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THE REPORT FOR THE FLOOD DAMAGE REDUCTION PROJECT, ROSEAU RIVER

COMMUNICATION

FROM

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

TRANSMITTING

THE ENGINEERING DOCUMENTATION REPORT FOR THE FLOOD DAMAGE REDUCTION PROJECT FOR THE ROSEAU RIVER

MARCH 4, 2013.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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

JAN 24 2013

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

Dear Mr. Speaker:

The Secretary of the Army recommends increasing the authorized total project cost of the Roseau River, Minnesota Flood Damage Reduction Project. The increase is necessary because the construction cost is projected to exceed the maximum project cost established by Section 902 of the Water Resources Development Act (WRDA) of 1986. The enclosed Engineering Documentation Report, dated July 2012, sets forth the cost increase and documents that the project remains economically justified, technically sound and environmentally acceptable.

Section 1001(27) of the WRDA of 2007 authorized the project at a cost of $25,100,000, with an estimated federal cost of $13,820,000 and non-federal cost of $11,280,000. The authorized project consists of a 4.5 mile long diversion channel around the eastern side of the city of Roseau, 5.5 miles of levees with a height of 5 feet or less along the diversion channel, a flow restriction structure on the Roseau River, an inlet control structure, 2 storage areas east and west of the diversion channel and 2 highway bridge channel crossings. Recreation features of the project include 6.7 miles of multipurpose trails, 5.5 miles of off-road vehicle trails, 2 bird watching stations and a trailhead. The maximum cost for the authorized project, adjusted for allowable inflation in accordance with Section 902, is $33,149,000 (October 2012 price level).

The revised estimated project first cost is $41,864,000 (October 2012 price level). In general, the cost increase results from unanticipated site conditions and design refinements. The project cost includes $3,523,000 for separable recreation features. The federal share of the project first cost is estimated at $24,320,000 and the non-federal share is estimated at $17,544,000. The majority of lands, easements, rights-of-way, relocations and excavated material disposal areas required for the project have been acquired. The city of Roseau is the non-federal cost sharing sponsor and will be responsible for the operation, maintenance, repair, replacement and rehabilitation of the project after construction, at a cost currently estimated at $114,000 per year.

Enclosures
1. Report of the Director of Civil Works, September 17, 2012
2. OMB Clearance Letter, January 11, 2013
3. Engineering Documentation Report, July 2012

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

REPLY TO
ATTENTION OF:

CECW-MVD

SEP 17 2012

MEMORANDUM FOR THE ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Roseau River, Minnesota, Flood Damage Reduction Project, Post Authorization Change Report (PACR)

1. Purpose: To provide the enclosed Roseau River, Minnesota, Flood Damage Reduction Project PACR to the Assistant Secretary of the Army (Civil Works) for review and approval. The PACR documents the need to modify the project authorization to increase the authorized cost to $41,864,000.

2. Background:

a. The Roseau River, Minnesota project was authorized by the Water Resources Development Act (WRDA) of 2007 at a cost of $25,100,000. The authorized project consists of a 4.5 mile long diversion channel around the eastern side of the city of Roseau, 5.5 miles of levees along the diversion channel with a height of 5 feet or less, a flow restriction structure on the Roseau River, an inlet control structure, 2 storage areas east and west of the diversion channel covering 750 acres contained by 4.8 miles of levees and 2 highway bridge channel crossings. Recreation features of the project include 6.7 miles of multipurpose trails along the project corridor, 5.5 miles of off-road vehicle trails, 2 bird watching stations and a trailhead.

b. The Project Partnership Agreement with the non-federal sponsor, the city of Roseau, was executed on 15 June 2009. Federal funds in the amount of $15,337,454 were appropriated in Fiscal Years 2009, 2010, 2011 and 2012 to initiate and continue project construction. The project's second of three construction contracts is approximately 50 percent complete. The project currently provides no flood damage reduction benefits. The remaining construction contract associated with completion of the diversion channel at the upstream end is estimated to cost $10,344,000.

c. At October 2012 price levels, the estimated total project first cost is $41,864,000, which includes $3,523,000 for the cost of recreation. The U.S. Army Corps of Engineers Cost Engineering Directory of Expertise completed its review of the project cost and certified the cost on 31 July 2012. The federal share of the authorized project is estimated at $24,320,000 and the non-federal share is estimated at $17,544,000. The non federal sponsor is responsible for the operation maintenance, repair, replacement and rehabilitation of the project after construction, at a cost currently estimated at $114,000 per year.

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

January 11, 2013

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

Dear Ms. Darcy:

As required by Executive Order 12322, the Office of Management and Budget completed its review of your recommendation to increase the authorized construction cost ceiling of the Roseau River, Minnesota, flood damage reduction and recreation project. Based on our review, we concluded that your recommendation is consistent with the policy and programs of the President.

The Corps Post Authorization Change Report indicated that previously unknown site conditions and revised design criteria contributed to the increased project cost. We would like to continue discussions with you on revisions to the Corps' planning process to ensure that appropriate steps are taken during the planning and design phase of future projects to better characterize cost risk and contingencies to minimize the risks of similar cost overruns.

The Office of Management and Budget does not object to your submitting the report to Congress to increase the authorized project cost. When you do so, please advise the Congress the project would need to compete with other proposed investments in future budgets.

Sincerely,

Paul Shawcross
Acting Deputy Associate Director
Energy, Science and Water Division

Enclosure 2

ENGINEERING DOCUMENTATION REPORT

PROJECT AUTHORIZATION CHANGE

Roseau, Minnesota

Flood Damage Reduction Project
Roseau River

St. Paul District, Corps of Engineers

July 2012

Enclosure 3

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Summary. Estimated project costs for the Roseau, MN Flood Damage Reduction Project exceed the authorized Section 902 limit. Congressional action to increase the total cost limit for the project is required to complete the project as authorized. The project has maintained its original purpose and scope, but differing site conditions and design refinements resulted in increased project costs.

Post authorization engineering field investigations identified site conditions differing from those assumed in the authorizing document. The subsequent design revisions increased quantities for excavation, fill and spoil materials. Application of current design standards included several risk reduction measures that also increased costs. Recreational feature designs were also revised to better suit the local climate and soil conditions.

The project's second of three construction contracts is approximately 50% complete at this time. The current total cost limit afforded by the project's existing authority will allow completion of this contract – but not award of the final contract. The project currently provides no flood damage reduction benefits – and will continue to do so until the entire project is constructed.

(1) Description of Authorized Project. Roseau is located in the northwestern corner of Minnesota, approximately 10 miles south of the Canadian border and 65 miles east of the North Dakota border. The Roseau River flows north through the city. The city and the areas immediately adjacent to the east form the project area. The population of Roseau is approximately 2,800. Polaris Industries employs over 2,100 people and, along with agriculture, provides a solid economic base for the community. Because of the relatively low elevation and flat topography, the majority of the city is located in the regulatory floodplain. As a result, when the river flows out of its banks, it inundates most of the city. The city experienced significant flooding in 2002 after heavy regional precipitation.

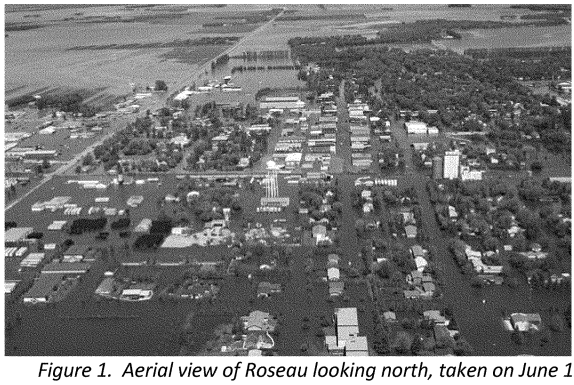

Figure 1. Aerial view of Roseau looking north, taken on June 12, 2002. The downtown business district is in the center of the photo.

The authorized project consists of a 4.5 mile long diversion channel around the eastern side of Roseau and a restriction structure on the Roseau River. The authorized project plan is depicted in Figure 2 and a detailed description is included in appendix C.

Figure 1: Authorized Project

(2) Authorization.

The project was authorized by the Water Resources Development Act of 2007. Public Law 110-114 [H.R. 1495], Section 1001, November 8, 2007.

(27) ROSEAU RIVER, ROSEAU, MINNESOTA.—The project for flood damage reduction, Roseau River, Roseau, Minnesota: Report of the Chief of Engineers dated December 19, 2006, at a total cost of $25,100,000, with an estimated Federal cost of $13,820,000 and an estimated non-Federal cost of $11,280,000.

(3) Funding Since Authorization.

FY	Appropriation Act	Category	Amount
2006	Public Law 109-103, Energy and Water Development Appropriations Act, approved 19 November 2005	PED	$74,000
2007	Public Law 110-5, revised Continuing Appropriations Resolution, approved 15 February 2007	PED	$416,000
2008	Public Law 110-161, Consolidated Appropriations Act, approved 26 December 2007	PED	$25,000
2009	Public Law 111-8, Omnibus Appropriations Act, approved 11 March 2009	Construction	$500,000
2009	Public Law 111-5, American Recovery and Reinvestment Act of 2009, approved 17 February 2009	Construction	$4,480,000
2010	Public Law 111-85, Energy and Water Development Appropriations Act, approved 28 October 2009	Construction	$1,938,000
2010	Public Law 111-5, American Recovery and Reinvestment Act of 2009, approved 17 February 2009	Construction	$120,000
2011	Public Law 112-10, Full-Year Continuing Appropriations Act, approved 15 April 2011	Construction	$7,484,454
2012	Public Law 112-74, Consolidated Appropriations Act, approved 23 December 2011	Construction	$300,000
		TOTAL:	$15,337,454

(4) Changes in Scope of Authorized Project. The authorized project was estimated to provide a greater than 95 percent probability of protecting the city of Roseau from a flood which has a 1.0 percent chance of occurring in any year. There have been no changes in project scope from that originally authorized.

(5) Changes in Project Purpose. The project's authorized purposes are Flood Damage Reduction and Recreation. There have been no changes in project purpose from that originally authorized.

(6) Changes in Local Cooperation Requirements. There have been no changes in local cooperation requirements.

(7) Change in Location of Project. A single change of location has occurred. It is discussed in the next paragraph and resulted in approximately one square mile reduction in project real estate acquisitions.

(8) Design Changes. Design changes are attributable to differing site conditions and design refinements.

Differing Site Conditions. Post authorization engineering investigations identified site conditions differing from those assumed in preparation of the Feasibility Study. (+$6,010,200)

a) Actual top soil depths were approximately 12 inches greater than assumed. These conditions increased excavation and fill quantities for virtually all project levees. Most of the excess topsoil was disposed of within the anticipated spoil areas while some was used as surplus fill at levee toes. The environmental effects of the consequential construction activities were assessed and documented as indicated in Appendix D. (+$3,971,900)

b) Subsurface investigations indicated the need for a subsurface drainage system to alleviate the risks of slope failures similar to that encountered recently on another project with virtually identical soil conditions. (+$748,400)

c) Subsurface investigations identified materials unsuitable for levee foundations, requiring increased excavation quantities. ($1,289,900)

Design Refinements. Application of institutional knowledge, post-Katrina levee safety standards and recently implemented Agency Technical Review processes identified necessary design improvements.

a) Channel inlet and outlet structures were designed to conform to current best practices. The outlet structure as conceptually designed in the Feasibility Study would not have adequately protected the Roseau River from erosion. The solution required the addition of much more rip rap protection. (+$663,400) The inlet structure as conceptually designed in the Feasibility Study did not include design lessons subsequently learned from similar MVP projects. The solution required the addition of sheet pile cut-off and the much more rip rap protection. (+$800,600)

b) Detailed design activities identified the need for a several minor features to resolve nuisance local drainage issues attributable to the project. These features included trenches and gated structures to direct water external to the project that was otherwise obstructed from its natural drainage patterns. (+$1,060,500)

c) The Roseau River restriction structure was designed to comply with Minnesota Department of Natural Resource standards minimizing impacts to habitat and recreation. The Feasibility design was based upon a concept to achieve restriction via a low bridge deck. This concept was impractical due to the hazardous effects it posed to recreational users (i.e. boaters). The bridge redesign also incorporated a longer span so as not to affect water habitat below the normal high water level. (+$1,283,100)

d) Multipurpose recreational trails have been designed to be more durable so their seasonal use can be extended beyond the typically dry summer months. This involved improving the trail bed and asphalting several trails and parking areas. (+$1,306,000)

e) The Feasibility Report significantly under estimated the quantities for topsoil and seed necessary to reestablish vegetation for erosion protection. (+$1,142,200)

One significant design change was made to reduce project costs. The authorized project design includes off-channel areas to capture and store peak flows. A one square mile pond on the project's eastern boundary was eliminated by inclusion of a weir in the diversion channel which optimizes the filling of the remaining ponds. (-$200,000)

These design changes - and the corresponding construction cost increases – increased the estimated costs for management, engineering and construction administration. ($2,183,000)

(9) Changes in Total Project First Costs. Other than price level effects, virtually all changes in cost are attributable to design changes since the project was authorized. Design changes were necessary due to site conditions differing from those assumed in the Feasibility Study or are the result of the engineering analysis necessary to define details sufficient for a construction ready project. One change was discretionary – but it was made to reduce costs for off-channel storage of peak flows.

	Recommended Project (Oct 2012 Price Level)	Authorized Project (Oct 2006 Price Level)	Authorized Project Current Price Level (Oct 2012)	Last Reported to Congress (Oct 2011 Price Level)
Lands and Damages	$2,840,000	$4,095,400	$4,522,100	$3,415,000
Relocations	$4,710,000	$4,617,700	$5,098,800	$5,011,000
Channels & Canals	$16,800,000	$8,669,900	$9,573,200	$15,036,000
Levees & Floodwalls	$6,686,000	$1,956,200	$2,160,000	$5,405,000
FDR Planning, Engineering & Design	$5,172,000	$2,804,300	$3,096,500	$5,125,000
FDR Construction Management	$2,133,000	$1,249,000	$1,379,000	$1,964,000
Total FDR	$38,341,000	$23,392,500	$25,829,600	$35,956,000
Recreation	$2,852,000	$1,348,700	$1,489,200	$2,602,000
Recreation Planning, Engineering and Design	$475,000	$244,700	$270,200	$396,000
Recreation Construction Management	$196,000	$114,100	$126,000	$246,000
Total Recreation	$3,523,000	$1,707,500	$1,885,400	$3,244,000
Project Total	$41,864,000	$25,100,000	$27,715,000	$39,200,000

*Costs were developed using the Civil Works Construction Cost Index System. Only remaining project costs were adjusted. Project costs that were completed did not have their price level adjusted. See Appendix A – Current Working Estimate for additional details.

Differing site conditions: (100% FDR)	
Greater than estimated top soil depth	
Stripping	$2,149,000
Embankment material	$1,822,900
Muck Excavation	$1,289,900
Trench Drain	$748,400
	$6,010,200
Design Refinement: (FDR unless otherwise noted)	
MnDNR compliant restriction structure	$1,283,100
Increased seeding and topsoil	$1,142,200
Localized drainage features (trenches, outlets, etc)	$1,060,500
Inlet Structure reliability	$800,600
Channel outlet erosion protection	$663,400
Multipurpose trails (recreation)	$1,306,000
	$6,255,800
Engineering, Management and Administration	
FDR	$1,985,000
Recreation	$198,000
	$2,183,000
Off-Channel Floodwater Storage Design Change: (FDR)	
Reduced real estate	($750,000)
Eliminated levees and control structure	($850,000)
Diversion Channel Weir	$1,400,000
	$(200,000)
TOTAL	$14,249,000

Price Level Related Cost Changes. As indicated in the above table, this category of costs accounts for $2,615,000 of the total increase in project costs.

Originally Authorized Project Cost	$25,100,000
Design Related Cost Changes	$14,249,000
Price Level Related Cost Changes	$2,615,000
Total	$41,864,000

(10) Changes in Project Benefits.

	Average Annual Benefits
Project Document	$4,340,000
Last Reported to Congress	$4,855,000
Recommended Project	$5,324,000

The authorizing document includes benefits of inundation damage reduction to structures (residential, commercial, industrial, public, and automobiles), savings of temporary relocation costs of displaced flood victims, reduction in emergency response and clean up costs, savings on flood insurance administrative costs, and recreational needs satisfied by the project. Benefits were recalculated at current price levels. All changes in benefits can be attributed to price level changes. Non- price level factors were analyzed and found to be negligible. Changes in benefits due to interest rates are negligible.

(11) Benefit-Cost Ratio.

	BCR-Current Rate - 4%	BCR-Applicable Rate - 5.125%	BCR-Standard Rate - 7%
Project Document	2.89*	2.89	2.14
Last Reported to Congress	2.43**	2.14	1.54
Recommended Project	2.4	1.97	1.48

*Current rate at time was 5.125%
**Current rate at was 4.125%

(12) Changes in Cost Allocation.

Purpose	Authorized Project	Recommended Project
Flood Damage Reduction	$23,398,000	$38,340,000
% of total	93%	92%
Recreation	$1,702,000	$3,524,000
% of total	7%	8%
TOTAL	$25,100,000	$41,864,000

(13) Changes in Cost Apportionment.

	Authorized Project	Recommended Project
Federal	$13,800,000	$24,320,000
% of total	55%	58%
Sponsor	$11,300,000	$17,544,000
% of total	45%	42%
TOTAL	$25,100,000	$41,864,000

The change in proportions of costs borne by the Federal Government and sponsor are attributable to the change in distribution of costs between features with differing cost share requirements. Estimated recreation costs - which are shared 50/50 – have doubled. Estimated FDR costs – which are shared 65/35 – have increased 65%. The recommended cost apportionment maintains all cost share responsibilities defined in the Project Partnership Agreement.

(14) Environmental Considerations in Recommended Changes. An Environmental Assessment was completed for the project and a FONSI was signed on 29 August 2006. The project has maintained its original purpose and scope, but differing site conditions and design refinements resulted in increased project costs. An environmental review of these changes is documented in Appendix D - Environmental Compliance. An increase in needed riprap quantities at the outlet structure was reviewed in February 2010 and it was determined the EA and 404(b)(1) evaluation were still valid and that no further action was required. Other design changes have been minor and will have no appreciable change in the environmental consequences described in the August 2006 Environmental Assessment. Project coordination with natural resource agencies is ongoing. The Project Authorization Change being recommended is an increase in the 902 limit, which will have no environmental effect.

(15) Public Involvement. Design changes were not considered significantly sufficient to warrant additional public involvement. The one square mile reduction in size has been perceived favorably by the public, particularly those who would have been directly affected. The public has not been involved in the recommended change to the 902 limit.

