
| *C* | Reach 2 – Main Street Tie-Off | $5,060,855 | N/A |
| *D* | Reach 2 – Marquette/Sturdevant Streets Tie-Off | $8,351,945 | N/A |
| *E* | Reach 2A – Government Bridge to Main Street | $10,009,746 | $15,070,601 *(C + E)* |
| *F* | Reach 2B – Main Street to Marquette Street | $14,422,997 | $27,835,797 *(C + D + F)* |
| *G* | Reach 2C – Marquette Street to Interstate 280 | $27,614,085 | $35,966,030 *(D + G)* |
| *H* | Reach 2 – Government Bridge to Interstate 280 | - - - | $52,046,828 *(E + F + G)* |
| *I* | Reaches 2A and 2B – Government Bridge to Marquette Street | - - - | $32,784,688 *(D + E + F)* |
| *J* | Reaches 2B and 2C – Main Street to Interstate 280 | - - - | $47,097,937 *(C + F + G)* |

* Costs include planning, engineering, design, construction management, real estate, relocations, rights-of-way, and construction contract.

** Stand-Alone Project Cost represents the cost if that reach were constructed as a separable flood protection project. For example, a Reach 2A stand-alone project would include the Reach 2A cost plus the Main Street tie-off cost.

**b. Changes in Project Benefits.** Table 5 compares the benefits, costs, and benefit-cost ratios of the authorized project and the current LRR. See Table B-8 in Appendix B - Economic Analysis for additional information.

**Table 5. Comparison of Benefit-to-Cost Analyses**
(50-year evaluation period, indicated discount rates)

| Item | Project Document (1982 GDM) | Limited Reevaluation Report |
|---|---|---|
| Price Level of Cost Estimate | Jul-81 | Mar-02 |
| Discount Rate for Evaluation | 7.625% | 6.125% |
| **Separable Water Plant Reach (Reach 1, Tie-Off Option A, recommended project)** | | |
| Element Total Cost Estimate | 1,109,000 | 3,180,260 |
| Annualized Costs (incl. Interest During Construction (IDC)) | 89,000 | 211,200 |
| Benefits | | |
| Flood Damage Reduction | 13,900 | 42,800 |
| Business Losses | 40,700 | Not Available |
| Protection of Municipal Water Supply | 93,800 | 812,900 |
| Total Annual Benefits | 148,400 | 855,700 |
| Benefit-Cost Ratio | 1.67 | 3.92 |
| **Separable Downstream Reach (Reach 2)** | | |
| Element Total Cost Estimate | 30,937,000 | 52,046,800 |
| Annualized Costs (incl. IDC, Operation & Maintenance (O&M)) | 3,065,000 | 3,800,500 |
| Benefits | | |
| Flood Damage Reduction (incl. Emerg. Costs) | 1,346,100 | 1,223,600 |
| Redevelopment | 1,015,400 | *Not Applicable |
| Bridge User Detour Costs | 5,900 | * 7,200 |
| Recreation | 696,700 | *Not Applicable |
| Improved Land Use | 269,900 | *Not Applicable |
| Future Growth | 222,300 | *Not Applicable |
| Total Annual Benefits | 3,556,300 | 1,230,800 |
| Benefit-Cost Ratio | 1.16 | 0.32 |
| **TOTAL AUTHORIZED PROJECT** | | |
| Total Project Cost Estimate | 32,046,000 | 55,127,060 |
| Annualized Costs (incl. IDC, O&M) | 3,154,000 | 4,018,700 |
| Total Annual Benefits | 3,704,700 | 2,086,500 |
| Total Benefit-Cost Ratio | 1.17 | 0.52 |

* See "Comparison to Authorized Project Document," page B-9.

**c. Benefit-Cost Ratio.** See Table 5 above and Appendix B - Economic Analysis for additional information.

**d. Changes in Cost Allocation.** See Appendix C - Cost Tables.

**e. Changes in Cost Apportionment.** This information was only developed for Reach 1, Tie-Off Option A, the recommended project. All other options were dropped due to economic infeasibility and will not be considered further. See paragraphs 17, CONCLUSIONS, and 18, RECOMMENDATION for more information. Based on current cost-sharing provisions, Federal and non-Federal costs will be distributed as shown in Table 6.

**Table 6. Project Cost Distribution**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**
**Davenport, Iowa**

| | | |
|---|---|---|
| Total Project Cost Estimate | $3,180,260 | |
| Federal Cost Estimate | 2,385,200 | |
| Non-Federal Cost Estimate | 795,060 | |
| Lands, Damages, & Relocations | | 346,900 |
| Cash Contributions | | 448,160 |
| Non-Federal Share Percent of Total Cost: | | 25% |

**f. Funding/Construction Schedule.** This information was only developed for Reach 1, Tie-Off Option A, the recommended project. All other options were dropped due to economic infeasibility and will not be considered further. See paragraphs 17, CONCLUSIONS, and 18, RECOMMENDATION for more information. The estimated funding and construction schedules to proceed with Reach 1, Tie-Off Option A, Levee and Floodwall Project, are shown in Tables 7 and 8.

**Table 7. Funding Schedule**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**
**Davenport, Iowa**

| Event | Cost Estimate ($000) |
|---|---|
| **LIMITED REEVALUATION STUDY (LRS)** | |
| Estimated FY 02 (Federal) Costs | 100 |
| | |
| **PRE-CONSTRUCTION ENGINEERING & DESIGN (PED)** | |
| Non-Federal Portion of LRS Costs (will be applied to PED costs) | 25 |
| Estimated FY 03 (Federal) Costs (75% of $413,000-$25,000) | 285 |
| Estimated (Non-Fed) Portion of PED Costs (25% of $413,000) | 103 |
| | |
| Total Estimated PED Costs (from page C-1, Appendix C of LRR) | 413 |
| | |
| **LANDS AND DAMAGES** | |
| Estimated FY 04 (Federal) Costs (from page C-1, Appendix C of LRR) | 48 |
| Estimated FY 04 (Non-Federal) Costs (from page C-1, Appendix C of LRR) | 161 |
| | |
| **CONSTRUCTION, S&A, AND RELOCATIONS** | |
| Estimated FY 04 (Non-Federal) Costs (from page C-1, Appendix C of LRR) | 186 |
| Estimated FY 04 (Federal) Construction Contract/Supervision & Administration Costs | 330 |
| Estimated FY 04 (Non-Federal) Construction Contract/Supervision & Administration Costs | 60 |
| Estimated FY 05 (Federal) Construction Contract/Supervision & Administration Costs | 1622 |
| Estimated FY 05 (Non-Federal) Construction Contract/Supervision & Administration Costs | 260 |
| | |
| **Total Estimated Federal Cost** | **2,385** |
| **Total Estimated Non-Federal Cost** | **795** |
| **Total Estimated Cost** | **3,180** |

**Table 8. Construction Schedule**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**
**Davenport, Iowa**

| Date | Event |
|---|---|
| Jul 2002 | LRR Approval |
| Sep 2002 | Execute Design Agreement |
| Oct 2002 | Begin Pre-construction Engineering & Design (PED) |
| Jun 2003 | Obtain Approval of Engineering Documentation Report (EDC) & Environmental Assessment (EA) |
| Jun 2003 | Execute Project Cooperation Agreement (PCA) |
| Dec 2003 | Establish Escrow Account & Receive Non-Federal Contribution |
| May 2004 | Complete Real Estate Acquisition |
| May 2004 | Advertise for Bids |
| Jul 2004 | Award Construction Contract |
| Aug 2004 | Construction Contract Notice to Proceed |
| Jul 2005 | Complete Construction |

**g. <u>Operation and Maintenance</u>.** Operation and maintenance costs are estimated to be approximately $15,000 per year on average. These costs will be higher during high water events when the gatewells and closures may need to be operated, but most of the project will consist of features designed to require minimal operation and maintenance.

## 15. PROPERTY SERVED BY REACH 1

All property within the area protected by Reach 1 of the project is owned by Iowa-American Water Company, except for an I&M Rail Link railroad line that transects the site and some City of Davenport property parcels adjacent to the river. The Iowa-American Water Treatment Plant at Davenport, Iowa, provides the only source of water for 131,000 people in Davenport, Bettendorf, and portions of Scott County in Iowa. Several hundred businesses and governmental organizations also rely on this water for their day-to-day activities and the water plant is the sole source of water to the area population for the foreseeable planning horizon.

Corps of Engineers policy, as stated in ER 1165-2-123, requires that civil works projects provide direct benefits to more than one non-public property. The ER states “A property directly served or benefited by the proposed project must be involved in realization of the benefit stream expected to result from the proposed project.” Because the Iowa-American Water Treatment Plant is a public utility providing essential public service, protection of the plant from flooding will provide direct benefits to thousands of properties in Iowa-American’s 82-square-mile service area. Fully 95% of the total benefits accrue to the reduction of governmental costs, which would be incurred in providing emergency water supplies during disastrous flood events. Only approximately 5% of the quantified benefits accrue to reduction of physical damages/costs at the water plant site. The proposed project

clearly benefits a large number of separate property ownerships and thus complies with the provisions of ER 1165-2-123.

## 16. PUBLIC INVOLVEMENT

Discussions regarding public involvement for the LRS began on October 30, 2001, at the meeting to initiate the LRS and continued on November 15, 2001, in a meeting specifically called to coordinate public involvement between the City of Davenport, Iowa-American Water Company, and the Rock Island District Corps of Engineers. A Memorandum for Record of the November 15th meeting is included in Appendix A - Pertinent Correspondence.

The "Davenport City News" for January/February/March 2002, a quarterly flyer, features an article stating that the U.S. Army Corps of Engineers has launched the LRS and that the results of the study will be made available for public review in the spring of 2002. A copy of the article is included in Appendix A.

Three public involvement activities were requested by the City of Davenport, as follows:

- PowerPoint Presentation to the Davenport City Council to be videotaped and re-broadcast over the City's cable TV channel 13, which reaches virtually all Davenport residents. Mr. Perry Hubert, Corps of Engineers Project Manager, made a presentation at the Davenport City Council meeting at 7:00 p.m. on December 19, 2001. The presentation was broadcast on the City's channel 13 on December 20-23, 2001.

- Creation of a Study Website. The Rock Island District Public Affairs Office staff designed a study website with input from the entire study team. The website was made available to the public on December 21, 2001. The website encourages the public to contact the Corps Project Manager or the Public Affairs Officer for further information. The website address is: http://www.mvr.usace.army.mil/PublicaffairsOffice/Davenport/DavenportFlood Control.htm

- Public Meeting. The City representatives agreed that a public meeting should be held after the draft LRR is completed. The City will host a public meeting or public open house and members of the study team, including representatives from the Corps of Engineers, the City of Davenport, and the Iowa American Water Company, will be on hand to answer questions.

## 17. CONCLUSIONS

The approved decision document for the overall project (Phase II GDM, dated February 1982 and approved on June 4, 1982), served as the basis for this LRR. The reevaluation process focused on updating the cost estimate and economics for the entire project (Reaches 1 and 2) that was previously authorized for construction. The LRR shows that there is a strong Federal interest in constructing structural flood damage reduction features to protect the water treatment plant (Reach 1, Tie-Off Option A). Reach 1, Tie-Off Option B is not economically feasible and will not be pursued. The LRR also shows that there is not a Federal interest in Reach 2 even if Reach 2 is subdivided into smaller reaches. As discussed in detail in Paragraph 9, HYDROLOGY AND HYDRAULICS, the LRR used 1979 Mississippi River water surface profiles, which are in the order of 2 feet lower than the 1966 Mississippi River water surface profiles, that the GDM used. This is a significant change and means that the floodplain properties are evaluated with significantly lower risk (probability) of flooding than in the GDM analysis. This also results in a reduced total floodplain area (acreage); hence, a somewhat smaller property inventory. Reach 2 only showed a Federal interest in the 1982 GDM because of Area Redevelopment Benefits, which comprised about 30% of the total benefits. This benefit category was included based upon the high and persistent unemployment being experienced at the time of the GDM formulation. This benefit category is no longer appropriate and is not included in the LRR.

## 18. RECOMMENDATION

Flood damage reduction improvements in Reach 1, Tie-Off Option A, Water Treatment Plant, as described in the Limited Reevaluation Report, are technically, economically, and environmentally feasible and are in the Federal interest. Assuming the City of Davenport, Iowa, wishes to proceed with Reach 1, Tie-Off Option A, it is recommended that this LRR be approved and that a cost-shared design agreement (75% Federal and 25% Non-Federal) be executed for preparation of an Engineering Documentation Report to include an Environmental Assessment to update the 1976 Environmental Impact Statement, and preparation of detailed plans and specifications.

It is further recommended that no additional study be warranted for Reach 1, Tie-Off Option B or Reach 2 of the authorized project. This LRR indicates that there is no Federal interest demonstrated in proceeding to construction with any flood damage reduction improvements in either Reach 1, Tie-Off Option B, or Reach 2 or in further study for reformulation of alternatives.

_____
Date

Torkild P. Brunso
Lieutenant Colonel, U.S. Army
Deputy District Engineer

## ACRONYMS

| | |
|---|---|
| BCR | Benefit-Cost Ratio |
| CCI | Construction Cost Index |
| CFR | Code of Federal Regulations |
| CEMVD | U.S. Army Corps of Engineers, Mississippi Valley Division |
| CEMVR | U.S. Army Corps of Engineers, Rock Island District |
| cfs | cubic feet per second |
| EDR | Engineering Documentation Report |
| EIS | Environmental Impact Statement |
| EPA | Environmental Protection Agency |
| ENR | Engineering News Record |
| ER | Engineering Regulation |
| FWS | United States Fish and Wildlife Service |
| GDM | General Design Memorandum |
| GIS | Geographic Information Systems |
| GRR | General Reevaluation Report |
| HEC-FDA | Hydrologic Engineering Center Flood Damage Assessment |
| HTRW | Hazardous, Toxic, and Radioactive Waste |
| LERRD | Lands, Easements, Rights-of-Way, Relocations and Dredge Placement Sites |
| LRR | Limited Reevaluation Report |
| LRS | Limited Reevaluation Study |
| NED | National Economic Development |
| NEPA | National Environmental Policy Act |
| NGVD | National Geodetic Vertical Datum |
| NHPA | National Historic Preservation Act |
| NRHP | National Register of Historic Places |
| OCE | Office of the Chief of Engineers |
| PAC | post-authorization change report |
| PCA | Project Cooperation Agreement |
| PED | Preconstruction Engineering and Design |
| PL | Public Law |
| SHSI | State Historical Society of Iowa |
| SPAC | special post-authorization change report |
| UMRBC | Upper Mississippi River Basin Commission |

# APPENDIX A

## PERTINENT CORRESPONDENCE

**LIMITED REEVALUATION REPORT**
**FOR**
**FLOOD DAMAGE REDUCTION**

**MISSISSIPPI RIVER AT DAVENPORT, IOWA**

**APPENDIX A**
**PERTINENT CORRESPONDENCE**

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City of Davenport

226 West Fourth Street • Davenport, Iowa 52801
319-326-7711 TDD 319-326-6145

May 21, 2001

Colonel William Bayles
District Engineer
U.S. Army Corps of Engineers
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Bayles:

On behalf of the City of Davenport, I am providing the enclosed resolution requesting the assistance of the U.S. Army Corps of Engineers in the completion of a Reconnaissance Study of the Davenport Flood Damage Reduction Project.

Your staff has advised our elected officials and staff in immediate and longer-term responses to the current and future Mississippi River flooding. We presented the recommendation to our City Council that this Reconnaissance Study be undertaken to review the previous proposal for structural flood protection; and on May 16, the resolution was approved.

We also are providing copies of this letter and enclosures to our Congressional delegation, requesting their assistance in the appropriation of funds for this study.

Thank you for your ongoing assistance with the City's response to the current flood and with the consideration of possible responses which may provide further protection against future flooding.

Please advise me if there is more that we should do regarding this request.

Very truly yours.

Clayton Lloyd
Director
Community and Economic Development

cc: Senator Charles Grassley
Senator Tom Harkin
Congressman Jim Leach

*Working together to serve you*

RESOLUTION NO. 2001-263

Resolution offered by Alderman McGivern

RESOLVED by the City Council of the City of Davenport.

RESOLUTION requesting federal funding for Reconnaissance Study and possible further work for Flood Control Project by U.S. Army Corps of Engineers.

WHEREAS, the City of Davenport has experienced periodic problems with flooding of the Mississippi River, including two crests in 2001 which are among the five highest on record;

WHEREAS, the U.S. Army Corps of Engineers developed plans for a structural flood control project in the 1970's and early 1980's;

WHEREAS, the Davenport City Council decided in 1984 not to continue pursuit of this project;

WHEREAS, the City has continued to consider structural flood protection, particularly for certain key public facilities, as part of its overall response to flood hazards;

WHEREAS, the U.S. Army Corps of Engineers has continued to provide technical assistance in emergency flood fighting responses and in limited consideration of possible structural flood protection;

WHEREAS, the City desires to continue its consideration of responses to flood hazards, including possible structural responses;

WHEREAS, the U.S. Army Corps of Engineers has informed the City that an appropriate next step would be to undertake a Reconnaissance Study, with this study to include the review of benefits and costs of the prior flood control project and whose scope and possible further research are outlined on the attached pages; and

WHEREAS, the Reconnaissance Study would require the appropriation of federal funding to support the work of the U.S. Army Corps of Engineers in conducting the study;

NOW, THEREFORE, BE IT RESOLVED that the City Council of Davenport, Iowa:

1. Requests the U.S. Army Corps of Engineers to undertake the Reconnaissance Study; and

2. Requests the support of its Congressional delegation is securing the necessary appropriation to fund the study.

Attest:

Jackie E. Ragsdale, CMC
Deputy City Clerk

Approved: MAY 16 2001

Phillip C. Yerington
Mayor

CEMVR-PM-M

2 Nov 2001
P.Hubert/782-5366

MEMORANDUM FOR RECORD

SUBJECT: Kickoff Meeting for Davenport, Iowa Limited Reevaluation Study for Flood Damage Reduction, 30 Oct 2001

1. Meeting attendees were as follows:

| Name | Organization | Phone | Email |
|---|---|---|---|
| Perry A. Hubert | Corps, CEMVR-PM-M | 309-782-5366 | Perry.a.Hubert@usace.army.mil |
| Clayton Lloyd | Davenport-Director, Community & Economic Development Dept. | 563-326-7769 | cml@ci.davenport.ia.us |
| Dennis Hamilton | Corps, CEMVR-PM-M | 309-794-5634 | Dennis.W.Hamilton@usace.army.mil |
| Roger Less | Corps, CEMVR-ED-DM | 309-794-5664 | Roger.A.Less@usace.army.mil |
| Dan Johnson | Corps, CEMVR-ED-C | 309-794-5857 | Daniel.J.Johnson@usace.army.mil |
| Chuck Van Laarhoven | Corps, CEMVR-ED-C | 309-794-5627 | Charles.Van.Laarhoven@usace.army.mil |
| Karen Grizzle | Corps, CEMVR-RE | 309-794-5201 | Karen.J.Grizzle@usace.army.mil |
| Daniel Fetes | Corps, CEMVR-PM-A | 309-794-5569 | Daniel.P.Fetes@usace.army.mil |
| Jim Ross | Corps, CEMVR-PM-A | 309-794-5540 | James.S.Ross@usace.army.mil |
| Gail Clingerman | Corps, CEMVR-PM-A | 309-794-5791 | Gail.A.Clingerman@usace.army.mil |
| Sue Simmons | Corps, CEMVR-PM-A | 309-794-5573 | Suzanne.R.Simmons@usace.army.mil |
| Dee Bruemmer | Davenport, Director, Public Works | 563-326-7734 | dfb@ci.davenport.ia.us |
| Patrick McGrath | Davenport, City Engineer | 563-326-7729 | Pat4418@yahoo.com |
| Gene Hellige | Davenport, Engineering | 563-326-7729 | grh@ci.davenport.ia.us |
| Charles Heston | Community & Economic Development Dept. | 563-326-7756 | ceh@ci.davenport.ia.us |
| Brock Earnhardt | Iowa American Water Company | 563-324-3264 | bearnhar@amwater.com |
| Steve Honse | Iowa American Water Company | 563-324-3264, x211 | shonse@amwater.com |
| Mark S. Neubauer | Iowa American Water Company | 563-322-0161 | mneubaue@amwater.com |
| Stacy R. Sagar | Iowa American Water Company | 563-324-3264 | ssagar@amwater.com |

2. Meeting was held from approximately 1300-1500 hours on 30 Oct 2001 in the Davenport Public Works Conference Room, 1200 East 46th Street, Davenport, IA 52806.

3. The Agenda for the meeting is Enclosure 1.

4. Dennis Hamilton provided a brief history of the project and stated that the purpose of the Limited Reevaluation Study (LRS) was to update the information provided in the 1982 Design Memorandum (DM), which the Rock Island District Corps of Engineers had previously prepared. The LRS will produce a Limited Reevaluation Report (LRR).

5. Compact Discs (2 copies) containing all documents of the 1982 DM, in pdf (Adobe Acrobat) format were provided to the City. Perry Hubert will send the City one hard copy of the DM after it has been reproduced.

6. The LRS is limited to a federal expenditure not to exceed $100,000 and shall be completed and approved within 12 months. Any expenditures beyond the $100k would require a cost-sharing agreement between the Corps & the City and the cost-sharing split would be 75% federal/25% non-federal.

7. Possible LRS outcomes and the schedule for the LRS were discussed using various handouts. These handouts are the PowerPoint slides of Enclosure 2. The goal is to have a draft LRR done in Feb 2002.

8. LRR discussion points:

   a. LRR will look at 2 project units-the IA Water Treatment Plant and then everything downstream.

   b. LRR will offer suggestions for some new alternatives, but will not explore new alternatives in any detail. New alternatives would have to be explored in detail via a cost-shared (75/25) General Reevaluation Report (GRR) or a cost-shared (50/50) Feasibility Report.

   c. LRR will update project to current standards and for current conditions looking at the 1982 scope.

   d. The Corps has the $100,000 to fund the LRS.

   e. The level of flood protection will be the same as that designed & in place for the City of Rock Island.

   f. All project cost estimates will be updated. Reaches of the project will be used to break the total project area up into smaller portions for reporting purposes. The reaches to be used will be discussed at the field trip scheduled for 0930 hours, 13 Nov 2001, at Iowa American Water Treatment Plant.

   g. The Corps is inviting lots of input to the LRS from the City and the Iowa American Water Co.

   h. Real Estate Costs will be updated to current market values and presented by reach. Denise Tyler, CEMVR-RE-P, will be working with Karen Grizzle. Karen requested a list of ownerships from the City.

   i. Historical/Cultural/Environmental considerations will be updated. National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) requirements will be reviewed.

   j. Dan Fetes will be updating the economics presented in the 1982 DM to account for the present conditions. It was noted that Oscar Mayer has constructed some features that provide some partial flood damage protection. Some homes have also been removed from the study area since 1982.

The water treatment plan has added some features that will be reviewed. Dan will coordinate closely with Clayton Lloyd.

9. 1982 DM discussion points:

   a. There are some reports that were done regarding flood damage reduction for the City of Davenport, IA, but the 1982 DM is the latest final report.

10. The Project Management Plan (PMP) (Enclosure 3) for the LRS was distributed and discussed briefly. Dennis asked everyone to review it and provide any comments to Perry Hubert. The Product Development team Member list will be updated to include additional personnel that will be supporting the LRS. City of Davenport Team members will be identified for purposes of documenting the City's involvement for crediting purposes. Clayton & Perry will coordinate & set-up the team. The City understands that they will need to keep records that would be sufficient for an audit. Dennis provided Clayton with copies of the "Model Agreement for Design in Accordance With Section 105c of Public Law 99-662, Policy Guidance Letter No. 55, and pp. 121-122, 138-140 of 32 CFR Ch. 1 (7-1-00 Edition). They have experience with this from documentation requirements that FEMA has.

11. Communication: Perry Hubert, for the Corps, and Clayton Lloyd, for the City, are the primary points-of-contact. Maximum use of email/telephone was encouraged for coordination. All Corps team members were asked to provide notes from discussions they have to Perry who will distribute the information to the entire Corps team and Clayton for his further distribution to the City team. All City team members were asked to provide notes from discussions they have to Clayton who will distribute the information to the entire City team and Perry for his further distribution to the Corps team. Perry will keep an inventory of all documents received from the City and make this list available together with information on the POC for the data, so that data can be available to all team members.

12. Information that Davenport has available to share with the Corps for the LRS:

   a. AutoCAD files of the project area. Bob Reibe is Corps POC to coordinate with Steve Gartner of City.

   b. Topography (2 foot) with Plano metrics. Bob Reibe is Corps POC to coordinate with Steve Gartner of City.

   c. Real Estate Parcel Maps (GIS). Mary Craig is Corps POC to coordinate with Steve Gartner of City.

   d. Plan & Zone Maps GIS). Mary Craig is Corps POC to coordinate with Steve Gartner of City.

   e. Iowa American Drawings were received from Steve Honse for the East River Station Clearwell Addition, Job No. 37184, June 2000, Drawings as follows:

      - Sheet C2, Civil/Location Plan & Control, Drawing No. 230-388-002
      - Sheet C3, Civil/Site Plan A, Drawing No. 230-388-003
      - Sheet C4, Civil/Site Plan B, Drawing No. 230-388-004
      - Sheet C5, Civil/Site Plan C, Drawing No. 230-388-005

   f. Iowa American Number of Customers, Customer Service Area, Contingency Plans including estimated cost of providing water in the event that flooding would render the water treatment plant inoperable and/or contaminated. The Iowa American POC for this info is Brock Earnhardt.

g. It was noted by the City that limited information is available on underground utilities. Very little information is available regarding the City's storm sewer system.

h.

13. Public Involvement Plan discussion:

    a. The City would like a Power Point presentation that they could run on their cable television network.

    b. The City also anticipates a requirement to make a presentation to the City Council.

    c. An email site should be set-up to allow public comment.

    d. Public Education should be a central goal/theme. The City and Corps web sites should have info & links to provide info.

    e. Sue Simmons is working to set-up a meeting on or about 15 Nov to discuss this further and get others involved, including the Corps Public Affairs Office.

14. Field Trip to walk/drive the project area is set for 0930 hours, 13 Nov, at Iowa American Water Company. A list of attendees for this trip is required. All attendees must bring identification with them. Some drawings will be available for field trip participants for note taking.

