



**Northeast Ohio
Regional Sewer District**

Lower Shaker Lake Dam Reconstruction

TONIGHT'S MEETING WILL BEGIN SHORTLY



**Northeast Ohio
Regional Sewer District**

NEORSD Podcast

A bi-weekly chat with the real people who bring our clean water work to life.

neorsd.buzzsprout.com



Clean Water Works




**Northeast Ohio
Regional Sewer District**



Lower Shaker Lake Dam Reconstruction

Tonight's meeting will start shortly.

A woman with curly blonde hair, wearing a blue polo shirt with the NEORS D logo, is leaning over a table to assist an older woman with short blonde hair and glasses. The older woman is holding a green pen and looking at a document on the table. The background shows other people at tables in a well-lit room, suggesting a community event or fair.

Can you save on your sewer bill?

Utility Assistance Resource Fair
November 16, 2024

(216)881.8247
neorsd.org/save

Lower Shaker Lake Dam Reconstruction

TONIGHT'S MEETING WILL BEGIN SHORTLY



Working for Clean Water



**Northeast Ohio
Regional Sewer District**

[NEORSD.ORG/CAREERS](https://www.neorsd.org/careers)



Lower Shaker Lake Dam Reconstruction

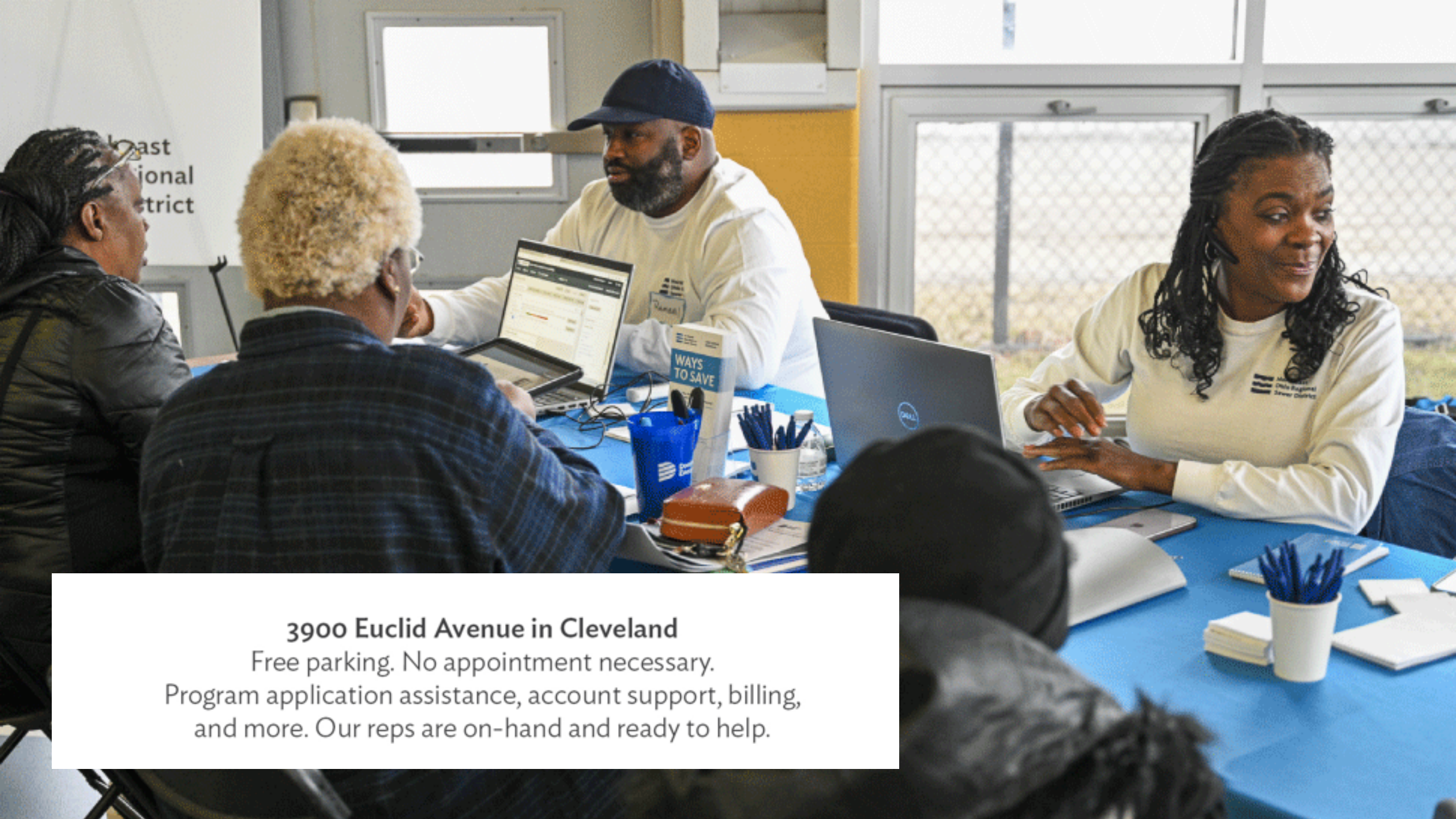
Tonight's meeting will start shortly.

Real people. Here to help.



FIRST SATURDAY
OF EVERY MONTH

8:00 TO 11:00 A.M.



3900 Euclid Avenue in Cleveland

Free parking. No appointment necessary.

Program application assistance, account support, billing,
and more. Our reps are on-hand and ready to help.



Lower Shaker Lake Dam Reconstruction

Tonight's meeting will start shortly.

Lower Shaker Lake Dam Reconstruction

NORTHEAST OHIO REGIONAL SEWER DISTRICT

OCTOBER 21, 2024



**Northeast Ohio
Regional Sewer District**

Glad you're here.

JESSICA SHUTTY, PUBLIC INFORMATION SPECIALIST II
NORTHEAST OHIO REGIONAL SEWER DISTRICT

SHUTTYJ@NEORSD.ORG

Housekeeping

- Tonight's meeting
 - Pre-Design Update on the project
 - Next steps to advance into Detailed Design
 - Recording available at neorsd.org/LowerLake

Public Engagement

- October 2023
 - October 5 Webinar – Project Kick-Off
 - October 7 Open House – held at the Lower Lake Dam
- Online Survey
 - February 23 to March 10, 2024 (Over 800 responses)
- May 2024
 - May 20 Webinar – Update on initial Pre-Design findings
 - May 21 Open House – held at the Nature Center at Shaker Lakes
- Partner events
 - Take to the Lake, AppleFest, AutumnFest



Zoom Q&A
askus@neorsd.org

Matt Scharver

DIRECTOR OF WATERSHED PROGRAMS
NORTHEAST OHIO REGIONAL SEWER DISTRICT

SCHARVERM@NEORSD.ORG

Tonight's Agenda

- Project Goals
- How We Got Here
- Dam Safety Challenges
- Pre-Design Update
- Next Steps
- Q&A



Roles and Responsibilities

- **Ohio Department of Natural Resources (ODNR):** Assess, enforce State of Ohio dam compliance
- **Shaker Heights and Cleveland Heights:** Dam owners; responsible to comply with ODNR standards
- **City of Cleveland:** Property owner; long-term lease to Cities of Shaker Heights and Cleveland Heights
- **NEORSD:** Regional Stormwater Management Program

Reasons to Reconstruct Dam

- **Non-compliance with State regulations:**
 - Dam not built to modern engineering standards
 - Class I dam failure would result in probable loss of life and property damage
 - Dam cannot pass Probable Maximum Flood

Reasons to Reconstruct Dam

- Non-compliance with State regulations
- **NEORSD Chagrin River & Lake Erie Direct Tributaries**

Stormwater Master Plan findings:

- Lower Shaker Lake Dam provides downstream flood control benefit

Doan Brook Watershed

Lower Shaker Lake Drainage Area 3,224 ACRES

Bratenahl

Cleveland

University Circle

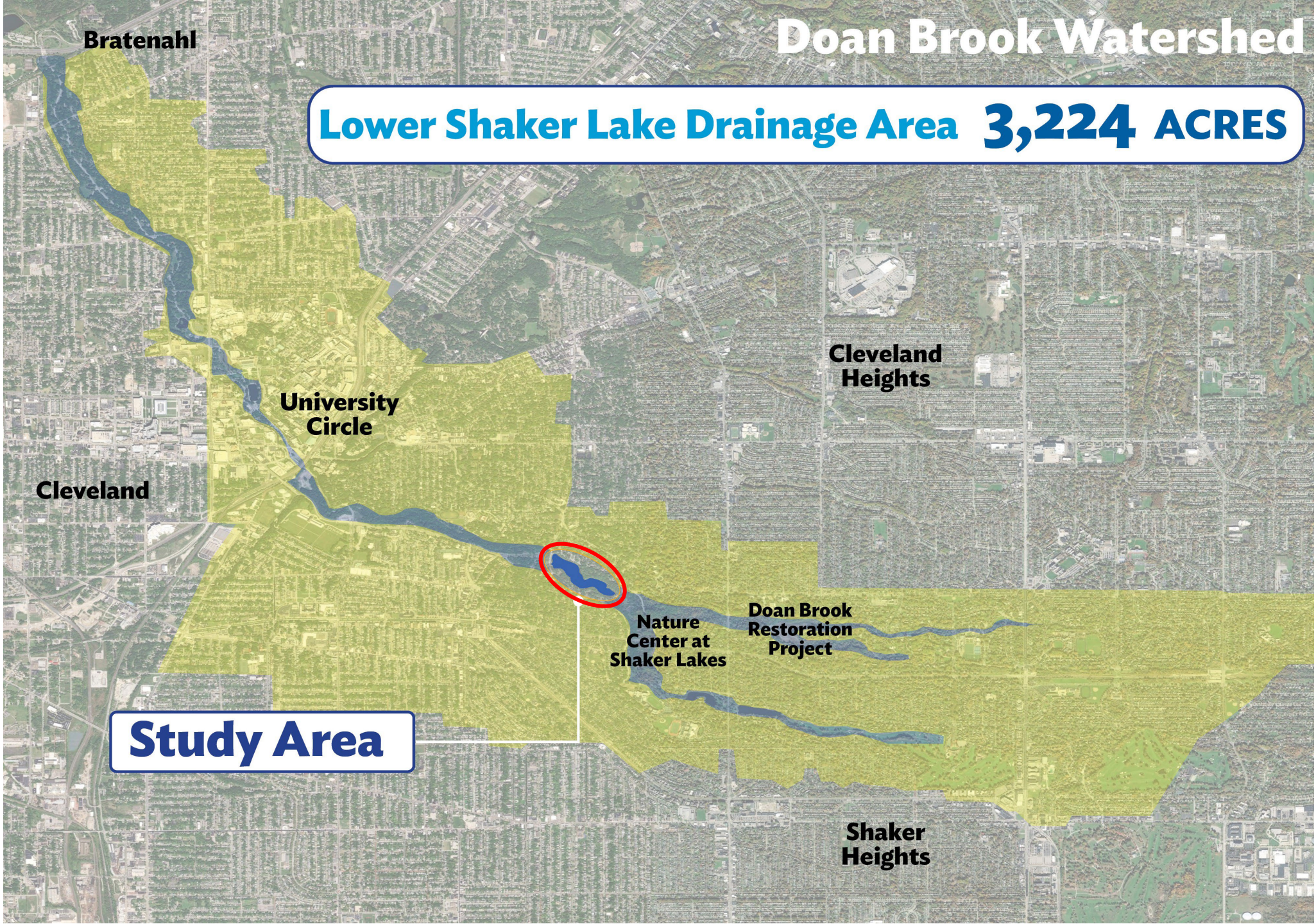
Cleveland Heights

Nature Center at Shaker Lakes

Doan Brook Restoration Project

Study Area

Shaker Heights



Project Goals

Project Goals

- **Address dam safety deficiencies** and bring dam into compliance with State of Ohio regulations

Project Goals

- **Reduce flood risk** downstream of the dam and along Coventry Road and North Park Boulevard

