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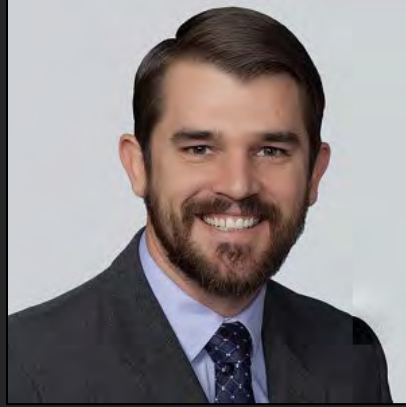
# Big Detention in the Little ROW (Right-of-Way)

*April 16, 2024*



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Education

# Introduction



**Matthew J. Moffitt, P.E., CFM**  
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Once upon a time, in a cozy residential neighborhood, there existed a narrow road called Sunny Lane.

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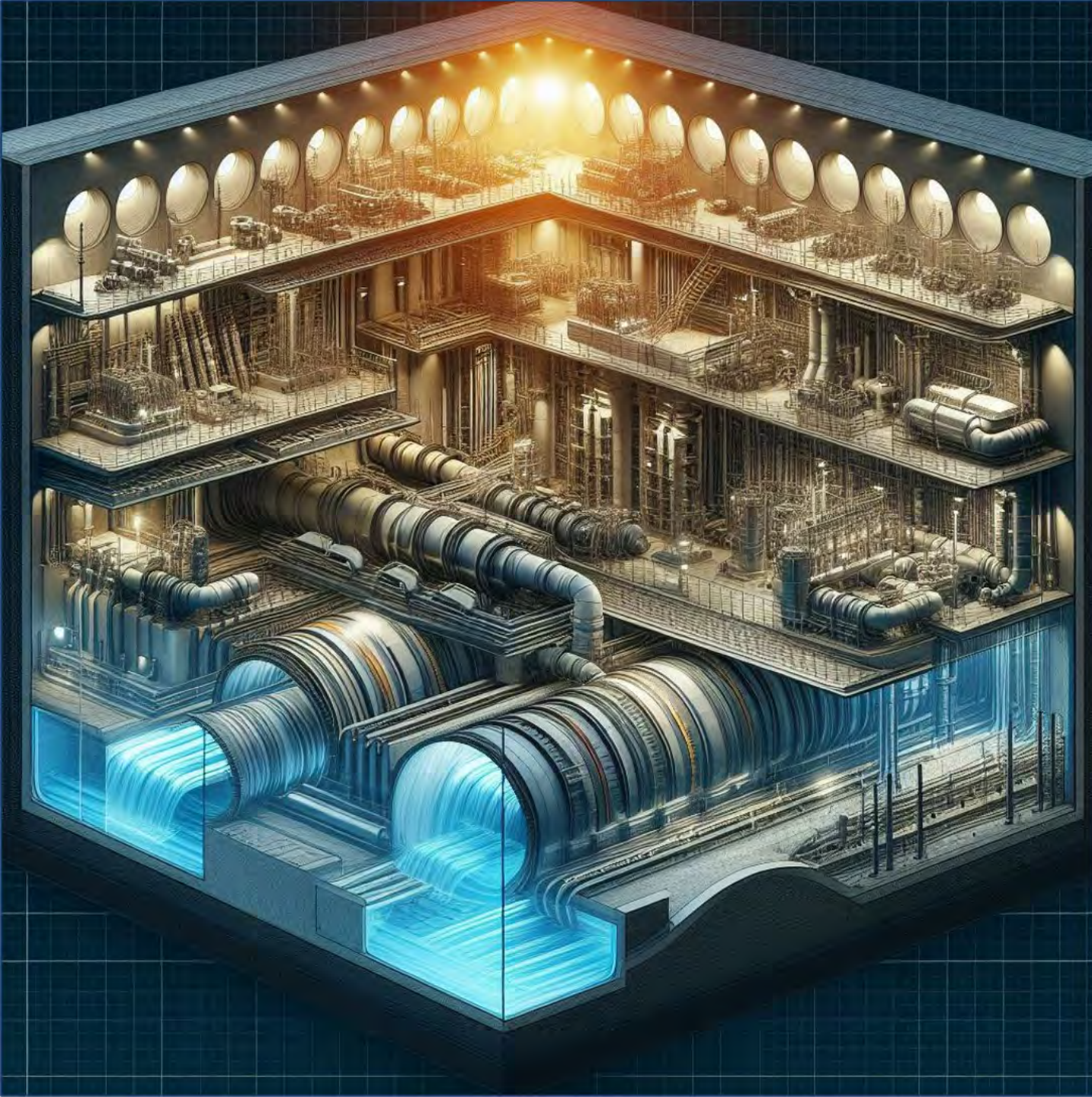
The houses on either side  
had white picket fences,  
and colorful flowers  
bloomed in every garden.

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But beneath the surface,  
a secret adventure  
awaited!

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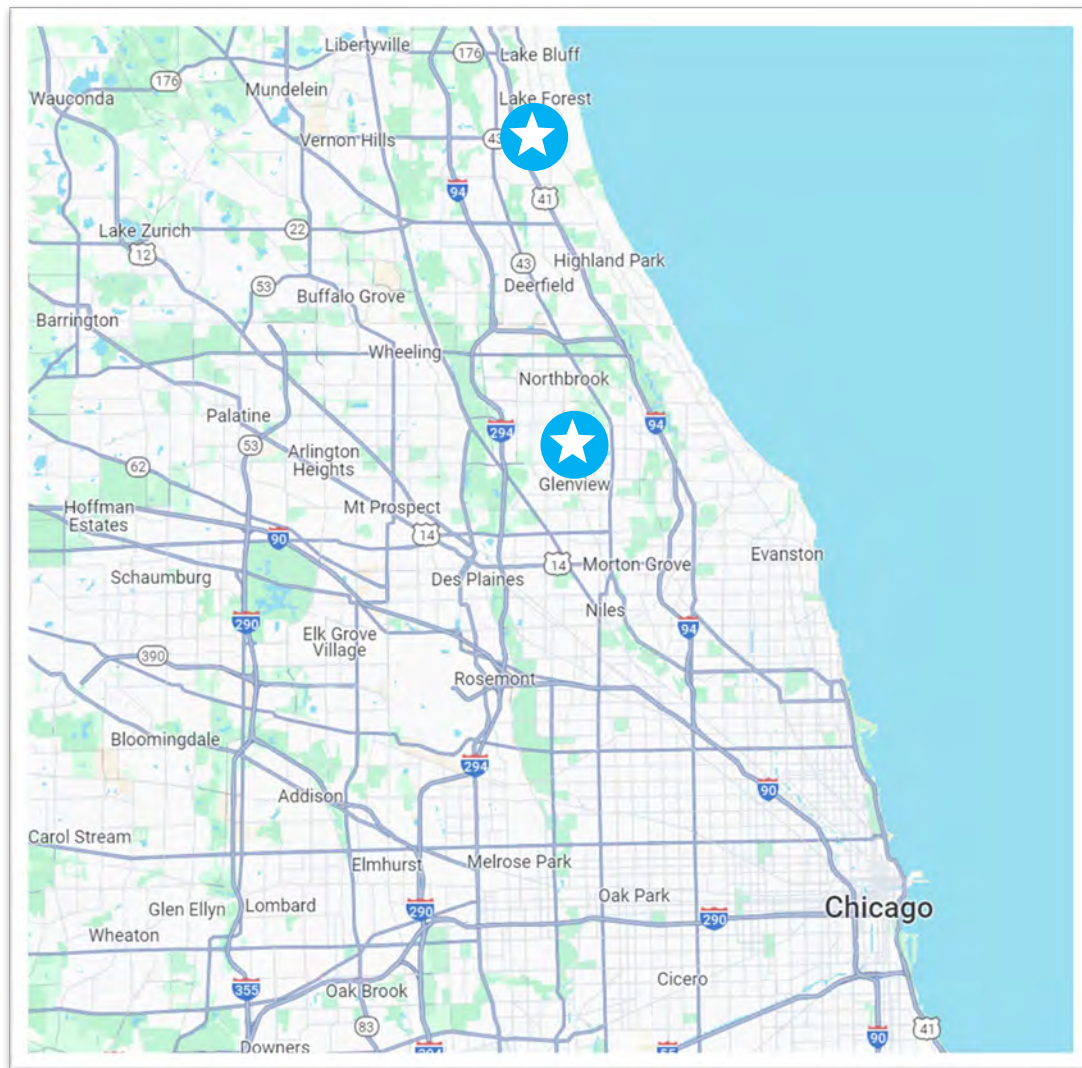
# Stormwater Superhero

