



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:
CECW-MVP (1105-2-10a)

SUBJECT: Fargo-Moorhead Metropolitan Area Flood Risk Management Project, Fargo, North Dakota and Moorhead, Minnesota.

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on Flood Risk Management improvements for the Fargo-Moorhead Metropolitan Area Flood Risk Management Project, located in the Red River basin of Fargo, North Dakota and Moorhead, Minnesota. It is accompanied by the report of the district and division engineers. These reports are in response to a resolution adopted 26 December 2007 (Public Law 110-161) and included in the Consolidated Appropriations Act of 2008. The resolution directed the Corps of Engineers to review past reports and initiate a Feasibility Study to determine whether any modifications of the recommendations contained therein are advisable in the interest of flood control, water supply, waste water management, and allied purposes. The requirements of a Feasibility Study are addressed in this report and are subject to review and approval by the Secretary of the Army. Preconstruction engineering and design activities for this Project will be continued under the cited authority.

2. The reporting officers recommend a Locally Preferred Plan (LPP) named the North Dakota 35K that will provide for a 36-mile diversion channel approximately four-miles south of the confluence of the Red and Wild Rice rivers. In order to construct the diversion channel, a connecting channel will be constructed between the Red and Wild Rice Rivers, and will convey flows from the Red River to a diversion channel inlet on the west side of the Wild Rice River. The flow split between the two rivers will be controlled by a combination of control structures on the southern end of the project, weirs at the west end of the connecting channels, and weirs at the entrance to the diversion channel near the Wild Rice River. The diversion channel will re-enter the Red River north of the confluence of the confluence of the Red and Sheyenne Rivers. The diversion channel will also cross the Sheyenne, Maple, Lower Rush, and Rush Rivers. The existing Horace to West Fargo Sheyenne River diversion channel will be incorporated into the Recommended Plan. Structures will be constructed at the Sheyenne and Maple Rivers to allow base flows to follow the natural river channel, diverting flows in excess of a 50-percent event into the diversion channel. Drop structures will be constructed at the Lower Rush and Rush rivers that will convey the entire flow of those rivers into the diversion channel. Additionally, the Recommended Plan would include 18 highway bridges, 4 railway bridges, and the purchase of 6,560 acres of land.

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3. The LPP will provide greater flood risk management benefits and less expected residual flood damages when compared to the NED plan. Additionally, the LPP will provide flood risk management across a much larger geographical area, while benefiting additional river systems that include the Red, Wild Rice, Sheyenne, Maple, Lower Rush, and Rush rivers. The LPP will also be a more robust plan, eliminating uncertainty related to the unpredictability of natural flood flows and climate variability. The Recommended Plan will diminish flood damages for events larger than the 1.0 percent chance event by decreasing flood stages and increasing the chances of successful emergency flood fighting. The Recommended Plan will also reduce highway and railroad traffic interruptions, lessen flood-induced disruptions to the delivery of health and safety services, and decrease the threat of loss of life attendant to flooding in urban settings.

4. Costs for the LPP were based on the Federally Comparable Plan (FCP), identified as the Minnesota 35K. As such, based on December 2009 price levels, the total first cost of the Recommended Plan for the Fargo-Moorhead Metropolitan Area Flood Risk Management Project is estimated to be \$1,066,597,000. The current fully funded cost is \$1,445,642,000. The Plan recommended by the reporting officers provides estimated annual benefits of \$176,278,000, with net annual benefits of \$98,675,000. The benefit-to-cost ratio is 2.27 to 1. In accordance with the allocation of funds for the LPP, the non-Federal sponsors will be required to pay the increment between the FCP (\$1,066,597,000) costs and the LPP costs (\$1,237,000,000), which total \$170,758,000.

5. In accordance with the cost-sharing requirements of Section 103 of the WRDA of 1986, the Federal cost of the recommended plan would be \$710,410,000 and the non-Federal cost would be \$390,429,000. The estimated lands, easements, right-of-way, and relocation costs for the recommended plan are \$292,729,000. Based on December 2009 price levels, a 50-year period of economic evaluation and a 4.375 percent discount rate, the equivalent annual cost of the proposed project is estimated at \$75,795,000, which includes operation, maintenance, repair, rehabilitation and replacement (OMRR&R), interest and amortization. The estimated annual costs for OMRR&R are \$3,318,000. The OMRR&R costs for recreation are estimated at \$47,000.

6. To ensure that an effective Flood Risk Management Plan was recommended, cost effectiveness techniques were used to evaluate alternative plans. The hydraulic model utilized to estimate the outputs that were used in the economic analysis was both peer-reviewed and certified for use in the project. The plan recommended for implementation is the Locally Preferred Plan and meets the policy criteria established in USACE guidance for planning in a collaborative environment

7. Independent External Peer Review (IEPR) of the Fargo-Moorhead Metropolitan Area Flood Risk Management Project was managed by Battelle Memorial Institute, a non-profit science and technology organization with experience in establishing and administering peer review panels for the USACE. The IEPR Panel consisted of five individuals selected by Battelle with technical expertise in biology and National Environmental Policy Act (NEPA) compliance, hydrology and hydraulics engineering, geotechnical engineering, civil design and construction cost engineering,

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and economics. The Final Report and Certification from the IEPR Panel was issued 17 May 2010 and included 23 comments. The USACE received concurrence on all 23 comment responses that were coordinated with the IEPR Panel, and 22 comments were adopted or adopted in part. Of the 23 total IEPR comments from the panel, seven were classified as high significance by the panel.

