



METRO
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AUTHORITY

FM Area Diversion Project Overview

Kris Bakkegard, Director of Engineering

Agenda

- 01 History & Need
- 02 Project Overview
- 03 P3 Work
- 04 USACE Work
- 05 City Work
- 06 Mitigation Work

Flood History



Past Fargo Flooding



1897



1943



1969



1997



2009



2010



2011



2019

Crest-level rankings

The Need for Flood Mitigation

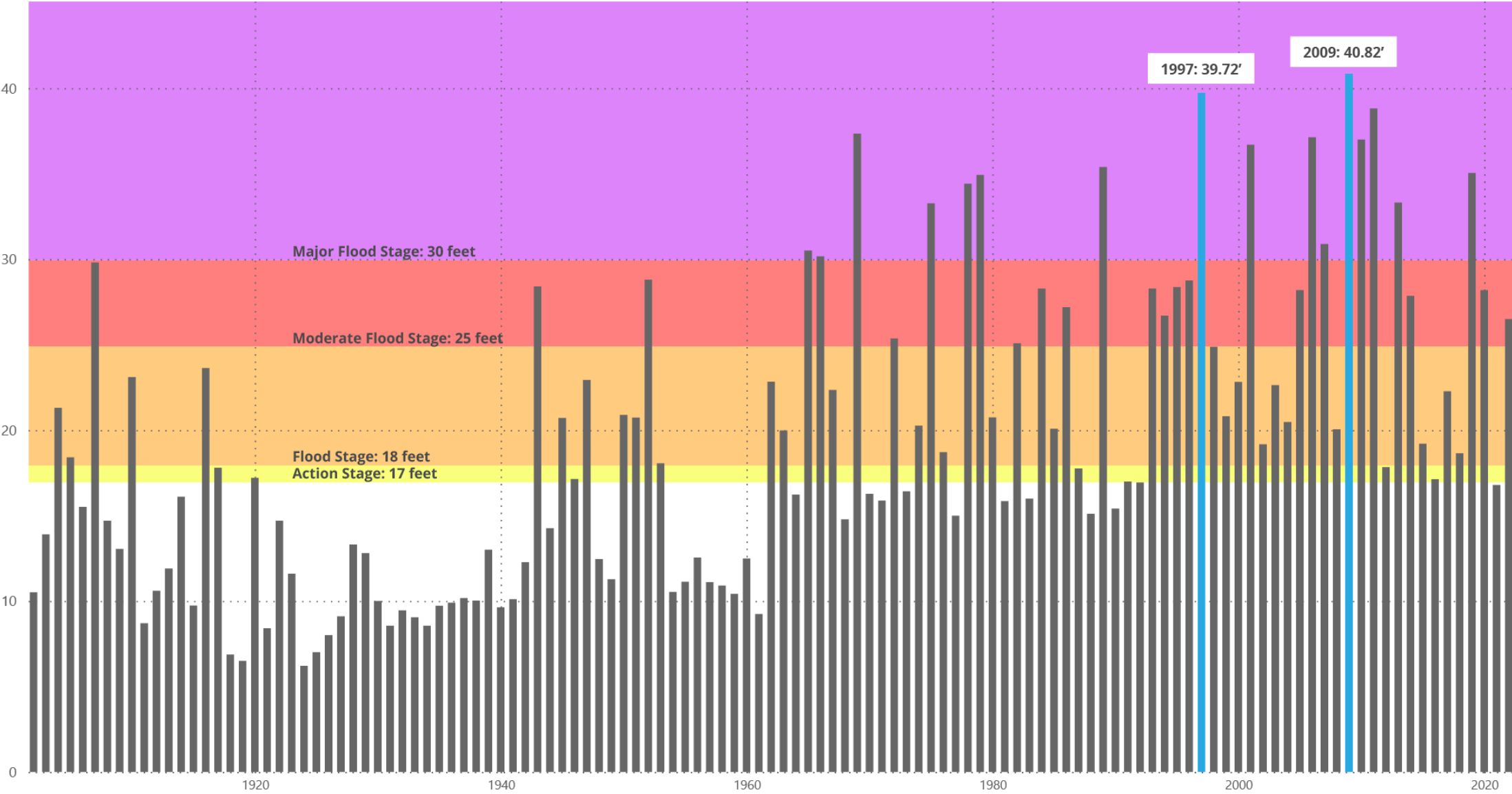


- Red River in Fargo **exceeded flood stage every year** from 1993-2023 except 2012, 2016 and 2021
 - It's **flooded 61 times** in the past 120 years
- **260,000 people** – along with \$18 billion worth of their homes, businesses and property – are **at risk of catastrophic flooding**
- **Economic impacts**
 - 1997 flood: \$3.5 billion in damages (more than \$6.4 billion when adjusting for inflation)
 - Millions spent fighting floods, including \$8.2M in 2009
 - Flood insurance will not be required for those protected after the diversion's construction, but it will be available for a reduced rate

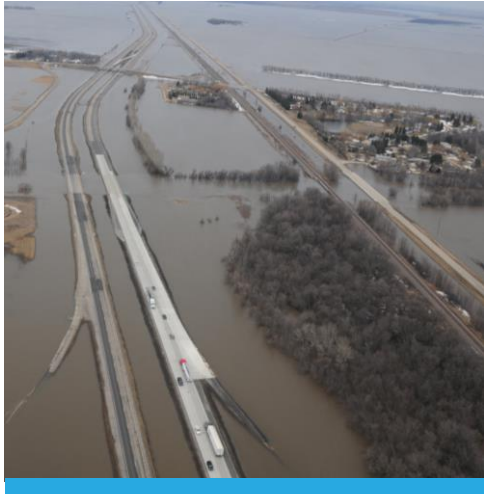
Fargo's Top 10 Floods

1. 40.82' – 2009
2. 39.72' – 1997
3. 39.10' – 1897
4. 38.81' – 2011
5. 37.34' – 1969
6. 37.13' – 2006
7. 36.99' – 2010
8. 36.69' – 2001
9. 35.39' – 1989
10. 35.04' – 2019

Changing 100-Year Floodplain



Fighting the Record 2009 Flood



40.82'