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# Stormwater Systems - Installations within ROW



City of Lake Forest - Burr Oak  
Stormwater Improvements

Village of Glenview - Tall Trees  
Flood Mitigation

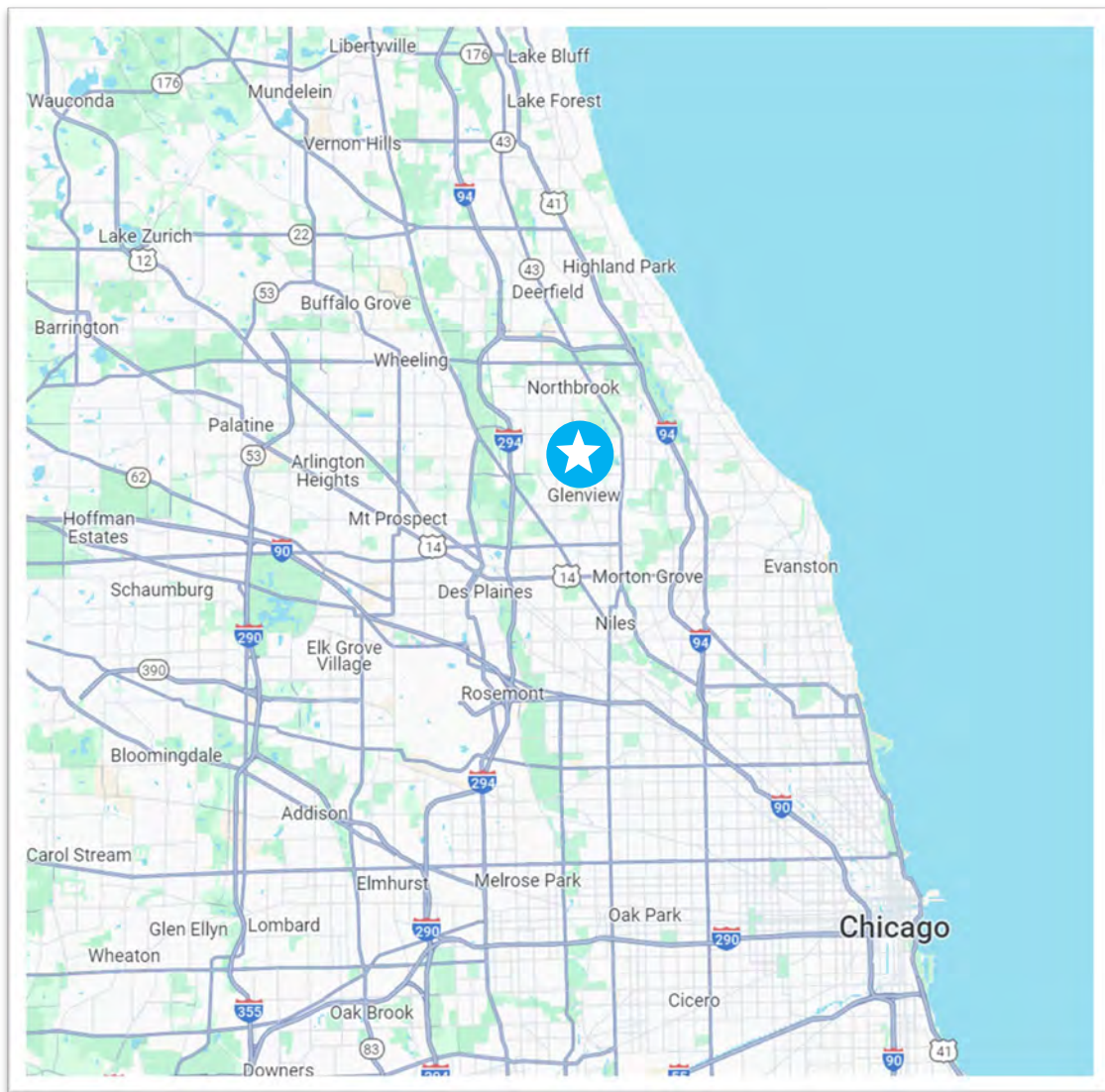
# Case Studies: Village of Glenview and City of Lake Forest

## Outline for Both Projects

- Project Overview
- Flooding Problem
- Analysis/Alternatives
- Recommended Project
- Design/Construction Challenges



# Tall Trees Flood Mitigation - Project Overview



Village of Glenview – Tall Trees  
Flood Mitigation

# Tall Trees: Project Background

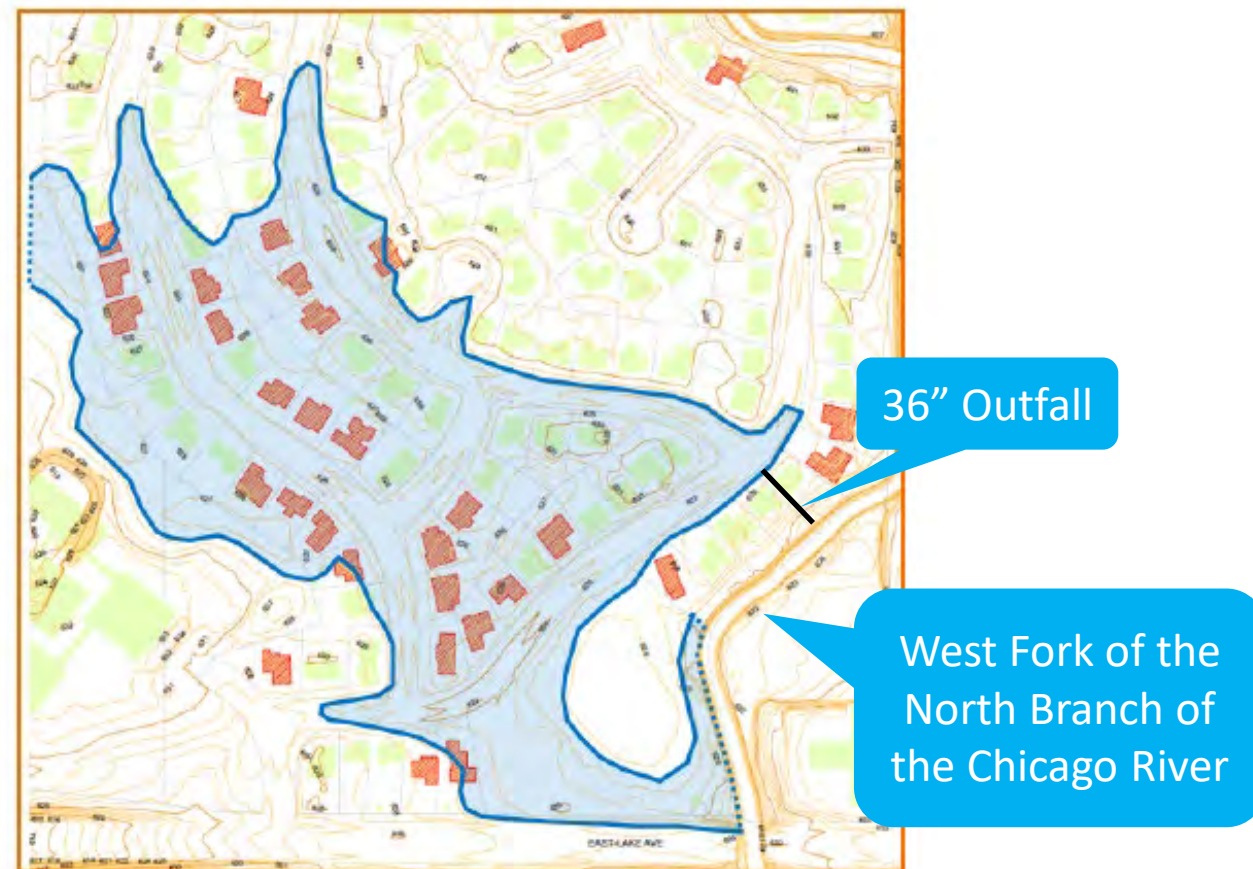
- Historic flood events
  - 1987 - 7" over 16 hours
  - 2008 - 6" over 4 hours - 9.5" total
- Regional Studies
  - MWRD (2013 - 2014)
  - Army Corps (2016 - 2020)





