Special Meeting
FM Area Diversion Project Permit Application Review

Buffalo - Red River Watershed District
April 23, 2019
Dilworth Community Center, 7:00 PM
Project Development
FM Diversion Alternatives

10 years of studies
► USACE Feasibility Study and EIS
► Post-Feasibility Alternatives and SEA
► MN EIS and SEIS
► Governors’ Task Force

Highly Detailed Modeling
► More detail and level of mitigation than any other flood control project in the Red River Valley

Numerous Alternatives Considered
► Diversion Channels
► Levees
► Distributed Storage/Retention
FM Diversion Project - BRRWD

- 100-year Flood Protection
  - Some features designed to PMF (Probable Maximum Flood) as required by State and Federal Requirements
- Diversion Channel
- Southern Embankment and Control structures
- Temporary Staging of Flood Waters Upstream
- In-town Levees through Fargo-Moorhead
Project Features within BRRWD

- Red River Control Structure
- Southern Embankment
- Eastern Tie-back / Wolverton Creek Structure
- In-Town Levees
- City of Wolverton
Red River Control Structure

- Located off-channel in North Dakota
- Includes three (3) 50-foot wide gates
- Gates will remain open when Project is not operating
Southern Embankment
Southern Embankment Transportation Features

- Crossings planned at Clay County Road 59, 140th Ave S, and Clay County Road 2
- Flexibility for more crossings of the Southern Embankment
Eastern Tie-back & Wolverton Creek Structure

- Dam/Southern Embankment extends east and crosses Wolverton Creek, MN – Extension is driven by dam design considerations (Probable Maximum Flood = 204,000 cfs)
- Ungated Crossing Maintains Existing Conditions Downstream
- Potential to Move Eastern Tie-back to Clay County Highway 50
In Town Levees – River Stage 37’

Property Acquisitions (68)
Existing Levee System
► Moorhead Country Club
► Woodlawn Park
► Horn Park
► 50th Avenue South

New Flood Protection Systems
► North Moorhead Protection Area
► Center Mall Area Sanitary Lift Relocation
► 1st Avenue North Area
► Riverview Circle Area
► Stormwater Lift Station Modifications

Transportation Improvements
Total Cost MN $43.2 million
Potential Permit Condition
City of Wolverton, MN

- 0.6’ Impact during the 100-year flood event
- Impacts 2 Residential Structures
- Mitigation Options include acquisition of impacted structures or community levee
Potential Permit Condition
City of Georgetown, MN

- Located near Diversion Outlet
- Existing Levee System – Not Accredited by FEMA
- FM Diversion Project Impacts of 0.11’ during 100-year flood event
City of Comstock, MN

- Project has No Impact in Comstock, MN
- Local Drainage Ditch that parallels the dam/southern embankment will convey local runoff north to the Red River
Project Operations

► Design will allow 37-feet through town
► Project will only operate 1 in 20 years, on average
► Project would not have operated this Spring

16 floods

Project Operation

<table>
<thead>
<tr>
<th>Stage at Fargo Gage (Feet)</th>
<th>Number of Days above the Stage</th>
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<tbody>
<tr>
<td>30</td>
<td>181</td>
</tr>
<tr>
<td>35</td>
<td>62</td>
</tr>
<tr>
<td>37</td>
<td>28</td>
</tr>
<tr>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>39</td>
<td>8</td>
</tr>
</tbody>
</table>

(1901/5-2017/11)
Impacted and Benefited Structures (100-yr flood)

BRRWD Impacts and Benefits (structures)

- Wilkin County
- Clay County
- BRRWD
- Structures Protected (BRRWD)

- Existing Structures in Floodplain
- Newly Impacted Structures
- Structures Protected
Property Acquisition and Mitigation
Property Rights Acquisition and Mitigation Plan, v4

► The PRAM Plan was drafted in coordination with U.S. Army Corps and in consultation with the ND State Water Commission and the MN Department of Natural Resources

