Errata Sheet
Final Feasibility Report and Environmental Impact Statement
Fargo-Moorhead Metropolitan Area Flood Risk Management
Red River of the North

November 2011

1. Purpose:

This errata sheet corrects and/or clarifies portions of the Final Feasibility Report dated July 2011. The information contained in this errata document supersedes the affected portions of the July 2011 report.

2. Pursuant to comments received in the Office of Water Project Review, the following changes were made to the Main Report:

A. Section 3.5.4.1, page 53, fourth paragraph: first sentence is changed to read: "The Rush and Lower Rush Rivers, which currently consist of constructed trapezoidal channels, would flow into the diversion channel, resulting in reduced flows in the downstream portion of these rivers."

B. Section 3.7.3.4, page 81, third paragraph: delete the sentence reading: "With either alignment the existing Horace to West Fargo diversion would be abandoned."

C. Section 3.11.1.1, page 112, fifth paragraph: fourth sentence is changed to read: "The Rush and Lower Rush Rivers, which currently consist of constructed trapezoidal channels, would be allowed to flow into the diversion channel, resulting in reduced flows in the downstream portion of these rivers."

D. Section 3.11.1.1, page 114, first paragraph: the first sentence is changed to read: "The existing Horace to West Fargo diversion channel would be incorporated into the ND35K alignment."

E. Section 3.13.1.1, page 121, fourth paragraph: the first sentence is changed to read: "The existing Horace to West Fargo diversion channel would be incorporated into the LPP alignment."

F. Section 5.2.1.5.3, page 244, second paragraph: the first sentence is changed to read: "Additional wetland impacts from the LPP and ND35K are possible because flows in the existing channels downstream of the diversion for the Lower Rush River and the Rush River will be reduced."

G. Section 5.2.1.7.1.4, page 261, fourth paragraph: first sentence is changed to read: "The plan for the North Dakota alternatives would result in significantly reduced flow in approximately 2.1 miles of the Rush River, and 3.4 miles of the Lower Rush River, between the diversion channel and their respective confluences with the Sheyenne River."

H. Section 5.2.1.7.1.4, page 261, fourth paragraph: sixth sentence is changed to read: "This habitat would be more abundant, and potentially of better quality, than the habitat affected by reduced flows."

I. Section 5.2.1.7.1.4, page 261, fifth paragraph: first sentence is changed to read: "The affected channels would likely be identified as areas not to be developed in the future."

J. Section 5.5.3.2, page 371, third paragraph: the first sentence is changed to read: "For the ND35K and LPP, the Rush River and Lower Rush River would be redirected to flow into the diversion channel, significantly reducing flows in almost six miles of tributary habitat."

K. Section 5.5.3.2, page 371, fourth paragraph: the first sentence is changed to read: "Monitoring for biotic use would be performed prior to construction within sections of the Rush and Lower Rush rivers proposed for modification."

L. Section 8.0, page 390, third paragraph: the last sentence is changed to read: "The modifications to these projects will not impact the purposes for which they were authorized or the benefits they currently provide, and in some cases will curtail or eliminate the need for their continued operation and maintenance. All modifications will be carried out in a manner that fulfills the authorized purposes and provides the intended benefits of existing projects as well as the recommended plan."

M. Section I, Part C on page 4 of Attachment 1, the last sentence on this page is changed to read: "At the Lower Rush River and Rush River, a stepped concrete spillway will be used to divert the entire flow into the diversion channel, significantly reducing flows in the remaining channel between the diversion channel and the Sheyenne River."

N. Section II, Part H on page 17 of Attachment 1, the third sentence is changed to read: "The Lower Rush River and Rush River will have 5.7 miles of channel with significantly reduced flows which will be maintained as wetland habitat."

3. Pursuant to comments received in the Office of Water Project Review, the following change was made to Appendix O – Plan Formulation: Section 8.4.4.2.4, paragraph 2 on page O-70, delete the third sentence reading: "With either alignment the existing Horace to West Fargo diversion would be abandoned."