PERRY A. HUBERT, P.E.
Project Manager

CF:

All Meeting Attendees
CEMVR-PM-M (Dist File)
CEMVR-ED-DM (Bob Riebe)
CEMVR-PA (Ron Fournier)
CEMVR-PM-A (Ken Barr, Dorie Bollman)
CEMVR-PM-M (Mary Craig)
CEMVR-RE-P (Denise Tyler)
CEMVR-PM-M (Joe Kellett)

G:/hubertpa$ on cemvr/Davenport, IA LRR/Correspondence/MFR 30 Oct 2001 Kickoff Meeting.doc

CEMVR-PM-A 5 December 2001

MEMORANDUM FOR RECORD

SUBJECT: Davenport, Iowa, Flood Protection Limited Reevaluation Study Public Involvement Meeting – Final Minutes

1. Personnel from the City of Davenport and the Corps of Engineers met on 15 November 2001 at the Davenport City Hall to discuss public involvement for the subject study. Meeting participants included:

City of Davenport
Clayton Lloyd
Dee Bruemmer
Jennifer Nahra

Iowa American Water Company
Steve Honse
Brock Earnhardt
Stacy Sagar
Mark Neubauer
Lisa Reisen

Corps of Engineers
Ron Fournier
Sue Simmons

2. Discussion centered around what types of public involvement activities will best inform/involve the citizens of Davenport. Three public involvement activities are requested by the City: PowerPoint presentation at a City Council meeting, creation of a study website, and a public meeting. Discussions about these activities are included in the following paragraphs.

3. Presentation to City Council. Suggest that the Corps of Engineers give a PowerPoint presentation to the City Council or to the Committee-of-the-Whole.

a. The purpose of the presentation would be to describe the limited reevaluation study – what it is and what it is not – so the public does not have unmet expectations of what the study is about. City Council meetings are taped and rebroadcast on the City of Davenport's Channel 13, which reaches virtually all Davenport residents.

b. The format would be for the Corps to present the presentation to the City Council members. Council members could ask questions; citizens would not ask questions.

c. The City Council meets on the 1st and 3rd Wednesdays of the month at 7 p.m. The meetings are then shown 4 times/day on Channel 13 on Thursday-Sunday following the meetings. The Committee-of-the-Whole meets at 4:30 p.m. on the Monday. The meetings are shown 8 times on Tuesday and Wednesday. The group felt that a presentation at the City Council meeting would be the most beneficial because the presentation would be shown more times and also would be shown over a weekend, thus allowing more viewing opportunities for the Davenport citizens.

d. The City may want to interview the Corps Study Manager and tape the interview so it can be shown on Channel 13 before the City Council meeting and the presentation are aired. The City also has the capability to provide a voice-over using the text of the presentation prior to placing it on Channel 13.

e. Because of the short timeframe of the study, suggested dates for presenting the PowerPoint presentation are:

| City Council Dates | Committee-of-the-Whole Dates |
|---|---|
| 5 December (best date) | 3 December |
| 19 December | 17 December |
| 16 January | 14 January |

f. TASK: Sue Simmons will coordinate with Perry Hubert and others as to their availability to attend a Council meeting and to prepare a PowerPoint presentation. Sue or Perry will coordinate with Clayton Lloyd. NOTE: It appears that 19 December is the meeting date that will work best for both the Corps of Engineers and the City of Davenport.

4. Davenport Study Web Page. Ron Fournier will design a web page for the study.

a. The web page will link to the City's web page. Study information will be presented (text, photos); however, caution will be used when providing details about the City's infrastructure (e.g., Water Plant).

b. TASK: Ron will coordinate the web page information with Lisa Reisen from the Water Company.

c. It will take Ron approximately 3 days to put the web page together. He will start after the Thanksgiving holiday.

5. Public Meeting. The City representatives agreed that a public meeting should be held after the draft limited reevaluation report is written. It is important to include and involve the public in this study.

a. Although a public meeting hosted by the Corps of Engineers is not in the scope for the limited reevaluation study, the City would like to host a public meeting or public open house. City representatives and Corps of Engineers representatives would be present to explain the study results to the citizens of Davenport and to provide an opportunity for the citizens to ask questions about the study to the City and the Corps.

b. Suggested timeframe for the public meeting: February 2002.

c. TASK: Sue Simmons will check with Perry Hubert about a comment review period and to verify that the information stated above about the Corps' participation at a public meeting/open house is correct.

(16 Nov – Sue spoke with Perry this morning. Perry is not certain whether there is a public comment review period in this type of study or not and will look in to it. He agreed that the Corps does not have the funds to hold a public meeting/open house; however, some study team members could participate in a city-hosted meeting.)

6. The group discussed how the study should be presented. Following are thoughts that were brought up as to the information we should relay to the public:

a. The approach should be low-key.

b. The City requested the Corps to reevaluate the study done in Davenport in the 1980's. The request is supported by the Water Company.

c. The City and the Corps have no preconceived expectations for the outcome of the study.

d. This reevaluation study is a limited study – a baseline review looking at the original design; however, it will set the stage for policy decisions by the City Council, including possible requests for further study or design of certain elements of a structural flood control project.

e. Set the tone for the expectations of the study outcome.

f. The City's message: the City of Davenport is doing the responsible thing – the information gathered in this limited reevaluation study will be included in the long-range planning for Davenport.

Suzanne R. Simmons

SUZANNE R. SIMMONS
Public Involvement Specialist
Economic & Environmental Analysis Branch

CF:
Dist File (PM)

# PROJECT MANAGEMENT PLAN

Davenport, Iowa Flood Protection (PWI 074987)
Limited Reevaluation Study

1. **Date:** 29 October 2001, revised 6 December 2001

2. **Reference**: ER 5-1-11, U.S. Army Corps of Engineers Business Process

3. **Project Description**: The city of Davenport is located in Scott County, Iowa on the Mississippi River. A reconnaissance-level Limited Reevaluation study would review the previous proposal for flood protection contained in the 1982 General Design Memorandum (GDM) and establish whether there is continued Federal interest in the project. This includes a determination of whether the project is still economically justified, environmentally acceptable, technically appropriate, and adequately supported by non-Federal interests. The study would review and update previous project assumptions and perform limited surveys, sampling, and application of other techniques to develop a reasonable estimate of project benefits. See the attached Issue Paper for more information.

4. **Scope of Work/Products**: The products of the limited reevaluation study are a Limited Reevaluation Report (LRR), a Project Management Plan (PMP) for any subsequent PED activities recommended by the LRR, and a cost sharing agreement (Design Agreement) for any subsequent PED activities recommended by the LRR. The LRR will include a limited update of the GDM including economic analysis, necessary design changes, and environmental compliance. The scope of work described in this document has been coordinated with the project sponsor, the City of Davenport.

5. **Schedule:** The timeframe for completing this limited reevaluation is 12 months from the date of initial expenditure of funds. The Project Manager will monitor schedule and costs. The official project schedule will be maintained within the PM-AIS system and can be viewed on the intranet at the PPDS website at http://ppdsintra-w.usace.army.mil/ppds/home. Following is a list of significant milestones:

| Event: | Date: |
|---|---|
| Initiate Limited Reevaluation | 30 Oct 2001 |
| Coordination Meeting with Sponsor | 30 Oct 2001 |
| Site Visit by Team | 13 Nov 2001 |
| Public Involvement Coordination Meeting | 15 Nov 2001 |
| Distribute Draft LRR to Team for Review | 01 Feb 2002 |
| Public Meeting Hosted by City of Davenport | Feb/Mar 2002 |
| Review LRR/Incorporate Comments | 01 Mar 2002 |
| Submit LRR to MVD | 01 Apr 2002 |
| MVD Review & Approval | 01 May 2002 |
| Draft PMP & Design Agreement | 01 July 2002 |
| Coordination Meeting with Sponsor | 15 July 2002 |
| Review PMP & Design Agreement | 15 Aug 2002 |
| Final PMP & Design Agreement | 15 Sep 2002 |
| Execute Design Agreement | 30 Sep 2002 |

6. **Budget**: PWI# 074987. Each Division or Branch will be responsible for managing the funds under the appropriate work item, including creating and amending PR&Cs.

| ORG | FWI | LRR Budget | PMP Budget |
|---|---|---|---|
| PM-M | 1852L1 | ~~$20,000~~ 15,000 | ~~$13,000~~ 8,000 |
| ED | 30JG1D | $20,000 | $5,000 |
| PM-A | 8BL25D | ~~$30,000~~ 40,000 | $5,000 |
| RE | HJ296D | $5,000 | $2,000 |

Per changes 01/04/02
Per conversation with
Perry Hubert (PM)
Jack Carr

7. **Product Development/Preconstruction Engineering & Design Team Members**:

| Name, Discipline | Organization | Phone | Email |
|---|---|---|---|
| Perry A. Hubert, Project Manager, | Corps, CEMVR-PM-M | 309-782-5366 | Perry.A.Hubert@usace.army.mil |
| Clayton Lloyd, Main POC for City of Davenport | Davenport-Director, Community & Economic Development | 563-326-7769 | cml@ci.davenport.ia.us |
| Dennis Hamilton, Product Line Manager | Corps, CEMVR-PM-M | 309-794-5634 | Dennis.W.Hamilton@usace.army.mil |
| Roger Less, Project Engineer | Corps, CEMVR-ED-DM | 309-794-5664 | Roger.A.Less@usace.army.mil |
| Robert Riebe, Engineering | Corps, CEMVR-ED-DM | 309-794-5507 | Robert.T.Riebe@usace.army.mil |
| Dan Johnson, Chief of Cost Engineering | Corps, CEMVR-ED-C | 309-794-5857 | Daniel.J.Johnson@usace.army.mil |
| Chuck VanLaarhoven, Cost Engineering | Corps, CEMVR-ED-C | 309-794-5627 | Charles.Van.Laarhoven@usace.army.mil |
| George Sporer, Realty Specialist | Corps, CEMVR-RE-A | 309-794-5382 | George.J.Sporer@usace.army.mil |
| Daniel Fetes, Economics | Corps, CEMVR-PM-A | 309-794-5569 | Daniel.P.Fetes@usace.army.mil |
| Jim Ross, Cultural/Historical Recsources | Corps, CEMVR-PM-A | 309-794-5540 | James.S.Ross@usace.army.mil |
| Gail Clingerman, Environmental Analysis | Corps, CEMVR-PM-A | 309-794-5791 | Gail.A.Clingerman@usace.army.mil |
| Sue Simmons, Public Involvement | Corps, CEMVR-PM-A | 309-794-5573 | Suzanne.R.Simmons@usace.army.mil |
| Mary Craig, GIS Specialist | Corps, CEMVR-PM-M | 309-794-5816 | Mary.R.Craig@usace.army.mil |
| Dee F. Bruemmer, Dir. of Public Works | Davenport, Director, Public Works | 563-326-7734 | dfb@ci.davenport.ia.us |
| Patrick McGrath, City Engineer | Davenport, City Engineer | 563-326-7729 | Pat4418@yahoo.com |
| Gene Hellige, Senior Engineer | Davenport, Engineering | 563-326-7729 | grh@ci davenport.ia.us |
| Charles Heston, Project Manager | Community & Economic Development Dept. | 563-326-7756 | ceh@ci davenport.ia.us |

8. **Site Visits**: Product development team members and reviewers will coordinate with the Project Manager to make site visits during the study as needed.

9. **Coordination/Communication**: Coordination will be made with Engineering Division for updated hydraulic and hydrologic data, surveys, geotechnical engineering, environmental engineering, project design, cost estimates, and other engineering data. Coordination also will be made with Real Estate Division for updating Real Estate data. Within the Planning, Programs, and Project Management Division, coordination will be made for plan formulation, social & economic analysis and environmental compliance considerations.

Product team members and reviewers are responsible for reading all written documents related to the project and for attending project meetings as appropriate. Regularly scheduled project meetings will be held and used as a forum for discussing issues related to product quality. Individual team members and reviewers are responsible for communicating issues, concerns and problems with each other and with the Project Manager, so that appropriate solutions can be developed in a timely fashion. Team members are also responsible for monitoring the schedule and budget for the tasks for which they are responsible, and keeping those tasks on schedule and within budget. Team members are responsible for coordinating the workload with their supervisor and others as necessary to accommodate the workload.

10. **Guidance**: Pertinent regulations include, but are not limited to, ER 5-1-11, Program and Project Management; ER 1105-2-100, Guidance for Conducting Civil Works Planning Studies; and ER 1110-2-1150, Engineering and Design for Civil Works Projects, as well as appropriate Engineering Manuals. Plates and drawings will be prepared using CADD. The study will be completed using English units of measure.

11. **Quality Assurance Reviews:**

a. Environmental: Coordination with the Environmental Analysis Branch (PM-A) regarding environmental statute compliance (i.e., National Environmental Policy Act, Endangered Species Act, Fish and Wildlife Coordination Act, National Historic Preservation Act) and with Engineering Division, Design Branch, Environmental Engineering Section (ED-DN) regarding environmental hazard, safety analysis, and pollution control compliance (i.e., Comprehensive Environmental Response, Compensation, and Liability Act; Resource Conservation and Recovery Act; Clean Air Act; and Clean Water Act) will be initiated as appropriate.

b. Internal Product Review: The product development team is responsible for producing a high quality product to meet the needs of the customer. Technical supervisors will assure that each team member's technical work is checked for completeness, accuracy, and clarity by other experienced technical persons who have been involved with similar work. Internal reviews will be documented through certification of a product development team checklist. Further reviews will not proceed before all checks have been accomplished.

c. Independent Technical Review (ITR). The ITR team will consist of appropriate personnel from the following organizations in the Rock Island District:

| | |
|---|---|
| **Planning, Programs, and Project Management Division:** | |
| Project Management Branch | PM-M |
| Economics & Environmental Analysis Branch | PM-A |
| **Engineering Division:** | |
| Cost Engineering Branch | ED-C |
| Design Branch, Project Management Section | ED-DM |
| Design Branch, Environmental Engineering Section | ED-DN |
| Geotechnical Branch | ED-G |
| Hydrology and Hydraulics Branch | ED-H |
| **Real Estate Division:** | RE |

The ITR Team members will not have been directly involved with development of the LRR. The expertise and technical backgrounds of the team members will qualify the team to provide a comprehensive technical review of this project. An ITR will be performed at the 95-percent-complete level. All comments resulting from their review will be resolved in accordance with the QMP.

d. Review Documentation. Copies of documentation of all review comments and responses, along with the Technical and Policy Compliance Checklist will be provided to the Chief of the Project Management Branch and the Assistant Chief of Design Branch.

12. **Approval**: Final approval of the product is accomplished when the Technical and Compliance Checklist is signed by the District Engineer.

13. **Cost Monitoring and Control**: Schedule and costs during the study will be monitored by the Project Manager. The Project Manager will be promptly notified of significant cost variations and funding needs. Changes to the project scope, schedule, and/or budget will be coordinated with the sponsor and Rock Island District Project Review Board (PRB) and formalized by amending this document.

**SIGNATURES:**

| | | |
|---|---|---|
| **SUBMITTED BY:** | **Project Manager** | 12/7/2001<br>**Date** |
| **REVIEWED BY:** | **Chief, Project Management Branch** | 12-14-01<br>**Date** |
| | **Chief, Economic & Environmental Analysis Branch** | 1-04-02<br>**Date** |
| | **Chief, Design Branch** | 1-09-02<br>**Date** |
| **APPROVED BY:** | **Chief, Planning, Programs, and Project Management Division** | 2-11-02<br>**Date** |
| | **Chief, Real Estate Division** | 1/25/02<br>**Date** |
| | **Chief, Engineering Division** | 1/25/02<br>**Date** |
| **CONCUR:** | **Director, City of Davenport, Community & Economic Development Department** | 2-13-02<br>**Date** |

Attachment: Issue Paper dated 29 October 2001, revised 6 Dec 2001

29 October 2001
Revised 6 December 2001

## ISSUE PAPER

## MISSISSIPPI RIVER AT DAVENPORT, IOWA

**STATEMENT OF ISSUE:** The City of Davenport has requested the Corps reevaluate the flood protection project authorized in 1970 to determine if it, or other flood damage reduction alternatives, are feasible based on current conditions.

**BACKGROUND AND PURPOSE:** The Davenport flood protection project was authorized for construction on 31 December 1970. A Phase I General Design Memorandum was completed in August 1976 and approved on 2 May 1978. A Phase II General Design Memorandum (GDM) recommending revisions to the project was completed in February 1982. The benefit-cost ratio in the GDM was 1.17, and the City's share of the $33. 9 million project was $13 million based on the Corps' policy requiring a 35% local cost share for new start projects. In May 1984, the City declined to participate due to the cost of the project and poor economic conditions at that time. The project has been classified as inactive and will be deauthorized in April 2002 unless funds are obligated.

Record flood levels in 1993 were nearly matched in 2001, causing extensive flood damages and attracting national attention. The baseball stadium, residential areas, commercial/industrial areas, and significant reaches of the downtown area were flooded. The water treatment plant was threatened by flooding, but remained in service during the floods due to emergency flood-fighting actions. The wastewater treatment plant was unable to keep up with the high water levels, and the City was forced to bypass sanitary sewer flows into the river. Davenport has been identified as the largest city along the Mississippi River without a flood damage reduction system. The prior decision (May 1984) not to proceed with structural flood protection has been brought into question. A City Council resolution was passed on 16 May 2001 requesting a reconnaissance study and appropriation of funds by Congress.

**DESCRIPTION OF STUDY:** In accordance with Corps of Engineers policy for resumption of authorized projects that have not been constructed, a reconnaissance-level Limited Reevaluation study would review the previous proposal for flood protection contained in the 1982 DM and establish whether there is continued Federal interest in the project. This includes a determination of whether the project is still economically justified, environmentally acceptable, technically appropriate, and adequately supported by non-Federal interests. The study would review and update previous project assumptions and perform limited surveys, sampling, and application of other techniques to develop a reasonable estimate of project benefits. A Limited Reevaluation Report (LRR) would be produced in approximately 4 to 6 months and be submitted to higher authority for approval.

**SUBSEQUENT ACTIVITIES**: Following are brief summaries of activities that could be recommended by the LRR:

- If the project is determined to be unjustified or inappropriate, and there appears to be no Federal interest in reformulating the project, the limited reevaluation study would be terminated.

- If the project or portions of the project are determined to be justified and appropriate for construction, then preconstruction engineering and design (PED) activities could proceed. A cost-shared design agreement (75% Federal and 25% Non-Federal) with the sponsor would be executed for preparation of an Engineering Documentation Report (EDR) and preparation of detailed plans and specifications for those portions of the project as recommended.

- If the project or portions of the project are determined to be unjustified or inappropriate for construction, but there appears to be a Federal interest in reformulating the project to consider other alternatives, a General Reevaluation study would be recommended to fully evaluate alternatives that may be justified and appropriate. These alternatives would include the broadest range of structural and non-structural alternatives deemed appropriate. A cost-shared design agreement (75% Federal and 25% Non-Federal) with the sponsor would be executed for preparation of the General Reevaluation study. The study would result in a General Reevaluation Report (GRR) that would make recommendations for implementation of alternatives that are determined to be in the Federal interest.

**COST:** A reconnaissance-level Limited Reevaluation study would be conducted at a cost not to exceed $100,000. A 25% local cost share would be required following completion of the Limited Reevaluation and execution of a cost sharing agreement.

**AUTHORIZATION:** The project was authorized for construction on 31 December 1970 by P.L. 91-611.

**CONGRESSIONAL DISTRICT:** IA-1

**POINT OF CONTACT:** Perry A. Hubert, Project Management Branch, CEMVR-PM-M, telephone (309) 782-5366. E-mail address: Perry.A.Hubert@usace.army.mil

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING — P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF:

December 7, 2001

Planning, Programs, and
Project Management Division

Mr. Clayton Lloyd
Director
Community & Economic
Development Department
City of Davenport
226 West Fourth Street
Davenport, Iowa 52801

Dear Mr. Lloyd:

Please reference the Davenport, Iowa, Flood Damage Reduction Limited Reevaluation Study that began on October 30, 2001. As you know, this study is being conducted by the Rock Island District of the U.S. Army Corps of Engineers (Corps) in cooperation with the City of Davenport. The purpose of this letter is to establish the Preconstruction Engineering and Design (PED) Coordination Team for the referenced project.

The PED Coordination Team was discussed at the meeting held at the City of Davenport Public Works Office on October 30, 2001. At that meeting, you were given copies of the following documents, which provide information relative to the PED Coordination Team:

a. Model Agreement for Design in Accordance with Section 105c of Public Law 99-662.

b. Policy Guidance Letter No. 55, dated October 7, 1997.

c. 32 CFR Ch. 1 (7-1-00 Edition), pp. 121-122 and 138-140.

The role of the PED Coordination Team includes the following:

a. To provide for consistent and effective communication through regularly scheduled meetings to exchange information. The Corps' Project Manager and a counterpart named by the Non-Federal Sponsor shall co-chair the PED Coordination Team.

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

c. The PED Coordination Team generally oversees issues related to PED, including scheduling of reports and work products; development of plans and specifications; anticipated real property and relocation requirements for construction or implementation of the project; contract awards and modifications; contract costs; the Corps' cost projections; anticipated requirements and needed capabilities for performance of operation, maintenance, repair, replacement and rehabilitation of the project; and other related matters.

d. The PED Coordination Team may make recommendations that it deems warranted to the Corps' District Engineer on matters that the PED Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Corps in good faith shall consider the recommendations of the PED Coordination Team. The Corps, having the legal responsibility and authority for PED, has the discretion to accept, reject, or modify the PED Coordination Team's recommendations.

e. The costs of participation in the PED Coordination Team shall be included in the total PED costs and cost shared in accordance with the provisions of subsequent Agreements to be executed after completion of the 100-percent Federal share of the Limited Reevaluation Study. No credit may be given to Non-Federal Sponsors for their costs to negotiate the Project Cooperation Agreement (PCA). Credit will be allowed, during the period of design, for all reasonable, allocable, and allowable costs incurred by the Non-Federal Sponsors in connection with their participation in the PED Coordination Team.

f. As the Corps' Project Manager, Mr. Perry A. Hubert will co-chair the PED Coordination Team with the counterpart of your choice. It is my understanding that you will be the City of Davenport's co-chair for the PED Coordination Team. It is also my understanding that the following City of Davenport personnel will be involved in the PED Coordination Team:

| Name | Organization/Title | Phone | Email |
|---|---|---|---|
| | | | |
| Dee F. Bruemmer | Davenport, Director, Public Works | 563/326-7734 | dfb@ci.davenport.ia.us |
| Blaine Flack | Davenport, Inspections Supervisor | 563/327-5165 | bhf@ci.davenport.ia.us |
| Steven Gartner | Davenport, GIS Analyst | 563/326-7729 | srg@ci.davenport.ia.us |
| Gene Hellige | Davenport, Senior Engineer | 563/327-5153 | grh@ci.davenport.ia.us |
| Charles Heston | Community & Economic Development Dept., Project Manager | 563/326-7756 | ceh@ci.davenport.ia.us |
| Scott Koops | Davenport, Planning Technician | 563/328-6701 | sek@ci.davenport.ia.us |
| Clayton Lloyd | Davenport, Director, Community & Economic Development Dept. | 563/326-7769 | cml@ci.davenport.ia.us |
| Patrick McGrath | Davenport, City Engineer | 563/326-7729 | Pat4418@yahoo.com |
| Jennifer Nahra | Davenport, Public Information Officer | 563/326-6151 | jen@ci.davenport.ia.us |
| Eric Schaiferl | Davenport, Senior Engineer | 563/327-5162 | ers@ci.davenport.ia.us |

Please provide a written confirmation of this information or any corrections/additions that you may have. Please send your reply to the following address:

ATTN: Project Management Branch (Hubert)
District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

If you have any questions, please do not hesitate to contact Mr. Perry A. Hubert, Project Manager, by telephone at 309/782-5366, or by email at Perry.A.Hubert@usace.army.mil.

Sincerely,

**ORIGINAL SIGNED BY**

Gary L. Loss, P.E.
Chief, Planning, Programs, and
Project Management Division

DAVENPORT CITY NEWS

"Working together to serve you" January/February/March 2002

# U.S. Army Corps of Engineers Launches Study

In late October 2001, the U.S. Army Corps of Engineers launched a Limited Reevaluation Study of an earlier flood control proposal considered by the City of Davenport in the late 1970's and early 1980's. This study follows a request approved by the City Council in May for Corps of Engineers assistance in again considering how structural protection could be part of the community's response to repeated flooding along the Mississippi River.

The earlier proposal featured an array of earthen levees, flood walls, and pumping facilities. The areas to be protected included the water company's treatment plant and the area between the Government Bridge and I-280. The current study is to determine if the previous proposal "is still economically justified, environmentally acceptable, technically appropriate, and adequately supported by non-Federal interests." The study will focus on updating estimates of costs and projections of benefits, within the framework of the current physical conditions and applicable regulations and procedures.

This limited Corps study will not involve any major revisions to the earlier design. However, the conclusions of the study will set the stage for further work -- for the pursuit of portions of the previous proposal that are feasible and which do have local support and for the consideration of revisions or alternative approaches to dealing with Mississippi River flooding.

Results of the study will be made available for public review in the spring of 2002.

CEMVR-PM-M

31 Jan 2002
P.Hubert/782-5366

MEMORANDUM FOR RECORD

SUBJECT: In-Progress Review/Coordination Meeting for Davenport, Iowa Limited Reevaluation Study for Flood Damage Reduction, 23 Jan 2002

1. **Meeting Attendees**:

| Name | Organization | Phone | Email |
|---|---|---|---|
| Perry A. Hubert | Corps, CEMVR-PM-M | 309-782-5366 | Perry.a.Hubert@usace.army.mil |
| Clayton Lloyd | Davenport-Director, Community & Economic Development Dept. | 563-326-7769 | cml@ci.davenport.ia.us |
| Roger Less | Corps, CEMVR-ED-DM | 309-794-5664 | Roger.A.Less@usace.army.mil |
| Daniel Fetes | Corps, CEMVR-PM-A | 309-794-5569 | Daniel.P.Fetes@usace.army.mil |
| George Sporer | Corps, CEMVR-RE-A | 309-794-5382 | George.J.Sporer@usace.army.mil |
| Dee Bruemmer | Davenport, Director, Public Works | 563-326-7734 | dfb@ci.davenport.ia.us |
| Patrick McGrath | Davenport, City Engineer | 563-326-7729 | Pat4418@yahoo.com |
| Gene Hellige | Davenport, Engineering | 563-326-7729 | grh@ci.davenport.ia.us |
| Charles Heston | Community & Economic Development Dept. | 563-326-7756 | ceh@ci.davenport.ia.us |
| Brock Earnhardt | Iowa American Water Company | 563-324-3264 | bearnhar@amwater.com |
| Fred Rader | Iowa American Water Company | 563-324-3264 | |
| Joel Molu | Iowa American Water Company | 563-324-3264 | |

2. **Meeting Time & Place**: The meeting was held from approximately 1300-1445 hours on 23 Jan 2002 in the Davenport Community & Economic Development Conference Room, 2nd floor, City Hall, Davenport, IA.