Red River
crest on
March 28,
2009



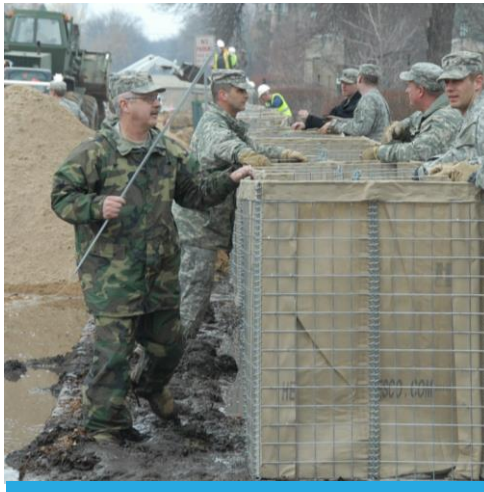
69

Miles of
emergency
measures



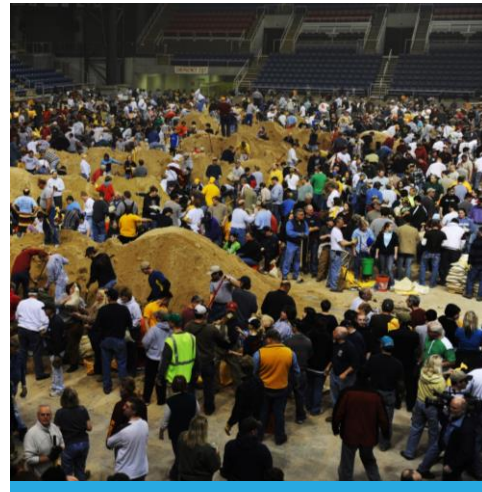
7.3M⁺

Sandbags
used



8

Miles of
Hesco
barriers
placed



150K

Volunteer
hours

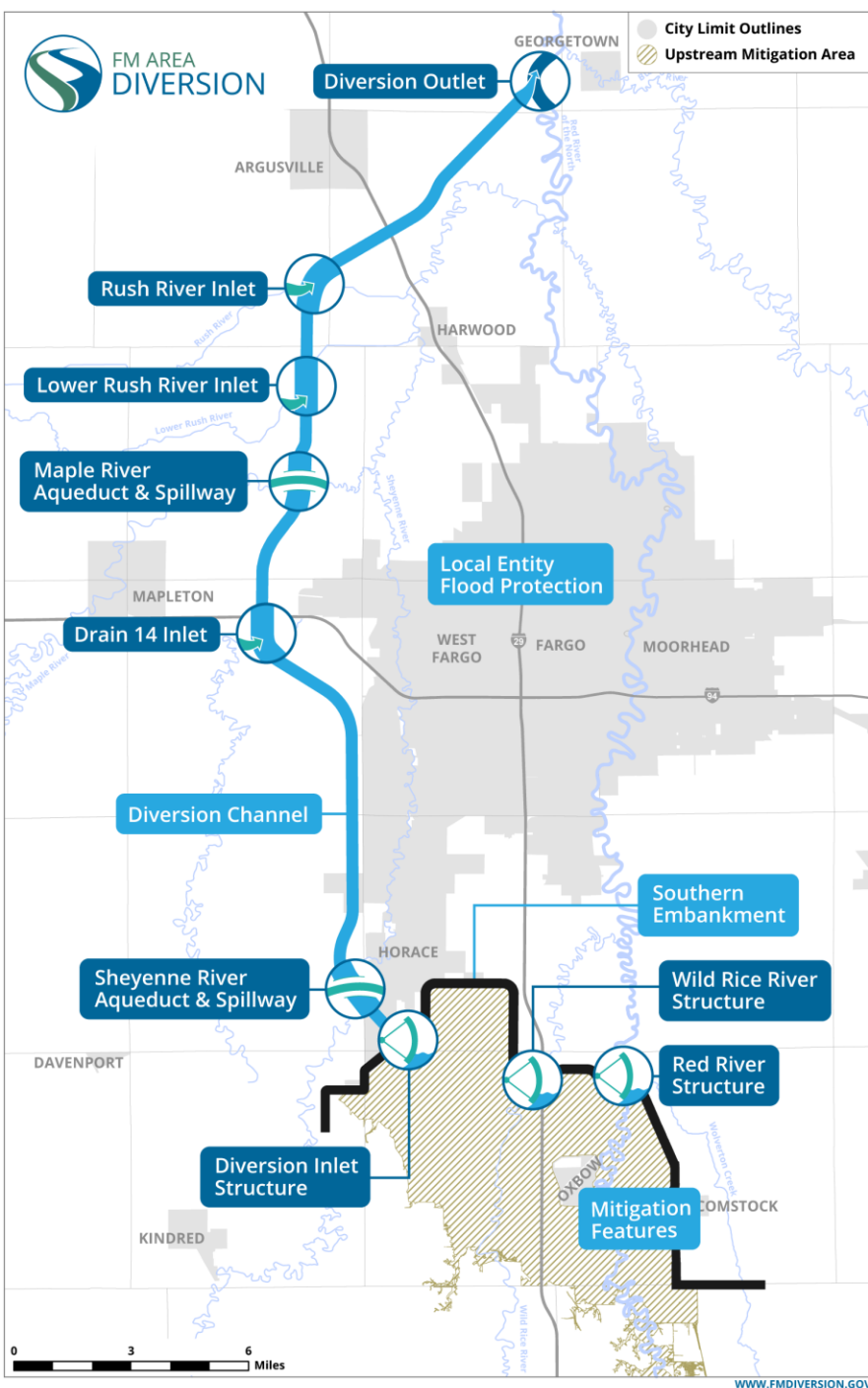


\$8.4M

Spent to fight
the flood

Project Overview





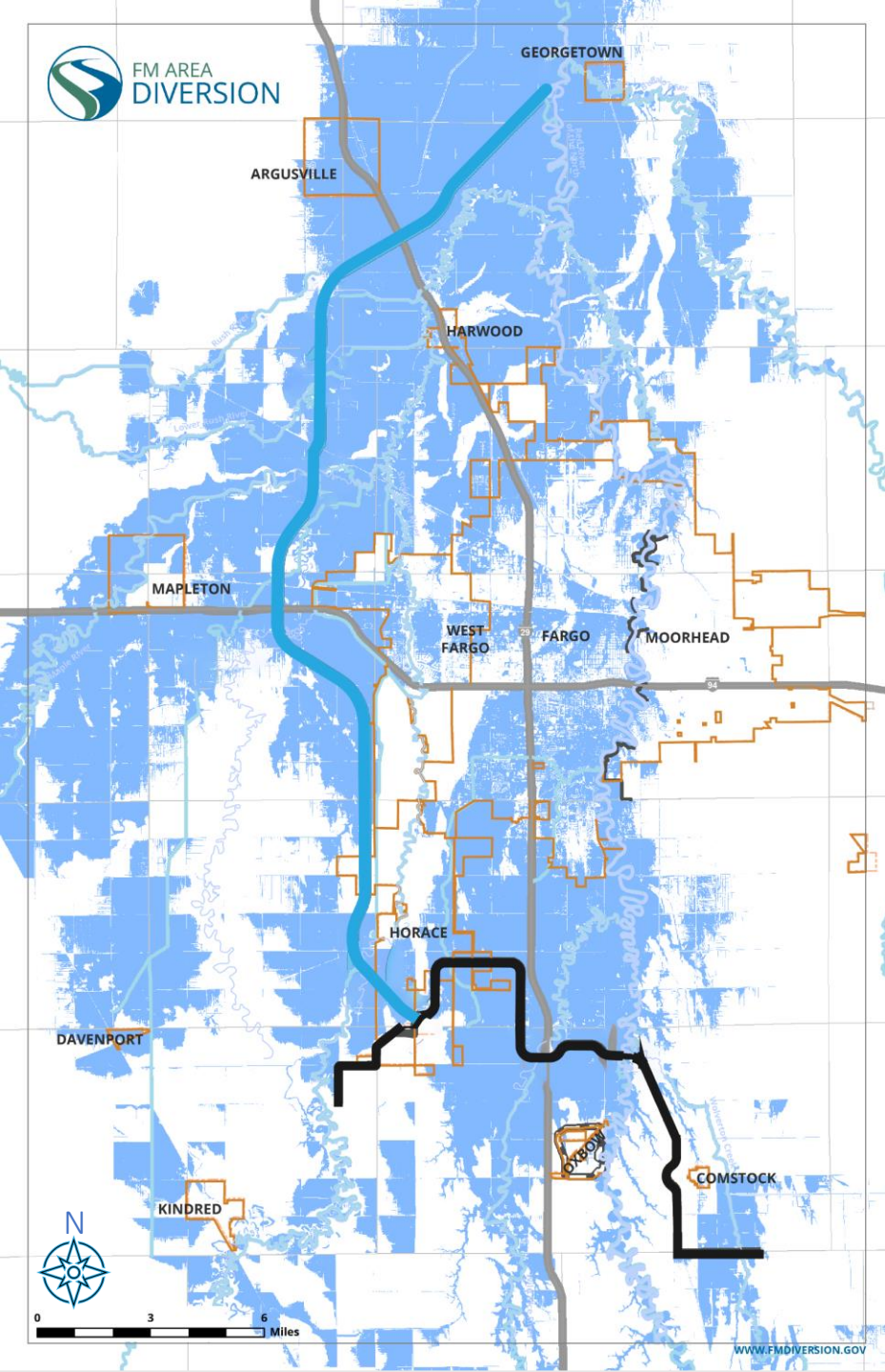
Project Goals

100-year flood protection minimum

37-foot river stage through town

500-year fightable protection

40-foot river stage through town

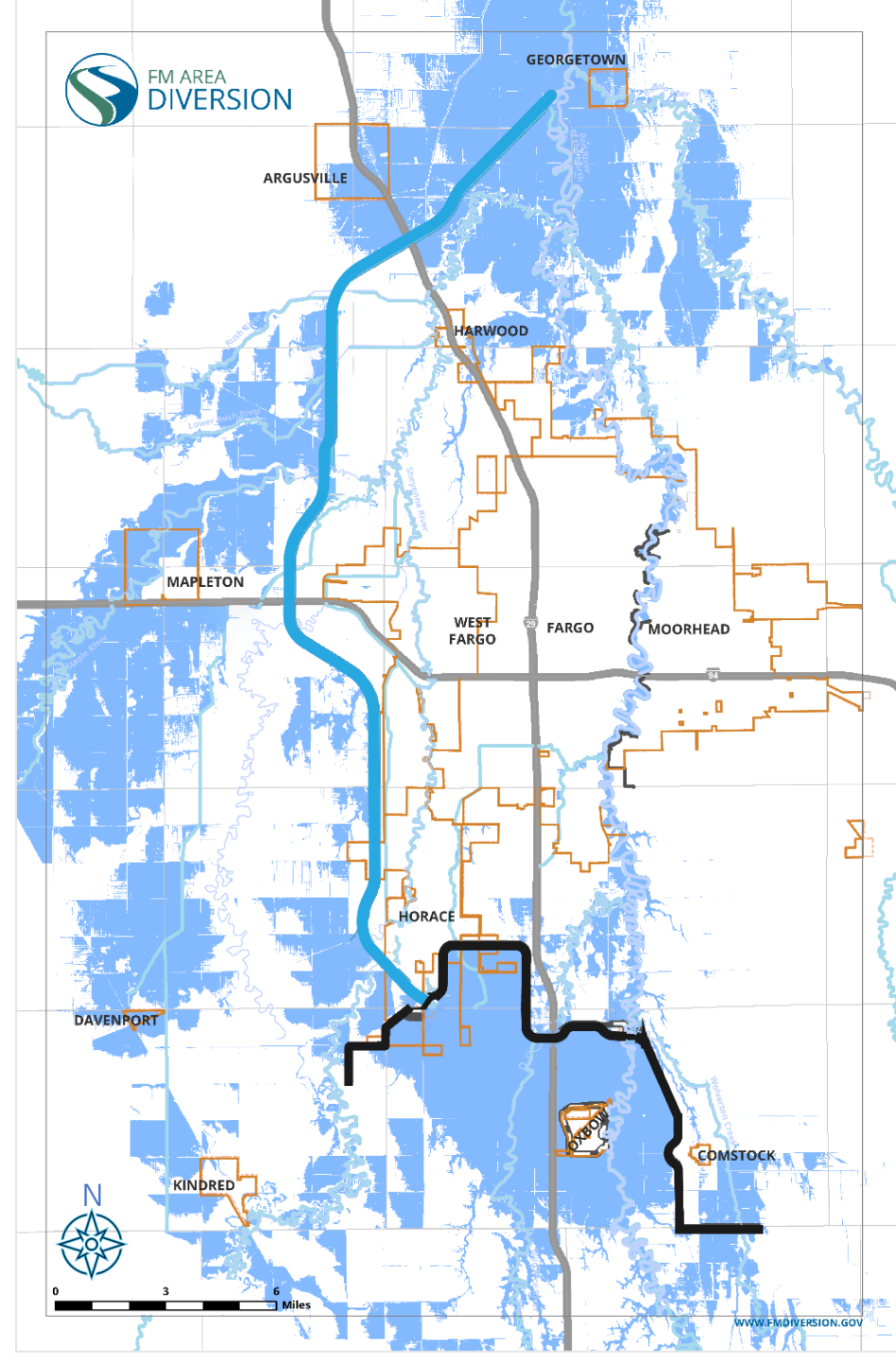


100-Year Floodplain

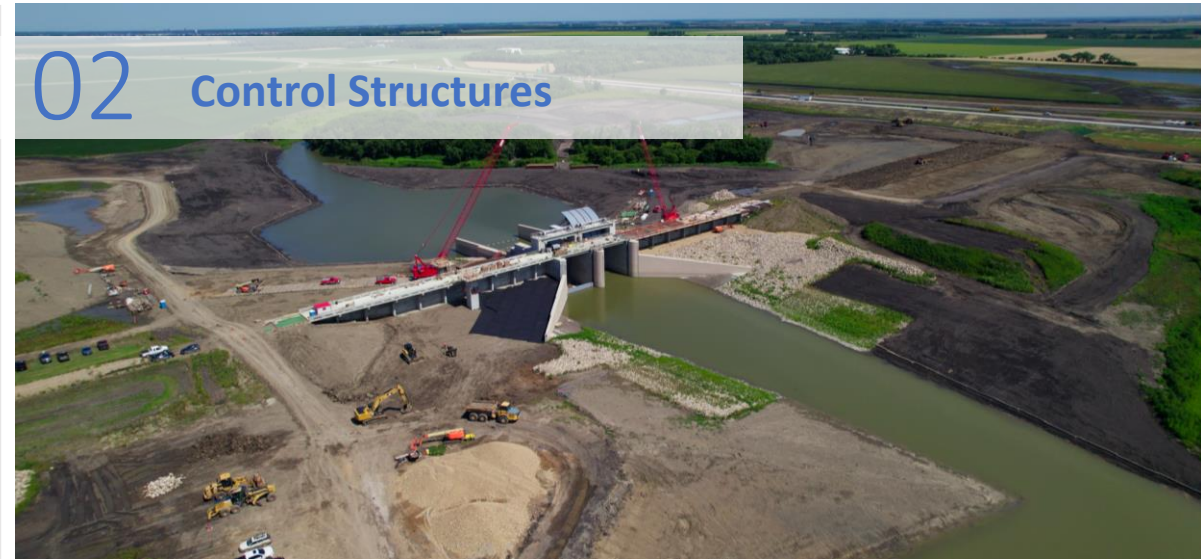
Existing Conditions



With Project



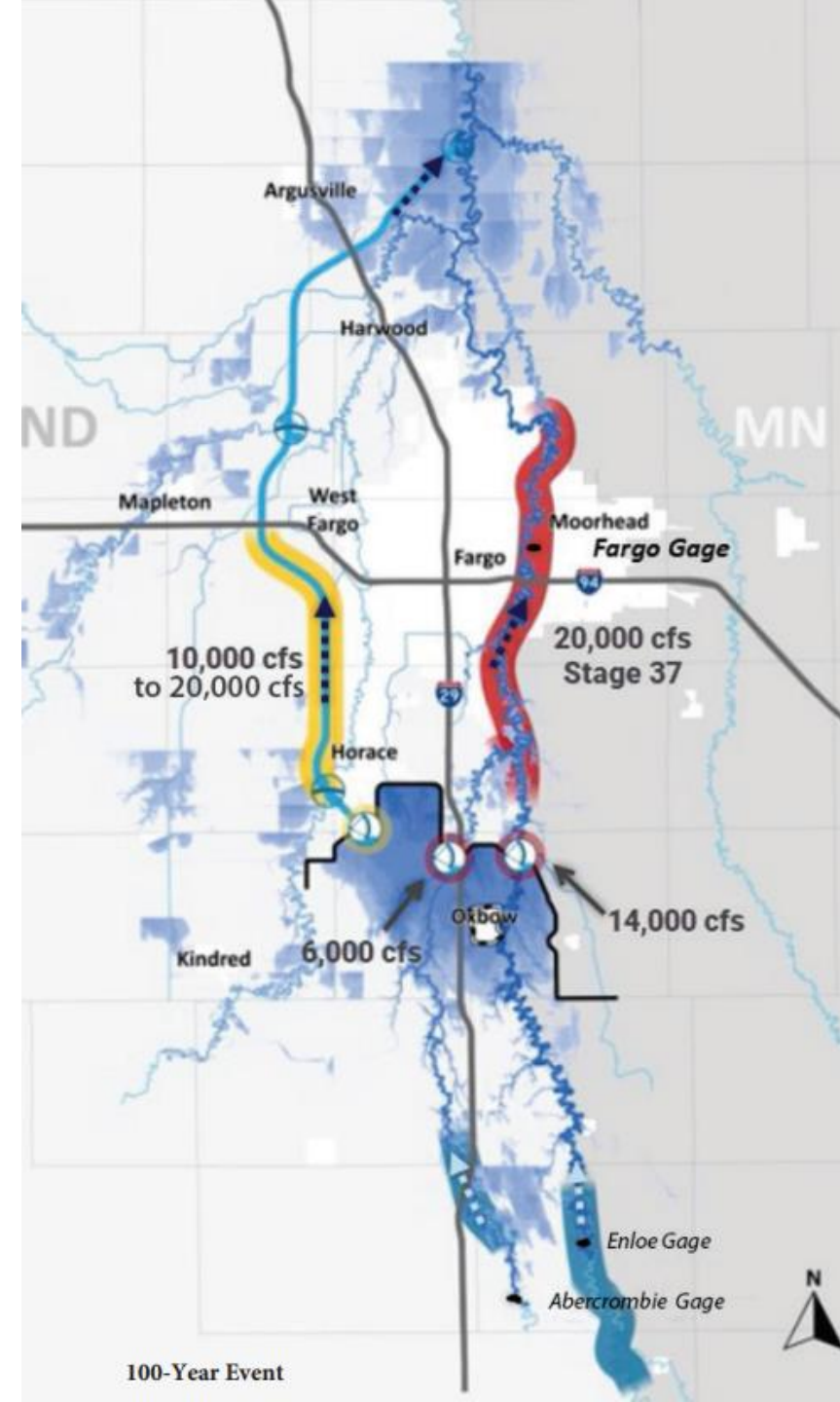
How It Will Work



Project Operation Map & CFS

100-year flood event operational example

- Red River Structure gates open about 5 feet to pass 14,000 cfs
- Wild Rice Structure gates open about 4 feet to pass 6,000 cfs
- Floodwaters are stored upstream behind the southern embankment
