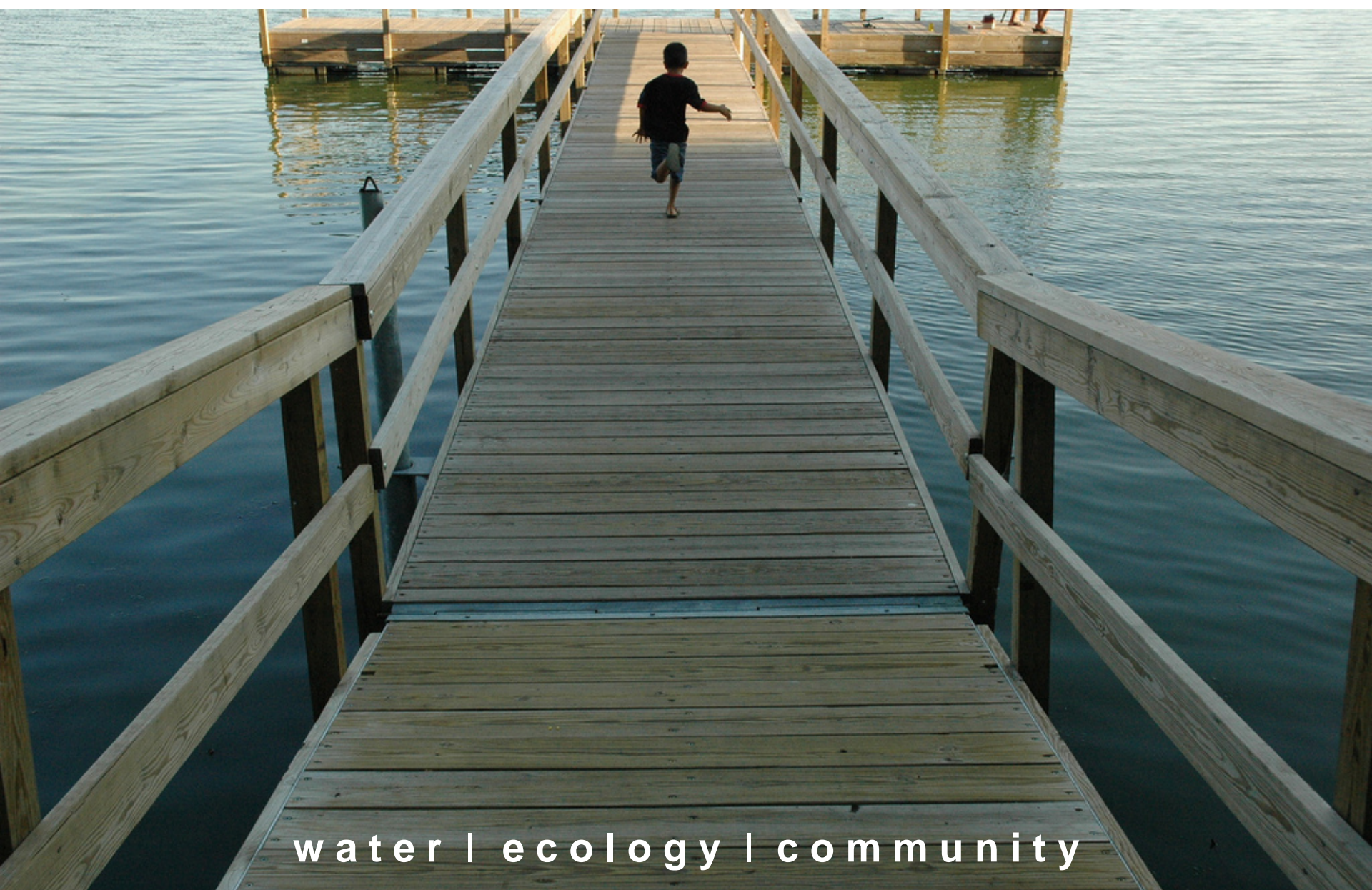


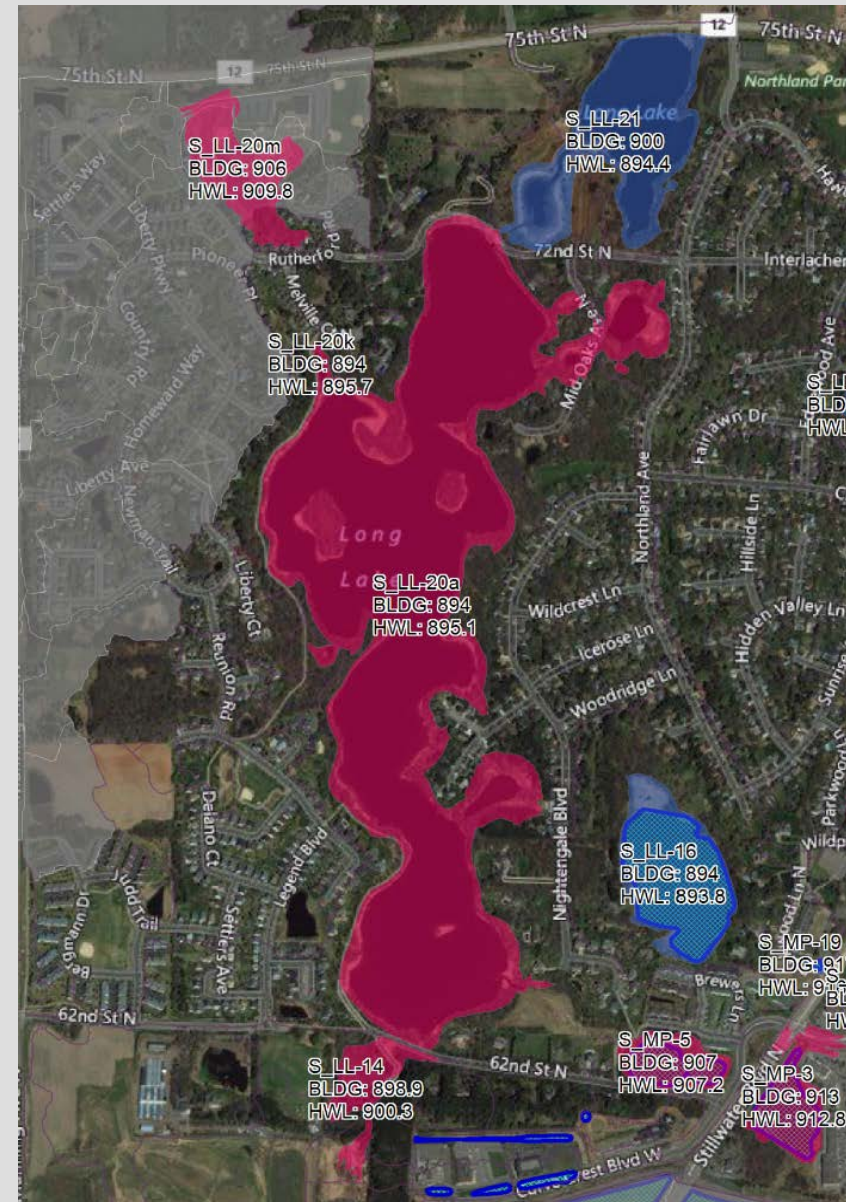
# Long Lake Flooding Evaluation



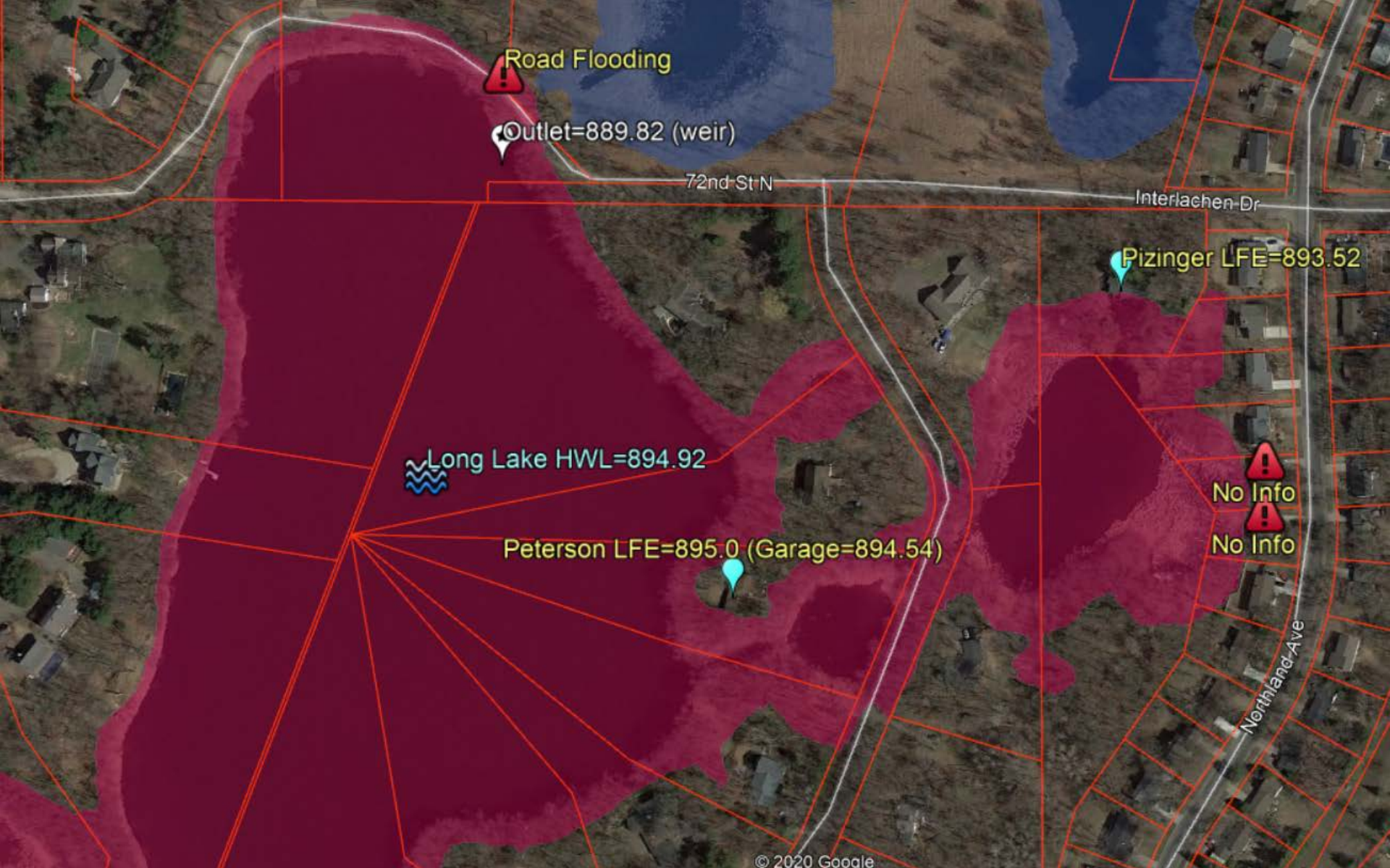
water | ecology | community

# Background

- Review of capacity in the Long Lake drainage area
- Observed high water levels throughout District
- Historical concerns on Long Lake
- Impact of change in 100-Year 24-Hour storm depth from 5.9 inches to 7.2 inches & improved model input data
- FEMA 100-Year Event = 893.0
- Revised 100-Year Event = 894.9