3. **Introduction**: Perry Hubert provided a brief history of the project since the 30 Oct 2001 Study Kickoff meeting. Perry also stated that he felt we were on target to distribute the Limited Reevaluation Report (LRR) for review by the team in Feb 2002. The LRR skeleton is in place and the sections/plates are beginning to be completed.

4. **LRR Draft Plates**: A Compact Disc containing all documents of the 1982 DM, LRR draft plates, and the 19 Dec 2001 PowerPoint briefing to the Davenport City Council was given to Clayton Lloyd, in pdf (Adobe Acrobat) format. Also included, as a Microsoft Word file is a series of color photos along

the project alignment with a red line showing the 1982 alignment and a blue line showing the 2002 alignment. Roger Less also provided one hard copy of draft color plates.

5. **LRR Plates/Reaches/Cost Estimate**: Roger Less explained that the LRR will look at 2 project units- the IA Water Treatment Plant (Reach 1) and then everything between Government Bridge and I-280 as Reach 2. Per an 11 Dec 2001 coordination meeting with the City of Davenport, Reach 2 will be subdivided into Reaches 2-A, 2-B, and 2-C as follows:

   For LRR study purposes, the two 1982 study reaches have been labeled:

   Reach 1 Iowa-American Water Plant
   Reach 2 Government Bridge to Interstate 280

   Reach 2 has been further sub-divided into three sub-reaches based on study coordination with the city of Davenport. These reaches are:

   | | |
   |---|---|
   | Reach 2-A | Government Bridge to Main Street |
   | Reach 2-B | Main Street to Marquette/Sturdevant Streets |
   | Reach 2-C | Marquette/Sturdevant Streets to Interstate 280 |

   An alternate upstream tie-off has been identified at Main Street and an alternate downstream tie-off has been identified at Marquette/Sturdevant Streets and act to further define the sub-reaches inland into the developed floodplain areas. These alternate tie-off locations are to be considered preliminary, but will be used during the LRR study to provide a greater understanding of the project costs and benefits by reach. No detailed engineering design will be done on the alternative tie-offs beyond what is shown on the plates, but the LRR study effort will update the 1982 project cost estimate to 2002 price levels and will be broken down into the sub-reaches to identify the cost of each reach. Concept costs will also be attached to each of the two alternative tie-offs that have been identified. The plates that show Reach 1 will be fairly vague to protect sensitive information concerning the Iowa American Water Plant facilities.

6. **Cost Estimate**: The $33.9 million 1982 cost has grown to approx. $50 million using inflation factors from Engineering News Record (ENR) for 1982 to 2002. Quantities are being re-calculated to account for various changes since 1982. One example is the Beiderbecke Drive area where the City has indicated they would like a change from the 1982 plan. This will result in a reduction in construction cost for this area.

7. **Reach 1 Coordination Meeting of 15 Jan 02**: Bob Riebe, Dan Fetes and Roger Less met with the Iowa American Water Company at their offices on 2nd Street in Davenport. In attendance from Iowa American was Steve Honse (Project Engineer), Stacy Sager (Operations Manager) and Fred Rader (Maintenance Manager).

   The LRR study process and status were initially discussed with Iowa American along with the issue of 1966 and 1979 Mississippi River flood profiles. Next, coordination of the revised line-of-protection through the Davenport water treatment facility was discussed. Plant improvements (pump transfer building and clearwell tank) since 1982 dictated that the alignment be reestablished. For LRR study purposes, it was decided that the downstream tie-off would be moved approximately 75 feet downstream and the recreational features adjacent to the bike trail would be relocated downstream thereof. At the upstream end, the new clearwell would be brought into the line-of-protection via incorporating the tank walls into the floodwall alignment. Also, the alignment would be shifted to miss the pulsator treatment building that has been constructed since 1982. These revised alignments have been updated on the LRR platework. Some more detailed design issues were discussed, but no issues arose that would significantly affect the overall construction cost.

   As such, the 1982 GDM construction costs will be ENR'ed to 2002 price levels with very little adjustment in underlying features that will impact on the updated cost estimate.

8. **1966 vs. 1979 Flood Profiles**: The 1982 GDM was based on 1966 flood profiles that are approximately 2-2.5 feet higher than 1979 flood profiles. The LRR will use 1979 flood profiles. For the LRR, the physical level of the project will be kept the same as in the 1982 GDM. This will correspond to flood damage reduction projects in place elsewhere in the quad cities. The change in flood profiles means that what was 200-year flood protection plus 3 feet of freeboard in the 1982 GDM theoretically changes to 500-year flood protection plus 4 feet of freeboard in the 2002 LRR. This change in flood profiles also has the affect of reducing the number of properties impacted by flooding because of the 2-2.5 foot decrease in levels. This corresponds to changes in flood damages prevented, or benefits.

9. **Real Estate Cost Estimate**: George Sporer and Roger Less have been working together closely to facilitate the preparation of a revised Real Estate cost estimate for the LRR. The revised cost estimate will concentrate on flood damage reduction lands and not on recreation features or on the Nahant Marsh mitigation areas. These items can be explored in more detail if the study proceeds to a General Reevaluation Report (GRR). The RE costs cannot just be inflated from 1982 to 2002 using ENR factors. George stated that all appears to be pretty straight forward for Reach 1, however if this portion of the project proceeds beyond the LRR, negotiations with the railroad will be required, which have proven to be challenging for other projects. The RE cost estimate will assume that we have no hazardous/toxic/radioactive waste (HTRW). Charlie Hesston stated that the City of Davenport currently owns about 78 acres of the Nahant Marsh, representing the core of the marsh, but that additional marshlands are available to be acquired and therefore this area could still possibly be used as a mitigation area.

10. **Economics**: Dan Fetes explained that he will be updating the benefit-cost analysis from 1982 to 2002. He noted the differences that the 1979 flood profiles will make compared to the 1966 flood profiles, as explained in paragraph 8 above. He also stated that many businesses & residences have relocated out of the floodplain since the 1982 GDM. He also stated that recreation costs and benefits will be kept separate from flood damage reduction costs & benefits. Dan went on to explain that for Reach 1, he needs catastrophic scenario details to facilitate his analysis. Iowa-American (I-A) Water Co. will provide information to Dan regarding the elevation at which their plant would have to shut-down if no temporary flood fight measures were put in place. Also, I-A will furnish cost estimates for all flood-related costs to include temporary flood fight measures, repairs to damages, and the cost of providing temporary water. The city of Des Moines estimated that they distributed 12 gallons of water/day/person in 1993 after their water supply system went down due to the 1993 flood. I-A indicated that wind action is a very significant factor when assessing the risk of temporary flood fight measures. The wave action is very significant.

11. **Project Management Plan (PMP)**: The PMP is being circulated for signatures at the Corps. Perry will find this & get it to Clayton for signature ASAP.

12. **Draft LRR**: Perry stated that the team should be receiving the draft LRR in late Feb 02 for review. No additional Team meetings are anticipated between now & then.

13. **Post LRR Questions**: Perry stated that we anticipate LRR approval in May 2002. After that we would work with the City of Davenport to proceed with post LRR coordination to implement LRR recommendations. I-A would like some lead time to know how much funding may be required if 75%/25% cost-shared work is pursued.

14. **Other Options Available to City of Davenport**: Clayton Lloyd and Dee Bruemmer asked what other options they could pursue through the Corps of Engineers, if the LRR does not show a federal interest in participating in a flood damage reduction project for portions of the 1982 recommended plan. Perry said that he would explore this further with Dennis Hamilton and get back to the City with some answers. Some preliminary information was discussed as follows:

a. **General Reevaluation Report (GRR)**: A GRR, cost-shared 75%/25% could be initiated to finish some of the items that could not be explored in the scope of the LRR. The project could be reformulated to look at other items other than the 1982 recommended plan. This would probably be the best avenue to evaluate other flood damage reduction alternatives.

b. **Planning Assistance to States (PAS)**: This is a 50%/50% cost-shared program through which we can assist with water resource planning.

c. **Section 205, Small Flood Protection Project:** A section 205 project (up to $7 million total cost) could be pursued to look at a specific feature like the Sewage Treatment Plant. This program is one of the Continuing Authorities that the Corps has where the project does not have to be specifically authorized by Congress. Subsequent to the meeting, it was determined that Section 205 authority is not appropriate for use on uncompleted authorized projects.

15. The POC for this Memorandum for Record is Perry Hubert. Please do not hesitate to contact him with any questions or comments you may have.

PERRY A. HUBERT, P.E.
Project Manager

CF:

All Team Members/Meeting Attendees
CEMVR-PM-M (Dist File)
CEMVR-PA (Ron Fournier)
CEMVR-PM-A (Ken Barr, Dorie Bollman, Rich Fristick)
CEMVR-PM-M (Mary Craig)
CEMVR-PM-M (Joe Kellett)

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# APPENDIX B

# ECONOMIC ANALYSIS

**LIMITED REEVALUATION REPORT**
**FOR**
**FLOOD DAMAGE REDUCTION**

**MISSISSIPPI RIVER AT DAVENPORT, IOWA**

**APPENDIX B**
**ECONOMIC ANALYSIS**

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# LIMITED REEVALUATION REPORT
# FOR
# FLOOD DAMAGE REDUCTION

## MISSISSIPPI RIVER AT DAVENPORT, IOWA

## APPENDIX B
## ECONOMIC ANALYSIS

## SECTION 1 - INTRODUCTION

This appendix describes the reevaluation of project alternatives (as presented in the 1982 General Design Memorandum) for providing flood damage reduction measures for the City of Davenport, Iowa. This report addresses damages that are caused by high flows of the Mississippi River. The five major sections of this appendix summarize the Limited Reevaluation Study analysis conducted by the Rock Island District, U.S. Army Corps of Engineers.

Following the introductory section, the second section describes the general characteristics of the study area and summarizes historical flooding. The third section presents the procedures used to quantify flood damages and the potential benefits which would accrue to a flood damage reduction project. The fourth section presents the benefit and cost analysis for the recommended plan. The fifth section summarizes the non-Federal financial analysis. Throughout this analysis, price levels are stated as of February 2002, with the required Federal discount rate of 6-1/8% for water resources projects being used to amortize costs for comparison with annualized benefits.

## SECTION 2 - CHARACTERISTICS OF THE STUDY AREA

### GENERAL

The City of Davenport is located on the right descending bank of the Mississippi River in Scott County, Iowa. The city has an estimated year 2000 population of 98,359 and is a part of the Rock Island-Moline, Illinois-Davenport, Iowa Metropolitan Statistical Area with a population of 350,000. The city is served by major state and Federal highways (including the Interstate highway system), railway, airline and navigable waterway systems.

### HISTORICAL FLOODING

The City of Davenport, Iowa, has experienced significant Mississippi River flooding in the past several decades, with severe recent flooding in 1993, 1997, and 2001. There is no riverfront levee system to protect the water treatment plant, downtown area, or downstream commercial/industrial and residential areas. Physical damage to structures, flood emergency costs, roadway detour costs, and security related costs are incurred during flood events.

### STUDY AREA

As shown on plate X2 in Appendix E of this report, the study area is the Mississippi River floodplain, extending approximately 5 miles upstream of Lock and Dam 15 to the Interstate 280 Bridge (downstream limit of study). Separate reaches are delineated on this plate. Table B-1 lists numbers of properties by category. The study area is mixed land usage, with commercial/industrial areas, residential neighborhoods, downtown retail/financial/services area, riverfront parkway, water treatment facilities, and open-space/wetland areas. Significant growth trends are not apparent.

**Table B-1. Study Area Properties [3/] by Category**

| Type | Reach 1 | Reach 2A | Reach 2B | Reach C |
|---|---|---|---|---|
| Commercial/Industrial | 11 [1/] | 25 | 93 | 82 |
| Residential | | | 31 | 293 |
| Public [2/] | | 2 | 10 | 5 |

[1/] Includes business in alternative tie-off area (Option B) and Option A water plant, which serves 131,000 individuals and approximately 4,400 commercial, industrial, and public entities.
[2/] Includes public and non-profit organizations.
[3/] Defined for study purposes as a property with damageable structure(s), as identified by City Assessor's listing or field observation. Impacts to roads, sewers, parks, cleanup, etc. are included in evaluation, but not enumerated as a "property."

# SECTION 3 - METHODOLOGY

## GENERAL CONDITIONS

This study area was evaluated using Corps of Engineers' Hydrologic Engineering Center Flood Damage Assessment (HEC-FDA) model, without risk and uncertainty analysis. Annual damage and benefit evaluation used the 1979 Mississippi River water surface profiles (the 1982 GDM was based on the 1966 profiles).

The 1982 GDM proposed a 200-year (.005, plus freeboard) flood protection project. The current Limited Reevaluation Report (LRR) has evaluated the same physical project height, which relates to a 500-year (.002, plus freeboard) protection project under the current (1979) water surface profiles.

## CHANGED CONDITIONS

This LRR attempts to reevaluate the prior study conclusions considering significant changes which have take place in the study area. For the Davenport study area, two changes have occurred that had a significant impact upon the project reevaluation.

First, Area Redevelopment Benefits were included in the 1982 GDM and comprised about 30% of the benefits total. This benefit category was included based upon the high and persistent area unemployment being experienced at the time of GDM formulation. This benefit category is no longer appropriate and is not included in the LRR.

Second, the LRR evaluated damages/benefits using 1979 Mississippi River water surface profiles. These profiles are, in general, about 2 feet lower than the water surface profiles used in the 1982 GDM. This means that floodplain properties are evaluated with significantly lower risk (probability) of flooding than in the GDM analysis. This also results in a reduced total floodplain area (acreage); hence, a somewhat smaller property inventory.

A less significant, but noteworthy changed condition is that, due to residential buyouts and some commercial removals, fewer properties are now in the higher risk portions of the floodplain. Newer construction at-risk properties are not evident, due to active enforcement of floodplain building restrictions.

## FLOOD DAMAGE DATA COLLECTION

Structure and content values and depth-damage estimates were compiled for all properties in the study area. Geographic Information Systems (GIS) and city assessor's databases were used to identify floodplain properties and to estimate depreciated replacement values.

Two-foot topographic mapping and field observations were used to estimate first floor elevations. Generic (based upon post-flood data collection) depth-damage relationships for commercial/industrial, residential, and public properties (to include structural and content damages, preparedness and cleanup costs) were applied to the study area property inventory.

**Water Plant Area.** Multiple communications with water plant officials provided information on plant replacement values, potential physical damages, customer base, water distribution volume, flood emergency costs, and an estimate of operational "shutdown" floodwater elevation.

Neither the City nor the water company have established plans for providing water supplies to local residents during a catastrophic flood event. In this instance, as was learned in Des Moines, Iowa, during the Great Flood of 1993, provision of emergency water supplies will assuredly fall to state and/or federal government. The Federal Response Plan (Emergency Support Function #3) would be the likely vehicle for supplying emergency water. Therefore, the following assumptions were employed in constructing a stage-frequency-damage curve for this damage category:

a. 131,000 people would need subsistence water supplies when flood heights cause a shutdown of the existing water plant operations.

b. The length of time for which water would be supplied would correspond to the stage-duration hydrograph (for elevations at or above the operational shutdown height), plus time to restore water service.

c. 10 gallons of water per person per day would be provided (this is a reasonable, yet conservative, assumption given the fact that the 1993 loss of the Des Moines water plant resulted in 12 gallons per person per day needed).

d. The cost for packaged water delivered to distribution sites would be $1.80 per gallon. This is the current cost estimate used by USACE for provision of emergency water supplies under Emergency Management authorities.

Using these experience-validated assumptions, the following damage curve point can be illustrated. At flood elevation 570.0 (.002 event), the duration at or above water plant shutdown height is 17 days. An estimated 8 additional days would be needed to restore water service. Therefore, this event would cause $58,950,000 in emergency water supply costs (131,000 x 10 gallons x $1.80 x 25 days). Refer to Table B-5 for frequency-damage relationships.

In addition to prevention of costs associated with emergency water supply, flood emergency preparation, and water plant physical damages, protection of the Reach 1 water plant will produce benefits that are not quantified for this LRR. Protection against loss of Davenport area fire protection capability (due to loss of water supply) is a critical public

security benefit. Elimination of the need for National Guard troops and company/municipal security measures (as during recent floods) is a beneficial impact of a protection project. The largest non-quantified beneficial impact is very likely the continuity of operations of local businesses. Thousands of business, in and out of the floodplain, would be forced to shut down if the municipal water supply is lost to flooding. Part of this business benefit would accrue to the NED account and part would be regional, but quantification is beyond the scope of this limited study.

**Single Beneficiary Issue.** Although protection of a privately owned and operated water plant may fall within the narrow "single beneficiary" context of ER 1105-2-100, discussion of this topic is very appropriate.

The water plant facilities at Davenport, Iowa, provide the only source of water to a population of 131,000. Several hundred business and governmental organizations also rely upon water plant operation for their day-to-day activities. This water plant will be the sole source of water supply to the area population for the foreseeable planning horizon, regardless of ownership—public or private.

The benefit assessment provided in this LRR is primarily based upon reductions of costs to governmental agencies, not to a single private concern. Fully 95% of total benefits accrue to the reduction of governmental costs that would be incurred in providing emergency water supplies during disastrous flood events. Only approximately 5% of the quantified benefits accrue to reduction of physical damages/costs at the water plant site.

Given this brief discussion, it is obvious that the proposed flood damage reduction project would not benefit only a single private property, but would accrue community-wide benefits, and cost reductions to local, state, and federal government.

## RISK AND UNCERTAINTY

Due to the limited scope inherent to a limited reevaluation, it was decided (by Rock Island District Project Management) at the study outset that Risk and Uncertainty evaluations would not be undertaken. Time and funding constraints would not allow these procedures, nor would study conclusions be sensitive to them.

The HEC-FDA model was used (without risk) to construct stage/frequency/damage relationships and to compute annual damages and benefits for all reaches and alternatives.

Tables B-2 and B-3 present damage estimates (by reach) for various flood elevations.

**Table B-2. Reach 1 Water Treatment Plant Area Existing Damages by Category ($000's)**

| Elevation (MSL 1912 adj.) | Frequency | Commercial Plant and Equipment | Commercial Emergency Measures | Public Water Supply |
|---|---|---|---|---|
| 565.0 | .035 | 0 | 0 | 0 |
| 566.0 | .02 | 0 | 167,000 | 0 |
| 567.0 | .012 | 678,300 | 200,000 | 33,000,000 |
| 568.0 | .006 | 2,355.500 | 250,000 | 40,000,000 |
| 569.0 | .0035 | 3,484,400 | 300,000 | 49,000,000 |
| 570.0 | .002 | 4,627,600 | 300,000 | 58,950,000 |

**Table B-3. Reach 2 Existing Damages by Category ($000's)**

| Elevation (MSL 1912 adj.) | Approx. Frequency | Industrial/ Commercial | Residential | Public |
|---|---|---|---|---|
| 558.0 | .27 | 0 | 0 | 0 |
| 559.0 | .19 | 152,600 | 118,100 | 25,000 |
| 560.0 | .12 | 507,600 | 147,800 | 196,500 |
| 561.0 | .08 | 1,101,000 | 201,800 | 611,300 |
| 562.0 | .05 | 2,655,000 | 340,500 | 1,177,000 |
| 563.0 | .03 | 4,679,000 | 599,800 | 2,045,000 |
| 564.0 | .016 | 7,706,000 | 833,300 | 3,510,000 |
| 565.0 | .01 | 11,381,000 | 1,019,000 | 5,518,000 |
| 566.0 | .006 | 16,235,000 | 11,230,000 | 7,627,000 |
| 567.0 | .003 | 20,891,000 | 12,716,700 | 9,826,000 |

## EXISTING CONDITION ANNUAL DAMAGES AND BENEFITS

Average annual damages are the expected value of flood losses for any given year. The calculation for existing condition average annual damages, using the HEC-FDA model (without risk), integrates stage-frequency relationships with stage-damage relationships in calculating the area under the damage-frequency curve (annual damages).

That portion of annual damages which can be prevented by construction of a project represents the benefits accruing to the project. Residual (with-project) damages are damages that could occur due to the possibility of flood events which would overtop the proposed levee improvement.

Since the plans evaluated for Reaches 1 and 2 are designed to protect to the 500-year (.002) flood height (plus freeboard), virtually all damages considered in the analysis would be prevented (no residual damages).

Table B-4 lists annual damages information for the existing condition and reaches considered.

**Table B-4. Annual Damages (& Benefits)**
**by Category, Reach, and Sub-Reach (where applicable)**

| | Commercial | Residential | Public | Totals |
|---|---|---|---|---|
| Reach 1 | 54,700 | 0 | 814,900 | 869,600 |
| Reach 2A | 130,200 | 0 | 28,900 | 159,100 |
| Reach 2B | 272,400 | 16,500 | 65,000 | 353,900 |
| Reach 2C | 321,100 | 226,700 | 162,800 | 710,600 |
| Reach 2 Totals | 723,700 | 243,200 | 256,700 | 1,223,600 |

## DETOUR COSTS

In addition to physical property damages and costs associated with emergency water supply, reduction in impacts associated with flood-caused vehicle detour costs can be considered in the benefits assessment. The Reach 2B access to the Centennial Bridge (Route 67) would be impaired at flood heights exceeding 565.0 (MSL). Protecting against this impact would result in an annualized cost savings of $7,200. This annual benefit is based upon current average daily traffic counts (15,200), miles per detour (8), vehicle operating costs ($.51 to $1.30 range), bridge tolls foregone (tolls are currently collected, but will reportedly be eliminated in 2003), and flood height duration, weighted by the probabilities of flood occurrence.

## SECTION 4 - BENEFIT-COST ANALYSIS

### GENERAL

Construction and operation and maintenance (O&M) costs detailed in this report are in February 2002 price levels. Interest during construction (IDC) and annualized costs are computed using a 6-1/8% rate as mandated for Federal water resource projects. A 50-year project life has been used for the period of analysis. Tables B-5 and B-6 summarize the calculations for interest during construction and annual charges for the proposed Reach 1 project (Tie-Off Option A, Water Plant Protection).

**Table B-5. Interest During Construction ($000's)**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**
**(6-1/8% Discount Rate)**

| Year | Project Expenditures | Time to Base Year (Period) | Interest Factor of $1 Deposited to Base Year | Accumulated Interest to Base Year ($000's) Total |
|---|---|---|---|---|
| 1 | 1,590,100 | 3 | .09472 | 150,600 |
| 2 | 1,590,160 | 1 | .03062 | 48,700 |
| Totals | 3,180,260 | | | 199,300 |

**Table B-6. Summary of Annual Costs ($)**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**
**(6-1/8%, 50-Year Evaluation Period)**

| Description | Total |
|---|---|
| Estimated Construction Cost | $3,180,260 |
| Interest During Construction | 199,300 |
| Total Economic Costs | 3,279,560 |
| Annualized Costs | |
| Interest and Amortization (.06455) | 218,200 |
| (Annual operation and maintenance costs not included) | |

## ECONOMIC SUMMARY

Table B-7 presents a summary economic analysis for the plans considered. As indicated, Reach 1 (Water Plant, Tie-Off Option A) levee/floodwall protection provides net National Economic Development (NED) benefits of $637,500 and a benefit-cost ratio of 3.92 to 1.0.

## COMPARISON TO AUTHORIZED PROJECT DOCUMENT

Table B-8 compares the Benefits, Costs and Benefit-Cost Ratios of the Authorized Project Document, the analysis last presented to Congress, and the current Limited Reevaluation Report. The appropriate price levels and discount rates are indicated. Table B-8 illustrates costs and benefits for separable project elements as well as in aggregate for the authorized project. As indicated, significant changes in the benefits assessment have occurred between the 1982 GDM and the 2002 LRR.

**Separable Water Plant Protection.** This element was strongly justified in the Project Document and it displays even stronger justification in the current LRR.

Flood Damage Reduction benefits accrue to preventable physical damages at the water plant. The plant has expanded and upgraded at considerable capital costs. This is reflected in the damage reduction benefit analysis.

In the Project Document, Business Losses due to loss of water supply needed for operations were estimated. This is a valid category, benefiting hundreds of water-dependant businesses (some loss being regional versus NED). However, due to time and funding constraints, this category was not pursued in the LRR. Separable element justification is not dependant upon quantification of this category.

Benefits for Protection of Municipal Water Supply, which comprise 95% of the total for this element, have increased significantly. The majority of this increase stems from a much more realistic evaluation of costs which would be incurred, without project, during rare (but disastrous) flood events. The Project Document analysis assumed that nearby cities would provide the source for emergency water supply. This would not likely occur, as there are no plans or agreements in place, and other local communities would be dealing with their own flood/high water related issues. As was the case in Des Moines, Iowa, during the Great Flood of 1993, provision of emergency water supplies would overwhelm local and state resources. This responsibility would be assumed under the Federal Response Plan (ESF #3). Refer to the Flood Damage Data Collection (Water Plant Area) section of this appendix for analysis detail.

**Separable Downstream Reach Protection.** This element was marginally justified in the Project Document analysis. Significant changed conditions have taken place and are incorporated into the current LRR. Incremental justification is no longer indicated.

Flood Damage Reduction benefits (including emergency costs) have decreased substantially. This is mainly due to LRR usage of current (1979) Mississippi River Water Surface Profiles (Upper Mississippi River, Water-Surface Profiles, River Mile 0.0 to River Mile 847.5, prepared for the Upper Mississippi River Basin Commission by the Corps of Engineers, dated November 1979). The GDM profiles were based upon the "Generalized, Regionalized Flow Frequency Study on the Mississippi River from Guttenberg, Iowa, to Hamburg Bay, Illinois," dated March 1966. In general, the 1979 profiles are about 2 feet lower than the 1966 profiles, across the range of potential flood events. Thus, properties are now evaluated with lower risk (probabilities) of flood damage than in the GDM analysis.