# Tall Trees: Neighborhood Stormwater Study

- Sources of flooding
  - Riverine flooding
  - Sewer system backflow
  - Undersized storm sewer
  
- At-risk structures
  - 30 homes (100-year)



**Figure 1 - 100-Year Floodplain Extents**

*Source: Stantec 12/2/2019 Technical Memo*

# Tall Trees: Conceptual Project

- Goal
  - Mitigate damages from localized street and river flooding
- Project components
  - Storm sewer improvements
  - 1,000 linear ft of dual 10'x5' box culverts
  - Pump station



**Figure 2 - Project Elements**

Source: Stantec 12/2/2019 Technical Memo

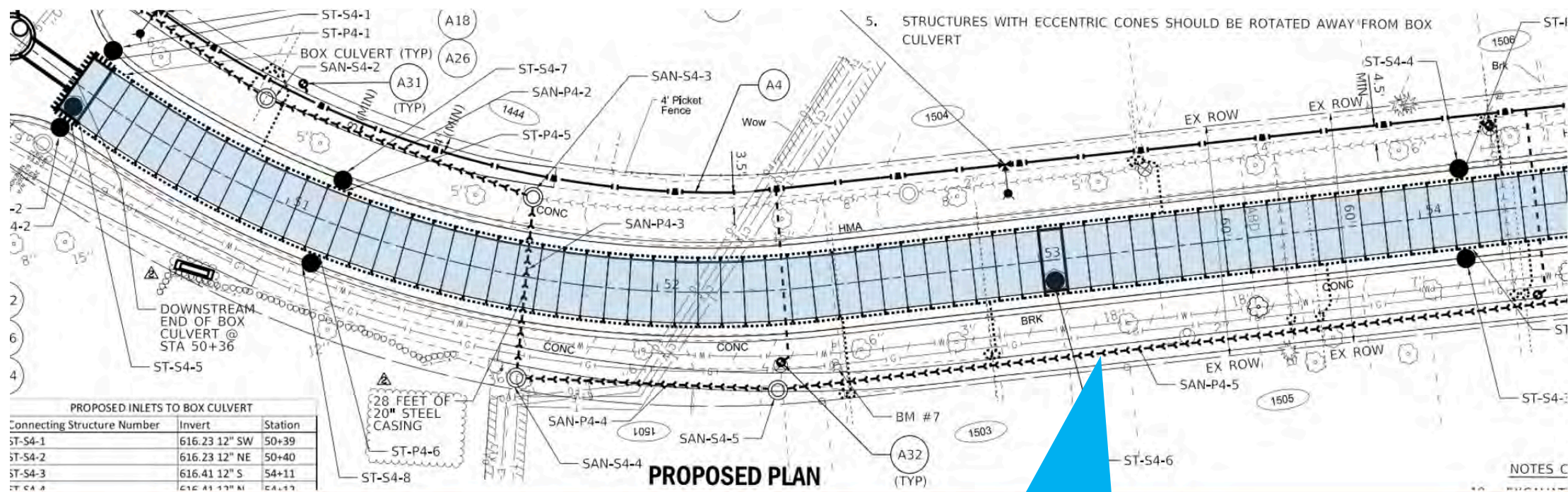


# Tall Trees: Underground Storage Design Challenges

- Total width of box culvert
- Curvature of Road
- Existing utilities
- Inlets and catch basins

# Tall Trees: Culvert Design

- Single 16'x5' box culvert
  - Reduced number of side walls
  - Extended length by 218 feet