► Version 4 submitted to MDNR with Permit Application

► Update needed to reflect MDNR and Draft BRRWD Permit Conditions

Table of Contents

- Property Acquisition Philosophies
- **Typical Property Acquisition Process**
- Appraisal Review Plan
- Offer Presentation and Negotiation Process
- Property Rights Map
- Property Acquisition Schedule
- Early Property Acquisition Program
- Organic Farmland Acquisition Plan
- Disposal of Excess Property
- Mitigation of Properties Upstream
- USACE/FEMA Coordination Plan
- **Flowage Easement Plan**
- Sample Flowage Easement
- Dispute Resolution Board
- Cemetery Mitigation Plan
- Mitigation of Historic Places
- Post-Operation Debris Clean-Up Plan: Private Lands
- Post-Operation Repair and Clean-Up Plan: Public Lands
- Summer Operation Supplemental Crop Loss Program
- Financial Assurance Plan for O&M, On-going Mitigation
- Mitigation Communications Plan
- Oxbow-Hickson-Bakke Mitigation Project
- In-Town Levee Mitigation Projects
- Pre-PPA Medical Hardship Acquisition Program
"Lands Program" is Critical Part of Project

<table>
<thead>
<tr>
<th>Category</th>
<th>Current Opinion of Estimated Cost</th>
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<tr>
<td>Lands/Impacted Properties Mitigation</td>
<td>$502</td>
</tr>
<tr>
<td>Channel / P3</td>
<td>$989</td>
</tr>
<tr>
<td>USACE / SEAI</td>
<td>$703</td>
</tr>
<tr>
<td>Fargo and Moorhead In-Town Projects</td>
<td>$266</td>
</tr>
<tr>
<td>Other/Mitigation Construction</td>
<td>$44</td>
</tr>
<tr>
<td>Non-Construction Costs*</td>
<td>$250</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$2,754</strong></td>
</tr>
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</table>

*Legal/Financial/Designs/Studies/Procurement/PgM/CM/General Contingency
Project Impacts &
Upstream Mitigation Area

- Mitigation Available to Property Owners
  - Project required to purchase “Property Rights”
  - Property Rights include:
    - Buyout of Land for Construction
    - Flowage Easements on Upstream Lands
    - Buyout of Upstream Structures (or other mitigation)
  - Several other mitigation measures for Impacts
    - Post-Operation Debris Clean-Up (private lands)
    - Post-Operation Repair and Clean-Up Program (public lands)
    - Supplemental Crop Loss
  - Cemetery Mitigation
  - Dispute Resolution Board
Acquisition Process

- Property rights determined by Project Design
- Valuation determined by Independent Appraisal following state law
- Property Owners receive
  - ‘Just Compensation’ = payment for real estate
  - ‘Relocation Benefits’ = moving, relocation, and re-establishment
- ~200 acquired to date
The Diversion Project includes a mitigation area upstream of the Project
  - Occasionally and temporarily used to store flood waters on average, once in 20 years

A Flowage Easement will be purchased and applied to properties upstream
  - Value of the easements will be determined through an appraisal that will consider the depth, duration, and frequency of flooding

The Diversion Authority has contracted with Crown Appraisals to develop the value of the easements
  - Phase 1 of the study was complete in Nov 2018
  - Phase 2 expected to start this spring
Post-Operation Debris Clean-Up Program (Private Lands)  (pg 97)

► Concern from Farmers about Debris Left on Fields after Project Operation
► Operation Anticipated ~20-year Return Frequency
► Flowage Easements Compensate Landowners for Impacts Associated with the Project
► Project may Cause Debris to Accumulate within the Upstream Mitigation Area, Impacting Farmers
► Private Property Plan is Mirrored after “Clean-up Week”
  ► Access to Private Property
  ► Voluntary Right of Entry
Post-Operation Repair and Clean-Up Program (Public Lands) (pg 98)

► Concern from Townships, Cemeteries, Watershed Districts, etc. damage caused by Project Operation