Redevelopment Benefits (use of unemployed labor in project construction) are no longer included as a benefit category. During the 1982 GDM evaluation, Davenport was experiencing high and persistent levels of unemployment, thus qualifying (under specific regulations) for usage of this benefit category (representing nearly 30% of total project benefits). National and local unemployment scenarios have changed dramatically since 1982, thus eliminating this benefit category from the LRR evaluation.

The costs and benefits of recreation features (associated with the Downstream Reach project) were included in the Project Document evaluation. Due to time and funding constraints, recreation analysis has not been included in the current LRR.

Future benefit categories (Location/Land Use Benefits, and Future Growth) have been excluded from the LRR evaluation. Active enforcement of floodplain building restrictions has eliminated the addition of at-risk floodplain structures. Development patterns do not indicate substantial growth in protected floodplain areas. Therefore, these Project Document categories are no longer appropriate.

**Table B-7**
**Costs and Benefits by Alternative**
(February 2002 prices, 6-1/8% discount rate, 50-year evaluation period)

| Alternative | Project Cost Estimate | Interest During Const. | Total First Costs | Total Annual Costs | Total Annual Benefits | Benefit Cost Ratio | Net Annual Benefits |
|---|---|---|---|---|---|---|---|
| **Reach 1 Water Plant Area Protection** | | | | | | | |
| Reach 1 Tie-off Option A | 3,180,260 | 199,300 | 3,379,560 | 218,200 | 855,700 | 3.92 | 637,500 |
| Reach 1 Tie-off Option B | 4,710,460 | 295,210 | 5,005,670 | 323,136 | 869,600 | 2.69 | 546,464 |
| **Reach 2 Protection - Total Reach** | 52,046,828 | 6,826,788 | 58,873,616 | 3,800,526 | 1,230,800 | 0.32 | -2,569,726 |
| 2A. Upstream Reach | 15,070,601 | 944,493 | 16,015,094 | 1,033,838 | 159,100 | 0.15 | -874,738 |
| 2B. Middle Reach | 27,835,797 | 2,673,517 | 30,509,314 | 1,969,498 | 361,100 | 0.18 | -1,608,398 |
| 2C. Downstream Reach | 35,966,030 | 3,464,064 | 39,430,094 | 2,545,370 | 710,600 | 0.28 | -1,834,770 |
| 2AB. Upstream and Middle Reaches | 32,784,688 | 3,148,838 | 35,933,526 | 2,319,652 | 520,200 | 0.22 | -1,799,452 |
| 2BC. Middle and Downstream Reaches | 47,097,937 | 4,533,239 | 51,631,176 | 3,332,998 | 1,071,700 | 0.32 | -2,261,298 |

Notes:
1. Interest During Construction was calculated for mid-year expenditure and appropriate construction period.
2. Costs do not include annual operations and maintenance costs.

**Table B-8**
**Comparison of Benefit-to-Cost Analyses**
(50-year evaluation period, indicated discount rates)

| Item | Project Document (1982 GDM) | Last Estimate Presented to Congress | Limited Reevaluation Report |
|---|---|---|---|
| Price Level of Cost Estimate | Jul-81 | Oct-86 | Mar-02 |
| Discount Rate for Evaluation | 7.625% | 8.875% | 6.125% |
| **Separable Water Plant Reach (Reach 1, Tie-Off Option A, recommended project)** | | | |
| Element Total Cost Estimate | 1,109,000 | 1,322,300 | 3,180,260 |
| Annualized Costs (incl. IDC) | 89,000 | 119,000 | 218,200 |
| Benefits | | | |
| Flood Damage Reduction | 13,900 | 17,200 | 42,800 |
| Business Losses | 40,700 | 50,400 | Not Available |
| Protection of Municipal Water Supply | 93,800 | 117,000 | 812,900 |
| Total Annual Benefits | 148,400 | 184,600 | 855,700 |
| Benefit-to-Cost Ratio | 1.67 | 1.55 | 3.92 |
| **Separable Downstream Reach (Reach 2)** | | | |
| Element Total Cost Estimate | 30,937,000 | 39,577,700 | 52,046,800 |
| Annualized Costs (incl. IDC, O&M) | 3,065,000 | 4,527,300 | 3,800,500 |
| Benefits | | | |
| Flood Damage Reduction (incl. Emerg. Costs) | 1,346,100 | 1,678,700 | 1,223,600 |
| Redevelopment | 1,015,400 | 2,247,500 | Not Applicable |
| Bridge User Detour Costs | 5,900 | 6,900 | 7,200 |
| Recreation | 696,700 | 806,900 | Not Applicable |
| Improved Land Use | 269,900 | 368,200 | Not Applicable |
| Future Growth | 222,300 | 208,300 | Not Applicable |
| Total Annual Benefits | 3,556,300 | 5,316,500 | 1,230,800 |
| Benefit-to-Cost Ratio | 1.16 | 1.17 | 0.32 |
| **TOTAL AUTHORIZED PROJECT** | | | |
| Total Project Cost Estimate | 32,046,000 | 40,900,000 | 55,227,060 |
| Annualized Costs (incl. IDC, O&M) | 3,154,000 | 4,646,300 | 4,018,700 |
| Total Annual Benefits | 3,704,700 | 5,501,100 | 2,086,500 |
| Total Benefit-to-Cost Ratio | 1.17 | 1.18 | 0.52 |

## SECTION 5 - FINANCIAL ANALYSIS

### COST DISTRIBUTION

Based on current cost-sharing provisions, Federal and non-Federal costs will be distributed as shown in Table B-9.

**Table B-9. Project Cost Distribution**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**
**Davenport, Iowa**

| | | |
|---|---|---|
| Total Project Cost Estimate | $3,180,260 | |
| Federal Cost Estimate | 2,385,200 | |
| Non-Federal Cost Estimate | 795,060 | |
| Lands, Damages, & Relocations | | 346,900 |
| Cash Contributions | | 448,160 |
| Non-Federal Share Percent of Total Cost: | | 25% |

### ABILITY TO PAY

Based on the provisions of Section 103 of Public Law 99-662, Davenport, Iowa, has the ability to provide the normal share percentage of project costs. This Public Law considers the magnitude of a project benefit-to-cost ratio and the per capita income of the state and county of the non-federal sponsor. Davenport does not qualify for reduced cost sharing. Table B-10 summarizes the required calculation.

**Table B-10. Ability to Pay Analysis**
**Reach 1, Tie-Off Option A, Levee and Floodwall Project**

| | | |
|---|---|---|
| Annual Cost | $218,200 | Cost & Benefits |
| Annual Benefits | 855,700 | for Flood Control |
| Total Cost | $2,180,260 | |
| Local Share | 795,060 | |
| Benefit/Cost Ratio (BCR) | 3.92 | |
| | | |
| Base Benefits Floor | 98% | BCR multiplied by 25% |
| Standard Non-Federal Share | 25% | |

NOT QUALIFIED for reduced cost sharing, as the Benefit-to-Cost Ratio multiplied by 25%, and stated as a percentage, is greater than the standard cost-sharing percentage (based upon the benefits test per Section 103 of Public Law 99-662, and ER 1165-2-121).

## FINANCIAL CAPABILITY

The City of Davenport, Iowa, has the willingness and capability to finance its share of the cost of constructing this local flood protection project. A Statement of Financial Capability and Financing Plan will be submitted, along with the Project Cooperation Agreement, if the City of Davenport, Iowa, chooses to proceed with Reach 1 project construction.

# APPENDIX C

# COST TABLES

## II - SUMMARY OF REACH 1 PROJECT COSTS

| Cost Acct # | Item | Water Treatment Plant Federal | Water Treatment Plant Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 48,000 | 161,000 |
| 02 | Relocations | 0 | 185,882 |
| 11 | Levees & Floodwalls | 2,022,341 | |
| 13 | Pumping Plants | 0 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 43,334 | 0 |
| 30 | Planning, Engineering & Design | 413,135 | 0 |
| 31 | Supervision & Administration | 206,567 | 0 |
| TOTAL | | 2,733,377 | 346,882 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 3,080,260 |

Note: The "E-xx" page numbering reference pertains to the page numbering in the February 1982 General Design Memorandum Appendix E - Detailed Cost Estimate.

## II - SUMMARY OF REACH 1 ADDITIONAL PROJECT COSTS

FOR TIE-OFF OPTION B- VILLAGE OF EAST DAVENPORT

| Cost Acct # | Item | Water Treatment Plant Federal | Water Treatment Plant Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 0 | 0 * |
| 02 | Relocations | 0 | 60,000 |
| 11 | Levees & Floodwalls | 774,000 | |
| 13 | Pumping Plants | 420,000 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 0 | 0 |
| 30 | Planning, Engineering & Design | 250,800 | 0 |
| 31 | Supervision & Administration | 125,400 | 0 |
| TOTAL | | 1,570,200 | 60,000 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 1,630,200 |

* A Lands & Damages Real Estate cost was not computed for the LRS for this tie-off option.

## II - SUMMARY OF REACH 2A PROJECT COSTS

| Cost Acct # | Item | Reach 2A Federal | Reach 2A Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 32,000 | 54,000 |
| 02 | Relocations | 0 | 8,194 |
| 11 | Levees & Floodwalls | 7,582,890 | 1,123 |
| 13 | Pumping Plants | 0 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 43,334 | 0 |
| 30 | Planning, Engineering & Design | 1,525,245 | 225 |
| 31 | Supervision & Administration | 762,622 | 112 |
| TOTAL | | 9,946,092 | 63,654 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 10,009,746 |

## II - SUMMARY OF REACH 2B PROJECT COSTS

| Cost Acct # | Item | Reach 2B Federal | Reach 2B Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 16,000 | 697,000 |
| 02 | Relocations | 0 | 5,673 |
| 11 | Levees & Floodwalls | 8,778,240 | 298,390 |
| 13 | Pumping Plants | 1,421,824 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 43,334 | 0 |
| 30 | Planning, Engineering & Design | 2,048,679 | 59,678 |
| 31 | Supervision & Administration | 1,024,340 | 29,839 |
| TOTAL | | 13,332,417 | 1,090,580 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 14,422,997 |

## II - SUMMARY OF REACH 2C PROJECT COSTS

| Cost Acct # | Item | Reach 2C Federal | Reach 2C Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 24,000 | 1,898,000 |
| 02 | Relocations | 0 | 48,534 |
| 11 | Levees & Floodwalls | 13,989,547 | 265,468 |
| 13 | Pumping Plants | 5,427,459 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 43,334 | 0 |
| 30 | Planning, Engineering & Design | 3,892,068 | 53,094 |
| 31 | Supervision & Administration | 1,946,034 | 26,547 |
| TOTAL | | 25,322,442 | 2,291,643 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 27,614,085 |

## II - SUMMARY OF MAIN STREET TIE-OFF PROJECT COSTS

| Cost Acct # | Item | Main Street Tie-off Federal | Main Street Tie-off Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 8,000 | 106,000 |
| 02 | Relocations | 0 | 0 |
| 11 | Levees & Floodwalls | 3,805,273 | 0 |
| 13 | Pumping Plants | 0 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 0 | 0 |
| 30 | Planning, Engineering & Design | 761,055 | 0 |
| 31 | Supervision & Administration | 380,527 | 0 |
| TOTAL | | 4,954,855 | 106,000 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 5,060,855 |

## II - SUMMARY OF MARQUETTE/STURDEVANT TIE-OFF PROJECT COSTS

| Cost Acct # | Item | Marquette/Sturdevant Tie-off Federal | Marquette/Sturdevant Tie-off Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 75,000 | 1,040,500 |
| 02 | Relocations | 0 | 0 |
| 11 | Levees & Floodwalls | 5,566,496 | 0 |
| 13 | Pumping Plants | 0 | 0 |
| 14 | Recreation | 0 | 0 |
| 19 | Buildings, Grounds, Utilities | 0 | 0 |
| 30 | Planning, Engineering & Design | 1,113,299 | 0 |
| 31 | Supervision & Administration | 556,650 | 0 |
| TOTAL | | 7,311,445 | 1,040,500 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 8,351,945 |

## II - SUMMARY OF RECREATION PROJECT COSTS

| Cost Acct # | Item | Recreation Federal | Recreation Non-Federal |
|---|---|---|---|
| 01 | Lands & Damages | 0 | 2,655,521 * |
| 02 | Relocations | 0 | 0 |
| 11 | Levees & Floodwalls | 0 | 0 |
| 13 | Pumping Plants | 0 | 0 |
| 14 | Recreation | 2,153,786 | 2,335,790 |
| 19 | Buildings, Grounds, Utilities | 0 | 0 |
| 30 | Planning, Engineering & Design | 430,757 | 430,757 |
| 31 | Supervision & Administration | 215,379 | 215,379 |
| TOTAL | | 2,799,922 | 5,637,447 |
| COMBINED FEDERAL AND NON-FEDERAL TOTAL | | | 8,437,369 |

*Recreation Project Costs including lands and damages were price level indexed only. No new real estate values were developed for the LRR.

## III - DETAIL COSTS BY AREA (LRR)

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **LANDS AND DAMAGES** | | | | | |
| Reach 2A Levee right-of-way* | 1 | Job | Sum | 32,000 | 54,000 |
| Reach 2B Levee right-of-way* | 1 | Job | Sum | 16,000 | 697,000 |
| Reach 2C Levee right-of-way* | 1 | Job | Sum | 24,000 | 1,898,000 |
| Ponding Area | 1 | Job | Sum | | 0 |
| Reach 2A, Lands and Damages, Sub-Total | | | | 32,000 | 54,000 |
| Reach 2B, Lands and Damages, Sub-Total | | | | 16,000 | 697,000 |
| Reach 2C, Lands and Damages, Sub-Total | | | | 24,000 | 1,898,000 |
| TOTAL, MAIN REACH - LANDS AND DAMAGES | | | | 72,000 | 2,649,000 |
| **RELOCATIONS** | (Includes allowance for E&D, S&A) | | | | |
| **Buildings** | | | | | |
| Reach 2C | | | | | |
| Picnic Shelter, Sta 26+20 | 1 | Job | Sum | | 11,267 |
| Snack Shop, Sta 24+00 | 1 | Job | Sum | | 11,267 |
| Subtotal | | | | | 22,534 |
| Contingencies | | | | | 2,600 |
| Total, Buildings | | | | | 25,134 |
| **Electric** | | | | | |
| REACH 2B | | | | | |
| Sta 38+00± Beiderbecke Drive Closure, Relocate one street light pole | 1 | Job | Sum | | 2,600 |
| Subtotal | | | | | 2,600 |
| Contingencies | | | | | 473 |
| Reach 2B Total | | | | | 3,073 |
| REACH 2A | | | | | |
| Sta 13+00± vic Dock Restaurant Relocate buried electric cableand manholes to outside toe of T-wall | 250 | LF | 45.07 | | 6,933 |
| Subtotal | | | | | 6,933 |
| Contingencies | | | | | 1,261 |
| Electrical Relocations Reach 2A Total | | | | | 8,194 |
| Total, Electric | | | | | 11,267 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Water** | | | | | |
| Reach 2C | | | | | |
| Sta 72+94 Move fire hydrant | 1 | Job | Sum | | 2,167 |
| | Contingencies | | | | 433 |
| | Reach 2C, Total, water | | | | 2,600 |
| Reach 2B | | | | | |
| Sta 55+05 Move fire hydrant | 1 | Job | Sum | | 2,167 |
| | Contingencies | | | | 433 |
| | Reach 2B, Total, water | | | | 2,600 |
| | Total, water | | | | 5,200 |
| **Gas** | | | | | |
| Reach 2C, Sta 247+00 - 237+00± | | | | | |
| Relocate existing gas line to freeboard of levee | 300 | LF | 22.36 | | 5,200 |
| Reach 2C, Sta 139+00 - 128+00± | | | | | |
| Relocate existing gas line to levee freeboard | 800 | LF | 22.36 | | 12,134 |
| | Subtotal | | | | 17,334 |
| | Contingencies | | | | 3,467 |
| | Reach 2C Total, Gas | | | | 20,800 |
| | Reach 2A, Relocations, Total | | | | 8,194 |
| | Reach 2B, Relocations, Total | | | | 5,673 |
| | Reach 2C, Relocations, Total | | | | 48,534 |
| | Total, Relocations | | | | 62,401 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **LEVEES AND FLOODWALLS** | | | | | |
| **Levees** | | | | | |
| Stripping | | | | | |
| Reach 2A, Fed | 9,138 | CY | 2.17 | 19,799 | |
| Reach 2A, Non-Fed | 150 | CY | 2.17 | | 325 |
| Reach 2B, Fed | 16,448 | CY | 2.17 | 35,638 | |
| Reach 2B, Non-Fed | 270 | CY | 2.17 | | 585 |
| Reach 2C, Fed | 65,790 | CY | 2.17 | 142,548 | |
| Reach 2C, Non-Fed | 1,080 | CY | 2.17 | | 2,340 |
| Reach 2B, Excavation, common, inspection trench | 13,714 | CY | 3.21 | 43,977 | |
| Reach 2C, Excavation, common, inspection trench | 39,032 | CY | 3.21 | 125,165 | |
| Reach 2B, Backfill, inspection trench | 3,537 | CY | 5.37 | 19,006 | |
| Reach 2C, Backfill, inspection trench | 10,065 | CY | 5.37 | 54,084 | |
| Disposal of waste stripping and inspection trench excavation spoil | | | | | |
| Reach 2A, Fed | 8,396 | CY | 4.33 | 36,383 | |
| Reach 2A, Non-Fed | 150 | CY | 4.33 | | 650 |
| Reach 2B, Fed | 8,396 | CY | 4.33 | 36,383 | |
| Reach 2B, Non-Fed | 150 | CY | 4.33 | | 650 |
| Reach 2C, Fed | 67,171 | CY | 4.33 | 291,080 | |
| Reach 2C, Non-Fed | 1,200 | CY | 4.33 | | 5,200 |
| Reach 2B, Riprap | 9,906 | CY | 37.27 | 369,171 | |
| Reach 2C, Riprap | 28,194 | CY | 37.27 | 1,050,718 | |
| Reach 2B, Bedding | 3,260 | CY | 37.27 | 121,492 | |
| Reach 2C, Bedding | 9,279 | CY | 37.27 | 345,805 | |
| Reach 2C, Excavation, common, McManus Creek | 7,200 | CY | 3.21 | 23,088 | |
| Reach 2B, Embankment fill, compacted, impervious | 30,956 | CY | 10.83 | 335,364 | |
| Reach 2C, Embankment fill, compacted, impervious | 123,822 | CY | 10.83 | 1,341,433 | |

| ITEM<br>Levees (Cont'd) | Qty | Unit | Unit Cost | Amount<br>Federal | Amount<br>Non-Federal |
|---|---|---|---|---|---|
| Embankment fill, semi-compacted, pervious hydraulic | | | | | |
| Reach 2B, Fed. | 179,145 | CY | 3.29 | 589,996 | |
| Reach 2B, Non-Fed. | 4,704 | CY | 3.29 | | 15,492 |
| Reach 2C, Fed. | 716,581 | CY | 3.29 | 2,359,989 | |
| Reach 2C, Non-Fed. | 18,814 | CY | 3.29 | | 61,962 |
| Reach 2B, Embankment fill, landslide slope, semi-compacted | 10,032 | CY | 3.29 | 33,039 | |
| Reach 2C, Embankment fill, landslide slope, semi-compacted | 40,126 | CY | 3.29 | 132,151 | |
| Reach 2B, Embankment fill, landslide slope, semi-compacted, impervious | 27,964 | CY | 10.83 | 302,950 | |
| Reach 2C, Embankment fill, landslide slope, semi-compacted, impervious | 27,964 | CY | 10.83 | 302,950 | |
| Reach 2A, Clearing and grubbing | 2.45 | AC | 6,500.13 | 15,925 | |
| Reach 2B, Clearing and grubbing | 4.41 | AC | 6,500.13 | 28,666 | |
| Reach 2C, Clearing and grubbing | 17.64 | AC | 6,500.13 | 114,662 | |
| Reach 2A, Seeding | 5.30 | AC | 2,166.71 | 11,484 | |
| Reach 2B, Seeding | 9.54 | AC | 2,166.71 | 20,670 | |
| Reach 2C, Seeding | 38.16 | AC | 2,166.71 | 82,682 | |
| Reach 2A, Paving and base | 400.00 | LF | 90.14 | 36,054 | |
| Reach 2B, Paving and base | 300.00 | LF | 90.14 | 27,041 | |
| Reach 2C, Paving and base | 300.00 | LF | 90.14 | 27,041 | |
| Reach 2C, Excavation, dredged, foundation preparation, Credit Island levee | 135,994 | CY | 6.93 | 942,911 | |
| Reach 2C, Sta 247+00 - 237+00± Provide existing 8" water line with flexible couplings and granular fill landside of levee | 1 | Job | Sum | 6,933 | |
| Reach 2C, Sta 139+000 - 128+00+ Provide existing 8" line with flexible couplings and granular fill landslide of levee | 1 | Job | Sum | 14,734 | |
| Reach 2A | Subtotal, Levees | | | 119,646 | 975 |
| Reach 2A | Contingencies | | | 17,887 | 148 |
| Reach 2A | Total, Levees | | | 137,532 | 1,123 |
| Reach 2B | Subtotal, Levees | | | 1,963,393 | 16,727 |
| Reach 2B | Contingencies | | | 293,521 | 2,538 |
| Reach 2B | Total, Levees | | | 2,256,914 | 19,266 |
| Reach 2C | Subtotal, Levees | | | 7,357,973 | 69,502 |
| Reach 2C | Contingencies | | | 1,099,994 | 10,547 |
| Reach 2C | Total, Levees | | | 8,457,967 | 80,050 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Drainage Facilities** | | | | | |
| Reach 2C, Sta 139+03 Install 30" CMP | 90 | LF | 112.67 | 10,140 | |
| Reach 2C, Sta 138+92 Remove existing twin 96" CMP culvert | 1 | Job | Sum | 20,800 | |
| Reach 2C; | | | | | |
| Sta 129+50± Triple 96" CMP culvert | | | | | |
| 96" CMP | 915 | LF | 11.70 | 10,706 | |
| Excavation | 8,000 | CY | 9.71 | 77,655 | |
| Backfill | 6,300 | CY | 11.70 | 73,712 | |
| Protection for water and gas lines | 1 | Job | Sum | 23,643 | |
| Site protection & dewatering | 1 | Job | Sum | 86,668 | |
| Temporary Access to Island | 1 | Job | Sum | 8,667 | |
| Sta 122+50 - 98+75 | | | | | |
| 72" RCP storm sewer | | | | | |
| Section 122+50 - 110+40 | | | | | |
| Excavation | 6,749 | CY | 7.54 | 50,889 | |
| Backfill | 5,040 | CY | 9.71 | 48,923 | |
| 72" RCP, Class II, on Class C bedding | 1,199 | LF | 225.34 | 270,180 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Manholes on "T" Sections | 3 | EA | 6,500.13 | 19,500 | |
| Section 110+40 - 104+19 | | | | | |
| Excavation | 5,583 | CY | 7.54 | 42,097 | |
| Backfill | 4,694 | CY | 9.71 | 45,564 | |
| 72" Class II RCP on Class C bedding | 623 | LF | 225.34 | 140,386 | |
| Dewatering | 1 | Job | Sum | 10,400 | |
| Manhole or "T" Section | 1 | EA | 6,500.13 | 6,500 | |
| Section 104+19 - 102+60 | | | | | |
| Backfill, granular | 1,019 | CY | 7.54 | 7,683 | |
| 72" RCP, Class II, on Class C bedding | 155 | LF | 225.34 | 34,927 | |
| Dewatering | 1 | Job | Sum | 10,400 | |
| Section 102+60 - 98+75 | | | | | |
| Excavation | 6,400 | CY | 7.54 | 48,257 | |
| Backfill | 5,829 | CY | 9.71 | 56,581 | |
| 72" RCP, Class IV, on Class C bedding | 400 | LF | 286.01 | 114,402 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Seeding, all sections | 1 | Job | Sum | 2,167 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Drainage Facilities (Cont'd)** | | | | | |
| Outlet | 1 | EA | 12,896.27 | 12,896 | |
| Sta 110+00 - 104+50± Remove 27" Sanitary sewer & MH | 1 | Job | Sum | 14,188 | |
| Sta 98+85 - 82+00± Install 30" RCP storm sewer Class IV, Class B bedding | 1,772 | LF | 121.34 | 215,007 | |
| Sta 90+100± Pressurize Division Street Storm Sewer | 1 | Job | Sum | | 161,203 |
| Reach 2B; | | | | | |
| Sta 65+00± Pressurize Marquette Street Storm Sewer | 1 | Job | Sum | | 135,203 |
| Sta 55+07 - 45+12 Install new storm sewer | | | | | |
| Section 55+07 - 52+63 | | | | | |
| Excavation | 677 | CY | 7.54 | 5,105 | |
| Backfill | 665 | CY | 9.71 | 6,455 | |
| 15" RCP, Class II, on Class C bedding | 260 | LF | 17.33 | 4,507 | |
| MH Sta 52+47 | 1 | Job | Sum | 13,000 | |
| MH Sta 55+07 | 1 | Job | Sum | 6,500 | |
| Section 52+47 - 46+07 | | | | | |
| Excavation | 3,821 | CY | 7.54 | 28,811 | |
| Backfill | 3,593 | CY | 9.71 | 34,877 | |
| 36" RCP, Class III on Class C bedding | 623 | LF | 79.73 | 49,675 | |
| MH Sta 48+74 | 1 | Job | Sum | 6,500 | |
| MH Sta 46+07 | 1 | Job | Sum | 13,000 | |
| Section 46+07 - 45+12 | | | | | |
| Excavation, braced sides | 535 | CY | 9.71 | 5,193 | |
| Backfill | 512 | CY | 9.71 | 4,970 | |
| 36" RCP, Class III, on Class B bedding | 202 | LF | 79.73 | 16,106 | |
| Pavement removal & replacement | 124 | SY | 78.00 | 9,672 | |
| MH Sta 45+54 | 1 | Job | Sum | 12,896 | |
| Seeding, all sections | 1 | AC | 2,166.71 | 2,167 | |
| Sta 45+60 Remove and plug 6' of 18" CMP storm sewer | 1 | Job | Sum | 4,333 | |
| Sta 45+12 to 42+04± New 48" storm sewer interceptor | | | | | |
| 48" RCP | 220 | LF | 260.01 | 57,201 | |
| Manhole sta 42+04 | 1 | Job | Sum | 13,000 | |
| Sta 42+04 to 37+75± New interceptor storm sewer | | | | | |
| 30" RCP | 3,251 | LF | 121.34 | 394,463 | |
| Manhole | 1 | Job | Sum | 13,000 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Drainage Facilities (Cont'd)** | | | | | |
| Sta 36+15 Remove 60' of abandoned 20" sewer | 1 | Job | Sum | 6,933 | |
| Sta 32+76 Remove 60' of abandoned 36" sewer | 1 | Job | Sum | 6,933 | |
| Sta 32+00 Pressurize Ripley Street Sewer | 1 | Job | Sum | | 107,469 |
| Sta 31+76 - 5+35± Construct new interceptor storm sewer | | | | | |
| Section 31+76 - 24+91 | | | | | |
| Excavation | 1,239 | CY | 9.71 | 12,027 | |
| Backfill | 1,116 | CY | 9.71 | 10,833 | |
| Pavement removal & replacement | 63 | SY | 78.00 | 4,914 | |
| 24" RCP, Class II, Class C bedding | 676 | LF | 30.33 | 20,506 | |
| Manhole Sta 31+76 | | | | | |
| Manhole Sta 28+90 | | | | | |
| Manhole Sta 27+31 | 3 | EA | 13,000.27 | 39,001 | |
| Reach 2A; | | | | | |
| Section 24+91 - 14+58 | | | | | |
| Excavation | 1,643 | CY | 9.71 | 15,948 | |
| Backfill | 1,384 | CY | 9.71 | 13,434 | |
| Pavement removal & replacement | 233 | SY | 78.00 | 18,174 | |
| 30" RCP, Class II Class C bedding | 986 | LF | 55.90 | 55,119 | |
| Manhole, Sta 23+78 | | | | | |
| Manhole, Sta 23+68 | | | | | |
| Manhole Sta 19+67 | | | | | |
| Manhole Sta 14+65 | | | | | |
| Manhole Sta 14+18 | 5 | EA | 13,000.27 | 65,001 | |
| Manhole Sta 21+97 | | | | | |
| Manhole, Sta 15+90 | 2 | EA | 6,933.48 | 13,867 | |
| 30" RCP Jacked excavation under RR tracks | 30 | LF | 866.68 | 26,001 | |
| Section 14+58 - 5+35 | | | | | |
| Excavation, braced | 1,077 | CY | 9.71 | 10,454 | |
| Backfill | 930 | CY | 9.71 | 9,027 | |
| Manhole, | | | | | |
| Sta 11+78 | | | | | |
| Sta 10+70 | 2 | EA | 6,933.48 | 13,867 | |
| Manhole, | | | | | |
| Sta 9+98 | | | | | |
| Sta 5+35 | 2 | EA | 13,000.27 | 26,001 | |
| Reach 2A, Seeding, all sections | 0.1 | AC | 2,166.71 | 217 | |
| Reach 2B, Seeding, all sections | 0.3 | AC | 2,166.71 | 650 | |
| Reach 2C, Seeding, all sections | 0.6 | AC | 2,166.71 | 1,300 | |
| Reach 2A, Dewatering, all sections | 1 | Job | Sum | 6,067 | |

