# Wabasha Flood Resiliency Study

City of Wabasha November 2025



Real People. Real Solutions.

### Submitted by:

Bolton & Menk, Inc. 111 Washington Ave S Suite 650 Minneapolis, Minnesota 55401

## Certification

### **Feasibility Report**

For

Wabasha Zumbro Slough Feasibility Study



257 Main Street West Wabasha, MN 55981

24X.135311.000

November 2025

### **PROFESSIONAL ENGINEER**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature:

Typed or Printed Name: Samuel Westlund

Date: 11/03/2025 License Number: 53569

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### I. Executive Summary

In September 2023, Bolton & Menk, Inc. (BMI) assisted the City of Wabasha in applying for a grant through the Small Communities Planning Grants for Stormwater, Wastewater, and Community Resilience program managed by the Minnesota Pollution Control Agency (MPCA). This application highlighted opportunities within the City to better protect public facilities, transportation infrastructure, homes and businesses, and residents from recurring flooding concerns. The application was successful as of June 2024, and funds were granted to the City to pay for 90% of the work documented in this report. The work is summarized below.

- Coordination with the City to identify alternatives and areas of interest
- Development of a bluff and slough drainage model
- Creation of a detailed river model, including the slough, and focusing specifically on the City of Wabasha
- Review and analysis of the feasibility of projects
- Documentation of project alternatives, estimated construction impacts, and preliminary cost estimates for design and construction

The purpose of this document is to summarize this work such that the City can efficiently prioritize future development opportunities, apply for grants and other funding opportunities for improvement projects, and avoid concepts with little benefit to cost ratios. The work in this report does not supersede the published FEMA data and shall be used for planning purposes only.

#### II. Introduction

The Wabasha Zumbro Slough Flood Resiliency Study project identifies infrastructure, drainage, and flood mitigation measures that will protect city and personal property and the transportation infrastructure in and around the Zumbro Slough during local and regional flood events. The report does not recommend a preferred alternative; rather, the alternatives presented can be implemented in various combinations depending on funding opportunities, preference, or findings of preliminary design efforts. The goal is to protect the transportation network and local properties from recurring flood concerns, especially during long-duration floods from the Mississippi River that limit movement in and out of the city for emergency responders and evacuation. Facilitating normal operations by reducing the impact of smaller floods is also a concern.

This study evaluated the feasibility of flood mitigation measures along the Zumbro Slough corridor to protect the existing properties most frequently impacted by major floods. It provides important planning tools for City officials and City planners to ensure that future development projects, building improvements, or transportation projects are constructed at appropriate elevations to reduce flood risk and improve long term resiliency to flooding in the community.

This project developed multiple hydrologic and hydraulic models of the local drainage in the slough and larger Mississippi River and assessed infrastructure improvements with the goals of:

- Communicating specific and current flood risks using updated, more accurate models.
- Identifying solutions to reduce flood related infrastructure damage and road closures.
- Identifying areas of increased or future flood risk due to climate change.

Existing and proposed hydraulic models provided the baseline for Mississippi River flooding in this study and alternative assessment. Analyzed conditions include:

- Existing (No Action)
- Localized Resiliency Improvements
- Alternative A 4<sup>th</sup>/5<sup>th</sup> Grant Blvd Improvements
- Alternative B Athletic Field Flood Reduction and Development Improvements
- Alternative C Beach Park, City Campground, and Marina Levee Improvements
- Alternative D Main St 600 Block Improvements
- Alternative E Wastewater Treatment Facility Flooding

Floodplain impacts are described for each alternative and considerations such as cost, constructability, and permitting requirements are discussed. All options were evaluated to be permissible under the Zone AE floodplain regulations with permits anticipated. Impacts to water surface elevations due to project grading are discussed for each alternative. The appendices include the 100-year and 500-year floodplain figures and a concept level cost estimate for each alternative. The 500-year floodplain impacts are used to review the resilience of the improvements.

This report provides the city with resources and data needed to pursue funding for design and construction of flood mitigation projects. Implementation of these recommendations will reduce the risk of life and property during flood events, enable quicker response times and alleviate emergency response congestion, and improve the level of flood protection in Wabasha today and into the future.

### III. Project Background

The City of Wabasha currently experiences regular flooding annually during the spring melt within the Mississippi River basin and during moderate or larger rain events within the local watershed. The Zumbro Slough channel experiences flash-flood runoff from steep bluff land areas and carries runoff north through the city and out to the Mississippi River during local rainfall events.

However, Zumbro Slough is also an area where water flows from the slough into the river during localized rainfall events but during larger river flooding events, water flows from the Mississippi River into the slough. The City of Wabasha has reached flood stage 6 times in the past 10 years, with the majority being in the last 5 years. Major roads into the city experience frequent inundation at major intersections due to overland flooding and storm sewer backups.

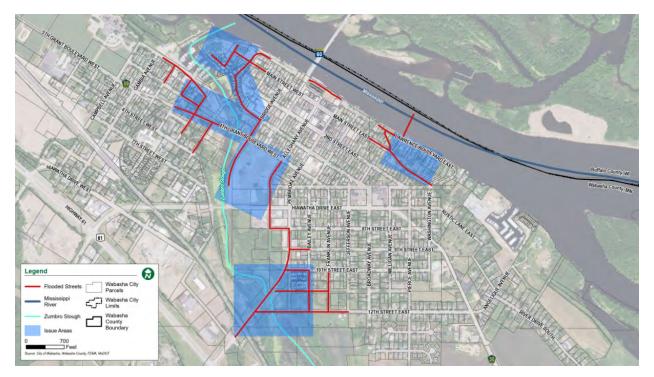


Figure 1 – Community Issues Map

Majority of key locations identified by the city that experience flood or drainage issues are shown in Figure 1, with two exceptions as noted below:

- Beach Park and Campground
- Izaak Walkton Park and Marina
- Malone Park and Bike Path
- 5<sup>th</sup> Grant Blvd Road Closures
- Athletic Fields
- Highway 60
- RV Park Flooding
- 600-Block / Lawrence Blvd E
- Wastewater Treatment Facility Drainage (See Appendix A)
- I&I Issues near 5<sup>th</sup> Grant Blvd
- Maintenance Equipment and Electrical Facilities near Beach Park
- Coulee Way and Arch Ave Intersection (See Appendix A)

Issues observed at these locations include undersized culverts, low road profiles, poor drainage networks, lack of appropriately elevated infrastructure, or nuisance conditions due to extended periods of flooding along the Mississippi River. Not all locations have flood mitigation solutions addressed in this report, but this provides a comprehensive outlook on documented issues. Appendix A includes a full-sized PDF of the issues map shown above. A public comment period was open for two weeks via Bolton & Menk's InputID system, which was advertised through official City channels; the feedback received confirmed the areas of interest as previously discussed and will assist the City as future project decisions are made. The comments have been summarized and documented in Appendix A.

### IV. Effective Floodplain Data

### A. FEMA Effective FIS Maps

The Effective FEMA floodplain map for the Mississippi River and Zumbro Slough entrance in Wabasha is currently shown on the following FEMA Flood Insurance Rate Map (FIRM) panels.

Table 1 - Effective FEMA FIRMs

| Community No. | Community Name    | State | Map No. | Panel No. | Effective Date |
|---------------|-------------------|-------|---------|-----------|----------------|
| 270490        | City of Wabasha   | MN    | 27157C  | 0095D     | June 20, 2000  |
| 270483        | Wabasha County    |       | 2/13/0  | 00330     | Julie 20, 2000 |
| 550232        | Village of Nelson | WI    | 55011C  | 0145D     | May 2, 2010    |
| 555547        | Buffalo County    | VVI   | 330110  | 01430     | May 3, 2010    |

The Effective FEMA floodplain designations are Zone AE with floodway (detailed study) within the city. A Preliminary FIRM and FIS have been released for Wabasha County dated April 25, 2024. Copies of the Effective and preliminary FIRMS are attached for reference in Appendix B. The 04/25/2024 Preliminary 27157C 0095E FIRM has also been included in Appendix B.

### V. Existing Hydrology Evaluation

### A. Mississippi River

Effective FEMA flows were used for the Mississippi River. Preliminary flows for the Mississippi River are reported in the Preliminary FIS.

Table 2 – Effective Flows for the Mississippi River

| Storm Event | Effective FEMA Flow |
|-------------|---------------------|
| Storm Event | cfs                 |
| 10-year     | 145,000             |
| 50-year     | 210,000             |
| 100-year    | 240,000             |
| 500-year    | 320,000             |

Table 3 – Preliminary Flows for the Mississippi River

| Location                 | 100-year Flow cfs |
|--------------------------|-------------------|
| 2768 ft upstream of      | CJS               |
| Wabasha County border    | 237,725           |
| 7,816 ft upstream of     |                   |
| Wabasha County border    | 236,240           |
| 10,242ft upstream of     |                   |
| Wabasha County border    | 236,185           |
| 18,793 ft downstream of  | 226.026           |
| Zumbro River             | 236,036           |
| 16,011 ft downstream of  | 226 104           |
| Zumbro River             | 236,104           |
| 13,545 ft downstream of  | 236,050           |
| Zumbro River             | 230,030           |
| 9,294 ft downstream of   | 235,941           |
| Zumbro River             | 233,341           |
| 7,742 ft downstream of   | 236,009           |
| Zumbro River             | 230,003           |
| 5,314 ft downstream of   | 235,995           |
| Zumbro River             | 233,333           |
| Zumbro River             | 235,792           |
| 14,796 upstream of TH 60 | 229,661           |

### B. Zumbro Slough Local Drainage

### 1. Watershed and Reach Parameterization

SCS TR-55 methods were used to parameterize the local watershed to the Slough. Statewide LiDAR was used to determine sub-watershed boundaries and calculate time of concentration. The National Land Cover Database (NLCD) and SSURGO Soils database was used to help parameterize composite curve numbers for each watershed.

Field measurements of road crossings were used to parameterize bridge and culvert openings.

### 2. Design Storms (Local Drainage)

Atlas 14 rainfall depths were applied using a 24-hour duration and MSE 3 distribution. Peak flows discharge into the Mississippi River at the Parkside Marina. The 24-hour precipitation depths and peak flows are listed in Table 2. There are significant flows that drain from the bluff towards 12<sup>th</sup> St W., but flood storage and peak flow attenuation between bridges occurs which ultimately reduces peak flow reaching the river. Appendix C includes drainage figures for this alternative.

Table 4 – Local Precipitation and Flow Data

|          |               | Peak Inflow –               | Peak Inflow – |
|----------|---------------|-----------------------------|---------------|
| Storm    | Precipitation | 12 <sup>th</sup> St W (cfs) | Slough North  |
| Event    | Depth (in)    |                             | Outfall (cfs) |
| 2-year   | 2.93          | 447.9                       | 219.4         |
| 10-year  | 4.38          | 945.3                       | 429.0         |
| 100-year | 7.61          | 2,577                       | 1,069         |
| 500-year | 10.6          | 3,986                       | 1,666         |

### VI. Existing Conditions Hydraulic Modeling

### A. Model Development Summary

The FEMA Preliminary Mississippi River Zone AE floodplain and floodway limits were established using a detailed HEC-RAS model developed by the USACE, extending from Prescott, WI to Guttenburg, IA. At the project site, this Preliminary model has ineffective flows within the Zumbro Slough. To better characterize flow dynamics and challenge this ineffective flow assumption in the slough, a 2D HEC-RAS model of the Mississippi River was developed from the upstream City limits to approximately Minneiska, MN.

A local floodplain 1D HEC-RAS model for the Zumbro Slough was also developed to represent high local runoff during low river flow conditions. Flows were sourced from the SSA model described in the previous section.

#### Base Data

Recent LiDAR data provides the basis for the hydraulic terrain data. LiDAR data was collected in 2021 within Southeast Minnesota. LiDAR data was collected in 2023 for southwest Wisconsin. Both datasets were completed for the USGS and have standard quality levels, providing consistency when merged. The terrain grid was processed using a 10-meter DEM, with additional resolution being added (1m DEM) near project limits.

### 2. Hydraulic Structure Data

Bolton & Menk completed field measurements of key bridge and culvert crossings within the study area between June 2020 and December 2024, including bathymetric and channel bottom estimates within the Slough. Plan data was available for the TH 60 bridge over the main channel of the Mississippi. MnDOT inspection and inventory information was available for half of the crossings to confirm hydraulic characteristics. Table 5 describes bridge data sources. All data was converted to the NAVD 88 datum as needed.

Table 5 – Bridge, Dam and Culvert Data Sources

| Crossing                     | Description                 | Bridge    | Dat          | a Sources L | Itilized  |
|------------------------------|-----------------------------|-----------|--------------|-------------|-----------|
| Crossing                     | (Year Constructed)          | Number    | Number Plans |             | Estimated |
|                              | Mississippi River – Main    | Channel   |              |             |           |
| TH 60 in Wabasha             | 2,462 ft Span Bridge (1988) | 79000     | х            | Х           | Х         |
| Lock and Dam Number 4        | Lock and Dam                | N/A       |              |             | Х         |
|                              | Mississippi River – Zumb    | ro Slough |              |             |           |
| Pedestrian Bridge            | 72' Span Precast Pedestrian | N/A       |              | х           | х         |
| redestriali bridge           | Bridge (Unknown)            | IN/A      |              |             | ^         |
| 4 <sup>th</sup> Grant Blvd W | 17 ft Span Bridge(1962)     | 79505     |              | х           | Х         |
| Hiawatha Dr W                | 10'x8' Concrete Box Culvert | 8272      |              | х           | х         |
| mawatha Di W                 | (1931)                      | 02/2      |              |             | X         |
| Pembroke Ave (TH 60)         | 8'x6' Concrete Box Culvert  | N/A       |              | x           | V         |
| rembioke Ave (10 60)         | (Unknown)                   | IN/A      |              | X           | Х         |
| 12 <sup>th</sup> St W        | 8' CMP (Unknown)            | N/A       |              | Х           | х         |

### B. Mississippi River

### 1. Model Development

To adequately model the Zumbro Slough and surrounding areas with flood issues, a 2D HEC-RAS model was created that incorporates the Mississippi River, the Slough, and the Zumbro River. An unsteady flow hydrograph was generated for the Mississippi River based on scaled gage data. Daily flow values from USGS gage 05344500 (Mississippi River at Prescott, WI downstream of the St. Croix River confluence) between 3/1/2023 and 6/17/2023 were used as a base hydrograph, then scaled to the various discharges of interest. The peak flow of the original base event was 136,000 cfs; the unscaled hydrograph is shown below.

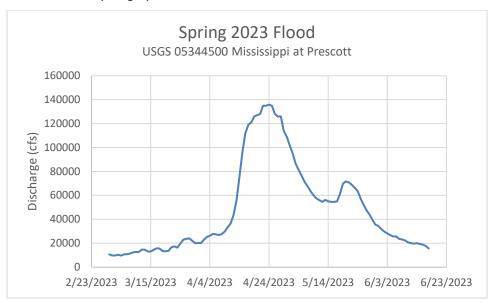


Figure 2 - Base Hydrograph for 2D Modeling

Initial Manning's n values were sourced from the National Land Cover Database (NLCD). Manual adjustments were made to the classification layer along the river channel. The 2D grid size was set to 1,000-foot cell spacing. Breaklines were added for stream banks, other existing high points, and hydraulic controls with near spacing ranging from 50 to 800 feet. The bridges were added to the model based on available data described in the previous section. A main channel was burned into LiDAR topography using data from the effective 1D model. The downstream boundary condition was set as the rating curve generated from the 1D effective model cross section 740.

#### 2. Flood Elevation Calibration

The model was calibrated to align as much as possible with the Preliminary FIS and Preliminary 1D steady state at the project site. This process improved alignment, but generally the 2D model is 1-2 feet higher in water surface elevation in comparison. A more comprehensive or regulatory-level study could incorporate more accurate information on USACE lock and dam operation, calibration, and other floodplain hydraulic features. For this feasibility level assessment, the 2D model is a balance between efficiency and accuracy, assuming the 1D model is accurate. The 2D provides the order of magnitude level information needed at this stage in the feasibility assessment to make informed decisions near Wabasha that is not adequately accounted for in the 1D model.

Manning's roughness coefficients decreased by anywhere from 0.007 to 0.03 during calibration. Table 6 describes calibrated Manning's n values.

Table 6 - Calibrated Manning's n Values

| Land Cover                     | Default | Calibrated |
|--------------------------------|---------|------------|
| Open Water                     | 0.035   | 0.027      |
| Developed, Open Space          | 0.04    | Unchanged  |
| Developed, Low Density         | 0.08    | 0.06       |
| Developed, Medium Density      | 0.1     | 0.08       |
| Developed, High Density        | 0.12    | 0.1        |
| Undeveloped, Barren Land       | 0.03    | Unchanged  |
| Undeveloped, Deciduous Forest  | 0.1     | 0.08       |
| Undeveloped, Evergreen Forest  | 0.14    | 0.1        |
| Undeveloped, Mixed Forest      | 0.12    | 0.09       |
| Undeveloped, Shrub-Scrub       | 0.085   | 0.065      |
| Undeveloped, Grassland         | 0.035   | Unchanged  |
| Agricultural, Pasture-Hay      | 0.04    | Unchanged  |
| Agricultural, Cultivated Crops | 0.035   | Unchanged  |
| Wetlands, Forested             | 0.12    | 0.09       |
| Wetlands, Non-Forested         | 0.07    | 0.05       |

#### C. Zumbro Slough

A 1D HEC-RAS model was generated from upstream of 12<sup>th</sup> St W to the marina. Existing condition flows were sourced from the previously described SSA model. All bridges were included based on Table 5 and standard lookup tables were used for Manning's n determinations.

### **VII. Existing Conditions Flood Results**

Appendix C includes figures of existing flooding extents for the 100-year and 500-year storms within the study area for both local drainage and for Mississippi River flooding.

### A. Local Drainage

Peak flood elevations in the slough based on local runoff have been calculated and compared against results from the following sections. This is summarized in Table 7 and Appendix C.

Ultimately, local runoff from the bluff and through the Slough results in lower flood elevations than those of the Mississippi River and those elevations should continue to govern regulatory flood protection elevations.

Table 7 – Zumbro Slough Local Drainage High Water Levels

|                          | Preliminary              | car bramage riight wat | 1                         |  |
|--------------------------|--------------------------|------------------------|---------------------------|--|
| HEC RAS Cross<br>Section | Mississippi River<br>BFE | Existing 100-year      | Existing 500-<br>year WSE |  |
| 1                        |                          | 666.8                  | 668.1                     |  |
| 1.0619                   |                          | 666.8                  | 668.1                     |  |
| 1.1004                   | 677.8                    | 666.9                  | 668.2                     |  |
| 1.1447                   | ]                        | 666.9                  | 668.2                     |  |
| 1.2289                   | ]                        | 666.9                  | 668.2                     |  |
| 1.2391                   |                          | Pedestrian Bridge      | •                         |  |
| 1.2485                   |                          | 666.9                  | 668.2                     |  |
| 1.2838                   |                          | 666.9                  | 668.2                     |  |
| 1.3289                   | 677.8                    | 666.9                  | 668.2                     |  |
| 1.3752                   |                          | 666.9                  | 668.2                     |  |
| 1.4299                   |                          | 667.0                  | 668.0                     |  |
| 1.4452                   |                          | 5th Grant Blvd         | •                         |  |
| 1.4659                   |                          | 674.4                  | 676.2                     |  |
| 1.5298                   |                          | 674.4                  | 676.2                     |  |
| 1.5954                   | 677.7                    | 674.4                  | 676.2                     |  |
| 1.6564                   |                          | 674.4                  | 676.2                     |  |
| 1.6921                   |                          | 674.4                  | 676.2                     |  |
| 1.7176                   | Hiawatha Dr W            |                        |                           |  |
| 1.7319                   |                          | 677.4                  | 678.1                     |  |
| 1.8036                   | 677.4                    | 677.4                  | 678.1                     |  |
| 1.9362                   | 077.4                    | 677.4                  | 678.1                     |  |
| 2.0782                   |                          | 677.4                  | 678.1                     |  |
| 2.1058                   |                          | HWY 60                 |                           |  |
| 2.1266                   |                          | 677.5                  | 678.1                     |  |
| 2.1421                   | 677.4                    | 677.5                  | 678.1                     |  |
| 2.1529                   |                          | 677.4                  | 678.0                     |  |
| 2.1699                   |                          | 12th St E              |                           |  |
| 2.1842                   |                          | 679.9                  | 680.2                     |  |
| 2.3288                   | 677.3                    | 679.9                  | 680.2                     |  |
| 2.5298                   | 0//.5                    | 679.9                  | 680.3                     |  |
| 2.7154                   |                          | 679.9                  | 680.3                     |  |

### B. Mississippi River Flooding

As the Mississippi River rises past elevation 665, a portion of the floodwater splits and begins flowing south through the Slough. The amount and velocity of the Slough discharge are significantly lower than those found in the main Mississippi River channel after the split. This information is detailed in Table 7. During the modeled flood events, there were not any tailwater effects within the Slough causing significant flow from south to north.