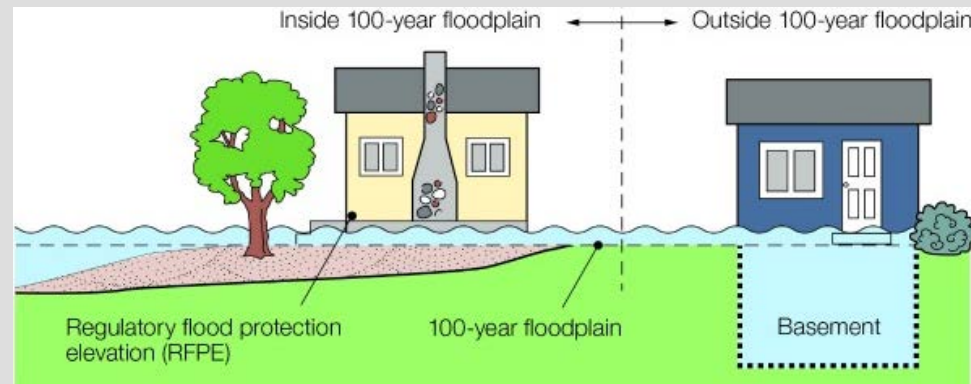


# Background



- **Common Flooding Terms**

- **Base Flood Elevation (BFE) – Regulatory FEMA 100-Year Flood**
- **Regulatory Flood Protection Elevation (RFPE) – MN state regulation requiring one foot of freeboard above the BFE on Lakes.**
- **Freeboard – Distance between flood water elevation and critical elevation such as:**
  - Lowest Opening
  - Lowest Floor Elevation
  - Lowest Adjacent Grade



# Survey & Model Findings Summary

- Lowest Opening**



## Lowest Floor



# Survey & Model Findings Summary

- **Lowest Floor, Opening, & Adjacent Grade**



# Survey & Model Findings Summary

- **Lowest Adjacent Grade (ground above windowsill)**



# Survey & Model Findings Summary

- **Update on Surveying and Modeling**
  - Total of 44 homes with surveyed elevations
  - Confirmed all survey data elevation datum is consistent
  - Modeled 2 through 500-Year events with and without weir at the Long Lake outlet
  - Rendered Maps to identify freeboard and level of protection





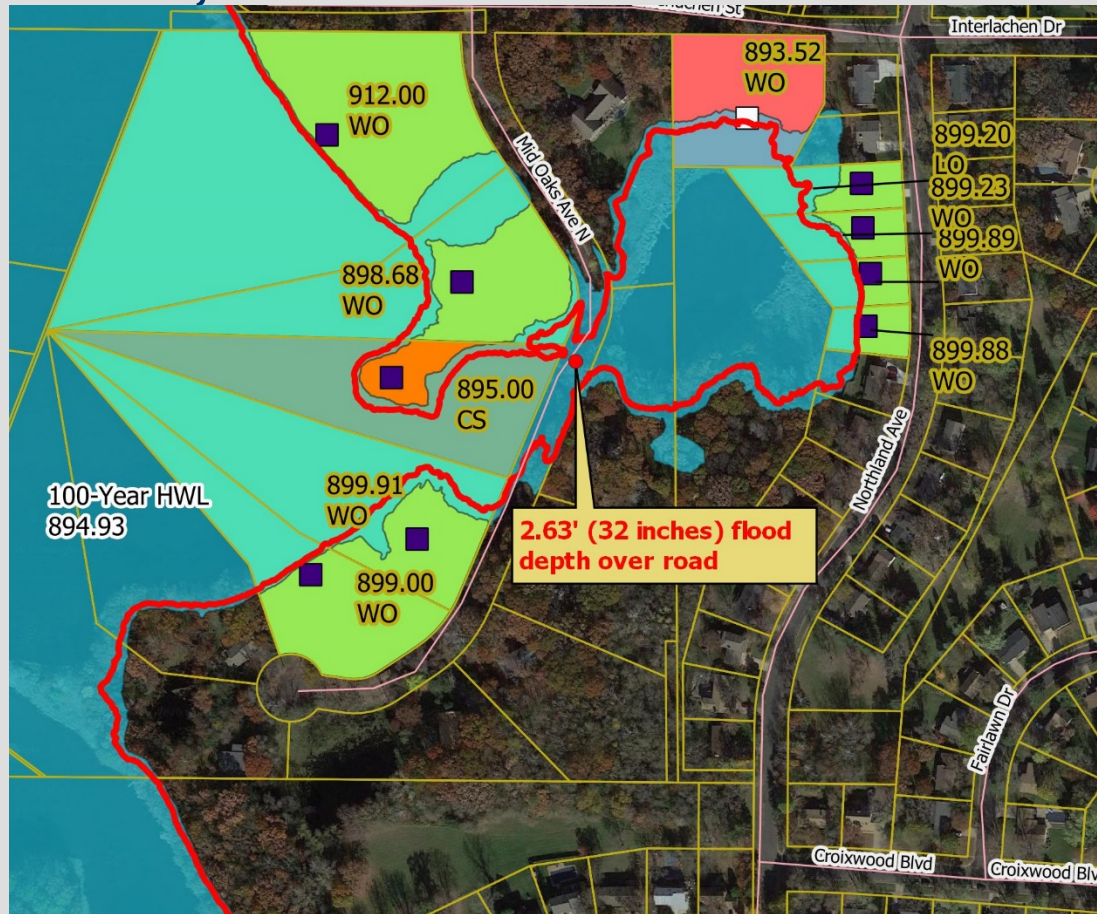
- **BCWD Atlas 14 24-Hour Storm Rainfall Depths**

