

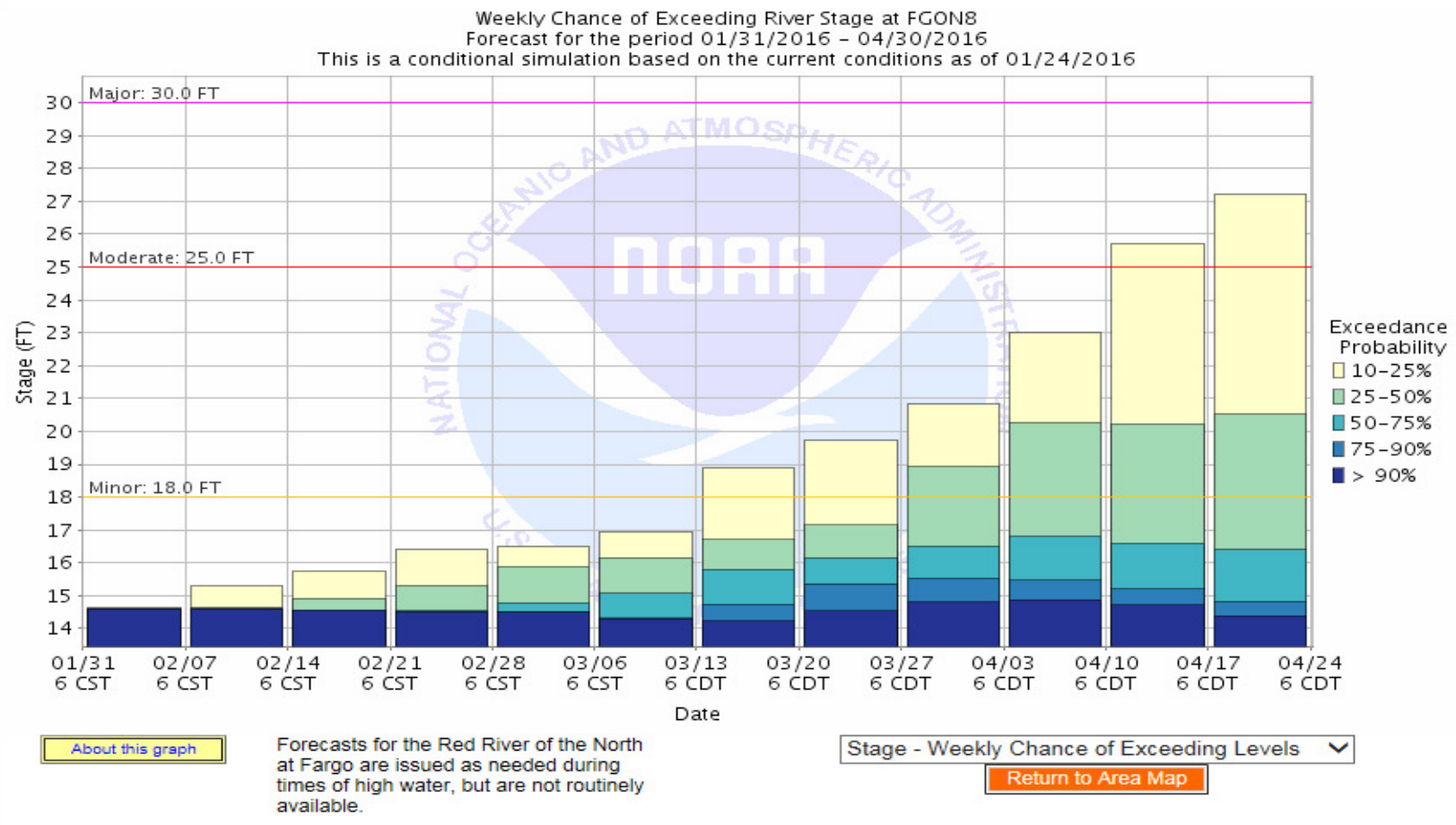


## FM-15-K0 Neighborhood Meeting Rosewood Addition Flood Protection



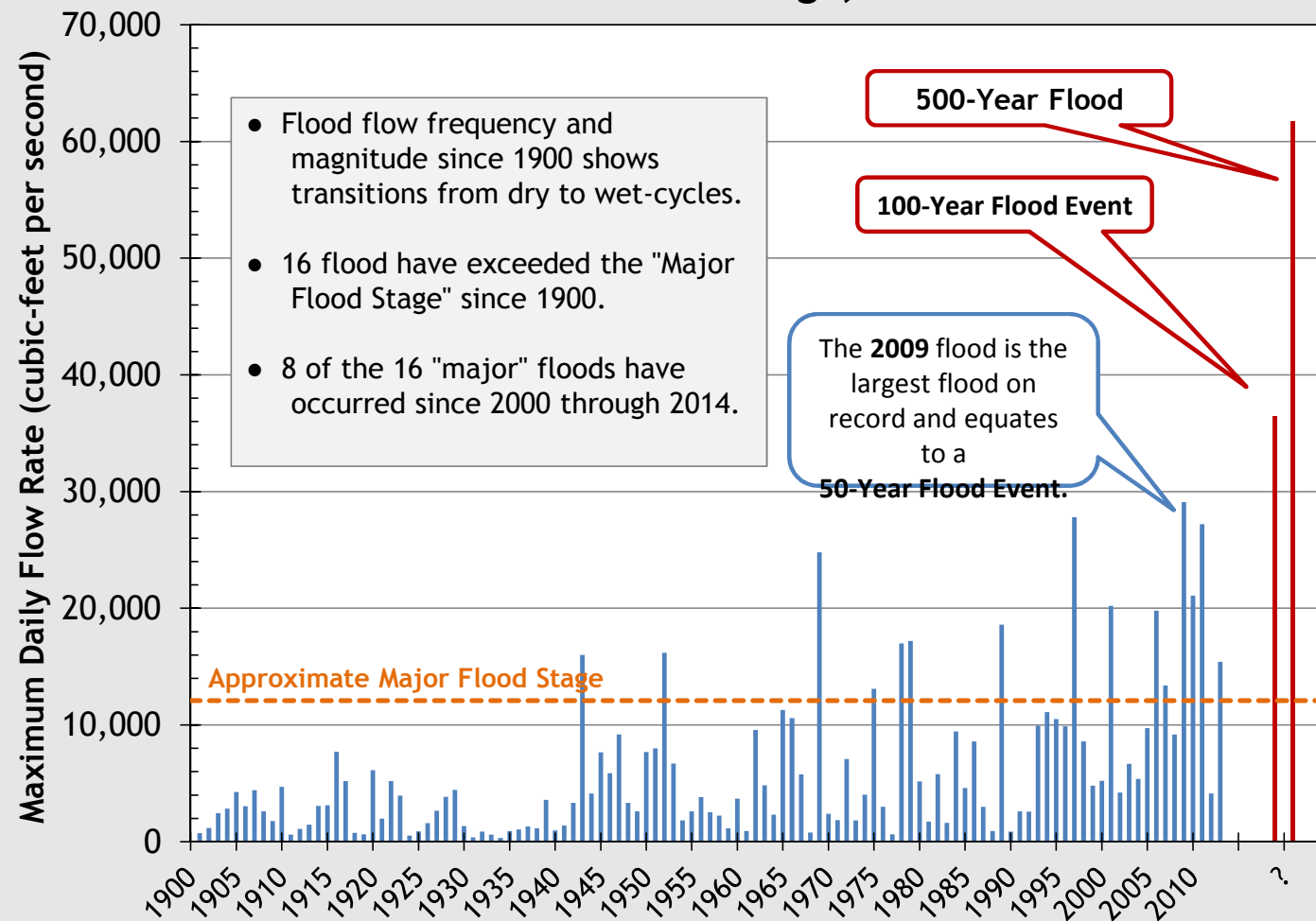


# 2016 Red River Forecast





## Red River of the North at Fargo, North Dakota



Source: USGS river flow data from USGS Station



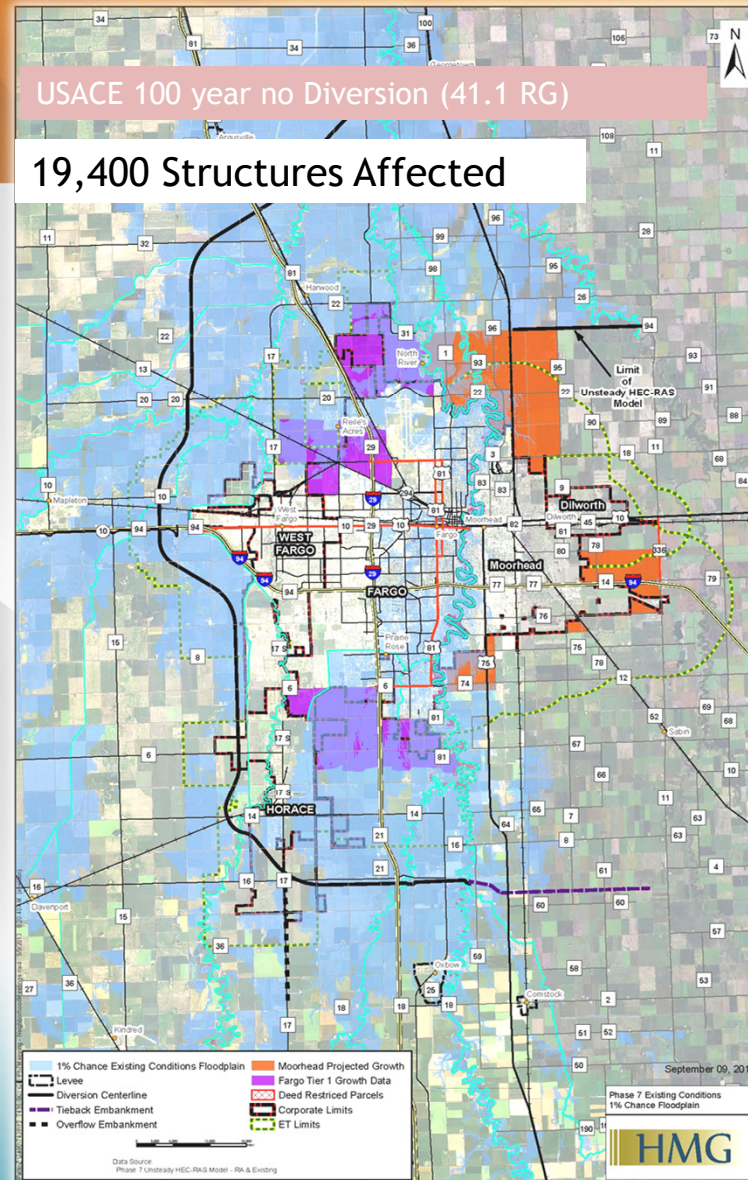
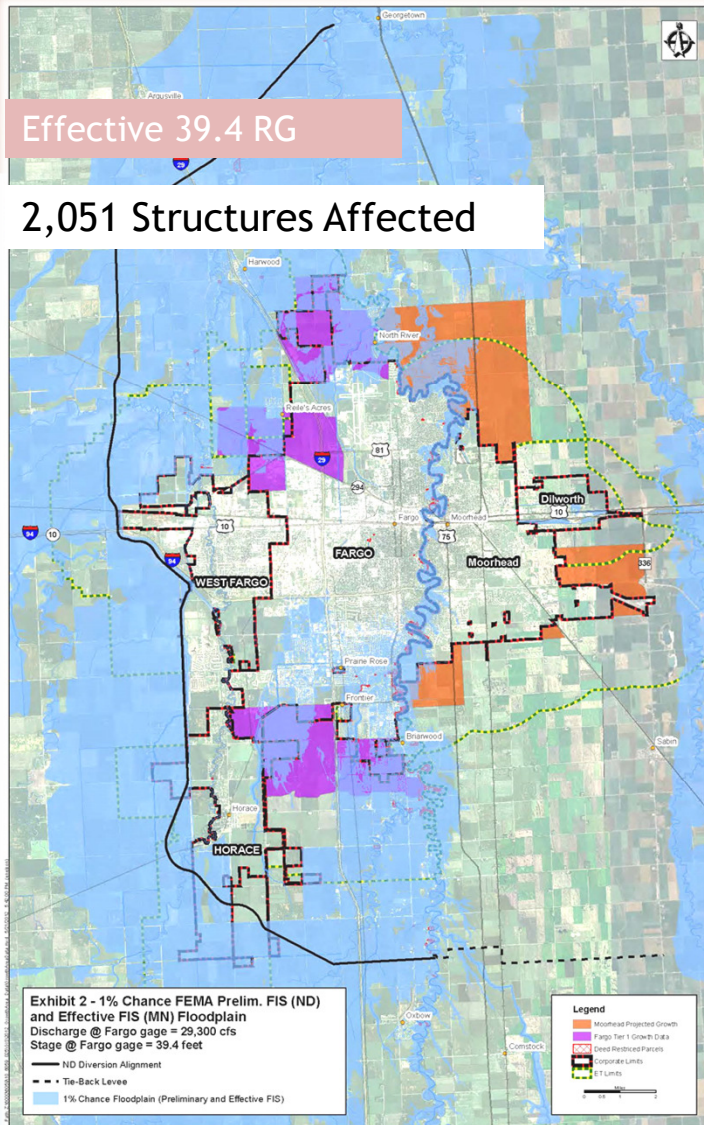
# Changing Flood Risk

- ◇ Now Effective Floodplain
  - ◇ 39.4 Feet River Gage (29,300 cfs)
  - ◇ Approx. 2,051 Impacted Structures
  - ◇ Approx. 7,500 Impacted properties
  - ◇ 27,600 Acres Impacted
  - ◇ After Diversion - This elevation will be close to 500-year flood levels
- ◇ Flood of Record
  - ◇ 40.8 Feet River Gage
  - ◇ \$70M expended to flood fight
- ◇ Future of the Floodplain
  - ◇ USACE 41.1 River Gage (34,700 cfs)
  - ◇ Approx. 19,400 Impacted Structures
  - ◇ 36,430 Acres Impacted

“If I am in a community that we come back five years down the road and they are still talking about a project, I am probably going to change the map then,” said Federal Emergency Management Agency’s (FEMA) Deputy Associate Administrator for Mitigation, Roy Wright. (April, 2015)