Table 8 - Slough Flow Summary

|                   | Peak Discharge |                           |            |                           |  |
|-------------------|----------------|---------------------------|------------|---------------------------|--|
| Conveyance        | 100-year       |                           | 500-year   |                           |  |
| Contequince       | Flow (cfs)     | Channel<br>Velocity (fps) | Flow (cfs) | Channel<br>Velocity (fps) |  |
| Mississippi River | 227,074        | 4.0 – 6.0                 | 279,708    | 4.0 – 6.0                 |  |
| Zumbro Slough     | 2,210          | 0.3 – 0.7                 | 5,787      | 0.7 – 1.1                 |  |

Combining those discharges with the flat topography of the Slough results in higher flood water elevations. The peak water surface elevations along both the Slough and main river conveyances are depicted below to provide context for these differences. While the peak elevations differ, the duration of flooding is similar between the two and the peak flows in both conveyances occur within 24 hours of each other.

The 2D modeling results confirm the flooded conditions in areas of concern defined by City staff: submergence of parks and beaches, roadway closures at 5<sup>th</sup> Grant Boulevard and Hwy 60, and flooding of the athletic fields.

#### C. Implications

Since local drainage flooding is the same or lower than Mississippi River flooding elevations, local drainage will be ignored during analysis of mitigation and improvements along the Slough.

Flooding in the Slough due to the Mississippi River lasts about 18 days for the 100-year and a total of 23 days for the 500-year.

The likelihood of flooding events occurring locally and on the river is unlikely due to their differing drainage area sizes. The Mississippi River has a drainage area of 56,940 square miles just upstream of the Slough, which has a local drainage area of 6 square miles.

#### D. Resiliency Evaluation and Modeling

The 500-year flooding event was modeled and will be discussed in this report as a simplified resilient, future condition. This event is approximately 2.0 feet higher than the 100-year event in the project area, both on the Mississippi River and in the Slough.

### **VIII. Localized Resiliency Improvements**

Localized alternatives were considered that would protect City infrastructure from flooding and reduce the occurrences of maintenance necessary. Appendix D includes a map of the sanitary system for reference along with callouts for sanitary sewer-specific projects listed below; other projects in this list are shown on Appendix E. The cost estimates discussed below do not include engineering or plan development.

- Elevate electrical pedestals in the Municipal Campground. The regulatory floodplain elevation at this location is 678.0, approximately 6 feet above the average ground elevation. Depending on the existing height of the pedestals, condition of the wiring, connections, pedestal itself, and whether it's necessary to rewire back to the source, the anticipated cost per pedestal should be expected to fall within the range listed in Table 9. This accounts for 50 sites, approximately the number visible in aerial imagery. The lower estimate assumes a simple extension of wiring and pedestal with minimal rewiring, while the higher estimate anticipates more rewiring and general updates to the appropriate city codes.
- Reduction of inflow and infiltration (I&I) from sanitary manhole MH246 to MH221 along 4<sup>th</sup>
   St W from Shields Avenue to Maiden Ave. Replacement of these two manholes and 420 feet
   of 8" sanitary sewer, as well as restoration of areas disturbed during excavation.
- Reduction of I&I from sanitary manhole MH244 to MH308 from the intersection of 4<sup>th</sup> St W and Shields Ave to the southwest end of the pedestrian bridge. Replacement of two manholes, lining about 600 feet of 12" sanitary sewer, and restoration of areas disturbed during excavation.
- Reduction of I&I from sanitary MH305 to MH306, starting in the marina parking lot and extending south to the alleyway near Cratte Ave between 3<sup>rd</sup> St W and 4<sup>th</sup> St W.
   Replacement of two manholes, lining of 400 feet of 6" sanitary sewer, and restoration of areas disturbed during excavation.
- Reduction of I&I from sanitary MH406 to MH168 at the intersection of Arch Ave and 2<sup>nd</sup> St W. Replacement of two manholes, lining about 60 feet of 6" sanitary sewer, and restoration of areas disturbed during excavation.
- Reduction of I&I at MH248. Replace T-valve and seal manhole.
- Reconstruct the public bathrooms at 4<sup>th</sup> St W and Maiden Ave. The replacement could be a
  two, three, or four season facility at an elevation that will provide protection from flooding.
- Replace the public docks at the Izaak Walton Park boat launch to eliminate recurring
  maintenance and repairs after flooding events. Includes replacement of the dock
  infrastructure to create boat ramps and mooring docks that rise and fall with floodwaters.
- General floodproofing of sanitary manholes to reduce I&I. Appendix D includes a map of flood-prone manholes identified and the approximate depth of submergence during the 500-year flood event. The cost shown in the table below assumes floodproofing only and that no other maintenance needs must be addressed.

**Table 9 - Localized Resiliency Improvement Costs** 

| Improvement   | Preliminary Cost Estimate for Construction |
|---|--|
| Raise Bathrooms at 4 <sup>th</sup> St and Maiden*                     | \$190,000 to \$315,000                     |
| Campground Electrical Pedestals                                       | \$35,000 to \$75,000                       |
| Boat Ramp Docks at Izaak Walton Park*                                 | \$180,000 each                             |
| Mooring Docks at Izaak Walton Park*                                   | \$150,000 each                             |
| I&I: MH246 to MH221, 4 <sup>th</sup> St from Shields to Maiden*       | \$115,000                                  |
| I&I: MH244 to MH308, 4 <sup>th</sup> St/Shields to Pedestrian Bridge* | \$85,000                                   |
| I&I: MH305 to MH306, Marina to Alleyway*                              | \$60,000                                   |
| I&I: MH406 to MH168, Arch/2 <sup>nd</sup> St*                         | \$25,000                                   |
| T-Valve and Manhole Sealing at MH248*                                 | \$7,000                                    |
| Floodproofing of Individual Sanitary Manholes                         | \$2,000 each                               |

<sup>\*</sup> Improvement indicated in Appendices D and E.

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### IX. Alternative A – 4<sup>th</sup>/5<sup>th</sup> Grant Blvd Improvements

4<sup>th</sup> and 5<sup>th</sup> Grant Blvd are subject to flooding and therefore closed to the public on a regular basis since the profile of the roadway is near the Mississippi River 10-year floodplain elevation.

### A. Recommended Improvement

Included in this alternative were modifications at and adjacent to 4<sup>th</sup>/5<sup>th</sup> Grant Blvd between Shields Ave and Pembroke Ave.

- Raise the profile of 4<sup>th</sup>/5<sup>th</sup> Grant Blvd for about 2,400 feet of its alignment to at least the 100-year floodplain elevation, maximum grade raise of 5 feet.
- Replace and upsize the 4<sup>th</sup>/5<sup>th</sup> Grant Blvd bridge with a structure opening of at least 1,000 square feet.

Protecting 5<sup>th</sup> Grant Blvd from floods up to and including the 100-year is feasible with this alternative while avoiding significant floodplain impacts. It was assumed that the grade raise would be limited to 4<sup>th</sup> and 5<sup>th</sup> Grant Blvd, with side roads and other connections being adjusted minimally to accommodate the grade raise. Access to Main St/Hwy 25 can be maintained with this alternative.

The improvements cause a localized 0.03-foot or 1/3" rise directly at the upstream side of the 4<sup>th</sup>/5<sup>th</sup> Grant bridge that tapers down to 0.00 feet before the Slough joins the river. Elimination of this rise will involve refinement of drainage features and grading and should be anticipated as a necessary part of future design efforts.

Alternative A is a necessary component of Alternative B.

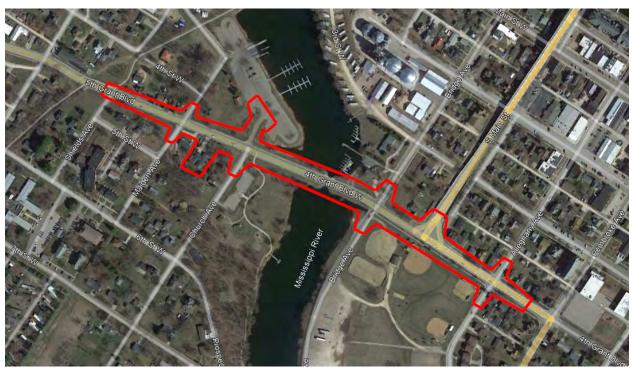


Figure 3 – Alternative A Extent

Table 10 - Cost Estimate for Alternative A

| Component                                     | Low End Cost | High End Cost |
|---|--------------|---------------|
| Earthwork (w/ 20% Contingency)                | \$975,000    | \$1,463,000   |
| Bridge or Large Culverts (w/ 20% Contingency) | \$3,637,000  | \$5,456,000   |
| Roadway (w/ 20% Contingency)                  | \$3,868,000  | \$5,802,000   |
| <b>Drainage</b> (w/ 20% Contingency)          | \$969,000    | \$1,454,000   |
| Engineering and Permitting                    | \$1,900,000  | \$2,900,000   |
| Total   | \$11,349,000 | \$17,075,000  |

Note: Costs do not include any right-of-way or acquisitions that may or may not be necessary.

#### B. Additional Considerations

- There is potential that by protecting to a lower flooding event such as the 50-year, a better ratio of better benefits to negative impacts can be provided. These iterations have not been evaluated.
- Around five intersections and a variety of driveways, sidewalks, trails, and other infrastructure would need to be reconstructed or modified to allow these improvements.
- Purchase of right of way will be needed to accommodate these improvements, and several full acquisitions should be expected.
- Additional benefits include a slight reduction of flood elevations south of 5<sup>th</sup> Grant Blvd.
- Access to Izaac Walton Park will need to be reconstructed to avoid an excessively steep driveway grade off 5<sup>th</sup> Grant Blvd, and the parking lot itself will likely require modification as a result.
- Local rainfall discharge will need to be analyzed during final design to ensure nuisance flooding is not introduced to local properties and dwellings.

See Appendix F for mapping to supplement this alternative.

### X. Alternative B – Athletic Field Flood Reduction and TH 60 Realignment

The athletic field areas experience frequent flooding similar to 4<sup>th</sup> and 5<sup>th</sup> Grant Blvd, resulting in unusable recreational areas and impacts to city access, transportation, and public safety.

### A. Recommended Improvement

- This alternative is likely to coincide with Alternative A Improvements: Raise 4<sup>th</sup>/5<sup>th</sup> Grant Blvd for about 2,400 feet, maximum of about 5 feet; replace and upsize bridge. These are represented in red in Figure 4.
- Raise athletic fields, ranging from 3 to 10 feet of fill.
- Redesignate Hiawatha Dr W as TH 60, raise profile to an elevation of 680, and realign through the athletic fields.
- Increase structure size at the Hiawatha Dr W/TH 60 crossing of the Slough.
- Additional impacts to access, intersections, and other adjacent infrastructure.

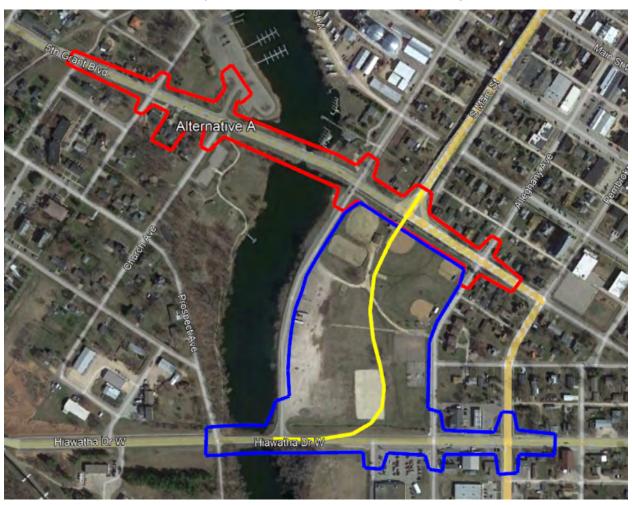


Figure 4 – Alternative B Extent

Flooding at the athletic fields and adjacent roadways can be reduced or eliminated during the 100-year flooding event but the necessary improvements would be significant. To clearly define the scope of this alternative, our primary assumption is that a full grade raise would be limited to the athletic fields themselves and the above-mentioned roadways. Impacts to other roadways or infrastructure would be minimized to what is necessary for connection with the reconstructed intersections.

Impacts to Bridge Ave were avoided since it primarily services access points to the fields that can be replaced with access points off of Hiawatha Dr and 4<sup>th</sup> Grand Blvd; additionally, environmental impacts and permitting are anticipated to be significant with changes to Bridge Ave due to its proximity to the Slough. The numerous driveways and residences directly adjacent to Alleghany Ave pose clear challenges from cost, right-of-way, and impact limit perspectives; while possible, this was not evaluated further.

Access to Hwy 25 would be maintained by the redesignated TH 60 after realignment through the athletic fields and a grade raise to provide protection during flooding events.

The improvements described above have floodplain impacts that would require additional analysis during the design process. This evaluation indicates a maximum impact of +0.03 feet, or about 1/3 inch, increase in 100-year flood elevation directly at the 5<sup>th</sup> Grant Blvd bridge, which tapers down to 0.01 at the north junction of the Slough and river. This is a result of constricting flow through the Slough, which increases flow in the Mississippi River itself; while this increase in flow is relatively small, it is enough to create a rise floodplain and trigger permitting implications. While small, this impact will need to be eliminated during the design process to ensure the project is permittable.

Table 11 - Cost Estimate for Alternative B

| Component                                     | Low End Cost | High End Cost |  |  |
|---|--------------|---------------|--|--|
| 2023 Estimate for TH60 Realignment            | \$9,900,498  |               |  |  |
|   |              |               |  |  |
| Additional Costs to Complete Alternative B    |              |               |  |  |
| Earthwork (w/ 20% Contingency)                | \$415,000    | \$622,000     |  |  |
| Bridge or Large Culverts (w/ 20% Contingency) | \$2,474,000  | \$4,135,000   |  |  |
| Engineering and Permitting                    | \$720,000    | \$1,050,000   |  |  |
| Total   | \$13,509,498 | \$15,707,498  |  |  |

Note: Costs do not include any right-of-way or acquisitions that may or may not be necessary.

### B. Sub Alternative B2

Given the significant cost and impact of Alternative A, which is also necessary for Alternative B as described above, a sub alternative was developed to focus on the TH 60 realignment and maximizing the raising and development of the athletic field while avoiding further modifications of the  $4^{th}/5^{th}$  Grant Blvd. This alternative reduces the floodplain impacts experienced by the Zumbro Slough and the Mississippi River as described above to +0.01 feet.



Figure 5 – Alternative B2 Extent

Table 12 - Cost Estimate for Alternative B2

| Component   | Low End Cost | High End Cost |  |  |
|---|--------------|---------------|--|--|
| 2023 Estimate for TH60 Realignment                    | \$9,900,498  |               |  |  |
|   |              |               |  |  |
| Additional Costs to Complete Alternative B2           |              |               |  |  |
| Additional Road & Drainage Costs (w/ 20% Contingency) | \$1,934,800  | \$2,902,400   |  |  |
| Bridge or Large Culverts (w/ 20% Contingency)         | \$2,474,000  | \$4,135,000   |  |  |
| Engineering and Permitting                            | \$1,102,200  | \$1,050,000   |  |  |
| Total   | \$15,411,498 | \$17,987,898  |  |  |

Note: Costs do not include any right-of-way or acquisitions that may or may not be necessary.

### C. Additional Considerations

- The required grade raise along Hiawatha Dr W will require modifications to access for adjacent businesses.
- Incorporates TH 60 Realignment Project work as previously developed for the City.
   See Appendix G for mapping to supplement this alternative and the 2023 project summary of the TH 60 realignment.

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### XI. Alternative C – Beach Park, Campground, and Marina Levee/Flood Wall

The areas addressed in this alternative experience flooding due to their proximity to the river. This interrupts recreational use, transportation, and general public safety.

### A. Evaluated Improvement

This alternative includes the construction of a levee or flood way that encompasses the areas indicated in the figure below. While this eliminates flooding up to the 100-year event for a significant portion of recreational and residential land, the impact necessary for construction is equally significant. The levee would have the following characteristics:

- Length of at least 3,500 feet
- Top width of 6 feet; side slopes of 1V:4H or flatter; top elevation that exceeds 100-year per FEMA requirements.

Based on this and the topography used for the 2D model, the levee would have an average depth of 7.6 feet, a maximum depth of 15.0 feet, and would require around 15,000 cubic yards of fill. The tallest portions of the levee, located in Beach Park, would have a construction footprint over 120 feet wide.



Figure 6 – Alternative C Extents

#### B. Cost Estimate

Construction costs were not evaluated due to the significant footprint of construction impacts and the considerations listed below.

#### C. Additional Considerations

- Access to the waterfront would be limited and views from this portion of the city would be obstructed.
- Various buildings, docks, and businesses would need to be relocated entirely.
- Nearly 50% of campground sites would need to be eliminated.
- About 50% of the area of Beach Park would be needed to house the levee, including all beach areas.
- A levee would need to be certified by FEMA, which requires additional detail and specifications during design, as well as specific materials during placement. These are feasible but result in increased cost of design and construction.
- Roadways and intersections need to be modified or raised to properly serve the area protected by the levee, including:
  - o Lawrence Blvd W
  - o Arch Ave
  - o 3<sup>rd</sup> St W
  - o Bridge Ave
- A flood wall system is a possible alternative that may eliminate some of these concerns.

Due to these estimations and considerations this alternative is not recommended. See Appendix H for mapping to supplement this discussion.

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### XII. Alternative D – Main St 600 Block Improvements

A low point on Lawrence Blvd E and storm sewer outfalls result in the Mississippi River floodwaters expanding into the residential areas during large flooding events, interrupting transportation, property access, and creating hazardous conditions overall.

#### A. Recommended Improvement

The improvements studied for this alternative include modifications to and near Lawrence Blvd E.

- Raise the grade of Lawrence Blvd E to at least 680, max raise of 8 feet.
- Modify local drainage between Lawrence Blvd E and Main St E to ensure rainfall doesn't create adverse flooding conditions.



Figure 7 - Alternative D Extents

These improvements would provide a benefit to multiple residences adjacent to Lawrence Blvd E and Main St E, as indicated in Appendix I since they would be removed from the floodplain. There would be no adverse impact to the floodplain because of these changes, but additional right of way would need to be purchased including one full acquisition.

Drainage in the areas south of Lawrence Blvd E would involve construction of ditches as well as installation of storm sewer and backflow prevention to keep the low-lying areas from remaining flooded after rainfall events. Backflow prevention would be critical to ensure the area is protected from river flooding.

Table 13 - Cost Estimate for Alternative D

| Component                      | Low End Cost | High End Cost |
|--------------------------------|--------------|---------------|
| Earthwork (w/ 20% Contingency) | \$134,000    | \$201,000     |
| Roadway (w/ 20% Contingency)   | \$356,000    | \$534,000     |
| Drainage (w/ 20% Contingency)  | \$100,000    | \$150,000     |
| Acquisitions and Right-of-Way  | \$2,200,000  | \$3,100,000   |
| Engineering and Permitting     | \$200,000    | \$200,000     |
| Total                          | \$2,990,000  | \$4,185,000   |

### B. Additional Considerations

- A strip of right of way will be needed to construct a roadside ditch for local runoff.
- Permanent sightline interruptions will result from the proposed changes; close coordination with property owners will be necessary.

See Appendix I for mapping to supplement this alternative.

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### XIII. Alternative E – Wastewater Treatment Facility Flooding

The parcel that contains the wastewater treatment facility is very flat with no defined drainage system for rainfall runoff. During rain events, the lowest area on the site accumulates runoff, causing flooding of buildings.

#### A. Recommended improvement

The modeling of the Mississippi River and Zumbro Slough flooding completed with this study have confirmed the wastewater treatment facility floods due to localized rainfall runoff, not river flooding. A total area of about 12 acres contributes to flooding at the facility, resulting in an anticipated 28 cfs during the 50-year rainfall event. To mitigate flooding of buildings and other infrastructure during the 50-year rainfall event, this runoff would need to be detained and discharged over time in a controlled fashion to the Hiawatha Dr E ditch system to the south or towards the river to the east. The flat topography in the area will require ditches to be established, or the installation of a detention pond, a lift station, and segment of force main. This analysis assumed a goal of protecting buildings during a 50-year rainfall event.



Figure 8 – Sub Alternatives E1 and E2 Concepts

#### B. Sub Alternatives

E1. Ditch Drainage, blue in above figure. Discharging the 28 cfs peak flow to the ditch system would require a series of 36" RCP culverts at a slope of 1%. Once in the ditch system, this discharge alone would flow about 1.2 feet deep until reaching steeper ditch grades as the system approaches the slough. Local micro-grading will be necessary around the facility to capture runoff from the various portions of the site. The ditch work would need to extend south along Hiawatha Dr E by several hundred feet to ensure positive grade and proper ditch capacity.

Table 14 - Cost Estimate for Alternative E1

| Component                            | Low End Cost | High End Cost |
|--------------------------------------|--------------|---------------|
| Earthwork (w/ 20% Contingency)       | \$27,000     | \$33,000      |
| Roadway (w/ 20% Contingency)         | \$90,000     | \$110,000     |
| <b>Drainage</b> (w/ 20% Contingency) | \$43,000     | \$53,000      |
| Engineering and Permitting           | \$40,000     | \$49,000      |
| Total                                | \$200,000    | \$245,000     |

E2. Lift Station and Force Main, red in above figure. Discharging this volume of runoff such that the treatment facility is protected will require a lift station with a detention basin. A larger detention basin will result in a smaller lift station and lower operating costs. The configuration evaluated in this study assumed detention basin constructed in the green space with a volume of 1.2 acre-feet, or 55,000 cubic feet, and a lift station with a capacity of at least 3,000 gallons per minute. Local micro-grading will be necessary to capture runoff from the various portions of the site.