4. Pursuant to an Independent External Peer Review comment, the following information is added to Appendix P – Non-Structural, Part 1:

16.0 Nonstructural Flood Proofing Cost Information for Residential Structures

Nonstructural flood risk reduction techniques used for residential structures include elevating the entire structure, elevating the main floor, wet flood proofing, and permanent acquisition (buyout). Additional methods can be combined with

the methods listed above such as filling in basements, and constructing additions to compensate for lost square footage and to house utilities.
To determine the cost for implementation of these measures, the National Nonstructural Flood Proofing Committee (NFPC) obtained costs from several different sources: Omaha District (NWO) Cost Estimating Branch, and the St. Paul District (MVP) Plan Formulation and Economics Branch. Each nonstructural option is listed below along with a description of the costs involved and how the total cost was calculated.

16.0.1 Elevating Entire Structure

The NWO Cost Estimating Branch provided the NFPC with a cost per square foot to raise a structure either 3, 6, 9, or 12 feet in height. A table was created and entered into Microsoft Excel and linear equation was derived for each range of structures. Table 2 contains the equations that were derived in Excel.

16.0.2 Elevation with Dry Flood Proofed Basement

The equations from Table 2 were used to elevate structures based on the vertical distance and square footage of the structure. The cost for the dry flood proofing materials was developed by contacting local hardware suppliers and calculating the individual unit cost and cost per square foot for the sealants and veneer.

16.0.3 Fill Basement with Main Floor Addition

The NWO Cost Estimating Branch provided the NFPC with average costs of fill material per cubic foot. An average depth of 8 feet and the perimeter of the structure was used to calculate the area. The cost for the main floor addition was provided to the NFPC by the NWO Cost Estimating Branch. It is based on an average cost per square foot for construction. (See Table 3 & 4)

16.0.4 Permanent Acquisition (Buyout)

The cost for buying out structures, as shown in Table 10, was calculated by adding the structure value and land value from the County Assessors database and applying a multiplier. The multiplier was based on actual mitigation costs provided by the MVP Plan Formulation and Economics Branch.

16.0.5 Wet Flood Proof

The costs for wet flood proofing were provided by the NFPC. Cost for removing damageable materials and raising utilities is an average cost that was used over a range of structure sizes. Costs for flood vents and installation of the vents were obtained from the flood vent manufacturer. Table 5 contains the cost breakdown.

16.1 Nonstructural Flood Proofing Cost Information for Commercial Structures

Nonstructural flood risk reduction techniques used for commercial structures include dry flood proofing, elevating the entire structure, constructing floodwalls, permanent acquisition (buyout), relocation of structures and wet flood proofing.

These techniques can be combined to include filling basements with a dry flood proofed main floor.
To figure the cost for implementation of these measures, the NFPC obtained costs from several different sources: NWO Cost Estimating Branch, and the MVP Plan Formulation and Economics Branch. Each nonstructural option is listed below along with a description of the costs involved and how the total cost was calculated.

16.1.1 Dry Flood Proofing
The costs for the dry flood proofing materials were developed by contacting local hardware suppliers and calculating the individual unit cost and cost per square foot for the sealants and veneer. Table 7 provides the breakdown of costs involved.

16.1.2 Elevate Entire Structure
The NWO Cost Estimating Branch provided the NFPC with a cost per square foot to raise a structure either 3, 6, 9, or 12 feet in height. A table was created and entered into Microsoft Excel and linear equation was derived for each range of structures. Table 2 contains the equations that were derived in Excel.

16.1.3 Floodwall
The cost for the construction of floodwalls was developed by the NWO Cost Estimating Branch. They gave the NFPC a range of heights above ground for the wall and a cost per linear foot for each. Table 8 contains the costs associated with the various heights.

16.1.4 Fill Basement
The NWO Cost Estimating Branch provided the NFPC with average costs of fill material per cubic foot. An average depth of 8 feet and the perimeter of the structure was used to calculate the area. Table 9 contains the breakdown of the costs to fill basements.