- Diversion Inlet Structure gates open about 2 feet to pass 10,000-20,000 cfs into the stormwater diversion channel



Project Firsts

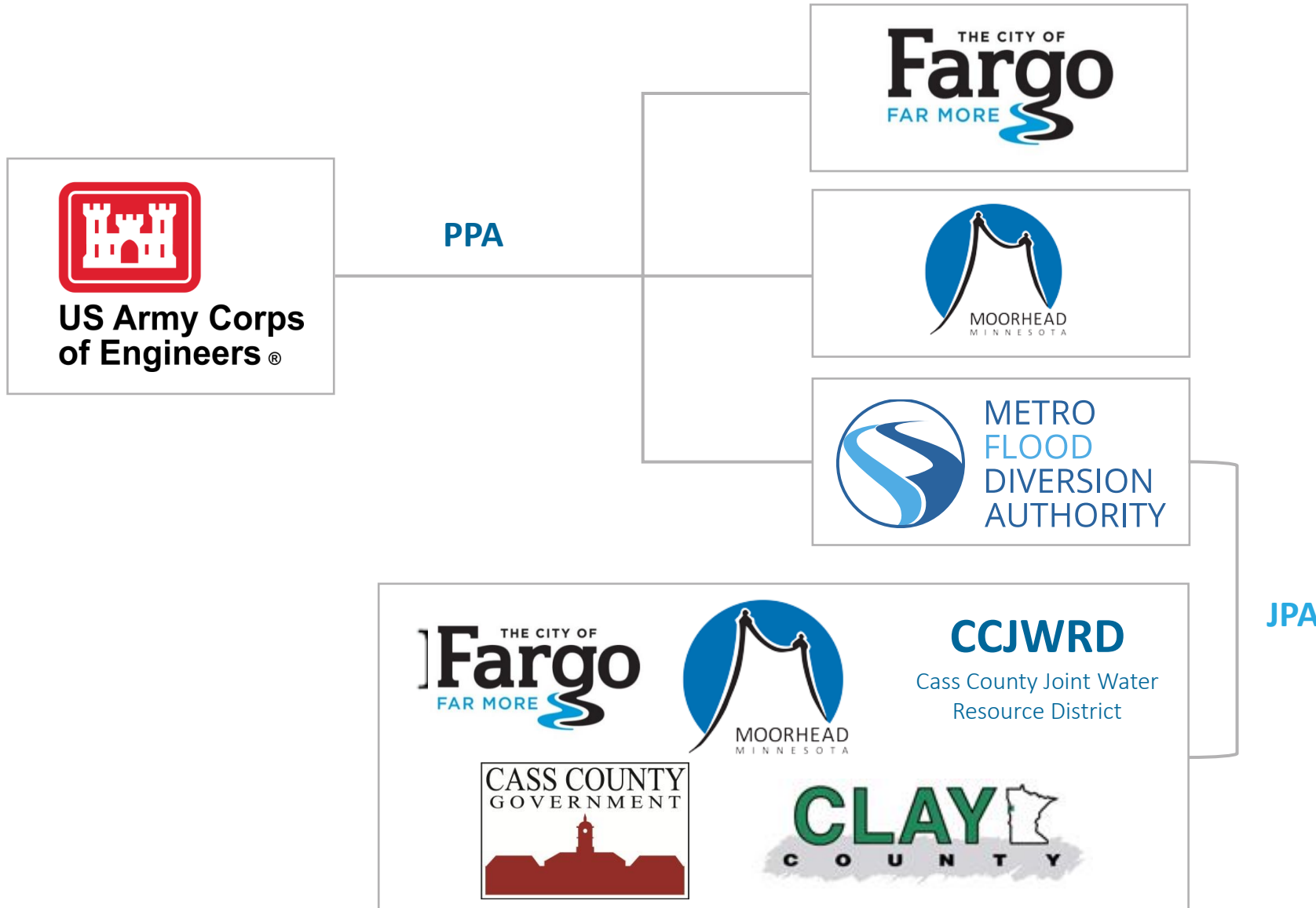


- First-ever public-private partnership (P3) done in conjunction with the U.S. Army Corps of Engineers
- First-ever water management P3 implemented in North America
- First green finance initiative in the U.S. specifically designed for climate change adaptation
- Pilot project for using renewable biofuels to power heavy machinery

Project Flyover



Split Delivery Structure



The Project Partnership Agreement (PPA) is between the government (USACE) and non-federal partners (MFDA, City of Fargo and City of Moorhead) and serves as the official agreement marking the beginning of the FM Area Diversion.

The Joint Powers Agreement (JPA) is an agreement between member entities that establishes duties, responsibilities, and obligations regarding the FM Area Diversion project.

P3 Structure



Governing Authority

13-member Board of Authority and staff



P3 Partner

Responsible for designing, constructing, financing, operating, and maintaining the Stormwater Diversion Channel & Associated Infrastructure

Joint venture of:   



Design & Construction Arm of RRVA

Responsible for design and construction of Stormwater Diversion Channel & Associated Infrastructure

Project Delivery Structure



Stormwater Diversion Channel & Associated Infrastructure (SWDCAI)



Delivered by the P3



Southern Embankment & Associated Infrastructure (SEAI)



US Army Corps of Engineers®

Delivered by the U.S. Army Corps of Engineers

Mitigation Features and Associated Infrastructure (MFAI)



US Army Corps of Engineers®



Delivered by the U.S. Army Corps of Engineers and city and county governments

Local Entity Flood Protection & Associated Infrastructure (LFPAI)



Delivered by city and county governments in coordination with the Corps



Why a Public-Private Partnership?