## FARGO

**52 MILES OF  
PROTECTION**

29 MILES OF LEVEE  
(Fargo)

5 MILES OF LEVEE  
(Cass)

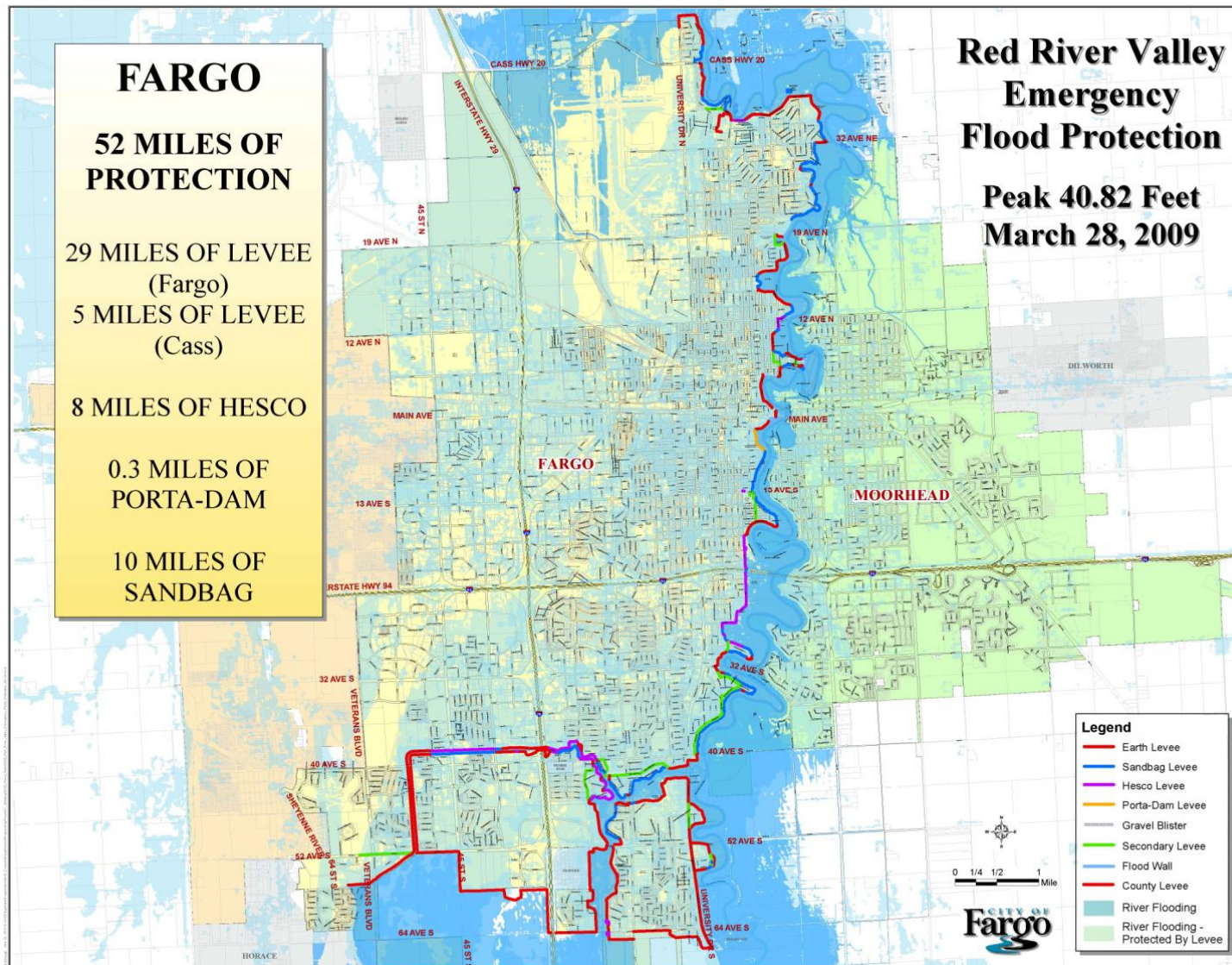
8 MILES OF HESCO

0.3 MILES OF  
PORTA-DAM

10 MILES OF  
SANDBAG

## Red River Valley Emergency Flood Protection

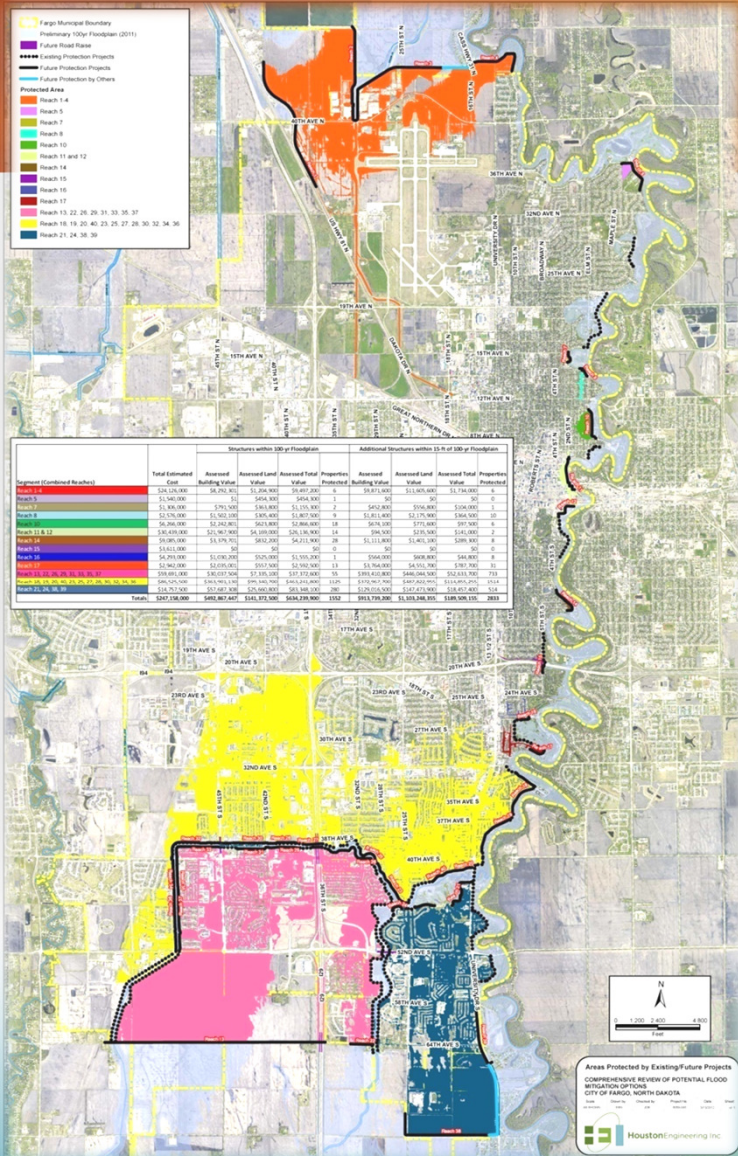
**Peak 40.82 Feet  
March 28, 2009**





# Comprehensive Plan

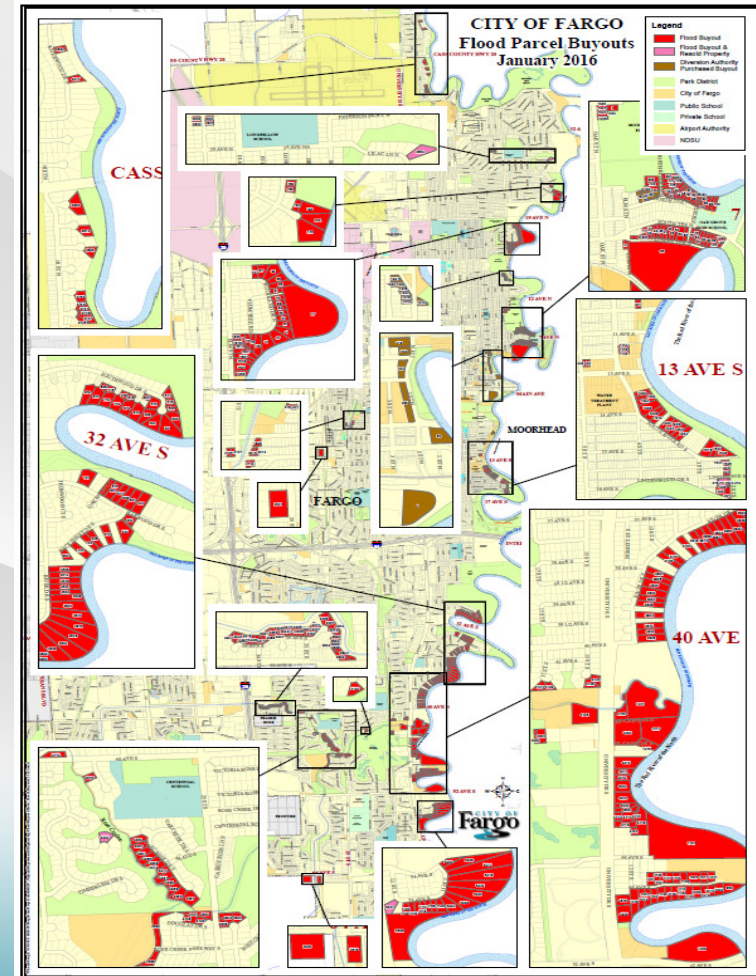
- Developed in Fall 2011 / Winter 2012
- Certifiable Protection From the Effective Floodplain (39.4 Feet)
- Funding limitations require prioritization
- Outstanding Issues
  - With Comprehensive Plan completed would still need:
    - 7.6 miles of emergency clay levees
    - 3.2 miles of sandbag levees





# Property Acquisitions (Since 2009)

- ◇ 183 Properties Purchased
  - ◇ Over 320 since 1990
- ◇ At cost of over \$60 million
- ◇ Cass County purchased 14 additional homes needed
- ◇ Diversion Authority is in process of acquiring 17 additional properties within Fargo
- ◇ Remaining Properties Under Comprehensive Plan
  - ◇ 121 properties to be acquired
  - ◇ Approximately \$36 million





# So...Why implement this Comprehensive Plan?

## Short Term:

- ◇ Reduce emergency measures-immediate benefit from each project
- ◇ Provide real protection for existing homes that were built prior to the knowledge of the increased risk