Parallel Sanitary Sewer





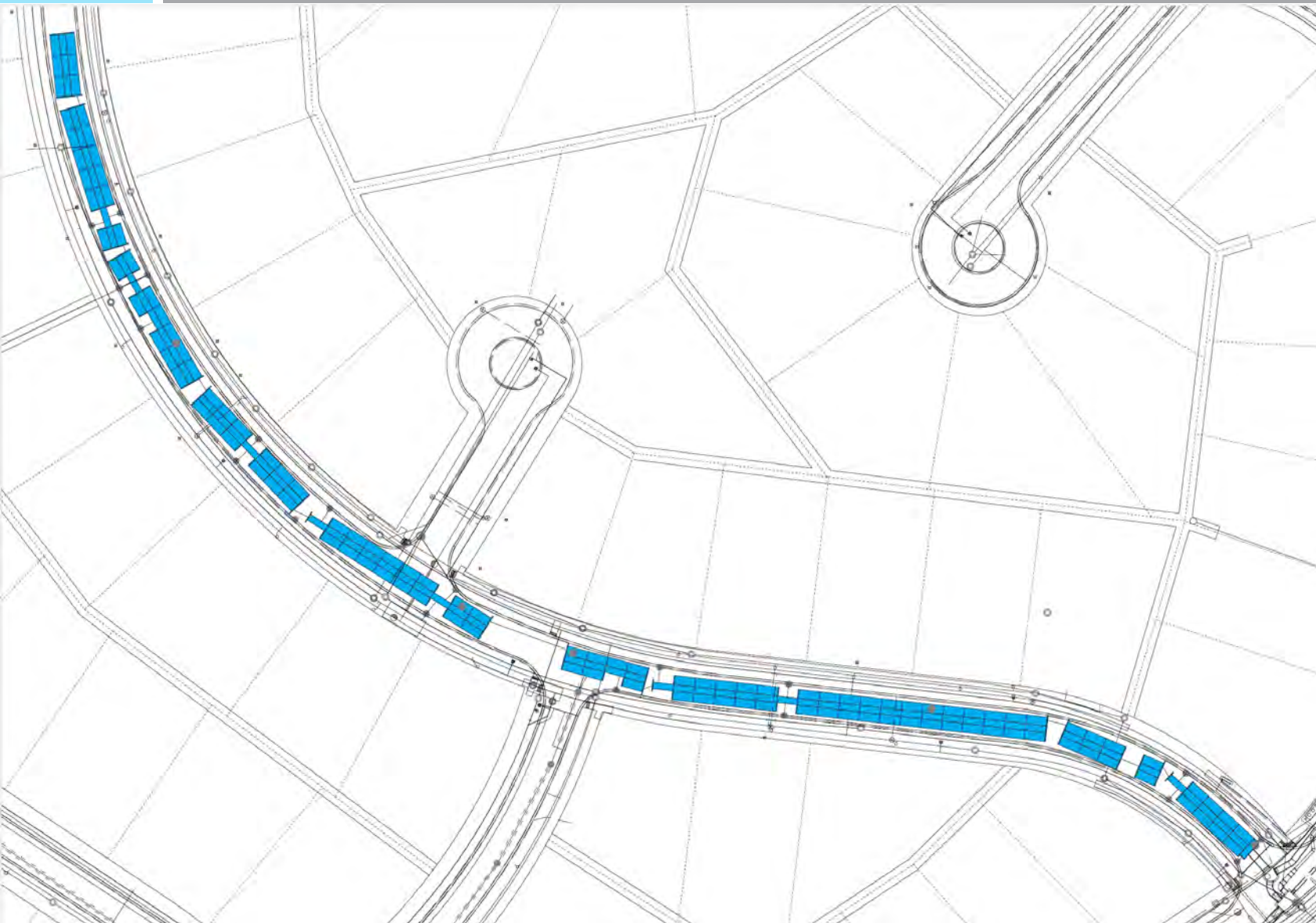
# Tall Trees: StormTrap Alternate

- StormTrap System
  - Modular, precast concrete system
  - 1'-1" to 15'-0" in heights of 1" increments
  - Smaller, lighter pieces
  - Cost savings





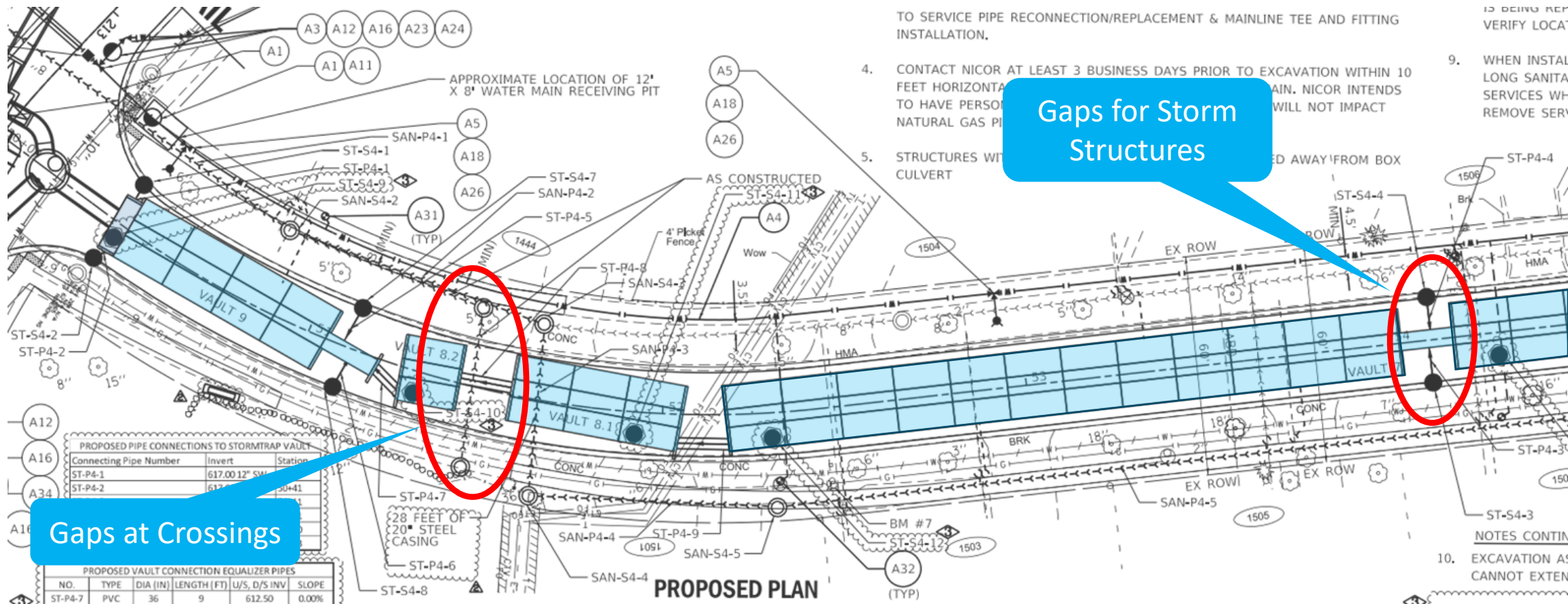
# Tall Trees: StormTrap Alternate



- StormTrap Design
  - 9 vaults
  - 18' -wide, 6' -6" tall
  - 36" equalizer pipes
- Challenges
  - Curvature of roadway
  - Space for storm structures