► Operation is Infrequent
  ▶ Operation Anticipated ~20-year Return Frequency
  ▶ Five Events in Recorded History would have Required Operation

► Public Property Plan is Mirrored after FEMA Disaster Assistance

► Allow Government Entities to Contract for Repair and Clean-up Work, then Submit for Reimbursement to Diversion Authority
Supplemental Crop Loss Program (pg 99)

- Summer Operation of the Project is Extremely Unlikely
  - Project Operation Begins at River Stage of 37-feet
  - Largest Summer Event in History (1975) = 33-feet
- But, Summer Flooding would likely Damage Growing Crops
- Diversion Authority will Provide a Program for Farmers to Cover the Crop Loss Risks Associated with Project-Induced Flooding During Summer Months
- Utilize Federal Crop Re-Insurers and Existing Structure to Offer this Rider Product to Farmers
Cemetery Mitigation (pg 72)

- There are 3 cemeteries in MN upstream of the Project that may be impacted at varying levels during major floods due to operation of the Project.
- Flowage easements will be purchased for each cemetery.
- Potential additional mitigation for each site will be reviewed and discussed with each cemetery after completion of environmental and permitting review.
Dispute Resolution Board (pg 67)

- Administrative Program for Properties that Believe they are Impacted by Project, but do not Receive Direct Mitigation
- Modeled after a Similar Process Created by the NDSWC for the Devils Lake Outlet Project
- Allows a Forum for Property Owners to File Claims and an Independent and Fair Process to Determine Damages from the Project
- Avoids Expensive Legal Action
Upstream Mitigation Area – Updated

- The Upstream Mitigation Area is being updated to reflect the conditions of MDNR Dam Safety & Public Waters Work Permit 2018-0819
- Two “Pools” for Flowage Easements
  - Operating Pool
  - Maximum Pool
- Two “Categories” for Structure Mitigation
  
<table>
<thead>
<tr>
<th>Impacted Land Mitigation (ie, Flowage Easements)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Pool</strong></td>
</tr>
<tr>
<td>- Flowage Easement with Development Prohibition</td>
</tr>
<tr>
<td><strong>Maximum Pool</strong></td>
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<tr>
<td>- Flowage Easement with Development Restriction</td>
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<table>
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<tr>
<th>Structure Mitigation</th>
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<tr>
<td><strong>Category 1 (Within Operating Pool)</strong></td>
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<tr>
<td>- Buyout and Remove Structures</td>
</tr>
<tr>
<td><strong>Category 2 (Within Maximum Pool)</strong></td>
</tr>
<tr>
<td>- Buyout or Other Mitigation</td>
</tr>
<tr>
<td>(If structure is impacted by Project)</td>
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Upstream Mitigation Area – Pools

- **Operating Pool**
  - Required to safely operate the Project
  - The Operating Pool will be treated as a floodway
  - Development Prohibited

- **Maximum Pool**
  - Flood water impacts from PMF event (204,000 cfs)
    - 100-year = 33,000 cfs
  - Revision Reach (FEMA)
  - Building Elevation Requirements
Upstream Mitigation Area – Categories

- **Category 1**
  - Within Operating Pool
  - Buyout and Remove

- **Category 2**
  - Within Maximum Pool
  - Offer Buyout, Consider Other Mitigation

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<tr>
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<td>(If structure is impacted by Project)</td>
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## Upstream Mitigation Area – BRRWD

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<tr>
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<th>Clay Co</th>
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<tr>
<td><strong>Flowage Easements</strong></td>
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<tr>
<td>Operating Pool Acres</td>
<td>4,233</td>
<td>427</td>
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<tr>
<td>Maximum Pool Acres</td>
<td>111</td>
<td>3,542</td>
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<td><strong>Residential Sites</strong></td>
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<tr>
<td>Category 2 Structures</td>
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DRAFT

BRRWD Permit
Condition #3

► Property Rights:
  ► Additional flexibility desired for upstream structures and property owners
  ► Goal for structures: no more restrictive in upstream area than in Moorhead or MN in general

POTENTIAL CONDITIONS OF THE BUFFALO-RED RIVER WATERSHED DISTRICT (BRRWD) PERMIT:
NOTE: THE BRRWD RESERVES THE AUTHORITY TO ADD, MODIFY, OR REMOVE CONDITIONS PRIOR TO ANY PERMIT ISSUANCE.