Project Goals

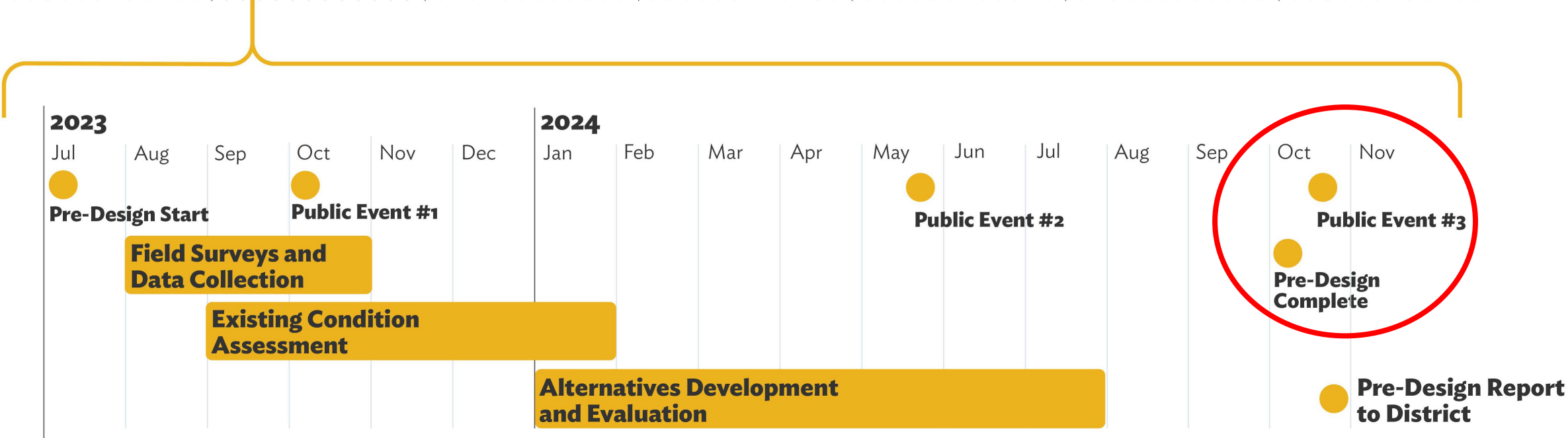
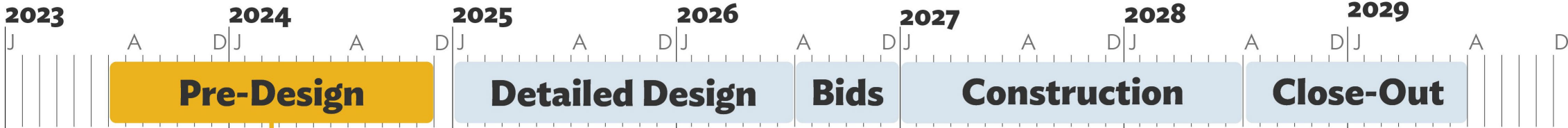
- **Stabilize Doan Brook** immediately downstream of the dam and Coventry Road

Project Goals

- **Integrate dam safety improvements** with consideration to historical and cultural features and park space

Project Timeline

Timeline



How We Got Here

BACKGROUND AND EXISTING CONDITIONS REVIEW

Lower Shaker Lake History

- North Union Shaker Community (1822-1889)
- Doan Brook dammed for sawmill, gristmill (1836)
- 187-year-old earthen dam not built to modern standards, noncompliant with state regulations

Landscape Features

KEY

- PEDESTRIAN ACCESS - PAVED
- PEDESTRIAN ACCESS - UNPAVED

- CONTOUR - INDEX
- CONTOUR - INTEGER

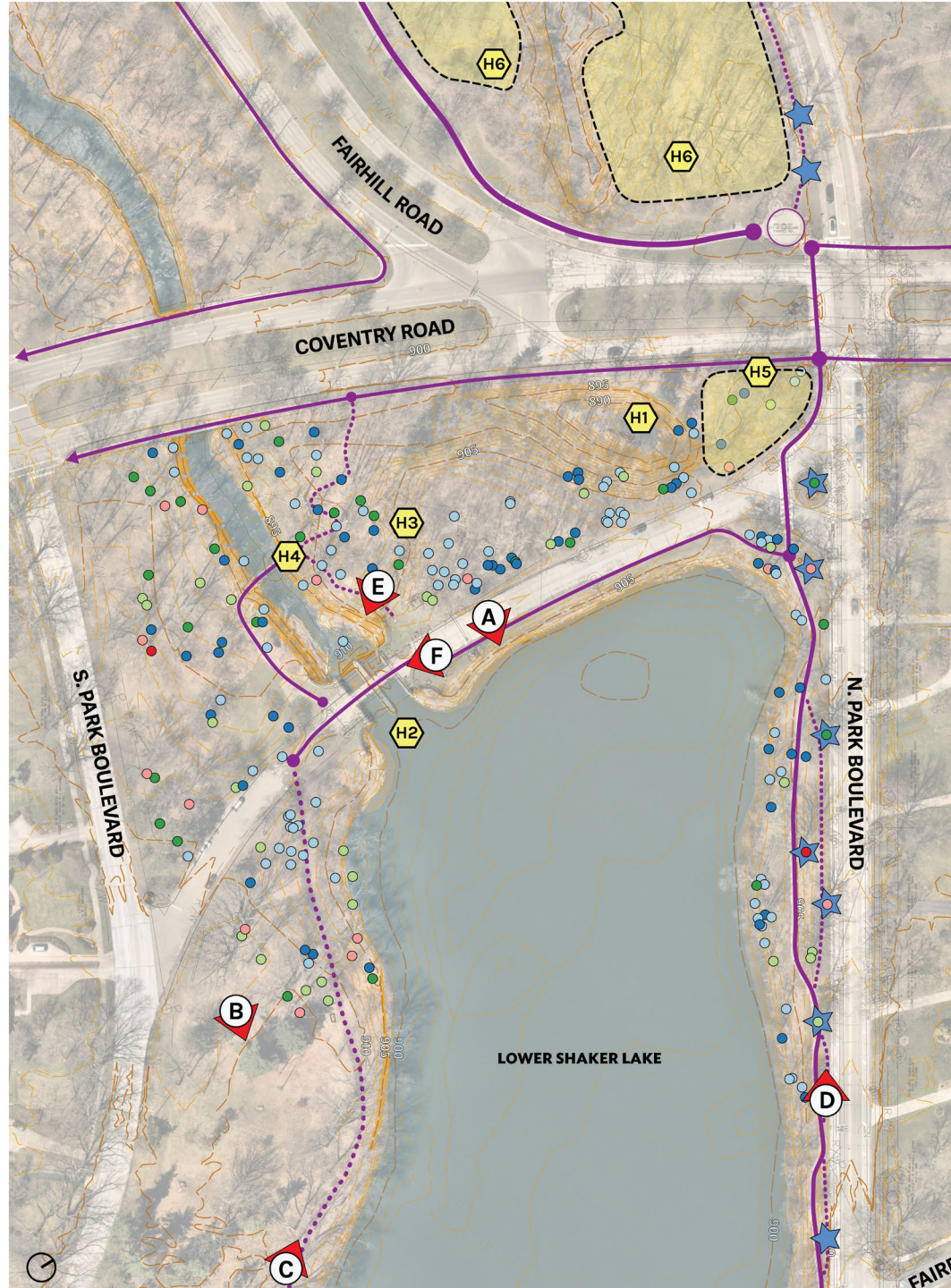
NORMAL LAKE LEVEL

LIBERTY OAK

SURVEYED TREES (BY DBH CLASS)

- 8 - 12 IN
- 12.5 - 18 IN
- 18.5 - 24 IN
- 24.5 - 30 IN
- 30.5 - 36 IN
- 36.5 - 42 IN

- H1 SAWMILL / GARDEN CLUB SITE
- H2 SPILLWAY
- H3 ICEHOUSE
- H4 FOOTBRIDGE
- H5 SHAKER MEMORIAL GARDEN
- H6 MILL FAMILY SETTLEMENT



Dam Regulation and Classification

- In Ohio, dams are regulated by ODNR's Division of Water Resources - Ohio Dam Safety Program
- All regulated (non-exempt) dams must meet all ODNR standards
- Classification of regulated dams in Ohio is governed by Ohio Administrative Code (OAC) 1501:21

Dam Classification

Lower Shaker Lake Dam is classified as a Class I (High Hazard Potential) dam

Ohio's Dam Classification Criteria

Hazard Potential	Height (FT)	Storage (AC FT)	Downstream Hazard Potential
I High	>60	>5,000	Probable Loss of Human Life
II Significant	>40	>500	Loss or Damage of High-value Infrastructure of Assets
III Low	>25	>50	Damage of Local Roads or Not Otherwise High Valued Assets
IV Exempt	<25	<50	Dam or Agriculture/Rural Land

Lower Shaker Lake Dam Class

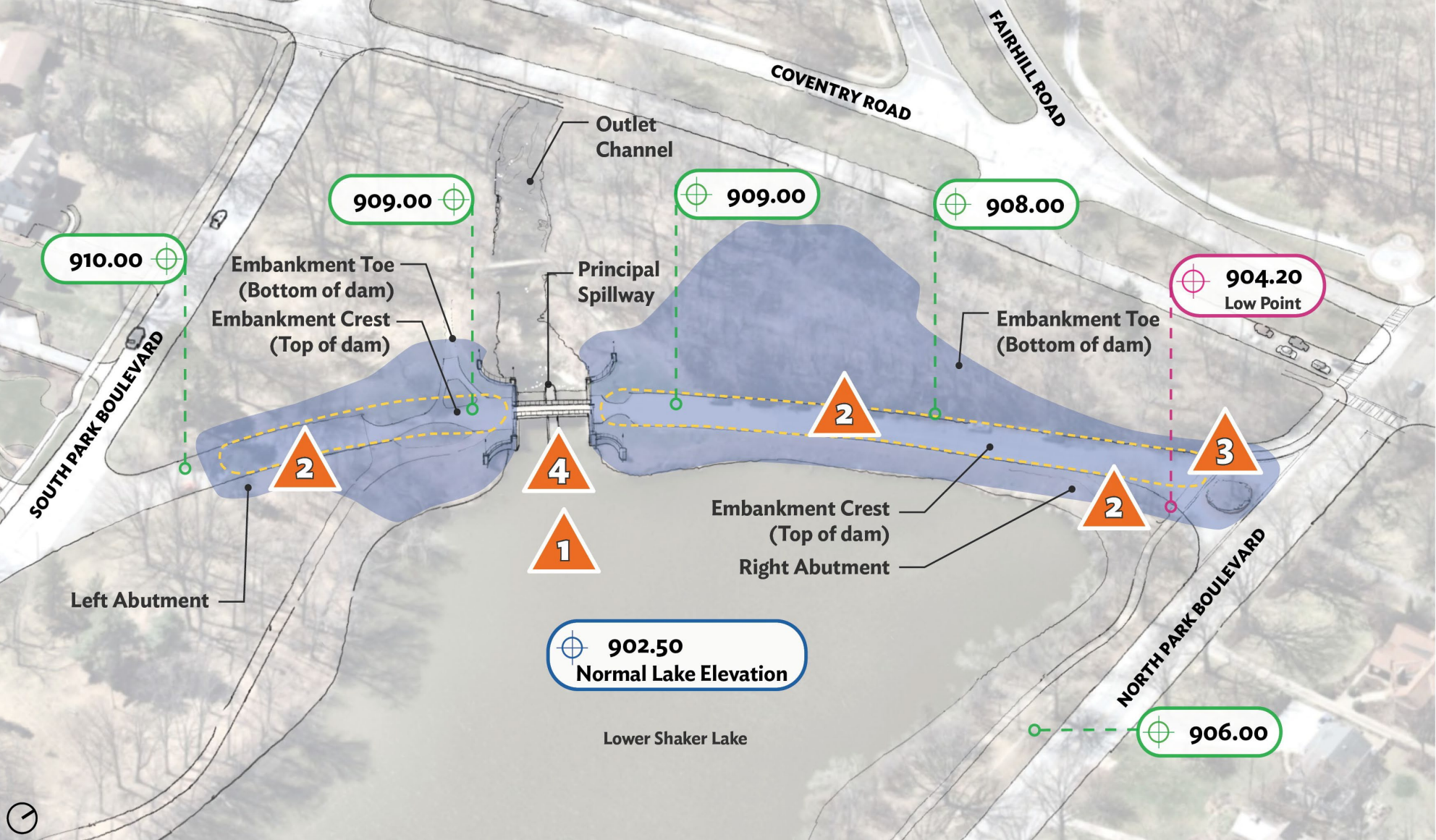
Height (FT)	Storage (AC FT)	D/S Hazard
		X
	178	
17.3		