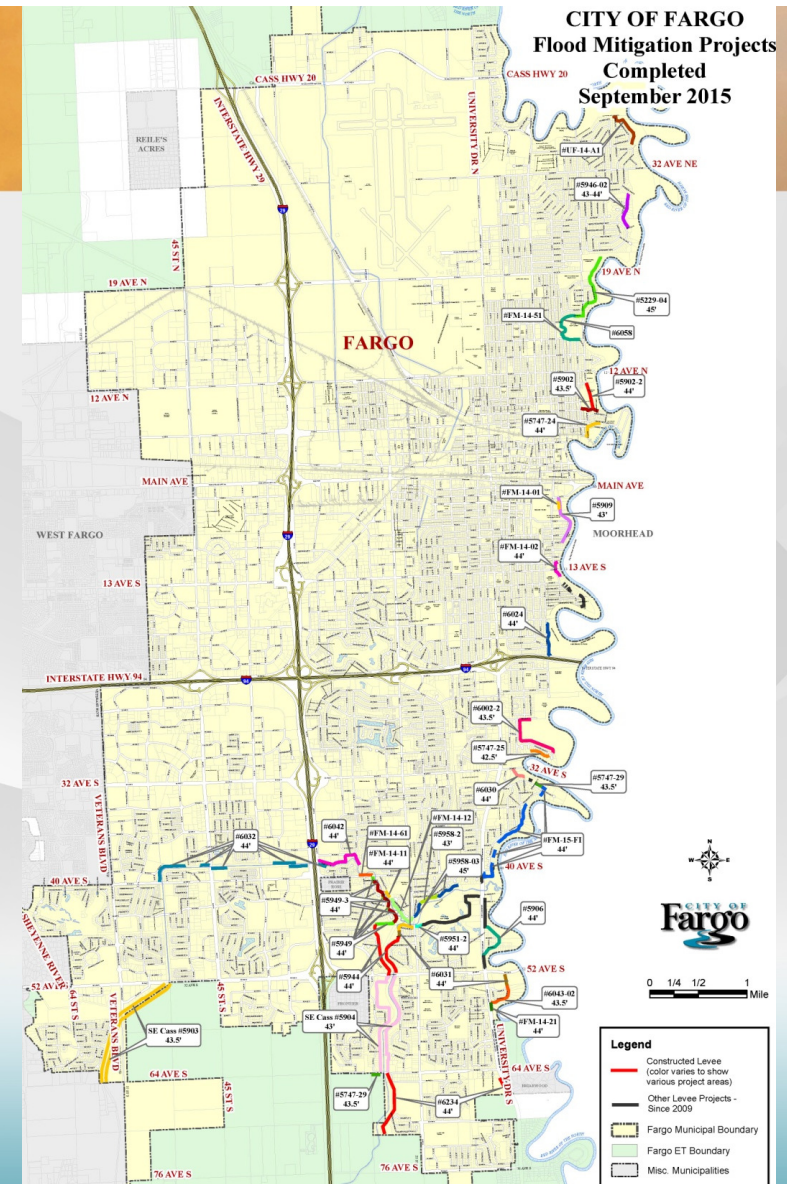
## Long Term:

- ◇ Upon completion of Certifiable reaches-Keep Housing Affordable for more of our population by making flood insurance available to residents at the lowest possible rates
- ◇ Combined with the FM Diversion- Provide for greater than 100 year protection for the largest population center in ND



# Completed Projects (Since 2009)

- Over 19 miles constructed
- 47 miles of emergency levees constructed by the City in 2009
- Project Cost ~ \$125 million
- Reduces required sandbags by approximately 4.5 million
- 50% of the Comprehensive Plan Completed





# Completed Flood Projects North

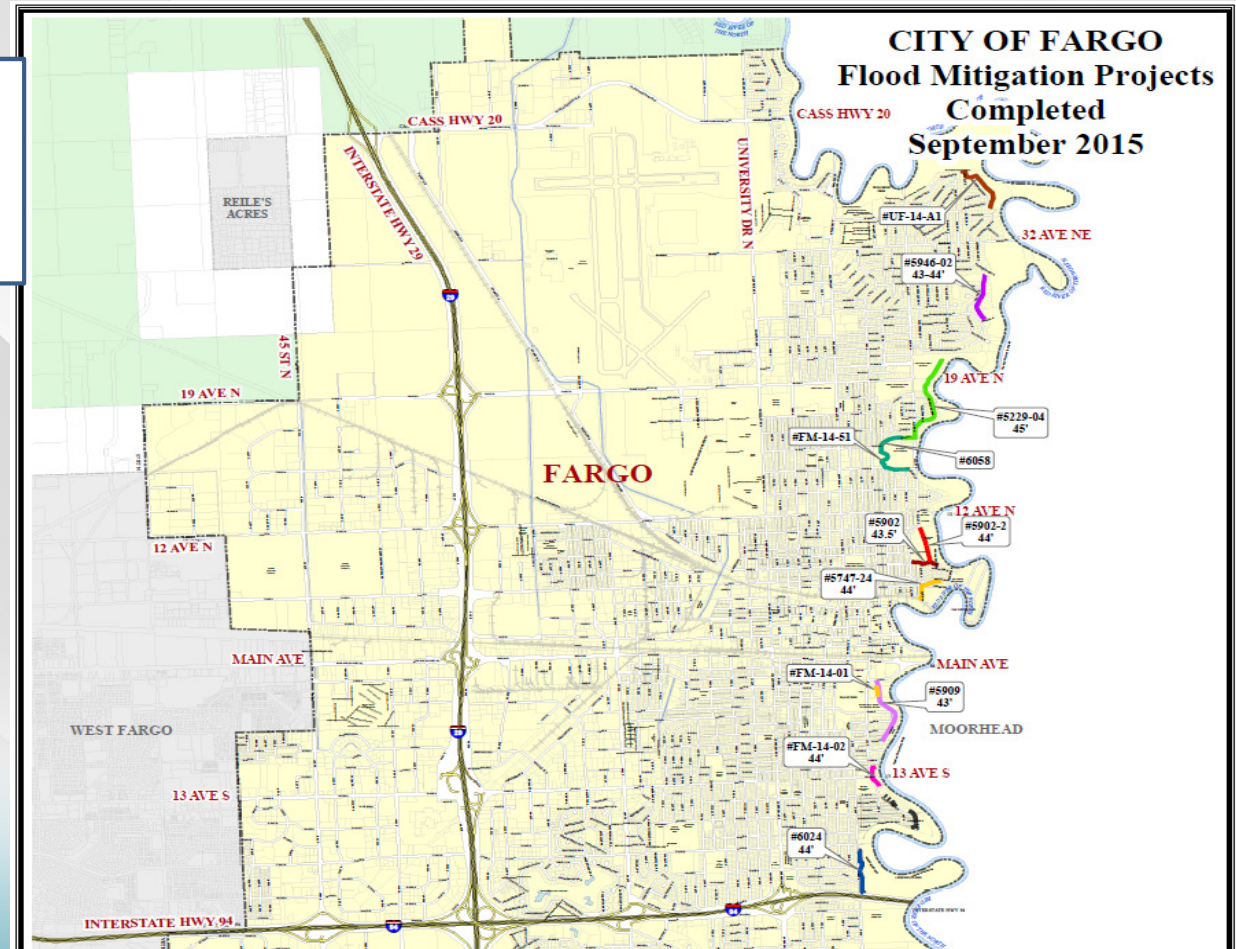
Since 2009 over 19 miles of levees constructed