Table 15 - Cost Estimate for Alternative E2

| Component  | Low End Cost | High End Cost |
|--|--------------|---------------|
| Earthwork (w/ 20% Contingency)                   | \$140,000    | \$175,000     |
| Lift Station and Force Main (w/ 20% Contingency) | \$1,120,000  | \$1,345,000   |
| Engineering and Permitting                       | \$300,000    | \$400,000     |
| Total  | \$1,560,000  | \$1,920,000   |

#### C. Additional Considerations

• Sub alternative E1 Ditch Drainage could benefit from being associated with roadway improvements and should be coordinated with Wabasha County.

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### **XIV. Summary**

### A. Cost Summary

A cost comparison of the options is provided in Table 9. Notably, these solutions provide partial flood reduction.

**Table 16 - Alternative Cost Comparison** 

| Option | Description  | Preliminary Cost Estimate<br>for Construction and<br>Design |
|--------|--|---|
| -      | Existing Conditions (No Action)                          | Unknown Emergency<br>Response and Mitigation<br>Costs       |
| Α      | 4 <sup>th</sup> /5 <sup>th</sup> Grant Blvd Improvements | \$11.3M - \$17.1M   |
| В      | Athletic Field Flood Reduction and TH 60 Realignment     | \$13.5M - \$15.7M   |
| B2     | Modified TH 60 Realignment                               | \$15.4M - \$18.0M   |
| С      | Beach Park, Campground, and Marina Levee                 | Not Evaluated   |
| D      | Main St 600 Block Improvements                           | \$3.0M - \$4.2M   |
| E1     | Wastewater Treatment Facility Ditch Drainage             | \$200k - \$250k   |
| E2     | Wastewater Treatment Facility Stormwater Lift Station    | \$1.6M - \$1.9M   |

#### B. Water Surface Impacts

The evaluated alternatives have varied impacts on the floodplain elevations and flood risk for the transportation system, residential infrastructure, and other areas of repeated flooding. A majority of impacts are between  $\pm 0.00$  and  $\pm 0.02$  feet, which is typically considered negligible at a feasibility level of design. Larger increases in water surface elevations will need to be mitigated during final design to ensure state and federal floodplain laws are followed.

Other considerations are discussed in the next section which may remove any of these options due to cost, mitigation requirements, or community preference. A summary of impacts to water surface elevations for the alternatives are reported in Table 10.

Table 17 - Summary of BFE Impacts (FEMA Flow Rates)

| Location                               | Motorcom    | Condition | 100-year Wate | r Surface   | 500-year Water Surface |             |
|--|-------------|-----------|---------------|-------------|------------------------|-------------|
| Location                               | Watercourse | Condition | Elev (NAVD88) | Impact (ft) | Elev (NAVD88)          | Impact (ft) |
|  |             | Existing  | 680.78        | -           | 682.78                 | -           |
|  |             | Alt A     | 680.78        | 0.00        | 682.79                 | +0.01       |
| Near                                   | Mississippi | Alt B     | 680.78        | 0.00        | 682.82                 | +0.04       |
| Confluence with                        | River       | Alt B2    | 680.78        | 0.00        | 682.79                 | +0.01       |
| Chippewa River                         |             | Alt C     | 680.78        | 0.00        | 682.76                 | -0.02       |
|  |             | Alt D     | 680.78        | 0.00        | 682.77                 | -0.01       |
|  |             | Existing  | 679.36        | -           | 681.44                 | -           |
|  |             | Alt A     | 679.37        | +0.01       | 681.45                 | +0.01       |
| 05                                     | Mississippi | Alt B     | 679.37        | +0.01       | 681.47                 | +0.03       |
| Hwy 25                                 | River       | Alt B2    | 679.37        | +0.01       | 681.46                 | +0.02       |
|  |             | Alt C     | 679.37        | +0.01       | 684.45                 | +0.01       |
|  |             | Alt D     | 679.36        | 0.00        | 684.45                 | +0.01       |
|  |             | Existing  | 679.65        | -           | 681.66                 | -           |
|  |             | Alt A     | 679.65        | 0.00        | 681.69                 | +0.03       |
| Northern Slough                        |             | Alt B     | 679.66        | +0.01       | 681.75                 | +0.09       |
| Inlet                                  | Slough      | Alt B2    | 679.66        | +0.01       | 681.70                 | +0.04       |
|  |             | Alt C     | 679.64        | -0.01       | 681.67                 | +0.01       |
|  |             | Alt D     | 679.65        | 0.00        | 681.66                 | 0.00        |
|  |             | Existing  | 679.63        | -           | 681.64                 | -           |
|  |             | Alt A     | 679.64        | +0.01       | 681.67                 | +0.03       |
|  | Slough      | Alt B     | 679.64        | +0.01       | 681.74                 | +0.10       |
| Pedestrian Trail                       |             | Alt B2    | 679.64        | +0.01       | 681.68                 | +0.04       |
|  |             | Alt C     | 679.62        | -0.01       | 681.58                 | -0.06       |
|  |             | Alt D     | 679.63        | 0.00        | 681.64                 | 0.00        |
|  |             | Existing  | 679.61        | -           | 681.58                 | -           |
|  |             | Alt A     | 679.62        | +0.01       | 681.60                 | +0.02       |
| 4 <sup>th</sup> /5 <sup>th</sup> Grant | 01 1        | Alt B     | 679.63        | +0.02       | 681.75                 | +0.17       |
| Blvd W                                 | Slough      | Alt B2    | 679.61        | 0.00        | 681.66                 | +0.08       |
|  |             | Alt C     | 679.59        | -0.02       | 681.57                 | -0.01       |
|  |             | Alt D     | 679.61        | 0.00        | 681.58                 | 0.00        |
|  | Slough      | Existing  | 679.59        | -           | 681.55                 | -           |
| 5                                      |             | Alt A     | 679.43        | -0.16       | 681.20                 | -0.35       |
| Hiawatha Dr W                          |             | Alt B     | 679.62        | +0.03       | 681.74                 | +0.19       |
| and<br>Future TH 60                    |             | Alt B2    | 679.36        | -0.23       | 681.59                 | +0.04       |
| Future 1H 60                           |             | Alt C     | 679.58        | -0.01       | 681.54                 | -0.01       |
|  |             | Alt D     | 679.59        | 0.00        | 681.54                 | -0.01       |
|  | Slough      | Existing  | 679.46        | -           | 681.39                 | -           |
|  |             | Alt A     | 679.31        | -0.17       | 681.10                 | -0.29       |
| Pembroke Ave                           |             | Alt B     | 679.16        | -0.30       | 680.69                 | -0.70       |
| Slough                                 |             | Alt B2    | 679.19        | -0.27       | 680.97                 | -0.42       |
|  |             | Alt C     | 679.44        | -0.02       | 681.38                 | -0.01       |
|  |             | Alt D     | 679.46        | 0.00        | 681.38                 | -0.01       |
|  | Mississippi | Existing  | 675.27        | -           | 677.45                 | -           |
|  |             | Alt A     | 675.27        | 0.00        | 677.45                 | 0.00        |
| Lock and                               |             | Alt B     | 675.27        | 0.00        | 677.45                 | 0.00        |
| Dam #4                                 |             | Alt B2    | 675.27        | 0.00        | 677.45                 | 0.00        |
|  |             | Alt C     | 675.27        | 0.00        | 677.45                 | 0.00        |
|  |             | Alt D     | 675.27        | 0.00        | 677.45                 | 0.00        |

### C. Resilient Design

The impact of Alternative A 500-year flooding conditions are similar to that of the 100-year but are amplified to a larger magnitude, which occurs to both positive and negative impacts. Alternative B remains the most impactful of the alternatives in the 500-year flooding event, adding nearly 0.20 feet of flooding at Hiawatha Dr W. Alternatives C and D have consistently small impacts to the 500-year flooding conditions.

#### D. Other Considerations

More investigation is needed to assess the necessary details regarding constructability and permitting viability of each option. All alternatives are conceptual but have been preliminarily vetted for constructability and permitting. Additional data must be gathered to understand anticipated grading footprints, easement or ROW needs, construction access and temporary traffic impacts, and construction schedules. Understanding wetland and river impacts will be crucial for successfully permitting these projects, and to ensure mitigation requirements and costs are understood. Early coordination with permitting agencies is highly recommended for any of the alternative concepts discussed.

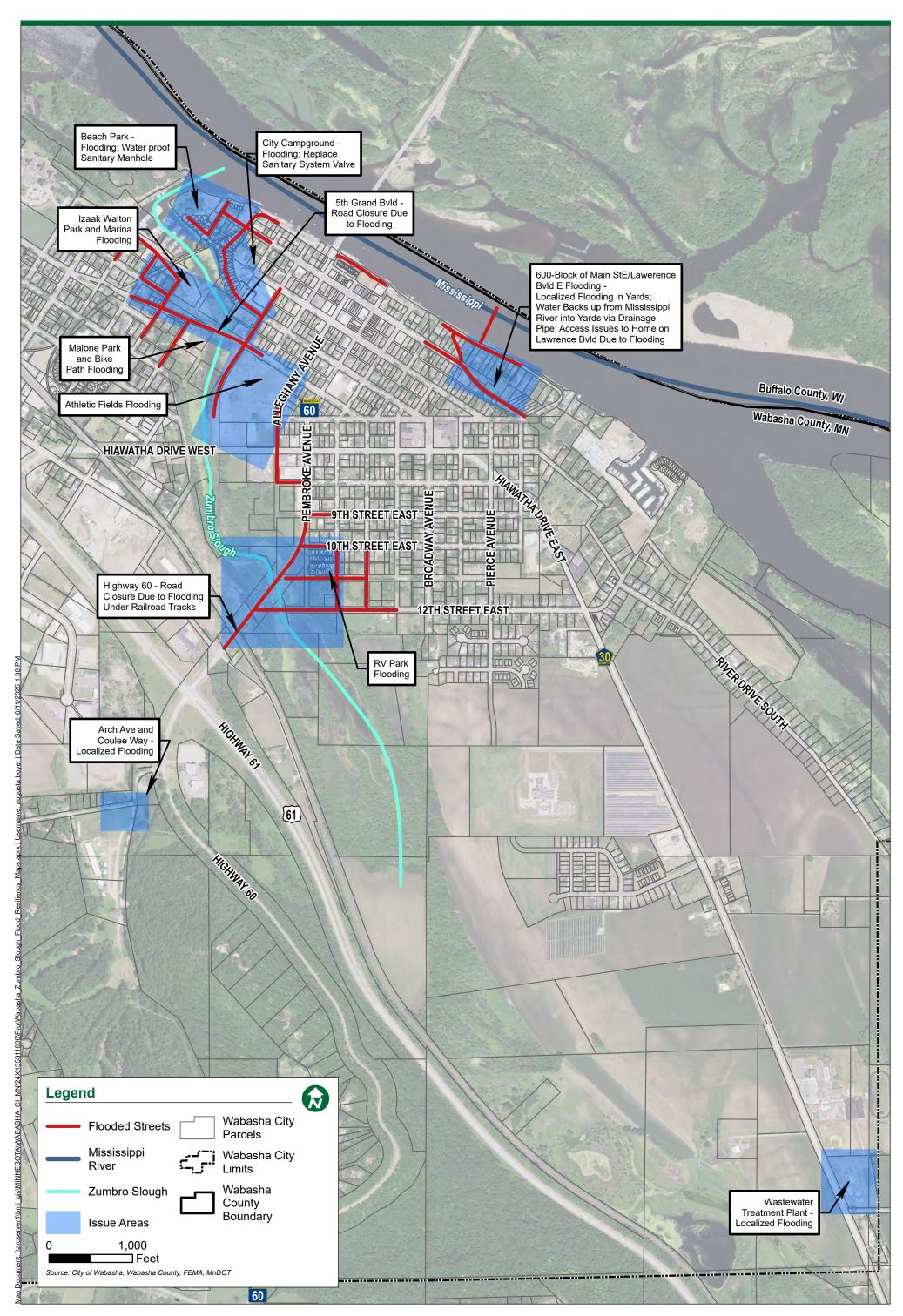
All alternatives impact the floodplain and floodway and therefore will require designs that meet Minnesota and FEMA floodplain regulations. This may result in additional design or construction costs to achieve the required floodplain impacts.

Other utility conflicts and impacts have not been assessed.

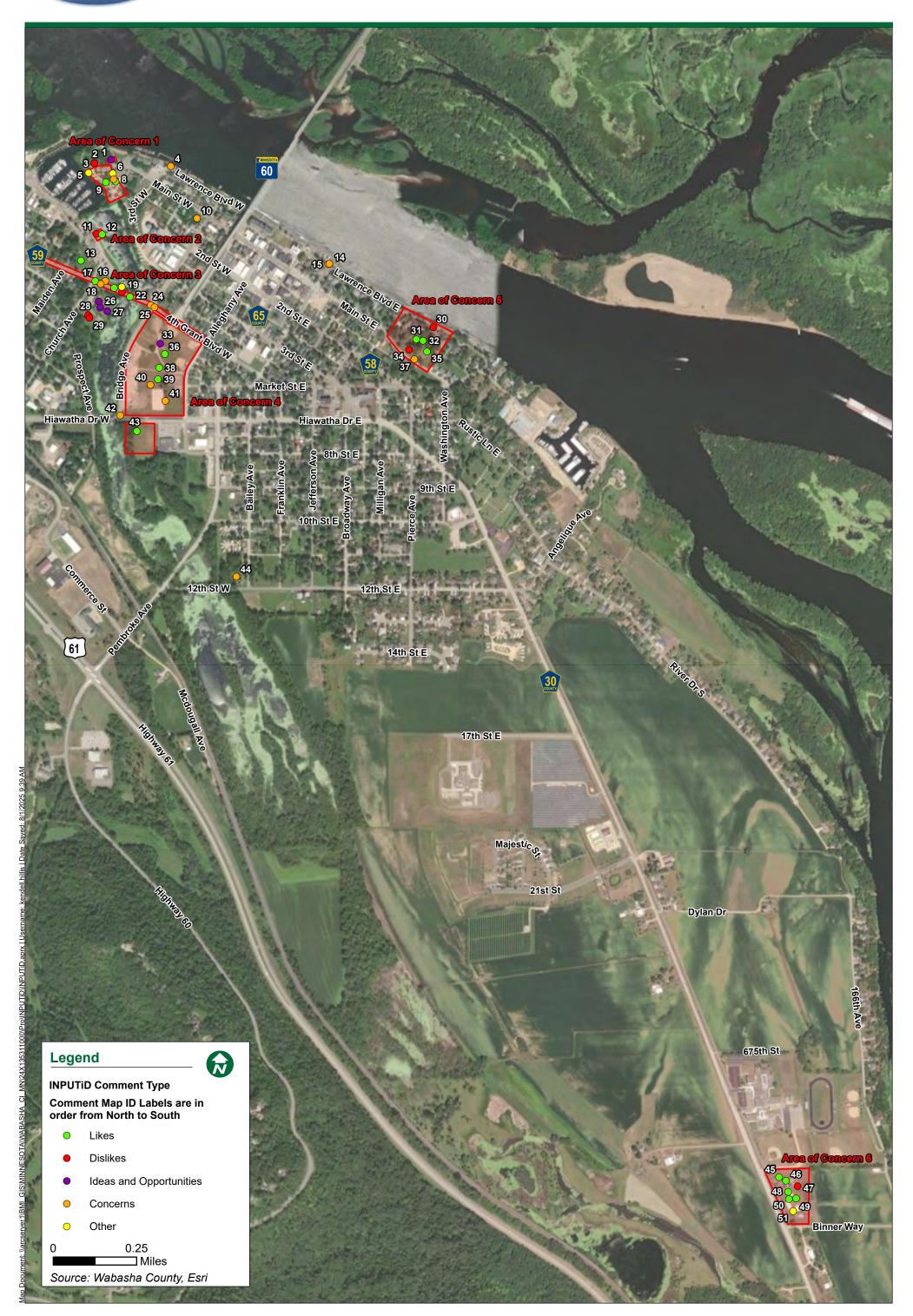
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| Appendix A: Issues Map and Public Comments |  |
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### Wabasha Flood Resiliency Evaluation Input ID Summary Wabasha, MN



### Area of Concern 1: Campground, Beach Park, and Sewer Infrastructure

- Mixed support for additional electrical and additional shelter (Map ID: 1).
- Questions about whether electrical upgrades benefit only the campground (Map IDs: 5, 6, 7, 8).
- Questions over whether floodproofing is worthwhile (Map ID: 2, 3)
- Support for durable, flood-resistant materials in shelters (Map ID: 2, 23).
- Suggestion to address infiltration in sewer pipes and manholes (Map ID: 10).
- Suggestion for flood resilient playground and park (Map ID: 26, 27).
- Support for protecting water/wastewater facilities (Map IDs: 46, 48, 49).

### Area of Concern 2: Ike's Park and Malone Park

- Anchoring docks is seen as low priority by some, but a few support it for maintenance and safety (Map IDs: 11, 12).
- Mixed support for an all-inclusive, flood-resilient playground at Ike's Park (Map ID: 13).
- Park shelters are viewed as a low priority due to flood risk but cleanup costs are to be kept in mind (Map IDs: 28, 29).
- Support for using durable materials in Malone Park shelters (Map ID: 23).



## Wabasha Flood Resiliency Evaluation Input ID Summary Wabasha, MN



### Area of Concern 3: Grant Blvd and Slough Area

- Mixed support for boating and boat mooring next to Malone Park even with the slough (Map ID: 16).
- Elevating Grant Blvd is seen as essential for emergency access to the hospital. Unanimously it is a high priority (Map IDs: 17, 20, 22).
- Concerns about cost, timing, and limited benefit of raising the road (Map ID: 18, 21, 25).
- Slight support for dredging the slough and raising the bridge (Map ID: 24).
- Some residents oppose investments in shelters due to infrequent closures (Map ID: 2, 3, 21, 28).

#### Area of Concern 4: Old Athletic Field and Highway 60 Reroute

- Mixed support for Highway 60 reroutes and redevelopment of the athletic field (Map IDs: 33, 36, 38, 39, 40, 42, 43).
- Concerns about developing in flood zones and shifting flood risk (Map IDs: 38, 40, 41).
- Suggestions to leave the athletic field as green space or use it for recreation (Map ID: 39).
- Support for a replaced playground at Malone Park outside of the flood plain (Map ID: 27).



## Wabasha Flood Resiliency Evaluation Input ID Summary Wabasha, MN



#### **Area of Concern 5: Residential Flood-Prone Areas**

- Support for buyouts or grants to elevate homes if homeowners are financing it, not taxpayers (Map IDs: 31, 32).
- Reminders that homeowners knowingly bought in flood zones and should pay for mitigation (Map IDs: 30, 32).
- Skepticism about retention ponds' effectiveness (Map IDs: 30, 32, 34, 35).
- Suggestions to convert flood-prone areas to green space, even buying up flood prone houses (*Map IDs*: 32, 35).
- Support for doing Main Street East flooding analysis study (Map ID: 37).

#### Area of Concern 6: Water Plant and Localized Flooding

- Strong support for protecting the water/wastewater facility as a top priority (Map IDs: 46, 48, 49).
- Concerns about localized flooding not related to the Mississippi River (Map IDs: 44, 45, 47, 50).
- Suggestion to coordinate with County (Map ID: 51).
- Support to improve boat launch (Map ID: 4).

#### Miscellaneous

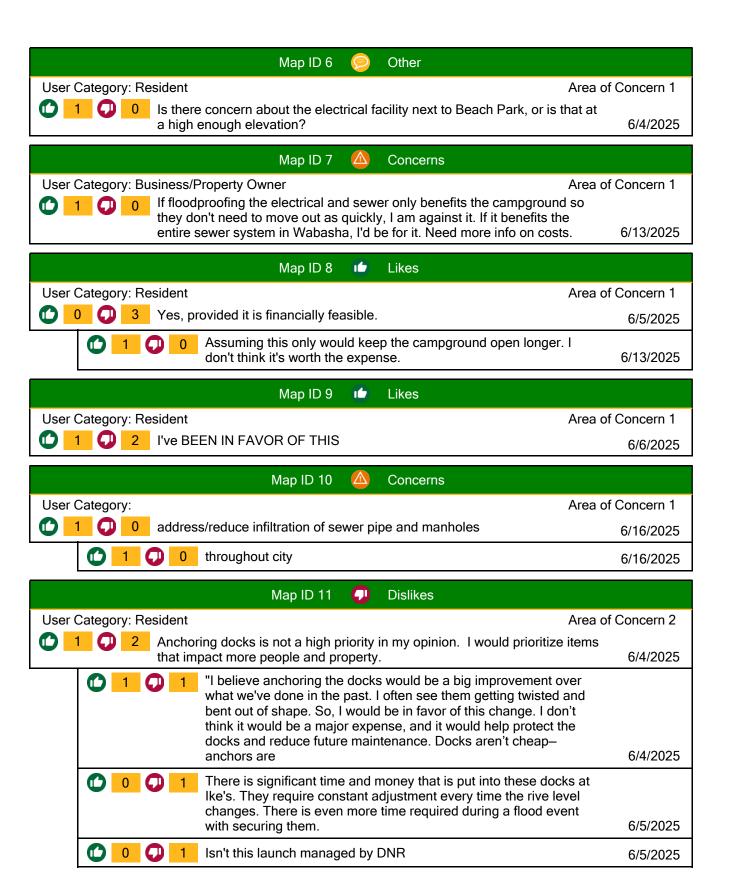
• Request to extend sewer discharge pipes further into the river (Map IDs: 14, 15).