Dam Safety Challenges

OHIO DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER RESOURCES – OHIO DAM SAFETY PROGRAM

Dam Safety Deficiencies



Dam Safety Deficiencies

- 1** Inadequate Spillway Capacity
- 2** Inadequate Embankment Protection & Uneven Crest Elevation
- 3** Inadequate Embankment Stability/Seepage
- 4** Inadequate Masonry Spillway Stability
- Embankment Limits

Dam Safety Improvements – Necessary Features

- New Concrete Dam Structure
 - Erosion protection of embankment

Dam Safety Improvements – Necessary Features

- Reconstructed Principal Spillway

Dam Safety Improvements – Necessary Features

- Expanded Spillway Capacity through Auxiliary Spillway
 - Must be able to safely pass the design storm (Probable Maximum Flood)

Dam Safety Improvements – Necessary Features

- Floodwalls
 - Containment and directing of flood waters

Pre-Design Update

Design Team

- HDR – *Civil Engineering*
- SmithGroup – *Landscape Architecture*
- Lawhon & Associates – *Cultural Resources*
- Bluestone – *Local Community Coordination*
- DLZ – *Structural Design*
- Sustainable Streams – *Streambank Stabilization*
- AECOM – *Sediment Management*

Necessary Features

- Gravity Dam
 - Overtopping protection
 - Safely pass Probable Maximum Flood (PMF) event
- Principal Spillway
 - Reconstructed with modern materials to meet dam safety requirements
- Auxiliary Spillway
 - Provides additional, required overflow control
- Floodwall
 - Contains flood waters to Lake footprint and directs flood waters over the gravity dam

- ① Gravity Dam
- ② Principal Spillway
- ③ Auxiliary Spillway
- ④ North Park Boulevard Floodwall
- ⑤ North Park Boulevard Pedestrian Entrance
- ⑥ South Park Boulevard Floodwall

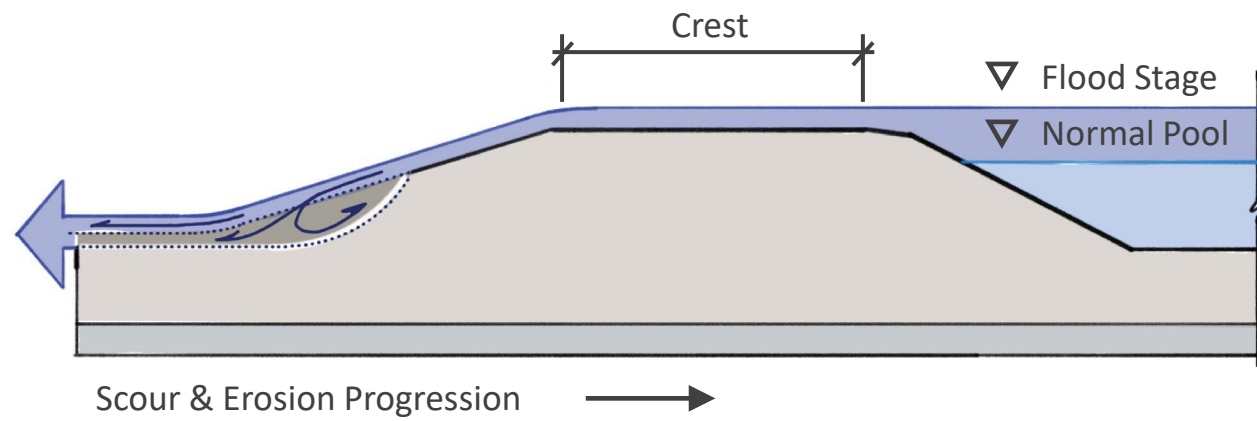


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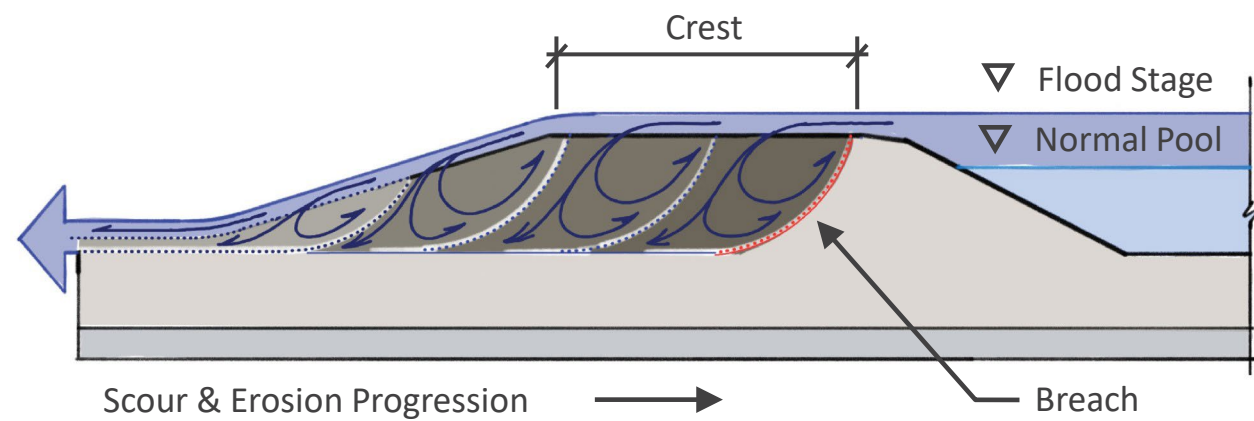


Problem

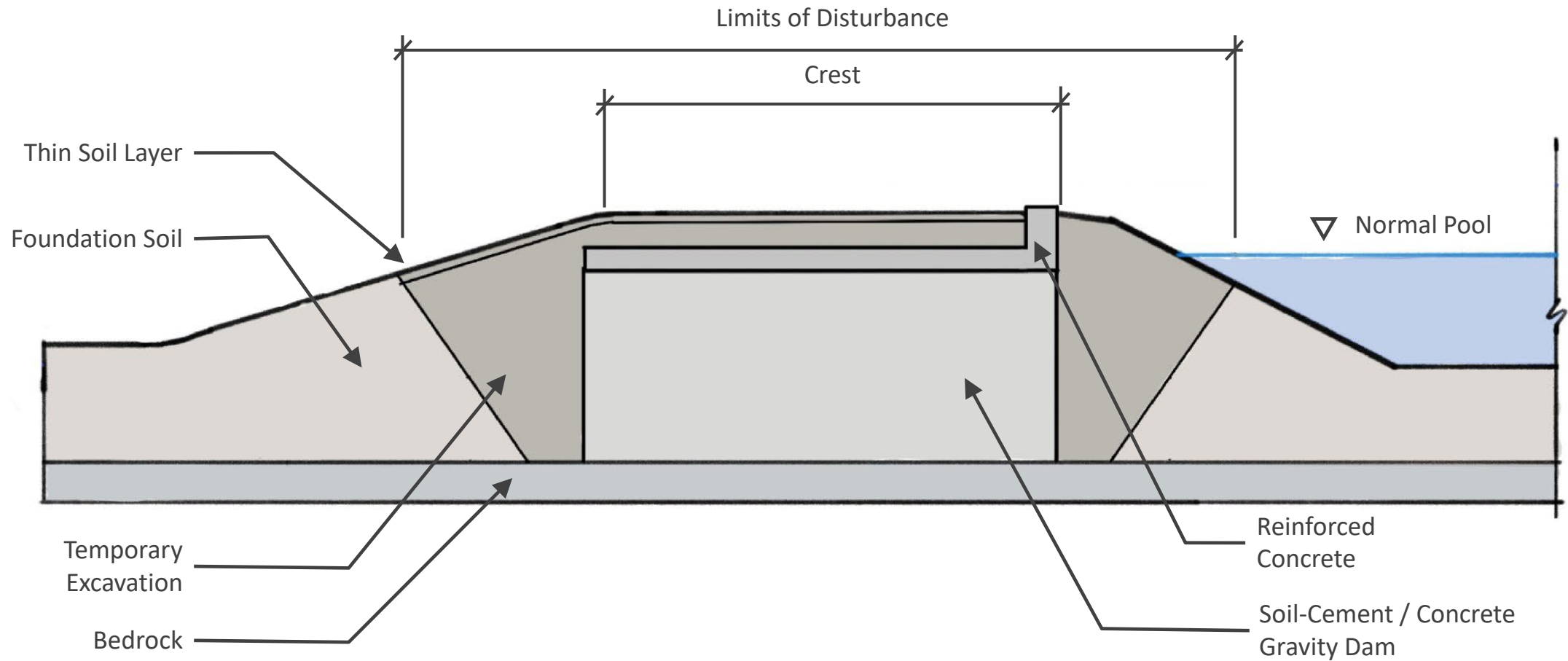
Unarmored Earthen Embankment – Initial Stage



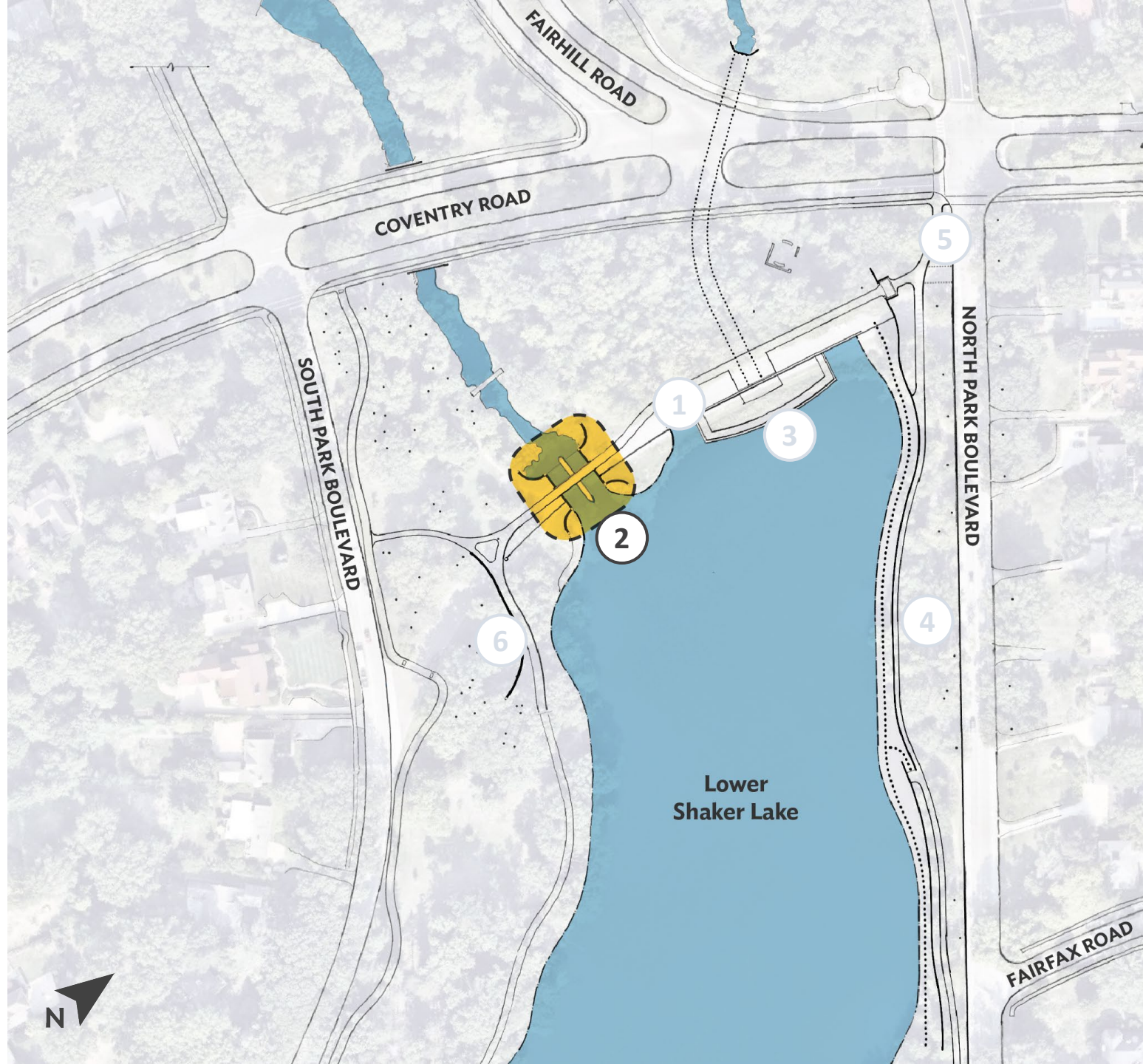
Unarmored Earthen Embankment – Breach Stage