# Tall Trees: StormTrap Design





# Tall Trees: Construction





# Tall Trees: Construction





# Tall Trees: Construction





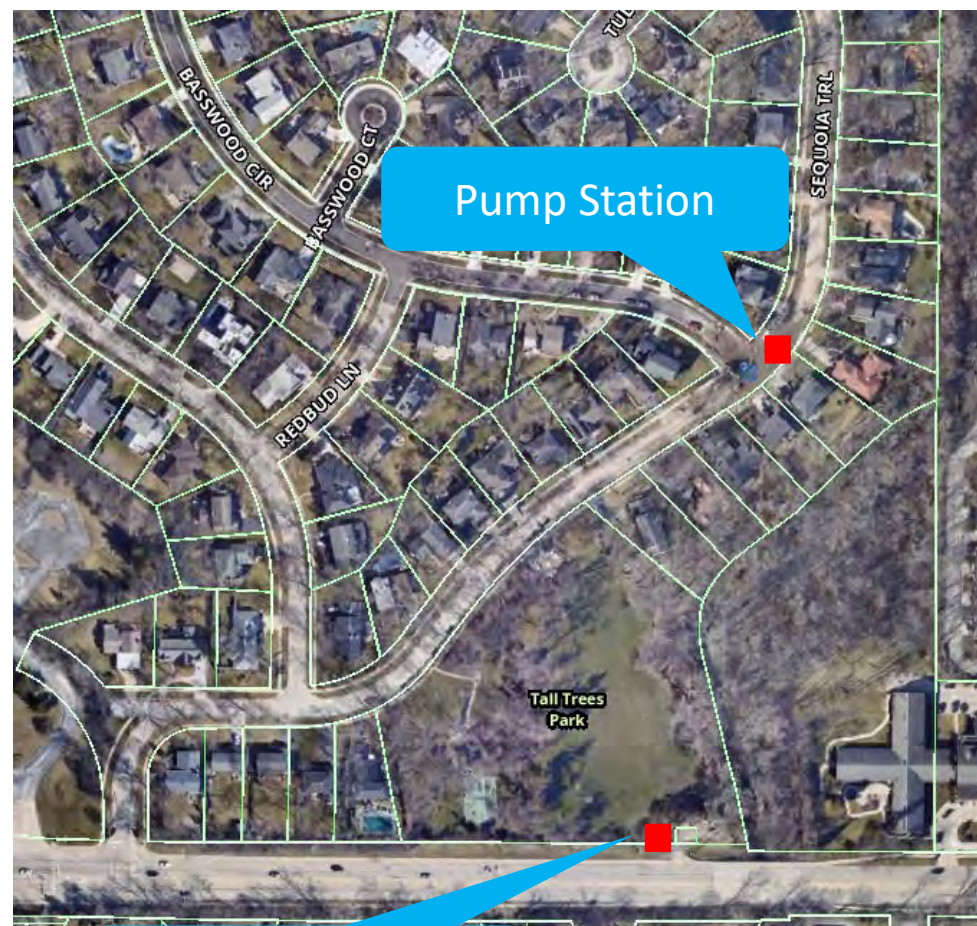
# Tall Trees: Post-Construction





# Tall Trees: Pump Station Design Challenges

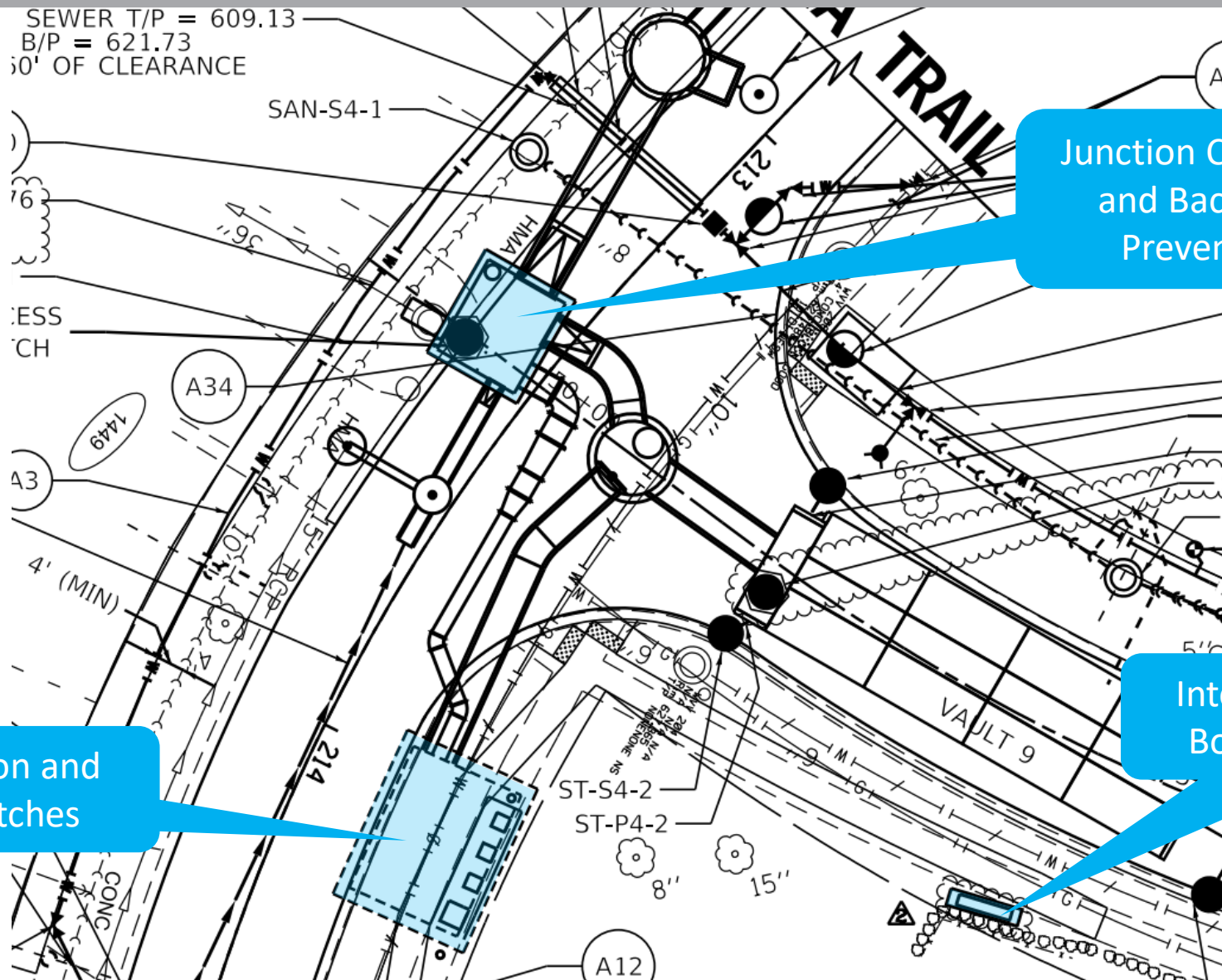
- Limited space in ROW
- Above-ground components required
  - Exhaust fan
  - Control Panel
  - Generator
- Distance to control panel and generator
  - Electrical conduit
  - Intermediate junction box