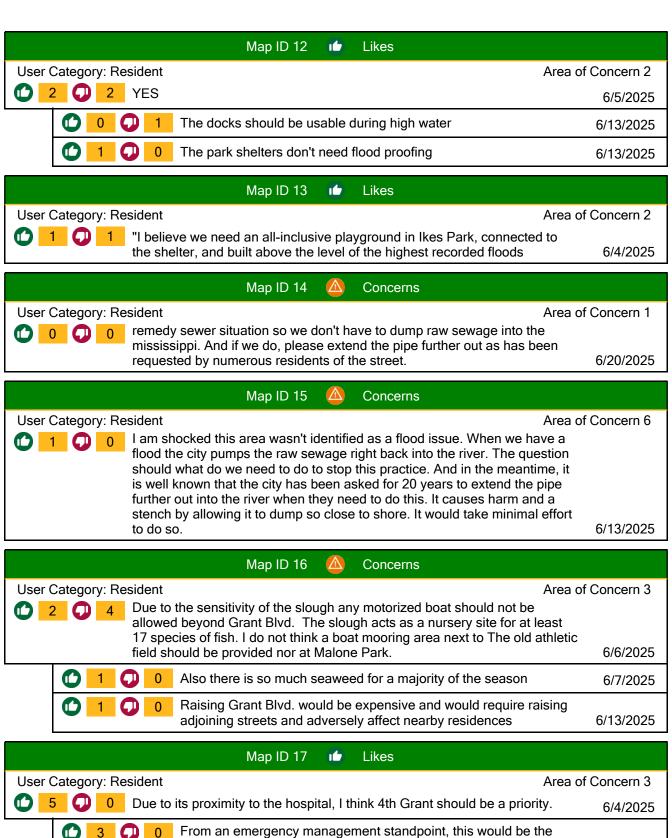


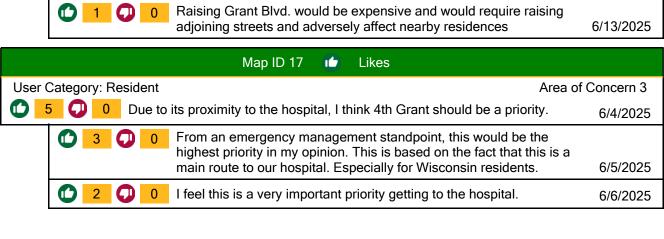
# Wabasha Flood Resiliency **Evaluation Input ID**

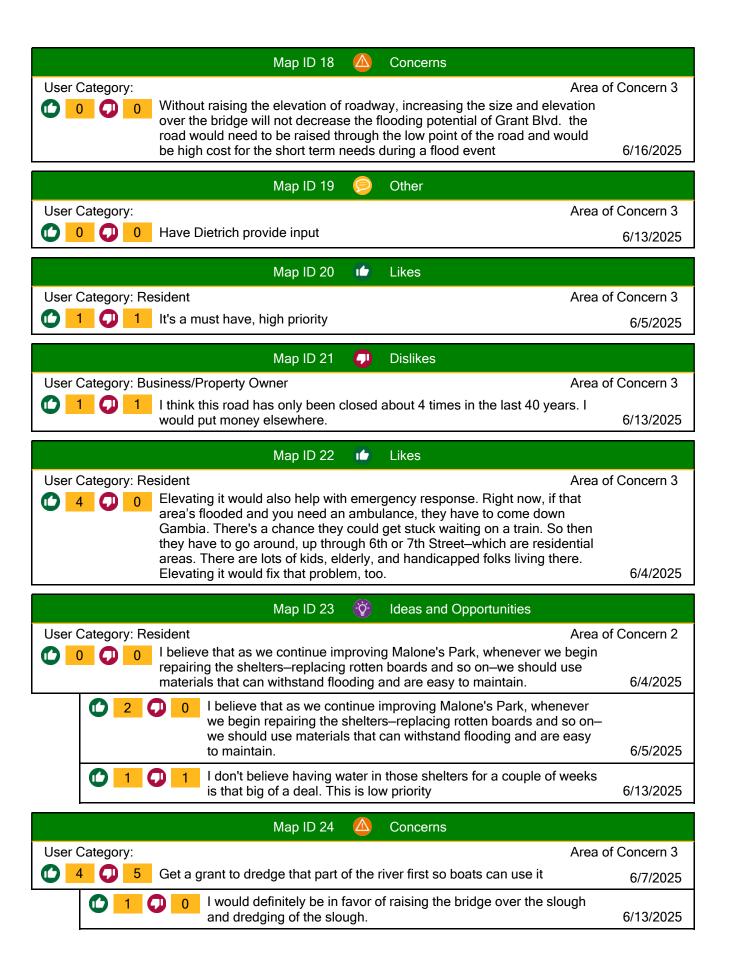


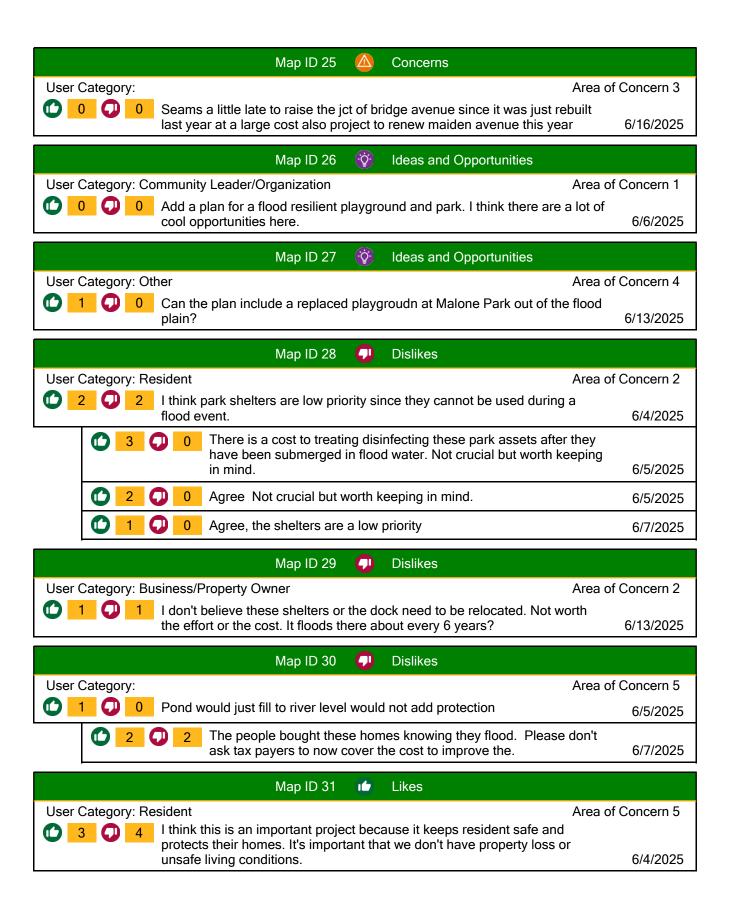
| Real People. Real Solutions. Wabasha, MN  | June 2025       |
|---|-----------------|
| Map ID 1 🥎 Ideas and Opportunities  |                 |
|   | ea of Concern 1 |
| Opportunity to add additional electrical and additional shelter. We've gotto feedback from the community about an additional shelter and electrical.  | en<br>6/4/2025  |
| I agree wholeheartedly. I've heard many citizens and visitors ask for another shelter at this location. During the summer, the large and small shelters are often already in use  | 6/4/2025        |
| 1 Ves, provided it is financially feasible.   | 6/5/2025        |
| Map ID 2 🕡 Dislikes   |                 |
| User Category: Resident Are   | ea of Concern 1 |
| 1 2 I think floodproofing shelters should be a low priority item since they canr be used during a flood event.  | ot<br>6/4/2025  |
| To me, a flood-proof shelter means making sure all the electrical components—like light switches, outlets, and lighting—are installed high enough so they won't be affected by floodwaters. It also means using durable materials, like stainless steel or surfaces withick coats of protective paint, so the structure can withstand water damage and be cleaned easily afterward. | th              |
| O    O  | 6/5/2025        |
|   | 3.0.232         |
| Map ID 3  |                 |
| User Category:  Are  1 0 The Beach Park shelters don't need flood proofing.   | ea of Concern 1 |
| The Beach Fank shelters don't fleed flood probling.   | 6/13/2025       |
| Map ID 4 (🙆 Concerns  |                 |
| User Category: Resident  This is the only area where boats can be launched during major flooding, but it's not well managed or maintained. I believe the city could do a bette job and should put more effort into improving this ramp. I also know that to DNR Fish and Wildlife uses this ramp, so there may be funding opportunities available to help with improvements         |                 |
| 0 0 agree with the statement above  | 6/5/2025        |
|   | 0/0/2020        |
| Map ID 5 👂 Other  |                 |
|   | ea of Concern 1 |
| Does the electrical system referenced here only power the campground?   | 6/4/2025        |
| d 4 0 0 If the campground electrical is a problem, raise it but, add the cost to improve it to the campers not people who don't use it.   | 6/7/2025        |











|                              | Map ID 32 🕩 Likes  |           |
|------------------------------|--|-----------|
| User Category: Resident      | Area of  | Concern 5 |
| time it<br>major<br>to mitio | we this is a high priority. In the past, we built a \$100,000 dike every flooded, though thankfully we haven't had to do that for the last three floods. Still, we need to closely examine this area and consider ways gate flooding—whether through home buyouts or grants to help lift the g homes | 6/4/2025  |
| 2 0 1                        | Pond would still fill up to the river level in a flood   | 6/5/2025  |
| 2 2 2                        | These people purchased their property in a floodway knowing full well it would flood. I believe that if they want to mitigate the flooding now it should be on their dime, not the City taxpayers.   | 6/7/2025  |
|                              |  |           |

User Category: Business/Property Owner

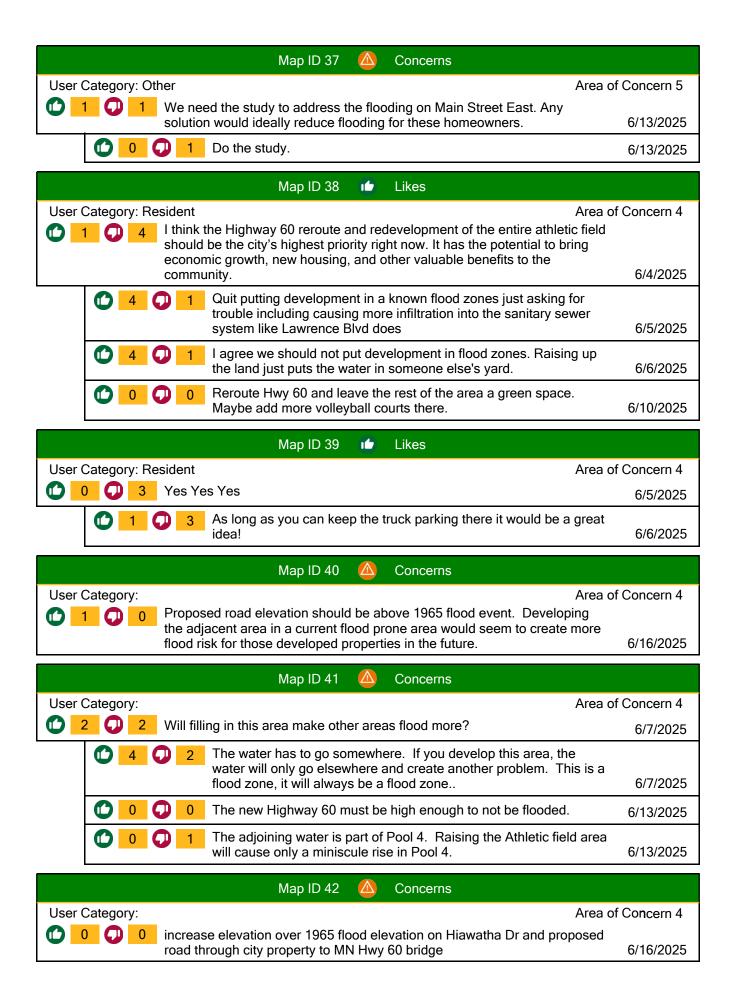
Area of Concern 5

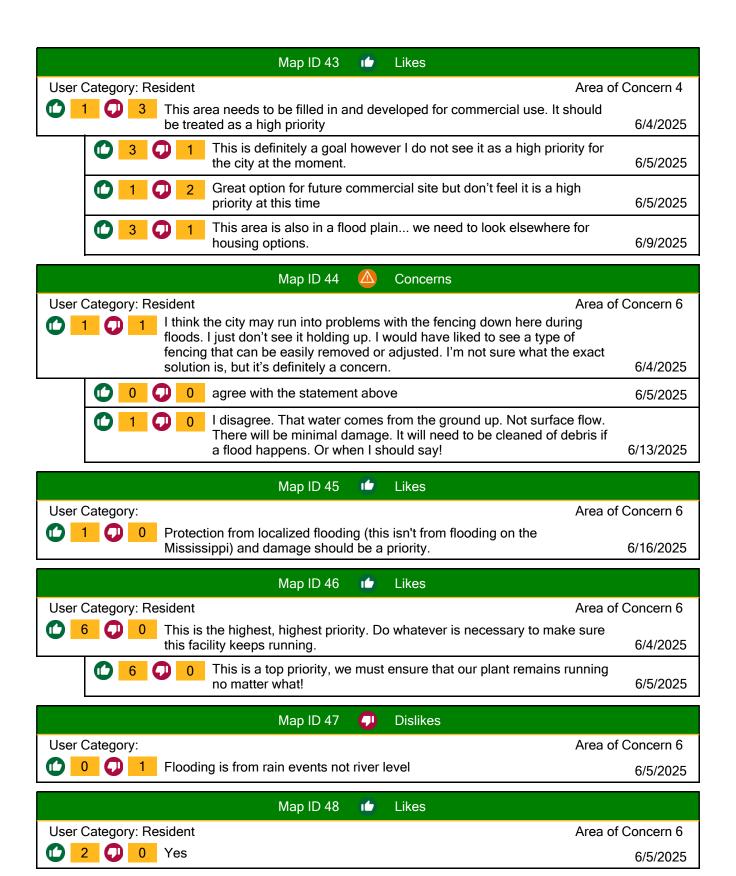
Building a retention pond? That doesn't make any sense. I think this existing pond should be filled and developed. I would put a large tube of sorts on the property that could be used as a sump pit of the city ever wanted to drain this area again. The last time this area was pumped was in 2001. It's a waste to maintain it waiting for a major flood. That said, you can still prepare to drain it and develop it at the same time.

6/13/2025

|        |                    | Map ID 35 🔟 Likes   |                   |
|--------|--------------------|---|-------------------|
| User ( | Category: Resident |   | Area of Concern 5 |
| 0 2    | 2                  | proof for development   | 6/5/2025          |
|        | 0 1 0 0            | Pond would still fill up to the level of the river not change any or protection   | thing<br>6/5/2025 |
|        | 4 0 1              | I don't think there should be anymore development in this are<br>Flood pond may help. Do not fill in low areas. Just pushes the<br>water somewhere else.      |                   |
|        | 2 0 0              | The city used to pump water out of this area when it flooded. buyouts to the homes that have flooded in the past 2 years a return those areas to green space. |                   |

|                         | return those areas to green space.  | 6/10/2025         |
|-------------------------|---|-------------------|
|                         | Map ID 36 🕩 Likes   |                   |
| User Category: Resident | ,   | Area of Concern 4 |
| rerout                  | the old athletic field should be a high priority. The Highway 60 te will have a significant impact on future transportation, housing, nercial development in Wabasha and the entire region. | and<br>6/4/2025   |
| 2 0 1                   | I think the highway reroute could continue to move forward with space, but I don't think it's a good idea to continue to pursue developing housing on this land. It's too much of a risk.   |                   |



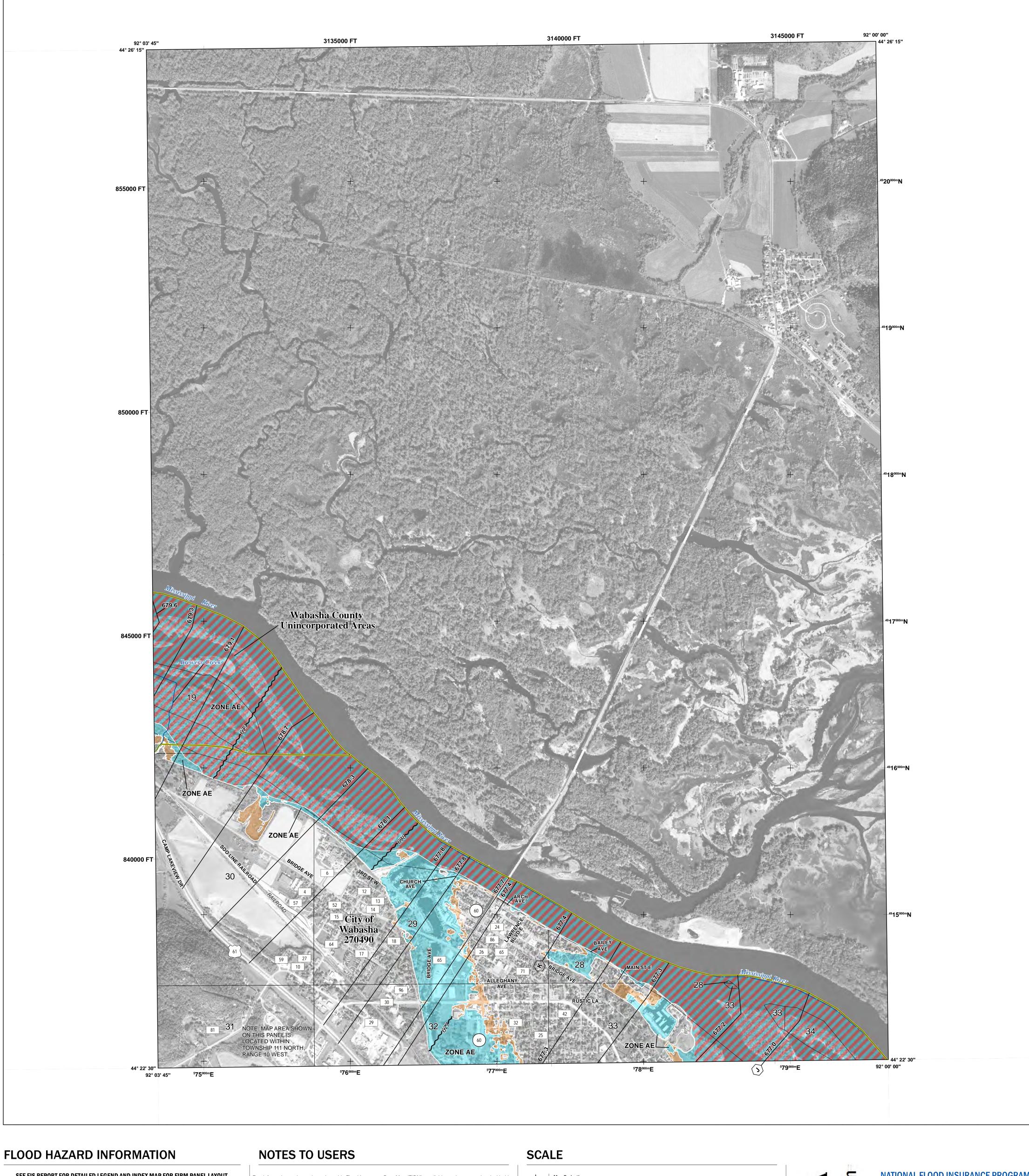


| Map ID 49 🕩 Likes  |                 |
|--|-----------------|
| User Category: Resident Are  | ea of Concern 6 |
| 10 0 I think it's important to ensure the city's water/wastewater operations are not disrupted during a flood event. | 6/4/2025        |
| 4 Q 2 Flooding is not from the river only rain events  | 6/5/2025        |