- MFDA **retains ownership** and control over operating standards and other requirements
- RRVA, as the private sector partner, delivers **innovative technical solutions** within MFDA requirements
- The engineer and contractor work collaboratively to **lower construction cost** and deploy new technology
- MFDA receives a **fixed-price bid** and RRVA assumes the risks of delay, cost escalation, etc.
- **Private entity holds debt** and is incentivized to deliver the project in order to receive payment

Stormwater Diversion Channel & Associated Infrastructure (SWDCAI)



Components

30-Mile Diversion Channel

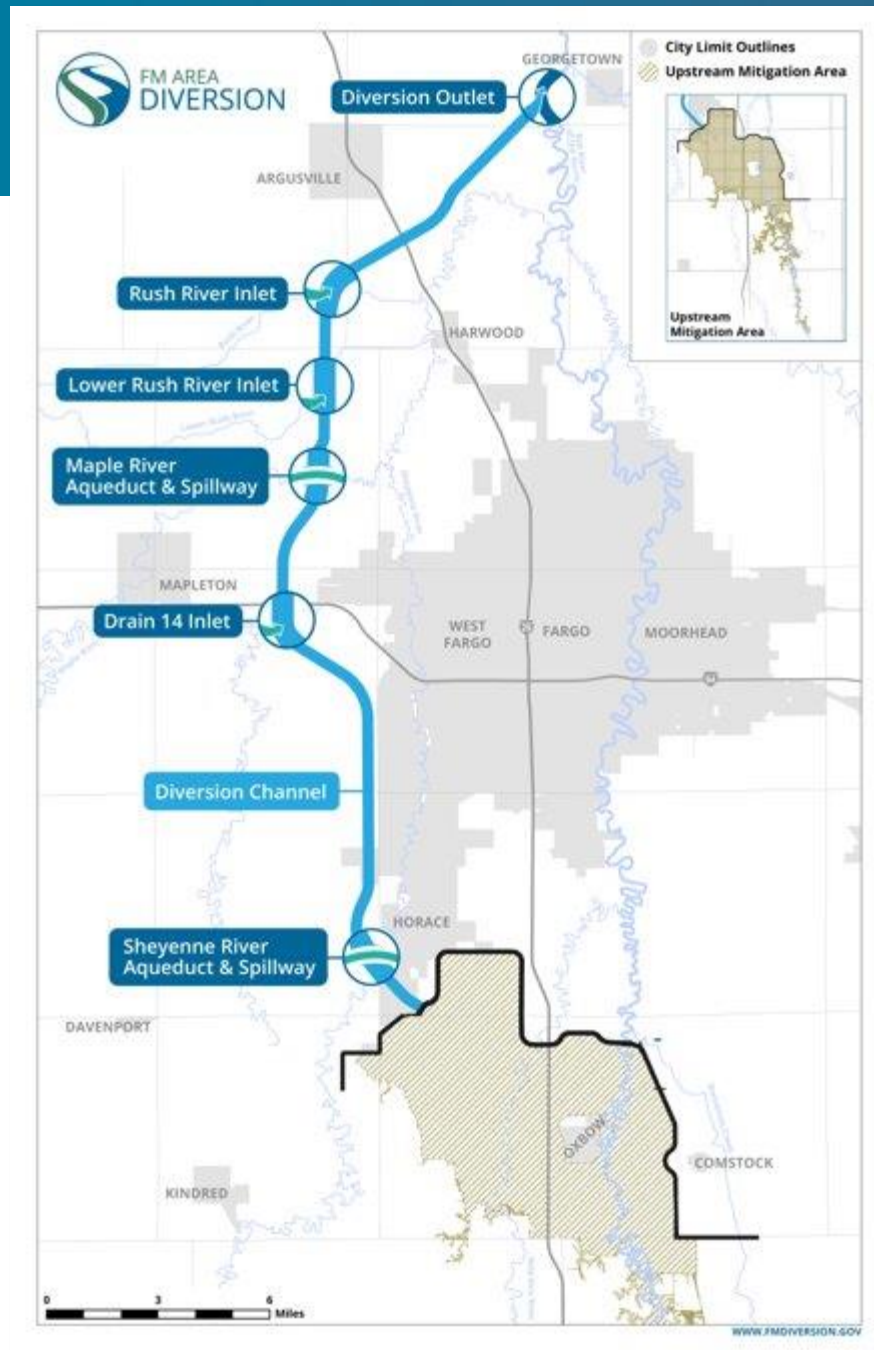
3 Structures

- Diversion Outlet
- Maple River Aqueduct
- Sheyenne River Aqueduct

14 Drainage Inlets

Transportation Features

- 3 Railroad Crossings
- 4 Interstate Crossings
- 12 County Road Crossings



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Stormwater Diversion Channel



Construction Overview

Builder: ASN Constructors (P3)

Start Date: August 2022

Scheduled Completion: Early 2027

Component Details

Length: 30 miles

Excavation Totals: 45 million cubic yards

Utility Relocations: coordinating with 18 companies



Stormwater Diversion Channel

Toe Drains

Low Flow Channel

Levee

Main Channel

Excavated Material Berm

Maple River Aqueduct



Construction Overview

Builder: ASN Constructors (P3)

Start Date: June 2023

Scheduled Completion: Q4 2025

Component Details

Length: 250 feet

Width: 50 feet

Concrete: 10,000 cubic yards

Piling: 48,194 linear feet of H pile

June 2024



Sheyenne River Aqueduct



Construction Overview

Builder: ASN Constructors (P3)

Start Date: 2024

Scheduled Completion: early 2027

Component Details

Length: 250 feet

Width: 35 feet

Concrete Used: 8,000 cubic yards

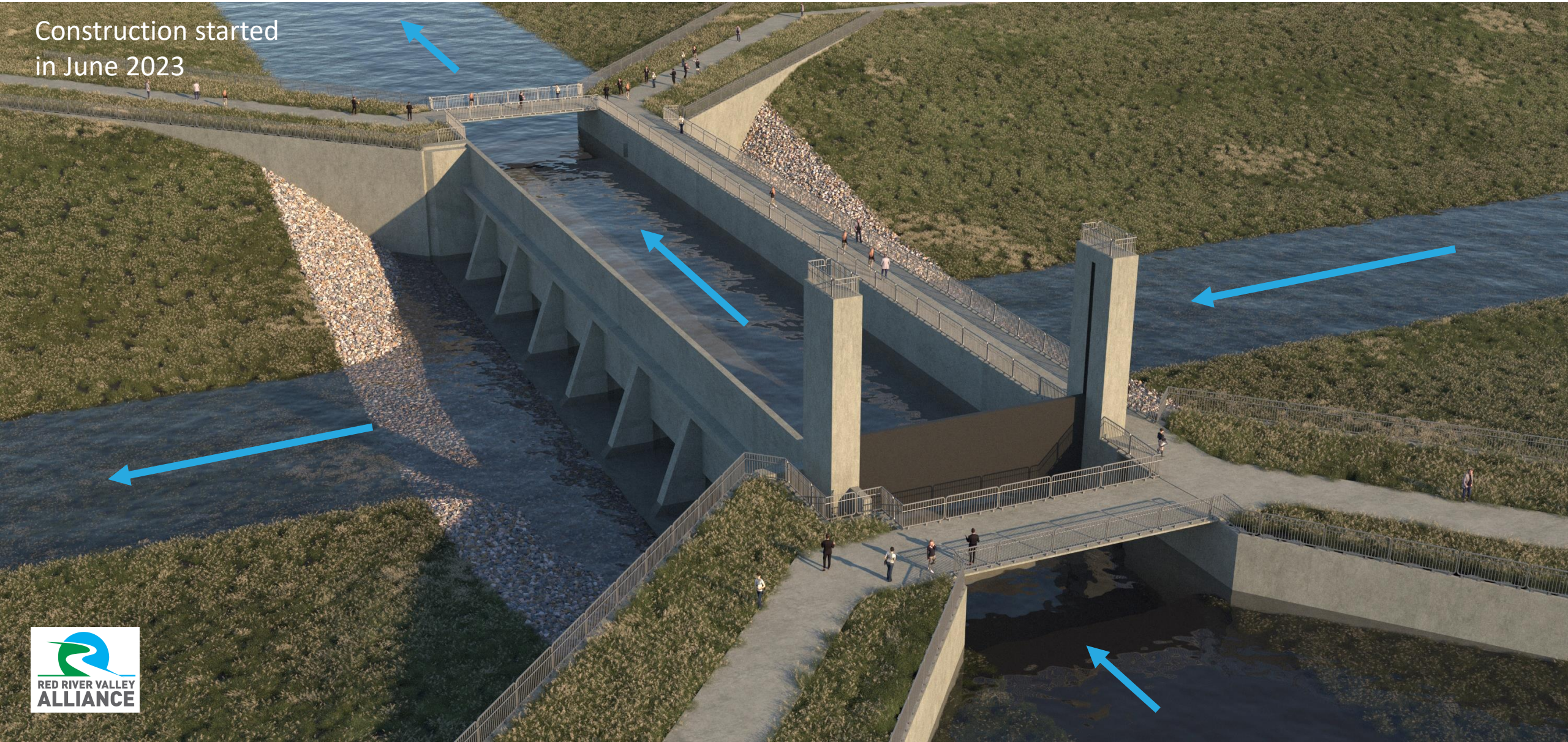
Piling: 9,642 linear feet of sheet pile

May 2024



Aqueduct

Construction started
in June 2023



Diversion Outlet



Construction Overview

Builder: ASN Constructors (P3)