## Approximate Costs

Construction - \$125 million

Sand Bags Reduced by approx. 4.5 million

50% of Comprehensive Plan Completed



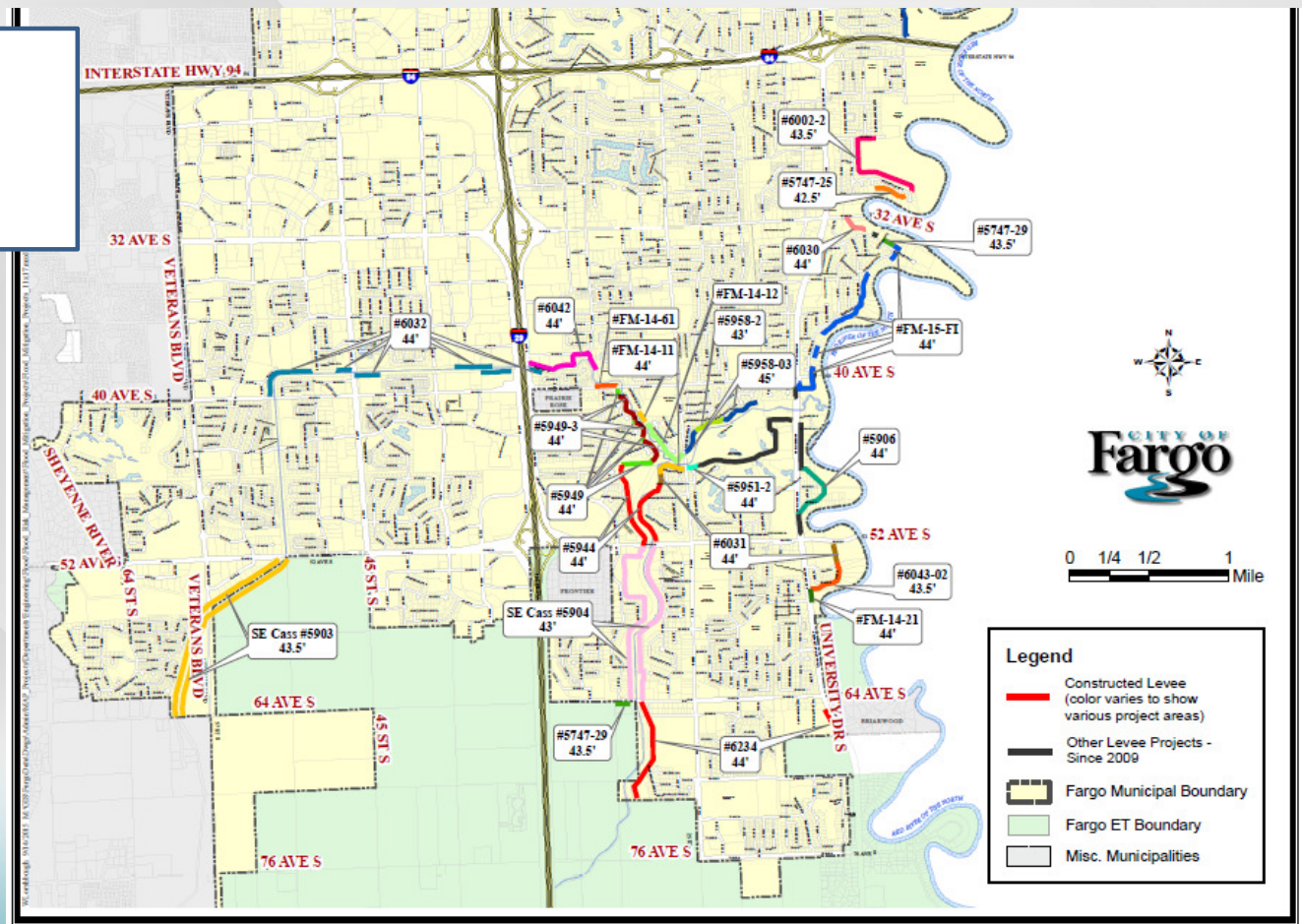


# Completed Flood Projects South

Since 2009 over 19 miles of levees constructed

## Approximate Costs

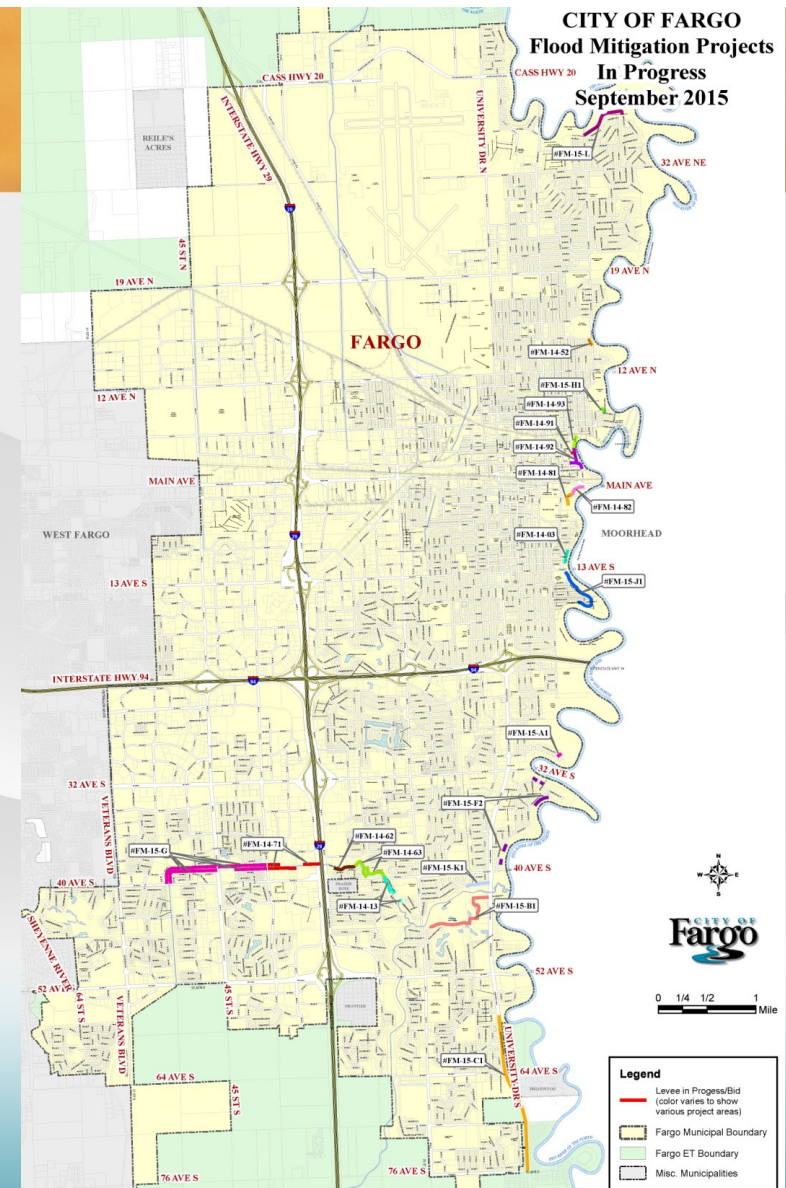
Construction - \$125 million  
Sand Bags Reduced by approx. 4.5 million  
50% of Comprehensive Plan Completed





# In Progress Projects

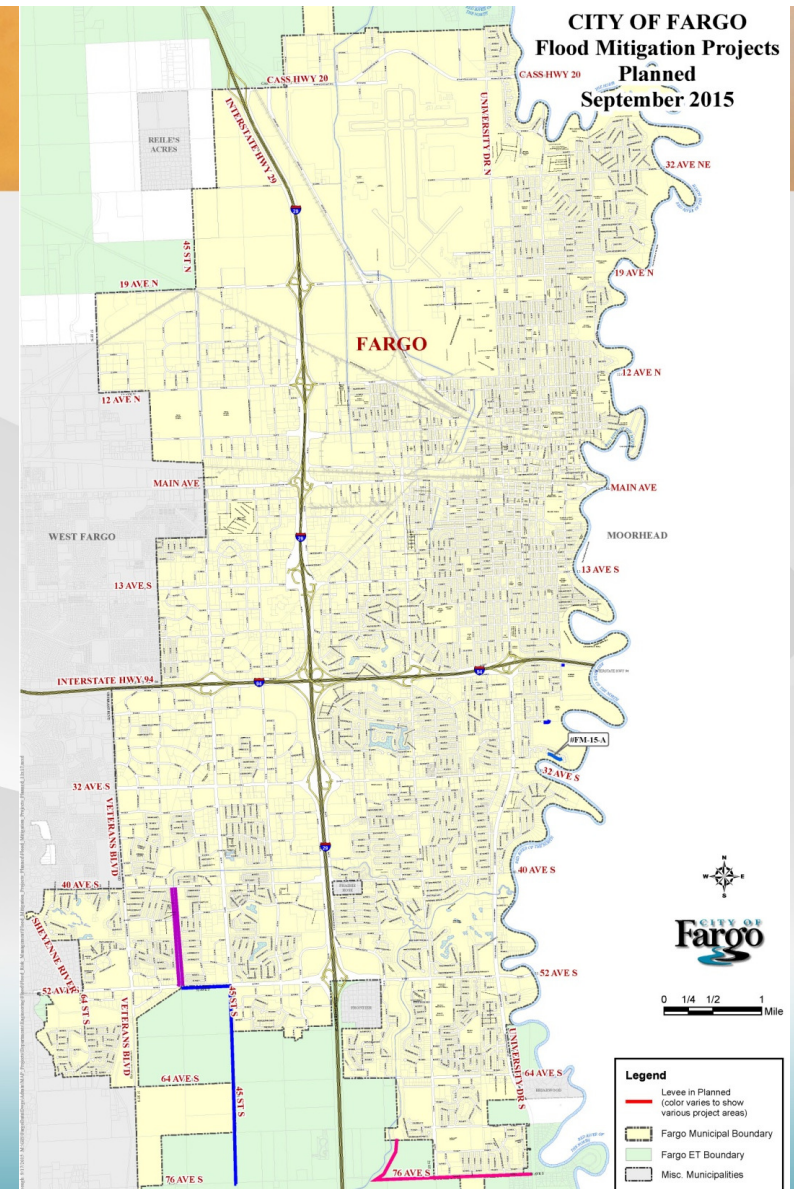
- Combination of projects under construction or under design for 2016/2017 construction
  - 12 City of Fargo Led
  - 7 Diversion Authority Led
- Over 3.5 miles in progress
- City Project Cost ≈ \$68.5 million
  - Construction Cost ≈ \$37million
- 65% of the Comprehensive Plan completed once these projects are done