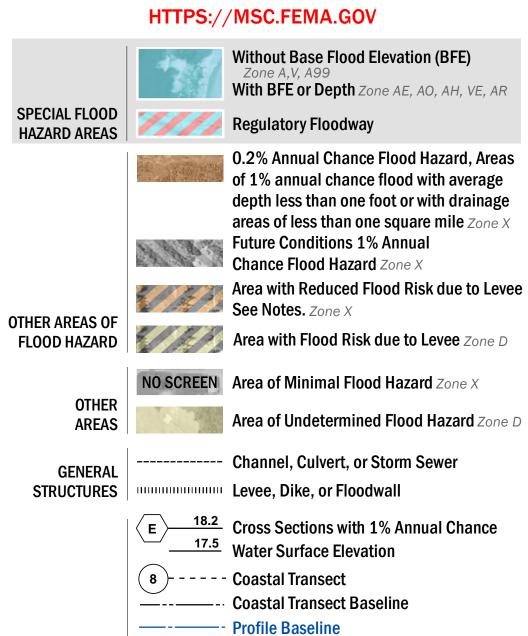
|                       | Map ID 50 🕩 Likes  |                           |
|-----------------------|--|---------------------------|
| User Category:  1 1 1 | Area of I highly doubt we are having issues from rain events as some have commented. This area is all closer to the water table that most realize. This should be protected for the benefit of all. Losing the system completely during a major flood would be catastrophic for all. | of Concern 6<br>6/13/2025 |

| Ma <sub>l</sub>                             | p ID 51 🤎      | Other                             |                   |
|---|----------------|-----------------------------------|-------------------|
| User Category: Other                        |                |                                   | Area of Concern 6 |
| Do we need to ask the they were part of it? | County to help | contribute to this as I understan | d<br>6/13/2025    |

Appendix B: Published and Pending FIRMs



SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT



- Hydrographic Feature

Jurisdiction Boundary

\*\*\*\* Base Flood Elevation Line (BFE)

**Limit of Study** 

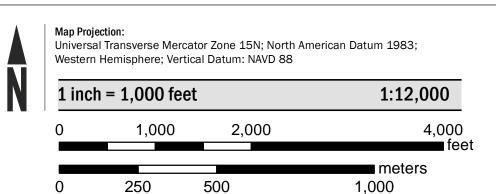
OTHER

**FEATURES** 

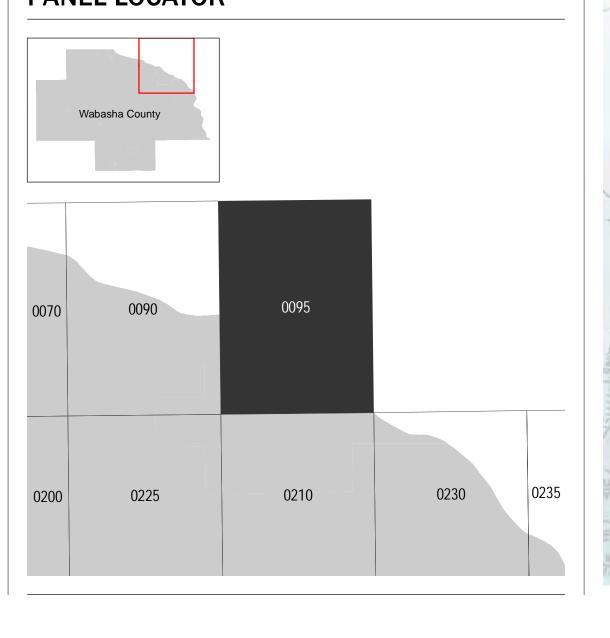
For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM Panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters be and contact of this map. Mapping of this map and the service of the products as soldied with this products as soldied with the service of the products as soldied with the service of the products as soldied with this products as soldied with the service of the products as soldied with the products digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above. For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction. To determine if flood insurance is available in the community, contact your Insurance agent or call the National

Flood Insurance Program at 1-800-638-6620. Base map information shown on this FIRM was derived from U.S. Department of Agriculture NAIP Imagery, dated 2015, and digital data provided by Minnesota Department of Natural Resources, dated 2019.



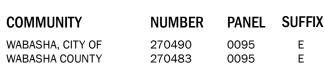
# PANEL LOCATOR



# National Flood Insurance Program NATIONAL FLOOD INSURANCE PROGRAM FEMA FLOOD INSURANCE RATE MAP WABASHA COUNTY, MINNESOTA PANEL 95 OF 500

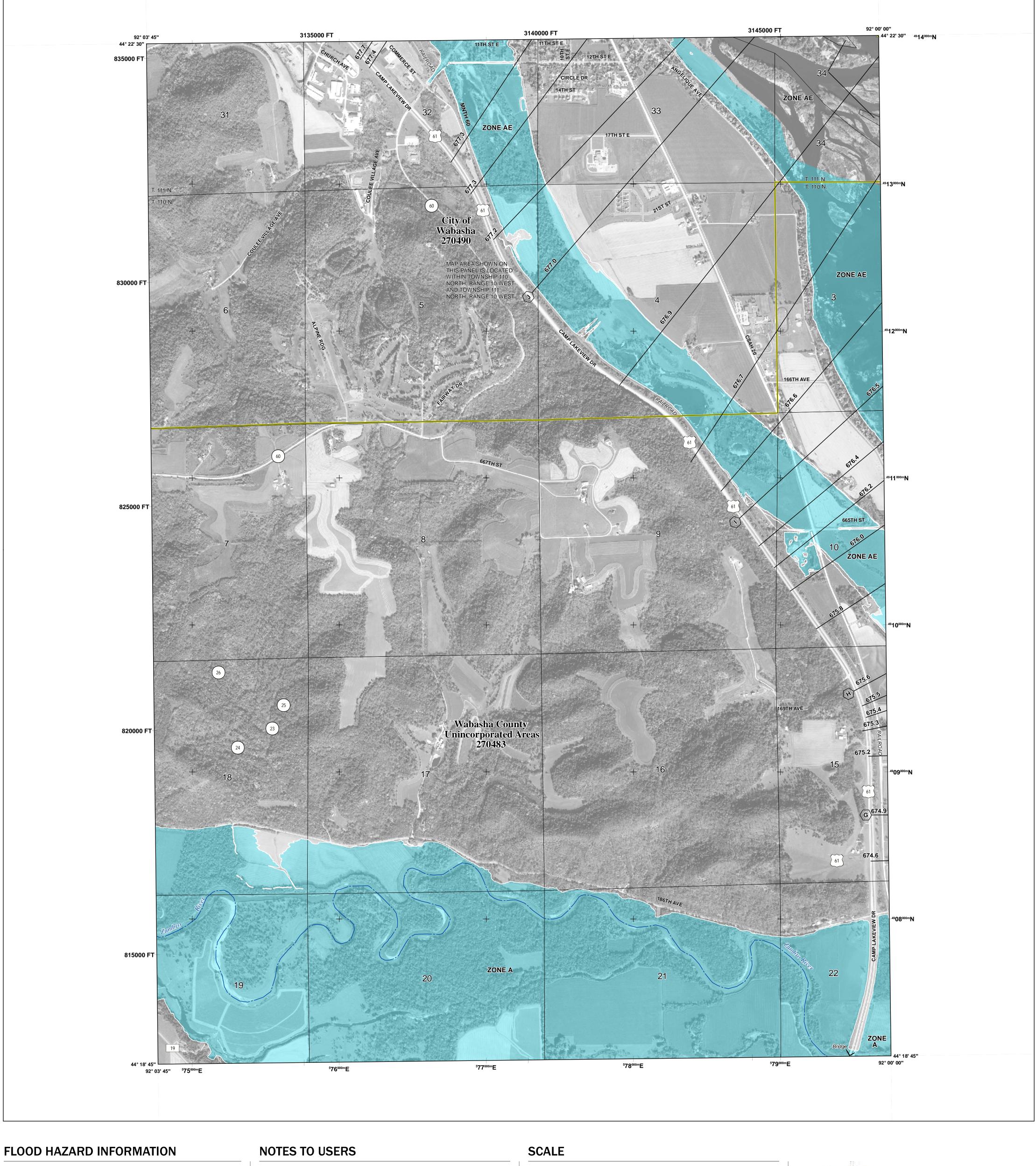
SZONE X



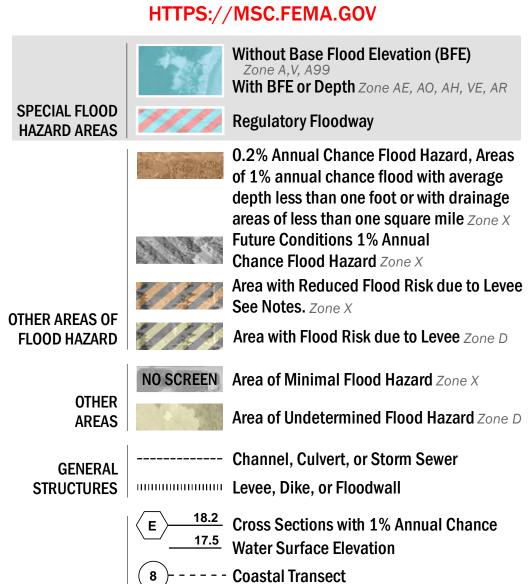


**PRELIMINARY** 4/25/2024

> **VERSION NUMBER** 2.6.3.5 MAP NUMBER 27157C0095E MAP REVISED



SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT



————— Coastal Transect Baseline

- Profile Baseline

- Hydrographic Feature

Jurisdiction Boundary

**Base Flood Elevation Line (BFE)** 

**Limit of Study** 

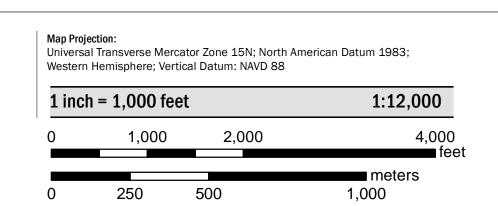
OTHER

**FEATURES** 

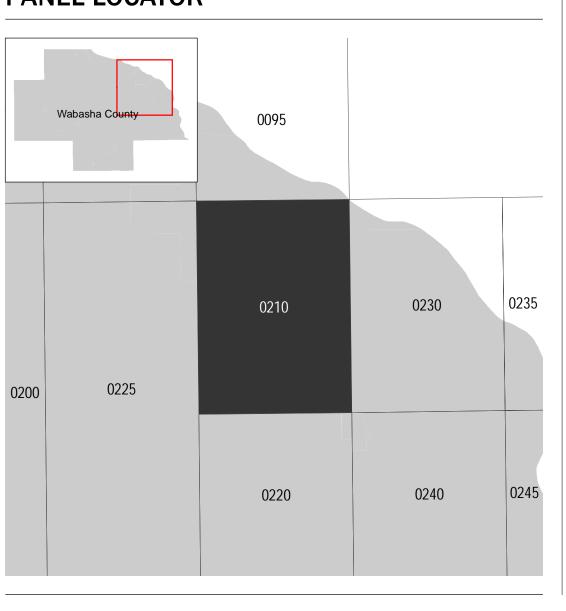
For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this For information and questions about this Flood insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM Panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products map include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

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Base map information shown on this FIRM was derived from U.S. Department of Agriculture NAIP Imagery, dated 2015, and digital data provided by Minnesota Department of Natural Resources, dated 2019.



# PANEL LOCATOR



# NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAP

WABASHA COUNTY, MINNESOTA

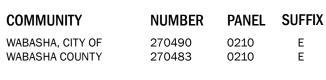
PANEL 210 of 500



Panel Contains:

National Flood Insurance Program

FEMA



**PRELIMINARY** 4/25/2024

> **VERSION NUMBER** 2.6.3.5 MAP NUMBER 27157C0210E MAP REVISED

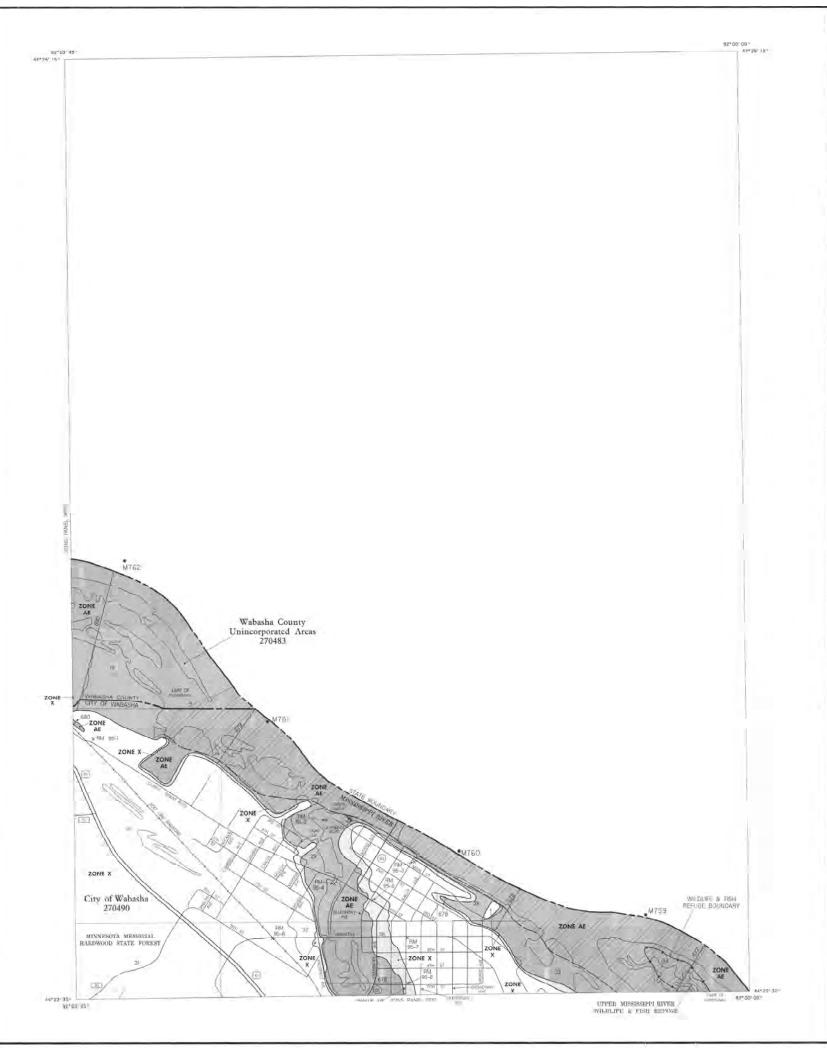
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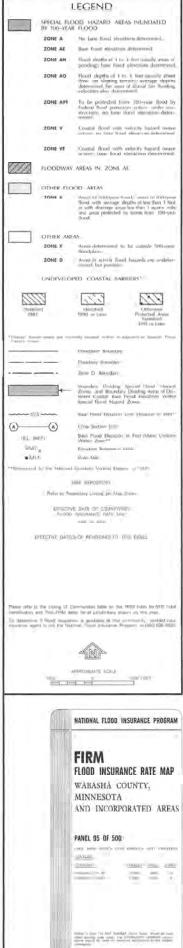
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NOTE: The guardinate system cased find the guidaction of the Flant Insurance. Ball Mag (FRM) is diversed fractions. Macrobia LTML Month Arrandin Insurance in the Control of the Control o

BASE MAP SOURCE: Easy map the sees proceed by the fine of Moneyold Department of Tempographer. These flow some company as a season of \$2,000 from U.S. Sentiment Burvey / 5.0-Money Barrie Tempographe on an application of services of the FOM sound one would proceed to the found of the found of the found of the found of the FOM sound.

|                 | ELEVATIO                  | N REFERENCE MARKS   |
|-----------------|---------------------------|---|
| DEFFERENCE TOWN | ELEVATION<br>IN 17 (NGVD) | DISCRIPTION OF LOCATION   |
| fit Az-1        | ZIE WA                    | The limits and consists agrees data, seemant 8 248 1574, and no red communication for the season of |
| B) 45-2         | &V3:72                    | Top of water waive, approximately I feet west of concrate ped in procise even, approximately 30 feet west of large weight over and approximately 100 feet months of railwand aper, and approximately 100 feet meanly 510 feet owns of paging studien.   |
| \$H 95-0        | .19),(()                  | U.S. Sames and Condexic Energy disk<br>stamped B 26 1933, one in two of neutro-<br>naivals PI less north of neutro-<br>naivals PI less north of metch correct<br>opposition of contenting to their opposition of<br>neutro-position of Mini Pyrodi,<br>approximately 11.7 foot spectages of<br>centerline of Positive Actors.   |
| Mt 75-4         | 177.49                    | Minnarous flightry Department State and in<br>continues survey using will at terresen-<br>tion of crossing river bed at Fourth-<br>from koulevant.  |
| 2H 055          | 181.41                    | Top ing at live bydramt as incorporation of fourth-Grant Boulevart and Allaganay Avenue.  |
| E 10-0          | - opposity o              | ginguit deld, set in contrate at hise of positions concern buttle pain casesing boo Line Hallood on Himmatta Drive.   |
| N( 91-11        | 80.07                     | (my most of tire bydraws as incorrection of Franklin Arctics and Statesthe Differ.  |
| MI N:-0         | 485-159                   | Toy and of fire hydrant as inconnection of lith Street and Franklin Avenue.   |





EFFECTIVE DATE: JUNE 20, 2000

MAP NUMBER 27157C0095 D

This map is for use in administering the Netional Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map reposition, should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs To obtain move detailed information in areas where Base Flood Elevations (BFEs) and/or Boodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summany of Stillwarte Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevation. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, though the sole of the the FIRM for purposes of construction and/or floodplain management

Costal Base Flood Elevations shown on this map apply only landward of 0,0' North American Vertical Datum of 1980 (NAVD 80). Users of this FirRM should be aware that coastal flood elevations are also provided in the Summary of Sillivan Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Sillivater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydrautic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 15. The horizontal datum was NAD 83, GRS 1980 sopheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to shouture and ground elevations referenced to the same verifical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1982 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website high triple of the National Geodetic Survey website high triple of the National Geodetic Survey with the National Geodetic Survey at the following address:

NGS Information Services NGAA, N/NGS12 National Geodetic Survey SSMC-3, #9202 1315 East-West Highway Silver Spring, Maryland 20910-3282 (301) 713-3242

Base map information shown on this FIRM was derived from digital adhophotograph provided by the Buffalo County Land Management Office. This information was derived from 2005 digital orthophotography produced at a resolution of 1 foot.

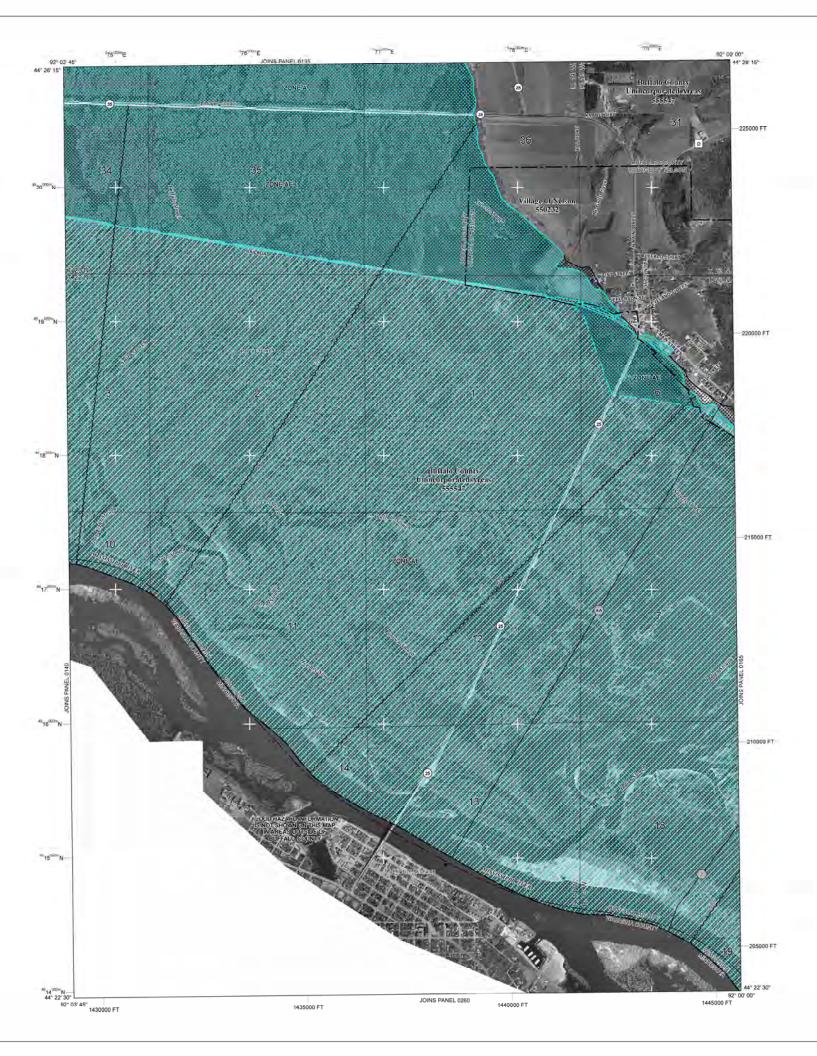
Based on updated topographic information, this map reflects more detailed and up-to-dale stream channel configurations and floodplain delineations those shown on the previous FIRM for this purification. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood insurance Sub/ Report (which contains authorisative hydrautic data) may reflect stream channel distance that offer from what is shown on the map. Also, the road to floodplain relationships for unrivised streams may define from what is

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have cocurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously based Letters of Map Change, a Flood insurance Study Report, and/or digital versions of this rana. The FEMA Map Service Center may also be reached by Fax at 1-800-356-9620 and its velosite at this <u>//msc fems ago</u>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/businesa/http:/



#### LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INJURIED TON THE 1% ANNUAL CHANCE FLOOD.

THE 1% enroul covers food; (6) year food; situal recent are the base flood. Internation to the flood street in a 1% crance of being occulied or increeded in any piece, year. The Spirical Flood Hazard Annual the eries subject for flooding by the 1% invitial chares (60). Areas of Spirical Flood Hazard include Zones A. R.A. H. A.A. AR. ARS, V. and VE. The Base Flood Benefit in the extension of the 1% annual chance flood. ZONEA No Base Floor Flevations deformined ZONE AE Base Flood Elevations determined. Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations ZONE AH ZONE AO Plood depths of 1 to 3 feet (usually sheet flow on sloping termin): average depths determined. For areas of alluvial fan flooding, velocities also determin Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently described. Zone AB includes that the former flood control system is being resident of on orwide projection from the 1% annual chance or greater flood.

Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no floar Flood Elevations determined. ZONEAR 20NE V Coastal flood zone with velocity nazard (wave action); Base Flood Devasions determined. ZONE VE

The floodway is the channel of a stream plus any adjecent floodplain areas that must be kept free of characterized by that the 1% annual chance flood can be carried without substantial increases in flood heights.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X

Areas of 0,2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 fact or with drainage areas less than 1 square-tile; and areas protected by levees from 1% annual chance flood. OTHER AREAS

Areas in which flood hazards are undetermined, but possible. COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or intijicent to Special Floories

0.2% Annual Chance Floodplain Boundary

Floodway boundary \_\_\_ Zone D boundary

CBRS and OPA boundary Boundary dividing Special Flood Hazard Areas of different Rase Flood Elevations, flood depths or flood velocities.

~~ 513~~~ Base Flood Elevation line and value; elevation in feet\* (CL 557) Same Flood Elevation value where uniform within yone; elevation in face (

(A) (A) Cross section line

23 ----- 23

45" 02" 08" 93" 02" 12" Geographic coordinates references to the North An 1983 (NAD 83) Western Hamisphere 5000-foot ticks: Wisconsin State Plane Central Zone (FIPS Zone 4802), Lambert Conformal Conic projection 1000-meter Universal Transverse Mercator grid values, zone 15

magnin N Bench mark (see explanation in Notes to Utien, section of this FIRM panel)

Power Mile DX5510 X \*MI.E

FFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP May 3, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood fraurance Study report for this jurisdiction.



MAP SCALE 1" = 1000" 500 0 1000 2000 FEET METERS

### NFIP PANEL 0145D FIRM FLOOD INSURANCE RATE MAP BUFFALO COUNTY, WISCONSIN AND INCORPORATED AREAS PANEL 145 OF 520 INSURANCE (SEE MAP INDEX FOR FIRM PANEL LAYOUT) CONTAINS: GOMMUNITY BUFFALD COUNTY NELSON YILLAGE OF 000 Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject WATIONAL Y

MAP NUMBER

EFFECTIVE DATE MAY 3, 2010

Federal Emergency Management Agency

55011C0145D

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The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 15. The horizontal datum was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compered to structure and ground elevations referenced to the same verifical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929, and the North American Vertical Datum of 1989, visit he National Geodetic Survey website at <a href="https://doi.org/10.1001/j.com/10.1001/j

NGS Information Services NGAA, N/NGS12 National Geodetic Survey SSMC-3, #9202 1315 East-West Highway Silver Spring, Maryland 20910-3282 (301) 713-3242

Base map information shown on this FIRM was derived from digital orthophotograph provided by the Buffalo County Land Management Office. This information was derived from 2006 digital orthophotography produced at a resolution of 1 foot.

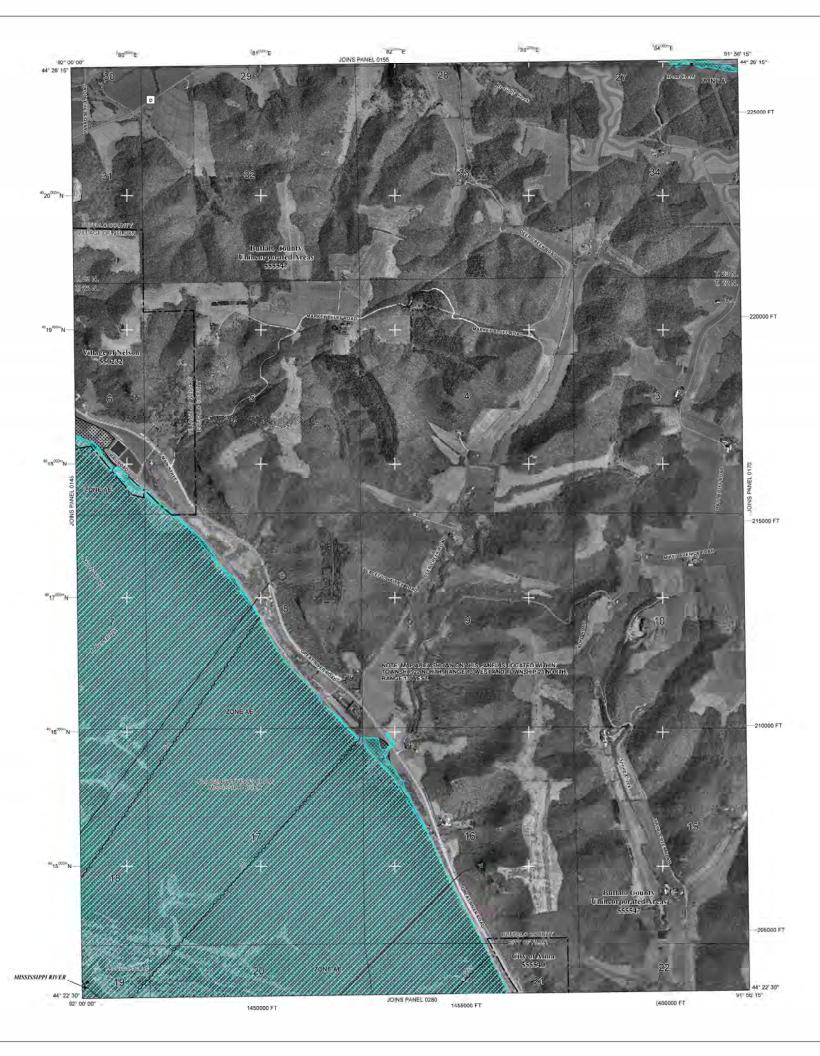
Based on updated topographic information, this map reflects more detailed and up-to-date stream channel configurations and floodplain delineations than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood insurance Sudy Report (which contains authorisative hydrautic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is

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Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with his FIRM. Available products may include previously based Letters of Map Change, a Flood insurance Study Report, and/or digital versions of this rap. The FEMA Map Service Center may also be reached by Fax at 1-800-356-9620 and its velocial at <a href="http://msc.fema.gov">http://msc.fema.gov</a>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/businesa/http/



#### LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INJURIED TO THE 19 ANNUAL CHAINCE FLOOD.

THE 19 areas counter floor (2014 year hoods, that income size house floor, is the fixed treat he a 11% citance of breeg equaled or exceeded in any piece, year. The Special Flood Hazard Annuals he area subject for flooding by the 11% invalid citative floor. Areas of Spoots Flood Hazard include Zones A, AE, AH, AO, AR, AR9, V, and VE. The Base Flood Elevation is the water-surface elevation of the 11% annual chaince floor.

ZONE A No Base Flood Flexations determined ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determine

Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently described. Zone AB indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

Area to be protected from 1% annual chance flood by a Federal flood protection system under controllation; no Base flood Blevations determined. ZONE AR

ZONE V

ZONE VE

Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroschment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. ZONE X

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplai Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood H

0.2% Annual Chance Floodplain Boundary Floodway boundary

---Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513~~~ Base Flood Elevation line and value; elevation in feet\* (EL 987)

Base Flood Elevation value where uniform within zone; elevation in face #

(A) Crossi section line

23 ----- 23

\* M1.5

.....

45" 02" 08", 93" 02" 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

5000-foot ticks: Wisconsin State Plane Central Zone (FIPS Zone 4802), Lambert Conformal Conic projection 1000-meter Universal Transverse Mercator grid values, zone 15 maggiore N

Bench mark (see explanation in Notes to Users section of this FIRM point)

Now Male

MAP REPOSITORIES

Refer to Map Recognitions list on Map Index DX5010 X

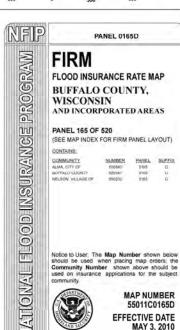
FLOOD INSURANCE RATE MAP May 3, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.



MAP SCALE 1" = 1000" 500 0 1000



Federal Emergency Management Agency

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage, sources of small size. The community map reposition, should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Silvate Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-floot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, the odd elevation data presented in the FIS Report should be cultized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1986 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Sillulvater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations hown in the Summary of Sillulvater Elevations table should be used for construction and/or floodplaim management purposes when they are higher than the elevations between the first terms of the first terms. shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National, Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood insurance Study Report.

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Flood elevations on this map are referenced to the North American Vertical Datum of 1958. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1959 and the North American Vertical Datum of 1959, visit the National Geodetic Survey website at <a href="https://www.ncs.ncea.gov">https://www.ncs.ncea.gov</a> or contact the National Geodetic Survey at the following address:

NGS Information Services NOAA, N/NGS12 National Geodetic Survey SSMC-3, #9202 1315 East-West Highway Silver Spring, Maryland 20910-3282 (301) 713-3242

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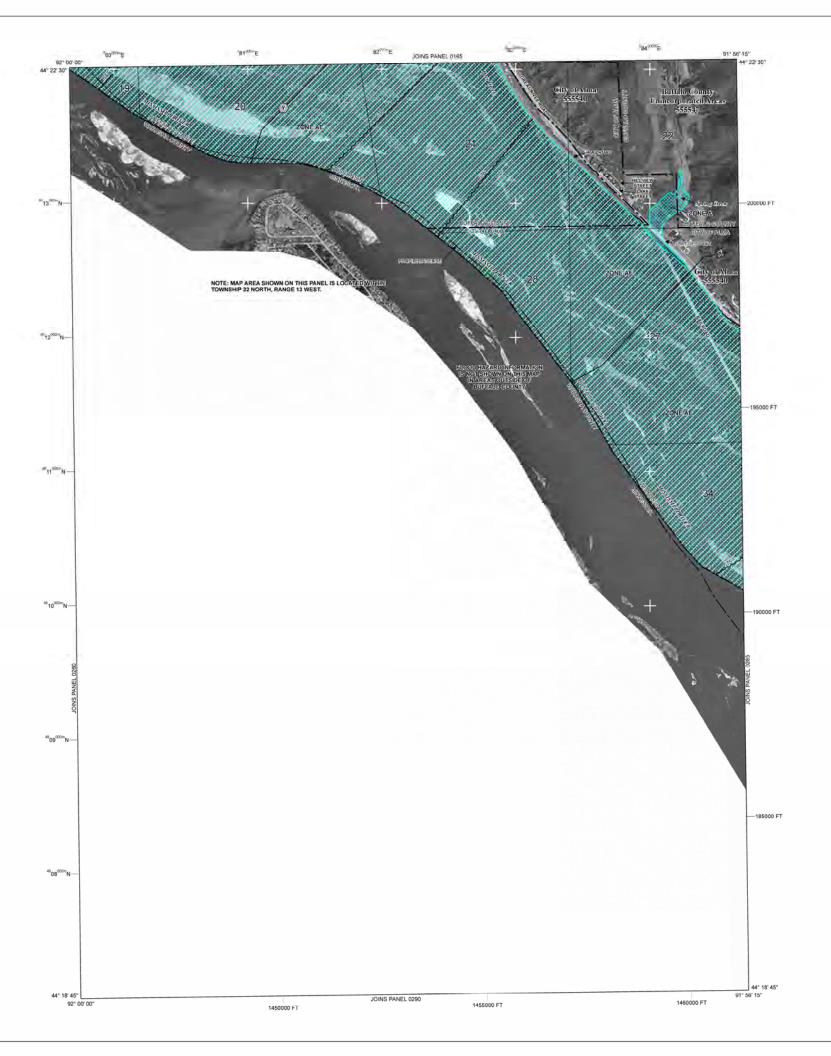
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#### LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBSECT TO INJUNIORATION BY THE 11% ANNUAL CHAINCE FLOOD.

The 1% shall amount frest (IMD/WF rect), also comes are the total floor, in the food that it as 1% drame of beany resulted or exceeded in any given year. The Spitial Flood Hearth is all the area subject in flooring by the 1% semals chores floor. Areas of Spicial Flood Hearth include Zones A, AE, AH, AQ, AR, AR, AN, V, and VE. The Base Flood Benesion is the water-surface execution of the 1% amount discher floor.

ZONE A No Base Flood Resistings determined ZONE AE Base Flood Elevations determined.

ZONE AO

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations

Flood depths of 1 to 3 feet (usually sheet flow on sloping tensin), livestige depths determined. For areas of alluvial fan flooding, velocities also determine Special Fload Hazard Ansas formerly protected from the 1% annual chance flood by a flood control system that was subsequently departing. Zone All indicates that the finemer flood control systems the impression control systems the impression of production from the 1% annual chance or greater flood.

Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Sase Flood Belledoors determined. ZONE AR

ZONEV

1000 FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 sauero-mile; and areas protected by levies from 1% annual chance flood. ZONE X

OTHER AREAS ZONE X

Areas determined to be outside the 0.2% annual chance floogpain ZONE D Areas in which flood flazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CRRS) AREAS OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and CPVs are normally located within or adjacent to special Flood

0.2% Annual Chance Floodolain Boundary

Floodway boundary \_\_\_ Zone D boundary

CBRS and OPA boundary \*\*\*\*\*\*\*\*\*\*\*

~~513~~~ Base Flood Elevation line and value: elevation in feet?

(EL 967) Base Flood Elevation value where uniform within zone; elevation is feat.\* Referenced to the North American Vertical Datum of 1988

(A)-(A) Gross section line 23 ----- 23

\*Alls

45" 62" 66" 90" 62 12" Geographic coordinates referenced to the north American Datum of 1983 (NAO 83) Western Hemisphere

5000-foot ticks: Wisconsin State Plane Central Zone (FIPS Zone 4802), Lambert Conformal Conic projection 1000 meter Universal Transverse Mercator and values, zone LS -Byann N DX5510 X

Sinch mark (see explanation in Iddes to Users section of the FIRM part)
River Mile:
MAP REPOSITORIES
Raise to Man Repositories tat on Map Index: EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP May 3, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.



MAP SCALE 1" = 1000" 500 0 1000 2000 FEET METERS

# NFIP FIRM

FLOOD INSURANCE RATE MAP BUFFALO COUNTY, WISCONSIN AND INCORPORATED AREAS

PANEL 0280D

PANEL 280 OF 520

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS: COMMUNITY ALMA, CITY OF

COOD INSURANCE

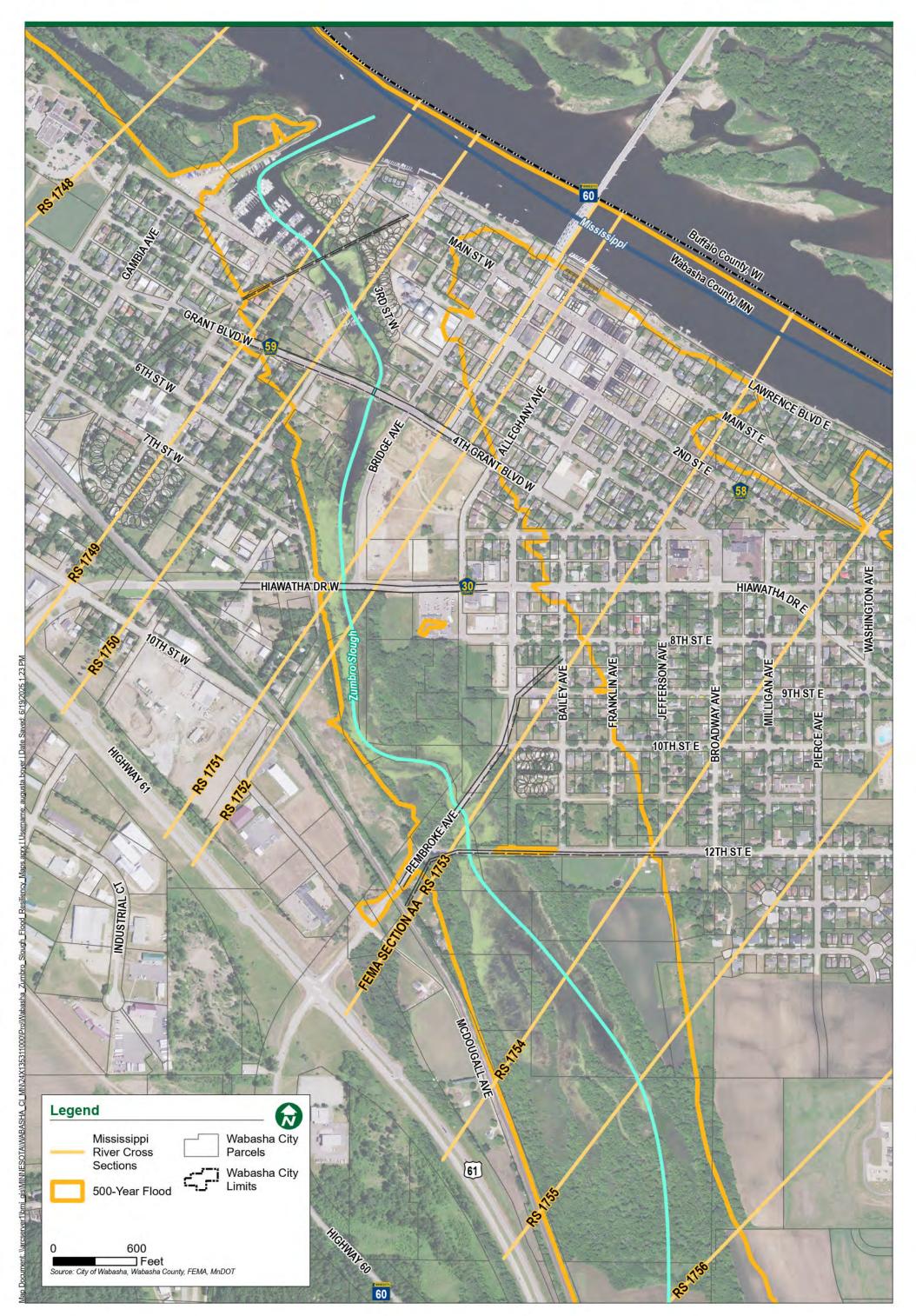
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject



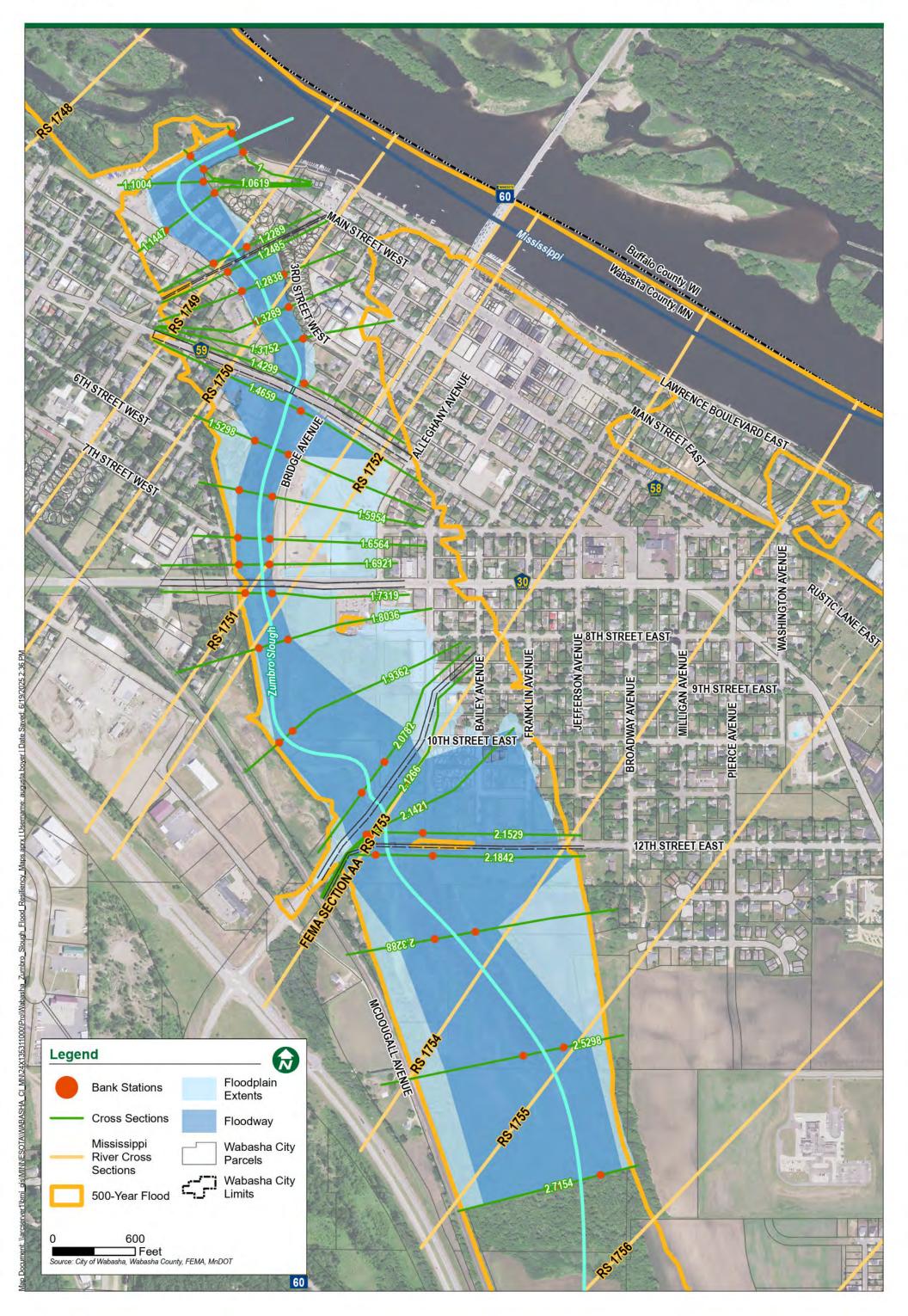
MAP NUMBER 55011C0280D EFFECTIVE DATE MAY 3, 2010

