
*Excellence in Engineering Since 1946*

Strand Associates, Inc.®

# Leveraging Clean Water Act Compliance to Maximize Community Benefits

**John T. Lyons, P.E. – Strand Associates, Inc.**

john.lyons@strand.com

www.strand.com
(p) 513.861.5600

Kentucky Stormwater Association – 2018 Conference
June 28, 2018

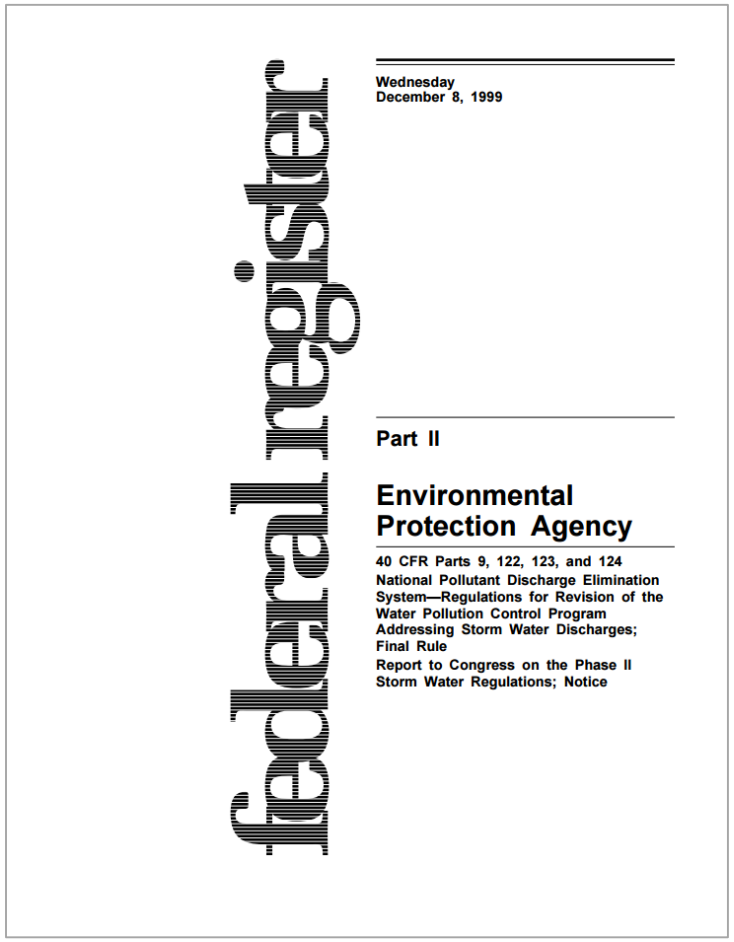
STRAND ASSOCIATES®

# 2018 Kentucky MS4 Permit

"Major outfall" means a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than a circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive stormwater from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage of 2 acres or more).

STRAND ASSOCIATES®

# MS4 Phase II Federal Rulemaking – 1999


federal register

Wednesday
December 8, 1999

Part II

Environmental Protection Agency

40 CFR Parts 9, 122, 123, and 124
National Pollutant Discharge Elimination System—Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule
Report to Congress on the Phase II Storm Water Regulations; Notice

*…requires all regulated small MS4s to develop and implement a storm water management program.*

1. Public education and outreach
2. Public involvement
3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction storm water management in new development and redevelopment
6. Pollution prevention and good housekeeping of municipal operations

STRAND ASSOCIATES®

# What are we trying to achieve?

Today's rule outlines six minimum control measures that constitute the framework for a storm water discharge control program for regulated small MS4s that, when properly implemented, will reduce pollutants to the maximum extent practicable (MEP)


STRAND ASSOCIATES®

# What are we trying to achieve?

…EPA presumes that a small MS4 program that implements the six minimum measures… **does not require more stringent limitations** to meet WQS.

EPA envisions that a BMP-based storm water management program that implements the six minimum measures will be **the extent of the NPDES permit requirements** for the large majority of regulated small MS4s

*Phase II Federal Rulemaking – 1999*

STRAND ASSOCIATES®

# 2018 Kentucky MS4 Permit

To implement an approved TMDL established for a pollutant of concern in the permittee's stormwater discharges, the permittee shall identify the impaired stream segment(s) and/or tributaries to those impaired stream segments and the location of all known MS4 major outfalls discharging a pollutant of concern under the TMDL to those segments or occurring within those segments.

STRAND ASSOCIATES®

# 2018 Kentucky MS4 Permit

The permittee shall evaluate the discharge load associated with the identified MS4 major outfalls for the pollutant, including monitoring, reporting and/or otherwise, at issue. Prior to any reopening of this permit under Part III.C., the permittee shall consider and propose, to the maximum extent practicable, applicable and appropriate best management practices guided by the wasteload goal of the TMDL, and a schedule of implementation for those Best Management Practices. Applicable limitations, conditions and requirements contained in the TMDL are also to be addressed in the SWQMP.