(16) History of Project. Since authorization, there have been no further studies, directions from Appropriations Committees or pertinent changes to basin studies or other applicable sources.

Local sponsor land acquisitions have included eminent domain condemnations of seven properties. Three of these cases have been settled and the remaining cases are expected to conclude in similar manner.

The Feasibility Report was completed in August 2006. The design agreement was signed in October 2006.

The project was authorized in November 2007 and a Project Partnership Agreement was signed in June 2009. The sponsor subsequently designed and constructed two highway bridges. In 2009, the American Recovery and Reinvestment Act provided funding to award an AE contract for all project Engineering and Design services. The AE contractor has completed detailed construction plans and specifications for all project features. FY10 funding allowed award of the first construction contract for the northern most reach which includes the diversion channel outlet. That construction effort has been completed for a contract price of $2,325,000. FY11 funding allowed award of a second contract in September 2011 which is currently estimated to cost $13,485,900 to complete in December of 2013. The remaining construction contract is estimated to cost $10,344,000 and its award is dependent upon a congressionally approved increase to the project's total cost limit.

Figure 3 depicts the three construction contract reaches.

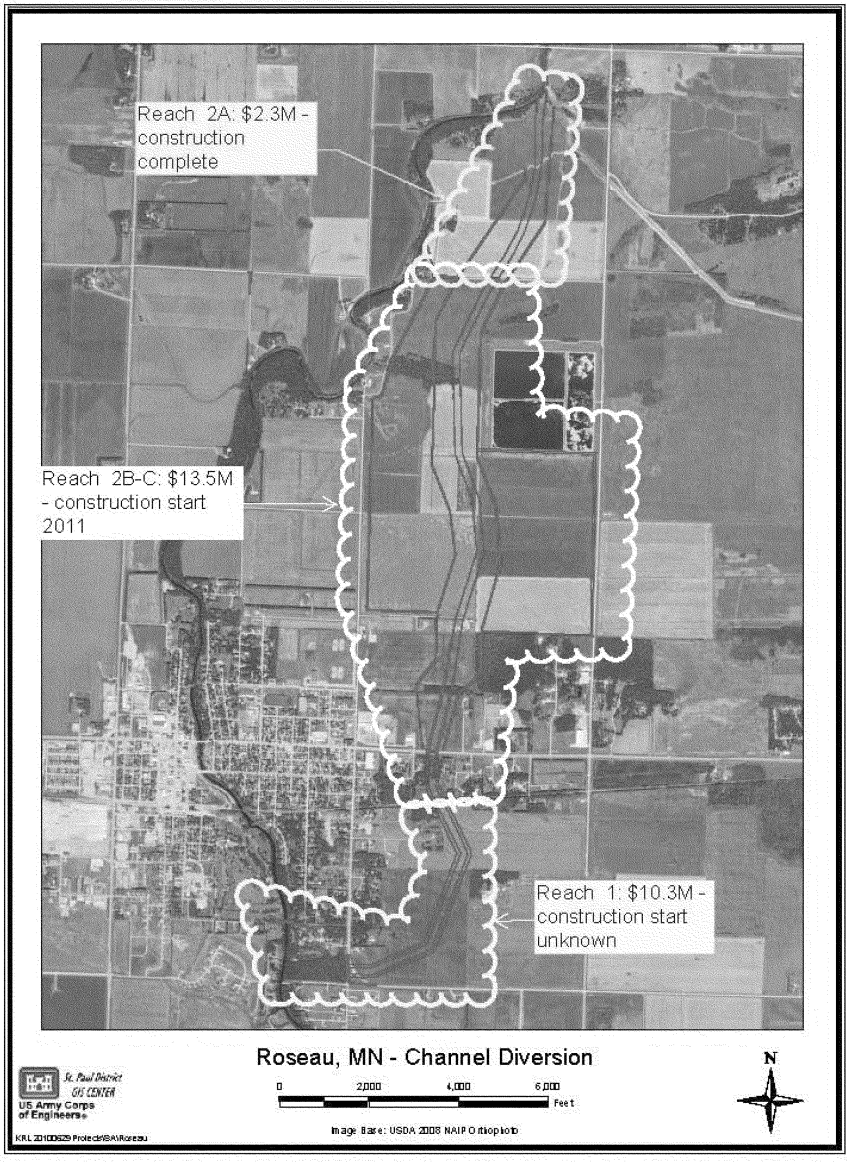

Figure 3: Construction Contract Reaches

(17) Recommendation. I recommend that this Engineering Documentation Report be approved and the authorized project cost be modified as described herein

MICHAEL J. PRICE
COL, EN
Commanding

Appendix A

Current Working Estimate

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CWE COST APPENDIX

ROSEA RIVER – REACH 1
Roseau, MN.

CURRENT WORKING ESTIMATE COST APPENDIX

I. INTRODUCTION

This appendix contains the Current Working Estimate (CWE) for the Roseau Flood Risk Management Project. The Project is being built in three reaches. The reaches are Reach 1, Reach 2A and Reach 2B/2C. The Reach 2A construction contract is essentially complete and only punch list items remain as of July 2012. The Reach 2B/2C construction contract was awarded late in the fall of 2011 and the Contractor did not physically mobilize until the spring of 2012. Reach 2B/2C is now well underway with an estimated completion date of March 2014. The Reach 1 design is essentially complete. Once funding is received the Reach 1 documents will undergo a second BCOE review prior to solicitation. Reach 1 will be the final reach to be constructed and will complete the project.

The CWE contained was updated to a FY13 Quarter 1 pricing level. Actual contract award pricing was used for reaches 2A and 2B/2C. These costs were not adjusted. For Reach 2A, any construction modifications were added to the CWE and a 5% contingency was included to capture any variations in quantity adjustments required due to the final surveys. It is anticipated this contingency is conservative at this stage of construction. For Reach 2B/2C a 10% contingency was added to the award pricing to capture potential construction modifications. This contingency is typically used on MVP projects under construction. The Reach 1 MII construction estimate was updated to represent October 2011 (FY12 Q1) pricing and escalated to FY13 quarter 1 pricing using the current Civil Works Construction Cost Index System (CWCCIS). For the fully funded estimate, Reach 1 estimated construction costs and remaining S&A were escalated to the mid-point of construction, assumed to be the third quarter of 2015. The remaining E&D remained at the current pricing level. The Reach 1 construction schedule is calculated to be 27 months and it is assumed this contract will immediately follow the completion of Reach 2B/2C in April 2014.

Pricing in the Reach 1 construction estimate was compared to the recent bid openings and adjusted if necessary. Fuel rates were checked and found to be reasonable for the current level. Labor rates were also checked with the current Davis Bacon Rates and adjusted if necessary. For items which Davis Bacon rates were not available, the Department of Labor statistics were utilized to check labor rates.

Relocations, Lands and Damages, E&D, and S&A costs and contingencies were provided by the Project Manager. These costs are shown with the Reach 2A work for simplicity. The remaining E&D and S&A costs are shown in connection with the Reach 1 work.

An abbreviated risk analysis was conducted on the Reach 1 construction estimate to determine an appropriate contingency to carry in the CWE. The risk register and resulting construction contingency calculations are attached at the end of this section. A contingency of 16.67% was utilized as a result of the risk analysis.

The effective price level of the updated CWE is October 1, 2012 or 1st Quarter FY13. The estimated project first cost (constant dollar) estimate for the project is $41,864,000. The constant dollar cost estimate is shown in the attached TPCS at the end of this section. The revised MII file for Reach 1 is available upon request.

Additional backup information concerning the base estimate for the project is contained in the project DDR.

ROSEAU CWE UPDATE

ROSEAU FLOOD RISK REDUCTION PROJECT
ROSEAU, MN

Cost Summary and TPCS

ROSEAU FLOOD RISK REDUCTION PROJECT
CURRENT WORKING ESTIMATE
FY13 Price Level

Item	Item Description	Estimated Amount	Lands/Damages & Relocations	Flood Control Amount	Recreation Amount	Cultural Amount	Engineering Amount	Betterments Amount
01	Lands & Damages	$ 2,840,000	$ 2,840,000.00	$ -	$ -	$ -	$ -	$ -
02	Relocations	$ 4,710,000	$ 4,710,000.00	$ -	$ -	$ -	$ -	$ -
09	Channels & Canals	$ 16,800,000	$ -	$ 16,800,000.00	$ -	$ -	$ -	$ -
11	Levees & Floodwalls	$ 6,686,000	$ -	$ 6,686,000.00	$ -	$ -	$ -	$ -
14	Recreational Facilities	$ 2,852,000	$ -	$ -	$ 2,852,000.00	$ -	$ -	$ -
30	Planning, Engineering and Design	$ 5,647,000	$ -	$ -	$ -	$ -	$ 5,647,000.00	$ -
31	Construction Management	$ 2,329,000	$ -	$ -	$ -	$ -	$ 2,329,000.00	$ -
	Estimated Project Cost	$ 41,864,000	$ 7,550,000.00	$ 23,486,000.00	$ 2,852,000.00	$ -	$ 7,976,000.00	$ -

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC): 2013								
						Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1-Oct-11 ($K)		COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
02	RELOCATIONS	$4,585	$125	3%	$4,710	0.0%	$4,585	$125	$4,710	$0		$4,585	$125	$4,710
09	CHANNELS & CANALS	$14,681	$1,942	13%	$16,623	1.1%	$14,833	$1,967	$16,800	$0		$15,187	$2,026	$17,213
11	LEVEES & FLOODWALLS	$6,088	$597	10%	$6,685	0.0%	$6,089	$597	$6,686	$0		$6,090	$597	$6,688
14	RECREATION FACILITIES	$2,564	$274	11%	$2,838	0.5%	$2,576	$276	$2,853	$0		$2,604	$281	$2,886
	#N/A	$0	$0	-	$0	-	$0	$0	$0	$0		$0	$0	$0
	CONSTRUCTION ESTIMATE TOTALS:	$27,918	$2,938		$30,856	0.6%	$28,082	$2,966	$31,048	$0		$28,467	$3,030	$31,497
01	LANDS AND DAMAGES	$2,763	$77	3%	$2,840	0.0%	$2,763	$77	$2,840	$0		$2,763	$77	$2,840
30	PLANNING, ENGINEERING & DESIGN	$5,521	$126	2%	$5,647	0.0%	$5,521	$126	$5,647	$0		$5,619	$137	$5,757
31	CONSTRUCTION MANAGEMENT	$2,043	$286	14%	$2,329	0.0%	$2,043	$286	$2,329	$0		$2,195	$312	$2,507
	PROJECT COST TOTALS:	$38,245	$3,427	9%	$41,672		$38,409	$3,455	**$41,864**	$0		$39,044	$3,556	$42,600

SENTZ.JAMES.D.1231191743 Digitally signed by SENTZ.JAMES.D.1231191743 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SENTZ.JAMES.D.1231191743 Date: 2012.07.31 09:03:02 -05'00'
CHIEF, COST ENGINEERING, James Sentz

KOSTERMAN.PAUL.R.1230538677 Digitally signed by KOSTERMAN.PAUL.R.1230538677 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=KOSTERMAN.PAUL.R.1230538677 Date: 2012.08.01 13:57:01 -05'00'
PROJECT MANAGER, Paul Kosterman

Digitally signed by John Albrecht
DN: cn=John Albrecht, o, ou, email=john.g.albrecht@usace.army.mil, c=US
Date: 2012.07.31 09:13:04 -05'00'
CHIEF, REAL ESTATE, John Albrecht

ESTIMATED FEDERAL COST: **58%** **$24,708**
ESTIMATED NON-FEDERAL COST: **42%** **$17,892**

ESTIMATED TOTAL PROJECT COST: **$42,600**

O&M OUTSIDE OF TOTAL PROJECT COST:

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

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.
This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Jul-12 Effective Price Level: 1-Oct-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Reach 2A (In Construction - 97% Complete)													
02	RELOCATIONS	$4,585	$125	3%	$4,710	0.0%	$4,585	$125	$4,710	2013Q1	0.0%	$4,585	$125	$4,710
09	CHANNELS & CANALS	$1,418	$71	5%	$1,489	0.0%	$1,418	$71	$1,489	2013Q1	0.0%	$1,418	$71	$1,489
11	LEVEES & FLOODWALLS	$290	$15	5%	$305	0.0%	$290	$15	$305	2013Q1	0.0%	$290	$15	$305
14	RECREATION FACILITIES	$509	$25	5%	$534	0.0%	$509	$25	$534	2013Q1	0.0%	$509	$25	$534
	#N/A		$0	5%	$0	0.0%	$0 $0	$0	$0	0	0.0%	$0	$0	$0
	CONSTRUCTION ESTIMATE TOTALS:	$6,802	$236	3%	**$7,038**		$6,802	$236	$7,038			$6,802	$236	$7,038
01	LANDS AND DAMAGES	$2,763	$77	3%	$2,840	0.0%	$2,763	$77	$2,840	2013Q1	0.0%	$2,763	$77	$2,840
30	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design (Sunk Costs)	$4,423	$0	0%	$4,423	0.0%	$4,423	$0	$4,423	2013Q1	0.0%	$4,423	$0	$4,423
31	CONSTRUCTION MANAGEMENT													
	Construction Management (Sunk Costs)	$341	$0	0%	$341	0.0%	$341	$0	$341	2013Q1	0.0%	$341	$0	$341
	CONTRACT COST TOTALS:	$14,329	$313		**$14,642**		$14,329	$313	$14,642			$14,329	$313	**$14,642**

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

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.
This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Jul-12 Effective Price Level: 1-Oct-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Reach 2B/2C - Under Construction - 20% complete													
02	RELOCATIONS	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
09	CHANNELS & CANALS	$5,096	$510	10%	$5,606	0.0%	$5,096	$510	$5,606	2013Q1	0.0%	$5,096	$510	$5,606
11	LEVEES & FLOODWALLS	$5,760	$576	10%	$6,336	0.0%	$5,760	$576	$6,336	2013Q1	0.0%	$5,760	$576	$6,336
14	RECREATION FACILITIES	$1,403	$140	10%	$1,543	0.0%	$1,403	$140	$1,543	2013Q1	0.0%	$1,403	$140	$1,543
	CONSTRUCTION ESTIMATE TOTALS:	$12,259	$1,226	10%	**$13,485**		$12,259	$1,226	$13,485			$12,259	$1,226	$13,485
01	LANDS AND DAMAGES	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design	$0	$0	10%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	Sunk PED shown in Reach 2A													
	Remaining PED shown inReach 1													
31	CONSTRUCTION MANAGEMENT													
	Construction Management	$0	$0	10%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	Sunk CM shown in Reach 1													
	Remaining CM shown inReach 1													
	CONTRACT COST TOTALS:	$12,259	$1,226		**$13,485**		$12,259	$1,226	$13,485			$12,259	$1,226	**$13,485**

Filename: Roseau Flood Damage Reduction TPCS_TPCS_July2012.xlsx
TPCS

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

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.
This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Jul-12 Effective Price Level: 1-Oct-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Reach 1 (95% P&S complete)													
02	RELOCATIONS	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
09	CHANNELS & CANALS	$8,167	$1,361	17%	$9,528	1.9%	$8,319	$1,387	$9,705	2015Q3	4.3%	$8,673	$1,446	$10,119
11	LEVEES & FLOODWALLS	$38	$6	17%	$44	1.9%	$39	$6	$45	2015Q3	4.3%	$40	$7	$47
14	RECREATION FACILITIES	$652	$109	17%	$761	1.9%	$664	$111	$775	2015Q3	4.3%	$692	$115	$808
	CONSTRUCTION ESTIMATE TOTALS:	$8,857	$1,476	17%	**$10,333**		$9,021	$1,504	$10,525			$9,406	$1,568	$10,974
01	LANDS AND DAMAGES	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design (E&D is Q1 2013$)	$1,098	$126	11%	$1,224		$1,098	$126	$1,224	2015Q3	9.0%	$1,196	$137	$1,334
31	CONSTRUCTION MANAGEMENT													
	Construction Management (CM is Q1 2013 $)	$1,702	$286	17%	$1,988		$1,702	$286	$1,988	2015Q3	9.0%	$1,854	$312	$2,166
	CONTRACT COST TOTALS:	$11,657	$1,888		**$13,545**		$11,821	$1,916	$13,737			$12,456	$2,017	**$14,473**

Filename: Roseau Flood Damage Reduction TPCS_TPCS_July2012.xlsx
TPCS

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
01	**LANDS & DAMAGES**		1	LS	$ 2,763,000.00	$2,763,000	2.787%	$2,840,000
TOTAL 01 - LANDS & DAMAGES								**$2,840,000**
02	**RELOCATIONS**		1.0	LS	$4,585,000.00	$4,585,000	2.726%	$4,710,000
	Note:this number includes sewer line relocations in Reach 2B/C (but in Const cont.)							
02 02	**UTILITY RELOCATIONS**				Total LEERDS			
	Relocate Gas Pipeline				Includes Relocations			
	Electric Power				Updated 12/14/2011			
	Telephone / Communications							
	Sewer Line							
02 03	**ROADS**							
	Traffic Control							
	Temporary Highway Bypass							
	Road Raise for Bridges							
	County 11 Bridge							
	County 124 Bridge							
02 04	**RAILROAD BRIDGE**							
	Shoofly							
	Remove Track							
	RR Bridge							
	Subballast							
	New Tracks							
TOTAL 02 - RELOCATIONS								**$4,710,000**
CONSTRUCTION - REACH 1						**$ 8,857,284**	17%	**$ 10,334,100.00**
09	**CHANNELS & CANALS**							
**	**CLEARING AND GRUBBING**					**$48,241.92**		**$56,200**
**	Clearing and Grubbing	Reach 1	12.0	AC	$2,303.41	$27,641	17%	$32,200
**	Tipping Fee per Load	Reach 1	120.0	EA	$88.17	$10,580	17%	$12,300
**	Large Tree Removal	Reach 1	38.0	EA	$263.70	$10,021	17%	$11,700
**	**DEMOLITION**					**$19,834.34**		**$23,200**
**	Demolition of 18" Culvert Rch 1	Reach 1	37.0	LF	$7.36	$272	17%	$300