NATIONAL Federal Emergency Management Agency Appendix C: Existing Floodplain Exhibits

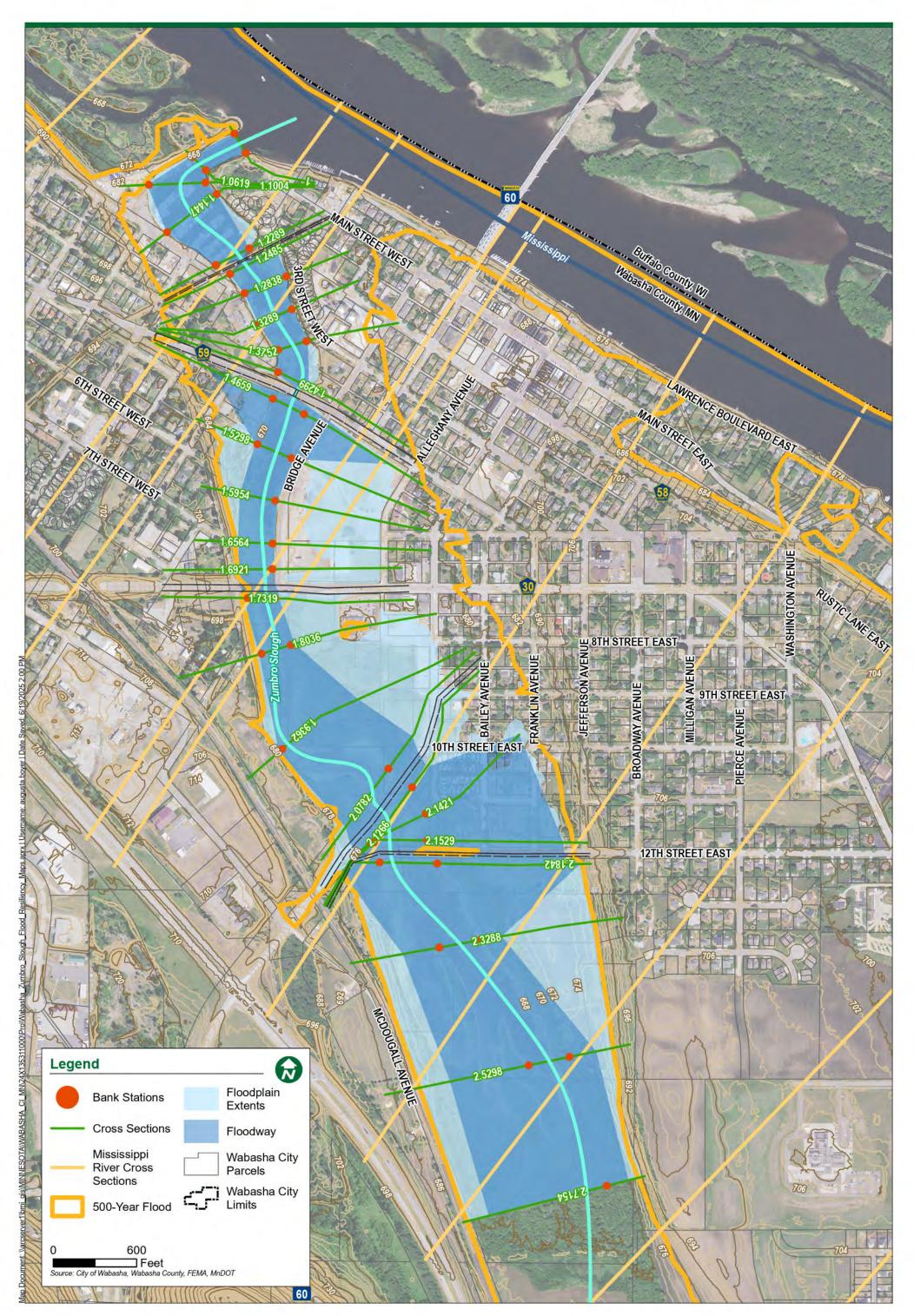




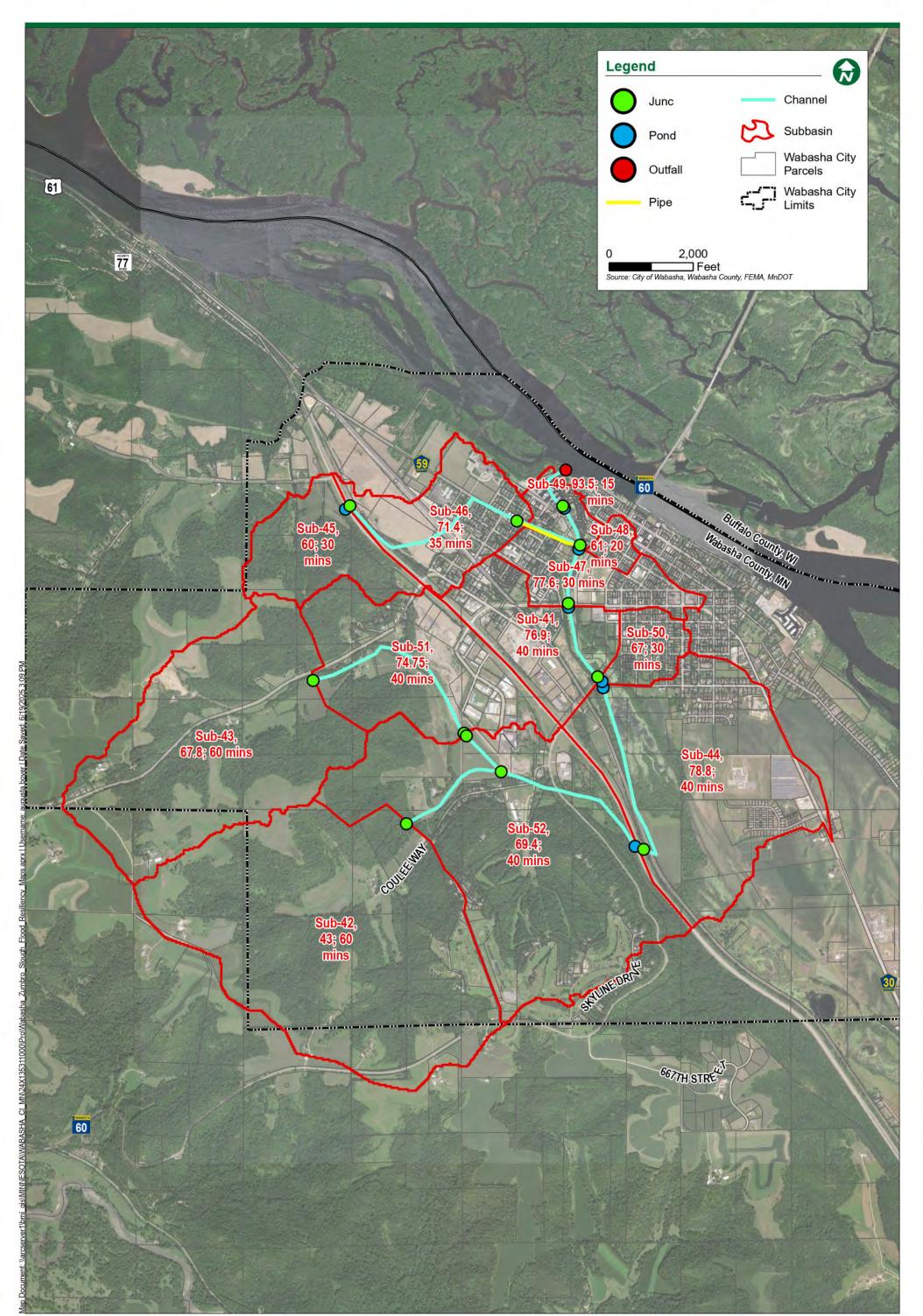




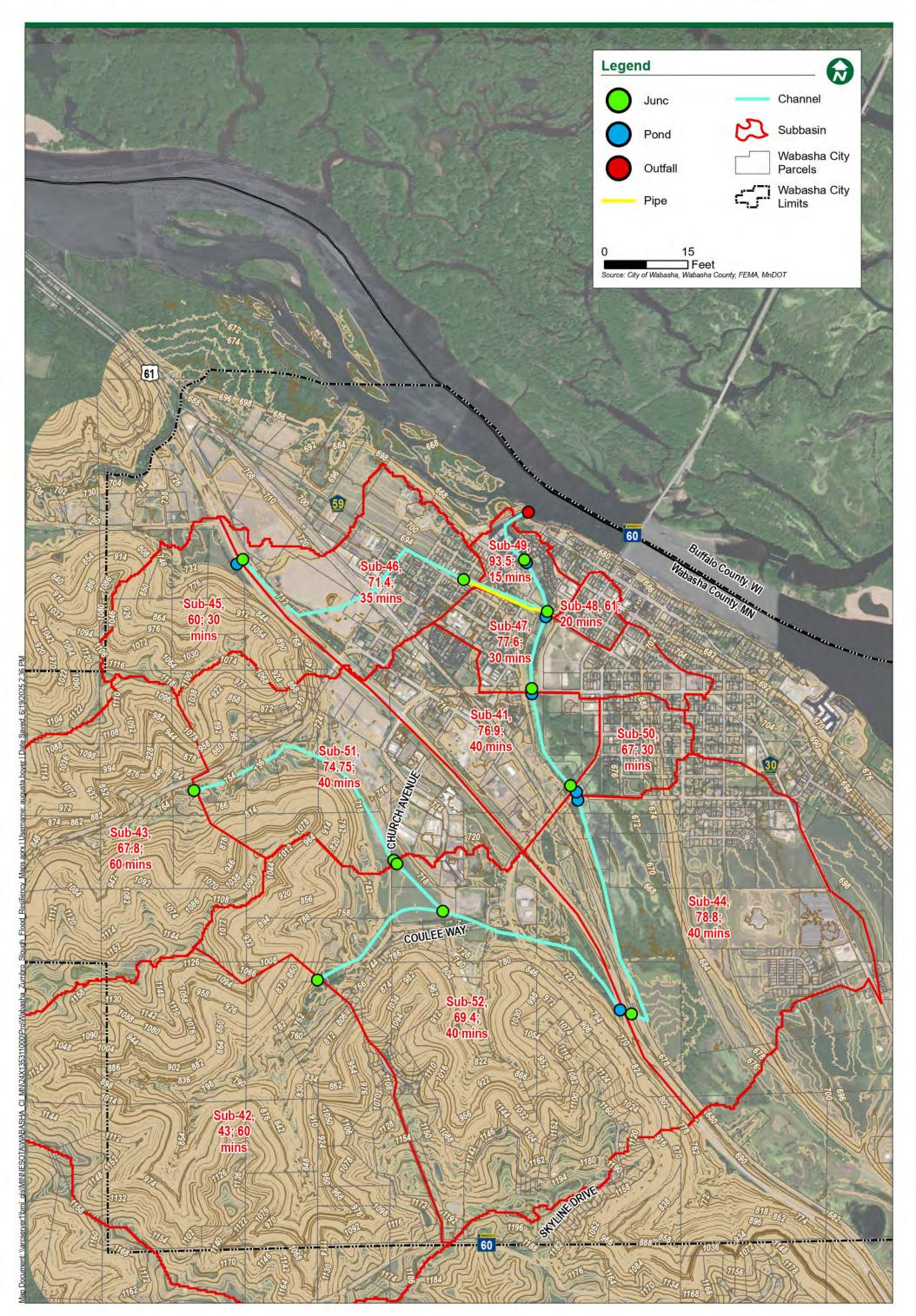








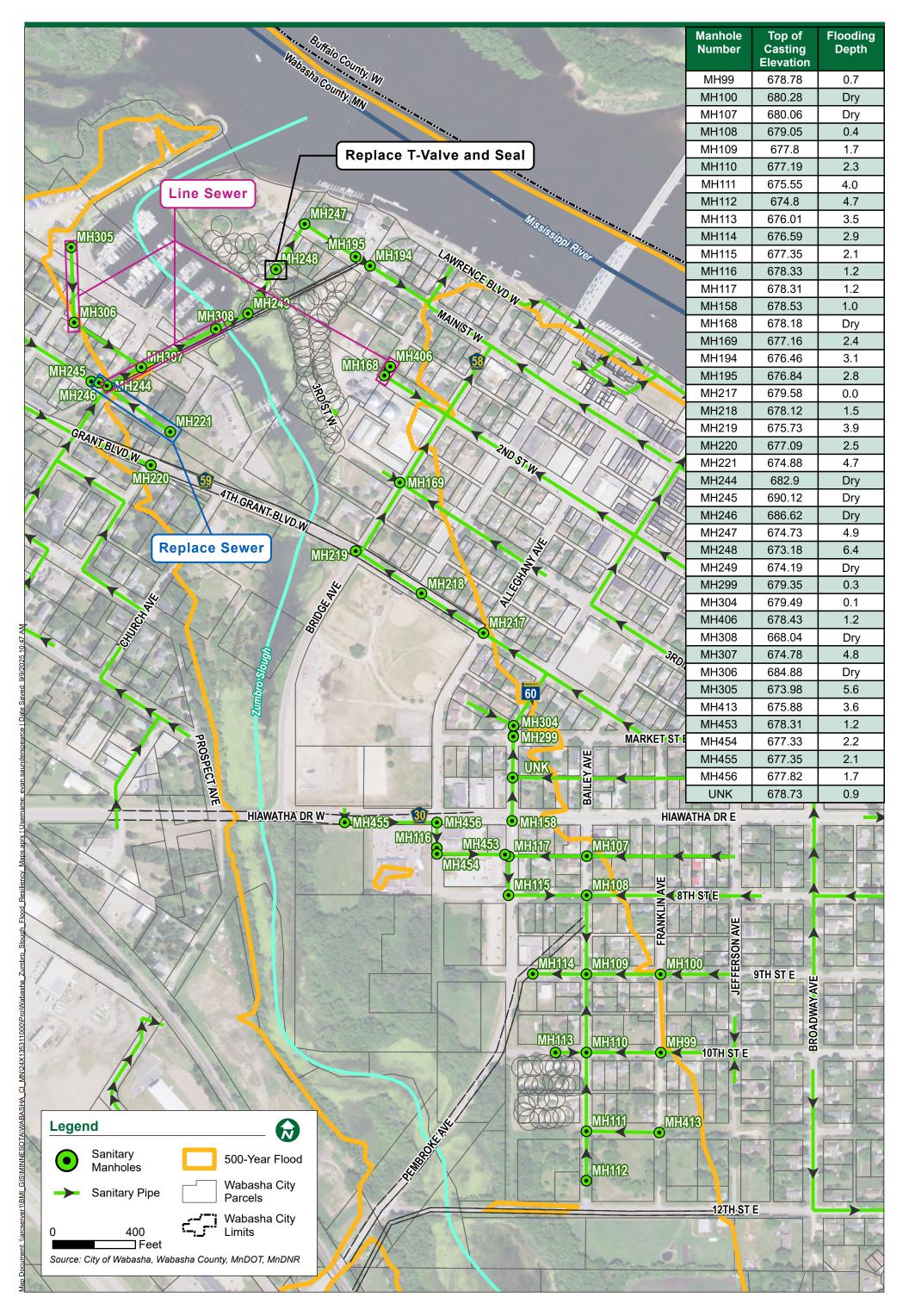




Appendix D: Sanitary System

September 2025





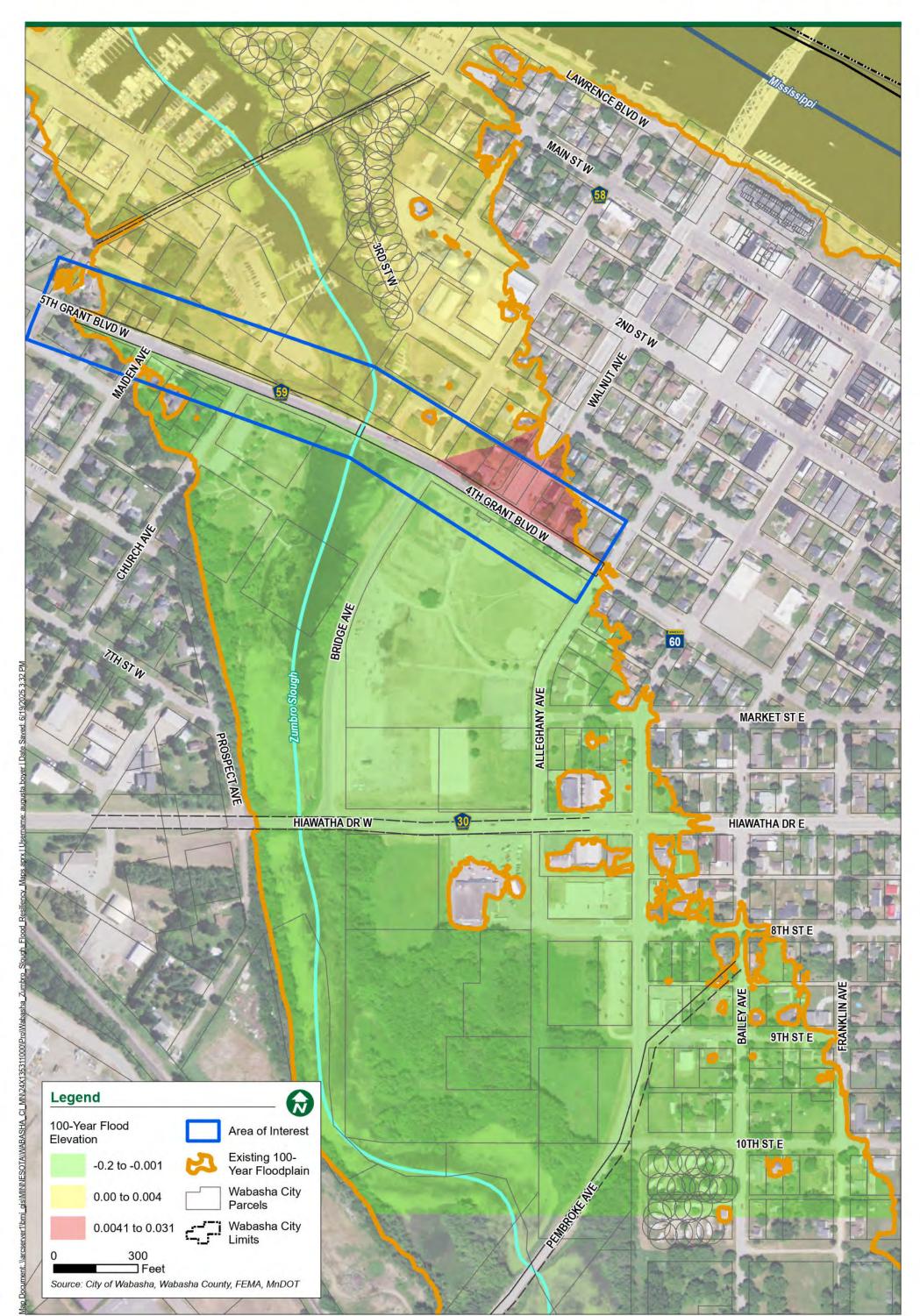
| Appendix E: Localized Resiliency Improvements |
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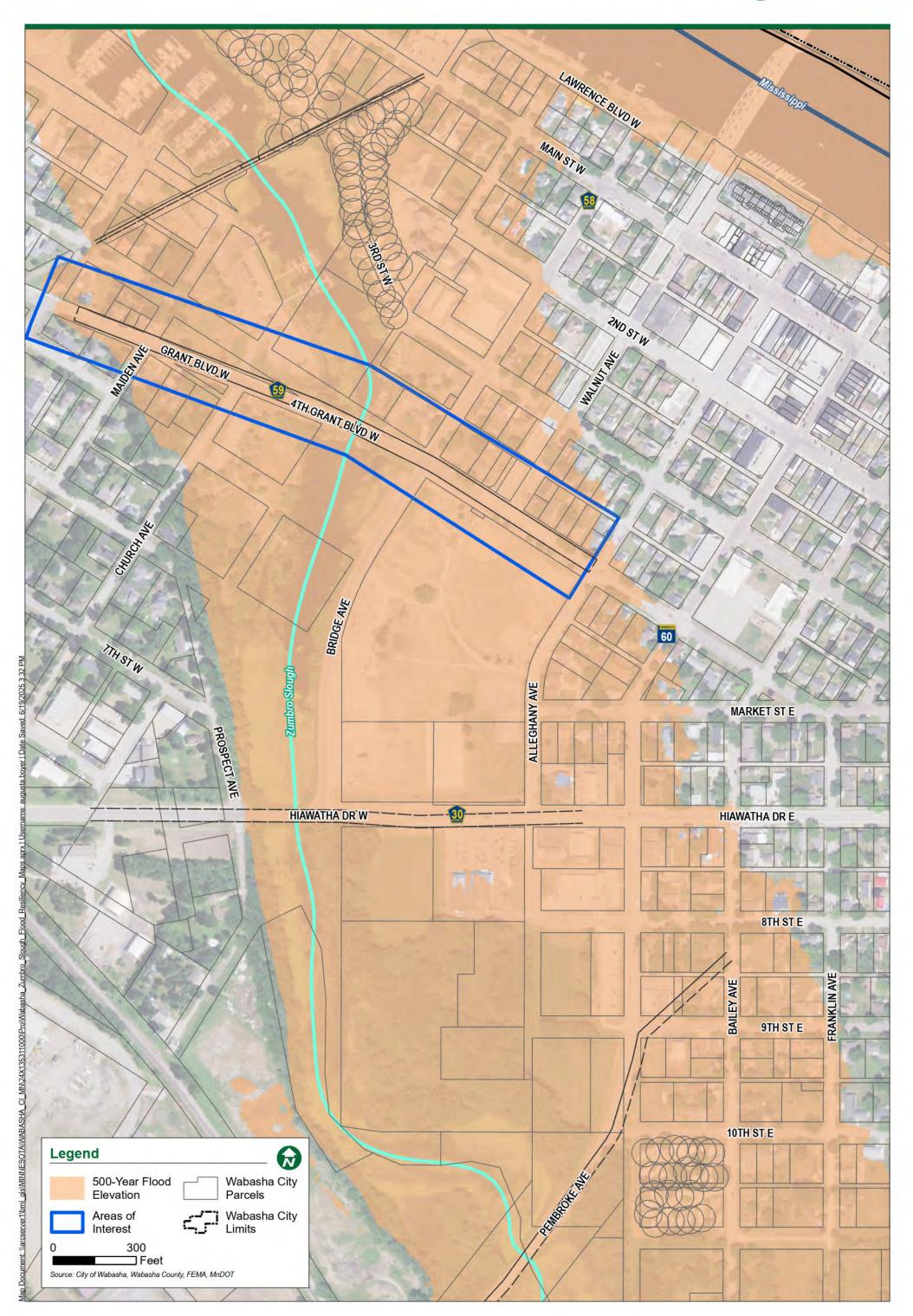