Start Date: 2023

Completion Date: 2024

Component Details

Length: 1,500 feet

Width: 300 feet

Riprap: 24,000 cubic yards

Boulders: 450+ placed as rock weir to promote fish passage

November 2023



Interstate Crossings



Railroad Crossings



Southern Embankment & Associated Infrastructure (SEAI)



**US Army Corps
of Engineers®**



Components

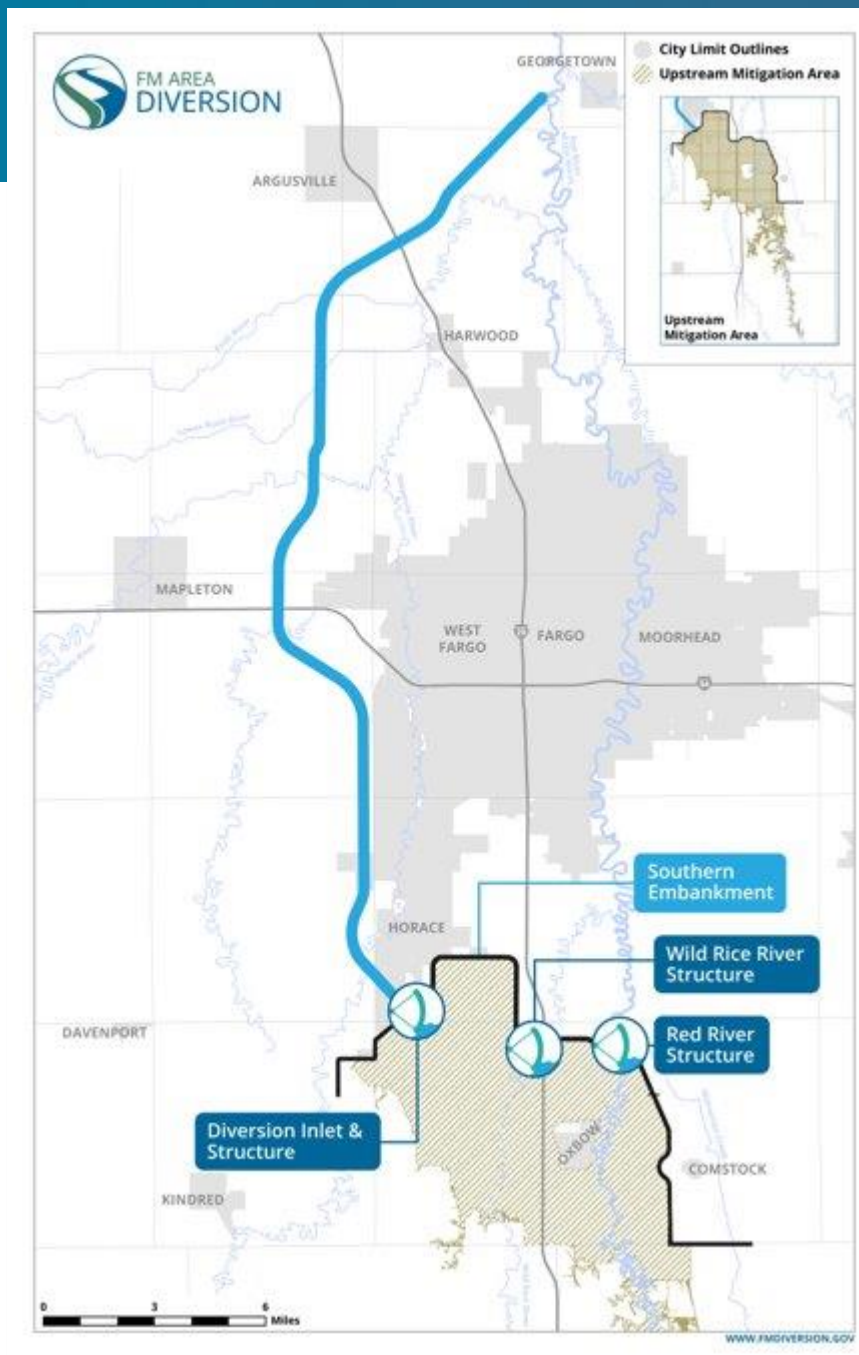
22 Miles of Earthen Embankment

3 Control Structures

- Diversion Inlet Structure
- Wild Rice River Structure
- Red River Structure

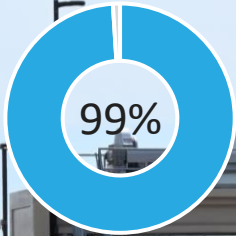
Transportation Features

- I-29 crossing bridge
- County and township crossings
- 4-mile grade raise on I-29



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Diversion Inlet Structure



Construction Overview

Builder: Ames Construction
(USACE contractor)

Start Date: 2017

Scheduled Completion:
November 2023

Component Details

Excavation: 264,000 cubic yards

Steel Piling: 55,400 linear feet

Concrete: 11,700 cubic yards

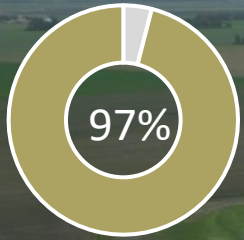
Riprap: 20,000 cubic yards

Gates: 50 feet wide by 26 feet tall

August 2023



Wild Rice River Structure



Construction Overview

Builder: Ames Construction
(USACE contractor)

Start Date: 2020

Completed: October 2023

Component Details

Excavation: 420,000 cubic yards

Steel Piling: 70,200 linear feet

Concrete: 13,000 cubic yards

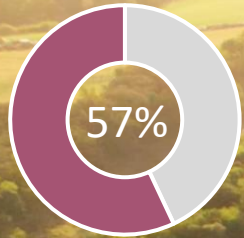
Riprap: 14,500 cubic yards

Gates: 40-by-40 feet

June 2023



Red River Structure



March 2024



Construction Overview

Builder: Ames Construction
(USACE contractor)

Start Date: 2022

Scheduled Completion:
March 2026

Component Details

Excavation: 1.8 million cubic yards

Steel Piling: 87,000 linear feet

Concrete: 72,000 cubic yards

Riprap: 26,200 cubic yards

Gates: 50 feet wide by 52.5 feet tall

Tainter Gates



Component Details

8 radial-arm Tainter gates
across 3 control structures

Diversion Inlet Structure:

- 3 gates
- 50 feet wide, 26 feet tall
- 47.5 tons each

Wild Rice River Structure:

- 2 gates
- 40 feet wide, 40 feet tall
- 70 tons each

Red River Structure:

- 3 gates
- 50 feet wide, 52.5 feet tall
- 136 tons each

Southern Embankment Reach SE-1A



SE-1A

November 2022



Construction Overview

Builder: Tunheim
Construction (USACE
contractor)

Start Date: 2021

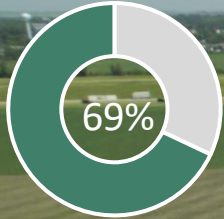
Completed: November 2022

Component Details

Length: 3 miles

Excavation: 142,000 cubic
yards

Southern Embankment Reach SE-2A



SE-2A

June 2023



Construction Overview

Builders: H. B. Construction Inc. (USACE contractor)

Start Date: 2021

Scheduled Completion: September 2024

Component Details

Length: 1.8 miles

Excavation: 693,000 cubic yards

Turf Reinforcing Mat: 79,000 cubic yards

Southern Embankment Reach SE-2B



Construction Overview

Builders: R.J. Zavoral & Sons Inc.