16.1.5 Fill Basement and Dry Flood Proof
The NWO Cost Estimating Branch provided the NFPC with average costs of fill material per cubic foot. An average depth of 8 feet and the perimeter of the structure was used to calculate the area. The costs for the dry flood proofing materials were developed by contacting local hardware suppliers and calculating the individual unit cost and cost per square foot for the sealants and veneer.

16.1.6 Fill Basement and Construct Floodwall
The NWO Cost Estimating Branch provided the NFPC with average costs of fill material per cubic foot. An average depth of 8 feet and the perimeter of the structure was used to calculate the area. The cost for construction of floodwalls was developed by the NWO Cost Estimating Branch. A range of heights above ground for the floodwall and a cost per linear foot was provided.

16.1.7 Permanent Acquisition (Buyout)

The cost for buying out structures, as shown in Table 10, was calculated by adding the structure value and land value from the County Assessors database and applying a multiplier. The multiplier was based on actual mitigation costs provided by the MVP Plan Formulation and Economics Branch.

16.1.8 Wet Flood Proof

The costs for wet flood proofing were provided by the NFPC. Cost for removing damageable materials and raising utilities is an average cost that was used over a range of structure sizes. Costs for flood vents and installation of the vents were obtained from the flood vent manufacturer. Table 11 provides the breakdown of the wet flood proofing costs.

5. The following changes are required to update the economic analysis and average annual cost information using the current interest rate of 4.0 percent. (An interest rate of 4.125 percent was used in the July 2011 FEIS.):

A. Section 8.0, page 390, second paragraph, last sentence is changed to read: "The selected plan has an overall benefit-cost ratio of 1.80 and would provide in excess of 1-percent chance level of risk reduction for the Fargo-Moorhead Metro Area."

B. Section 3.13.6, page 129, Table 23: Replace Table 23 with the following updated table:

Table 23 - Economic Analysis of the LPP

Estimate of Project First Costs LPP				
Account	**Item**	**Flood Risk Management**	**Recreation**	**Total**
01	Lands & Damages	278,372		278,372
02	Relocations	154,291		154,291
06	Fish and Wildlife Facilities	61,987		61,987
08	Roads, Railroads and Bridges	60,045		60,045
09	Channels & Canals	783,778		783,778
11	Levees and Floodwalls	143,435		143,435
14	Recreation Facilities		29,800	29,800
Subtotal		$ 1,481,908	$ 29,800	$ 1,511,708
30	Planning, Engineering and Design	179,408	4,442	183,850
31	Construction Management	83,717	2,073	85,790
Subtotal		$ 263,125	$ 6,515	$ 269,640
	Subtotal First Costs	$ 1,745,033	$ 36,315	$ 1,781,348
	Interest During Construction	287,111	726	287,837
	Total Investment Costs	**$ 2,032,144**	**$ 37,041**	**$ 2,069,185**
Estimate of Annual Costs				
	Annualized Project Costs	94,597	1,724	96,321
	Annual OMRR&R Cost	3,501	130	3,631
	Annual Induced Damages	-		-
	Total Annual Costs	**$ 98,098**	**$ 1,854**	**$ 99,952**
Average Annual Benefits				
	Flood Risk Management	162,600	0	162,600
	Flood Proofing Cost Savings	10,430	0	10,430
	Flood Insurance Administrative Costs	960	0	960
	Non Structural Flood Risk Benefit	627		627
	Recreation	-	5,130	5,130
	Total Annual Benefits	**$ 174,617**	**$ 5,130**	**$ 179,747**
	Net Annual Benefits	$ 76,519	$ 3,276	$ 79,795
	Benefit to Cost Ratio	1.78	2.77	1.80

All costs and benefits in thousands ($1,000)

Costs presented at October 2011 price level

Discount Rate = 4.0%

Assumes a 50 year period of analysis