Appendix F: Alternative A Exhibits



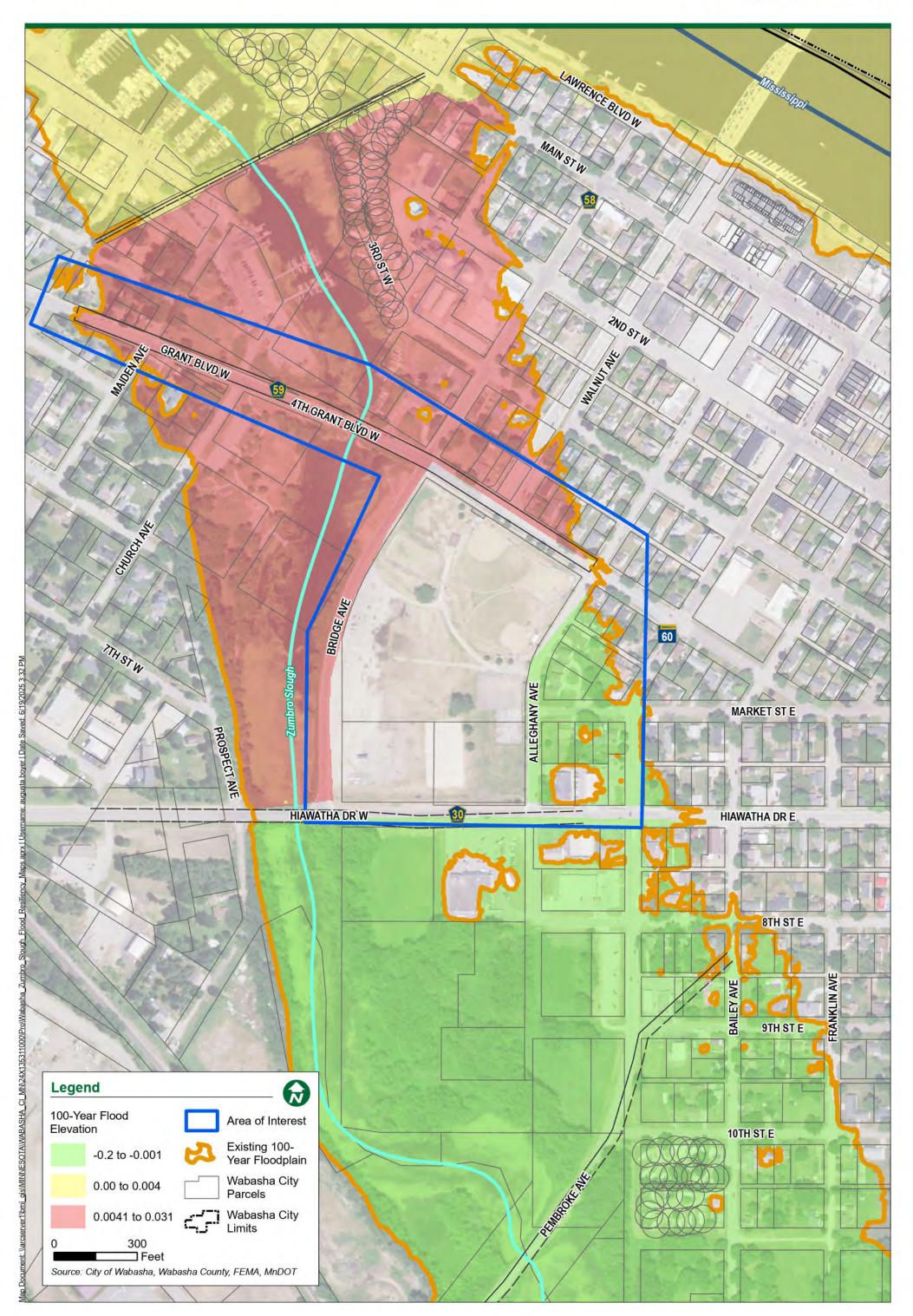




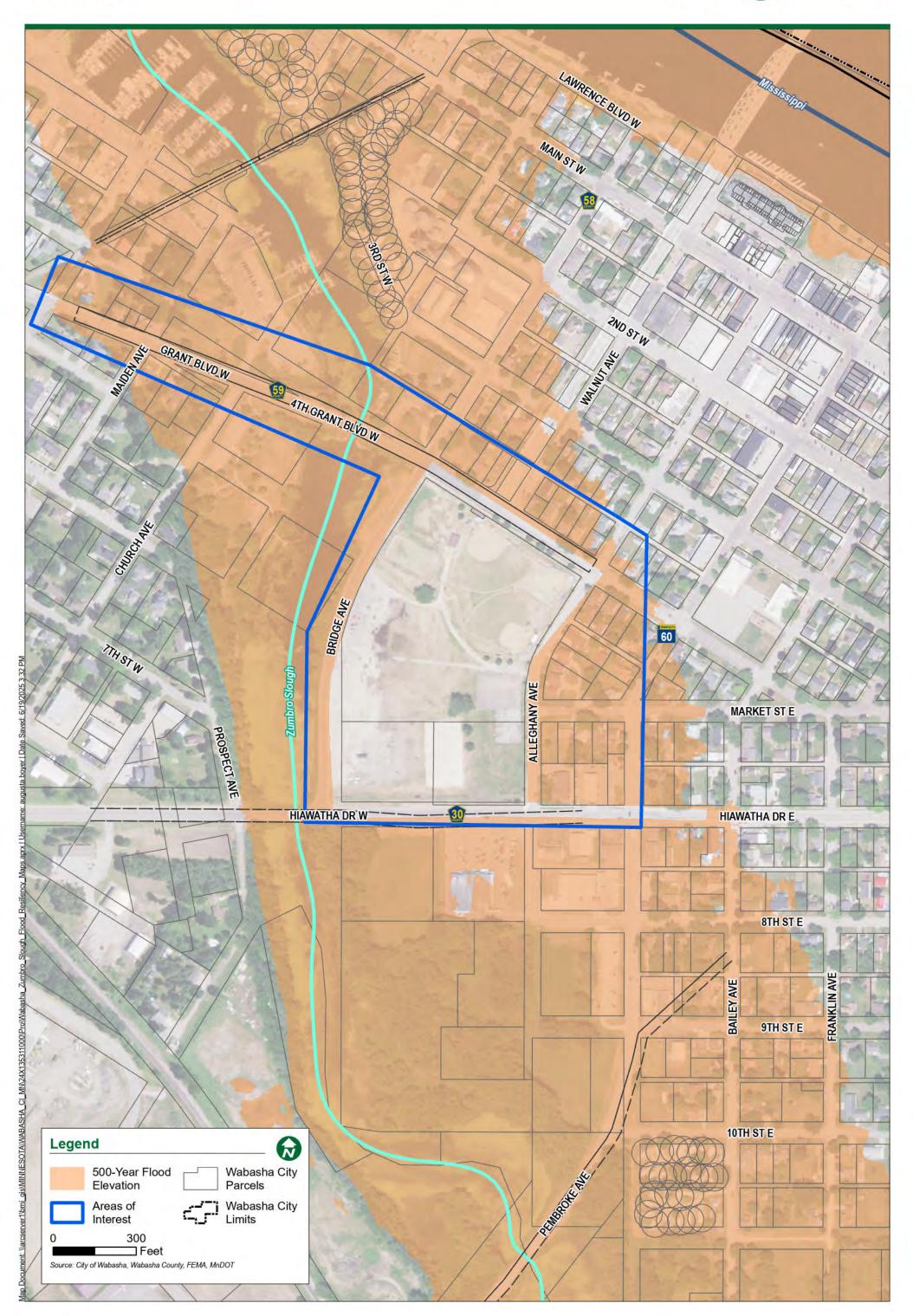


Appendix G: Alternative B Exhibits









TH 60 Realignment Project

# WABASHA

### **Project Summary**

\$2.894 million in state capital budget funds is requested to construct a new roadway segment to re-route Trunk Highway (TH) 60, an important interstate bridge crossing and key freight corridor. This will drastically improve safety and eliminate a dangerous T intersection at the foot of a steep bridge approach. It will improve freight traffic mobility and reduce road closures due to flooding. The project will also activate land for future affordable and workforce housing.

The roadway would be built through the City's former Athletic Field and would be raised above the 100-yr flood elevation. The City has already invested over \$2.2 million to relocate the Athletic Field facilities at a new site in preparation for this project.



## **Project Benefits**

- 20 to 50 percent reduction in crash rates
- Elimination of dangerous
   Tintersection at
   the foot of the steep bridge
   approach 1
- Reduced roadway closures due to flooding (120 days in the past 10 years, 51 days in 2019 and 20 days in 2023 alone)
- Activate near downtown neighborhood for housing and commercial development
- Elimination of three stopcontrolled intersections
- Elimination of railroad crossing height restriction 3
- Reduced commercial traffic through residential neighborhoods
- Safe pedestrian environment

## **Project Cost**

Total Project Cost
TH 60 Realignment

\$12,294,000

Athletic Field Relocation

\$9,894,000 \$2,400,000

Total Project Funding

\$9,400,000

City Match (secured/spent) \$2,400,000 Federal CDS Funding (secured) \$5,000,000 MnDOT TED Funding (secured) \$2,000,000

**State GO Bond Request** 

\$2,894,000

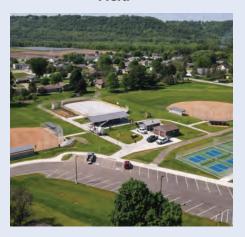
# TH 60 Realignment Project



The site surrounding the TH 60 realignment as proposed will create new public infrastructure incentivizing needed residential and commercial development and flood resilience. A 2023 housing study initiated by the City of Wabasha determined both community and regional need for new construction of varied housing types to meet current and future workforce demand. Southeast Minnesota is jobs-rich, but growth is limited by housing. This project is well-planned transportation infrastructure that bolsters both housing and commercial development, access to natural resources, and improved flood resilience at the terminus of 1 of 6 of Minnesota's interstate Mississippi River freight and vehicle bridge crossings.



New Athletic Field



Recent Car Crash at Existing TH 60 Intersection



Existing TH 60 Route Flooded in Spring 2024



#### **Contacts:**

Caroline Gregerson
City Administrator
cityadmin@wabasha.org
651-565-4568

Emily Durand Mayor mayor@wabasha.org 651-565-4568



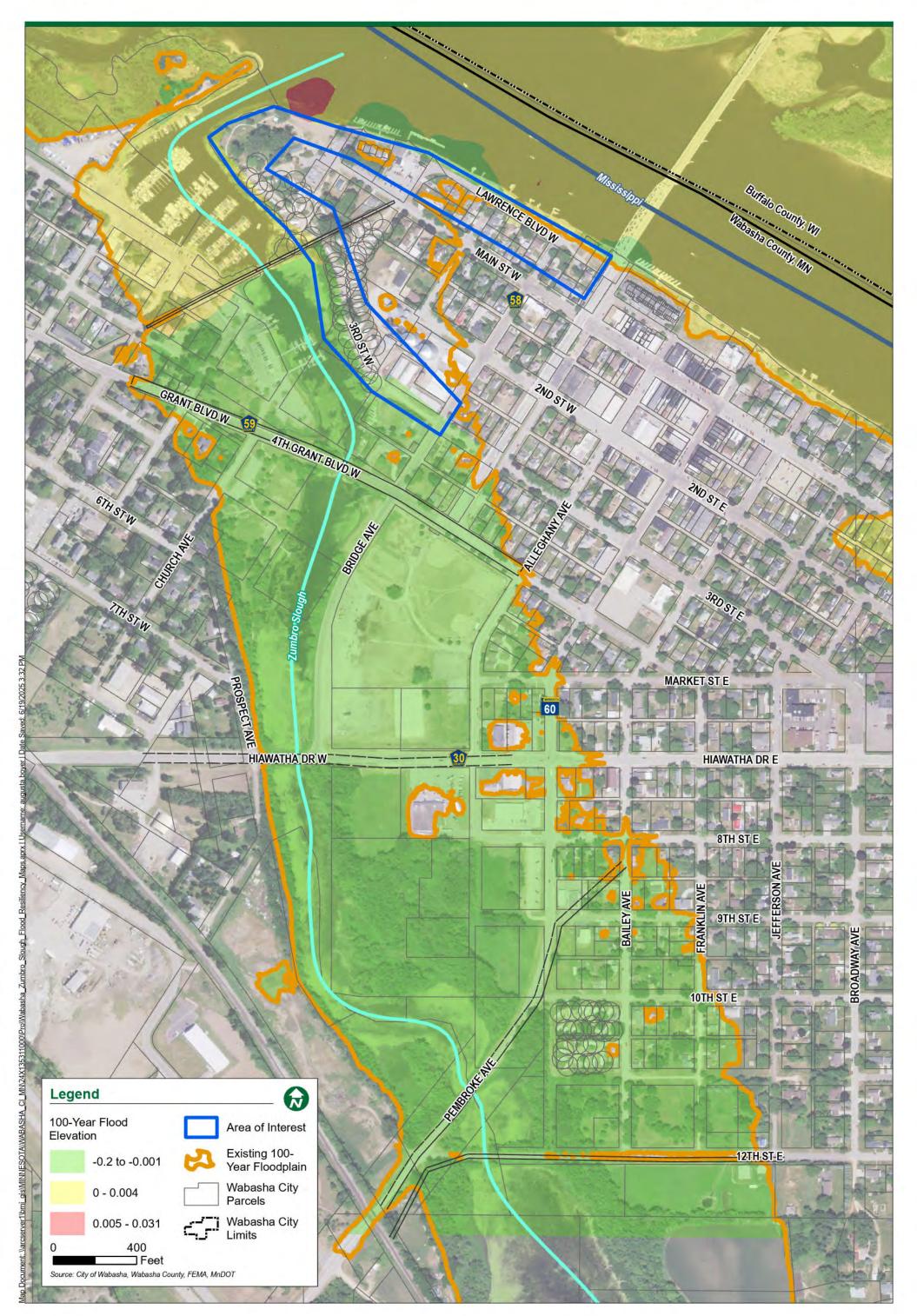


Real People. Real Solutions.

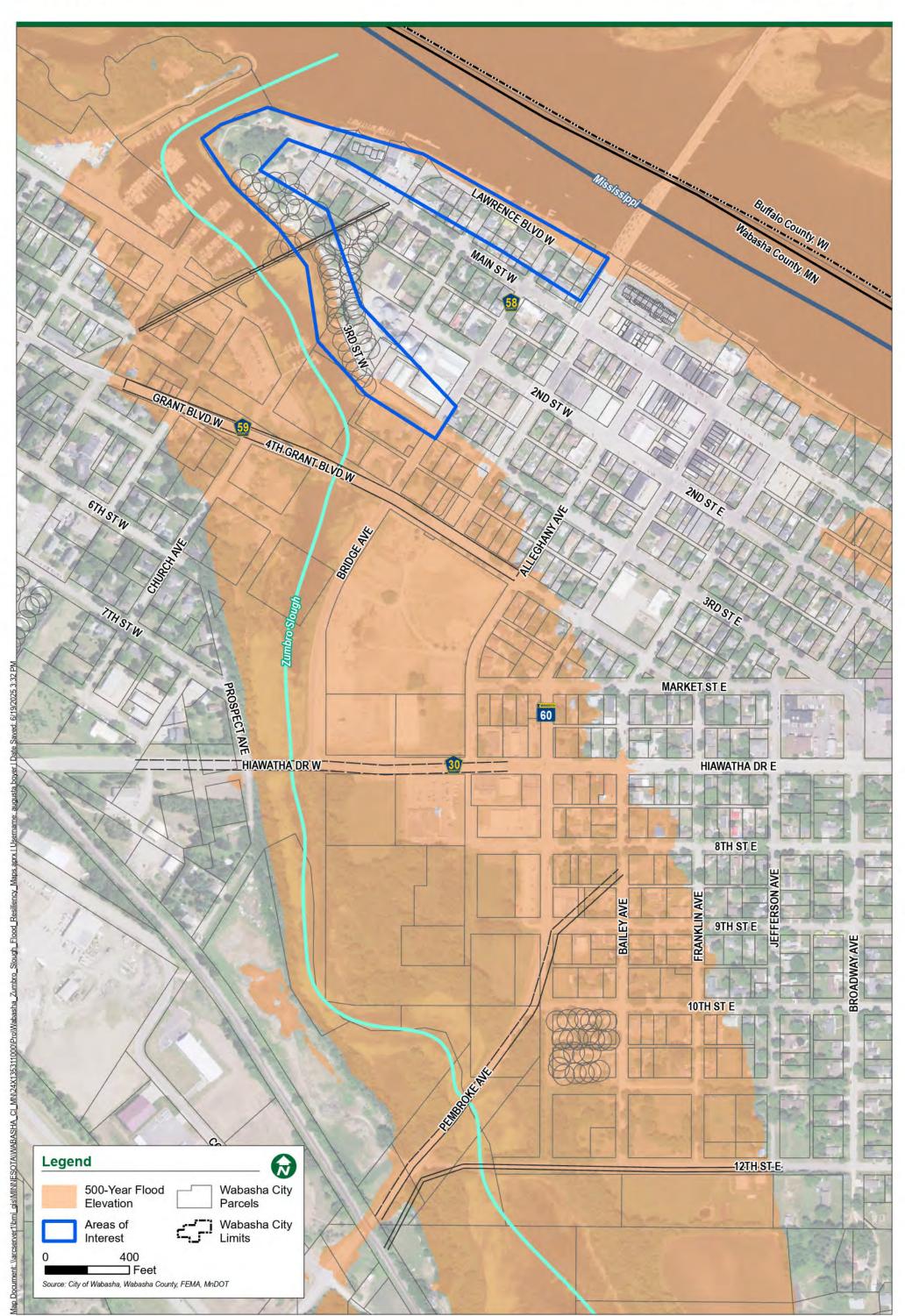
Bolton-Menk.com

Appendix H: Alternative C Exhibits









Appendix I: Alternative D Exhibits

September 2025