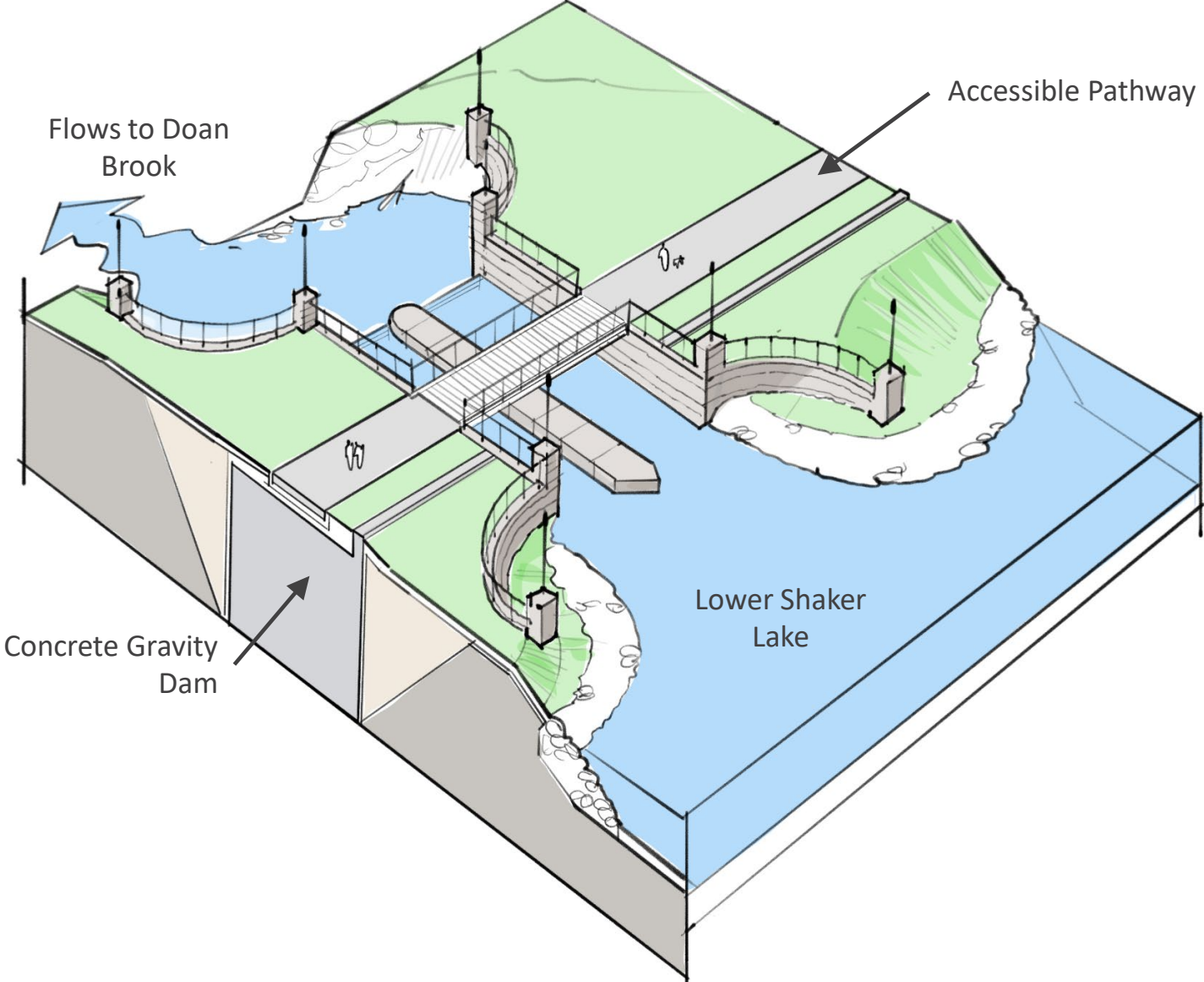
Gravity Dam



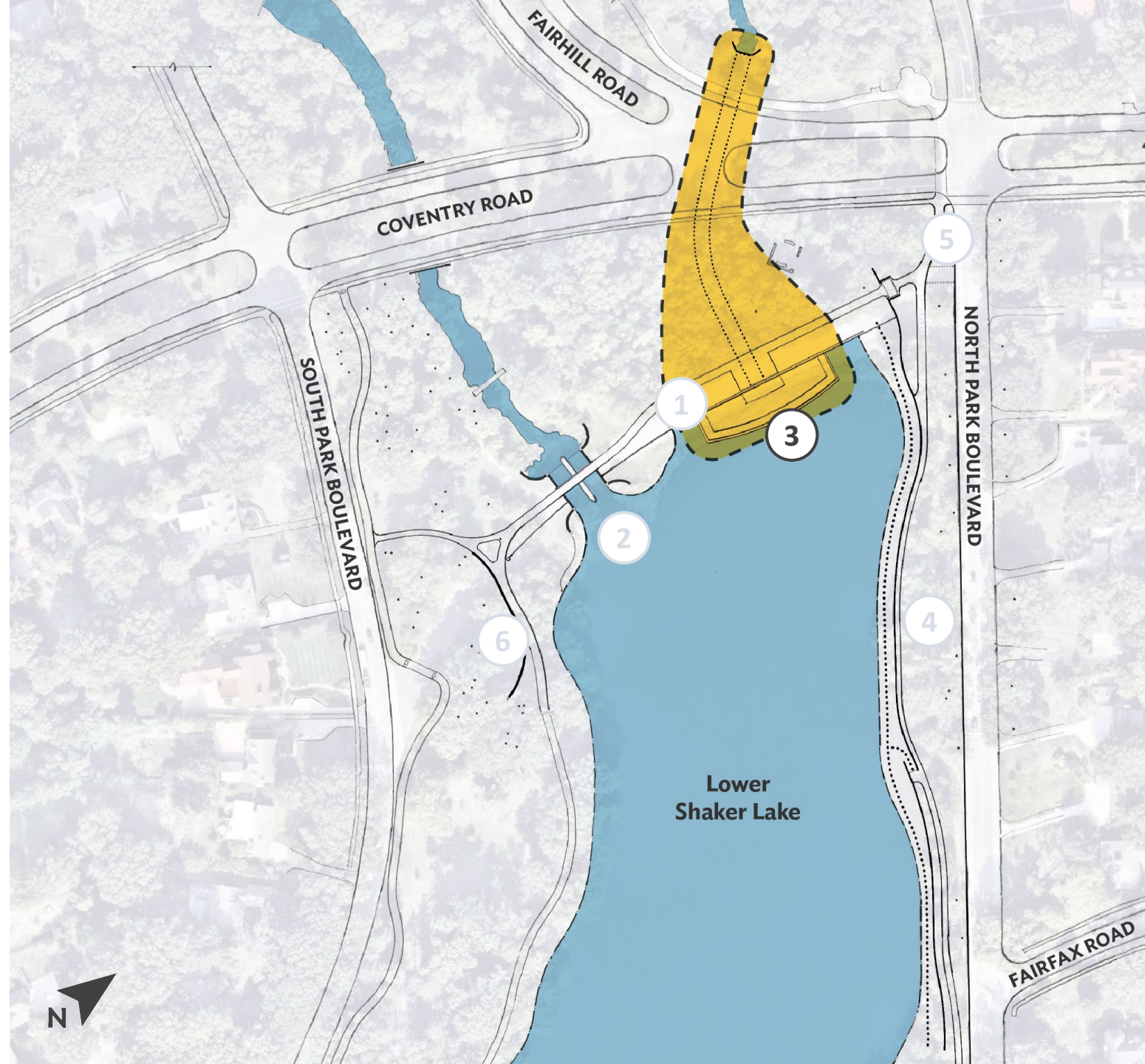
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Reconstructed Principal Spillway

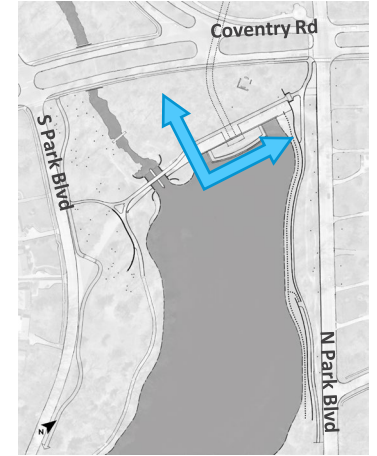
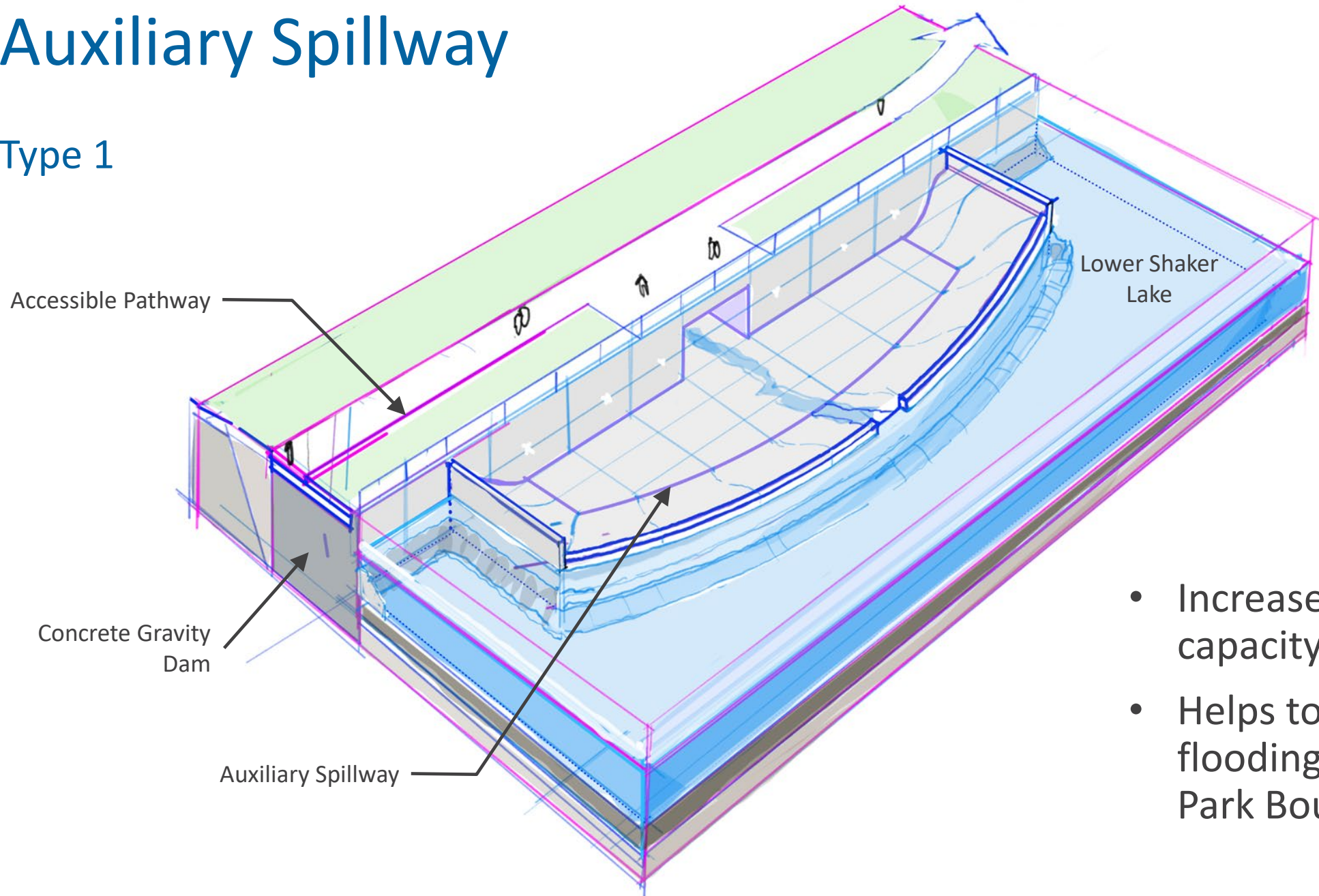