| ITEM<br>Drainage Facilities (Cont'd) | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| Reach 2B, Dewatering, all sections | 1 | Job | Sum | 18,200 | |
| Reach 2C, Dewatering, all sections | 1 | Job | Sum | 36,401 | |
| Reach 2A, 24" RCP, Class II, on Class B bedding | 808 | LF | 30.33 | 24,510 | |
| Reach 2B; | | | | | |
| Sta 29+25± Remove 60' of abandoned 48" pipe | 1 | Job | Sum | 6,500 | |
| Reach 2A; | | | | | |
| Sta 19+87± Remove 60' of abandoned 18" pipe | 1 | Job | Sum | 6,500 | |
| Sta 14+25 Install new 21" sanitary sewer, class III, class C bedding | 120 | LF | 95.34 | 11,440 | |
| Manhole | 3 | EA | 6,066.79 | 18,200 | |
| Sta 14+70± Remove existing 21" RCP san. sewer | 1 | Job | Sum | 6,500 | |
| Sta 14+60+ Remove existing MH & 30' of 20" san. sewer | 1 | Job | Sum | 6,500 | |
| Sta 14+50 Install MH and 50' of 36" RCP, Class III Class B bedding | 1 | Job | Sum | 11,267 | |
| Sta 14+35 Remove existing 36" storm sewer | 1 | Job | Sum | 2,167 | |
| Sta 14+00+ Move catch, basin and install 45' of 12" RCP | 1 | Job | Sum | 7,800 | |
| Sta 5+10 to 4+85+ Construct 8" VCP interceptor | | | | | |
| Manholes | | | | | |
| Sta 5+10 | 1 | EA | 11,163 | 3,750 | |
| Sta 4+85 | 1 | EA | 11,163 | 3,750 | |
| 8" VCP | 23 | LF | 90.14 | 690 | |
| Reach 2A Subtotal, Drainage Facilities | | | | 376,252 | |
| Reach 2A Contingencies | | | | 57,091 | - |
| Reach 2A Total, Drainage Facilities | | | | 433,343 | - |
| Reach 2B Subtotal, Drainage Facilities | | | | 827,930 | 242,672 |
| Reach 2B Contingencies | | | | 125,627 | 36,453 |
| Reach 2B Total, Drainage Facilities | | | | 953,557 | 279,125 |
| Reach 2C Subtotal, Drainage Facilities | | | | 1,542,241 | 161,203 |
| Reach 2C Contingencies | | | | 234,013 | 24,215 |
| Reach 2C Total, Drainage Facilities | | | | 1,776,254 | 185,418 |
| Project Subtotal, Drainage Facilities | | | | 2,746,423 | 403,875 |
| Project Contingencies | | | | 416,731 | 60,668 |
| Project Total, Drainage Facilities | | | | 3,163,154 | 464,543 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Gatewells** | | | | | |
| Reach 2C; | | | | | |
| Sta 257+00+ at I-280 Twin 10' x 10' Gatewell "A" | | | | | |
| Excavation | 530 | CY | 9.71 | 5,145 | |
| Backfill | 434 | CY | 11.70 | 5,078 | |
| Concrete | 56 | CY | 476.68 | 26,694 | |
| Grating, handrail, ladder | 1 | Job | Sum | 3,224 | |
| Dewatering, site protection, diversion of existing flows | 1 | Job | Sum | 43,334 | |
| 10' x 10' Sluice gate w/ appurtenances | 2 | EA | 64,134.66 | 128,269 | |
| Reach 2C; | | | | | |
| Sta 238+50± 96" Gatewell "B" | | | | | |
| Excavation | 859 | CY | 9.71 | 8,338.20 | |
| Backfill | 494 | CY | 11.70 | 5,779.92 | |
| Concrete | 108 | CY | 477 | 51,481.06 | |
| 96" Sluice gate w/ appurtenances | 1 | Job | Sum | 53,734.44 | |
| Diversion of existing sewage flows, dewatering, site protection | 1 | Job | Sum | 60,667.92 | |
| Grating, ladder, handrail | 1 | Job | Sum | 2,582.72 | |
| 96" RCP, Class IV | 190 | LF | 433.34 | 82,335.03 | |
| Sta 238+40 15" Gatewell "C" | | | | | |
| Excavation, dewatering, and backfill | 1 | Job | Sum | 10,400.21 | |
| 15" RCP, Class III, Class A bedding | 165 | LF | 43.33 | 7,150.15 | |
| 15" Slide Gate w/lift | 1 | EA | Sum | 13,866.95 | |
| Concrete, non-reinforced | 15 | CY | 260.01 | 3,900.08 | |
| 48" RCP, Class II | 18 | LF | 130.00 | 2,340.05 | |
| Grating, handrail, ladder | 1 | Job | Sum | 2,166.71 | |
| Sta 134+12 Credit Island | | | | | |
| Slough Inlet, twin 8' x 8' Gatewell "D" | | | | | |
| Slide Gates w/motor lift | 2 | EA | 46,800.97 | 93,601.93 | |
| Grating, handrail, ladders | 1 | Job | Sum | 13,000.27 | |
| Protection of water and gas lines | 1 | Job | Sum | 17,333.69 | |
| Site protection & dewatering | 1 | Job | Sum | 86,668.45 | |
| Excavation, structural | 5,500 | CY | 9.71 | 53,387.77 | |
| Backfill | 4,500 | CY | 11.70 | 52,651.09 | |
| Conrete, reinforced | 970 | CY | 433.34 | 420,342.01 | |
| Sta 123+10± McManus Creek | | | | | |
| Outlet twin 10' x 10' Gatewell "E" | | | | | |
| Excavation | 1,900 | CY | 9.71 | 18,443.05 | |
| Backfill | 600 | CY | 11.70 | 7,020.14 | |
| Conrete, reinforced | 1,080 | CY | 433.34 | 468,009.66 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Gatewells (Cont'd)** | | | | | |
| Slide gates w/motor lift 10' x 10' | 2 | EA | 64,134.66 | 128,269.31 | |
| Gratings, ladders, handrails on gatewells & headwalls | 1 | Job | Sum | 17,333.69 | |
| Site protection & dewatering | 1 | Job | Sum | 104,002.15 | |
| Reach 2C; | | | | | |
| Sta 98+85± 72" Gatewell "F" | | | | | |
| Excavation, backfill, dewatering, site protection, bypass or pumping or existing flows | 1 | Job | Sum | 104,002 | |
| 72" RCP | | | | | |
| Class IV, Class "C" Bedding | 48 | LF | 277.34 | 13,312 | |
| Class IV, Class "A" Bedding | 100 | LF | 320.67 | 32,067 | |
| Sluice gate & appurtenances | 1 | Job | Sum | 38,134 | |
| Grating, handrail, ladder | 1 | Job | Sum | 2,167 | |
| Conrete, reinforced | 100 | CY | 485.34 | 48,534 | |
| Concrete, non-reinforced | 54 | CY | 260.01 | 14,040 | |
| Sta 98+55 60" Gatewell "G" | | | | | |
| 60" Sluice gate & appurtenances | 1 | Job | Sum | 34,667 | |
| Concrete, reinforced | 58 | CY | 485.34 | 28,150 | |
| Concrete, non-reinforced | 41 | CY | 260.01 | 10,660 | |
| 60" RCP, Class IV, Class "A" bedding | 100 | LF | 303.34 | 30,334 | |
| Excavation, backfill, site protection, dewatering, and removal of existing MH and pipe | 1 | Job | Sum | 52,001 | |
| New MH | 1 | Job | Sum | 13,000 | |
| Grating, handrail, ladder | 1 | Job | Sum | 2,167 | |
| Sta 89+78 Twin 72" Gatewell | | | | | |
| Excavation | 2,400 | CY | 9.71 | 23,296 | |
| Backfill | 2,250 | CY | 11.70 | 26,326 | |
| Dewater, site protection, pump or bypass flows | 1 | Job | Sum | 78,002 | |
| 72" Sluice gate & appurtenances | 2 | EA | 38,134.12 | 76,268 | |
| Concrete | 110 | CY | 485.34 | 53,388 | |
| Ladders, grating, handrails | 1 | Job | Sum | 3,467 | |
| Sta 82+10± 60" Gatewell "I" | | | | | |
| Excavation | 1,100 | CY | 9.71 | 10,678 | |
| Backfill | 1,000 | CY | 11.70 | 11,700 | |
| Concrete | 51 | CY | 485.34 | 24,753 | |
| 60" Sluice gate w/appertenances | 1 | Job | Sum | 34,667 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Gatewells (Cont'd)** | | | | | |
| Dewater, Site protection, bypass flows | 1 | Job | Sum | 52,001 | |
| Ladder, grate, handrail | 1 | Job | Sum | 2,167 | |
| Reach 2B; | | | | | |
| Sta 65+85 78" Gatewell "J" | | | | | |
| Excavation | 850 | CY | 9.71 | 8,251 | |
| Backfill | 800 | CY | 11.70 | 9,360 | |
| 78" Sluice gate & appurtenances | 1 | EA | Sum | 43,334 | |
| Grating, handrail, ladder | 1 | Job | Sum | 2,167 | |
| Dewater, Site protection, bypass for storm flows | 1 | Job | Sum | 78,002 | |
| 78" RCP, Class IV, Class "A" bedding, incl. excavation, backfill, & existing RCP removal | 100 | LF | 485.34 | 48,534 | |
| Concrete, reinforced | 60 | CY | 485.34 | 29,121 | |
| Concrete, non-reinforced | 60 | CY | 260.01 | 15,600 | |
| Sta 52+58 60" Gatewell "K" | | | | | |
| 60" Sluice gate & appurtenances | 1 | Job | Sum | 34,667 | |
| Concrete, reinforced | 58 | CY | 485.34 | 28,150 | |
| Concrete, non-reinforced | 41 | CY | 260.01 | 10,660 | |
| 60" RCP, Class IV, Class "A" bedding | 100 | LF | 303.34 | 30,334 | |
| Excavation, backfill, site protection, dewatering, and removal of existing MH and pipe | 1 | Job | Sum | 34,667 | |
| Grating, handrail, and ladder | 1 | Job | Sum | 2,167 | |
| NOTE: | | | | | |
| Sta 45+20 Gatewell "L" forms a part of Gaines Street Pump Station | | | | | |
| Sta 42+04 48" Gatewell "M" | | | | | |
| Excavation | 108 | CY | 9.71 | 1,048 | |
| Backfill | 39 | CY | 11.70 | 456 | |
| Concrete, reinforced | 12 | CY | 485.34 | 5,824 | |
| Slide gate, 48" w/ lift rising stem, guides | 1 | EA | 26,000.54 | 26,001 | |
| Handrail, grating, ladder | 1 | Job | Sum | 2,167 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Sta 37+88 30" Gatewell "N" | | | | | |
| Excavation | 160 | CY | 9.71 | 1,553 | |
| Backfill | 145 | CY | 11.70 | 1,697 | |
| Concrete, reinforced | 21 | CY | 485.34 | 10,192 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Gatewells (Cont'd)** | | | | | |
| Slide gate, 30" self-contained, non-rising stem, guides, floor box, and packing gland | 1 | EA | Sum | 20,800 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Pressurized access cover w/ frame 4.5' x 2.0' | 1 | EA | Sum | 1,040 | |
| Sta 32+06 66" Gatewell "O" | | | | | |
| Excavation | 395 | CY | 9.71 | 3,834 | |
| Backfill | 321 | CY | 11.70 | 3,756 | |
| Concrete, reinforced | 32 | CY | 485.34 | 15,531 | |
| Slide gate, 66" self-contained, w/nonrising stem floor box, and packing gland | 1 | Job | Sum | 32,241 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Pressurized access cover w/ frame | 1 | EA | Sum | 1,040 | |
| Sta 31+83 30" New Gatewell "F" | | | | | |
| Excavation | 367 | CY | 9.71 | 3,562 | |
| Backfill | 336 | CY | 11.70 | 3,931 | |
| Concrete, reinforced | 17 | CY | 485.34 | 8,251 | |
| Slide gate, 30" self-contained, w/ non-rising stem, packing gland and floor box | 1 | Job | Sum | 20,800 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Pressurized access cover w/ frame | 1 | EA | 1,040.02 | 1,040 | |
| Sta 29+13 48" New Gatewell | | | | | |
| Excavation | 964 | CY | 9.71 | 9,357 | |
| Backfill | 910 | CY | 11.70 | 10,647 | |
| Concrete, reinforced | 30 | CY | 485.34 | 14,560 | |
| Slide gate, 48" self contained, w/non-rising stem, packing gland and floor box | 1 | Job | Sum | 26,001 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Pressurized access cover w/ frame | 1 | EA | 1,040.02 | 1,040 | |
| Sta 27+33 48" New Gatewell | | | | | |
| Excavation | 382 | CY | 9.71 | 3,708 | |
| Backfill | 334 | CY | 11.70 | 3,908 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Gatewells (Cont'd)** | | | | | |
| Concrete, reinforced | 23 | CY | 485.34 | 11,162.90 | |
| Slide gate, 48' self-contained, w/non-rising stem, packing gland and floor box | 1 | EA | Sum | 26,000.54 | |
| Dewatering | 1 | Job | Sum | 20,800.43 | |
| Pressurized access cover w/ frame | 1 | EA | 1,040.02 | 1,040.02 | |
| Sta 25+33 60" Gatewell "S" | | | | | |
| Excavation | 560 | CY | 9.71 | 5,435.85 | |
| Backfill | 500 | CY | 11.70 | 5,850.12 | |
| Concrete, reinforced | 39 | CY | 485.34 | 18,928.39 | |
| Slide gate, 60" self-contained, w/non-rising stem, packing gland and floor box | 1 | EA | Sum | 31,200.64 | |
| Dewatering | 1 | Job | Sum | 20,800.43 | |
| Pressurized access cover w/ frame | 1 | EA | Sum | 1,040.02 | |
| RCP, 60", Class III on Class "B" bedding | 118 | LF | 303.34 | 35,794.07 | |
| Outlet headwall | 1 | Job | Sum | 19,067.06 | |
| Reach 2A; | | | | | |
| Sta 23+75 36" Gatewell "T" | | | | | |
| Excavation | 546 | CY | 9.71 | 5,299.95 | |
| Backfill | 353 | CY | 11.70 | 4,130.19 | |
| Concrete, reinforced | 22 | CY | 485.34 | 10,677.55 | |
| Slide gate, 36" self-contained, w/non-rising stem, floor box, and packing gland | 1 | Job | Sum | 21,493.78 | |
| Pressurized access cover | 1 | EA | 1,040.02 | 1,040.02 | |
| RCP, 36", Class IV on Class "B" bedding | 44 | LF | 216.67 | 9,533.53 | |
| Sta 19+64 36" Gatewell "U" | | | | | |
| Excavation | 486 | CY | 9.71 | 4,717.54 | |
| Backfill | 460 | CY | 11.70 | 5,382.11 | |
| Concrete, reinforced | 22 | CY | 485.34 | 10,677.55 | |
| Slide gate, 36" non-rising stem, floor box, and packing gland | 1 | Job | Sum | 20,800.43 | |
| Dewatering | 1 | Job | Sum | 20,800.43 | |
| Pressurized access cover | 1 | EA | 1,040.02 | 1,040.02 | |
| Sta 15+21 54" Gatewell "V" | 720 | CY | 9.71 | 6,988.94 | |
| Excavation | | | | | |
| Backfill | 617 | CY | 11.70 | 7,219 | |
| Concrete, reinforced | 47 | CY | 485.34 | 22,811 | |
| Concrete, non-reinforced | 15 | CY | 260.01 | 3,900 | |
| Slide gate, 54" self-contained, w/non-rising stem, floor box, and packing gland | 1 | Job | Sum | 26,001 | |
| Pressurized access cover | 1 | EA | 1,040.02 | 1,040 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Gatewells (Cont'd)** | | | | | |
| 48" Elliptical conc. Pipe | 25 | LF | 260.01 | 6,500 | |
| Sta 14+88 36" Gatewell "W" | | | | | |
| Excavation | 256 | CY | 9.71 | 2,485 | |
| Backfill | 63 | CY | 11.70 | 737 | |
| Concrete, reinforced | 22 | CY | 485.34 | 10,678 | |
| Concrete, non-reinforced | 23 | CY | 260.01 | 5,980 | |
| Slide gate, 36" self-contained, w/non-rising stem, floor box, and packing gland | 1 | Job | Sum | 20,800 | |
| Pressurized access cover | 1 | EA | 1,040.02 | 1,040 | |
| 48", RCP, Class IV, Class "B" bedding | 125 | LF | 260.01 | 32,501 | |
| Sta 10+12 36" Gatewell "X" | | | | | |
| Excavation | 108 | CY | 9.71 | 1,048 | |
| Backfill | 39 | CY | 11.70 | 456 | |
| Reinforced concrete | 12 | CY | 433.34 | 5,200 | |
| Slide gate, w/rising stem, lift operator | 1 | Job | Sum | 20,800 | |
| Handrail, grating, ladder | 1 | Job | Sum | 2,167 | |
| Dewatering | 1 | Job | Sum | 20,800 | |
| Sta 5+38 36" Gatewell "Y" | | | | | |
| Excavation | 139 | CY | 9.71 | 1,349 | |
| Backfill | 47 | CY | 11.70 | 550 | |
| Concrete, reinforced | 22 | CY | 485.34 | 10,678 | |
| Slide gate, 36" | 1 | Job | Sum | 10,678 | |
| Handrail, grating, ladder | 1 | Job | Sum | 20,800 | |
| Dewatering | 1 | Job | Sum | 2,167 | |
| Sta 5+05 66" Gatewell "Z" | | | | | |
| Excavation | 440 | CY | 9.71 | 4,271 | |
| Backfill | 295 | CY | 11.70 | 3,452 | |
| Concrete, reinforced | 47 | CY | 485.34 | 22,811 | |
| Slide gate 66" w/ lift | 1 | Job | Sum | 34,667 | |
| Handrail, grating, ladder | 1 | Job | Sum | | |
| Dewatering | 1 | Job | Sum | 10,400 | |
| | Reach 2A, Subtotal, Gatewells | | | 436,569 | |
| | Reach 2A, Contingencies | | | 66,958 | |
| | Reach 2A, Total, Gatewells | | | 503,527 | |
| | Reach 2B, Subtotal, Gatewells | | | 910,123 | |
| | Reach 2B, Contingencies | | | 139,589 | |
| | Reach 2B, Total, Gatewells | | | 1,049,712 | |
| | Reach 2C, Subtotal, Gatewells | | | 2,816,499 | |
| | Reach 2C, Contingencies | | | 431,977 | |
| | Reach 2C, Total, Gatewells | | | 3,248,476 | |
| | Project Total, Gatewells | | | 4,801,716 | |

NOTES:

(1) Sta 3+77, 78" Gatewell "AA" forms a part of the River Drive Closure

(2) Sta 174+24, 24" Gatewell "RI" is for recreation enhancement and is listed with proposed Credit Island recreation features

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Floodwalls** | | | | | |
| Reach 2A, I-Wall | | | | | |
| Stripping | 569 | CY | 3.21 | 1,825 | |
| Excavation | 165 | CY | 5.37 | 887 | |
| Backfill/embankment fill | 2,653 | CY | 11.70 | 31,041 | |
| Concrete | 452 | CY | 381.34 | 172,366 | |
| Sheet Piling PZ-27 | 8,384 | SF | 24.70 | 207,089 | |
| Toe drain, 12" performance pipe | 466 | LF | 39.00 | 18,174 | |
| Catch Basins | 4 | EA | 2,166.71 | 8,667 | |
| 6" Riprap bedding | 130 | CY | 43.33 | 5,633 | |
| 18" Riprap | 545 | Ton | 32.07 | 17,477 | |
| Seeding | 2 | AC | 2,166.71 | 4,333 | |
| Reach 2B, I-Wall, Sat 22+25 Protect existing buried telephone cable and provide granular fill | 1 | Job | Sum | 1,733 | |
| Reach 2A, "T" floodwall | | | | | |
| Excavation, common | 9,324 | CY | 5.37 | 50,102 | |
| Backfill | 5,835 | CY | 6.50 | 37,928 | |
| Concrete, reinforced | 3,540 | CY | 381.34 | 1,349,948 | |
| Dewatering, site protection | 1 | Job | Sum | 67,601 | |
| Remove & replace existing concrete pavement | 1,042 | SY | 77.13 | 80,344 | |
| Sheet piling vic 14+18 | 4,000 | SF | 24.70 | 98,802 | |
| Sheet piling, dewatering vic 5+86 - 3+86 | 1 | Job | Sum | 173,337 | |
| Toe Drain | 734 | LF | 39.00 | 28,642 | |
| Reach 2B, "T" floodwall | | | | | |
| Excavation, common | 6,216 | CY | 5.37 | 33,401 | |
| Backfill | 3,890 | CY | 6.50 | 25,286 | |
| Concrete, reinforced | 2,360 | CY | 381.34 | 899,965 | |
| Dewatering, site protection | 1 | Job | Sum | 45,068 | |
| Remove & replace existing concrete pavement | 694 | SY | 77.13 | 53,562 | |
| Toe Drain | 490 | LF | 39.00 | 19,095 | |
| Reach 2A, Sta 10+60 Protect cable and provide annular crossing of wall | 1 | Job | Sum | 1,733 | |
| Reach 2A, New Manhole | 1 | Job | Sum | 8,667 | |
| Reach 2A, Remove and replace existing 8" railroad t | 300 | LF | 32.07 | 9,620 | |
| Reach 2A, Folding floodwall | | | | | |
| Excavation | 358 | CY | 5.37 | 1,922 | |
| Backfill | 162 | CY | 11.70 | 1,900 | |
| Levee impervious fill | 4,221 | CY | 10.83 | 45,731 | |
| Concrete, reinforced | 890 | CY | 433.34 | 385,848 | |
| Toe Drain 12" perf. CMP, w/filter material | 903 | LF | 39.00 | 35,210 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Floodwalls (Cont'd)** | | | | | |
| Aluminum Panel, Aluminum | 11,035 | LB | 7.54 | 83,207 | |
| Aluminum Panel, Seal | 1,466 | LF | 4.33 | 6,351 | |
| Aluminum Panel, Steel | 13,760 | LB | 4.33 | 59,628 | |
| Concrete Panel, Concrete | 67 | CY | 520.01 | 34,737 | |
| Concrete Panel, Steel | 46,954 | LB | 4.33 | 203,470 | |
| Concrete Panel, Seal | 317 | LF | 4.33 | 1,373 | |
| Sheet Piling (PZ-27) | 16,251 | SF | 24.70 | 401,413 | |
| Pavement Removal | 4,986 | SY | 17.33 | 86,426 | |
| New Pavement, concrete | 1,068 | SY | 60.67 | 64,818 | |
| Site protection, dewatering | 1 | Job | Sum | 45,761 | |
| Seeding | 1 | AC | 2,166.71 | 2,600 | |
| Concrete grid turf | 352 | SF | 10.40 | 3,661 | |
| Maintenance road base and paving | 1,188 | SY | 23.40 | 27,800 | |
| Reach 2A Subtotal | | | | 3,866,070 | |
| Reach 2A Contingencies | | | | 584,697 | |
| Reach 2A Total, Floodwall | | | | 4,450,768 | |
| Reach 2B, Folding floodwall | | | | | |
| Excavation | 536 | CY | 5.37 | 2,882 | |
| Backfill | 244 | CY | 11.70 | 2,850 | |
| Levee impervious fill | 6,332 | CY | 10.83 | 68,596 | |
| Concrete, reinforced | 1,336 | CY | 433.34 | 578,772 | |
| Toe Drain 12" perf. CMP, w/filter material | 1,354 | LF | 39.00 | 52,815 | |
| Aluminum Panel, Aluminum | 16,553 | LB | 7.54 | 124,811 | |
| Aluminum Panel, Seal | 2,198 | LF | 4.33 | 9,527 | |
| Aluminum Panel, Steel | 20,640 | LB | 4.33 | 89,442 | |
| Concrete Panel, Concrete | 100 | CY | 520.01 | 52,105 | |
| Concrete Panel, Steel | 70,430 | LB | 4.33 | 305,205 | |
| Concrete Panel, Seal | 475 | LF | 4.33 | 2,059 | |
| Sheet Piling (PZ-27) | 24,377 | SF | 24.70 | 602,119 | |
| Pavement Removal | 7,479 | SY | 17.33 | 129,639 | |
| New Pavement, concrete | 1,603 | SY | 60.67 | 97,226 | |
| Site protection, dewatering | 1 | Job | Sum | 68,641 | |
| Seeding | 1.80 | AC | 2,166.71 | 3,900 | |
| Concrete grid turf | 528 | SF | 10.40 | 5,491 | |
| Maintenance road base and paving | 1,782 | SY | 23.40 | 41,700 | |
| Reach 2B Subtotal | | | | 3,315,891 | |
| Reach 2B Contingencies | | | | 501,489 | |
| Reach 2B Total, Floodwall | | | | 3,817,380 | |
| Subtotal, Floodwalls | | | | 7,181,961 | |
| Contingencies, Floodwalls | | | | 1,086,187 | |
| Project Total, Floodwalls | | | | 8,268,148 | |