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
**	Demolition of Bituminous Trail Rch 1	Reach 1	516.0	SF	$1.25	$645	17%	$800
	Saw Cut Bituminous Trail Rch 1	Reach 1	20.0	LF	$1.91	$38	17%	$0
**	Demolition of Aggregate Trail Rch 1	Reach 1	792.0	SY	$14.02	$11,104	17%	$13,000
**	Demolition of TH 11 and CSAH 24 Rch 1	Reach 1	0.0	SF	$0.00			
**	Salvage Riprap under CSAH 24 Bridge	Reach 1	70.0	CY	$27.38	$1,917	17%	$2,200
**	Salvage Riprap under TH 11	Reach 1	0.0	CY	$0.00			
**	Remove Wood Fence	Reach 1	250.0	LF	$2.59	$648	17%	$800
	Remove Watermain	Reach 1	708.0	LF	$7.36	$5,211	17%	$6,100
**	Saw Cut TH 11	Reach 1	0.0	LF	$0.00			
**	**STORM SEWERS / CULVERTS**					**$60,307.41**		**$70,400**
**	Storm Sewer at TH 11	Reach 1	0.0	LS	$0.00	$0	17%	$0
**	Storm Sewer at CSAH 24	Reach 1	1.0	LS	$60,307.41	$60,307	17%	$70,400
09 01	**EAST CHANNEL DIVERSION**					**$5,100,754.45**		**$5,951,000**
	Stripping	Reach 1	99,600.0	CY	$2.90	$288,840	17%	$337,000
	Channel Excavation	Reach 1	705,000.0	CY	$3.90	$2,749,500	17%	$3,207,800
**	Trench Drain	Reach 1	9,715.0	LF	$85.64	$831,993	17%	$970,700
	Channel Inlet Structure					**$763,991.85**		**$891,300**
	- PZ-22 Sheet Pile	Reach 1	5,035.0	SF	$48.95	$246,463	17%	$287,500
	- Geotextile Fabric	Reach 1	6,964.0	SY	$6.40	$44,570	17%	$52,000
	- R-30 Riprap	Reach 1	5,000.0	TN	$49.00	$245,000	17%	$285,800
	- B-1 Bedding	Reach 1	2,100.0	TN	$48.00	$100,800	17%	$117,600
	- Stabilizer and Vegetation Mat	Reach 1	10,100.0	SY	$12.59	$127,159	17%	$148,400
	Channel Topsoil	Reach 1	73,100.0	CY	$3.55	$259,505	17%	$302,800
	Turf Establishment	Reach 1	150.0	ACRE	$1,379.50	$206,925	17%	$241,400
09 02	**RESTRICTION STRUCTURE w/ ACCESS BRIDGE**							**$1,791,600**
	Temporary Sheetpile	Reach 1	330.0	LF	$109.09	$36,000	17%	$42,000
	Granular Fill	Reach 1	1,560.0	CY	$27.06	$42,214	17%	$49,300
	CIP Concrete	Reach 1	1,139.0	CY	$533.97	$608,192	17%	$709,600
	Faux Brick Liner	Reach 1	417.0	SY	$82.25	$34,298	17%	$40,000
	Prefabricated Bridge	Reach 1	1.0	EA	$117,126.03	$117,126	17%	$136,700
	Metal Railing	Reach 1	303.0	LF	$233.03	$70,608	17%	$82,400
	Drainage System in Abutments	Reach 1	350.0	LF	$121.30	$42,455	17%	$49,500
	Waterstop	Reach 1	489.0	LF	$8.36	$4,088	17%	$4,800
	R-30 Riprap	Reach 1	1,480.0	TN	$49.00	$72,520	17%	$84,600
	B-1 Bedding	Reach 1	605.0	TN	$48.00	$29,040	17%	$33,900
	Geotextile Fabric	Reach 1	180.0	SY	$6.40	$1,152	17%	$1,300
	Common Excavation	Reach 1	3,810.0	CY	$3.01	$11,468	17%	$13,400

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
	- Test Piling HP 10 x 57	Reach 1	55.0	LF	$214.00	$11,770	17%	$13,700
	- Restriction Bridge Piling HP 10 x 57	Reach 1	810.0	LF	$90.91	$73,637	17%	$85,900
	- Test Piling HP 12 x 74	Reach 1	45.0	LF	$241.97	$10,889	17%	$12,700
	- Restriction Bridge Piling HP 12 x 74	Reach 1	2,455.0	LF	$114.69	$281,564	17%	$328,500
	Watermain Construction	Reach 1	1.0	LS	$88,508.19	$88,508	17%	$103,300
09 05B	**SPOIL PILES**							**$1,636,000**
	Spoil Pile Grading	Reach 1	735,250.0	CY	$1.90	$1,396,975	17%	$1,629,900
	Traffic Control	Reach 1	1.0	LS	$5,197.00	$5,197	17%	$6,100
TOTAL	**09 - CHANNELS & CANALS**					**$8,167,000**		**$9,528,000**
11	**LEVEES & FLOODWALLS**							
**	**REACH 1 - TIE BACK LEVEES AT TH 11**							**$44,800**
**	Inspection Trench	Reach 1	908.0	LF	$8.18	$7,427	17%	$8,700
**	Stripping	Reach 1						
**	Earthwork - Impervious Fill	Reach 1	7,500.0	CY	$4.12	$30,900	17%	$36,100
**	Topsoil	Reach 1						
**	Turf	Reach 1						
	Water Control Structure No. 1	Reach 1	0.0	LS	$0.00			
TOTAL	**11 - LEVEES & FLOODWALLS**					**$ 38,000**		**$45,000**
14	**RECREATIONAL FACILITIES**							
14 01	**MULTI-PURPOSE TRAILS**							**$543,700**
	Multi Use Trail	Reach 1	8,280.0	SY	$53.10	$439,668	17%	$513,000
	Trail Signage	Reach 1	1.0	LS	$5,765.85	$5,766	17%	$6,700
	Storm Sewer & Utility Modifications 19448	Reach 1	1.0	LS	$20,537.86	$20,538	17%	$24,000
14 02	**MOTORIZED TRAILS**							**$29,400**
**	Mowed Grass	Reach 1	5,020.0	LF	$0.11	$552	17%	$600
**	Cable Tied Concrete Mat	Reach 1	355.0	SY	$69.45	$24,655	17%	$28,800
14 05	**TRAILHEAD FACILITY**							**$5,300**
	Site Furnishings	Reach 1	1.0	LS	$4,522.26	$4,522	17%	$5,300

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
14 08	**RECREATIONAL AREA TREES**							**$182,500**
	Hardwood Trees	Reach 1	1.0	LS	$156,417.41	$156,417	17%	$182,500
TOTAL 14 - RECREATIONAL FACILITIES						**$652,000**		**$761,000**
CONSTRUCTION - REACH 2A						**$ 2,216,697**	5%	**$ 2,325,500.00**
09	**CHANNELS & CANALS**							
09 01	**EAST CHANNEL DIVERSION**							**$1,361,300**
	Stripping	2A Bid	30,118.0	CY	$1.70	$51,201	5%	$53,800
	Channel Excavation							
	Reach 2A - Up to 105,000 CY	2A Bid	105,000.0	CY	$2.85	$299,250	5%	$314,200
	Reach 2A - Over 105,000 CY	2A Bid	33,000.0	CY	$2.85	$94,050	5%	$98,800
	Topsoil	2A Bid	8,283.0	CY	$3.33	$27,610	5%	$29,000
	Turf - 350 Mix	2A 350	60.0	ACRE	$298.05	$17,883	5%	$18,800
	Turf - 280 Mix	2A 280	54.7	ACRE	$1,053.83	$57,645	5%	$60,500
	Channel Riprap (Outlet Structure)	2A Bid	1.0	LS	$800,000.00	$800,000	5%	$840,000
09 05B	**SPOIL PILES**							**$43,300**
	Stripping	2A Bid	16,061.0	CY	$1.70	$27,304	5%	$28,700
	Turf - 350 Mix	2A 350	11.3	ACRE	$298.05	$3,368	5%	$3,500
	CONSTRUCTION CONTRACT MODS							
	R-01 Riprap Bedding / Geotextile	No Cost	1.0	LS	$0.00	$0	0%	$0
	R-02 See 14 Recreation Facilities below							
	R-03 Barrier between channel and river		1.0	LS	$39,800.00	$39,800	0%	$39,800
	R-04 Weather Days	No Cost	1.0	LS	$0.00	$0	0%	$0
TOTAL 09 - CHANNELS & CANALS						**$1,418,000**		**$1,487,000**
11	**LEVEES & FLOODWALLS**							
**	**DITCHES**							**$30,500**
**	Excavation	2A Bid	4,250.0	CY	$6.00	$25,500	5%	$26,800
	Topsoil	2A Bid	1,065.0	CY	$3.33	$3,550	5%	$3,700
11 01	**LEVEES**							**$274,000**
**	Inspection Trench	2A Bid	6,700.0	LF	$5.00	$33,500	5%	$35,200

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
	Stripping	2A Bid	15,150.0	CY	$1.70	$25,755	5%	$27,000
	Lean Impervious Fill Up to 43,500 CY	2A Bid	43,500.0	CY	$3.00	$130,500	5%	$137,000
	Lean Impervious Fill Over 43,500 CY	2A Bid	13,200.0	CY	$3.00	$39,600	5%	$41,600
	Topsoil	2A Bid	5,936.0	CY	$3.33	$19,787	5%	$20,800
	Turf - 350 Mix	2A 350	7.0	ACRE	$298.05	$2,086	5%	$2,200
	Turf - 280 Mix	2A 280	9.2	ACRE	$1,053.83	$9,695	5%	$10,200
TOTAL	**11 - LEVEES & FLOODWALLS**					**$290,000**		**$305,000**
14	**RECREATIONAL FACILITIES**							
14 01	**MULTI-PURPOSE TRAILS**							**$416,700**
**	Compacted Gravel and Asphalt In Place	2A Bid	7,700.0	SY	$33.00	$254,100	5%	$266,800
	Stripping	2A Bid	5,363.0	CY	$1.70	$9,117	5%	$9,600
**	Birding Station	2A Bid	1.0	EA	$44,000.00	$44,000	5%	$46,200
**	Texas Crossing	2A Bid	1.0	LS	$60,000.00	$60,000	5%	$63,000
	Topsoil	2A Bid	2,077.0	CY	$3.33	$6,923	5%	$7,300
	Turf Establishment - U8	2A U8	38.2	ACRE	$505.87	$19,324	5%	$20,300
	CONSTRUCTION CONTRACT MODS							
	R-02 Raise Trail to Solve Ponding Issue		1.0	LS	$3,500.00	$3,500	0%	$3,500
14 05	**TRAILHEAD FACILITY & PARKING LOTS**							**$115,000**
	Trailhead Parking at 330th Ave	2A Bid	1.0	LS	$75,000.00	$75,000	5%	$78,800
	Site Furnishings	2A Bid	1.0	LS	$10,000.00	$10,000	5%	$10,500
	Landscaping	2A Bid	1.0	LS	$20,000.00	$20,000	5%	$21,000
	Stripping	2A Bid	2,658.0	CY	$1.70	$4,519	5%	$4,700
	Topsoil	2A Bid	639.0	CY	$3.33	$2,130	5%	$2,200
TOTAL	**14 - RECREATIONAL FACILITIES**					**$509,000**		**$534,000**
CONSTRUCTION - REACH 2B-C						**$ 12,259,645**	10%	**$ 13,485,900.00**
09	**CHANNELS & CANALS**							
09 01	**EAST CHANNEL DIVERSION**							**$3,552,400**
	Stripping - First	2BC Bid	170,000.0	CY	$2.75	$467,500	10%	$514,300
	Stripping - Over	2BC Bid	30,489.0	CY	$2.75	$83,845	10%	$92,200

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
	Clear & Grub Trees	2BC Bid	1.0	LS	$300,000.00	$300,000	10%	$330,000
	Channel Excavation - 2B First	2BC Bid	50,000.0	CY	$3.50	$175,000	10%	$192,500
	Channel Excavation - 2B Over	2BC Bid	8,830.0	CY	$3.50	$30,905	10%	$34,000
	Channel Excavation - 2C First	2BC Bid	275,000.0	CY	$3.50	$962,500	10%	$1,058,800
	Channel Excavation - 2C Over	2BC Bid	52,370.0	CY	$3.50	$183,295	10%	$201,600
	Impervious Fill	2BC Bid	0.0	CY	$0.00			
**	Trench Drains - First	2BC Bid	3,500.0	LF	$50.00	$175,000	10%	$192,500
	Trench Drains - Over	2BC Bid	828.0	LF	$50.00	$41,400	10%	$45,500
	Channel Topsoil	2BC Bid	1.0	LS	$350,000.00	$350,000	10%	$385,000
	Channel Turf	2BC Bid	1.0	LS	$400,000.00	$400,000	10%	$440,000
**	Demolition of TH 11	2BC Bid	0.0	SF	$0.00	Part of Bid Price for Demolition		
**	Salvage Riprap under TH 11	2BC Bid	0.0	TN	$0.00	Part of Bid Price for Control Structure		
**	Saw Cut TH 11	2BC Bid	0.0	LF	$0.00	Part of Bid Price for Demolition		
	Haul & Dispose of Material	2BC Bid	0.0	EA	$0.00	Part of Bid Price for Demolition		
	TH 11 Closure (Signs & Barricades)	2BC Bid	1.0	LS	$60,000.00	$60,000	10%	$66,000
09 02	**RESTRICTION STRUCTURE w/ BRIDGE**	Reach 1						**$0**
09 03	**CR28 ROAD RAISE**	Eliminated with alternate design						**$0**
09 04	**BOX CULVERTS UNDER C28**	Eliminated with alternate design						**$0**
09 05B	**SPOIL PILES**							**$0**
	Spread Spoil Pile Material	Rch 2B-C	0.0	CY	$0.00	Part of Bid Price for Excavation		
	Turf	Rch 2B-C	0.0	ACRE	$0.00	Part of Bid Price for Excavation		
09 06	**LOWER DRIVEWAY**							**$0**
	Excavation	Rch 2B-C	0.0	CY	$0.00	No Longer a Project Feature		
	Aggregate Surface	Rch 2B-C	0.0	TN	$0.00	No Longer a Project Feature		
09 07	**WEST CONTROL STRUCTURE**							**$220,000**
	Water Control Structure No. 1	2BC Bid	1.0	LS	$200,000.00	$200,000	10%	$220,000
09 08	**EAST CONTROL STRUCTURE**							**$110,000**
	Water Control Structure No. 2	2BC Bid	1.0	LS	$100,000.00	$100,000	10%	$110,000
**	**ADDITIONAL WTER CONTROL STRUCTURES**							**$231,000**
**	Water Control Structure No. 3	2BC Bid	1.0	LS	$210,000.00	$210,000	10%	$231,000
**	Water Control Structure No. 4 ("C" Levee)	Eliminated with alternate design						
09 11	**IN CHANNEL WEIR STRUCTURE**							**$1,492,700**
	In Channel Wier	2BC Bid	1.0	LS	$1,200,000.00	$1,200,000	10%	$1,320,000

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
	Foundation Piling - First	2BC Bid	2,800.0	LF	$40.00	$112,000	10%	$123,200
	Foundation Piling - Over	2BC Bid	510.0	LF	$40.00	$20,400	10%	$22,400
	Test Piling HP 12 x 74	2BC Bid	145.0	LF	$170.00	$24,650	10%	$27,100
TOTAL 09 - CHANNELS & CANALS						**$5,096,000**		**$5,606,000**
11	**LEVEES & FLOODWALLS**							
**	**DEMOLITION**							**$330,000**
**	Demolition of 400th Ave and Culverts Rch 2	2BC Bid	1.0	LS	$300,000.00	$300,000	10%	$330,000
**	**DITCHES**							**$226,500**
**	Ditch Excavation - 2B First	2BC Bid	24,000.0	CY	$4.25	$102,000	10%	$112,200
	Ditch Excavation - 2B Over	2BC Bid	3,954.0	CY	$4.25	$16,805	10%	$18,500
	Ditch Excavation - 2C First	2BC Bid	17,500.0	CY	$4.25	$74,375	10%	$81,800
	Ditch Excavation - 2C Over	2BC Bid	2,986.0	CY	$4.25	$12,691	10%	$14,000
**	**MUCK EXCAVATION**							**$1,016,700**
**	Muck Excavation Rch 2 - First	2BC Bid	98,500.0	CY	$8.00	$788,000	10%	$866,800
	Muck Excavation Rch 2 - Over	2BC Bid	17,029.0	CY	$8.00	$136,232	10%	$149,900
**	**SEWAGE LAGOON FEATURES**							**$0**
**	Sewage Lagoon Outlet Structure	Eliminated with alternate design						
**	Sewage Lagoon Fence Replacement	Eliminated with alternate design						
11 01	**LEVEES**							**$4,241,100**
**	Inspection Trench - 2B First	2BC Bid	11,500.0	LF	$5.00	$57,500	10%	$63,300
	Inspection Trench - 2B Over	2BC Bid	1,891.0	LF	$5.00	$9,455	10%	$10,400
	Inspection Trench - 2C First	2BC Bid	22,500.0	LF	$5.00	$112,500	10%	$123,800
	Inspection Trench - 2C Over	2BC Bid	3,857.0	LF	$5.00	$19,285	10%	$21,200
	Stripping							
	Earthwork - Impervious Fill - 2B First	2BC Bid	21,000.0	CY	$4.50	$94,500	10%	$104,000
	Earthwork - Impervious Fill - 2B Over	2BC Bid	3,735.0	CY	$4.50	$16,808	10%	$18,500
	Earthwork - Impervious Fill - 2C First	2BC Bid	145,000.0	CY	$4.50	$652,500	10%	$717,800
	Earthwork - Impervious Fill - 2C Over	2BC Bid	28,289.0	CY	$4.50	$127,301	10%	$140,000
	Earthwork - Lean Imp Fill - 2B First	2BC Bid	180,000.0	CY	$8.00	$1,440,000	10%	$1,584,000
	Earthwork - Lean Imp Fill - 2B Over	2BC Bid	31,165.0	CY	$8.00	$249,320	10%	$274,300
	Earthwork - Lean Imp Fill - 2C First	2BC Bid	110,000.0	CY	$7.00	$770,000	10%	$847,000
	Earthwork - Lean Imp Fill - 2C Over	2BC Bid	23,740.0	CY	$7.00	$166,180	10%	$182,800
	Topsoil	Reach 2	0.0	CY	$0.00			
	Turf	Rch 2B-C	0	ACRE	$0.00			