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Auxiliary Spillway

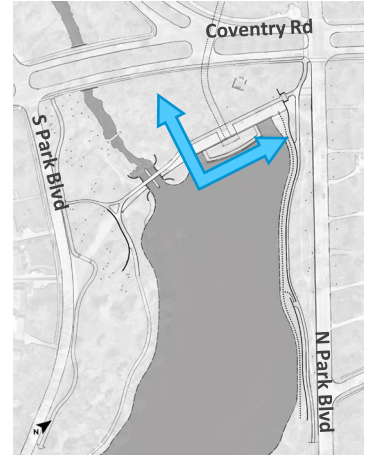
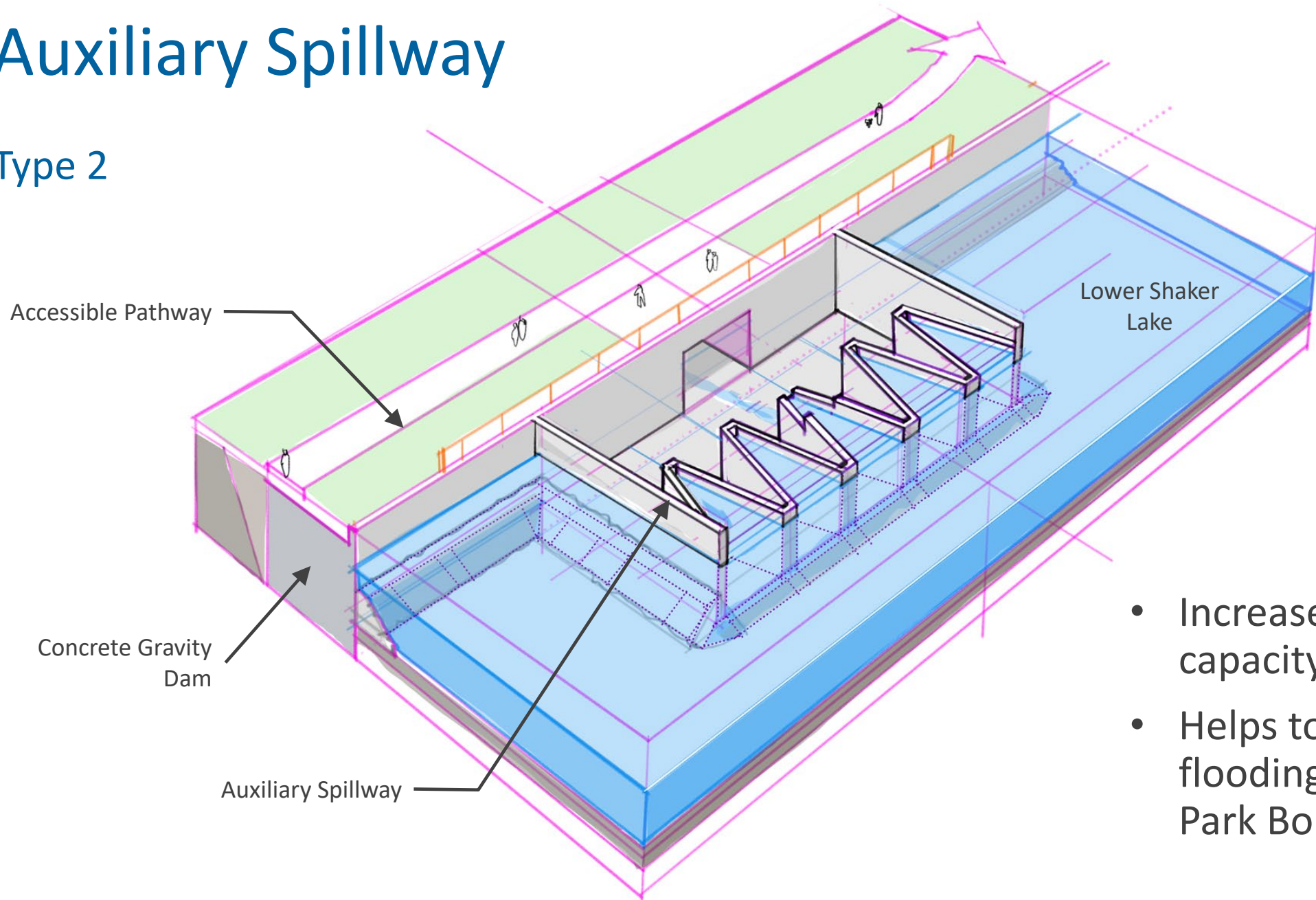
Type 1



- Increased hydraulic capacity
- Helps to prevent flooding along North Park Boulevard