- **1-Year = 2.44"**
- **5-Year = 3.49"**
- **10-Year = 4.17"**
- **25-Year = 5.23"**
- **50-Year = 6.17"**
- **100-Year = 7.20"**
- **200-Year = 8.35"**
- **500-Year = 10.00"**
- **1000-Year = 11.40"**



# Survey & Model Findings Summary

- Mid Oaks Ave, Interlachen St. and Northland Ave.



|                        |                  |
|------------------------|------------------|
| Atlas 14 Rainfall      | 100-yr Freeboard |
| Event Protection Level | < 0 ft           |
| □ 10-yr                | 0 - 1 ft         |
| □ 50-yr                | 1 - 2 ft         |
| □ 100-yr               | > 2 ft           |
| □ FEMA 100-Yr (893.00) | Parcel Lines     |

**Long Lake  
Flood Evaluation  
Level of Protection**

0 100 200 ft

# Survey & Model Findings Summary

- **Marine Circle**



|                        |                        |                  |  |  |
|------------------------|------------------------|------------------|--|--|
|                        | Atlas 14 Rainfall      | 100-yr Freeboard |  | <p><b>Long Lake Flood Evaluation</b><br/>Level of Protection</p> <p>0 100 200 ft</p> |
|                        | Event Protection Level | < 0 ft           |  |  |
|                        | □ 10-yr                | 0 - 1 ft         |  |  |
|                        | □ 50-yr                | 1 - 2 ft         |  |  |
|                        | □ 100-yr               | > 2 ft           |  |  |
| □ FEMA 100-Yr (893.00) | Parcel Lines           |                  |  |  |