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
	Sanitary Sewer Forcemain Relocation	2BC Bid	1	LS	$520,000.00	$520,000	10%	$572,000
						-$520,000	-10%	-$572,000
	Spillways	2BC Bid	4	EA	$35,000.00	$140,000	10%	$154,000
11 02	**400TH AVE ROAD RAISE**							**$247,500**
**	400th Ave Road Raise	2BC Bid	1.0	LS	$225,000.00	$225,000	10%	$247,500
	Field Entrances & Driveways							**$275,000**
**	Driveway Culverts	Rch 2B	0.0	LS	$0.00	Included in Bid Price for Driveways		
	Driveway & Field Entrance Mods	2BC Bid	1.0	LS	$250,000.00	$250,000	10%	$275,000
TOTAL 11 - LEVEES & FLOODWALLS						**$5,760,000**		**$6,337,000**
14	**RECREATIONAL FACILITIES**							
14 01	**MULTI-PURPOSE TRAILS**							**$862,200**
	Trails in 2B by the SY	2BC Bid	4,902.0	SY	$50.00	$245,100	10%	$269,600
**	Trails in 2C by the SY	2BC Bid	9,223.0	SY	$50.00	$461,150	10%	$507,300
**	Topsoil	Rch 2B-C	0.0	CY	$0.00			
**	Turf - U8 Mix	Rch 2B-C	0.0	ACRE	$0.00			
**	Birding Station	2BC Bid	2.0	EA	$30,000.00	$60,000	10%	$66,000
**	Trail Signage	2BC Bid	1.0	LS	$17,500.00	$17,500	10%	$19,300
14 02	**MOTORIZED TRAILS**							**$257,300**
	Mowed Grass Trails - First	2BC Bid	20,000.0	LF	$10.00	$200,000	10%	$220,000
	Mowed Grass Trails - Over	2BC Bid	3,395.0	LF	$10.00	$33,950	10%	$37,300
	Shape Challenge Trails	Rch 2B-C	0.0	LS	$0.00			
**	Turf - 350 Mix	Rch 2B-C	0.0	ACRE	$0.00			
**	Turf - 350 Mix w/ Forbes	Rch 2B-C	0.0	ACRE	$0.00			
**	Turf - 150 Mix	Rch 2B-C	0.0	ACRE	$0.00			
14 03	**RIVER CANOE LAUNCH**							**$0**
	Canoe Launch / Take-outs							
14 04	**PARKING LOTS**							**$121,000**
	Car Parking Lot 1	**Trailhead Parking at 330th Street - Reach 2A**						
	Car / Trailer Parking Lot 1	**Trailhead Parking at ATV Challenge Course**						

ROSEAU FLOOD RISK REDUCTION PROJECT - RECOMMENDED PLAN

Recommended Plan

CWE Estimate - Using Reach 2A & 2BC Bids & Revised Reach 1 MII Estimate

ITEM	ITEM DESCRIPTION		QUANTITY	UNITS	UNIT PRICE	AMOUNT	CONTINGENCY	AMOUNT PLUS CONTINGENCY
	Trailhead Parking Area	2BC Bid	1.0	LS	$110,000.00	$110,000	10%	$121,000
14 05	**TRAILHEAD FACILITY**	**Trailhead Facility - Reach 2A**						**$0**
14 06	**SIDEWALK**	**Sidewalk - Reach 2A**						**$0**
14 07	**LEVEE OVERBUILD FOR TRAILS**							**$0**
	Overbuild Levee additional 2 feet wide							
14 08	**RECREATIONAL AREA TREES**							**$110,000**
	Hardwood Trees	2BC Bid	1.0	LS	$100,000.00	$100,000	10%	$110,000
14 09	**ATV CHALLENGE COURSE**							**$192,500**
	ATV Challenge Course in 2B	2BC Bid	1.0	LS	$175,000.00	$175,000	10%	$192,500
TOTAL 14 - RECREATIONAL FACILITIES						**$1,403,000**		**$1,543,000**
30	**PLANNING, ENGINEERING & DESIGN**		1.0	JOB	$5,521,000.00	$5,521,000	2%	$5,647,000
TOTAL 30 - PLANNING, ENGINEERING & DESIGN						**$5,521,000**		**$5,647,000**
31	**CONSTRUCTION MANAGEMENT**		1.0	JOB	$2,043,000.00	$2,043,000	14%	$2,329,000
TOTAL 31 - CONSTRUCTION MANAGEMENT						**$2,043,000**		**$2,329,000**
TOTAL PROJECT						**$38,245,600**		**$41,671,500**
CONSTRUCTION COSTS ONLY						**$23,333,626**		**$26,145,500**

ROSEAU CWE UPDATE

ROSEAU FLOOD RISK REDUCTION PROJECT
ROSEAU, MN

CONTINGENCY DETERMINATION

Abbreviated Risk Analysis

Project (less than $40M): **Roseau Flood Risk Reduction Project**
Project Development Stage: **PED 90%**
Risk Category: **Moderate Risk: Typical Project or Possible Life Safety**

Total Construction Contract Cost = $ 8,857,000

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
1	09 01 CHANNELS	**Earthwork**	$ 5,633,934		16.83%	$ 948,103	$ 6,582,036.60
2	09 01 CHANNELS	**Structural - Concrete**	$ 876,767		17.77%	$ 155,792	$ 1,032,558.62
3	09 01 CHANNELS	**Piles**	$ 660,323		16.83%	$ 111,122	$ 771,444.99
4	09 01 CHANNELS	**Utilities**	$ 148,815		16.83%	$ 25,043	$ 173,858.23
5	09 01 CHANNELS	**Rock Protection**	$ 620,241		16.83%	$ 104,377	$ 724,617.82
6	09 01 CHANNELS	**Misc items (Landscape/demolition)**	$ 226,759		12.97%	$ 29,414	$ 256,173.49
7	11 LEVEES AND FLOODWALLS	**Levees**	$ 38,000		13.07%	$ 4,967	$ 42,967.37
8	14 RECREATION FACILITIES	**Recreation**	$ 652,000		15.11%	$ 98,505	$ 750,505.37
9	14 RECREATION FACILITIES				0.00%	$ -	$ -
10	13 PUMPING PLANT		$ -		0.00%	$ -	$ -
11	14 RECREATION FACILITIES		$ -		0.00%	$ -	$ -
12		**Remaining Construction Items**	**$ 161**	*0.0%*	3.00%	$ 5	$ 165.83
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 1,328,550		3.00%	$ 39,857	$ 1,368,406.50
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 619,990		9.28%	$ 57,517	$ 677,507.11

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 8,857,000	16.68%	$ 1,477,328	$ 10,334,328	
Total Planning, Engineering & Design	$ 1,328,550	3.00%	$ 39,857	$ 1,368,407	
Total Construction Management	$ 619,990	9.28%	$ 57,517	$ 677,507	
Total	$ 10,805,540		$ 1,574,702	$ 12,380,242	

Roseau Flood Risk Reduction Project
PED 90%
Abbreviated Risk Analysis

Meeting Date: Via Email

Risk Level

	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
Project Scope Growth							
						Max Potential Cost Growth	**75%**
PS-1	Earthwork	• Design confidence?	There is very little concern at this stage of the project. The project includes 3 reaches. One reach, the channel and outlet is essentially complete (97% constructed), the second reach is about 25% constructed. The final reach has been through the BCOE process and is awaiting funding to construct. There is very little concern that any scope change will occur since this is the final reach. The project has also undergone significant reviews to maximize funding that was available or anticipated. Channel dimensions are set by previous work and should not change. Biggest concern would be swell factors for spoil areas, but east spoil area is flexible with regards to acceptance of material, so this issue should not be a factor.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-2	Structural - Concrete	• Design confidence?	No concerns over concrete structures. Inlet structure has been revised to include measures to harden structure against ice forces which were incurred on other projects in the area - incorporating lessons learned. Scope change not a concern at this stage of the project. The AE had the previous two reaches as guides for the final reach design and adjustments.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-3	Piles	• Design confidence?	No concerns over pile design. AE has had opportunity to capture knowledge from previous reaches.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-4	Utilities	• Design confidence?	• Design confidence? No issues anticipated.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-5	Rock Protection	• Potential for scope growth, added features and quantities?	• Design confidence? No issues anticipated.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-6	Misc items (Landscape/demolition)	• Design confidence?	• Design confidence? No issues anticipated.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-7	Levees	• Design confidence?	• Design confidence? Very small portion of this reach - no issues anticipated.	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-8	Recreation	• Potential for scope growth, added features and quantities?	• Design confidence? No issues anticipated. • Design confidence? • Potential for scope growth, added features and quantities?	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-13	Planning, Engineering, & Design	• Design confidence?	• Design confidence?	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0
PS-14	Construction Management	• Design confidence?	• Design confidence?	Scope is clearly translated in the design which is at a level greater than 95%, and the odds of a design change are unlikely at this stage. The impact of minimal changes would be negligible. Designers are confident in the scope of work to date. This was heavily reviewed when the 902 issue arose. Design follows design of initial reaches that are in construction. reach 2A is nearly complete.	Unlikely	Negligible	0

Acquisition Strategy

						Max Potential Cost Growth	**30%**
AS-1	Earthwork	• Bid schedule developed to reduce quantity risks?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent. If a change occurs it would probably be to a hub zone set-aside which potentially could limit competition, however the size of the job is large enough to generate significant interest in the area. Any affect on aquisition plan should be small. Bid schedule has measured quantities for most earthwork items, so pricing reduces Contractor risk and should be competitive.	Possible	Marginal	1
AS-2	Structural - Concrete	• Bid schedule developed to reduce quantity risks?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent. If a change occurs it would probably be to a hub zone set-aside which potentially could limit competition, however the size of the job is large enough to generate significant interest in the area. Any affect on aquisition plan should be small.	Possible	Marginal	1
AS-3	Piles	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent. If a change occurs it would probably be to a hub zone set-aside which potentially could limit competition, however the size of the job is large enough to generate significant interest in the area. Any affect on aquisition plan should be small. Piles are measured for payment.	Possible	Marginal	1
AS-4	Utilities	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent. If a change occurs it would probably be to a hub zone set-aside which potentially could limit competition, however the size of the job is large enough to generate significant interest in the area. Any affect on aquisition plan should be small.	Possible	Marginal	1
AS-5	Rock Protection	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent.	Possible	Marginal	1
AS-6	Misc Items (Landscape/demolition)	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent. If a change occurs it would probably be to a hub zone set-aside which potentially could limit competition, however the size of the job is large enough to generate significant interest in the area. Any affect on aquisition plan should be small.	Possible	Marginal	1
AS-7	Levees	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bis competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent. If a change occurs it would probably be to a hub zone set-aside which potentially could limit competition, however the size of the job is large enough to generate significant interest in the area. Any affect on aquisition plan should be small. Minimal levees on this reach - most material goes to stock pile areas.	Possible	Marginal	1
AS-8	Recreation	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Acquisition strategy impacting the costs: Estimate incorporates bid results from two earlier phases of work based on small business hub zone set-aside. This seems to have generated competition. It is possible that future solicitation plan could further limit the potential bidding pool resulting in less competition. Still, the project is large enough that it will be bid competitively and increase in price due to further restriction should be marginal. It is likely the contracting plan will change, but the possibility of it being true full and open are non-existent.	Possible	Marginal	1
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Procurement method will have no affect on the PED.	Unlikely	Negligible	0
AS-14	Construction Management	• Contracting plan firmly established?	• 8a or small business likely? • Limited bid competition anticipated? • Bid schedule developed to reduce quantity risks?	Procurement method will have minimal affect on the CM. CM involvement and effect will be determined upon the Contractor awarded.	Possible	Negligible	0

Construction Elements

						Max Potential Cost Growth	25%
CE-1	Earthwork	• Water care and diversion plan?	• Potential for construction modification and claims? • Water care and diversion plan?	The largest concern is the unkown or varrying site conditions that may arrise during construction. Two previous reaches have or are under construction so site conditions are well known. Methods to deal with high water have proven effective while minimizing cost impacts. Final BCOE meeting can be utilized to minimize any risk facotrs that arise such as swell or non compaction of Spoil piles. Minimal mods are envisioned for earthwork other than typical quantity adjustments at the end of the project. These will occur but the impact will be marginal.	Likely	Marginal	2
CE-2	Structural - Concrete	• Water care and diversion plan?	• Potential for construction modification and claims? • Water care and diversion plan?	The largest concern is the unkown or varrying site conditions that may arrise during construction. Two previous reaches have or are under construction so site conditions are well known. Methods to deal with high water have proven effective while minimizing cost impacts. Final BCOE meeting can be utilized to minimize any risk factors. This is a lump sum item, but no changes or mods are anticipated. Biggest concern is high water which could slow construction.	Possible	Marginal	1
CE-3	Piles	• Potential for construction modification and claims?	• Potential for construction modification and claims?	The largest concern is the unkown or varrying site conditions that may arrise during construction. Cocern is the same as site work and quantity adjustments. Not many unknowns here at this stage based on previous work.	Likely	Marginal	2
CE-4	Utilities	• Potential for construction modification and claims?	• Potential for construction modification and claims?	The largest concern is the unkown or varrying site conditions that may arrise during construction. Site 2B/2C ran into some asbetos containing pipe for removal. It appears removal costs are not impacted a great extent, except for a requirement for a certified contractor to do the specific portions of the work. It is not anticipated to occur in the final reach but could impact costs if it does.	Possible	Significant	2
CE-5	Rock Protection	• Potential for construction modification and claims?	• Potential for construction modification and claims?	The largest concern is the unkown or varrying site conditions that may arrise during construction. Cocern is the same as site work and quantity adjustments. Not many unknowns here at this stage based on previous work.	Likely	Marginal	2
CE-6	Misc Items (Landscape/demolition)	• Potential for construction modification and claims?	• Potential for construction modification and claims?	The largest concern is the unkown or varrying site conditions that may arrise during construction. These should have little or no impact on landscaping costs.	Likely	Marginal	2
CE-7	Levees	• Potential for construction modification and claims?	• Potential for construction modification and claims?	The largest concern is the unkown or varying site conditions that may arrise during construction. On Reach 2B/2C there was concern about the quantity of material suitable for levee building. Reach 2B/2C had a large quantity of levee material. Reach 1 has very little required levee material. There should be no issues for suitable levee building materials for Reach 1, hence there is unlikely chance for change and negligible risk.	Likely	Negligible	1
CE-8	Recreation	• Accelerated schedule or harsh weather schedule?	• Potential for construction modification and claims?	The recreation features should not change. There is little chance for modifications. The largest concern is varying site conditions that may arise during construction. These should have little to no impact on recreation costs.	Likely	Negligible	1
CE-13	Planning, Engineering, & Design	• Potential for construction modification and claims?	• Potential for construction modification and claims?	Construction Complexity will not impact the PED.	Unlikely	Negligible	0
CE-14	Construction Management	• Potential for construction modification and claims?	• Potential for construction modification and claims?	None of the work involved is complex or should require inordinate amount of CM time. Changes due to weather could impact CM time, but there is enough work in the area that down times are easily filled with other project work. This is possible but would at most have a marginal impact.	Possible	Marginal	1

Quantities for Current Scope

						Max Potential Cost Growth	20%
Q-1	Earthwork	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood for the design changing is minimal. While the measured quantities will change, the change could be either way and the effect should be negligible on overall costs. There is high confidence in the quantities, yet they will undoubedly be different in the field for measured earthwork items.	Likely	Negligible	1
Q-2	Structural - Concrete	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	The concrete features are fully designed and are lump sum items. They will not change prior to solicitation and there should be no quantity adjustments on them. These are very unlikely to change.	Unlikely	Negligible	0
Q-3	Piles	• Appropriate methods applied to calculate quantities?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood fo the design changing is minimal. While the measured quantities will change, the change could be either way and the effect should be negligible on overall costs.	Likely	Negligible	1
Q-4	Utilities	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood for the design changing is minimal. The utilities will be bid lump sum and will not be subject to quantity adjustments. There is very little chance for change here. Potential for mods has been addressed above.	Likely	Negligible	1
Q-5	Rock Protection	• Level of confidence based on design and assumptions?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood fo the design changing is minimal. While the measured quantities will change, the change could be either way and the effect should be negligible on overall costs. There is high confidence in the quantities, yet they will undoubedly be different in the field for measured rock (riprap) items.	Likely	Negligible	1
Q-6	Misc items (Landscape/demolition)	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood fo the design changing is minimal. The landscaping will be bid lump sum and will not be subject to quantity adjustments. There is very little chance for change here. Potential for mods has been addressed above.	Unlikely	Negligible	0
Q-7	Levees	• Appropriate methods applied to calculate quantities?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood fo the design changing is minimal. While the measured quantities will change, the change could be either way and the effect should be negligible on overall costs.	Likely	Negligible	1
Q-8	Recreation	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood fo the design changing is minimal. While the measured quantities will change, the change could be either way and the effect should be negligible on overall costs.	Likely	Negligible	1
Q-12	Remaining Construction Items	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Current level of design is greater than 95% and the likelihood fo the design changing is minimal. While the measured quantities will change, the change could be either way and the effect should be negligible on overall costs.	Unlikely	Negligible	0
Q-13	Planning, Engineering, & Design	• Appropriate methods applied to calculate quantities?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Quantities will not affect the PED.	Unlikely	Negligible	0
Q-14	Construction Management	• Quality control check applied?	• Level of confidence based on design and assumptions? • Appropriate methods applied to calculate quantities? • Quality control check applied?	Quantities will not affect the CM.	Unlikely	Negligible	0

Specialty Fabrication or Equipment							
						Max Potential Cost Growth	75%
FE-1	Earthwork	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There are no fabrication concerns with Earthwork.	Unlikely	Negligible	0
FE-2	Structural - Concrete	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There is the potential for fabricated items from a supplier to not meet project requirements. It is not likely that this would result in large cost increases. Overall effect is negligible. (Prefabricated bridge is biggest prefabriated item, rebar) These items are not considered unusual. Cost of bridge could be considered here.	Possible	Marginal	1
FE-3	Piles	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There is the potential for fabricated items from a supplier to not meet project requirements. It is not likely that this would result in large cost increases. Overall effect is negligible.	Unlikely	Negligible	0
FE-4	Utilities	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There is the potential for fabricated items from a supplier to not meet project requirements. The items utilized are common and should not be a problem. Contractor may propose alternative pile types depending on supplier, but this is not a concern and would not affect schedule or cost. It is not likely that this would result in large cost increases. Overall effect is negligible.	Unlikely	Negligible	0
FE-5	Rock Protection	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There are no fabrication concerns with rock work. The rock called for is a common gradation.	Unlikely	Negligible	0
FE-6	Misc items (Landscape/demolition)	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There is the potential for fabricated items from a supplier to not meet project requirements. It is not likely that this would result in large cost increases. Overall effect is negligible.	Unlikely	Negligible	0
FE-7	Levees	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There is the potential for fabricated items from a supplier to not meet project requirements. It is not likely that this would result in large cost increases. Overall effect is negligible.	Unlikely	Negligible	0
FE-8	Recreation	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	There are some fabricated items, however they are not specialty items and are not considered to be a concern.	Unlikely	Negligible	0
FE-13	Planning, Engineering, & Design	• Unusual parts, material or equipment manufactured or installed?		No fabrication impact on the PED.	Unlikely	Negligible	0
FE-14	Construction Management	• Unusual parts, material or equipment manufactured or installed?		These factors could result in increased supervision and oversight required by the construction representative. Overall effect will be negligible in the overall project.	Unlikely	Negligible	0