Control Panel and Generator



# Tall Trees: Pump Station



Junction Chamber and Backflow Preventers

Pump Station and Access Hatches

Intermediate Junction Box and Exhaust Fan



# Tall Trees: Pump Station



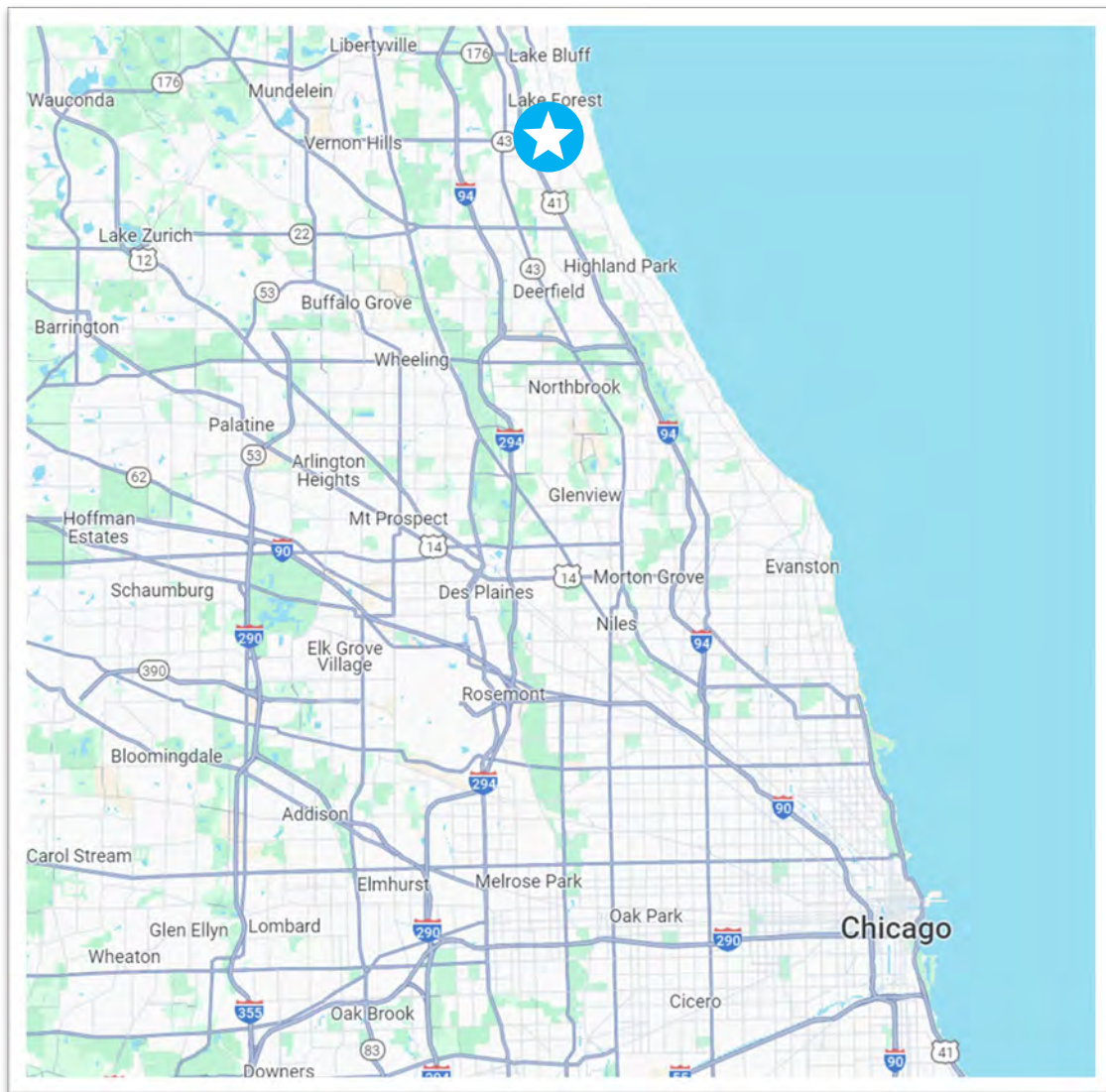


# Tall Trees: Control Panel and Generator





# Burr Oak Stormwater Improvements: Project Overview

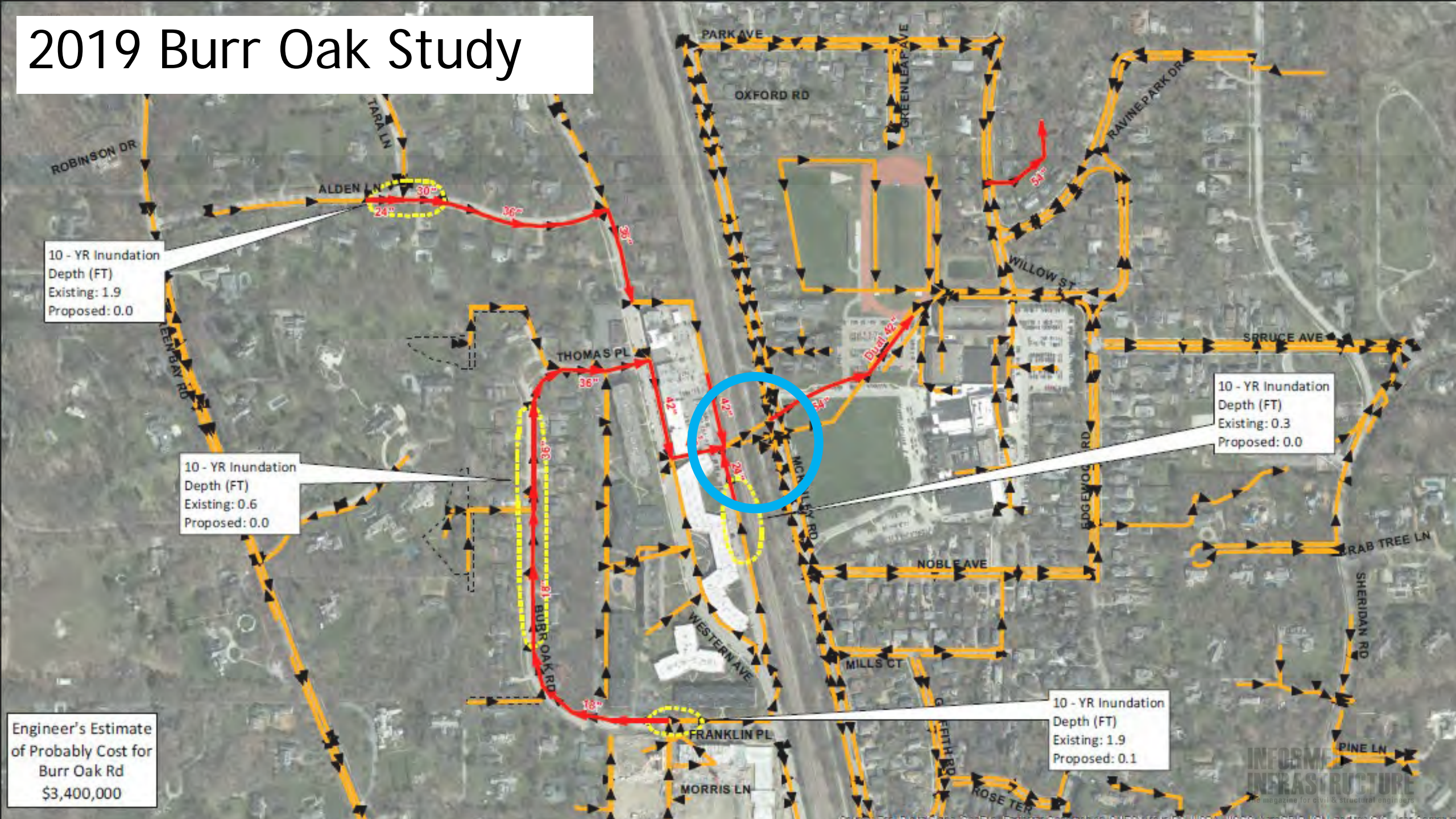


City of Lake Forest - Burr Oak Stormwater Improvements

Received \$2.75M from LCSMC DCEO



# 2019 Burr Oak Study





# Burr Oak - Pre-Project Conditions







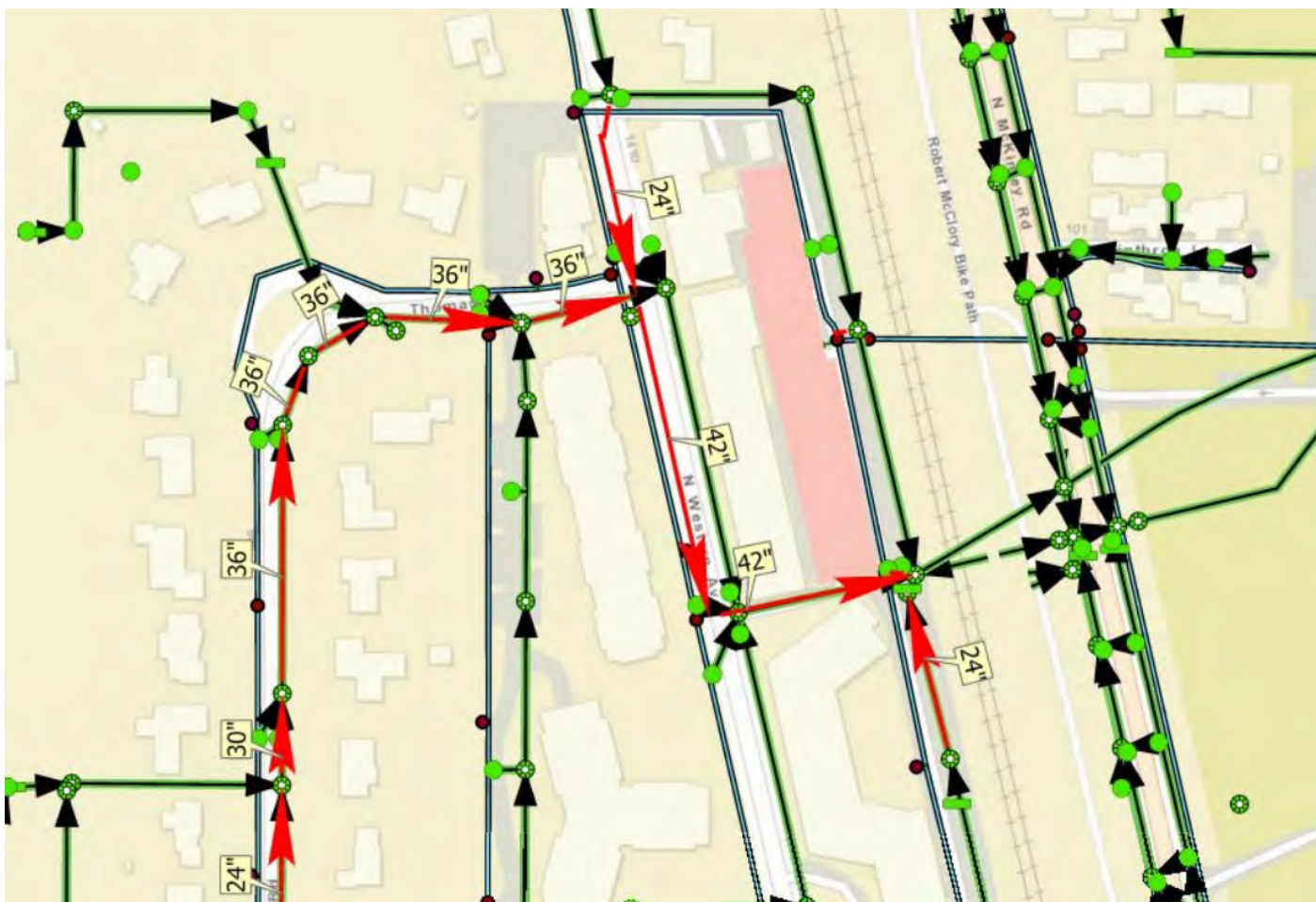
# Back to the Drawing Board (SWMM Model)