# Remaining Projects

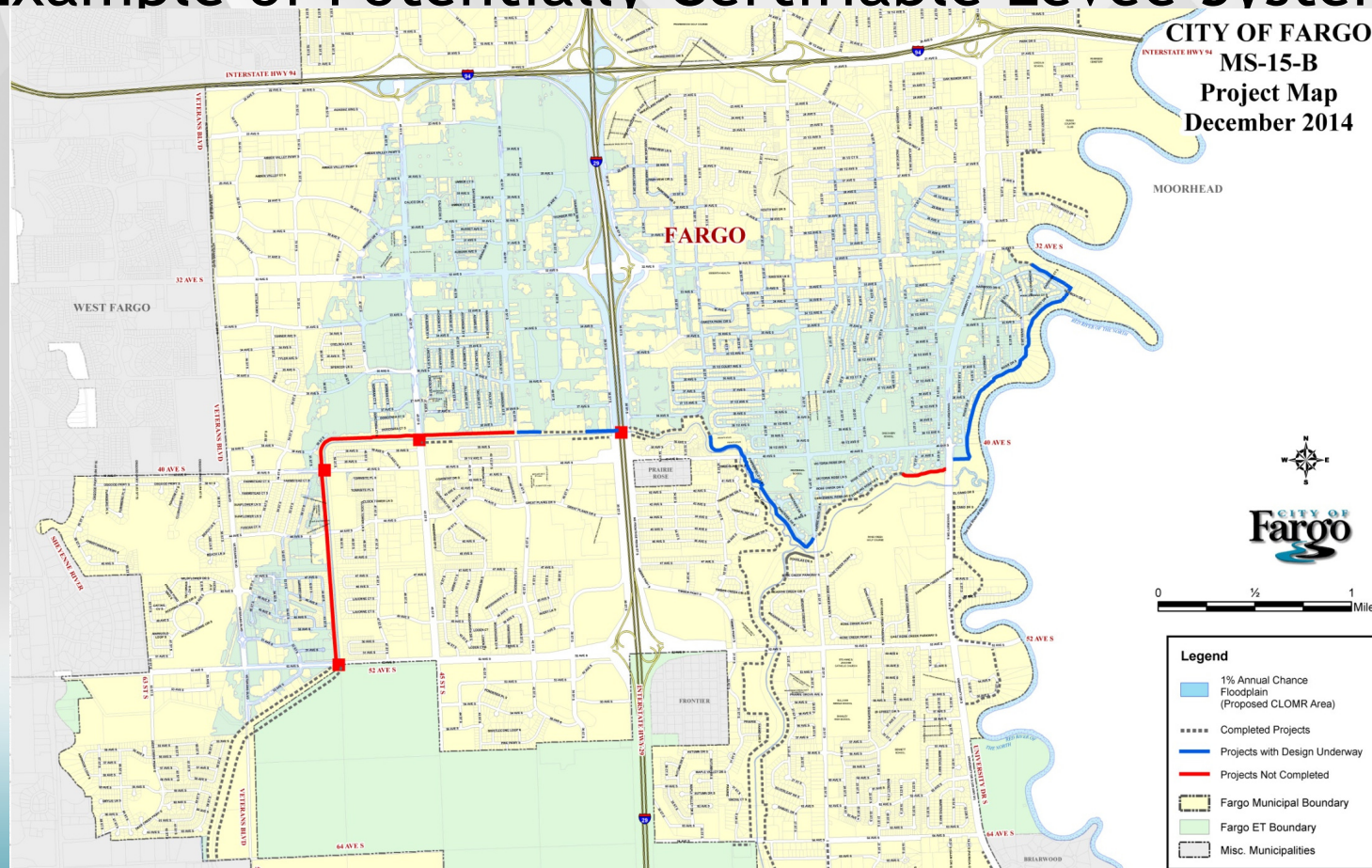
- ◇ Approx. 10 miles remaining
  - ◇ \*excludes Cass County 20 Area
- ◇ Project Cost ≈ \$130 million
  - ◇ # Does not include south side line of protection
  - ◇ # Does not include 2016 planned projects
  - ◇ # Does not include Diversion Authority More Flow Through Town Projects
- ◇ Type of Projects:
  - ◇ Levees along River & Legal Drains
  - ◇ Road Raises
    - ◇ Includes Interstate 29 at Drain 27
- ◇ 92% of the Comprehensive Plan would be completed





# Comprehensive Plan

## Example of Potentially Certifiable Levee System





# Frequently Asked Questions

- ◊ Why build levee if Diversion Project is constructed?
  - ◊ Levee will provide real/interim flood protection
  - ◊ Levee will be compatible with the Diversion Project by providing protection on the greater than 100 year flood events
  - ◊ Levee + Diversion = Increased level of flood protection
- ◊ Will I be assessed for this levee project?
  - ◊ No - levee is being designed and constructed with Fargo Infrastructure Sales Tax Dollars, as well as dollars from the State

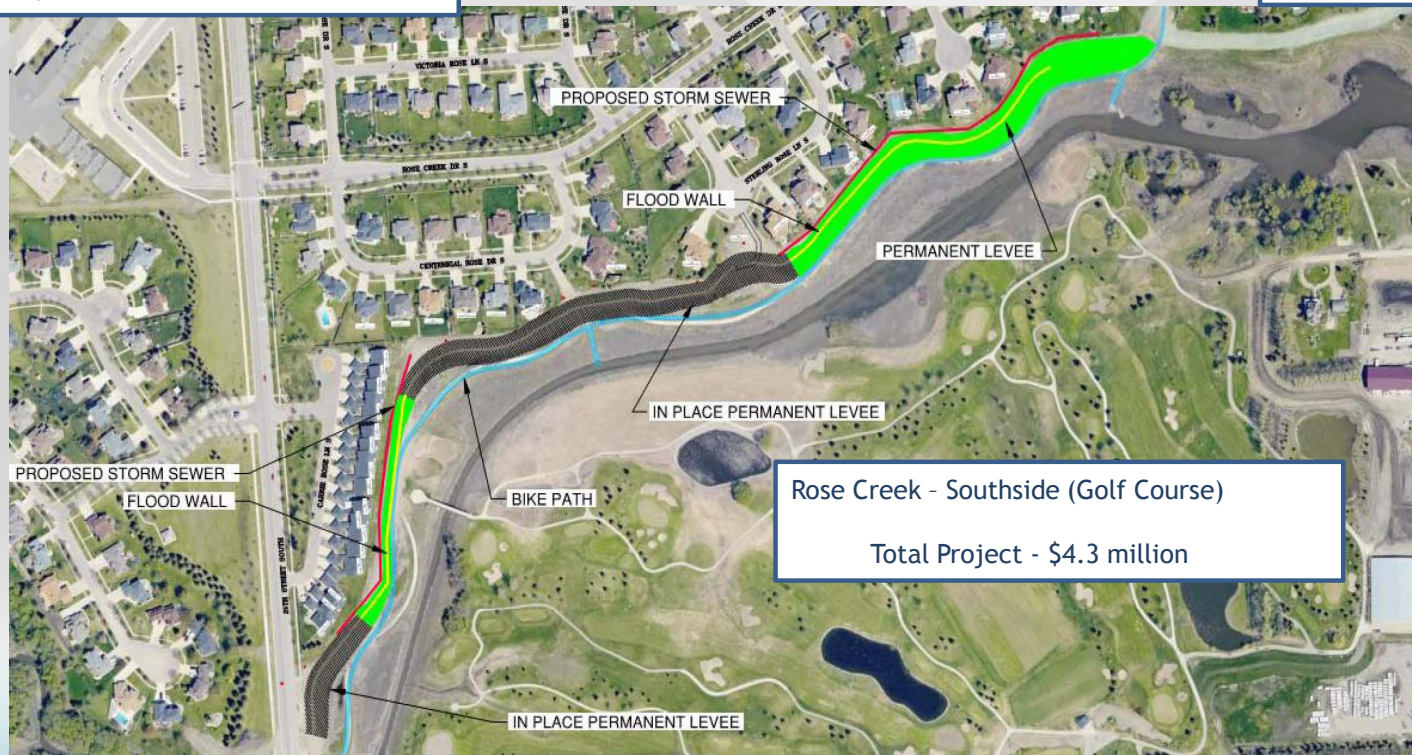


# Rose Creek Flood Risk Reduction Projects

Rose Creek - Phase 2 (2013/14)