Cost Estimate Assumptions

							Max Potential Cost Growth	35%
CT-1	Earthwork	• Assumptions regarding crew, productivity, overtime?	• Assumptions related to prime and subcontractor markups/assignments? • Assumptions regarding crew, productivity, overtime?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best. This project is mostly earthwork. It is highly unlikely that a structural or other type contractor would bid the job as the prime and be competitive. Reviewers question the use or lack of use and documentation of BCY/LCY/ECY. If these are not correct there could be quantity problems. Pricing however is available 2b/2c work.	Possible	Marginal	1
CT-2	Structural - Concrete	• Assumptions regarding crew, productivity, overtime?	• Assumptions related to prime and subcontractor markups/assignments? • Assumptions regarding crew, productivity, overtime?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best. This is anticipated to be subcontracted which seems reasonable. Some ahave concern the structural estimate may be slightly low, so it could potentially increase. This is possible, but the overall affect would be small. Previous estimates have been low for structural concrete items.	Possible	Significant	2
CT-3	Piles	• Assumptions regarding crew, productivity, overtime?	• Assumptions related to prime and subcontractor markups/assignments? • Assumptions regarding crew, productivity, overtime?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best.This is anticipated to be subcontracted which seems reasonable. Pile pricing was available from earlier work.	Possible	Marginal	1
CT-4	Utilities	• Assumptions regarding crew, productivity, overtime?	• Assumptions related to prime and subcontractor markups/assignments? • Assumptions regarding crew, productivity, overtime?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best. A new Contractor could potentially sub out this work. Of items this could be possible, and cost effect would be marginal.	Possible	Marginal	1
CT-5	Rock Protection	• Reliability and number of key quotes?	• Assumptions related to prime and subcontractor markups/assignments?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best. A new Contractor could potentially sub out this work. Of items this could be possible, and cost effect would be marginal.	Possible	Marginal	1
CT-6	Misc items (Landscape/demolition)	• Assumptions related to prime and subcontractor markups/assignments?	• Assumptions related to prime and subcontractor markups/assignments?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best. This work is assumed to be sub contracted out. No concerns on costs here.	Possible	Negligible	0
CT-7	Levees	• Assumptions related to prime and subcontractor markups/assignments?	• Assumptions related to prime and subcontractor markups/assignments?	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best.	Possible	Negligible	0
CT-8	Recreation	• Reliability and number of key quotes?	• Assumptions related to prime and subcontractor markups/assignments? Also there is a concern with pricing/quotes.	Cost estimate development may not reflect actual methds, material prices, crews, production rates, etc. used for execution of the contract. Estimate incorporates average bid pricing from previous contracts on this project. Any changes in pricing would be marginal at best.	Possible	Marginal	1
CT-13	Planning, Engineering, & Design	• Assumptions related to prime and subcontractor markups/assignments?	• Assumptions related to prime and subcontractor markups/assignments?	This is not a concern for PED costs.	Unlikely	Negligible	0
CT-14	Construction Management	• Assumptions related to prime and subcontractor markups/assignments?	• Assumptions related to prime and subcontractor markups/assignments?	Will not affect CM costs.	Unlikely	Negligible	0

External Project Risks

							Max Potential Cost Growth	40%
EX-1	Earthwork	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-2	Structural - Concrete	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-3	Piles	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-4	Utilities	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-5	Rock Protection	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-6	Misc items (Landscape/demolition)	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-7	Levees	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-8	Recreation	• Potential for severe adverse weather?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	external impacts such as delayed funding (both federal and nonfederal), adverse weather (such as a wetter than typ. Summer), volitility in fuel and materials, and tie in to existing construction areas could all impact this project.	Likely	Marginal	2
EX-13	Planning, Engineering, & Design	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	Current level of design will result in minimal impact on PED from funding delays.	Unlikely	Marginal	0
EX-14	Construction Management	• Potential for market volatility impacting competition, pricing?	• Political influences, lack of support, obstacles? • Unanticipated inflations in fuel, key materials? • Potential for market volatility impacting competition, pricing?	External project risks can impact schedule for construction management including increased time required on site. More CM field staff time may be required if projects don't overlap.	Likely	Marginal	2

Roseau Flood Risk Reduction Project
PED 90%
Abbreviated Risk Analysis

Typical Risk Elements	Potential Risk Areas												
	Earthwork	Structural - Concrete	Piles	Utilities	Rock Protection	Misc Items (Landscape/demo...on)	Levees	Recreation	0	0	0	Remaining Construction Iter...	Planning, Engineering, & Design	Construction Management
Project Scope Growth	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acquisition Strategy	1	1	1	1	1	1	1	1	-	-	-	-	-	-
Construction Elements	2	1	2	2	2	2	1	1	-	-	-	-	-	1
Quantities for Current Scope	1	-	1	1	1	-	1	1	-	-	-	-	-	-
Specialty Fabrication or Equipment	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Cost Estimate Assumptions	1	2	1	1	1	-	-	1	-	-	-	-	-	-
External Project Risks	2	2	2	2	2	2	2	2	-	-	-	-	-	2

ROSEAU CWE UPDATE

ROSEAU FLOOD RISK REDUCTION PROJECT
ROSEAU, MN

MII Estimate

To obtain the MII estimate please contact MVP Cost Engineering at 651-290-5625

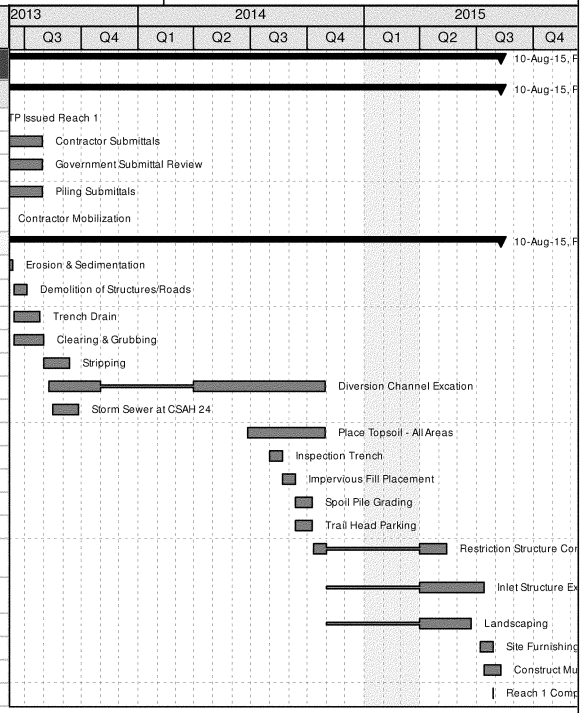
ROSEAU CWE UPDATE

ROSEAU FLOOD RISK REDUCTION PROJECT
ROSEAU, MN

PROJECT SCHEDULE

The construction duration for Reach 1 is computed to be 27 months as shown in the Schedule on the following page. The attached schedule indicates a construction start date of May 2013. It is anticipated this will not occur. For the purposes of the CWE it is assumed the construction start date will occur in April 2014. The Construction duration will be 27 months from that date, making the midpoint of Construction for Reach 1 May 2015.

Activity ID	Activity Name	Original Duration	Remaining Duration	Early Start	Early Finish
Roseau Reach 1		594	594	01-May-13	10-Aug-15
Pre-Construction		594	594	01-May-13	10-Aug-15
A1120	NTP Issued Reach 1	1	1	01-May-13	01-May-13
A1010	Contractor Submittals	90	90	01-May-13	29-Jul-13
A1020	Government Submittal Review	90	90	01-May-13	29-Jul-13
A1290	Piling Submittals	90	90	01-May-13	29-Jul-13
A1030	Contractor Mobilization	20	20	02-May-13	29-May-13
Reach 1 Construction		573	573	30-May-13	10-Aug-15
A1050	Erosion & Sedimentation	10	10	30-May-13	12-Jun-13
A1060	Demolition of Structures/Roads	15	15	13-Jun-13	03-Jul-13
A1070	Trench Drain	30	30	13-Jun-13	24-Jul-13
A1080	Clearing & Grubbing	35	35	13-Jun-13	31-Jul-13
A1090	Stripping	30	30	01-Aug-13	11-Sep-13
A1110	Diversion Channel Excation	215	215	08-Aug-13	30-Oct-14
A1190	Storm Sewer at CSAH 24	30	30	15-Aug-13	25-Sep-13
A1180	Place Topsoil - All Areas	90	90	27-Jun-14	30-Oct-14
A1100	Inspection Trench	15	15	01-Aug-14	21-Aug-14
A1220	Impervious Fill Placement	15	15	22-Aug-14	11-Sep-14
A1170	Spoil Pile Grading	20	20	12-Sep-14	09-Oct-14
A1250	Trail Head Parking	20	20	12-Sep-14	09-Oct-14
A1210	Restriction Structure Construction	47	47	10-Oct-14	13-May-15
A1200	Inlet Structure Excavation & Construction	75	75	31-Oct-14	13-Jul-15
A1260	Landscaping	60	60	31-Oct-14	22-Jun-15
A1230	Site Furnishings	15	15	07-Jul-15	27-Jul-15
A1240	Construct Multi-Use Trail	20	20	14-Jul-15	10-Aug-15
A1270	Reach 1 Complete	0	0	28-Jul-15	28-Jul-15



Actual Work | Critical Remaining ... | Remaining Work | Milestone

TASK filter: Normal.

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WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For

Roseau Flood Damage Reduction Project
902 Calculations

The Roseau Flood Damage Reduction Project (902 check), as presented by St Paul District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of July 31, 2012, the Cost MCX certifies the estimated total project cost of:

FY 2013 Price Level: $41,864,000 including spent costs
Fully Funded Amount: $42,600,000 including spent costs

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

Glenn R. Matlock

Glenn R. Matlock, PE, CCE
Chief, Cost Engineering
Walla Walla District

US Army Corps of Engineers®

Date 7-31-12

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST ($K) C	CNTG ($K) D	CNTG (%) E	TOTAL ($K) F	ESC (%) G	COST ($K) H	CNTG ($K) I	TOTAL ($K) J	Spent Thru: 1-Oct-11 ($K) K	L	COST ($K) M	CNTG ($K) N	FULL ($K) O
02	RELOCATIONS	$4,585	$125	3%	$4,710	0.0%	$4,585	$125	$4,710	$0		$4,585	$125	$4,710
09	CHANNELS & CANALS	$14,681	$1,942	13%	$16,623	1.1%	$14,833	$1,967	$16,800	$0		$15,187	$2,026	$17,213
11	LEVEES & FLOODWALLS	$6,088	$597	10%	$6,685	0.0%	$6,089	$597	$6,686	$0		$6,090	$597	$6,688
14	RECREATION FACILITIES	$2,564	$274	11%	$2,838	0.5%	$2,576	$276	$2,853	$0		$2,604	$281	$2,886
	#N/A	$0	$0 -		$0	-	$0	$0	$0	$0		$0	$0	$0
	CONSTRUCTION ESTIMATE TOTALS:	$27,918	$2,938		$30,856	0.6%	$28,082	$2,966	$31,048	$0		$28,467	$3,030	$31,497
01	LANDS AND DAMAGES	$2,763	$77	3%	$2,840	0.0%	$2,763	$77	$2,840	$0		$2,763	$77	$2,840
30	PLANNING, ENGINEERING & DESIGN	$5,521	$126	2%	$5,647	0.0%	$5,521	$126	$5,647	$0		$5,619	$137	$5,757
31	CONSTRUCTION MANAGEMENT	$2,043	$286	14%	$2,329	0.0%	$2,043	$286	$2,329	$0		$2,195	$312	$2,507
	PROJECT COST TOTALS:	$38,245	$3,427	9%	$41,672		$38,409	$3,455	**$41,864**	$0		$39,044	$3,556	$42,600

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CHIEF, COST ENGINEERING, James Sentz

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PROJECT MANAGER, Paul Kosterman

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ESTIMATED FEDERAL COST: **58%** **$24,708**
ESTIMATED NON-FEDERAL COST: **42%** **$17,892**
ESTIMATED TOTAL PROJECT COST: **$42,600**

O&M OUTSIDE OF TOTAL PROJECT COST:

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

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.
This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Jul-12 Effective Price Level: 1-Oct-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Reach 2A (In Construction - 97% Complete)													
02	RELOCATIONS	$4,585	$125	3%	$4,710	0.0%	$4,585	$125	$4,710	2013Q1	0.0%	$4,585	$125	$4,710
09	CHANNELS & CANALS	$1,418	$71	5%	$1,489	0.0%	$1,418	$71	$1,489	2013Q1	0.0%	$1,418	$71	$1,489
11	LEVEES & FLOODWALLS	$290	$15	5%	$305	0.0%	$290	$15	$305	2013Q1	0.0%	$290	$15	$305
14	RECREATION FACILITIES	$509	$25	5%	$534	0.0%	$509	$25	$534	2013Q1	0.0%	$509	$25	$534
	#N/A		$0	5%	$0	0.0%	$0 $0	$0	$0	0	0.0%	$0	$0	$0
	CONSTRUCTION ESTIMATE TOTALS:	$6,802	$236	3%	**$7,038**		$6,802	$236	$7,038			$6,802	$236	$7,038
01	LANDS AND DAMAGES	$2,763	$77	3%	$2,840	0.0%	$2,763	$77	$2,840	2013Q1	0.0%	$2,763	$77	$2,840
30	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design (Sunk Costs)	$4,423	$0	0%	$4,423	0.0%	$4,423	$0	$4,423	2013Q1	0.0%	$4,423	$0	$4,423
31	CONSTRUCTION MANAGEMENT													
	Construction Management (Sunk Costs)	$341	$0	0%	$341	0.0%	$341	$0	$341	2013Q1	0.0%	$341	$0	$341
	CONTRACT COST TOTALS:	$14,329	$313		**$14,642**		$14,329	$313	$14,642			$14,329	$313	**$14,642**

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

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.
This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Jul-12 Effective Price Level: 1-Oct-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Reach 2B/2C - Under Construction - 20% complete													
02	RELOCATIONS	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
09	CHANNELS & CANALS	$5,096	$510	10%	$5,606	0.0%	$5,096	$510	$5,606	2013Q1	0.0%	$5,096	$510	$5,606
11	LEVEES & FLOODWALLS	$5,760	$576	10%	$6,336	0.0%	$5,760	$576	$6,336	2013Q1	0.0%	$5,760	$576	$6,336
14	RECREATION FACILITIES	$1,403	$140	10%	$1,543	0.0%	$1,403	$140	$1,543	2013Q1	0.0%	$1,403	$140	$1,543
	CONSTRUCTION ESTIMATE TOTALS:	$12,259	$1,226	10%	**$13,485**		$12,259	$1,226	$13,485			$12,259	$1,226	$13,485
01	LANDS AND DAMAGES	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design	$0	$0	10%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	Sunk PED shown in Reach 2A													
	Remaining PED shown inReach 1													
31	CONSTRUCTION MANAGEMENT													
	Construction Management	$0	$0	10%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
	Sunk CM shown in Reach 1													
	Remaining CM shown inReach 1													
	CONTRACT COST TOTALS:	$12,259	$1,226		**$13,485**		$12,259	$1,226	$13,485			$12,259	$1,226	**$13,485**

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

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

PROJECT: Roseau Flood Damage Reduction Project
LOCATION: Roseau, MN.
This Estimate reflects the scope and schedule in report; Roseau Post Authorization Change - July 2012

DISTRICT: CEMVP PREPARED: 7/30/2012
POC: CHIEF, COST ENGINEERING, James Sentz

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Doller Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 15-Jul-12 Effective Price Level: 1-Oct-11				Program Year (Budget EC): 2013 Effective Price Level Date: 1 OCT 12								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	Reach 1 (95% P&S complete)													
02	RELOCATIONS	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
09	CHANNELS & CANALS	$8,167	$1,361	17%	$9,528	1.9%	$8,319	$1,387	$9,705	2015Q3	4.3%	$8,673	$1,446	$10,119
11	LEVEES & FLOODWALLS	$38	$6	17%	$44	1.9%	$39	$6	$45	2015Q3	4.3%	$40	$7	$47
14	RECREATION FACILITIES	$652	$109	17%	$761	1.9%	$664	$111	$775	2015Q3	4.3%	$692	$115	$808
	CONSTRUCTION ESTIMATE TOTALS:	$8,857	$1,476	17%	**$10,333**		$9,021	$1,504	$10,525			$9,406	$1,568	$10,974
01	LANDS AND DAMAGES	$0	$0	0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
30	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design (E&D is Q1 2013$)	$1,098	$126	11%	$1,224		$1,098	$126	$1,224	2015Q3	9.0%	$1,196	$137	$1,334
31	CONSTRUCTION MANAGEMENT													
	Construction Management (CM is Q1 2013 $)	$1,702	$286	17%	$1,988		$1,702	$286	$1,988	2015Q3	9.0%	$1,854	$312	$2,166
	CONTRACT COST TOTALS:	$11,657	$1,888		**$13,545**		$11,821	$1,916	$13,737			$12,456	$2,017	**$14,473**

Filename: Roseau Flood Damage Reduction TPCS_TPCS_July2012.xlsx
TPCS

Appendix B

Level II Economic Update

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Level II Economic Update

Flood Damage Reduction Project at Roseau, Minnesota - Roseau River - Water Resources Development Act 2007

July 2012

US Army Corps of Engineers ®

Prepared by:
U.S. Army Corps of Engineers
St. Paul District
180 Fifth Street East, Suite 700
St. Paul, Minnesota 55101-1678

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1. Introduction

In 2006, the Chief of Engineers approved the Feasibility Report and Environmental Assessment for the Flood Damage Reduction Project at Roseau, Minnesota (referred to as "the Feasibility Report"). The Water Resources Development Act of 2007 (WRDA '07) authorized the recommended project for construction, and the Corps of Engineers began design and construction shortly thereafter. The project consists of a 150 foot wide diversion channel and tieback levees on the east side of Roseau.