| ITEM<br>Closures | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| I-280 Railroad Closure | | | | | |
| Dewatering | 1 | Job | Sum | 10,400 | |
| Temporary railroad bridge | 1 | EA | 53,734.44 | 53,734 | |
| Excavation, structural | 749 | CY | 9.71 | 7,270 | |
| Sheet Piling, PZ 27 | 2,088 | SF | 24.71 | 51,586 | |
| Backfill | 700 | CY | 11.70 | 8,190 | |
| Concrete, I Wall | 65 | CY | 433.34 | 28,167 | |
| Concrete, closure foundation | 33 | CY | 381.34 | 12,584 | |
| Structural Aluminum | 1,584 | LB | 7.54 | 11,944 | |
| Structural Steel | 5,542 | LB | 4.33 | 24,016 | |
| Toe Drain | 60 | LF | 39.00 | 2,340 | |
| Timbers | 1,728 | BM | 1.30 | 2,246 | |
| Seal | 162 | LF | 4.33 | 702 | |
| Flapgate, 12" | 2 | EA | 2,166.71 | 4,333 | |
| Railroad Closure near Pershing Street | | | | | |
| Sta 9+40± | | | | | |
| Dewatering | 1 | Job | Sum | 13,867 | |
| Temporary bridge | 1 | Job | Sum | 27,734 | |
| Excavation | 240 | CY | 9.71 | 2,330 | |
| Sheet Piling, PMA 22 | 220 | SF | 24.70 | 5,434 | |
| Backfill | 150 | CY | 11.70 | 1,755 | |
| Concrete | 155 | CY | 381.34 | 59,108 | |
| Steel, structural | 5,900 | LB | 4.33 | 25,567 | |
| Toe Drain | 18 | LF | 39.00 | 702 | |
| Sta 45+55± Gaines Street | | | | | |
| Closure Structure | | | | | |
| Remove existing pavement | 219 | SY | 17.33 | 3,796 | |
| Replace pavement | 107 | SY | 60.67 | 6,491 | |
| Remove & plug existing 30" RCP storm sewer | 1 | Job | 1,074.69 | 1,075 | |
| Remove existing catch basin drain pipe | 1 | Job | 1,074.69 | 1,075 | |
| Excavation | 288 | CY | 9.71 | 2,796 | |
| Backfill | 104 | CY | 11.70 | 1,217 | |
| Concrete | 184 | CY | 381.34 | 70,167 | |
| Toe Drain | 48 | LF | 39.00 | 1,872 | |
| Steel, structural | 18,757 | LB | 4.33 | 81,282 | |
| Aluminum, structural | 1,497 | LB | 7.54 | 11,288 | |
| Seals | 553 | LF | 4.33 | 2,396 | |
| Main St. Ramp Closure Structure Concrete | | | | | |
| Concrete, reinforced | 260 | CY | 320.67 | 83,375 | |
| Piling, Steel Sheet, PMA 22 | 780 | SF | 24.70 | 19,266 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Closures (Cont'd)** | | | | | |
| Piling, Bearing- HP8-36 | 685 | LF | 36.40 | 24,935 | |
| Access Covers Incl. Frames & Mounting Hardwai | 252 | SF | 43.33 | 10,920 | |
| Excavate 800 cy ±, Backfill 400 cy ±. Barricades, Remove and Replace Paving as Required and Dewater | 1 | Job | Sum | 31,201 | |
| Structural Steel | 12,500 | LBS | 4.33 | 54,168 | |
| Structural Aluminum | 3,170 | LBS | 7.54 | 23,902 | |
| Concrete Turf Blocks | 1,080 | SF | 8.67 | 9,360 | |
| Steel Decking | 3,180 | LBS | 3.64 | 11,575 | |
| Perry Street Closure | | | | | |
| Concrete, reinforced | 195 | CY | 381.34 | 74,362 | |
| Site Protection, Excavation, Backfill, Dewatering, Removal of Pavement & Traffic Control | 1 | Job | Sum | 17,334 | |
| Access Covers, Frames & Hardware | 180 | SF | 43.33 | 7,800 | |
| Structural Steel | 6,500 | LB | 4.33 | 28,167 | |
| Structural Aluminum | 1,500 | LB | 7.54 | 11,310 | |
| Steel Decking | 1,820 | LB | 3.64 | 6,625 | |
| Sta. 3+77 River Drive Closure and Gatewell "AA" | | | | | |
| Dewatering | 1 | Job | Sum | 26,001 | |
| Diversion of existing 78" sanitary sewer flow | 1 | Job | Sum | 43,334 | |
| Excavation, structural | 1,066 | CY | 9.71 | 10,348 | |
| Excavation, rock | 42 | CY | 130.00 | 5,460 | |
| Sheet piling | 450 | SF | 24.70 | 11,115 | |
| Backfill | 620 | CY | 11.70 | 7,254 | |
| Concrete | 438 | CY | 381.34 | 167,027 | |
| Toe Drain | 80 | LF | 31.20 | 2,496 | |
| Removal of existing pavement | 325 | SY | 17.33 | 5,633 | |
| Replacement of pavement | 159 | SY | 60.67 | 9,646 | |
| Steel, structural | 31,732 | LB | 4.33 | 137,508 | |
| Aluminum, structural | 2,578 | LB | 7.54 | 19,439 | |
| Slide Gate w/non-rising stem, packing box | 1 | Job | Sum | 43,334 | |
| Pressurized access cover | 1 | EA | 1,040.02 | 1,040 | |
| Seals | 1,063 | LF | 4.33 | 4,606 | |
| Remove & Replace existing RR tracks on River I | 80 | LF | 107.47 | 8,598 | |
| Traffic Diversion | 1 | Job | Sum | 6,933 | |
| Rhythm City Casino Closure Structure | 1 | Job | 200,000.00 | 200,000 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Closures (Cont'd)** | | | | | |
| East 3rd Street Closure | | | | | |
| Remove and Replace Conc. Street, sidewalk, cu | 92 | SY | 77.13 | 7,096 | |
| Excavation & Backfill | 1 | Job | Sum | 6,500 | |
| PZ-27 Sheet Pile | 820 | SF | 24.70 | 20,254 | |
| Closure Concrete & Reinforcement | 75 | CY | 381.34 | 28,601 | |
| Imbedded, Metal, Trench, Cover, etc. | 1 | Job | Sum | 37,614 | |
| Toe Drain | 82 | LF | 39.00 | 3,198 | |
| Aluminum Posts and panels, hardware | 1 | Job | Sum | 33,315 | |
| Manhole | 1 | Job | Sum | 5,373 | |
| Traffic control, protection & dewatering | 1 | Job | Sum | 20,800 | |
| granular fill around 6" pipe landward of closure | 1 | Job | Sum | 867 | |
| Provide granular fill around 12" gas line landside of closure | 1 | Job | Sum | 867 | |
| East 2nd Street Closure | | | | | |
| Remove and Replace Conc. Street, sidewalk, cu | 78 | SY | 77.13 | 6,017 | |
| Excavation & Backfill | 1 | Job | Sum | 4,333 | |
| PZ-27 Sheet Pile | 635 | SF | 24.70 | 15,685 | |
| Concrete, reinforced | 64 | CY | 381.34 | 24,406 | |
| Imbedded metal | 1 | Job | Sum | 31,599 | |
| Toe Drain | 70 | LF | 39.00 | 2,730 | |
| Aluminum Posts and panels | 1 | Job | Sum | 27,942 | |
| Manhole | 1 | Job | Sum | 5,373 | |
| Traffic control and dewatering | 1 | Job | Sum | 20,800 | |
| granular fill around 8" pipe landward of closure | 1 | Job | Sum | 867 | |
| Beiderbecke Ramp Walkthru Closure | | | | | |
| Remove existing pavement | 477 | SY | 17.33 | 8,268 | |
| Replace pavement | 60 | SY | 55.90 | 3,354 | |
| Excavation | 18 | CY | 9.71 | 175 | |
| Sheet Piling | 563 | SF | 24.70 | 13,906 | |
| Backfill | 27 | CY | 11.70 | 316 | |
| Concrete | 37 | CY | 433.34 | 16,034 | |
| Toe Drain | 40 | LF | 39.00 | 1,560 | |
| Embankment fill, compacted | 104 | CY | 11.70 | 1,217 | |
| Steel, structural | 6,561 | LB | 4.33 | 28,432 | |
| Aluminum, structural | 2,214 | LB | 7.54 | 16,694 | |
| Closure Structure near Band Shell | | | | | |
| Excavation | 633 | CY | 5.37 | 3,401 | |
| Backfill, compacted Impervious | 595 | CY | 10.83 | 6,446 | |
| Concrete, reinforced | 39 | CY | 433.34 | 16,900 | |
| Structural Aluminum | 2,675 | LB | 7.54 | 20,170 | |
| Toe Drain, 12" perforated pipe | 55 | LF | 39.00 | 2,145 | |
| Steps, conc. | 1 | Job | Sum | 1,875 | |
| Access Covers, Cast Iron | 825 | LB | 4.33 | 3,575 | |
| Sheet Piling, PZ-27 | 800 | SF | 24.70 | 19,760 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Closures (Cont'd)** | | | | | |
| Closure Structure at Ripley St. Extended | | | | | |
| Excavation | 640 | CY | 5.37 | 3,439 | |
| Backfill, compacted Impervious | 600 | CY | 10.83 | 6,500 | |
| Concrete, reinforced | 40 | CY | 433.34 | 17,334 | |
| Structural Aluminum | 2,670 | LB | 7.54 | 20,132 | |
| Toe Drain, 12" perforated pipe | 54 | LF | 39.00 | 2,106 | |
| Access Covers, Cast Iron | 850 | LB | 4.33 | 3,683 | |
| Sheet Piling, PZ-27 | 800 | SF | 24.70 | 19,760 | |
| Steps, conc. | 1 | Job | Sum | 4,333 | |
| Closure Structure at Harrison St. Extended | | | | | |
| Excavation | 640 | CY | 5.37 | 3,439 | |
| Backfill, compacted Impervious | 600 | CY | 10.83 | 6,500 | |
| Concrete, reinforced | 40 | CY | 433.34 | 17,334 | |
| Structural Aluminum | 2,670 | LB | 7.54 | 20,132 | |
| Toe Drain, 12" perforated pipe | 54 | LF | 39.00 | 2,106 | |
| Access Covers, Cast Iron | 850 | LB | 4.33 | 3,683 | |
| Sheet Piling, PZ-27 | 800 | SF | 24.70 | 19,760 | |
| Steps, conc. | 1 | Job | Sum | 4,333 | |
| Brady St. Walkthru Closure | | | | | |
| Remove existing pavement, parking island | 595 | SY | 17.33 | 10,314 | |
| Replace pavement | 75 | SY | 55.90 | 4,193 | |
| Excavation | 22 | CY | 9.71 | 214 | |
| Sheet Piling | 700 | SF | 24.70 | 17,290 | |
| Backfill | 34 | CY | 11.70 | 398 | |
| Concrete, reinforced | 46 | CY | 433.34 | 19,934 | |
| Toe Drain | 50 | LF | 39.00 | 1,950 | |
| Embankment fill, compacted | 130 | CY | 11.70 | 1,521 | |
| Steel, structural | 8,160 | LB | 4.33 | 35,361 | |
| Aluminum, structural | 2,755 | LB | 7.54 | 20,773 | |
| Steps, conc. | 1 | Job | Sum | 4,333 | |
| | Reach 2A, Closure Subtotal | | | 1,681,089 | |
| | Contingencies | | | 254,145 | |
| | Reach 2A, Total, Closures | | | 1,935,234 | |
| | Reach 2B, Closure Subtotal | | | 502,259 | |
| | Contingencies | | | 75,931 | |
| | Reach 2B, Total, Closures | | | 578,190 | |
| | Reach 2C, Closure Subtotal | | | 217,514 | |
| | Contingencies | | | 32,883 | |
| | Reach 2C, Total, Closures | | | 250,397 | |
| | Total, Closures | | | 2,763,822 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Beautification** | | | | | |
| Reach 2A, Downtown, Planters for Trees | 18 | EA | 866.68 | 15,167 | |
| Reach 2A, Downtown, Planters for Shrubs | 34 | EA | 1,074.69 | 36,002 | |
| Reach 2A, Downtown, Trees | 75 | EA | 216.67 | 16,250 | |
| Reach 2A, Downtown, Shrubs | 150 | EA | 75.40 | 11,310 | |
| Reach 2A, Downtown, Ground Cover | 500 | EA | 2.17 | 1,083 | |
| Reach 2B, Downtown, Planters for Trees | 18 | EA | 866.68 | 15,167 | |
| Reach 2B, Downtown, Planters for Shrubs | 34 | EA | 1,074.69 | 36,002 | |
| Reach 2B, Downtown, Trees | 75 | EA | 216.67 | 16,250 | |
| Reach 2B, Downtown, Shrubs | 150 | EA | 75.40 | 11,310 | |
| Reach 2B, Downtown, Ground Cover | 500 | EA | 2.17 | 1,083 | |
| Reach 2C, Cresent Park, Landscaping, Trees | 300 | EA | 216.67 | 65,001 | |
| Reach 2C, Cresent Park, Landscaping, Shrubs | 600 | EA | 75.40 | 45,241 | |
| Reach 2C, Credit Island, Landscaping, Trees | 200 | EA | 216.67 | 43,334 | |
| Reach 2C, Credit Island, Landscaping, Shrubs | 400 | EA | 75.40 | 30,161 | |
| Reach 2A, Subtotal | | | | 79,813 | |
| Reach 2A, Contingencies | | | | 13,373 | |
| Reach 2A, Total, Beautification | | | | 93,186 | |
| Reach 2B, Subtotal | | | | 79,813 | |
| Reach 2B, Contingencies | | | | 13,373 | |
| Reach 2B, Total, Beautification | | | | 93,186 | |
| Reach 2C, Subtotal | | | | 183,737 | |
| Reach 2C, Contingencies | | | | 30,785 | |
| Reach 2C, Total, Beautification | | | | 214,522 | |
| Total Beautification | | | | 400,894 | |
| **Mitigation** | | | | | |
| Reach 2A, Downtown, Conservation Areas | | | | | |
| Concrete | 13 | SY | 39.00 | 488 | |
| Furniture | 18 | EA | 433.34 | 7,800 | |
| Trash receptacles | 6 | EA | 216.67 | 1,300 | |
| Lighting | 1 | Job | Sum | 5,373 | |
| Concrete walk | 333 | SY | 26.00 | 8,658 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| Reach 2B, Downtown, Conservation Areas | | | | | |
| Concrete | 13 | SY | 39.00 | 488 | |
| Furniture | 18 | EA | 433.34 | 7,800 | |
| Trash receptacles | 6 | EA | 216.67 | 1,300 | |
| Lighting | 1 | Job | Sum | 5,373 | |
| Concrete walk | 333 | SY | 26.00 | 8,658 | |
| Reach 2C, Credit Island, Fishing Access Path | 5,200 | SY | 6.50 | 33,801 | |
| | Reach 2A, Subtotal | | | 23,619 | |
| | Reach 2A, Contingencies | | | 5,681 | |
| | Reach 2A, Total, Mitigation | | | 29,300 | |
| | Reach 2B, Subtotal | | | 23,619 | |
| | Reach 2B, Contingencies | | | 5,681 | |
| | Reach 2B, Total, Mitigation | | | 29,300 | |
| | Reach 2C, Subtotal | | | 33,801 | |
| | Reach 2C, Contingencies | | | 8,129 | |
| | Reach 2C, Total, Mitigation | | | 41,930 | |
| | Project Total, Mitigation | | | 100,530 | |

**PUMPING PLANTS**

| | | | | |
|---|---|---|---|---|
| Reach 2C, Credit Island Pumping Plant and Closure | | | | |
| Pump Station | | | | |
| Pumps, 30", motors and controls | 3 | EA | 107,468.88 | 322,407 |
| Slide Gates, 8' x 4', w/ motor lifts | 3 | EA | 41,600.86 | 124,803 |
| Building, 14 x 36, w/ vents, hatches | 1 | Job | Sum | 26,001 |
| Flapgates, 30" | 3 | EA | 6,500.13 | 19,500 |
| Sump pump w/ shear gates and piping | 1 | Job | Sum | 8,667 |
| Storage shed and stop logs | 1 | Job | Sum | 2,080 |
| Trash racks, gratings, handrails, etc. | 20,500 | LB | 3.21 | 65,738 |
| Guardrail | 150 | LF | 69.33 | 10,400 |
| Concrete | 1,950 | CY | 381.34 | 743,615 |
| Closure structure | | | | |
| Concrete | 1,875 | CY | 381.34 | 715,015 |
| Bulkheads, A-588 | 95,000 | LB | 1.73 | 164,670 |
| Bulkhead Rollers and Appurtenances | 5,000 | LB | 8.67 | 43,334 |
| Service Bridge | 1 | Job | Sum | 52,001 |
| Misc. metal work | 4,000 | LB | 3.21 | 12,827 |
| Crane | 1 | LF | Sum | 60,668 |
| Guardrail | 90 | LF | 69.33 | 6,240 |

| ITEM<br>PUMPING PLANTS (Cont'd) | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| Misc. Items | | | | | |
| Impervious fill | 950 | CY | 13.87 | 13,174 | |
| Riprap | 125 | CY | 39.00 | 4,875 | |
| Granular bedding | 45 | CY | 43.33 | 1,950 | |
| Excavation, silt in cofferdam, and cells | 14,000 | CY | 9.71 | 135,896 | |
| Excavation, rock, in cofferdam | 300 | CY | 64.13 | 19,240 | |
| Dewatering | 1 | Job | Sum | 173,337 | |
| Pervious Fill for cells | 28,400 | CY | 10.83 | 307,673 | |
| Sheet pile cells, permanent | 29,078 | SF | 30.33 | 882,051 | |
| Sheet pile cells, temporary | 31,214 | SF | 21.67 | 676,317 | |
| Lean concrete for shale protection | 150 | CY | 138.67 | 20,800 | |
| Concrete for retaining walls | 150 | CY | 433.34 | 65,001 | |
| Power Supply 500 KVA | 1 | Job | Sum | 43,334 | |
| Reach 2B, Gaines Street Pump Station | | | | | |
| Pumps, 20", motors, and controls | 3 | EA | 76,268.24 | 228,805 | |
| Handrail, trash racks, grating and stoplog frames | 1 | Job | Sum | 27,734 | |
| Discharge pipe, and flapgates | 3 | EA | 43.33 | 130 | |
| Concrete block building w/ ventilators, hatches, etc | 1 | Job | Sum | 34,667 | |
| Excavation | 2,200 | CY | 9.71 | 21,355 | |
| Backfill | 1,850 | CY | 11.70 | 21,645 | |
| Dewatering | 1 | Job | Sum | 52,001 | |
| Slide gates, 5' x 5' w/ motor lifts | 4 | EA | 34,667.38 | 138,670 | |
| RCP, 60" | 110 | LF | 303.34 | 33,367 | |
| Discharge headwall | 1 | Job | Sum | 10,400 | |
| Fencing | 1 | Job | Sum | 5,200 | |
| Road gravel & seeding | 1 | Job | Sum | 2,080 | |
| Electrical, supply and interior (225 KVA) | 1 | Job | Sum | 20,800 | |
| Concrete, reinforced | 625 | CY | 433.34 | 270,839 | |
| Main Street Pump Station | | | | | |
| Excavation | 1,450 | CY | 9.71 | 14,075 | |
| Backfill | 1,200 | CY | 11.70 | 14,040 | |
| Fill to grade | 650 | CY | 11.70 | 7,605 | |
| Pumps, motors, and controls | 2 | EA | 62,401.29 | 124,803 | |
| Concrete, reinforced | 150 | CY | 433.34 | 65,001 | |
| Covers, gratings, and trash rack | 1 | Job | Sum | 13,000 | |
| Flap gates, 18" | 2 | EA | 3,466.74 | 6,933 | |
| Discharge pipe 18" steel | 160 | LF | 112.67 | 18,027 | |
| Gate valves, 18" | 2 | EA | 26,000.54 | 52,001 | |
| Dewatering | 1 | Job | Sum | 26,001 | |
| Manholes for valves | 2 | EA | 6,933.48 | 13,867 | |
| Electric service | 1 | Job | Sum | 13,867 | |
| Reach 2B Subtotal | | | | 1,236,915 | |
| Reach 2B Total, Contingencies | | | | 184,909 | |
| Reach 2B Total | | | | 1,421,824 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **PUMPING PLANTS(Cont'd)** | | | | | |
| Reach 2C Subtotal | | | | 4,721,615 | |
| Reach 2C Total, Contingencies | | | | 705,844 | |
| Reach 2C Total | | | | 5,427,459 | |
| TOTAL - PUMP PLANTS | | | | 6,849,283 | |
| **BUILDINGS, GROUNDS, UTILITIES** | | | | | |
| Storage Buildings, vic | | | | | |
| Reach 1 - Water Treatment Plant | 850 | SF | 43.33 | 36,834 | |
| Reach 2A - Sta 2+00 | 850 | SF | 43.33 | 36,834 | |
| Reach 2B - Sta 45+00 | 850 | SF | 43.33 | 36,834 | |
| Reach 2C - 237+00 | 850 | SF | 43.33 | 36,834 | |
| Reach 1 Sub-total | | | | 36,834 | |
| Reach 1 Contingencies | | | | 6,500 | |
| Reach 1 Reach 1, Total | | | | 43,334 | |
| Reach 2A Sub-total | | | | 36,834 | |
| Reach 2A Contingencies | | | | 6,500 | |
| Reach 2A Total, Buildings, Grounds, Utilities | | | | 43,334 | |
| Reach 2B Sub-total | | | | 36,834 | |
| Reach 2B Contingencies | | | | 6,500 | |
| Reach 2B Total, Buildings, Grounds, Utilities | | | | 43,334 | |
| Reach 2C Sub-total | | | | 36,834 | |
| Reach 2C Contingencies | | | | 6,500 | |
| Reach 2C Total, Buildings, Grounds, Utilities | | | | 43,334 | |
| TOTAL, MAIN REACH - BUILDINGS, GROUNDS, UTILITIES | | | | 173,337 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **MARQUETTE/STURDEVANT STREET TIE-OFF** | | | | | |
| Marquette/Sturdevant Tie-off, I-Wall | | | | | |
| Stripping | 2,851 | CY | 3.21 | 9,143 | |
| Excavation | 827 | CY | 5.37 | 4,443 | |
| Backfill/embankment fill | 13,293 | CY | 11.70 | 155,537 | |
| Concrete | 2,265 | CY | 381.34 | 863,681 | |
| Sheet Piling PZ-27 | 42,010 | SF | 24.70 | 1,037,667 | |
| Toe drain, 12" performance pipe | 2,335 | LF | 39.00 | 91,067 | |
| Catch Basins | 20 | EA | 2,166.71 | 43,427 | |
| 6" Riprap bedding | 651 | CY | 43.33 | 28,228 | |
| 18" Riprap | 2,731 | Ton | 32.07 | 87,571 | |
| Seeding | 10 | AC | 2,166.71 | 21,714 | |
| Tie-off I-Wall | M/S Street, Sub-Total | | | 2,342,476 | |
| Tie-off I-Wall | M/S Street, Contingencies | | | 468,495 | |
| Tie-off I-Wall | M/S Street, Total | | | 2,810,972 | |
| Marquette/Sturdevant Tie-off, Closures | | | | | |
| Marquette Street | | | | | |
| Closure Structure | | | | | |
| Remove existing pavement | 219 | SY | 17.33 | 3,796 | |
| Replace pavement | 107 | SY | 60.67 | 6,491 | |
| Remove & plug existing 30" RCP storm sewer | 1 | Job | 1,074.69 | 1,075 | |
| Remove existing catch basin drain pipe | 1 | Job | 1,074.69 | 1,075 | |
| Excavation | 288 | CY | 9.71 | 2,796 | |
| Backfill | 104 | CY | 11.70 | 1,217 | |
| Concrete | 184 | CY | 381.34 | 70,167 | |
| Toe Drain | 48 | LF | 39.00 | 1,872 | |
| Steel, structural | 18,757 | LB | 4.33 | 81,282 | |
| Aluminum, structural | 1,497 | LB | 7.54 | 11,288 | |
| Seals | 553 | LF | 4.33 | 2,396 | |
| | Marquette Street Closure Total | | | 183,454 | |
| Public Works Access Closure | | | | | |
| Concrete, reinforced | 195 | CY | 381.34 | 74,362 | |
| Site Protection, Excavation, Backfill, Dewatering, Removal of Pavement & Traffic Control | 1 | Job | Sum | 17,334 | |
| Access Covers, Frames & Hardware | 180 | SF | 43.33 | 7,800 | |
| Structural Steel | 6,500 | LB | 4.33 | 28,167 | |
| Structural Aluminum | 1,500 | LB | 7.54 | 11,310 | |
| Steel Decking | 1,820 | LB | 3.64 | 6,625 | |
| | Public Works Access Closure Total | | | 145,598 | |
| Railroad Closure | | | | | |
| Dewatering | 1 | Job | Sum | 13,867 | |
| Temporary bridge | 1 | Job | Sum | 27,734 | |
| Excavation | 240 | CY | 9.71 | 2,330 | |
| Sheet Piling, PMA 22 | 220 | SF | 24.70 | 5,434 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Marquette/Sturdevant Tie-off, Closures (Cont'd)** | | | | | |
| Backfill | 150 | CY | 11.70 | 1,755 | |
| Concrete | 155 | CY | 381.34 | 59,108 | |
| Steel, structural | 5,900 | LB | 4.33 | 25,567 | |
| Toe Drain | 18 | LF | 39.00 | 702 | |
| | | | Railroad Closure Total | 136,497 | |
| River Drive | | | | | |
| Dewatering | 1 | Job | Sum | 26,001 | |
| Diversion of existing 78" sanitary sewer flow | 1 | Job | Sum | 43,334 | |
| Excavation, structural | 1,066 | CY | 9.71 | 10,348 | |
| Excavation, rock | 42 | CY | 130.00 | 5,460 | |
| Sheet piling | 450 | SF | 24.70 | 11,115 | |
| Backfill | 620 | CY | 11.70 | 7,254 | |
| Concrete | 438 | CY | 381.34 | 167,027 | |
| Toe Drain | 80 | LF | 31.20 | 2,496 | |
| Removal of existing pavement | 325 | SY | 17.33 | 5,633 | |
| Replacement of pavement | 159 | SY | 60.67 | 9,646 | |
| Steel, structural | 31,732 | LB | 4.33 | 137,508 | |
| Aluminum, structural | 2,578 | LB | 7.54 | 19,439 | |
| | | | River Drive Closure Total | 445,262 | |
| Mid American Glass Access Closure | | | | | |
| Concrete, reinforced | 195 | CY | 381.34 | 74,362 | |
| Site Protection, Excavation, Backfill, Dewatering, Removal of Pavement & Traffic Control | 1 | Job | Sum | 17,334 | |
| Access Covers, Frames & Hardware | 180 | SF | 43.33 | 7,800 | |
| Structural Steel | 6,500 | LB | 4.33 | 28,167 | |
| Structural Aluminum | 1,500 | LB | 7.54 | 11,310 | |
| Steel Decking | 1,820 | LB | 3.64 | 6,625 | |
| | | | Mid American Glass Access Closure Total | 145,598 | |
| Rockingham Road Closure | | | | | |
| Closure Structure | | | | | |
| Remove existing pavement | 219 | SY | 17.33 | 3,796 | |
| Replace pavement | 107 | SY | 60.67 | 6,491 | |
| Remove & plug existing 30" RCP storm sewer | 1 | Job | 1,074.69 | 1,075 | |
| Remove existing catch basin drain pipe | 1 | Job | 1,074.69 | 1,075 | |
| Excavation | 288 | CY | 9.71 | 2,796 | |
| Backfill | 104 | CY | 11.70 | 1,217 | |
| Concrete | 184 | CY | 381.34 | 70,167 | |
| Toe Drain | 48 | LF | 39.00 | 1,872 | |
| Steel, structural | 18,757 | LB | 4.33 | 81,282 | |
| Aluminum, structural | 1,497 | LB | 7.54 | 11,288 | |
| Seals | 553 | LF | 4.33 | 2,396 | |
| | | | Rockingham Road Closure Total | 183,454 | |