Total Project - \$5.2 million

Rose Creek - Phase 3  
(Rosewood)





# Acquisition Overview

- › General R/W Acquisition Information
  - › 2 Residential Homes
  - › 1 Vacant Lot
  - › 4 Residential Easements



# Need for Project

- Protection from 100-Year Flood
- Designed to FEMA Accreditation Standards





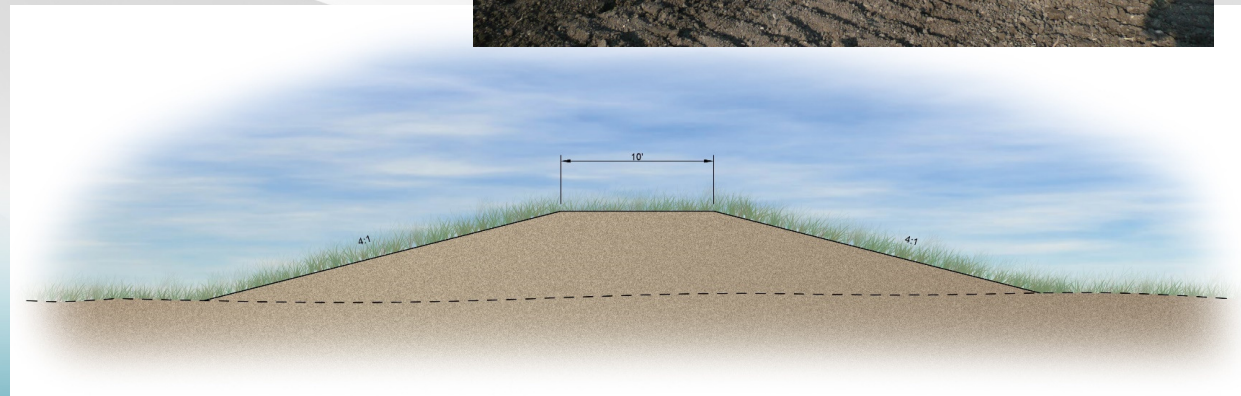
# Design Considerations

- ◇ Flood Protection Elevations
  - ◇ Base Flood Elevation = 905.7, 39.4' Flood Stage
  - ◇ Levee Protection = 911.0, ±44.5' Flood Stage
  - ◇ Lift Station/Gate Well = 913.0, ±46.5' Flood Stage
  - ◇ Floodwall = 912.0, ±45.5' Flood Stage
    - ◇ Accommodations for 1' future raise



# Design Elements

- ◇ Earthen Levee
  - ◇ 10' wide top, 4:1 side slopes
  - ◇ 7' average height
  - ◇ Approximately 1,000' long
- ◇ Floodwall
  - ◇ Reinforced Concrete
  - ◇ 7' average height
  - ◇ 300' long





# Design Elements

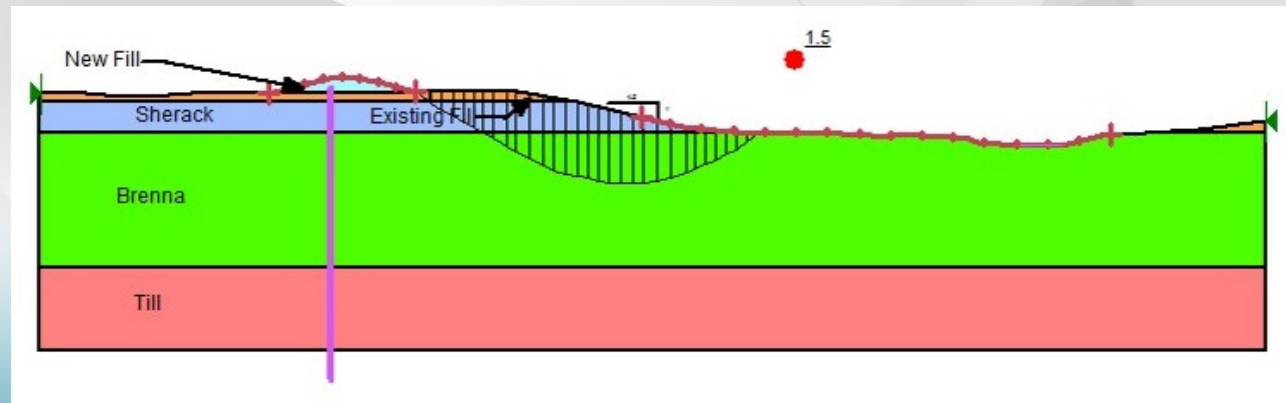
- ◇ Realign Milwaukee Bike Trail
- ◇ Hydraulics
  - ◇ Combine existing pump stations
  - ◇ Accommodate 2011 rain event
    - ◇ No structure inundation





# Design Elements

- ◇ Geotechnical Analysis
  - ◇ Braun Intertec
  - ◇ Levee Alignment Setback
  - ◇ Slope Stability
    - ◇ Floodwall Extents
  - ◇ Slope Regrading





# Project Overview





# Existing Conditions



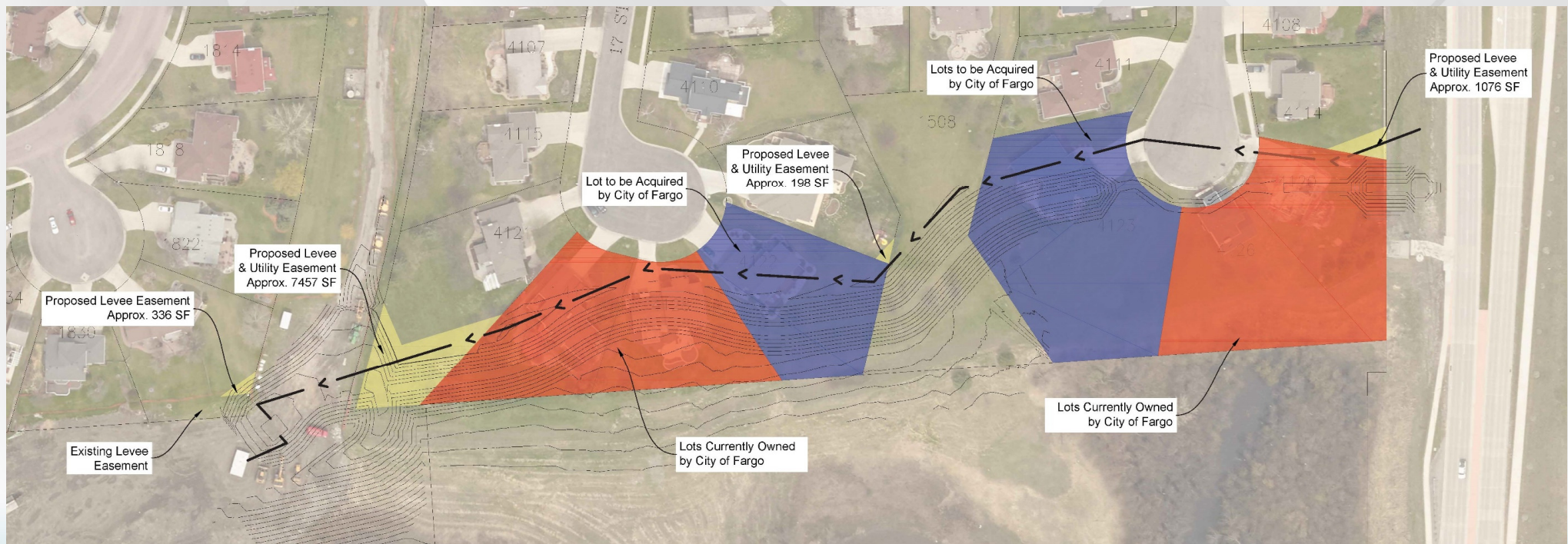


# Proposed Rendering





# Easements





# Easements

- ◇ Permanent/Temporary Easement Process
  - ◇ Prepare Exhibit
  - ◇ Negotiations
    - ◇ Donate
    - ◇ Minimum Payment
    - ◇ Negotiated Price
    - ◇ Appraisal
  - ◇ Offer Letter