Auxiliary Spillway

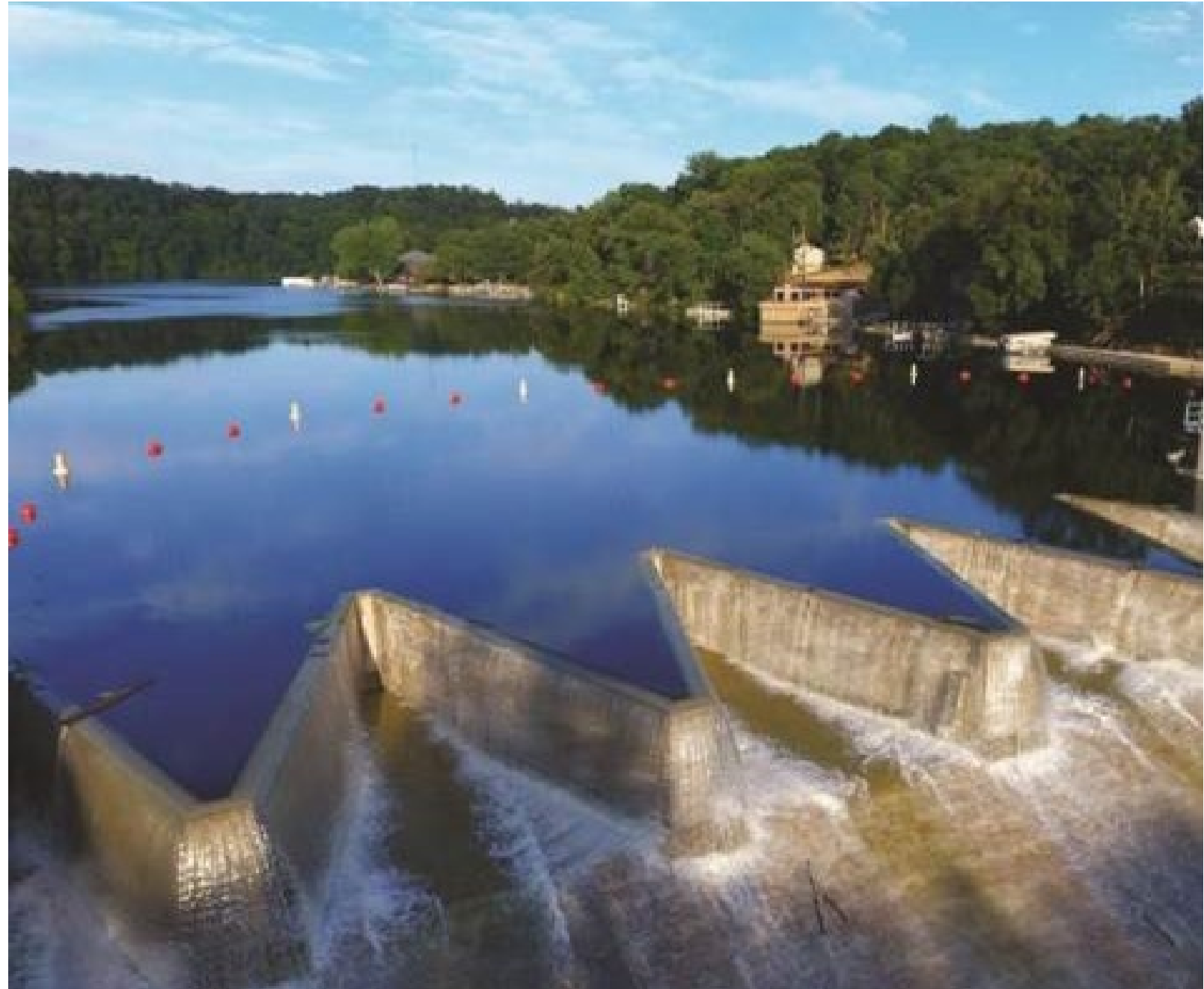
Type 2



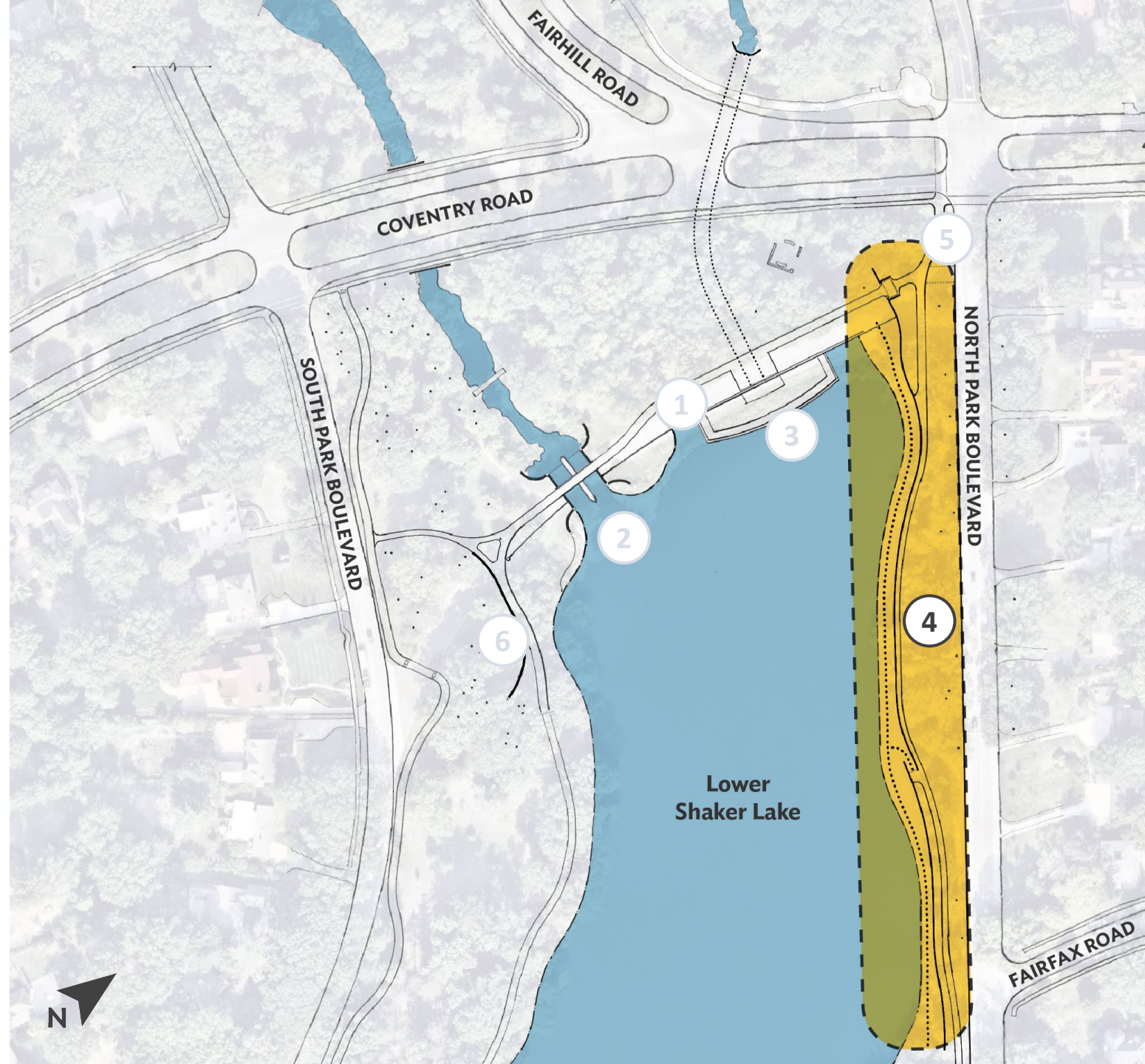
- Increased hydraulic capacity
- Helps to prevent flooding along North Park Boulevard

Auxiliary Spillway

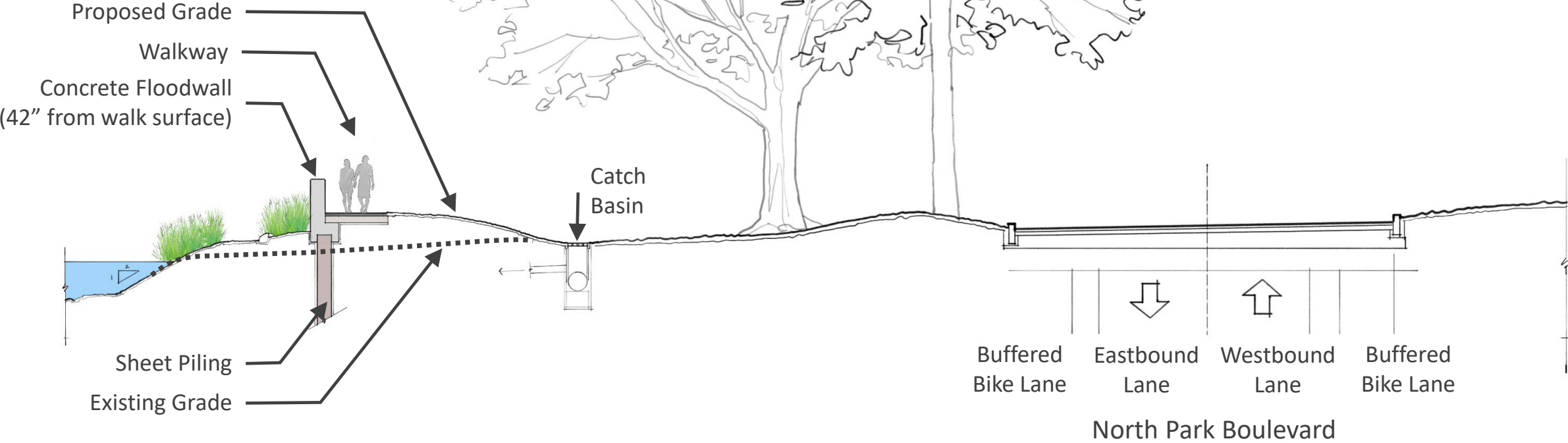
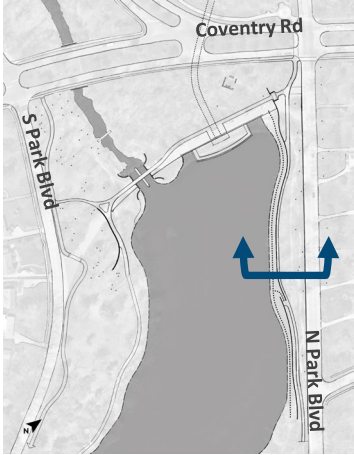
Example Photo:
Lake Delhi Dam, Iowa



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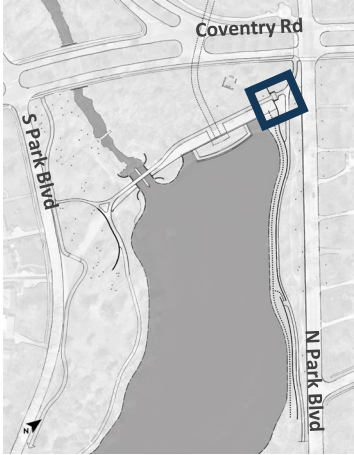
North Park Floodwall



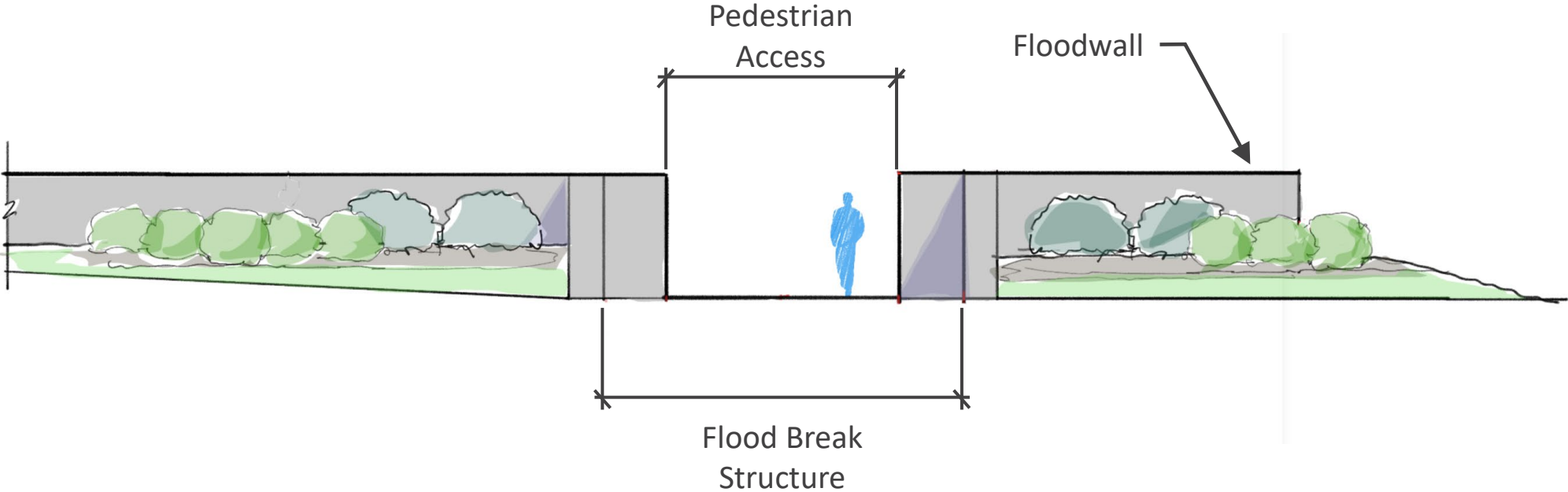
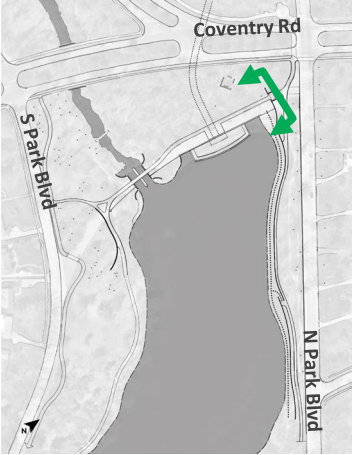
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North Park Boulevard Pedestrian Access



North Park Boulevard Pedestrian Access



Passive-Deployable Floodwall (Floodbreak)

Non-Deployed Condition
No Flooding



Passive-Deployable Floodwall (Floodbreak)

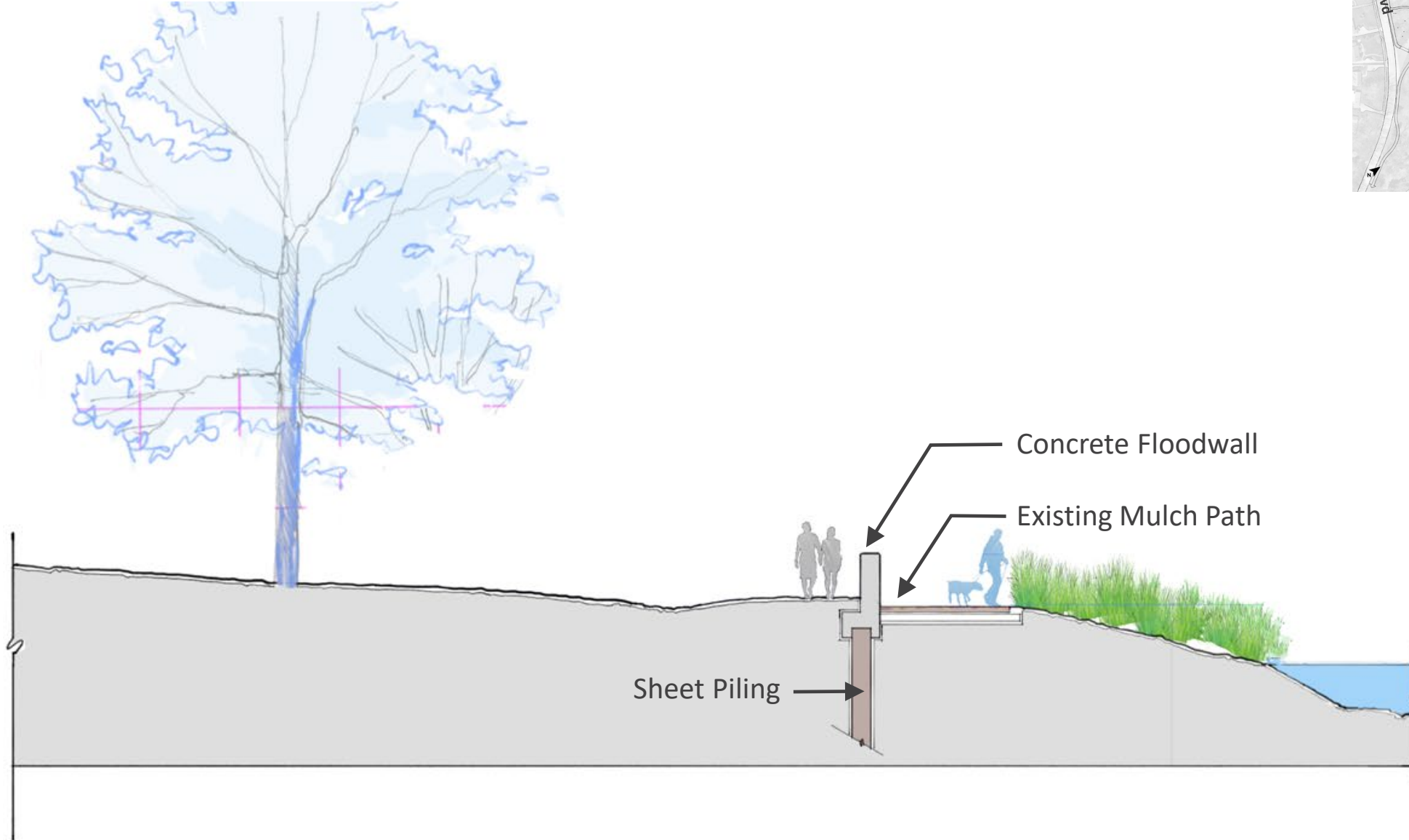
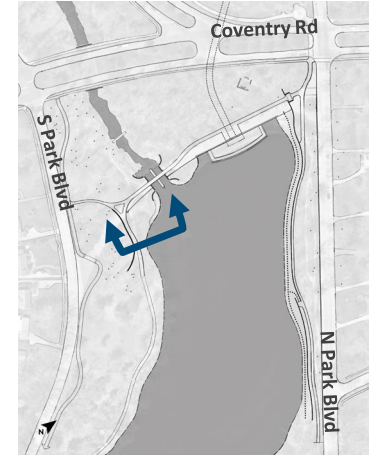
Deployed Condition
Protects from Flooding