The comments of high significance included requests for sufficient geotechnical analyses, construction soil strength values, assessments of channel conveyance capacity, and more detailed hydraulic hydrodynamic modeling. The IEPR panel also requested a discussion of direct and indirect project impacts as well as an expansion of the cost-benefit analysis.

After discussion and concurrence with the IEPR panel, more detailed geotechnical and soil strength analyses will be conducted during the project design phase. A three-dimensional hydrodynamic model will also be used in the design phase to compute the flow velocity field and flow depths. An additional assessment of downstream impacts was added to the report. The cost-benefit calculations in the report were updated to include flood fighting

Thirteen of the IEPR Panel comments were classified as medium significance. The IEPR panel an analysis of the erosive effects of the compensatory mitigation proposal, a more comprehensive review of sediment characteristics and transport, and a clarification of the Future Without Project condition in regards to existing and future upstream flood control measures. Concerns were raised about environmental hazards that may result from Rail Yard relocation and construction techniques that would allow construction year-round.

The IEPR panel also requested that cost estimates for non-structural management measures be more thorough explained in the report. Additionally, the panel requested that the Corps clarify the probability of success for emergency flood fights in the project area. Future growth estimates and incorporation into the hydraulic model was questioned, and the panel also provided commentary concerning wetland impacts and details on fish passages and structures. The panel also recommended that the overall organization of the report be improved.

In response to the comments, the Future Without Project condition was thoroughly clarified with the IEPR panel. Additional analysis on sediment characteristics and transport was performed, the compensatory mitigation proposal will be reviewed during the Design phase, and ongoing investigations of environmental hazards at the Rail Yard will be fully incorporated into the project. New techniques for year-round construction will be investigated during the Plans and Specifications phase.

Updated cost estimates for non-structural measures were provided in the report and the chances for the success of flood fighting has been clarified as "low." Flood risk was re-evaluated after incorporating future growth estimates in the HEC-FDA hydraulic model. Wetland impacts and compensatory mitigation details have been fully addressed and incorporated into the final report.

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The IEPR comment regarding downstream adverse effects that would be contrary to recent floodplain management policy was adopted in part. In its response, the Corps stated that no cost effective alternatives were found that did not cause an increase in flood stages within downstream areas. Additionally, the Corps stated that the proposed diversion channel would only operate when flows exceed the 20% chance event; therefore, any downstream effects would be minor when compared to substantial flooding events. However, the Corps did indicate that it included a legal opinion in the report and also updated the hydraulic analysis to include the most recent information available. The updated information will also be furnished to the public. As such, the IEPR panel concurred with the response by the Corps. Also, the Corps adopted in part the comment regarding the overall organization of the report. Many sections of the report were revised as a result of this comment, improving readability and flow.

The Corps did not adopt the IEPR comment that the list of economic opportunities that may arise from the proposed project be expanded. In its response, the Corps emphasized that the current economic analysis is adequate for the NED benefit assessment under current guidance, and any further suggestions would not qualify for inclusion. The IEPR panel concurred with the explanation provided by the Corps.

Three comments from the IEPR panel were classified as low significance. The first comment noted that there were inconsistencies in the estimated costs, flood damages and design parameters. Additionally, the panel added that the potential effects of ice jams and debris loading in unclear and should be addressed. The final comment noted that the study area needs to be more clearly defined in the maps and text.

In response to the IEPR comments, all tables, figures and information in the report were cross-checked for accuracy and updated. The design phase will include an ice analysis and channel performance assessment using a numerical ice model. Lastly, the report was reviewed and updated where necessary to clarify the project area.

8. Washington level review indicates that the plan recommended by the reporting officers is environmentally justified, technically sound, cost effective and socially acceptable. The plan conforms to essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other administration and legislative policies and guidelines. Also, the views of interested parties, including Federal, State and local agencies, have been considered.