- Maintain similar benefits
- Increase capacity under RR tracks
- Eliminate upsized outfall to ravine
- Consider Detention



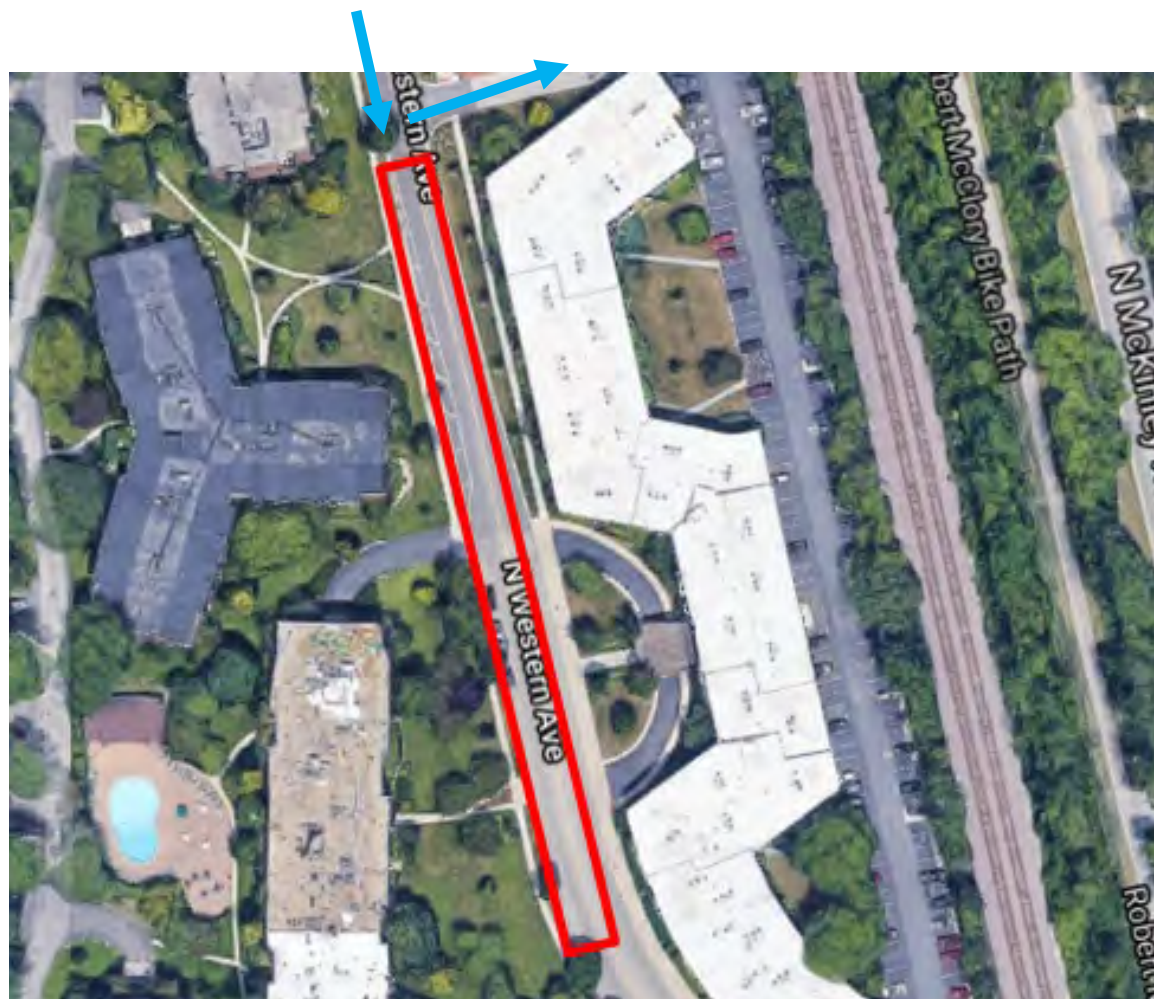
# Plan B: Upstream Detention



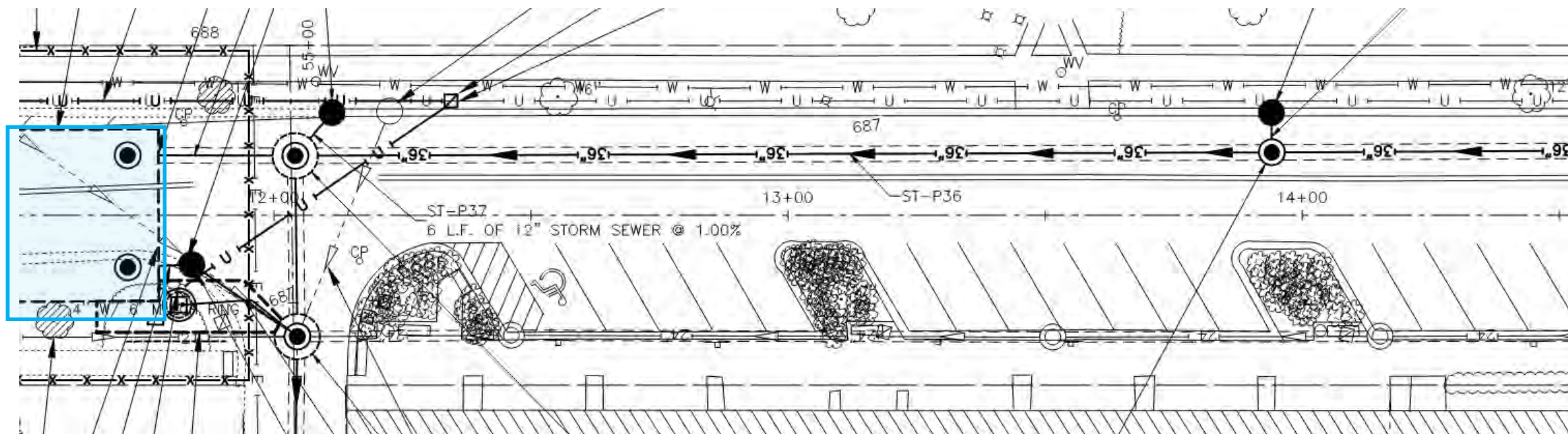
- Do NOT cross the tracks
- Solve problem upstream
- Underground Detention