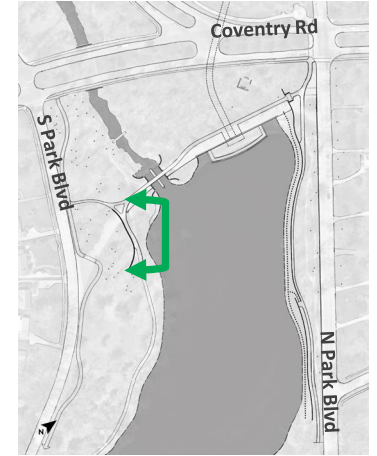
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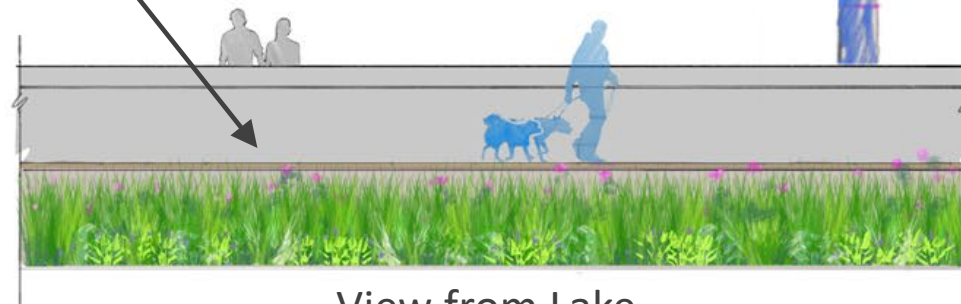
South Park Boulevard Floodwall



South Park Boulevard Floodwall



Existing Mulch Path



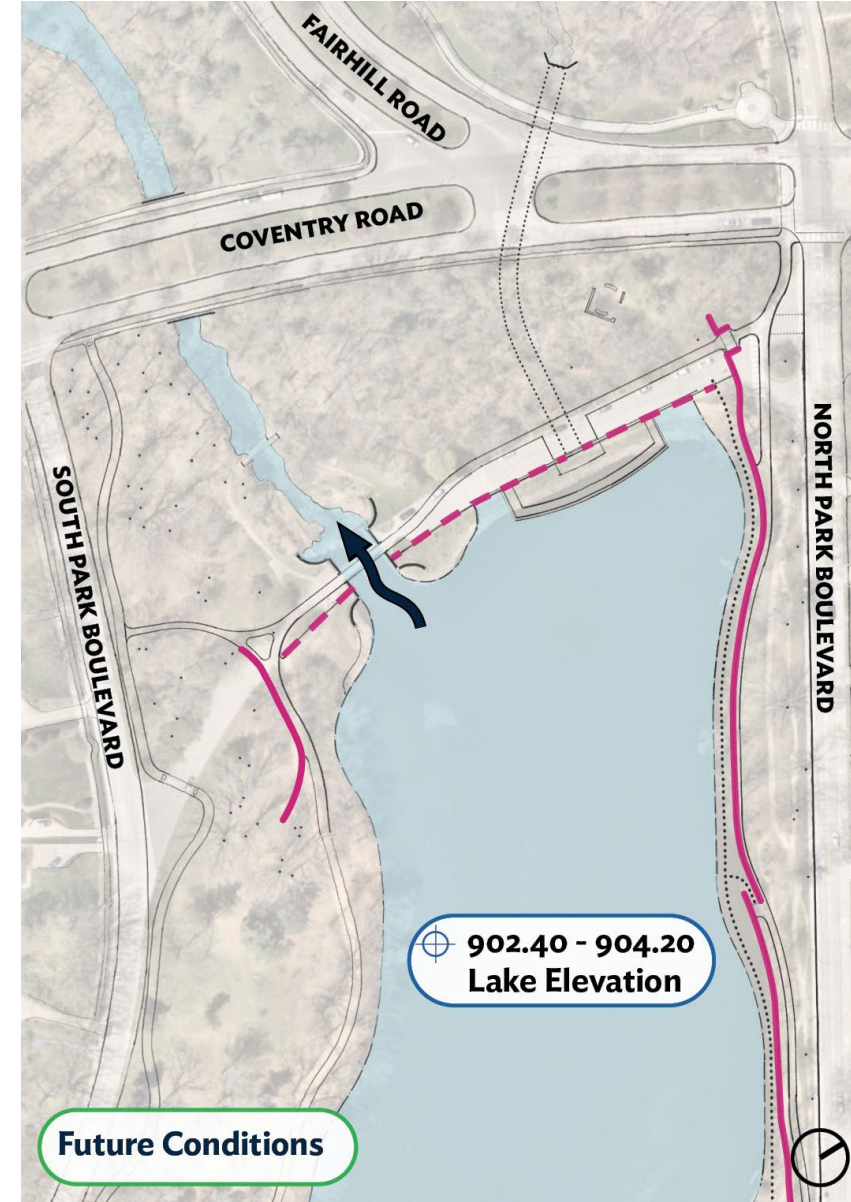
Concrete Floodwall

Non-Woody Vegetation

View from Lake

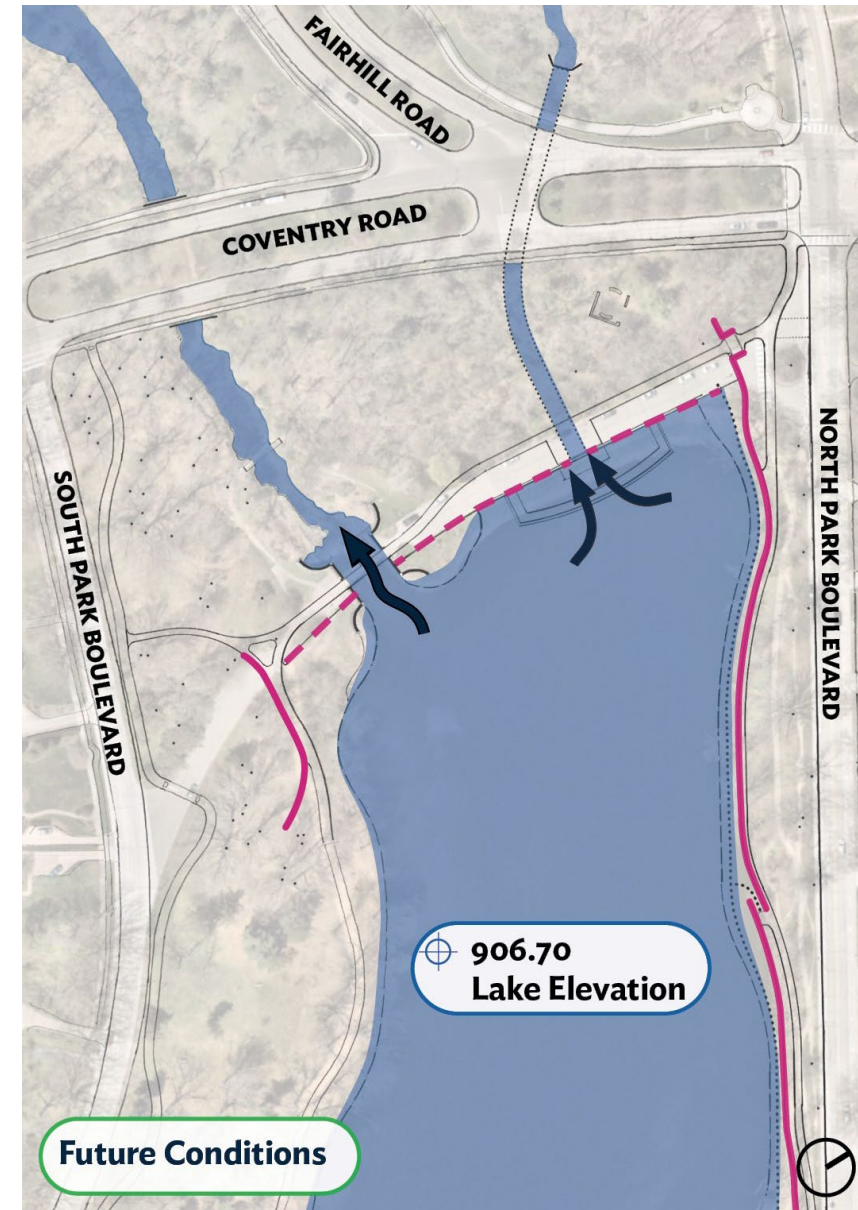
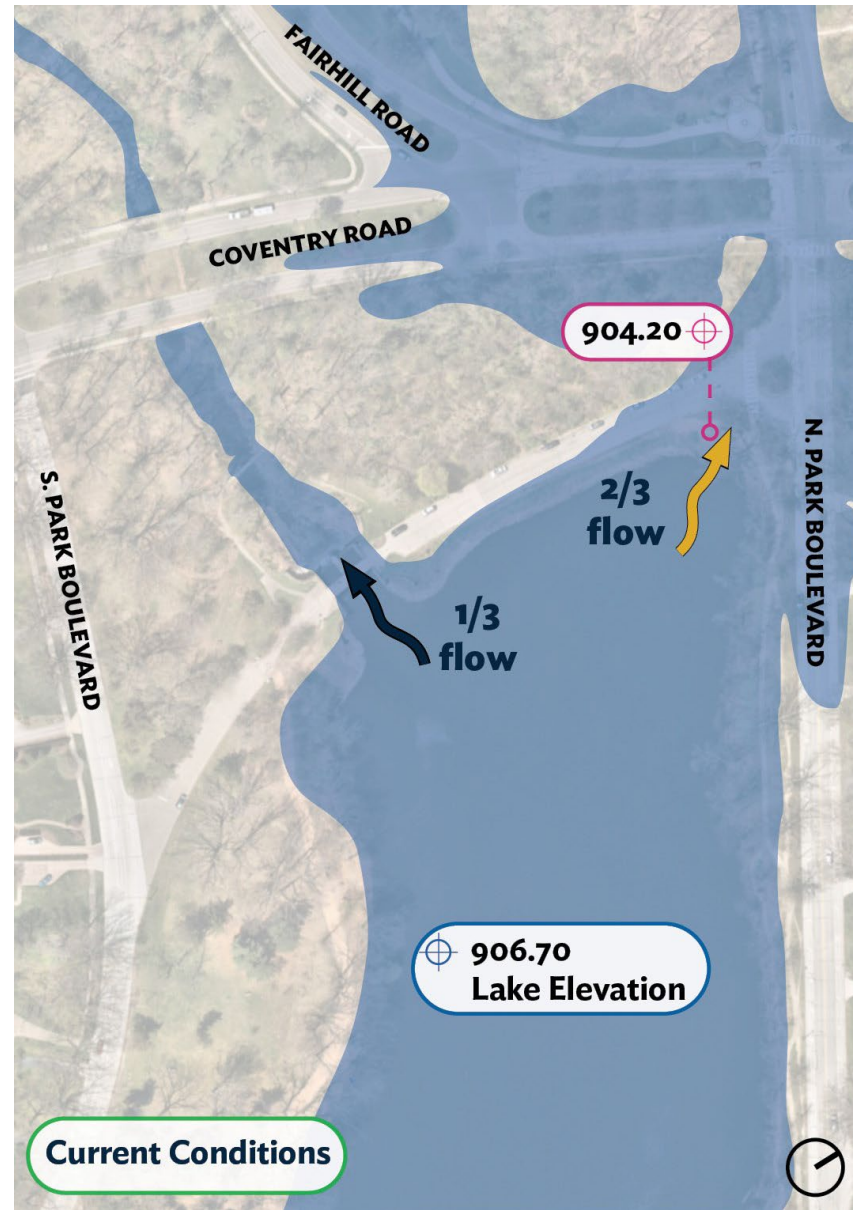
Normal Pool Level

- At normal pool level, water passes through the Principal Spillway.