A BRRWD Permit is granted and becomes valid subject to the following conditions:

1. ADDITIONAL FLOOD MITIGATION: With impacts expected to flood levels at Wolverton and Georgetown, the Permittee shall provide certifiable, permanent 100-year flood protection to the City of Georgetown and the City of Wolverton. Flood protection for the Cities of Georgetown and Wolverton may commence prior to acquisition of all flowage easements for the proposed maximum flood pool and to acquisition of property rights for dam construction.

2. SITE ACCESS: The permittee shall grant access to the Minnesota portions of the project site at all reasonable times during and after construction to BRRWD authorized representatives and the Board of Managers for inspection of the work authorized hereunder.

3. PROPERTY RIGHTS: Minnesota Property rights shall be acquired, or option agreements shall be signed for all property necessary for construction and operation of the Project prior to the commencement of construction in Minnesota. Property rights shall include fee simple absolute acquisition of all property of the Project footprint (Plan B eastern tieback could be by easement). Temporary construction easements shall be acquired on all property that will be used for construction of the Project.

All lands with residential or farmstead structures that will be impacted will be acquired in fee simple absolute, unless the:
   a. landowner prefers an alternative, and
   b. other regulatory authorities (such as Army Corps and Department of Natural Resources) will permit (assumed to be no more restrictive than current statewide floodplain regulations), and
   c. it is cost effective (costs less than full fee simple absolute purchase) for the structure to be relocated, elevated, ringdiked, or floodproofed.

For all other property impacted when the dam is operated at maximum capacity that is not acquired in fee simple absolute, flowage easements are required. The demolition and/or cleanup of bought-out structures, or construction associated with relocation, elevating, floodproofing, or ringdiking of farmstead or rural residences may commence prior to acquisition of all flowage easements.

4. SUBMITTALS: All submittals required by the Minnesota Department of Natural Resources in their Permit No. 2018-0819 conditions shall also be provided concurrently to the BRRWD.

5. WOLVERTON CREEK CROSSING: The Permittee shall coordinate the final design of the Wolverter Creek Structure with the BRRWD to ensure compatibility with the Wolverter Creek Restoration Project. The BRRWD recommends the Wolverter Creek Structure and Plan B Eastern Tieback levee be moved to the County line. No construction of the Wolverter Creek Structure is allowed by this permit until written approval of the final design is obtained from the BRRWD.

6. OPERATION, MAINTENANCE, MONITORING, AND INSPECTION PLAN: Any changes to the Operation and Maintenance Plan require prior written approval of the BRRWD.
Moorhead Perspectives
Post-2009 Total: $109.9M

- State: $77.4M
- City: $32.2M
- Other: $0.3M

Floodwall top elevation: 45 feet
Levee top elevation: 44 feet

**Post-2009 City Project Summary**

- Voluntary acquisitions: 263
- Easements: 68
- Levees/floodwalls (miles): 12.1
- Removable floodwall closures: 5
- Stormwater pump stations: 19
- Stormwater gates: 78
- Sanitary pump station upgrades: 5
Total: $36M

BRRWD Oakport Project Summary

- Property acquisitions: 60
- Easements: 24
- Levees/floodwalls (miles): 6.1
- Road closures: 1
- Stormwater pump stations: 5
- Stormwater gates: 4
- Sanitary pump station upgrades: 1
## Probabilistic Forecasts vs Actual Crest