The purpose of this study is to review and update the Feasibility Report in accordance with Engineer Regulation 11-2-200 and Mississippi Valley Division's Draft Final Methodology for Conducting Economic Updates, January 2011

A more detailed description of the project and study area can be found in the Feasibility Report.

2. Review of Key Planning Assumptions

2.1. Population Growth

The Feasibility Report shows that Roseau County's population was approximately 16,000 in 2005, and predicted that the population would double by the year 2055. According to the US Census Bureau, the county population in 2010 was 15,629. Although, the recent trend in the county has been a decrease in population, it is not clear whether the prediction of growth is accurate or not.

2.2. Land Use

The Feasibility Report assumed that land use would remain the same throughout the period of analysis, with a predominance of agricultural land in the study area. In order to check this assumption, orthogonal photography from the US Farm Agency's National Agriculture Imagery Program (NAIP) was reviewed for the years 2003 and 2009. Comparing both sets of imagery, land use was largely unchanged over the course of six years, with some minor development of commercial and residential land.

2.3. National Flood Insurance Program

The City of Roseau has remained compliant with National Flood Insurance Program requirements. Comparison of NAIP photographs shows that approximately 23 structures were constructed between 2003 and 2009. None of these structures appear to be below the base flood elevation. The Federal Emergency Management Agency (FEMA) indicated that there are currently 412 flood insurance policies in place in the City of Roseau. That is 13 fewer policies than were in place at the time of the Feasibility Report.

2.4. Constant Expected Annual Damage

The Feasibility Report assumed that Expected Annual Damage (EAD) would remain constant over the period of analysis. It was assumed that a decrease in EAD due to buyouts would be offset by an increase in EAD due to future development. This assumption also implies that structures would be maintained in the same condition as they were at the time of the Feasibility Report, that the use of structures would be unchanged, and that the content value of structures would remain unchanged.

Upon review of the NAIP photography, there appear to be 23 new structures in the study area, and 16 structures that have been removed. Most of the new structures are residential or apartment types, with two that appear to be commercial. The removed structures are all residential, except for one that is commercial. Of the 16 removed structures, 5 were below the median 1% flood elevation.

New structures were assigned a ground elevation using LiDAR data (2008 Red River Basin Mapping Initiative). None of the new structures appear to be below the median 1% flood elevation.

Given the quantity and elevations of the new and removed structures, it is reasonable to assume that development has offset buyouts.

Structure use, condition, and contents are discussed in section 3.3 of this report.

2.5. Other Planning Assumptions

The Feasibility Report estimated damages with the assumptions that emergency measures were reliable to some degree, and that three internal drainage projects (West Intercept, West Side Storm Water System, and East Side Storm Water Protection) would come online in the future. These assumptions appear to remain valid; however they were not subject to in depth review.

3. Update of Existing and Future Conditions

3.1. Hydrology

The median 1% flood discharge was estimated at 10,860 cfs in the Feasibility Report. The associated flow-frequency curve remains the latest hydrologic work on the Roseau River at Roseau. No major floods have occurred since the report was completed, and it is assumed that the flow-frequency curve at Roseau remains valid.

3.2. Hydraulics

A steady state hydraulic model was developed for the Feasibility Study. This model has continued to be refined throughout design of the project; however no significant changes have been made for planning purposes. Water surface elevation changes between the feasibility and plans and specs modeling are generally less than 0.1 feet for the existing and project conditions (1, 0.5, and 0.2 percent events). The model remains the most up to date hydraulic model available, and no significant changes to river geometry have occurred.

3.3. Economic Conditions

3.3.1. Structure and Content Damage

The total number of structures inventoried in the Feasibility Report was 1,221. Since then, 23 structures have been added and 16 have been removed, for a net change of 7 additional structures. This amounts to less than 1% of the structure inventory. The small change in the structure inventory is assumed to have no significant bearing on the level of flood damages and benefits.

The price level of the damages in the Feasibility report is October 2006. The Feasibility Report used the Marshal and Swift Estimator program to determine depreciated replacement values of structures. Since that time, inflationary changes in depreciated replacement values have occurred. For the economic update, a sample of 3 structures from the inventory was selected to update the remaining inventory. Due to extremely limited data (detailed information for structures was not retained since the Feasibility Report), re-sampling a large number of structures was not possible. Replacement costs for each structure increased by between 29% and 54% since the time of the report. On average, replacement costs increased by 40%. In order to make a conservative estimate, an adjustment factor of 29% was used to update replacement costs of for the remaining structures in the study area.

It was not possible to perform a site visit to determine how structure conditions (depreciation and improvements) have changed. The replacement cost of structures has increased by 29% since 2006, however this does not give an indication of non-inflationary changes in structure values (how structures have been maintained, whether there have been major improvements to structures, whether certain components have been replaced with lower quality components, etc). A call was made to the local Assessor's office to discuss the conditions and maintenance of structures. The assessor indicated that structures have been well maintained, and that fair market values have remained constant. The assessor believed that fair market values would have been higher than in 2006, had it not been for a slow economy over the last six years.

In addition to talking with the assessor, real income in Roseau County was analyzed for the years 2000 through 2010. In general, a decrease in real income would leave residents with fewer resources to maintain and improve their homes, while an increase in real income would have the opposite effect. A significant change in population would affect the level of demand for housing, places of business, etc., and would therefore have an effect on the ability to maintain and improve existing structures.

As discussed in section 2.1, the population of Roseau County has not changed dramatically. According to the US Census Bureau, median household income in the county was $39,852 in the year 2000, and $49,400 in the year 2010. Using the Consumer Price Index (All Urban Consumers-Annual series), the median income in the year 2000 is approximately $50,500 in 2010 dollars. That means that real income in Roseau County has decreased by $1,100 (2010 dollars), or 2.2%, in the interval between the years 2000 and 2010.

It was decided that since real income has decreased only slightly in the study area, and that the assessor believed that structures have been well maintained, no adjustment would be made for the level of depreciation present in structures in the study area. Therefore, an adjustment factor of 29% was used to update depreciated replacement costs

The value of contents is generally correlated with the value of structures. The feasibility report assumed that content values were approximately 50% of depreciated replacement costs. Since real income has not changed dramatically since the Feasibility Report, there is no evidence to suggest that the content-to-structure value ratios would have changed.

3.3.2. Vehicle Damage

In order to update vehicle damages, the Consumer Price Index (CPI) for New and Used Motor Vehicles (Unadjusted, US City Average) was used. The current CPI (March 2012) is 100.398, and the October 2004 CPI is 94.7. Therefore, the vehicle damage category will be adjusted upwards by 6%.

3.3.3. Household Relocation Costs

Household relocation costs are those associated with the temporary displacement of residents who have been evacuated due to flooding. The CPI's Rent of Primary Residence (unadjusted) was used to inflate household relocation costs to current dollars. Since the hydrology and hydraulic analyses have not changed since the Feasibility Report, it is unlikely there have been any non-inflationary changes in this damage category. For October of 2004, the CPI was 212.8 and for March 2012 it was 258.568. This is a 21.5% increase.

3.3.4. Infrastructure and Emergency Damage

Damage to infrastructure and costs associated with emergency efforts are largely comprised of construction components. Consequently, it is appropriate to use the Civil Works Construction Cost Index System (CWCCIS) in order to determine current damages. Since the hydrology and hydraulic analyses have not changed since the Feasibility Report, it is unlikely there have been any non-inflationary changes in infrastructure and emergency damages. The CWCCIS Composite index for the first quarter of 2005 is 599.22, and for the second quarter of 2012 is 752.00. Therefore, the increase in this damage category is 25.5%.

3.3.5. Expected Annual Damage

The table below shows the updated expected annual damage for each category.

Equiv. Expected Annual Damage - Roseau without project			
Damage Category	Damage from Feasibility Report (October 2004)	Adjustment Factor	Damage at Current Price Levels (FY 13)
Residential	$781,630	29.0%	$1,008,300
Commercial/Industrial/Public	$1,319,570	29.0%	$1,702,200
Automobile	$10,850	6.0%	$11,500
Household Temporary Relocation	$82,500	21.5%	$100,300
Infrastructure/Emergency Response	$240,400	25.5%	$301,700
Total (percentage is composite of all)	$2,434,950	28.30%	$3,124,000

4. NED Benefits and Costs

4.1. Benefit Summary

4.1.1. Flood Risk Management Benefits

It is likely that benefits have increased proportionally with expected annual damages. Therefore, the same factors were used to adjust benefits. The table below summarizes expected annual benefits for the recommended plan.

Equiv. Expected Annual Benefits - Roseau 150' Bottom Width East Diversion Channel - Locally Preferred Plan			
Damage Category	Benefits from Feasibility Report (October 2004)	Adjustment Factor	Benefits at Current Price Levels (FY 13)
Residential	$580,800	29.0%	$749,200
Commercial/Industrial/Public	$1,227,700	29.0%	$1,583,700
Automobile	$8,200	6.0%	$8,700
Household Temporary Relocation	$65,100	21.5%	$79,100
Infrastructure/Emergency Response	$240,370	25.5%	$301,700
Total (percentage is composite of all)	$2,122,170	28.28%	$2,722,400

4.1.2. Recreation Benefits

The project recreation benefits were update by applying the unit day values from Economic Guidance Memorandum, 12-03 (dated Jan 27 2012) to the recreation analysis from the Feasibility Report. The table below shows the recreation points assigned to each category from the Feasibility Report, as well as the unit day values from 2006 and 2012.

Criteria (and maximum points)		Activity								
		Walking	Canoeing	Picnicking	Nature Study	Fishing	Bicycling	Snowmobile	XC Skiing	ATV
Recreation Experience (30)		23	20	17	17	20	25	15	20	20
Availability (18)		15	6	4	10	6	15	6	6	15
Carrying Capacity (14)		10	8	10	5	5	11	5	8	10
Accessibility (18)		18	18	12	15	10	18	15	15	18
Environmental Quality (20)		10	10	15	6	12	10	12	10	10
Total Points Assigned (100)		76	62	58	53	53	79	53	59	73
UNIT DAY VALUES (2006)		$7.79	$6.93	$6.68	$6.37	$6.37	$7.98	$6.37	$6.74	$7.61
UNIT DAY VALUES (2012)		$10.01	$8.61	$8.61	$7.91	$8.61	$10.01	$7.91	$8.61	$9.08
Recreational Needs Met by Project (annual user-days)		50,012	3,221	8,229	4,207	16,246	44,328	70,280	13,104	70,280
Recreation Benefits (2012)		$500,600	$27,700	$70,900	$33,300	$139,900	$443,700	$555,900	$112,800	$638,100
Total	$2,522,900									

Applying the unit day values from 2012 to the recreational needs met by the project, the average annual recreation benefits for the project are estimated to be $2,522,900 in 2012 dollars (compared to $2,011,000 from the Feasibility Report).

4.1.3. Flood Insurance Administrative Cost Savings

The Feasibility report indicated that there were 425 flood insurance policies in place in Roseau, with an administrative cost of $163 per policy. The FEMA Region V office indicated that there are currently 412 policies in the city of Roseau. The most recent guidance places the administrative cost of each policy at $192 annually (Economic Guidance Memorandum 06-04). Therefore, current administrative cost savings are $79,104 annually.

4.2. Implementation, Interest during Construction, Operation & Maintenance Costs

The current estimate of implementation cost is $41,200,000. The project was initially authorized for $25,100,000. The estimate has changed considerably due to unforeseen engineering issues

that were discovered during PED. One issue was that the top soil in the diversion footprint proved to be thicker than initially thought.

Average annual costs, interest during construction, and operation and maintenance costs are presented in section 4.3 at the current, applicable, and standard discount rates.

4.3. Benefit-Cost Ratios

The following tables provide a summary of current benefits and costs, and include a calculation of benefit-cost ratios at the current (4% for Fiscal Year 2012), applicable (5-1/8% at the time of authorization), and standard (7%) interest rates. Also included is the remaining benefit-remaining cost ratio at the standard rate.

Roseau, Minnesota - Roseau River

BCR - Benefit Cost Ratio - Current Rate

Price Level of Last Approved Report	FY 13 1st Quarter
CWCCIS Composite Index	785.16
Price Level of Current Cost Est.	FY 13 1st Quarter
CWCCIS Composite Index	785.16
Cost Deflation Factor	1

	Federal	Non-Federal	Total	*Change from Feasibility*
Installation Costs (Current)	$24,320	$17,544	$41,864	*$17,447*
IDC (Current)	$1,998	$1,441	$3,439	*$2,180*
Investment Cost (Current)	$26,318	$18,985	$45,303	*$19,627*
Investment Cost (Deflated to Last Approved)	$26,318	$18,985	$45,303	*N/A*
Annual Investment - Amortization	$526	$380	$906	*N/A*
Annual Investment - Interest	$699	$504	$1,203	*N/A*
Annual O&M Cost	$0	$114	$114	*$46*
Total Annual Cost	$1,225	$997	$2,223	*$721*
FRM Equiv. Expected Annual Benefit	-	-	$2,722	*$527*
Flood Insurance Adminstrative Cost Saving	-	-	$79	*$9*
Recreation	-	-	$2,523	*$448*
Total Equiv. Avg. Annual Benefit	-	-	$5,324	*$984*
Net Benefit	-	-	$3,102	*$263*
BCR (without Recreation)	-	-	1.26	*-0.37*
BCR	-	-	2.40	*-0.49*

Equiv. Expected Annual Damage = $3,124
Discount Rate = 4.000%

1. Costs and Benefits are given in $1,000's
2. Assumes a 50 year period of analysis
3. Assumes a 3 year period of construction

Roseau, Minnesota - Roseau River

BCR - Benefit Cost Ratio - Applicable Rate

Price Level of Last Approved Report	FY 13 1st Quarter
CWCCIS Composite Index	785.16
Price Level of Current Cost Est.	FY 13 1st Quarter
CWCCIS Composite Index	785.16
Cost Deflation Factor	1

	Federal	Non-Federal	Total	*Change from Feasibility*
Installation Costs (Current)	$24,320	$17,544	$41,864	*$17,447*
IDC (Current)	$2,579	$1,860	$4,440	*$3,181*
Investment Cost (Current)	$26,899	$19,404	$46,304	*$20,628*
Investment Cost (Deflated to Last Approved)	$26,899	$19,404	$46,304	*N/A*
Annual Investment - Amortization	$538	$388	$926	*N/A*
Annual Investment - Interest	$964	$695	$1,659	*N/A*
Annual O&M Cost	$0	$114	$114	*$46*
Total Annual Cost	$1,502	$1,197	$2,699	*$1,198*
FRM Equiv. Expected Annual Benefit	-	-	$2,722	*$527*
Flood Insurance Adminstrative Cost Saving	-	-	$79	*$9*
Recreation	-	-	$2,523	*$448*
Total Equiv. Avg. Annual Benefit	-	-	$5,324	*$984*
Net Benefit	-	-	$2,625	*-$213*
BCR (without Recreation)	-	-	1.04	*-0.59*
BCR	-	-	1.97	*-0.92*

Equiv. Expected Annual Damage = $3,124
Discount Rate = 5.125%

1. Costs and Benefits are given in $1,000's
2. Assumes a 50 year period of analysis
3. Assumes a 3 year period of construction

Roseau, Minnesota - Roseau River

BCR - Benefit Cost Ratio - Standard Rate

Price Level of Last Approved Report	FY 13 1st Quarter
CWCCIS Composite Index	785.16
Price Level of Current Cost Est.	FY 13 1st Quarter
CWCCIS Composite Index	785.16
Cost Deflation Factor	1

	Federal	Non-Federal	Total	*Change from Feasibility*
Installation Costs (Current)	$24,320	$17,544	$41,864	*$17,447*
IDC (Current)	$3,566	$2,573	$6,139	*$3,581*
Investment Cost (Current)	$27,886	$20,117	$48,003	*$21,028*
Investment Cost (Deflated to Last Approved)	$27,886	$20,117	$48,003	*N/A*
Annual Investment - Amortization	$558	$402	$960	*N/A*
Annual Investment - Interest	$1,463	$1,055	$2,518	*N/A*
Annual O&M Cost	$0	$114	$114	*$46*
Total Annual Cost	$2,021	$1,571	$3,592	*$1,570*
FRM Equiv. Expected Annual Benefit	-	-	$2,722	*$527*
Flood Insurance Adminstrative Cost Saving	-	-	$79	*$9*
Recreation	-	-	$2,523	*$448*
Total Equiv. Avg. Annual Benefit	-	-	$5,324	*$984*
Net Benefit	-	-	$1,732	*-$585*
BCR (without Recreation)	-	-	0.78	*-0.34*
BCR	-	-	1.48	*-0.66*

Equiv. Expected Annual Damage = $3,124
Discount Rate = 7.000%

1. Costs and Benefits are given in $1,000's
2. Assumes a 50 year period of analysis
3. Assumes a 3 year period of construction

Roseau, Minnesota - Roseau River

RBRCR - Remaining Benefit Remaining Cost Ratio - Standard Rate

Price Level of Last Approved Report	FY 12 1st Quarter
CWCCIS Composite Index	728.25
Price Level of Current Cost Est.	FY 12 1st Quarter
CWCCIS Composite Index	728.25
Cost Deflation Factor	1

	Federal	Non-Federal	Total
Installation Costs (Current)	$12,537	$6,751	$19,287
IDC (Current)	$1,838	$990	$2,828
Investment Cost (Current)	$14,375	$7,740	$22,116
Investment Cost (Deflated to Last Approved)	$14,375	$7,740	$22,116
Annual Investment - Amortization	$288	$155	$442
Annual Investment - Interest	$754	$406	$1,160
Annual O&M Cost	$0	$114	$114
Total Annual Cost	$1,042	$675	$1,716
FRM Equiv. Expected Annual Benefit	-	-	$2,722
Flood Insurance Adminstrative Cost Saving	-	-	$79
Recreation	-	-	$2,523
Total Equiv. Avg. Annual Benefit	-	-	$5,324
Net Benefit	-	-	$3,608
BCR (without Recreation)	-	-	1.63
BCR	-	-	3.10

Equiv. Expected Annual Damage = $3,124
Discount Rate = 7.000%

1. Costs and Benefits are given in $1,000's
2. Assumes a 50 year period of analysis
3. Assumes a 3 year period of construction

4.4. Section 902 of WRDA 1986

Table G-4 from Appendix G of ER 1105-2-100 is presented below for the Roseau project using the fully funded cost estimate. It is clear that the fully funded cost estimate exceeds the 902 maximum project cost. To date, expenditures have not exceeded the 902 maximum project cost.