# Proposed StormTrap Location



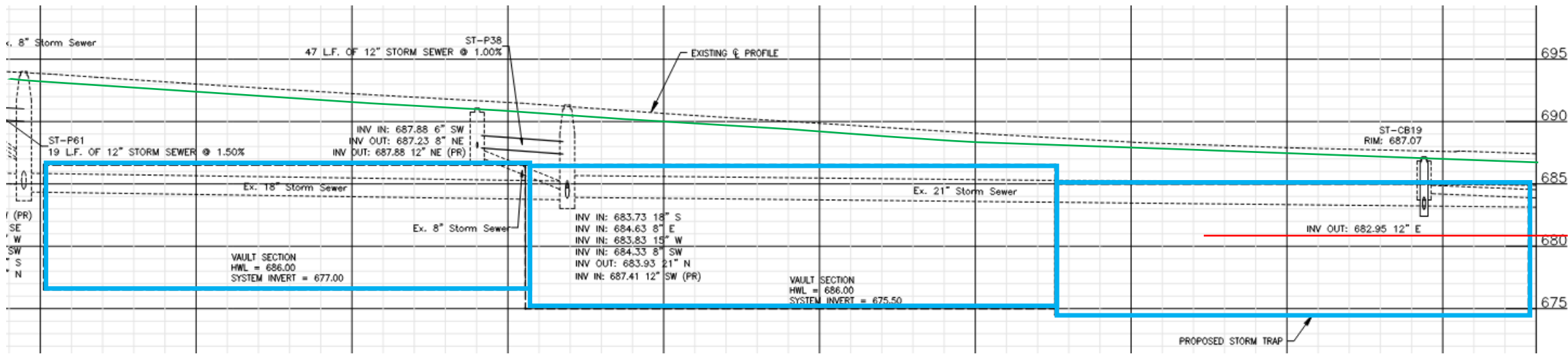
# Western Avenue Challenges and Opportunities



- New Streetscape on Northern Section (right)
- Need Streetscape over Vault
- No Sanitary Sewers
- Water Main far west (up)



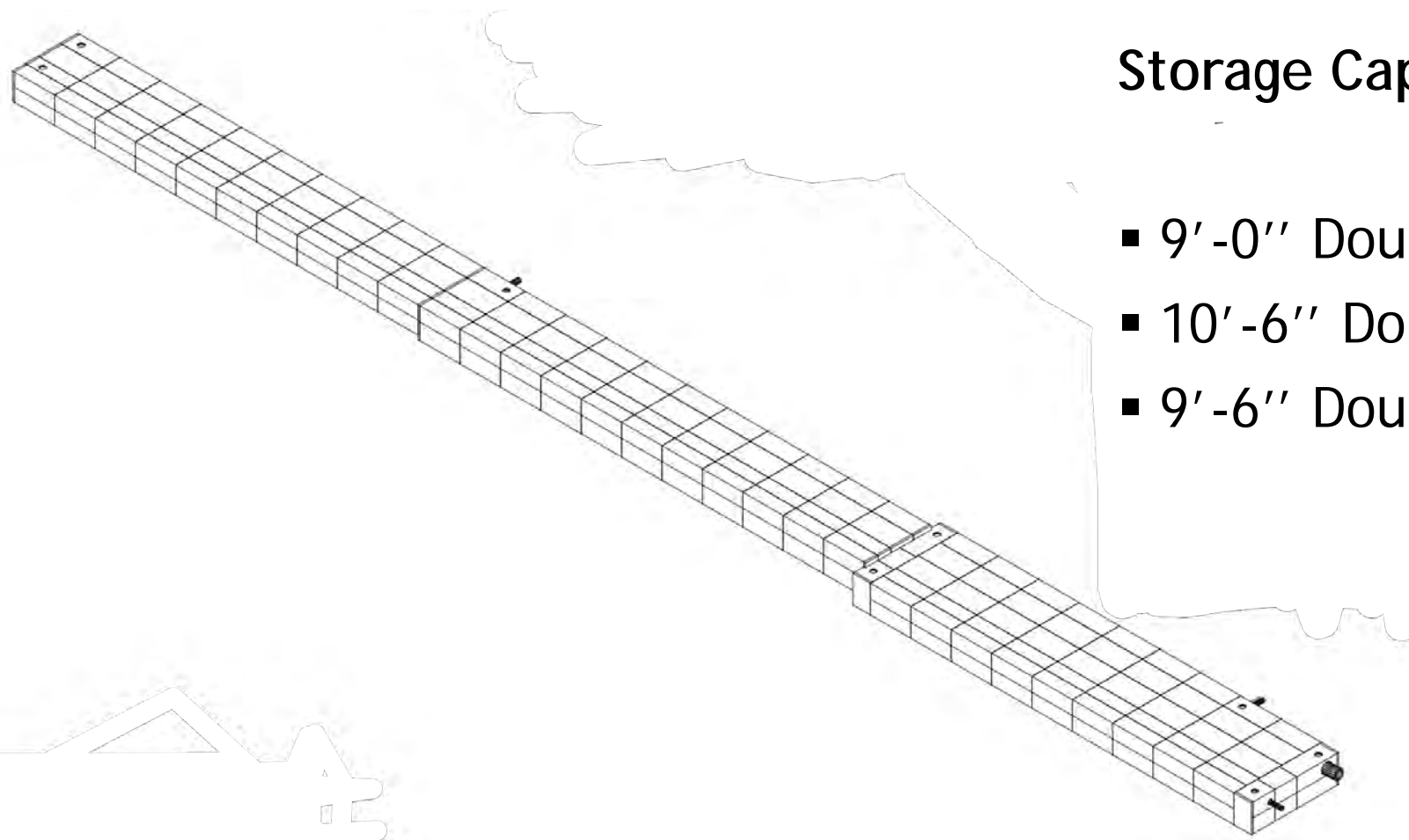
# Western Avenue Challenges and Opportunities



- Segmented, variable height, vault
- Significant overburden
- Vault invert deeper than outfall
- Inlet filtration



# Burr Oak: StormTrap Design



Storage Capacity: 2.61 ac ft

- 9'-0" DoubleTrap - 80 pieces
- 10'-6" DoubleTrap - 88 pieces
- 9'-6" DoubleTrap - 102 pieces



# ROW Construction Operations





# ROW Construction Operations





# ROW Construction Operations





# Burr Oak Area Storm Sewer Improvement







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# Questions and Answers with:



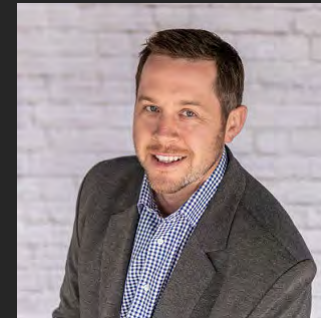
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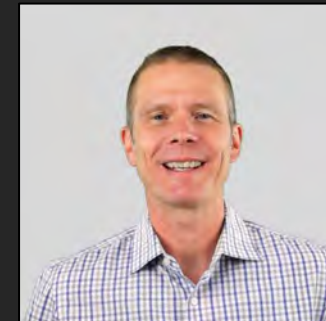
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