# Survey & Model Findings Summary

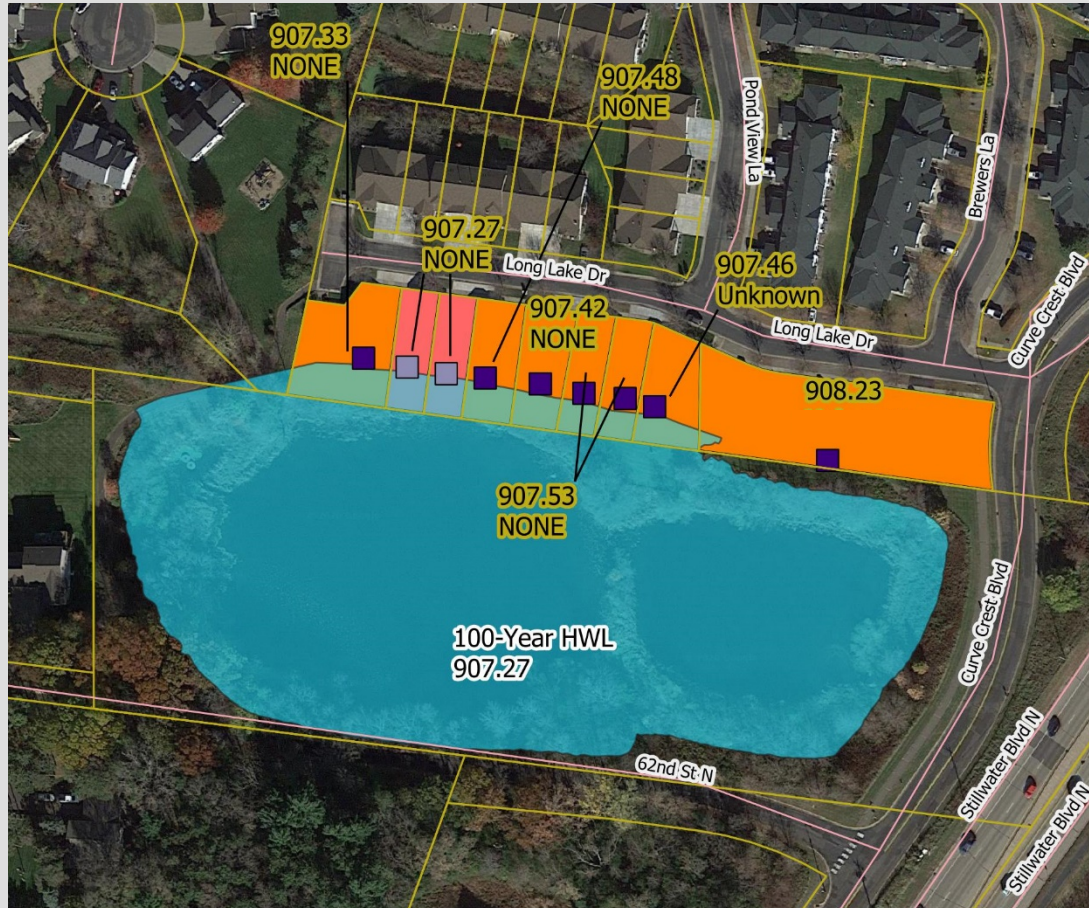
- Nightingale Blvd



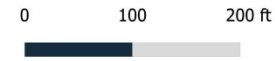
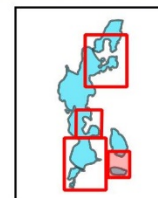
|  |  |                  |  |  |
|--|--|------------------|--|--|
|  | Atlas 14 Rainfall Event Protection Level | 100-yr Freeboard |  | <p><b>Long Lake Flood Evaluation</b><br/>Level of Protection</p> <p>0 100 200 ft</p> |
|  | □ 10-yr                                  | □ < 0 ft         |  |  |
|  | □ 50-yr                                  | □ 0 - 1 ft       |  |  |
|  | □ 100-yr                                 | □ 1 - 2 ft       |  |  |
|  | □ FEMA 100-Yr (893.00)                   | □ > 2 ft         |  |  |
|  | □ Parcel Lines                           |                  |  |  |

# Survey & Model Findings Summary

- Long Lake Villas



|                        |                  |
|------------------------|------------------|
| Atlas 14 Rainfall      | 100-yr Freeboard |
| Event Protection Level | < 0 ft           |
| □ 10-yr                | 0 - 1 ft         |
| □ 50-yr                | 1 - 2 ft         |
| □ 100-yr               | > 2 ft           |
| □ FEMA 100-Yr (893.00) | Parcel Lines     |



**Long Lake  
Flood Evaluation  
Level of Protection**

- **Existing HWL & Critical Elevation Exceeded (44 Structures Surveyed EOR & SEH)**
  - 500-Year = 896.67 – 19 Homes
  - 100-Year = 894.93 – 6 Homes\*
  - 50-Year = 894.28 – 1 Home
  - 25-Year = 893.57 – 1 Home
  - 10-Year = 892.67 – None (**Pzinger <1 foot of freeboard**)
- **Long Lake Weir Removed Scenario**
  - 500-Year = 896.11 – 17 Homes
  - 100-Year = 894.36 – 3 Homes\*
  - 50-Year = 893.64 – 1 Home
  - 25-Year = 892.84 – None (**Pzinger <1 foot of freeboard**)
  - 10-Year = 891.92 – None (**Pzinger 1.6 feet of freeboard**)

**\*Note: Two homes on 62<sup>nd</sup> Street Pond exceeded for 100-Year**

- **Road Flooding and Access**

- Mid Oaks Avenue floods for 10-Year; 100-Year = 2.6 feet
- Nine properties no access
- Exceeds 0.5' depth for 10 to 25-Year event



- **Road Flooding and Access**

- 62<sup>nd</sup> Street floods for 25-Year; 100-Year = 1.4 feet
- Potentially one property no access
- Exceeds 0.5' depth for 50-Year event





- **Road Flooding and Access**

- 72<sup>nd</sup> Street floods for 50-Year; 100-Year = 0.93 feet
- No foreseen access implications
- Exceeds 0.5' depth for ~75-Year event