Table G-4 (ER 1105-2-100 Appendix G)

MAXIMUM COST INCLUDING INFLATION THROUGH CONSTRUCTION

FY 13 - Thousands Dollars (000's)

Line 1		
a.	Current Project estimate at current price levels:	$41,864
b.	Current project estimate, inflated through construction:	$42,490
c.	Ratio: Line 1b / line 1a	1.0150
d.	Authorized cost at current price levels:	$27,715
	(Column (h) plus (i) from table G-3)	
e.	Authorized cost, inflated through construction:	$28,129
	(Line c x Line d)	
Line 2	Cost of modifications required by law:	$0
Line 3	20 percent of authorized cost:	$5,020
	.20 x (table G-3, columns (f) + (g)	
Line 4	Maximum cost limited by section 902:	$33,149
	Line 1e + line 2 + line 3	

Appendix C

Authorized Project Description

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Detailed Description of the Proposed Project

NED Plan and LPP Features

The optimized east diversion plan defined in the final screening has had additional design, resulting in more accurate costs, and has been assessed from an environmental perspective in the final phase of the feasibility study plan formulation. The NED and recommended LPP are presented in figures 3 and 4 (see plates 1a through 5a in the plan plates section of this report for the LPP and plates 6 through 10 for the NED plan). The proposed alignment was determined by using engineering expertise along with public and agency inputs. The proposed alignment would meet the goals of the project, minimize environmental and social impacts, and adequately protect the city from future floods.

The east diversion plan, referred to as the NED plan, is a multipurpose flood damage reduction project with associated recreational features (figure 4). The flood damage reduction portion would provide permanent flood protection for nearly all areas of Roseau, while the recreation portion would benefit the city and surrounding area by providing numerous recreational activities and tying into other recreational features in the region. The plan includes plantings of native tree, shrub, and grass species that would be used throughout the project features, which would consist of a permanent diversion channel to the east of the city. This plan would remove a substantial portion of Roseau from the 100-year regulatory floodplain and would also significantly reduce flood stages as far upstream as Malung dam. Because the NED plan is a diversion and not a levee system, the consequences of an overtopping would not be catastrophic, but nonetheless a threat, and the non-Federal sponsor would need to continue to be proactive in its measures to prevent future flooding. The alignment chosen would provide the city the ability to implement future flood fighting measures in case of a very infrequent flood event that would exceed the design capacity of the permanent project. The city has requested that the recommended plan include two large storage areas to eliminate any downstream stage increases as a result of the project. Therefore, the recommended plan is the east diversion channel with storage areas. This plan, described below, would function the same as the NED plan providing the same benefits with the city of Roseau paying the additional costs.

The recommended plan would divert the waters of the Roseau River to the 4.5-mile diversion running parallel and to the east of the Roseau River. The diversion channel would split from the river at the city park flowing north until returning to the river just upstream from the confluence of the river and Hay Creek. The entrance to the diversion would be set to elevation 1042.0 feet, roughly equivalent to the 2-year channel-forming event. Higher inlet elevations will be analyzed during the design phase in an attempt to minimize potential impacts to the river. Splitting the flows would decrease the amount of water being carried in the main channel. To provide more efficient use of the diversion channel, a restriction bridge, as it is being called, would begin to restrict the flows on the main channel of the river at the 5-year flood event (20-percent exceedance frequency). The channel would have a bottom width of 150 feet and 1V:5H side slopes. The channel invert would drop approximately 1 foot on a slope of 0.000256 from the channel entrance to the railroad bridge, located approximately 1 mile down the diversion channel. The channel bottom would be horizontal from this location to the point where it would begin a descent toward the confluence with the Roseau River, a distance of about 1,000 feet.

During this distance, the depth of the diversion would go from 16 feet to areas where no channel cut is needed.

The channel would be formed by excavating into the existing topography. Upstream of Highway 11, the channel would be cut as much as 16 feet below the existing ground. From Highway 11 north, the channel cut would become increasingly shallow as the channel invert elevation approaches the land surface elevations. The bottom width of the channel would be a constant 150 feet, truncating to 125 feet at the bridges, but the top width would vary between 300 and 150 feet depending on the elevation of the adjacent land areas. In the reaches of the diversion corridor north of Highway 11, the flow would transition from flow in a channel to overland floodplain flow. In this section of the corridor, the flow would be confined within a floodplain corridor by diversion levees as described below. Just downstream of the northern end of the wastewater treatment plant, the confined channel would disappear and the water would be free to spread across the terrain. On the northern edge of this area, adjacent to the Roseau River, a sloped (0.01V:1.0H), 150-foot-wide, 1,000-foot-long, grass-lined channel would be constructed to allow the water from the diversion channel to re-enter the river. The channel dimensions for this segment are 1V:3.5H side slopes with a bottom width of 150 feet. Surplus material excavated in the construction of the diversion channel would be spread on adjacent farm fields at the southern (upstream) end of the diversion. Approximately 120 acres covered to a depth of 4.5 feet would be needed to dispose of the material, which would be shaped and vegetated to accommodate recreation activities, among others.

Approximately 9 miles of diversion levees would be constructed to the east and west of the diversion channel to ensure containment of the diversion flows. The levees would be 10 feet wide at the top, would have a 1V:3H side slope and would cover 48 acres including 11 acres of road raises. The levee east of the diversion channel would ensure that properties to the east would not be adversely affected by the project. The east diversion levee would extend to the north and east from Highway 11. The first segment would end at County Road 28, which would tie into high ground to the south. The second segment of levee would begin near the airport, 1 mile to the east. This levee would encompass the largest of the storage cells (see below). The levee would extend north along Township Road 338, then west for 1 mile and then north again. This portion of the levee would block the diversion flows from entering Hay Creek. The levee would end at the Roseau River just downstream of its confluence with Hay Creek.

The levee west of the diversion channel would prevent the water in the channel from flowing back toward the main river channel north of the city and would maintain the flow parallel to the river within the floodway. This levee also would prevent diversion flows from backing into town. It would begin near Highway 11 and continue generally to the north to the high ground above the Roseau River bank about 1 river mile upstream of the confluence with Hay Creek. The area between the two diversion levees would encompass the diversion corridor as well as the storage cells (see below).

Three wooded areas are along the length of the diversion channel and levees. Trees within the footprint of these structures would be removed. Upon completion of construction, these areas would be seeded with native grasses. Trees would be planted at various locations along the floodway and buffer areas outside of the channels. A substantial amount of the storage and floodway area could be managed for environmental enhancement purposes. Local, State and Federal natural resource agencies would be coordinated with in future project design phases to determine the preferred vegetative species and management practices to use.

Bridges are also proposed to cross the diversion channel at County Road 24, the railroad

tracks, and Highway 11. Abutments of these bridges would be armored with rock. Downstream of Highway 11, a Texas crossing with box culverts would be installed. This crossing would not interrupt flow in the area nor change the post-construction land use. Two roads would be used as is, or slightly raised, as levees for the storage areas. Minimal changes in structure or size would be expected. Highway traffic bypass during construction would be handled with detours rather than construction.

To increase the efficiency of the diversion channel and add additional protection for the downstream community, a restriction bridge would be constructed just downstream from the entrance to the diversion channel. This restriction would raise the water in the channel, thereby increasing the energy available to drive water through the diversion channel. The proposed structure would be similar to a roadway bridge abutment with a 16-foot-wide bridge deck. The flanks of the restriction would extend across the valley at elevation 1053.5. The gap left by the opening would have a width of 100 feet and a bottom elevation of 1030.0. The structure would not begin to affect existing flow conditions until approximately the 5-year flood event. The head losses at the structure for various year events are presented below.

Head Loss at River Restriction Bridge

Year Event	2- Year	5-Year	10-Year	20-Year	50-Year	100-Year
Head loss	0.01 foot	0.02 foot	0.10 foot	0.17 foot	0.27 foot	0.38 foot

Rock protection would be placed in the existing river channel from just upstream of the structure to approximately 50 feet downstream from the structure. Sufficient existing substrate material would be removed to allow for the placement of the rock riprap protection while still maintaining the existing river bathymetry. The resulting river stages upstream of the entrance to the diversion channel for any flow would be lower than existing conditions because of the water being diverted into the diversion channel.

The presence of the diversion channel alone would slightly increase the hydrograph of the Roseau River during high flood events downstream of the confluence of the channel and river. To maintain the existing hydrograph, additional storage/ponding areas have been added to the alternative plan, as requested by the non-Federal sponsor. The storage areas would be located on either side of the 1,000-foot-wide diversion corridor north of Highway 11. These storage areas would be inside the main levees described above but isolated from the diversion channel by an additional set of lower, intermediate levees. Land within the storage levees would remain dry for all but large floods. During floods, beginning at the 20-year frequency, discharges would reach the height of an earthen, rock protected spillway at the upstream end of the storage levee and a portion of the flow would spill into the storage areas. This water would collect in the levee-bound areas until river stages had receded enough so that the water could be released through rock-protected control structures in the levees. The peak stage downstream of the project would be unchanged with the addition of storage cells.

The project would not have any adverse effects outside the immediate project area and would have minimal adverse effects on natural resources in the area. The project alignment has been designed to avoid disturbance of natural resources as much as possible. All areas disturbed during construction would be planted with native vegetative species, and opportunities to establish additional natural habitat would be explored. Such opportunities are likely to be successful given the amount of previously farmed land that would become part of the project area. Cultural resources have been previously found in the area; a survey would be conducted and, if any cultural resources were found, the project would be modified to avoid them if possible. If avoidance was not possible, the resource loss would be mitigated. The project has

been designed to minimize adverse effects, and this effort would continue during preparation of plans and specifications.

The proposed recreation features would include multipurpose trails for pedestrians and bicycles that would use the project corridor for a total length of approximately 7 miles. These trails would be either paved or constructed of compacted gravel. During the winter, cross-country skiers and snowshoe enthusiasts would use these trails. Off-road vehicle trails are also included in the design to take advantage of the local recreational pastime and prevalence of off-road vehicles due to the Polaris facility which produces snowmobiles and all-terrain vehicles. These trails would be separate from the other trails and would be nearly 9 miles long. See figure 5 for a visual on the proposed recreation plan.

The recreation plan includes a trailhead that would include restrooms, potable water, picnic facilities, and parking. Additional aesthetic features would consist of 5 acres of hardwood plantings and 25 acres of saplings along the trails to act as buffers.

During the planning process, the east diversion plan was refined with inputs from the public, sponsors, stakeholders, and affected landowners and became a multifeatured east diversion plan with storage areas and recreational components. Components of the LPP and NED plan are summarized below (see the cost engineering, plan plates, recreation, and environmental assessment appendixes for additional details regarding project features).

Table 5 contains a list of the project features and environmental effects listed incrementally for the NED and LPP. The LPP would affect 9.71 acres of wetlands, 1,200 square feet of riparian habitat, and 11.75 acres of woodlands. The project area, which includes an area 1 mile on either side of the structural features, consists of developed urban area and active farmland. The project area contains 721 acres of woodlands and 136 acres of riparian habitat. The immediate project area contains approximately 32.83 acres of wetlands.

The wetlands in the immediate project area are small and disconnected by roads or agricultural fields, offering limited habitat value. Compensatory mitigation is not necessary for this project; however, construction of the project would create wetland habitat incidental to the project. It is anticipated that the project would have be no appreciable effect on the riparian habitat within the project area and that the rocky area would quickly repopulate with benthic organisms and the presence of the rock would increase habitat diversity in this reach of the river. Because 721 acres of woodlands are in the project area, the removal of 11.75 acres of woodlands and replacement planting of 30 acres of woodlands for the recreational features would have no appreciable effect.

Table 5.

Feature	NED	LPP	Total
Acres of Land	763	1089	1852
Miles of Levee	5.1	4.1	9.2
Miles of Road Raise	0.51	0.69	1.2
Spoil Areas	129	-9	120
Gated Culverts	2	0	2
Spillways for storage	0	4	4
Highway Bridges	2	0	2
Railroad Bridges	1	0	1
Restriction Bridge	1	0	1
Diversion Length, Miles	4.5	0	4.5
Inlet Control Structure	1	0	1
Affected Wetlands Acres	8.25	1.46	9.71
Affected Riparian Square Feet	1200	0	1200
Affected Woodland Acres	11.75	0	11.75
Native Plantings, Acres	200	0	200
Tree Plantings (Recreation) Acres	30	0	30

NED Plan Features

- Approximately 4.5 miles of diversion channel (ranging from a maximum depth of 16 feet to areas where no channel cut is needed, with a bottom width of 150 feet and 1V:5H side slopes).
- 129 acres of disposal stockpiles with a depth of approximately 4.5 feet to match levee heights and blend into the naturally flat landscape in the area.
- 763 acres of land acquisition.
- Approximately 5.1 miles of levees used to contain flows within the diversion channel. These levees would have a top width of 10 feet with 1V:3H side slopes. The majority would have a height of less than 5 feet.
- 0.51 mile of road raises ranging from 2 to 4 feet.
- Two gated culverts for maintaining drainage during nonevents.
- An inlet control structure to regulate the events that would pass into the diversion channel, beginning with 2-year frequency events.
- A restriction structure to increase the efficiency of the diversion channel. This structure would be 16 feet wide and 100 feet long. It would begin to restrict flows at the 5-year event (20-percent exceedance frequency).
- Construction of three bridges (two associated with roads crossing the diversion and one railroad bridge crossing the diversion).
- Relocations of electrical, sewer, gas, and telephone infrastructure.

- Riprap at various locations to protect the levees and diversion structures from erosion.
- 8.25 acres of affected wetlands.
- Approximately 200 acres of native plantings to provide ground cover in the project area.
- Lower driveway (0.6 foot) on west side of river to maintain existing breakout flows.

LPP Features (Changes to NED Plan)

- Approximately 4.1 miles of additional levees used to contain peak flows within the storage areas. These levees would have a top width of 10 feet with 1V:3H side slopes. The majority would be less than 5 feet, the highest would be 15 feet.
- Approximately 5.1 miles of reduced levee heights; the reduction would vary from 2 to 5 feet (see NED plan features above).
- 1,089 acres of additional land acquisition for storage areas and associated levees.
- 0.69 mile of additional road raises ranging from 2 to 4 feet.
- 9.0-acre reduction in disposal stockpiles; the material would be used in levee construction.
- Four additional spillways along the levee system to allow for peak flow storage.
- 1.46 additional acres of affected wetlands.

Recreation Plan Features

- Three multipurpose recreational trail loops combining for a total of approximately 7 miles of paved or compacted gravel trails.
- 4.3 miles of canoe trails in two segments, the north being 1.3 miles and the south 3 miles.
- One scenic overlook, two interpretative sites, and birding stations.
- A total of 9 miles of off-road vehicle trails of different levels of difficulty.
- Restrooms, potable water, picnic facilities, grills, and parking at the off-road vehicle trailhead where the project intersects with Highway 11.
- 5 acres of hardwood planting for trail head and park areas.
- Planting of 25 acres of wooded areas near trails.