Start Date: 2024

Scheduled Completion: 2025

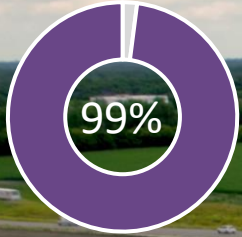
Component Details

Length: 4.1 miles

June 2024



I-29 Grade Raise



Construction Overview

Builder: Industrial Builders Inc. (USACE contractor)

Start Date: 2021

Scheduled Completion: January 2024

Component Details

Length: 4.2 miles

Excavation: 1.2 million cubic yards

Steel Piling: 13,000 feet

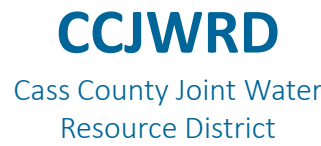
Concrete: 387,000 cubic yards

Riprap: 11,700 cubic yards

October 2023



Local Entity Flood Protection & Associated Infrastructure (LFPAI)



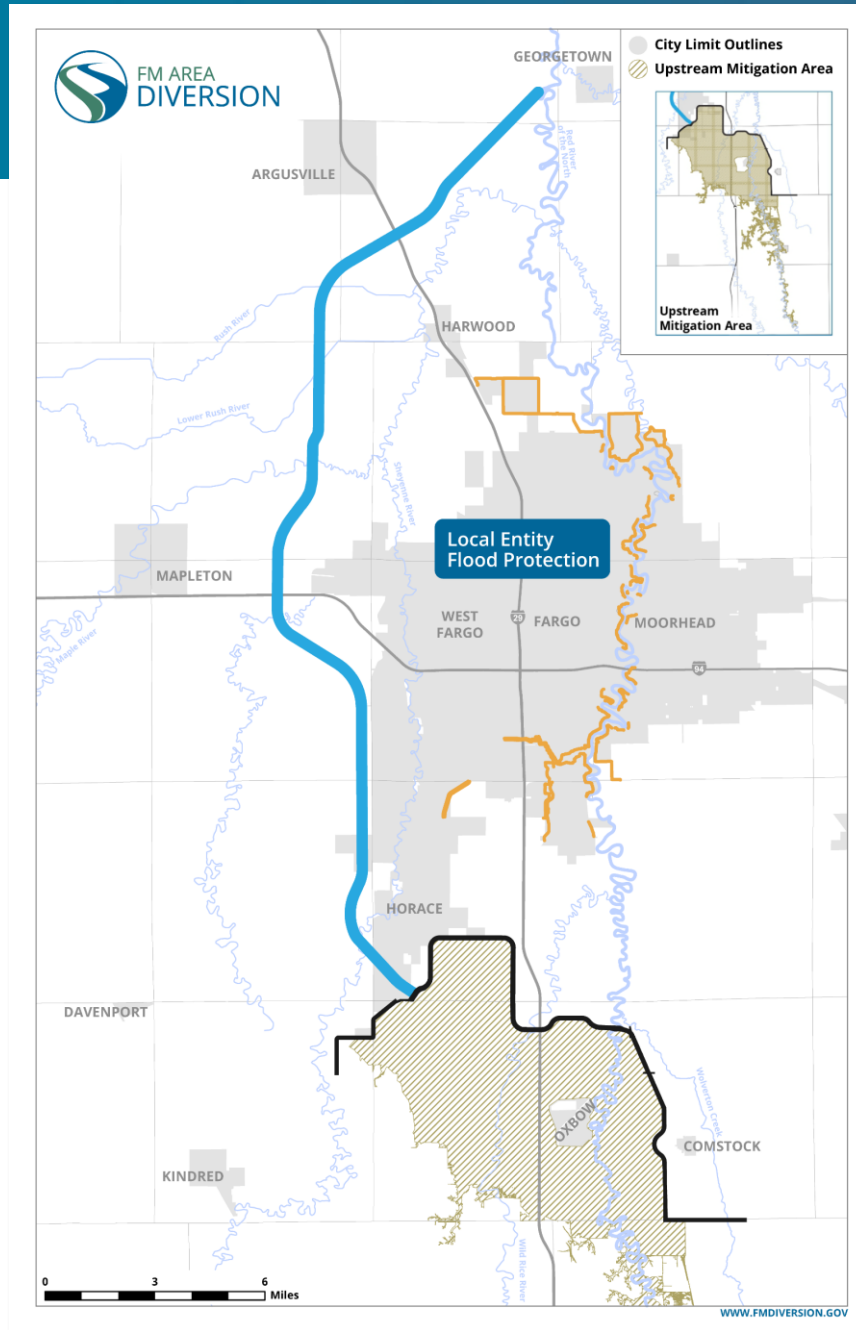
Components

Levees & floodwalls

Stormwater lift stations

County & township road improvements and grade raises

Goal: safely pass as much as 37 feet of water through town during a 100-year flood without the need for emergency measures



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Mitigation Features & Associated Infrastructure (MFAI)



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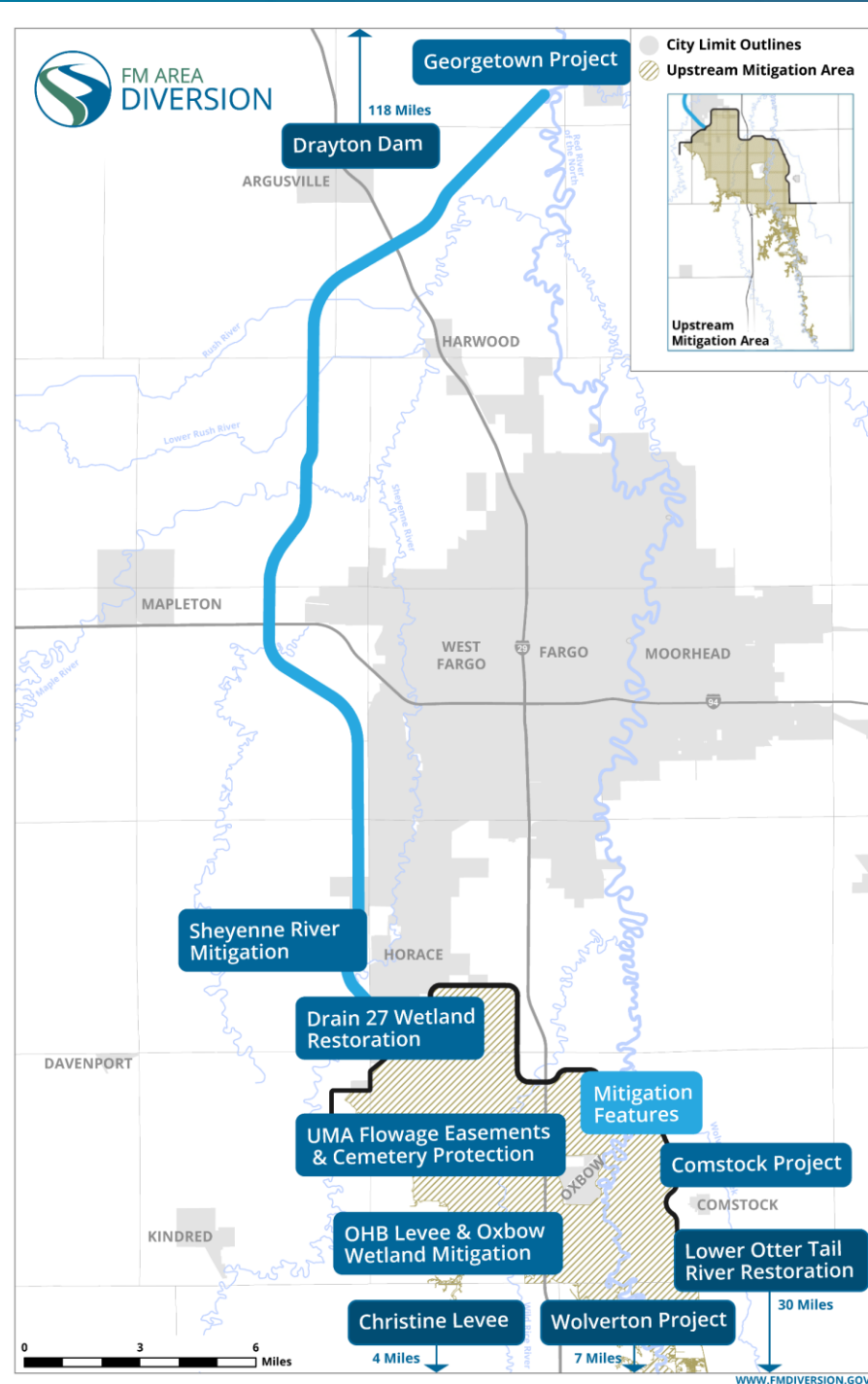


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Components

- Cemetery mitigation*
- Christine Levee*
- Comstock Project*
- Drain 27 Wetland Mitigation
- Drayton Dam
- Flowage easements*
- Georgetown Project*
- Lower Otter Tail River Restoration Project
- OHB Levee
- Oxbow Wetland Mitigation
- Sheyenne River Mitigation
- Wolverton Project*



* Projects being completed by MFDA and member entities; other projects being completed by USACE

Oxbow Wetland Mitigation



Project Overview

Contractor: Industrial Builders Inc.