| ITEM | | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|---|
| | Tie-off Closures | M/S Street, Sub-total | | | 2,296,270 | |
| | Tie-off Closures | M/S Street, Contingencies | | | 459,254 | |
| | Tie-off Closures | M/S Street, Total | | | 2,755,524 | |
| **MARQUETTE/STURDEVANT STREET TIE-OFF** | | **TOTAL** | | | 5,566,496 | |
| **MAIN STREET TIE-OFF** | | | | | | |
| MAIN STREET, I-Wall | | | | | | |
| Stripping | | 1,465 | CY | 3.21 | 4,699 | |
| Excavation | | 425 | CY | 5.37 | 2,283 | |
| Backfill/embankment fill | | 6,832 | CY | 11.70 | 79,933 | |
| Concrete | | 1,164 | CY | 381.34 | 443,862 | |
| Sheet Piling PZ-27 | | 21,590 | SF | 24.70 | 533,277 | |
| Toe drain, 12" performance pipe | | 1,200 | LF | 39.00 | 46,801 | |
| Catch Basins | | 10 | EA | 2,166.71 | 22,318 | |
| 6" Riprap bedding | | 335 | CY | 43.33 | 14,507 | |
| 18" Riprap | | 1,403 | Ton | 32.07 | 45,004 | |
| Seeding | | 5 | AC | 2,166.71 | 11,159 | |
| | Tie-off I-Wall | MAIN STREET, Sub-total | | | 1,203,842 | |
| | Tie-off I-Wall | MAIN STREET, Contingencies | | | 240,768 | |
| | Tie-off I-Wall | MAIN STREET, Total | | | 1,444,611 | |
| MAIN STREET TIE-OFF, Closures | | | | | | |
| Biederbeck Drive Closure | | | | | | |
| Concrete, reinforced | | 195 | CY | 381.34 | 74,362 | |
| Site Protection, Excavation, Backfill, Dewatering, Removal of Pavement & Traffic Control | | 1 | Job | Sum | 17,334 | |
| Access Covers, Frames & Hardware | | 180 | SF | 43.33 | 7,800 | |
| Structural Steel | | 6,500 | LB | 4.33 | 28,167 | |
| Structural Aluminum | | 1,500 | LB | 7.54 | 11,310 | |
| Steel Decking | | 1,820 | LB | 3.64 | 6,625 | |
| | | Biederbeck Drive Closure Total | | | 145,598 | |
| Railroad Closure | | | | | | |
| Dewatering | | 1 | Job | Sum | 13,867 | |
| Temporary bridge | | 1 | Job | Sum | 27,734 | |
| Excavation | | 240 | CY | 9.71 | 2,330 | |
| Sheet Piling, PMA 22 | | 220 | SF | 24.70 | 5,434 | |
| Backfill | | 150 | CY | 11.70 | 1,755 | |
| Concrete | | 155 | CY | 381.34 | 59,108 | |
| Steel, structural | | 5,900 | LB | 4.33 | 25,567 | |
| Toe Drain | | 18 | LF | 39.00 | 702 | |
| | | Railroad Closure Total | | | 136,497 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **MAIN STREET TIE-OFF(Cont'd)** | | | | | |
| Riverdrive Closure | | | | | |
| Dewatering | 1 | Job | Sum | 26,001 | |
| Diversion of existing 78" sanitary sewer flow | 1 | Job | Sum | 43,334 | |
| Excavation, structural | 1,066 | CY | 9.71 | 10,348 | |
| Excavation, rock | 42 | CY | 130.00 | 5,460 | |
| Sheet piling | 450 | SF | 24.70 | 11,115 | |
| Backfill | 620 | CY | 11.70 | 7,254 | |
| Concrete | 438 | CY | 381.34 | 167,027 | |
| Toe Drain | 80 | LF | 31.20 | 2,496 | |
| Removal of existing pavement | 325 | SY | 17.33 | 5,633 | |
| Replacement of pavement | 159 | SY | 60.67 | 9,646 | |
| Steel, structural | 31,732 | LB | 4.33 | 137,508 | |
| Aluminum, structural | 2,578 | LB | 7.54 | 19,439 | |
| | | | Riverdrive Closure Total | 445,262 | |
| Main Street Closure | | | | | |
| Closure Structure | | | | | |
| Remove existing pavement | 219 | SY | 17.33 | 3,796 | |
| Replace pavement | 107 | SY | 60.67 | 6,491 | |
| Remove & plug existing 30" RCP storm sewer | 1 | Job | 1,074.69 | 1,075 | |
| Remove existing catch basin drain pipe | 1 | Job | 1,074.69 | 1,075 | |
| Excavation | 288 | CY | 9.71 | 2,796 | |
| Backfill | 104 | CY | 11.70 | 1,217 | |
| Concrete | 184 | CY | 381.34 | 70,167 | |
| Toe Drain | 48 | LF | 39.00 | 1,872 | |
| Steel, structural | 18,757 | LB | 4.33 | 81,282 | |
| Aluminum, structural | 1,497 | LB | 7.54 | 11,288 | |
| Seals | 553 | LF | 4.33 | 2,396 | |
| | | | Main Street Closure Total | 183,454 | |
| Alley Access Closure | | | | | |
| Concrete, reinforced | 195 | CY | 381.34 | 74,362 | |
| Site Protection, Excavation, Backfill, Dewatering, Removal of Pavement & Traffic Control | 1 | Job | Sum | 17,334 | |
| Access Covers, Frames & Hardware | 180 | SF | 43.33 | 7,800 | |
| Structural Steel | 6,500 | LB | 4.33 | 28,167 | |
| Structural Aluminum | 1,500 | LB | 7.54 | 11,310 | |
| Steel Decking | 1,820 | LB | 3.64 | 6,625 | |
| | | | Alley Access Closure Total | 145,598 | |
| Tie-off Closures | MAIN STREET, Sub-total | | | 1,967,218 | |
| Tie-off Closures | MAIN STREET, Contingencies | | | 393,444 | |
| Tie-off Closures | MAIN STREET, Total | | | 2,360,662 | |
| **MAIN STREET TIE-OFF TOTAL** | | | | 3,805,273 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| Reach 1 Project Costs | | | | | |
| Reach 1 | Total, Lands & Damages | | | 48,000 | 161,000 |
| Reach 1 | Total, Relocations | | | | 185,882 |
| Reach 1 | Total, Levees, & Floodwalls | | | 2,022,341 | |
| Reach 1 | Total, Bldgs, Grounds, Utilities | | | 43,334 | |
| | | | | 2,113,675 | 346,882 |
| Reach 1 | Total, PED | | | 413,135 | |
| Reach 1 | Total, S&A | | | 206,567 | |
| Reach 1 Project Costs Total | | | | 2,733,377 | 346,882 |
| | Reach 1 Combined Total = | | | 3,080,260 | |
| Reach 2A Project Costs | | | | | |
| Reach 2A | Total, Lands and Damages | | | 32,000 | 54,000 |
| Reach 2A | Total, Relocations | | | | 8,194 |
| Reach 2A | Total, Levees | | | 137,532 | 1,123 |
| Reach 2A | Total, Drainage Facilities | | | 433,343 | - |
| Reach 2A | Total, Gatewells | | | 503,527 | - |
| Reach 2A | Total, Floodwall | | | 4,450,768 | - |
| Reach 2A | Total, Closures | | | 1,935,234 | - |
| Reach 2A | Total, Beautification | | | 93,186 | - |
| Reach 2A | Total, Mitigation | | | 29,300 | - |
| Reach 2A | Total, Buildings, Grounds, Utilities | | | 43,334 | - |
| | | | | 7,658,224 | 63,317 |
| Reach 2A | Total, PED | | | 1,525,245 | 225 |
| Reach 2A | Total, S&A | | | 762,622 | 112 |
| Reach 2A Project Costs, | Total = | | | 9,946,092 | 63,542 |
| | Reach 2A Combined Total = | | | 10,009,633 | |
| Reach 2B Project Costs | | | | | |
| Reach 2B | Total, Lands and Damages | | | 16,000 | 697,000 |
| Reach 2B | Total, Relocations | | | - | 5,673 |
| Reach 2B | Total, Levees | | | 2,256,914 | 19,266 |
| Reach 2B | Total, Drainage Facilities | | | 953,557 | 279,125 |
| Reach 2B | Total, Gatewells | | | 1,049,712 | - |
| Reach 2B | Total, Floodwall | | | 3,817,380 | - |
| Reach 2B | Total, Closures | | | 578,190 | - |
| Reach 2B | Total, Beautification | | | 93,186 | - |
| Reach 2B | Total, Mitigation | | | 29,300 | - |
| Reach 2B | Total, Pump Plants | | | 1,421,824 | - |
| Reach 2B | Total, Buildings, Grounds, Utilities | | | 43,334 | - |
| | | | | 10,259,397 | 1,001,063 |
| Reach 2B | Total, PED | | | 2,048,679 | 59,678 |
| Reach 2B | Total, S&A | | | 1,024,340 | 29,839 |
| Reach 2B Project Costs, | Total = | | | 13,332,417 | 1,090,580 |
| | Reach 2B Combined Total = | | | 14,422,997 | |

| ITEM | Qty | Unit | Cost | Federal | Non-Federal |
|---|---|---|---|---|---|
| Reach 2C Project Costs | | | | | |
| Reach 2C Total, Lands and Damages | | | | 24,000 | 1,898,000 |
| Reach 2C Total, Relocations | | | | | 48,534 |
| Reach 2C Total, Levees | | | | 8,457,967 | 80,050 |
| Reach 2C Total, Drainage Facilities | | | | 1,776,254 | 185,418 |
| Reach 2C Total, Gatewells | | | | 3,248,476 | |
| Reach 2C Total, Closures | | | | 250,397 | |
| Reach 2C Total, Beautification | | | | 214,522 | |
| Reach 2C Total, Mitigation | | | | 41,930 | |
| Reach 2C Total, Pump Plants | | | | 5,427,459 | |
| Reach 2C Total, Buildings, Grounds, Utilities | | | | 43,334 | |
| | | | | 19,484,340 | 2,212,002 |
| Reach 2C Total, PED | | | | 3,892,068 | 53,094 |
| Reach 2C Total, S&A | | | | 1,946,034 | 26,547 |
| Reach 2C Project Costs Total = | | | | 25,322,442 | 2,291,643 |
| Reach 2C Combined Total = | | | | 27,614,085 | |
| Recreation Project Costs | | | | | |
| Recreation - Lands & Damages, Total | | | | | 2,655,521 |
| Shared Recreation Features, Total | | | | 2,153,786 | 2,153,786 |
| Non-Shared Recreation Features, Total | | | | | 182,004 |
| | | | | 2,153,786 | 4,991,311 |
| Recreation Total, PED | | | | 430,757 | 430,757 |
| Recreation Total, S&A | | | | 215,379 | 215,379 |
| Recreation Project Costs, Total = | | | | 2,799,922 | 5,637,447 |
| Recreation Combined Total = | | | | 8,437,369 | |
| Marquette/Sturdevant (M/S) Street Tie-off Costs | | | | | |
| M/S Street Tie-off Total, Lands and Damages | | | | 75,000 | 1,040,500 |
| M/S Street Tie-off Total, Floodwall | | | | 2,810,972 | |
| M/S Street Tie-off Total, Closures | | | | 2,755,524 | |
| | | | | 5,641,496 | 1,040,500 |
| M/S Street Tie-off Total, PED | | | | 1,113,299 | |
| M/S Street Tie-off Total, S&A | | | | 556,650 | |
| Marquette/Sturdevant Street Tie-off Costs Total = | | | | 7,311,445 | 1,040,500 |
| M/S Street Tie-off Combined Total = | | | | 8,351,945 | |
| Main Street Tie-off Costs | | | | | |
| Main Street Tie-off Total, Lands and Damages | | | | 8,000 | 106,000 |
| Main Street Tie-off Total, Floodwall | | | | 1,444,611 | |
| Main Street Tie-off Total, Closures | | | | 2,360,662 | |
| | | | | 3,813,273 | 106,000 |
| Main Street Tie-off Total, PED | | | | 761,055 | |
| Main Street Tie-off Total, S&A | | | | 380,527 | |
| Main Street Tie-off Costs Total = | | | | 4,954,855 | 106,000 |
| Main Street Tie-off Combined Total = | | | | 5,060,855 | |
| LANDS AND DAMAGES | | | | | |
| Main Street Tie-back Right-of-way | 1 | Job | Sum | 8,000 | 106,000 |
| Marquette/Sturdevant Tie-back Right-of-way | 1 | Job | Sum | 75,000 | 1,040,500 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **WATER TREATMENT PLANT- LANDS AND DAMAGES** | | | | | |
| Land Acquisition | 1 | Job | Sum | 48,000 | 161,000 |
| TOTAL, WATER TREATMENT PLANT- LANDS AND DAMAGES | | | | 48,000 | 161,000 |
| **Relocations** | | | | | |
| Buildings | | | | | |
| Remove & Replace Existing Roadway | 2,000 | SY | 78 | | 156,003 |
| Bike Path Gazebo | 1 | Job | Sum | | 5,633 |
| | | | Contingencies | | 24,246 |
| TOTAL, WATERTREATMENT PLANT - RELOCATIONS | | | | | 185,882 |
| **WATER TREATMENT PLANT- LEVEES AND FLOODWALLS** | | | | | |
| Levee | | | | | |
| Road Gravel | 160 | CY | 27.73 | 4,437 | |
| Inspection Trench Excavation | 8,400 | CY | 2.17 | 18,200 | |
| Inspection Trench Backfill using material excavated | 4,400 | CY | 4.33 | 19,067 | |
| Inspection Trench Waste | 4,000 | CY | 7.54 | 30,161 | |
| Compacted Impervious fill | 13,500 | CY | 13.87 | 187,204 | |
| Riprap | 650 | CY | 39.00 | 25,351 | |
| Granular bedding | 220 | CY | 43.33 | 9,534 | |
| Seeding | 1.5 | AC | 2,080.04 | 3,120 | |
| Cap Wall | | | | | |
| Drill/Grout Reinf., 2,000 holes 1-1.5" dia. 24" deep | 1 | Job | Sum | 34,667 | |
| Concrete | 1,000 | CY | 381.34 | 381,341 | |
| T-Wall | | | | | |
| Excavation | 230 | CY | 9.53 | 2,193 | |
| Backfill | 190 | CY | 11.70 | 2,223 | |
| Concrete | 85 | CY | 433.34 | 36,834 | |
| Dewater (175 LF+) | 1 | Job | Sum | 17,334 | |
| I-Wall | | | | | |
| Excavation | 190 | CY | 9.53 | 1,811 | |
| Backfill | 150 | CY | 11.70 | 1,755 | |
| Concrete | 85 | CY | 476.68 | 40,518 | |
| Sheet Pile PZ-27 | 1,150 | SF | 24.70 | 28,406 | |
| Intake Area Closure | | | | | |
| Structural aluminum | 565 | LBS | 10.83 | 6,121 | |
| Structural steel, galv., embedded | 400 | LBS | 4.33 | 1,733 | |
| Upstream R R Closure | | | | | |
| Structural aluminum | 860 | LBS | 10.83 | 9,317 | |
| Structural steel, galv., embedded | 625 | LBS | 4.33 | 2,708 | |
| Cast Iron frames & covers | 475 | LBS | 4.33 | 2,058 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **WATER TREATMENT PLANT- LEVEES AND FLOODWALLS (Cont'd)** | | | | | |
| Concrete | 18 | CY | 433.34 | 7,800 | |
| Sheet Pile PZ-27 | 275 | SF | 24.70 | 6,793 | |
| Excavation | 70 | CY | 9.53 | 667 | |
| Backfill | 50 | CY | 11.70 | 585 | |
| Temp. track support & replacing track & ballast | 1 | Job | Sum | 58,935 | |
| Downstream R R Closure | | | | | |
| Structural aluminum | 425 | LBS | 10.83 | 4,604 | |
| Structural steel, galv., embedded | 550 | LBS | 4.33 | 2,383 | |
| Cast Iron frames & covers | 475 | LBS | 4.33 | 2,058 | |
| Concrete | 15 | CY | 433.34 | 6,500 | |
| Sheet Pile PZ-27 | 235 | SF | 24.70 | 5,805 | |
| Excavation | 70 | CY | 9.53 | 667 | |
| Backfill | 50 | CY | 11.70 | 585 | |
| Temporary track support and replacing track & balla | 1 | Job | Sum | 58,935 | |
| Gatewell W1 | | | | | |
| Rock Excavation | 34 | CY | 130.00 | 4,420 | |
| Excavation, common | 1,150 | CY | 9.53 | 10,964 | |
| Backfill | 990.0 | CY | 11.70 | 11,583 | |
| Concrete | 88 | CY | 433.34 | 38,134 | |
| Slide gate & lift 78" dia. | 1 | EA | Sum | 43,334 | |
| Slide gate & lift 48" dia. | 1 | EA | Sum | 26,001 | |
| Covers & Handrail | 1 | Job | Sum | 3,033 | |
| Gatewell W2 & W3 | | | | | |
| Excavation, common | 975 | CY | 9.53 | 9,295 | |
| Backfill | 900 | CY | 11.70 | 10,530 | |
| Concrete | 5 | CY | 433.34 | 2,167 | |
| Slide gate & lift 24" diam. | 2 | EA | 17,333.69 | 34,667 | |
| Covers & Handrail | 1 | Job | Sum | 3,033 | |
| Cut 24" hole Gov. Interceptor | 1 | Job | Sum | 2,080 | |
| Precast pipe | 1 | Job | Sum | 12,827 | |
| Gatewell W4 | | | | | |
| Excavation | 190 | CY | 9.53 | 1,811 | |
| Backfill | 160 | CY | 11.70 | 1,872 | |
| Slide gate & lift 48" diam. | 1 | EA | Sum | 26,001 | |
| Covers & Handrail | 1 | Job | Sum | 3,033 | |
| Concrete | 35 | CY | 433.34 | 15,167 | |
| Gatewell W5 | | | | | |
| Rock excavation | 28 | CY | 130.00 | 3,640 | |
| Common, excavation | 220 | CY | 9.53 | 2,097 | |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **WATER TREATMENT PLANT- LEVEES AND FLOODWALLS (Cont'd)** | | | | | |
| Backfill | 170 | CY | 11.70 | 1,989 | |
| Concrete | 55 | CY | 433.34 | 23,834 | |
| Slide gate & lift 78" diam. | 1 | EA | Sum | 43,334 | |
| Covers & Handrail | 1 | Job | Sum | 3,033 | |
| C.I. Pipe 16" dia. Sewer | 16 | LF | 182.00 | 2,912 | |
| C.I. Pipe 24" dia. Sewer | 50 | LF | 216.67 | 10,834 | |
| RCP 12" dia. Sewer | 125 | LF | 112.67 | 14,084 | |
| MH 5' dia. | 2 | EA | 6,500.13 | 13,000 | |
| MH 4' dia. | 4 | EA | 6,066.79 | 24,267 | |
| Excavate at Gov. Interceptor and plug existing sewe | 5 | EA | 3,206.73 | 16,034 | |
| Plug drain holds in Gov. Interceptor (from inside Int.) | 125 | EA | 21.67 | 2,708 | |
| Toe drain, 12" perforated pipe & .3 CY graded filter/f | 165 | LF | 38.57 | 6,364 | |
| Remove abandoned sewer | 130 | LF | 17.33 | 2,253 | |
| Water Treatment Plant Access Road Closure | 1 | Job | 145,598 | 145,598 | |
| Trail Closure Strutures | 2 | EA | 80,000 | 160,000 | |
| | Reach 1, | Sub-total | | 1,758,345 | |
| | Reach 1, | Total, Contingencies | | 263,995 | |
| TOTAL,WATER TREATMENT PLANT, LEVEES AND FLOODWALLS | | | | 2,022,341 | |
| **RECREATION- LANDS AND DAMAGES** | | | | | |
| Land Acquisition | 1 | Job | Sum | | 2,655,521* |
| TOTAL, RECREATION-LANDS AND DAMAGES | | | | | 2,655,521 |
| **RECREATION-FEATURES** | | | | | |
| Stripping | | | | | |
| Fed | 2,200 | CY | 2.17 | 4,767 | |
| Non-Fed | 2,200 | CY | 2.17 | | 4,767 |
| Disposal of waste stripping and inspection trench excavation (hauling and placement at Cresent Park spoil areas) | | | | | |
| Fed | 10,772 | CY | 4.33 | 46,680 | |
| Non-Fed | 10,772 | CY | 4.33 | | 46,680 |

*Recreation Project Costs including lands and damages were price level indexed only. No new real estate values were developed for the LRR.