9. I generally concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that the plan described herein for flood risk management be authorized for implementation as a Federal Project, with such modifications as in the discretion of the Chief of Engineers may be advisable, and subject to cost-sharing, financing, and other applicable requirements of the Water Resources Development Act of 1986. Further, this recommendation is subject to the non-Federal sponsor agreeing to comply with all applicable Federal laws, including the following requirements:

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a. Provide a minimum of 35 percent, but not to exceed 50 percent of the total project costs allocated to the NED plan for flood control, as further specified below:

- i. Enter into agreement which provides, prior to execution of the project partnership agreement, 25 percent of design costs, either through a cash contribution or through acceptable and allowable in-kind work;
- ii. Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;
- iii. Provide, during construction, a cash contribution equal to 5 percent of total project costs allocated to structural flood control;
- iv. Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal area, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;
- v. Provide or pay to the Government the cost of providing all retaining dikes, waste weirs, bulkheads, and embankments, including all monitoring features and stilling basins that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project;
- vi. Provide, during construction, any additional costs as necessary to make its total contribution equal to at least 35 percent of total project costs allocated to structural flood control and a total of 35 percent of the total project costs allocated to non-structural flood control;

b. Pay 100 percent of the additional cost of the plan for flood control that is in excess of the costs of the NED plan:

c. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project;

d. Assume responsibility for operating, maintaining, repairing, replacing, and rehabilitating (OMRR&R) the Project or completed functional portions of the Project in a manner compatible with the Project's authorized purposes and in accordance with applicable Federal and State laws and specific directions prescribed in the OMRR&R manuals and any subsequent amendments thereto.

e. The non-Federal Sponsor shall operate, maintain, repair, replace and rehabilitate the recreational features of the Project with responsibility for 100 percent of the cost;

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f. Unless otherwise provided for in the statutory authorization for this Project, comply with Section 221 of PL 91-611, Flood Control Act of 1970, as amended, and Section 103 of the WRDA of 1986, PL 99-662, as amended which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Non-Federal Sponsor has entered into a written agreement to furnish its required cooperation for the Project or separable element;

g. Hold and save the Government free from all damages arising from the construction, OMRR&R of the Project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors;

h. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the Project to the extent and in such detail as will properly reflect total project costs, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments in 32 CFR Section 33.20.;

i. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction and operation and maintenance (O&M) of the Project; except that the non-Federal Sponsor shall not perform such investigations on lands, easements, or rights of way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government;

j. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on or under lands, easements, or right-of-ways that the Government determines necessary for the construction and O&M of the Project;

k. As between the Government and the non-Federal Sponsor, the non-Federal Sponsor shall be considered the operator of the Project for the purposes of CERCLA liability. To the maximum extent practicable, the non-Federal Sponsor shall OMRR&R the Project in a manner that will not cause liability to arise under CERCLA;

l. Prevent obstructions of and encroachments on the Project (including prescribing and enforcing regulations to prevent such obstruction or encroachments) which might reduce flood risk management benefits, hinder O&M, or interfere with the Project's proper function, such that as any new developments on Project lands or the addition of facilities which would degrade the benefits of the Project;

m. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, as amended by the title IV of the Surface

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Transportation and Uniform Relocation Assistance Act of 1987 (PL 100-17), and Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights of way, and performing relocations for construction, O&M of the Project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

n. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, PL 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled, "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and all applicable Federal labor standards and requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act [formerly 40 U.S.C. 276a et seq.], the Contract Work Hours and Safety Standards Act [formerly 40 U.S.C. 327 et seq.] and the Copeland Anti Kickback Act [formerly 40 U.S.C. 276c]);

o. Comply with Section 106 of the National Historic Preservation Act in completion of all consultation with the State Historic Preservation Office of Minnesota and North Dakota and, as necessary, the Advisory Council on Historic Preservation prior to construction as part of the Pre-construction Engineering and Design phase of the Project;

p. Provide the non-Federal share of that portion of total cultural resource preservation mitigation and data recovery costs attributable to the Project that are in excess of one percent of the total amount authorized to be appropriated for the Project;

q. Do not use Federal funds to meet the Non-Federal Sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized;

r. The Non-Federal Sponsor agrees to participate in and comply with applicable Federal floodplain management and flood insurance programs consistent with its statutory authority.

- i. Not less than once each year the Non-Federal Sponsor shall inform affected interests of the extent of protection afforded by the Project.
- ii. The Non-Federal Sponsor shall publicize flood plain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the Project.
- iii. The Non-Federal Sponsor shall comply with Section 402 of WRDA 1986, as amended (33 U.S.C. 701b-12), which requires a non-Federal interest to have prepared, within one year after the date of signing a project partnership agreement for the Project, a floodplain management plan. The plan shall be designed to reduce the impacts of

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future flood events in the project area, including but not limited to, addressing those measures to be undertaken by non-Federal interests to preserve the level of flood protection provided by the Project. As required by Section 402, as amended, the non-Federal interest shall implement such plan not later than one year after completion of construction of the Project. The Non-Federal Sponsor shall provide an information copy of the plan to the Government upon its preparation.

- iv. The Non-Federal Sponsor shall prescribe and enforce regulations to prevent obstruction of or encroachment on the Project or on the lands, easements, and rights-of-way determined by the Government to be required for the construction, operation, maintenance, repair, replacement, and rehabilitation of the Project, that could reduce the level of protection the Project affords, hinder operation or maintenance of the Project, or interfere with the Project's proper function.; and

10. The recommendation contained herein reflects the information available at this time and current Departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities in the formulation of a national Civil Works construction program or the perspective of higher review levels within the Executive Branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding.

Robert L. Van Antwerp
Lieutenant General, U.S. Army
Chief of Engineers