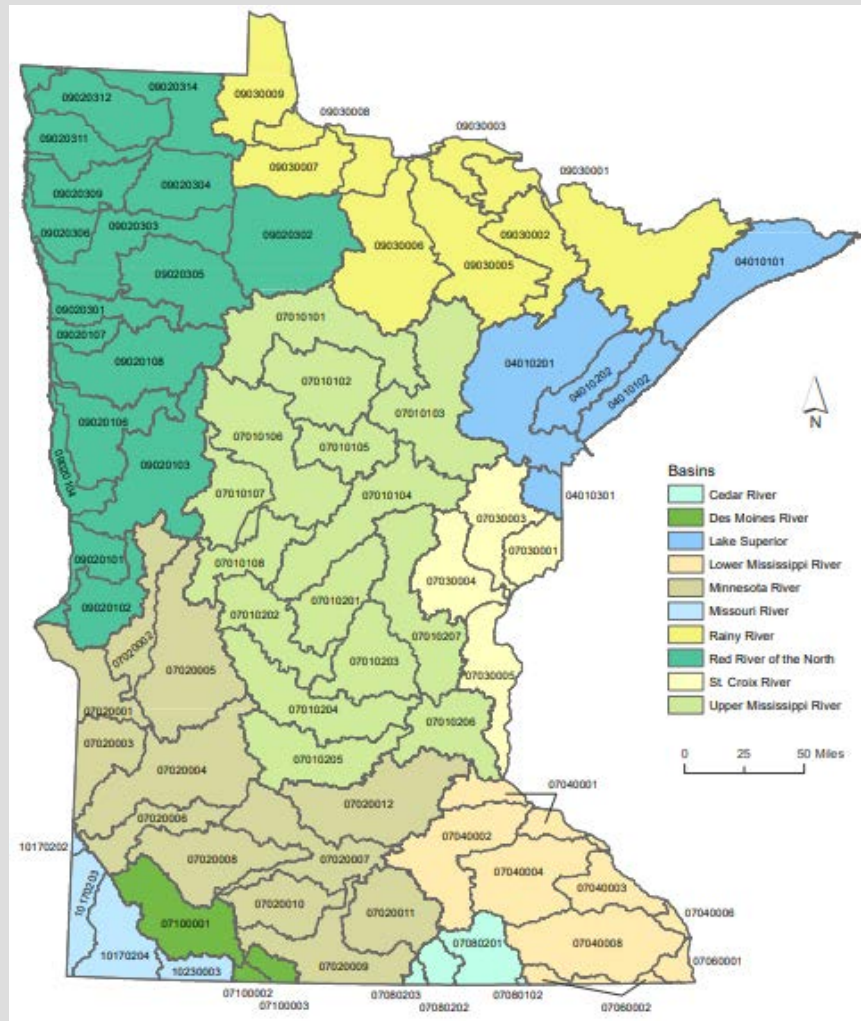


# Survey & Model Findings Summary

- **Low Opening Vs. Low Floor & Proximity to HWL**
  - Low opening = 898.46; Low Floor = 890 +/-



- **FEMA Re-Mapping and Flood Risk 2.0 (Future)**
  - Ongoing re-mapping throughout Minnesota by HUC-8



- **Woodbury Flood Risk Reduction Grant Program**
  - Provides technical assistance to identify flood damage reduction techniques.
  - High Risk Property = No 100-Year Freeboard (6 Homes around Long Lake)
  - Medium Risk Property = 0' to 1' Freeboard (10 Homes around Long Lake)
  - 50% or 75% cost coverage based on risk level
  - Up to \$50,000 per property
  - City covers preliminary investigation and cost estimating and engineering services up to 15% of total project cost
  - Potential projects include:
    - Concrete block walls or berms
    - Filling and grading modifications around points of entry
    - Adding or modifying window wells
    - Water resistant siding
    - Flood barrier doors

# Project Examples

- Opening Flood Planking



# Project Examples

- **Block Walls**



# Project Examples

- **Foundation Waterproofing**



- **Finalize report and share with City of Stillwater (December – January)**
- **Share with residents (January – February)**
  - **Prior to spring melt**
  - **Allows time for flood insurance waiting period should they decide to purchase**
- **Review flood-proofing programs and grant options**



# Questions?



Illustration by Julia Rothman

Thank you