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| RECREATION-FEATURES (Cont'd) | | | | | |
| Embankment fill, semi-compacted pervious (from river dredging) | | | | | |
| Fed | 47,503 | CY | 3.21 | 152,329 | |
| Non-Fed | 47,503 | CY | 3.21 | | 152,329 |
| Embankment fill, semi-compacted, landside slope (dredged from slough) | | | | | |
| Fed | 4,279 | CY | 10.83 | 46,357 | |
| Non-Fed | 4,279 | CY | 10.83 | | 46,357 |
| Clearing and grubbing | | | | | |
| Fed | 1.5 | AC | 6,500.13 | 9,750 | |
| Non-Fed | 1.5 | AC | 6,500.13 | | 9,750 |
| Excavation, common (for roadway) | | | | | |
| Fed | 8,572 | CY | 3.21 | 27,488 | |
| Non-Fed | 8,572 | CY | 3.21 | | 27,488 |
| Crescent Park hydraulic fill | | | | | |
| Fed | 25,000 | CY | 7.54 | 188,504 | |
| Non-Fed | 25,000 | CY | 7.54 | | 188,504 |
| Bicycle Trail along Levee | | | | | |
| Paving and Base | 8,500 | SY | 16.47 | 69,985 | 69,985 |
| Signs | 12 | EA | 112.67 | 676 | 676 |
| Rest Stops (2 benchs 20 SY asphalt) | 10 | EA | 1,074.69 | 5,373 | 5,373 |
| Cresent Park | | | | | |
| Bicycle Trail | | | | | |
| Pavement & base | 2,320 | SY | 16.47 | 19,102 | 19,102 |
| Signs | 1 | Job | Sum | 520 | 520 |
| Rest Stops | 1 | Job | Sum | 520 | 520 |
| Embankment fill, ramps | 1,400 | CY | 8.67 | 6,067 | 6,067 |
| Baseball Diamond (4) | | | | | |
| Backstops | 4 | EA | 3,293.40 | 6,587 | 6,587 |
| Fence | 4,500 | LF | 26.00 | 58,501 | 58,501 |
| Bleachers 8 x 60' | 500 | LF | 21.67 | 5,417 | 5,417 |
| Multi-Purpose Building | 1 | Job | Sum | 106,602 | 106,602 |
| Water Supply, 4" CIP 1100 feet | 1 | Job | Sum | 12,134 | 12,134 |
| Wastewater removal 12" RCP 1100 feet | 1 | Job | Sum | 19,067 | 19,067 |
| Parking lot 200 cars | | | | | |
| Asphalt pavement and base | 13,500 | SY | 23.83 | 160,878 | 160,878 |
| Wheel Stops | 250 | EA | 69.33 | 8,667 | 8,667 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **RECREATION-FEATURES (Cont'd)** | | | | | |
| Markings | 1 | Job | Sum | 520 | 520 |
| Lighting | 1 | Job | Sum | 5,633 | 5,633 |
| Picnic Area | | | | | |
| Shelters | 5 | EA | 21,667.11 | 54,168 | 54,168 |
| Tables | 80 | EA | 476.68 | 19,067 | 19,067 |
| Grills | 40 | EA | 173.34 | 3,467 | 3,467 |
| Fountains | 2 | EA | 1,083.36 | 1,083 | 1,083 |
| Trash containers | 30 | EA | 216.67 | 3,250 | 3,250 |
| Restroom | | | | | |
| Building | 484 | SF | 173.34 | 41,948 | 41,948 |
| 4" Water Supply | 1,000 | LF | 32.07 | 16,034 | 16,034 |
| 12" RCP Sanitary Sewer | 1,000 | LF | 34.67 | 17,334 | 17,334 |
| Electric Supply 700' #4AWG | 1 | Job | Sum | 2,600 | 2,600 |
| Parking Lot | | | | | |
| 2" Asphalt paving and base | 7,600 | SY | 23.83 | 90,569 | 90,569 |
| Wheel Stops | 1,600 | LF | 8.67 | 6,933 | 6,933 |
| Markings | 1 | Job | Sum | 173 | 173 |
| Playgrounds | 2 | EA | 26,000.54 | 26,001 | 26,001 |
| Credit Island | | | | | |
| Bicycle Trail | | | | | |
| Pavement & base | 15,600 | SY | 16.47 | 128,443 | 128,443 |
| Clearing, heavy | 1.5 | AC | 6,933.48 | 5,200 | 5,200 |
| Fill, compacted | 3,800 | CY | 8.67 | 16,467 | 16,467 |
| Rest Stops | 4 | EA | 1,083.36 | 2,167 | 2,167 |
| Signs | 1 | Job | Sum | 650 | 650 |
| Bicycle bridge on existing conc. Culvert vic. Hwy 61 & Blackhawk Creek | | | | | |
| Excavation | 67 | CY | 10.40 | 348 | 348 |
| Backfill | 63 | CY | 12.13 | 382 | 382 |
| Guard rails anchored to conc. Parapet | 2,223 | LB | 6.50 | 7,225 | 7,225 |
| Guard railing with steel post & post hole grouting | 40 | LF | 75.40 | 1,508 | 1,508 |
| Concrete for abutments | 10 | CY | 476.68 | 2,383 | 2,383 |
| Steel Railing | 3,550 | LB | 4.33 | 7,692 | 7,692 |
| Timber flooring w/ plywood wearing surface | 480 | SF | 4.33 | 1,040 | 1,040 |
| Misc. Steel | 300 | LB | 4.33 | 650 | 650 |
| Sta 174+24 24" Gatewell "RI" | | | | | |
| Excavation | 1,067 | CY | 9.71 | 5,179 | 5,179 |
| 24" Slide Gate w/ lift | 1 | EA | Sum | 6,933 | 6,933 |
| Backfill | 989 | CY | 9.71 | 4,800 | 4,800 |
| 24" RCP, Class III, on a Class A bedding | 424 | LF | 86.67 | 18,374 | 18,374 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **RECREATION-FEATURES (Cont'd)** | | | | | |
| Dewatering | 1 | Job | Sum | 5,200 | 5,200 |
| Parking Lot, 48 car | | | | | |
| Pavement, 2" asphalt | 3,900 | SY | 23.83 | 46,476 | 46,476 |
| Marking | 1 | Job | Sum | 173 | 173 |
| Portable Toilets | 2 | EA | 3,206.73 | 3,207 | 3,207 |
| Picnic Ground | | | | | |
| Tables | 90 | EA | 476.68 | 21,450 | 21,450 |
| Shelters | 1,000 | SF | 21.67 | 10,834 | 10,834 |
| Grills | 45 | EA | 173.34 | 3,900 | 3,900 |
| Trash Containers | 30 | EA | 216.67 | 3,250 | 3,250 |
| Portable Toilet | 2 | EA | 3,206.73 | 3,207 | 3,207 |
| Water Fountains | 2 | EA | 1,300.03 | 1,300 | 1,300 |
| Parking Lot, (30 car) | | | | | |
| 2" Asphalt paving and base | 2,250 | SY | 23.83 | 26,813 | 26,813 |
| Embankment fill | 1,575 | CY | 8.67 | 6,825 | 6,825 |
| Marking | 1 | Job | Sum | 173 | 173 |
| Turnaround | | | | | |
| 2" Asphalt pavement | 110 | SY | 24.27 | 1,335 | 1,335 |
| Embankment fill | 600 | CY | 8.67 | 2,600 | 2,600 |
| Boat Launch | | | | | |
| Clearing | 1 | AC | 6,066.79 | 3,033 | 3,033 |
| Excavation | 50 | CY | 8.67 | 217 | 217 |
| Embankment fill | 2,000 | CY | 8.67 | 8,667 | 8,667 |
| 2" Asphalt paving | 1,600 | SY | 24.27 | 19,414 | 19,414 |
| Concrete ramp | 45 | CY | 520.01 | 11,700 | 11,700 |
| Cofferdam, dewatering | 1 | Job | Sum | 10,400 | 10,400 |
| Excavation, Lagoon dredging (disposal on golf cours | 100,000 | CY | 3.81 | 190,671 | 190,671 |
| Seeding lagoon dredging on golf course | 20 | AC | 2,166.71 | 21,667 | 21,667 |
| Tent Camping | | | | | |
| Picnic Tables | 42 | EA | 476.68 | 10,010 | 10,010 |
| Fire Rings | 21 | EA | 69.33 | 728 | 728 |
| Trash receptacles | 14 | EA | 216.67 | 1,517 | 1,517 |
| Nahant Marsh, Educational Development | | | | | |
| Gravel parking lot and access road | 1 | Job | Sum | 3,900 | 3,900 |
| | | Subtotal | | 1,872,858 | 1,872,858 |
| | | Contingencies | | 280,928 | 280,928 |
| | Total, Shared Recreation Features | | | 2,153,786 | 2,153,786 |

| ITEM | Qty | Unit | Unit Cost | Amount Federal | Amount Non-Federal |
|---|---|---|---|---|---|
| **Non-Sharable Costs (Includes allowance for E&D, S&A)** | | | | | |
| Ballfield Lights | 1 | Job | Sum | | 55,468 |
| Boat Rental Bldg | | | | | |
| Embankment fill | | | | | |
| (dredged river sand) | 19,000 | CY | 3.99 | | 75,748 |
| Electric feeder supply | 1 | Job | Sum | | 7,800 |
| Bldg. Proper | 360 | SF | 55.47 | | 19,968 |
| | Subtotal | | | | 158,985 |
| | Contingencies | | | | 23,019 |
| | Total, Non-Shared Recreation Features | | | | 182,004 |
| | Total, Recreation Features | | | 2,153,786 | 2,335,790 |

# APPENDIX D

# PHOTOGRAPHS

**LIMITED REEVALUATION REPORT**
**FOR**
**FLOOD DAMAGE REDUCTION**

**MISSISSIPPI RIVER AT DAVENPORT, IOWA**

**APPENDIX D**
**PHOTOGRAPHS**

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Reach 1 - Upstream view along seawall @ the Iowa-American Water Plant ..... D-3

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Alternate Main Street tie-off along River Drive @ Main Street..... D-12

Alternate Main Street tie-off along Brady Street facing toward the Mississippi River..... D-12

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Alternate Marquette/Sturdevant Streets tie-off facing westward along River Drive @ Oscar Mayer ..... D-14

Alternate Marquette/Sturdevant Streets tie-off showing approximate 1982 GDM Plan design grade height ..... D-14

# Davenport, Iowa

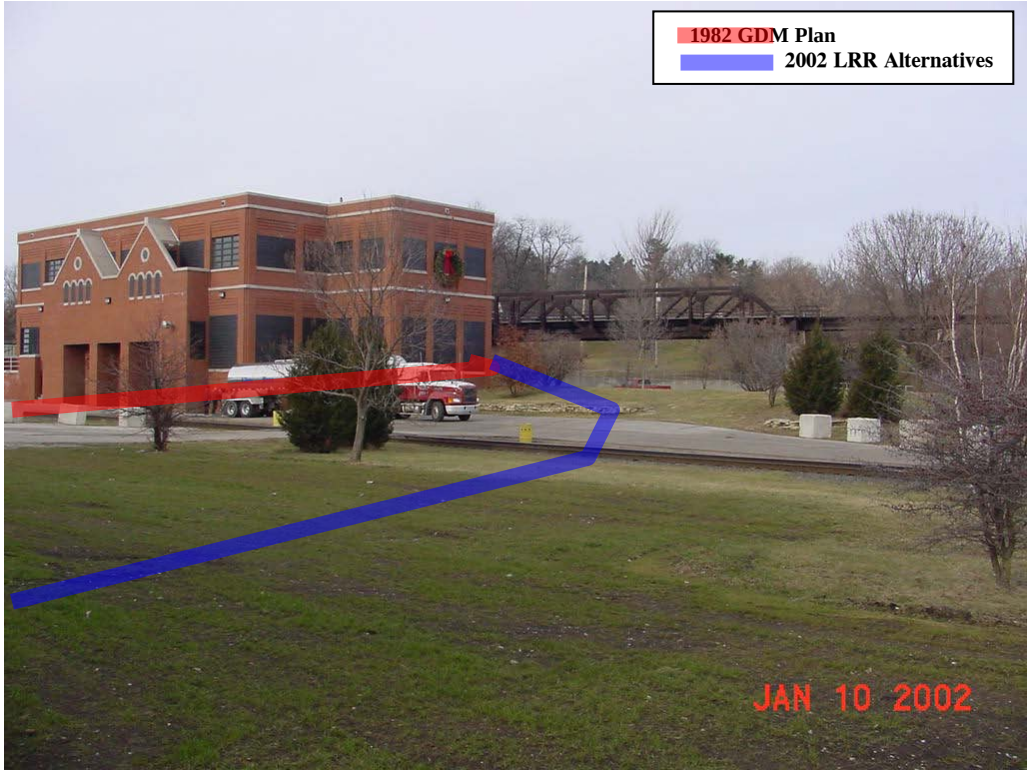
# Local Flood Protection Project

# *Photographs along Levee Alignment*

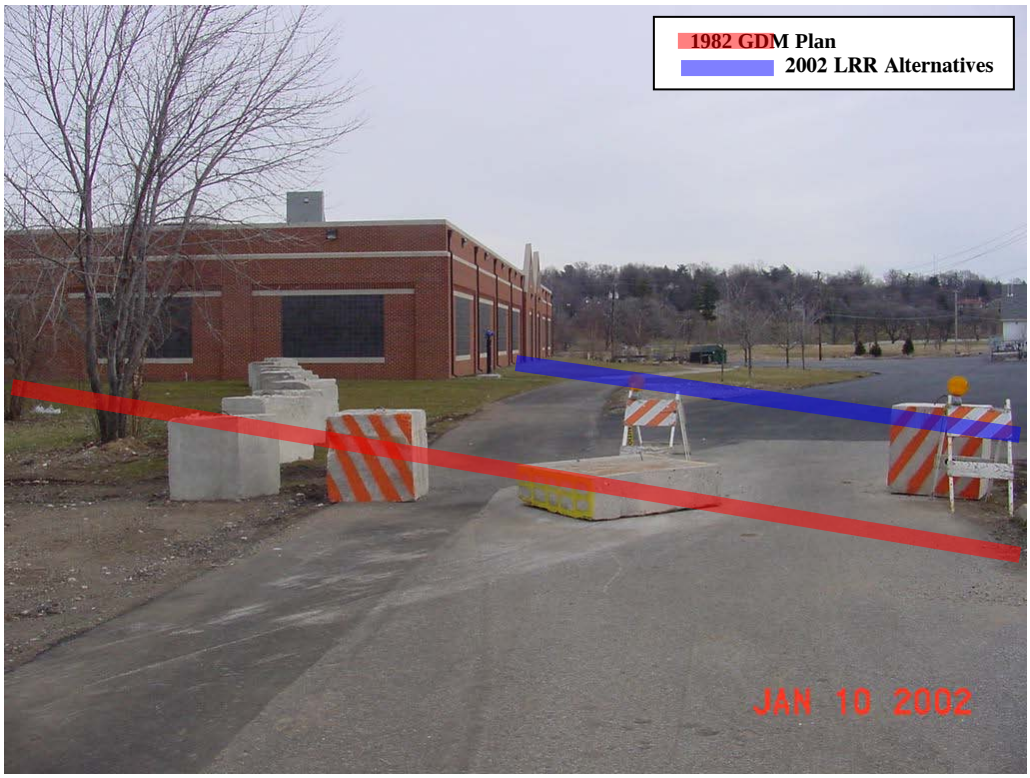
January 2002

**Indicates approximate 1982 General Design Memorandum Levee Alignment Plan**

**Indicates approximate 2002 Limited Reevaluation Report Alternate Levee and Tie-Off Alignments**




Reach 1 - Location of upstream levee tie-off adjacent to River Drive
@ Iowa-American Water Plant




Reach 1 - View toward water plant building and Lindsey Boat Harbor
parking lot @ Iowa-American Water Plant

Reach 1 - Scenic vista near location of the downstream levee tie-off
@ the Iowa-American Water Plant

Reach 1 - Upstream view along seawall
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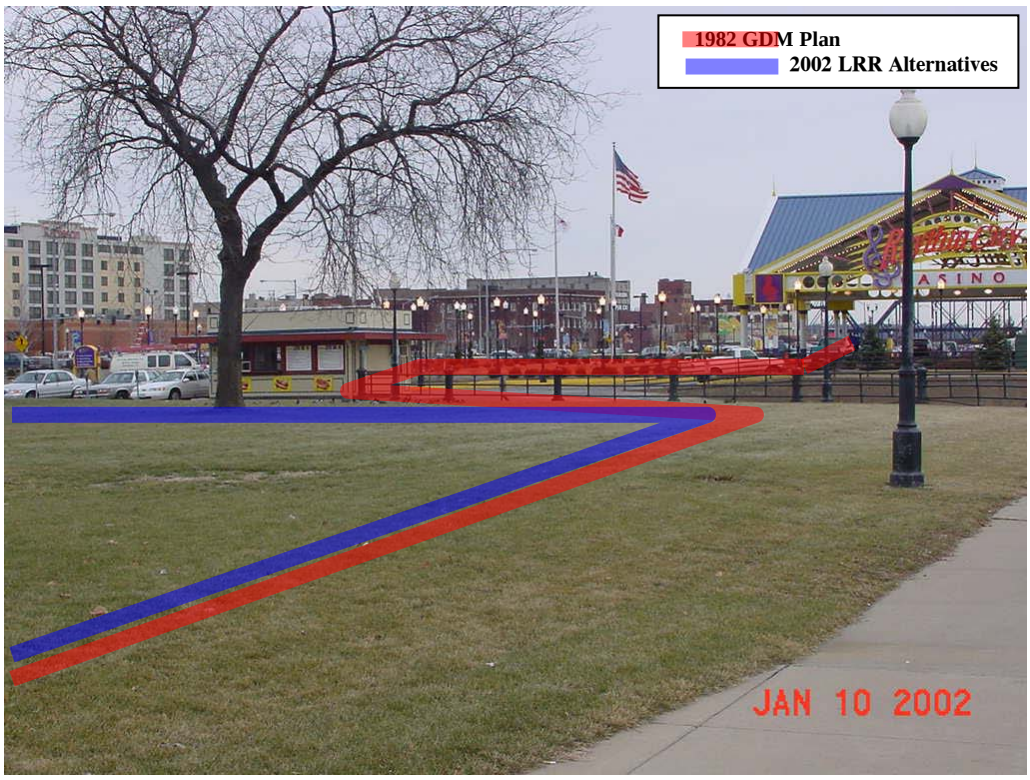
Reach 2A - View toward Government Bridge from near Iowa Avenue

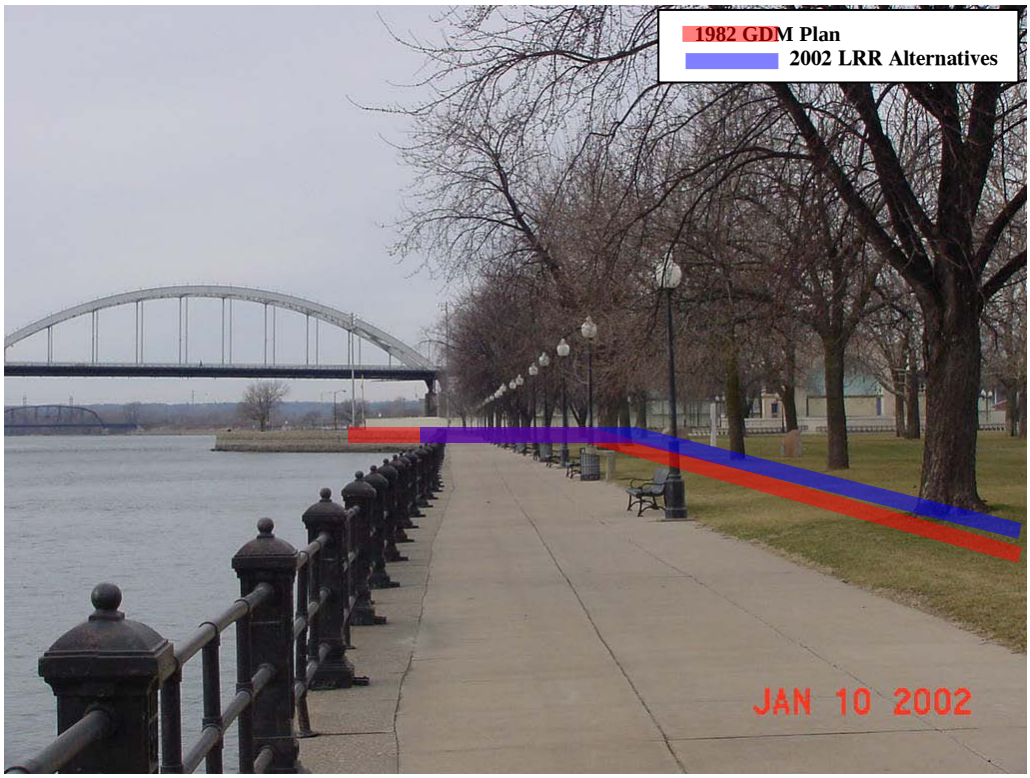
Reach 2A - Upstream view along bike trail from near Pershing Avenue

Reach 2A - Dock Restaurant w/Mississippi River on right.
Building riverward of Line-of-Protection

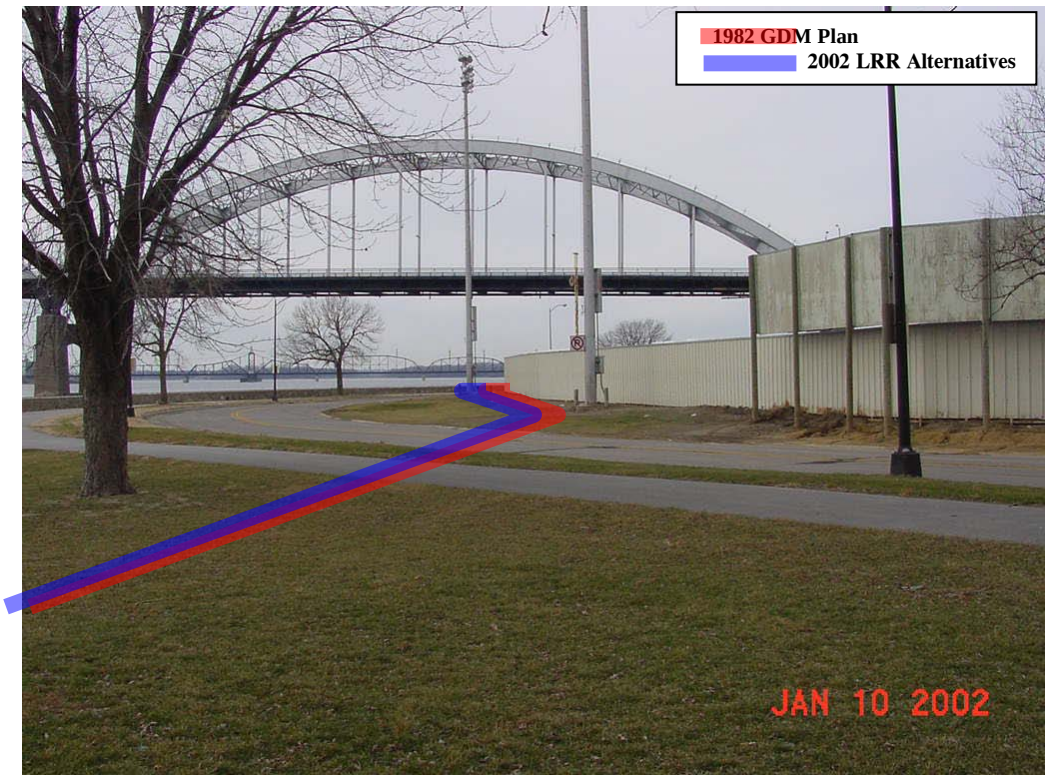
Reach 2A - Downstream view along seawall toward
Rhythm City Casino




Reach 2A and 2B - Main Street boat ramp and
Rhythm City Casino




Reach 2B - Downstream view along seawall
@ Le Claire Park




Reach 2B - Downstream view around John O'Donnell Stadium outfield fence

Reach 2B - Downstream view under Centennial Bridge toward Marquette Street

Reach 2C - Upstream view from Crescent Park toward
Public Works facility and Oscar Mayer

Reach 2C - Downstream view along River Drive near entrance
to Credit Island

Reach 2C - Downstream view through upper Credit Island

Reach 2C - Upstream view through Credit Island along the slough

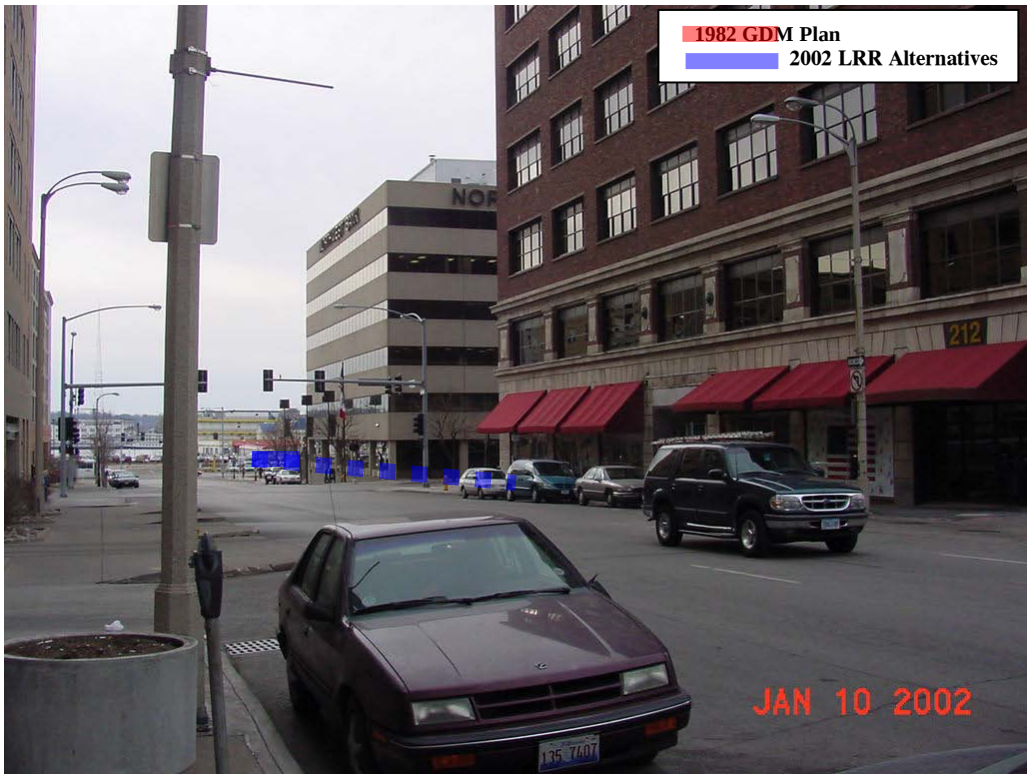
Reach 2C - View of Credit Island shoreline on slough from
Concord Street

Reach 2C - Downstream view along Concord Street
near Big Red's Auto Salvage

Reach 2C - Downstream end of project
near Wapello Avenue

Reach 2C - Downstream levee tie-off into
Interstate 280 roadway embankment

Alternate Main Street tie-off along
River Drive @ Main Street




Alternate Main Street tie-off along Brady Street
facing toward the Mississippi River

Alternate Marquette/Sturdevant Streets tie-off
facing toward Rockingham Road

Alternate Marquette/Sturdevant Streets tie-off
facing northward across Rockingham Road

Alternate Marquette/Sturdevant Streets tie-off
facing westward along River Drive @ Oscar Mayer

Alternate Marquette/Sturdevant Streets tie-off
showing approximate 1982 GDM Plan design grade height

# APPENDIX E

# PLATES

**LIMITED REEVALUATION REPORT**
**FOR**
**FLOOD DAMAGE REDUCTION**

**MISSISSIPPI RIVER AT DAVENPORT, IOWA**

**APPENDIX E**
**PLATES**

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| R2-2 | 5 | Warren Street to Crescent Park – 1982 GDM Alignment |
| R2-3 | 6 | Crescent Park to Credit Island Causeway – 1982 GDM Alignment |
| R2-4 | 7 | Upper Credit Island – 1982 GDM Alignment |
| R2-5 | 8 | Credit Island – 1982 GDM Alignment |
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# APPENDIX F

# DISTRIBUTION LIST

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