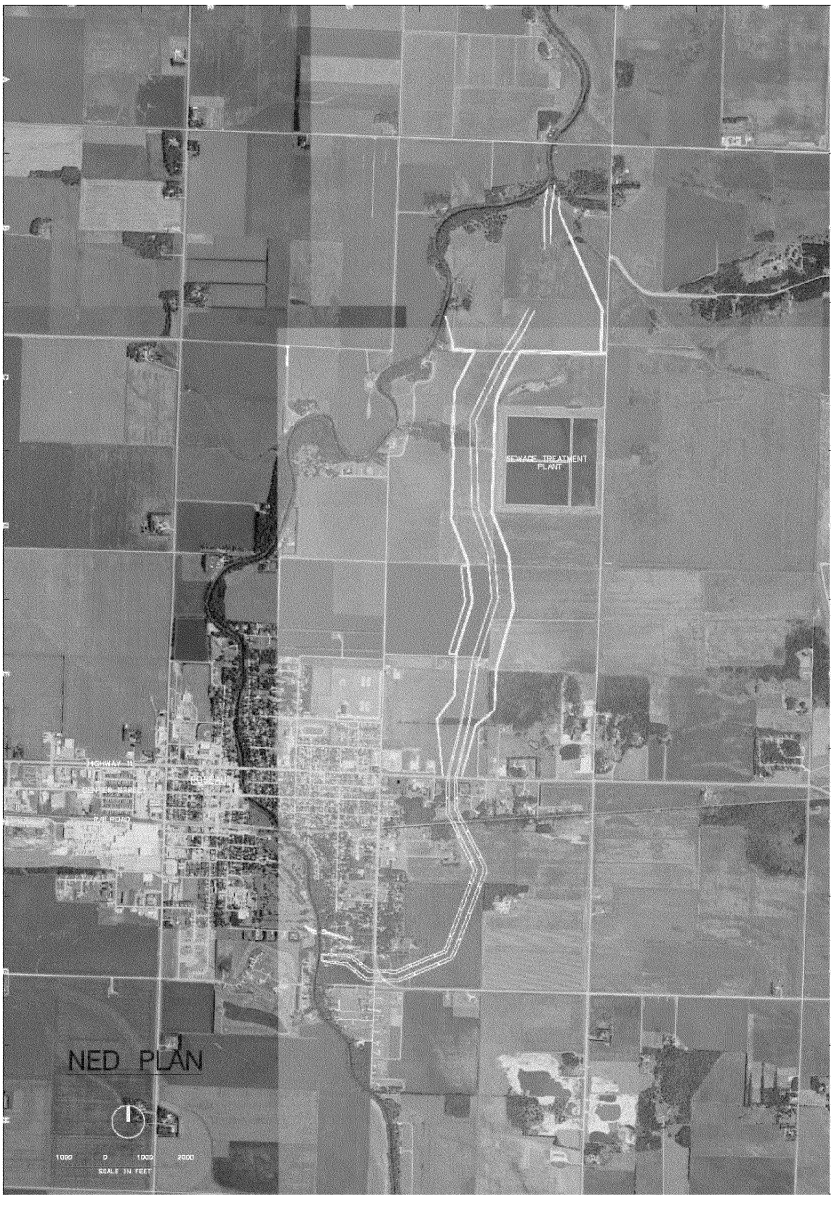

Figure 3 – National Economic Development Plan Alignment and Associated Features

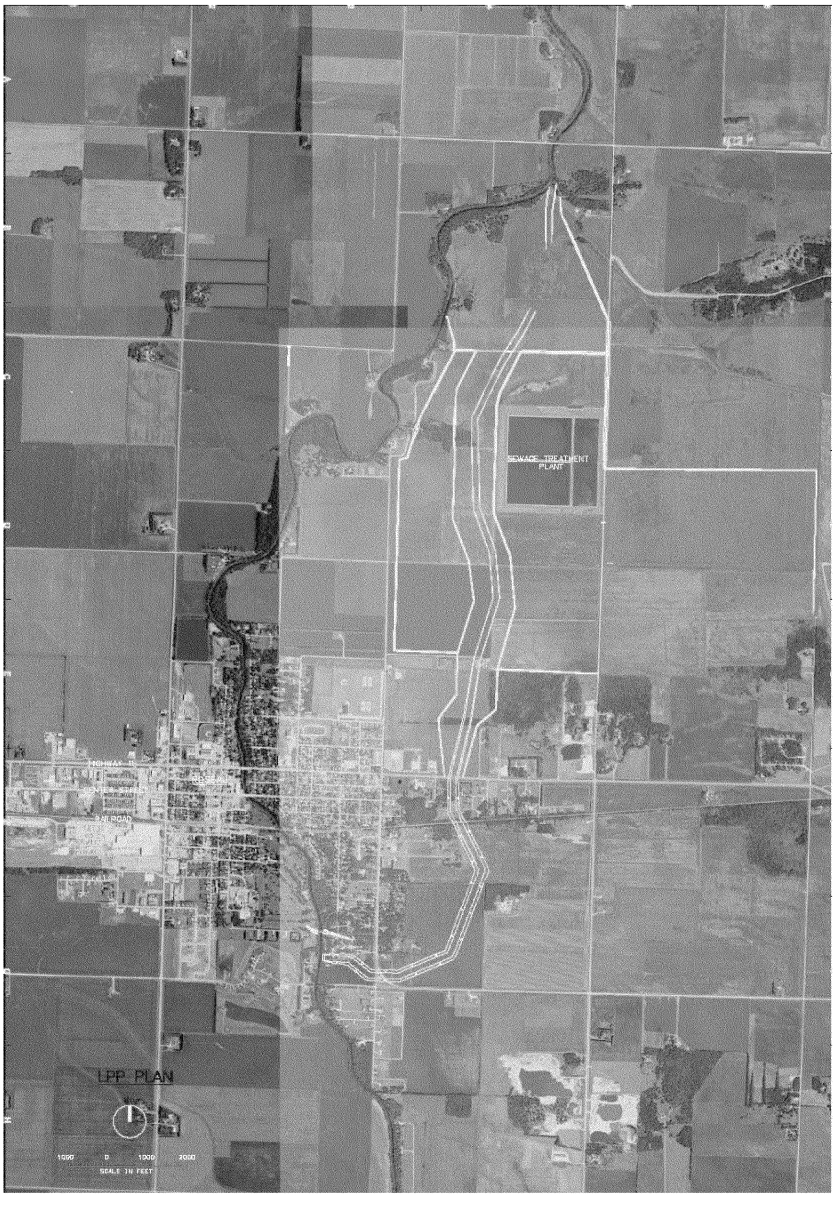

Figure 4 –Locally Preferred Plan East Diversion Channel Alignments and Associated Features

Figure 5 – Proposed Recreational Alignments and Features

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Appendix D

Environmental Compliance

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CEMVP-PD-P 18 July 2012

MEMORANDUM FOR RECORD

SUBJECT: Environmental Compliance Review – Minor Design and Construction Changes for Roseau, Minnesota Flood Risk Management Project.

PREPARED BY: Steve Clark, Fisheries Biologist

1. The Roseau, MN Flood Risk Management Project requires Congressional reauthorization to complete the project due to an increase in project costs exceeding the authorized Section 902 limit. The increased costs are the result of unforeseen site conditions and design refinements.

2. An Environmental Assessment and 404(b)(1) were completed for the project and a FONSI signed on 29 August 2006 (Attachments 1 and 2).. Minor design changes have not altered the project's original purpose and scope, nor have they resulted in any appreciable change in the environmental consequences as described in the August 2006 Environmental Assessment.

    a. An increase in needed riprap quantities at the outlet structure led to the completion on an environmental compliance review in February 2010 (Attachment 3) that determined the EA and 404(b)(1) evaluation were still valid and that no further action was required.
    b. Greater than estimated topsoil depths and unsuitable subsoil quantities resulted in greater than estimated excavation and fill quantities. This did not result in changed environmental effects because the footprints of disturbance areas were unchanged.
    c. A subsurface drainage system was added to reduce the risk of slope failure within the diversion channel; however, the inclusion of this drain would have no appreciable environmental effects because it is included within the excavated diversion footprint, nor would it lead to the drainage of wetlands.
    d. The restriction structure on the Roseau River was redesigned to include a boulder field within the riprap on the channel bottom under the structure to help ensure the passage of fish. This did not appreciably change the design or the amount of fill, but will help reduce some minor adverse effects to fish passage.
    e. The multipurpose recreation trails were redesigned with a more durable surface, but the location and footprint of these trails was not changed.
    f. Minor changes were made to the design of the inlet, outlet and restriction structures, but none change the footprints or affects of these features.

3. **Determination:** The St. Paul District has determined that the design changes for the Roseau Flood Risk Management Project will not result in environmental effects markedly different from those described in the August 2006 Environmental Assessment and 404(b)(1) evaluation, and additional NEPA documentation is not required at this time.

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Terry J. Birkenstock
Deputy Chief, Regional Planning and Environment Division North

Attachments (3)

Attachment 1

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
190 FIFTH STREET EAST, SUITE 401
ST. PAUL, MN 55101-1638

REPLY TO
ATTENTION OF

Finding of No Significant Impact

In accordance with the National Environmental Policy Act, the St. Paul District, Corps of Engineers, has assessed the environmental impacts of the following project:

ROSEAU, MINNESOTA
FLOOD DAMAGE REDUCTION PROJECT
ROSEAU RIVER

The purpose of the actions proposed in this environmental assessment is to provide flood protection to the city of Roseau, Minnesota. Activities would include the construction of a diversion channel, a restriction bridge in the Roseau River, and several levees including those which would establish water storage areas for large volume floods. The project is described in Section IV of the Environmental Assessment. This Finding of No Significant Impact is based on the following factors: the project would have substantial positive impacts on public health and safety, flood damage reduction and recreation and would have no appreciable effects to fish, wildlife, woodland, and wetland resources or the social or cultural environment. None of the project effects were determined to be significant. Continued coordination will be maintained with appropriate agencies and individuals.

The environmental review process indicates that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an Environmental Impact Statement will not be prepared.

8-29-06
Date

Judith L.A. DesHarnais
Acting District Commander

Attachment 2

404(b)(1) EVALUATION

ROSEAU, MINNESOTA
FLOOD DAMAGE REDUCTION PROJECT
ROSEAU RIVER

I. PROJECT DESCRIPTION

A. Location

The project features described below are located on the Roseau River in the city of Roseau, Minnesota (Plate 1).

B. General Description

The St. Paul District, Corps of Engineers in partnership with the city of Roseau, Minnesota has developed plans to construct a flood damage reduction project on the Roseau River in and near the city of Roseau. The proposed project would consist of features designed to reduce the potential for flooding within and upstream of the city. The features would include a diversion channel that would divert a portion of the river flow upstream of the city and return it to the river downstream of the city and a restriction bridge that would be placed in the Roseau River immediately downstream of the diversion inlet to raise the water surface elevation and increase the efficiency of the diversion channel. In addition, on the downstream end of the project there would be levees on either side of the diversion channel forming a floodway and storage areas that have been designed to store excess water carried through the diversion channel during peak flows, eliminating induced flooding downstream (Plate 2). Alternatives to the locally preferred plan (LPP) included the NED plan (the LPP less the storage areas), upstream storage, other diversion plans, permanent levees with home relocations, and no action.

C. Authority and Purpose

A 30 September 1974 Resolution of the Senate Committee on Public Works, which requested that the Corps investigate Flood Control within the basin of the Red River of the North, among other areas, provides the authorization for the study of this project.

D. General Description of Dredged or Fill Material

1. *Physical Characteristics* - Rock for the project would be obtained from operating sources or farm field piles. Stone for riprap would be durable material free from cracks, blast fractures, bedding, seams and other defects that would tend to increase deterioration from natural causes. Bedding used for the base layer would be clean rock 8-inches in diameter, or smaller, produced from an operating facility. Levee material would be locally excavated soil from the diversion channel.

Geotextile fabric, placed on streambanks prior to stabilization with riprap, would meet the requirements of MNDOT 3733, Type IV.

2. *Chemical Characteristics* - All stone would be clean and reasonably free from soil, quarry fines, and would contain no refuse. Materials would be obtained from approved pits/quarries in the project vicinity and would be free of chemical contaminants.

3. *Quantity of Material* - Approximately 5,000 square feet of channel excavation and a minor amount of vegetation stripping would be required as part of site preparation. An estimated 5,000 square feet of bedding and 278 cubic yards of riprap would be required to complete construction of the restriction bridge. Geotextile fabric would be placed on streambanks prior to stabilization with riprap. Approximately 178 cubic yards of riprap would be used at the outlet structure. Additional riprap would be used for bank protection at each of the three bridges within the project area.

E. Description of the Proposed Discharge Sites

1. *Location* - The proposed project is located on the Roseau River within and downstream of the city limits of Roseau, Minnesota (Roseau County).

2. *Size* - Approximately 1,200 square feet would be affected by the construction of two concrete abutments that would form the restriction bridge. Riprap would be placed on the channel bottom under the bridge and would convert substrate types from sandy-clay to rock. Riprap would also be used for bank protection, transitions into and out of the diversion channel and armoring of bridge abutments. A total area of less than 0.25 acre would be affected. Conversion of aquatic habitat to terrestrial habitat is not anticipated. Four wetlands totaling 4.7 acres would be partially or completely filled but would be offset by wetlands developed in an area at the downstream end of the diversion channel.

3. *Type of Site/Type of Habitat* – Aquatic habitats located within the project area are typical of the Roseau River. Depths generally vary from 1 to 2 feet near shoreline areas to about 3 feet at mid-channel locations. Substrates present include a mixture of sand and clay. The channel is approximately 30 feet wide in the vicinity of the project. Affected wetlands are Palustrine, Emergent, Temporarily Flooded, Drained/Ditched (1.56 acres, LPP or 0.1 acres, NED) and Palustrine, Forested, Broad-Leafed (8.15 acres LPP or NED).

F. Description of Disposal Method

Cranes, backhoes, dump trucks and other heavy machinery suited to working with rock would be used to deliver and place rock materials during construction. Riprap would generally be placed in a systematic manner to ensure a continuous uniform layer of well-graded stone. Stone placed underwater would not be cast across the surface of the water. Levee material would be placed with earth moving equipment.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

1. *Substrate Elevation and Slope* – Substrate under the restriction bridge would be excavated before placement of riprap to ensure that the existing substrate elevation was maintained. Riprap placed on slopes for erosion protection would follow the existing contour.

2. *Sediment Type/Substrate Changes* – Substrate in the Roseau River are sandy clay. Placement of riprap for erosion protection would convert existing substrates to rock.

3. *Dredged/Fill Material Movement* - Use of interlocked riprap would ensure little or no post-construction movement of materials.

B. Water Circulation, Fluctuation, and Salinity Determination

1. *General Water Chemistry* - The use of clean fill material would preclude any significant impacts on water chemistry during project construction. Some minor, short-term decreases in water clarity are expected from the proposed fill activities. No significant impacts on water color, odor, taste, dissolved oxygen levels, temperature or nutrient levels are anticipated.

2. *Current Patterns and Circulation* - The restriction bridge would increase the water surface elevation of higher volume discharges to initiate operation of the diversion channel. There would be no change to current patterns and circulation for normal flows.

3. *Sedimentation Patterns* - The project is not expected to affect sedimentation patterns within or below the project area. Stabilization of streambanks is included in the project plan and should result in reduced streambank erosion in the immediate project vicinity. These assumptions would be validated through a monitoring plan created in cooperation with interested parties and agencies.

C. Suspended Particulate/Turbidity Determination

1. *Suspended Particulates and Turbidity* - Turbidity and the concentration of suspended solids would be expected to increase temporarily during construction of project features. However, increases would be relatively minor and restricted to a relatively localized area. No long-term adverse impacts on water quality are expected.

2. *Effects on Chemical and Physical Properties of the Water Column* - Some minor short-term impacts on light penetration and aquatic organisms would occur during riprap placement. However, these effects would be rapidly dissipated upon project completion. No effects are expected on toxic metal concentrations, pathogens, or the aesthetics of the water column.

D. Contaminant Determinations

The use of clean, quarry-run rock riprap for construction would not introduce contaminants into

the aquatic system. Neither the materials used nor the placement method would cause relocation or increases of contaminants in the aquatic system.

E. Aquatic Ecosystem and Organism Determination

The effects of project construction are discussed in detail in the main *Environmental Assessment* section of this report. The more important effects are summarized in the following paragraphs.

1. *Effects on Plankton* - During construction, increases in turbidity and suspended solids near the fill activities might have a short-term localized effect on phytoplankton productivity. The plankton populations should recover quickly once the fill and other construction activities have ceased. In the long-term, overall aquatic habitat quality would improve, with resulting positive effects on plankton.

2. *Effects on Benthos* - Placement of rock during construction would cover and smother benthic communities located within the footprint of these structures, or would require excavation of substrates within the footprint. However, rapid colonization of newly placed rock substrates would be anticipated with minimal long-term effects.

3. *Effects on Fish* - Increases in turbidity and suspended solids during construction would temporarily displace fish occupying project areas. Fish are more mobile than benthic invertebrates and would likely simply avoid construction areas during project construction.

4. *Effects on Aquatic Food Web* - The proposed project is not expected to affect the total productivity of the Roseau River although there would be a temporary disruption to the aquatic biota present during project construction.

5. *Effects on Special Aquatic Sites* – With the LPP, 9.71 acres of wetland will be filled; with the NED plan, 8.25 acres of wetland will be filled. As part of the project design, wetlands would be replaced in-kind, in close proximity.

6. *Threatened and Endangered Species* - No known Federally-listed threatened or endangered species would be affected by the project. The project has been coordinated with the U.S. Fish and Wildlife Service and they concur with this determination.

7. *Other Wildlife* - The fill activities would not result in the significant loss of aquatic or terrestrial habitat. The general diversity and productivity of the affected areas would be maintained.

8. *Actions Taken to Minimize Impacts* – The LPP and NED plan both impact wetlands, with the LPP impacting an additional 1.46 acres of wetland. The alignment of the diversion channel was adjusted to avoid wetlands.

F. Proposed Disposal Site Determination

1. *Mixing Zone Determination* – The proposed fill activities would have minimal mixing

zones. The fill material used for the project would be sufficiently large and relatively clean so that very little exposed material could be suspended in the water column.

2. *Determination of Compliance with Applicable Water Quality Standards* - The fill materials used for this project would be obtained from approved quarries in the project area. The area does not have a history of contamination, which should insure that State water quality standards would not be violated because of project-related activities. Water quality certification from Minnesota and North Dakota would be obtained prior to project construction.

3. *Potential Effects on Human Use Characteristics* - The project would provide community flood protection without adversely affecting the river under normal conditions. The land acquired for the project would provide locations for the installation of recreational features. Water related recreational use of the project area would not be adversely affected by the project.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

Implementation of the proposed action would cause no significant cumulative adverse impacts on the aquatic ecosystem.

H. Determination of Secondary Effects on the Aquatic Ecosystem

No adverse secondary affects on the aquatic ecosystem are anticipated as a result of the fill activities. Disturbed aquatic habitat would be expected to quickly recover.

III. FINDING OF COMPLIANCE WITH RESTRICTIONS ON DISCHARGE

1. The Locally Preferred Plan (LPP) is a least environmentally damaging practicable alternative and satisfies the Section 404(b)(1) guidelines of the Clean Water Act. The NED is also a least environmentally damaging practicable alternative. In comparison to the NED, the LPP impacts an additional 1.46 fewer acres of wetlands, but those impacts would be more than offset by additional redevelopment of wetlands due to the storage levees cutting off existing tile drains and ditches. Additionally, the NED plan presents logistical issues - downstream opposition due to the potential for increased water level during floods coupled with the need to acquire land outside of the condemnation authority of the local sponsor - that are not present under the LPP.

2 In addition to the NED plan and the LPP, the other alternatives considered were: no action, upstream storage, other diversion plans, and permanent levees. More detail on these plans can be found on page 22-23 of the Environmental Assessment and pages 19, 21-24 of the feasibility report.

3. The LPP complies with all State water quality standards. The disposal operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. Use of the selected disposal site would not harm any endangered species or their critical habitat.

5. The LPP would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation, and commercial fishing. The LPP would not adversely affect plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. Significant adverse effects on wetlands, aquatic ecosystem diversity, productivity, and stability and on recreational, aesthetic, and economic values would not occur.

6. To minimize the potential for adverse impacts, the fill would be placed during periods of normal to low water levels. Since the LPP would not result in any net adverse effects, additional measures to minimize impacts would not be required.

7. On the basis of this evaluation, I find that the LPP plan complies with the requirements of the guidelines for the discharge of dredged or fill material.

8-29-06
Date

Judith L.A. DesHarnais
Acting District Commander

Attachment 3

CEMVP-PD-E 18 Feb 2010

MEMORANDUM FOR RECORD

SUBJECT: Environmental Compliance Review for increase in rip rap for the outlet structure for the Roseau River Diversion.

1. Reference:
   a. Feasibility Report and Environmental Assessment (EA)/404(b)(1) Evaluation and Finding of No Significant Impact (FONSI) (signed 8 August 2006) for the Roseau River Flood Damage Reduction Project.

2. The final designs for the Roseau River Diversion channel and outlet structure (Reach 2A) indicate that approximately 1,385 cubic yards of rip rap will be placed at or below the ordinary high-water mark in the Roseau River and Hay Creek. This is an increase 7 times greater then the 178 cubic yards of rip rap that was identified in the 404(b) (1) evaluation.

3. The initial design for the diversion outlet in the Feasibility Report called for clearing the vegetation for a short reach on either side of the diversion channel and riprapping the bank. Since the outlet is located at the confluence of Hay Creek and the Roseau River, the final design calls for excavation of the bank on either side of the diversion and filling the cut with riprap. While this design substantially increases the amount of riprap being placed in the footprint of the outlet, the extent of the impacted area or the type of impacts would not appreciably change from what was described in the referenced EA or 404(b)(1) evaluation.

4. The required waters permit with Minnesota DNR will have the required 30 day public comment period which will provide the opportunity for the public to comment on this action.

5. Based on the above information, it is my determination that the EA and 404(b)(1) is still applicable and that no further action is required at this time.

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Terry J. Birkenstock
Chief, Environmental and GIS Branch

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