<table>
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<tr>
<th>Flood Year</th>
<th>90%</th>
<th>80%</th>
<th>70%</th>
<th>60%</th>
<th>50%</th>
<th>40%</th>
<th>30%</th>
<th>20%</th>
<th>10%</th>
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<td>34.8</td>
<td>35.1</td>
<td>36.6</td>
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<td>2006</td>
<td>32.1</td>
<td>32.4</td>
<td>32.6</td>
<td>32.9</td>
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<td>33.6</td>
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<td>40.3</td>
<td>40.7</td>
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<td>42.1</td>
<td>42.4</td>
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<td>2019</td>
<td>34.9</td>
<td>35.03</td>
<td>36.5</td>
<td>37.9</td>
<td>38.9</td>
<td>40.3</td>
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Red River

- 8 of top 10 flood events within the last 30 years
- Flood magnitudes & frequencies changing

<table>
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<tr>
<th>Date</th>
<th>Crest (feet)</th>
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<tbody>
<tr>
<td>03-28-2009</td>
<td>40.84</td>
</tr>
<tr>
<td>04-18-1997</td>
<td>39.72</td>
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<td>04-07-1897</td>
<td>39.10</td>
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<td>04-09-2011</td>
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<td>04-15-1969</td>
<td>37.34</td>
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<td>04-05-2006</td>
<td>37.13</td>
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<td>03-21-2010</td>
<td>36.99</td>
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<td>04-14-2001</td>
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<td>04-09-1989</td>
<td>35.39</td>
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<tr>
<td>04-08-2019</td>
<td>35.03</td>
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</table>
A Changing 100-Year Floodplain

Governors’ Task Force Recommended Level
100-year = 33,000 cfs
City of Moorhead Floodplain Revisions

Floodplain Map Revisions
- 1972
- 1979
- 1987
- 2012

Significant development within the City prior to 1st floodplain map, subsequent revisions & NFIP authority to regulate

<table>
<thead>
<tr>
<th></th>
<th>2012 FEMA Floodplain</th>
<th>Period of Record¹</th>
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<tbody>
<tr>
<td><strong>Period of record</strong></td>
<td>Thru ≈ 1970±</td>
<td>Thru 2009</td>
</tr>
<tr>
<td>100-yr flood flow (cfs)</td>
<td>29,300</td>
<td>33,000</td>
</tr>
<tr>
<td>100-yr flood stage (feet)</td>
<td>39.3</td>
<td>41.3</td>
</tr>
<tr>
<td>500-yr flood flow (cfs)</td>
<td>50,000</td>
<td>66,000</td>
</tr>
<tr>
<td>500-yr flood stage (feet)</td>
<td>43.5</td>
<td>46.5</td>
</tr>
</tbody>
</table>

¹Source: MN SEIS
Future 100-year Floodplain Impacts:

- Existing levees lose FEMA accreditation
- Without a comprehensive project, flood insurance mandates expand significantly
  - Between 700 & 1,300 properties impacted
  - Negative impact to property values & neighborhood character
  - Negative impact to affordable housing stock
No Diversion Project?

City of Moorhead
Path Forward

- Complete acquisitions & levees to 44 feet where possible
- Accept future flood risk (less than 100-year protection)
- Accept future floodplain mapping & flood insurance mandates

- Abandon previous work that can’t be modified
- “Start over” with a larger scale levee plan
No Project?

- Physical limitations to modifying previous work
- To achieve reliable protection most previous work would be abandoned
  - Remove existing levees & floodwalls
  - Remove streets
  - Remove & reroute utilities
  - Acquire additional property
  - Reconstruct levee further from the river
No Project?

Raise I-94 & Red River Bridge
No Diversion Project?

City of Moorhead Path Forward

- Complete acquisitions & levees to 44 feet where possible
- Accept future flood risk (less than 100-year protection)
- Accept future floodplain mapping & flood insurance mandates

From Governor’s Task Force:
- 22.5 miles levee/floodwall
- 26 stormwater pump stations
- 673 property acquisitions
- Grade raises: Main Ave, I-94
- Upstream impacts requiring mitigation & property rights
- $800M

Cost Prohibitive
Thank you