Start Date: Fall 2020

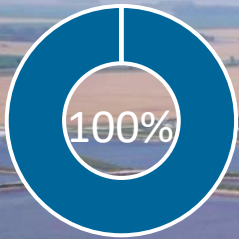
Completed: Spring 2023

Component Details

Size: 10.6 wetland acres with 8.2 acres of 50-foot upland buffers

Growth: 63.1 acres of seedlings planted

Drayton Dam Mitigation



Project Overview

Contractor: HSG Park Joint Venture (USACE Contractor)

Start Date: May 2022

Scheduled Completion: Fall 2023

Location: 120 miles north of Fargo-Moorhead

Component Details

- Constructing a rock rapids fishway structure
- Offsets project impacts to biotic connectivity on the Red River

August 2023



Drain 27 Mitigation



Project Overview

Contractor: HSG Park Joint Venture (USACE contractor)

Start Date: Spring 2022

Completed: Fall 2022

Component Details

Size: 320 acres of wetland

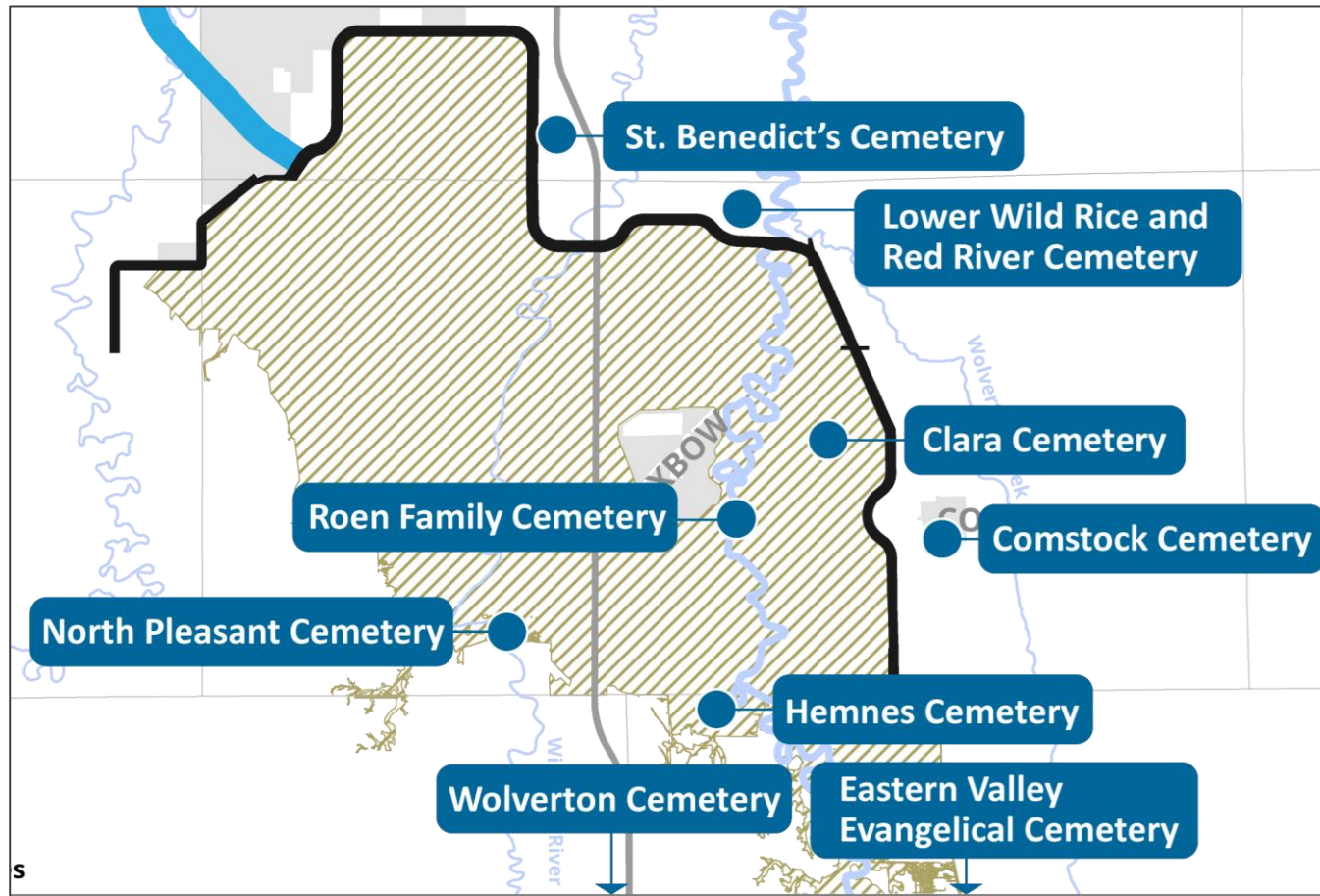
Excavation: 436,000 cubic yards

Native Plant Seeding: 485 acres

April 2023

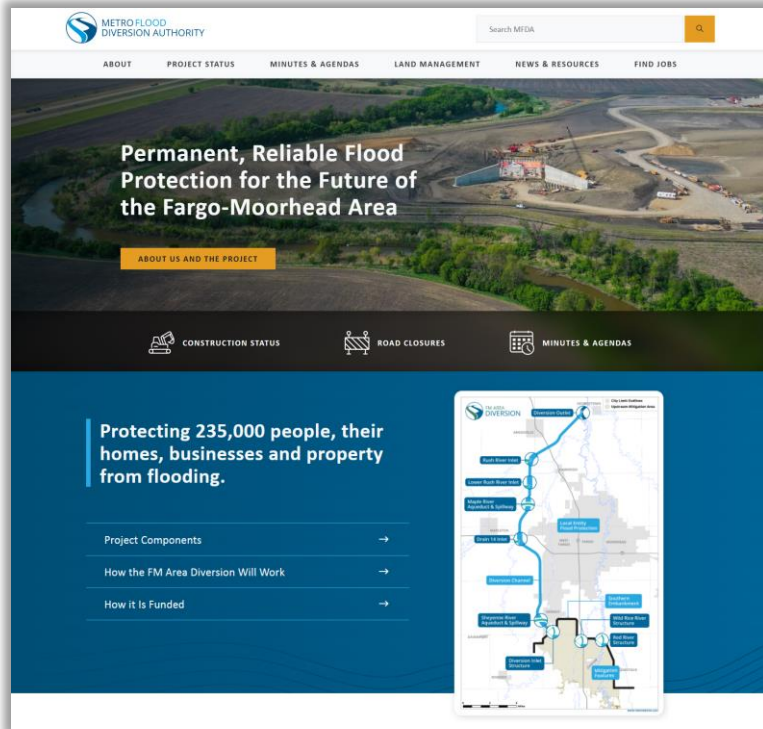


UMA Cemetery Protection Projects



- Plan in place to reduce impacts to cemeteries in the upstream mitigation area
- Unique to each cemetery
- Considers viewshed as well as protection
- Cemetery Protection Plan available at FMDiversion.gov

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