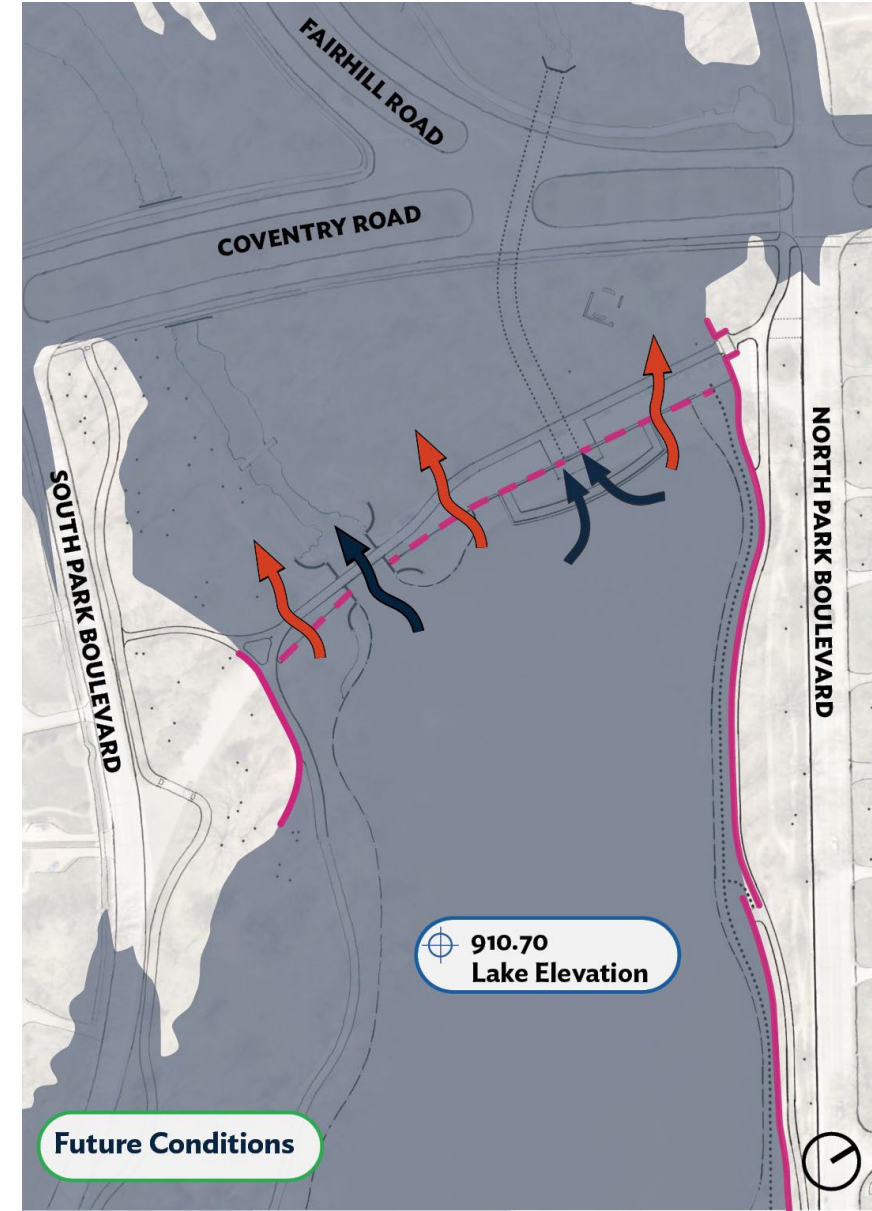
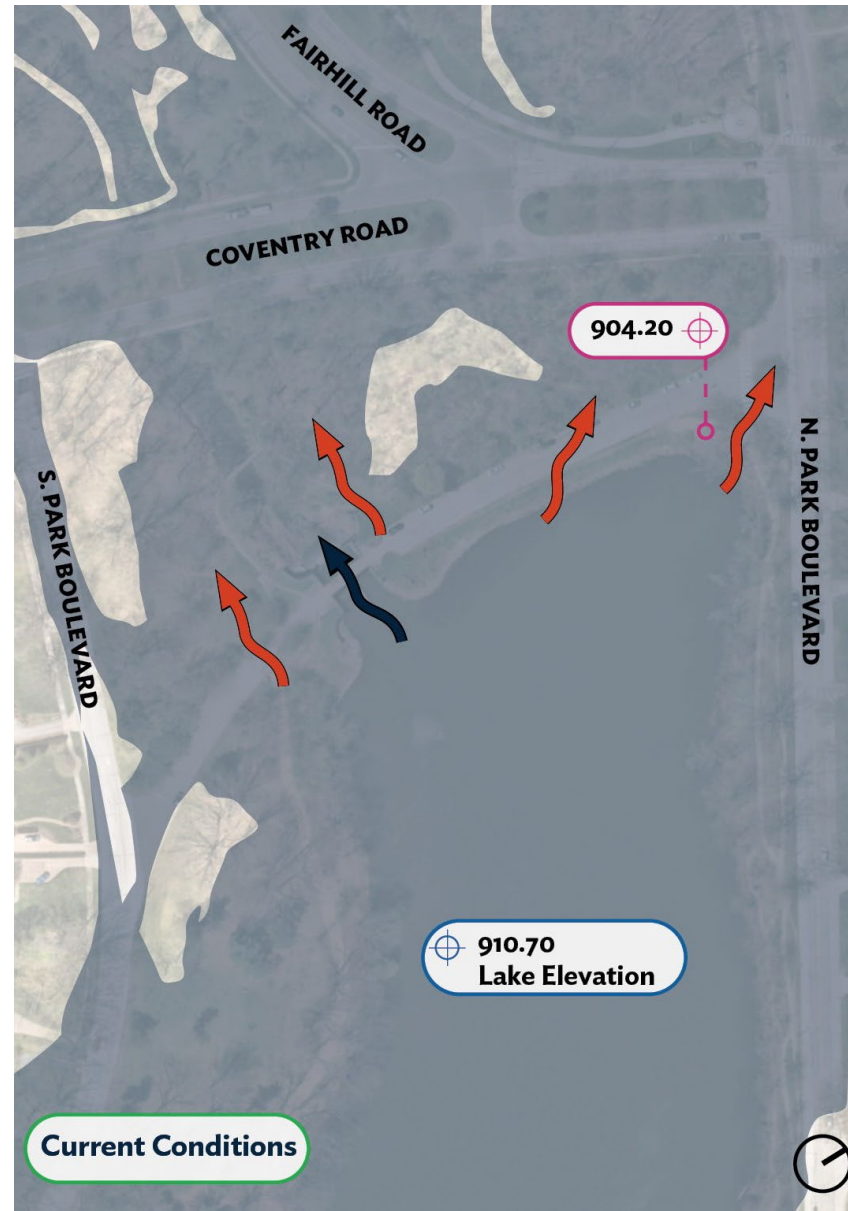
1- and 2-yr Storm Event (5" rainfall)

- Overtopping occurs frequently near the right abutment at the low point
- Floodwalls limit flooding and direct flows over the armored portions of the embankment and to the spillways



PMF Storm Event (17" to 26" rainfall)

- Extensive Overtopping of entire unarmored embankment and extensive flooding
- Floodwalls limit flooding and direct flows over the armored portions of the embankment



Next Steps

Detailed Design Development

- Begin in early 2025
- Preferred Alternative from Pre-Design advanced to Detailed Design for further refinement
- Draft Design Plans
- Public Engagement & Updates (30%, 60%, 90%, Final)
 - In-person & Virtual Meeting (Spring 2025 – 30% Design)



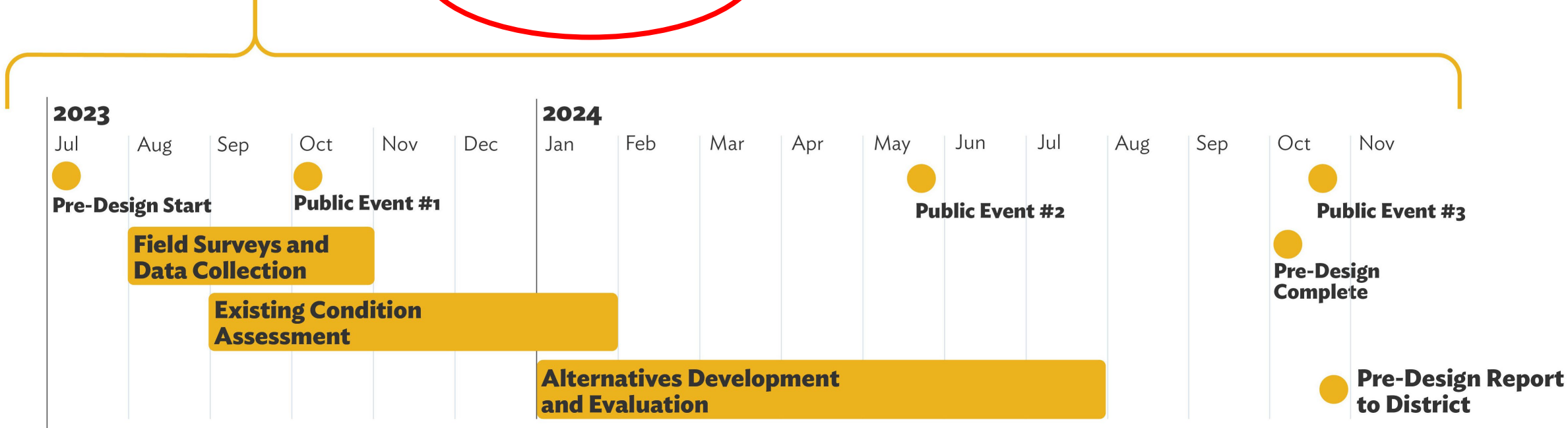
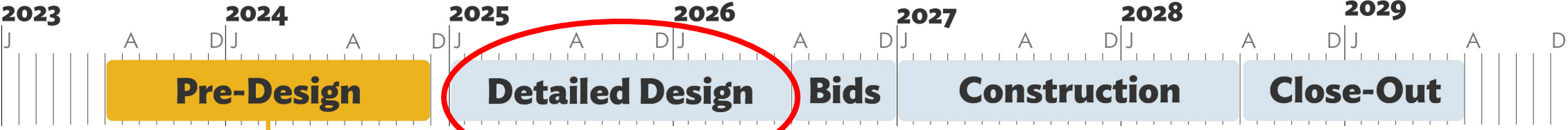
Further Development in Detailed Design

- Culvert under Coventry Road
- Streambank Stabilization
- Floodwall and Maintenance Access Details
- Floodwall Details (configuration, aesthetics)
- Auxiliary Spillway Selection

Schedule

Project Timeline

Timeline



neorsd.org/LowerLake

PROJECT UPDATES, PRESENTATION RECORDINGS, FAQ AND MORE!