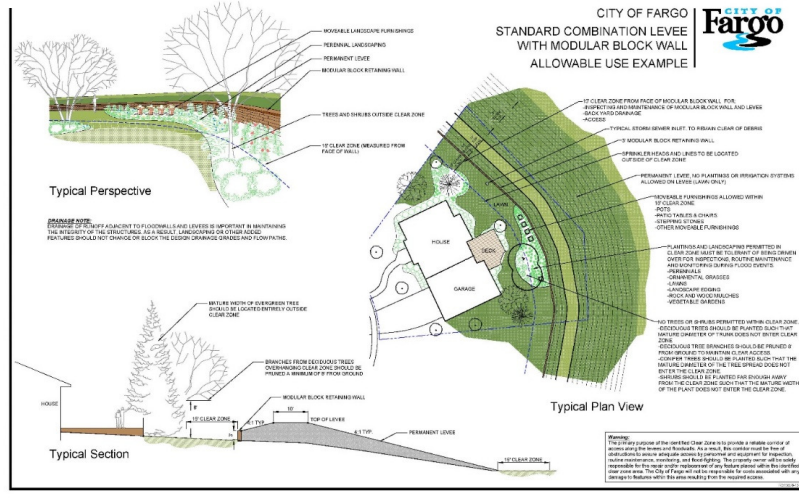
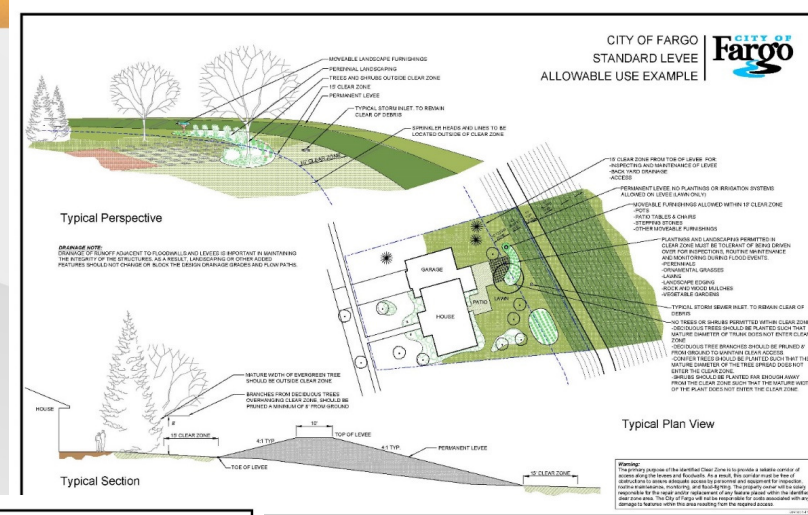
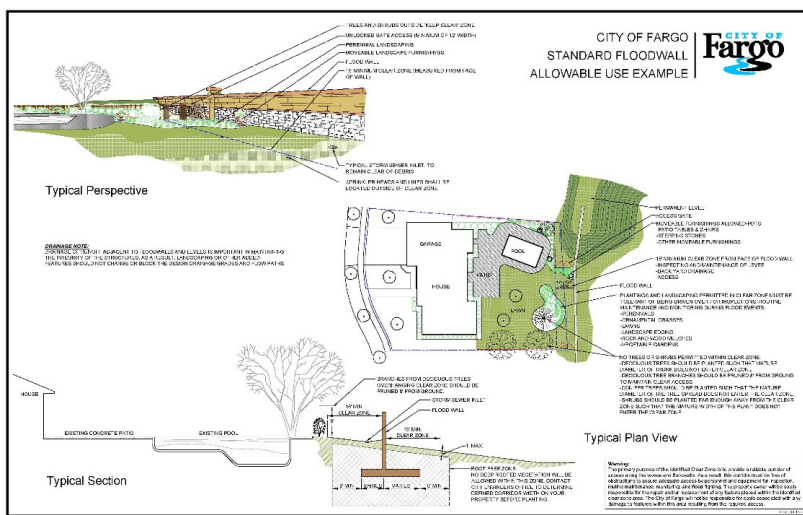


# Trees

- ◇ Approximately 100 Trees Removed
- ◇ Removed for various reasons
  - ◇ Levee Construction
    - ◇ Vegetation Free Zone
  - ◇ Slope Grading
  - ◇ Storm Sewer Installation
- ◇ Replaced at a 2:1 Ratio
- ◇ Tree Planting Plan to be developed

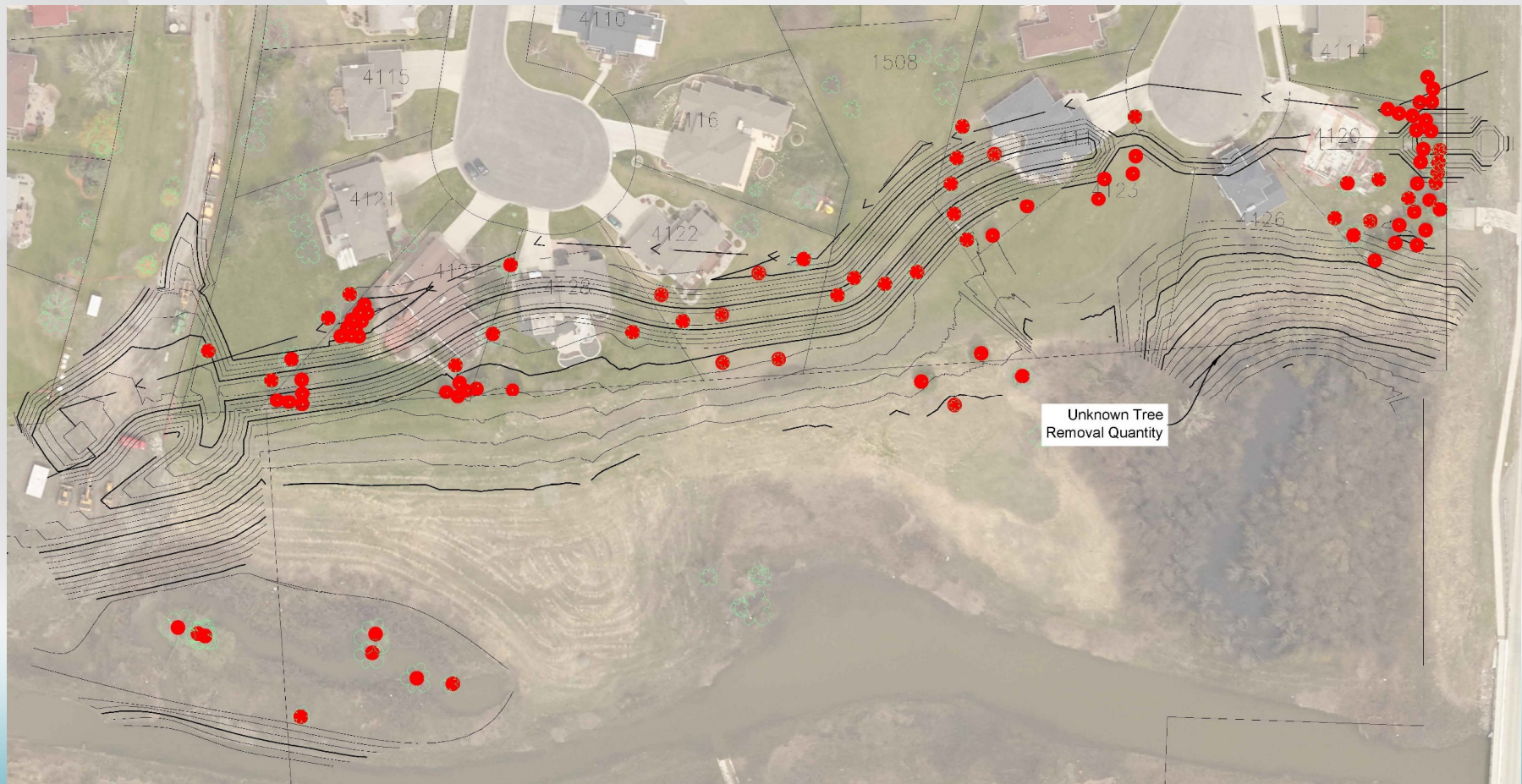


# Tree Planting Requirements





# Tree Removals





# Project Schedule

- ◇ February 2016
  - ◇ 50% Plans
- ◇ March 2016
  - ◇ Begin Negotiations/Appraisals
- ◇ April 2016
  - ◇ Final Plans
- ◇ Summer 2016
  - ◇ Bid Opening - Pending Property Acquisitions
- ◇ Construction during summer/fall of 2016
  - ◇ Substantially complete by spring 2017



# Questions/Comments?

<http://www.cityoffargo.com/> - Flood Control Projects  
[www.fargofloodinsurance.com](http://www.fargofloodinsurance.com)  
[feng@cityoffargo.com](mailto:feng@cityoffargo.com)

Scott Middaugh, PE  
KLJ

[Scott.Middaugh@kljeng.com](mailto:Scott.Middaugh@kljeng.com)  
701.271.4871