STRAND ASSOCIATES®

# Kentucky Statewide Total Maximum Daily Load

*for* ***Bacteria*** *Impaired Waters*

Proposed Draft
March 2018

Submitted to:
United States Environmental Protection Agency
Region IV
Atlanta Federal Building
61 Forsyth Street SW
Atlanta, GA 30303-1534

Prepared by:
Kentucky Department for Environmental Protection
Division of Water
300 Sower Blvd.
Frankfort, KY 40601

Kentucky

STRAND ASSOCIATES®

# Draft Statewide Bacteria TMDL

**Table S.3 Segment TMDL Allocations[1]**

| TMDL[2] | Allocations for Direct Loads to the Segment | | | |
|---|---|---|---|---|
| | SWS-WLA[3] | MS4-WLA[4] | CSO-WLA[5] | LA[6] |
| $Q_S \times WQC \times CF$ | $\sum(Q_{SWS} \times WQC \times CF)$ | $\sum(Q_{MS4} \times WQC \times CF)$ | $\sum(Q_{CSO} \times WQC \times CF)$ | $\sum(Q_{LA} \times WQC \times CF)$ |

4) QMS4 is the flow (ft3/s) in the segment due to a MS4 entity. The MS4-WLA is not an end-of-pipe limit; the MS4-WLA is an in-stream allocation.

This means that the MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP) to the Maximum Extent Practicable (MEP).

STRAND ASSOCIATES®

# How much will the Phase II Program Cost?

The total average per household cost of the rule is expected to be $9.16 per household annually.

*Phase II Federal Rulemaking – 1999*


*AP Photo*

STRAND ASSOCIATES®

# We Often Look at Regulatory Requirements as a Check in the Box

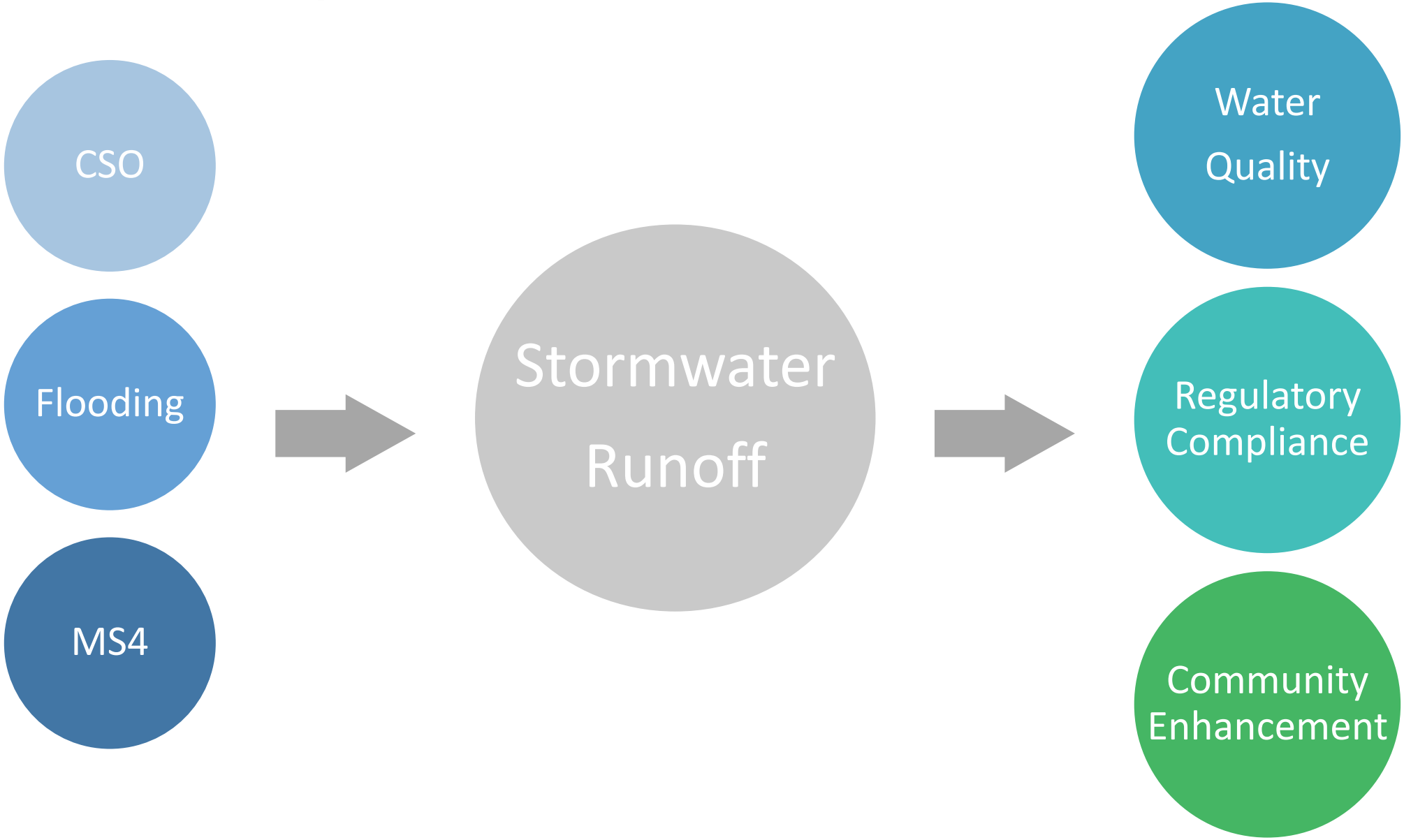
| MS4 Permit Requirements | |
|---|---|
| Public Education & Outreach | ✓ |
| Public Participation/Involvement | ✓ |
| Illicit Discharge Detection and Elimination | ✓ |
| Construction Site Runoff Control | ✓ |
| Post-Construction Runoff Control | ✓ |
| Pollution Prevention/Good Housekeeping | ✓ |

STRAND ASSOCIATES®

# We may be missing opportunities…


STRAND ASSOCIATES®

# Revised Perspective Can Maximizes Benefits




STRAND ASSOCIATES®

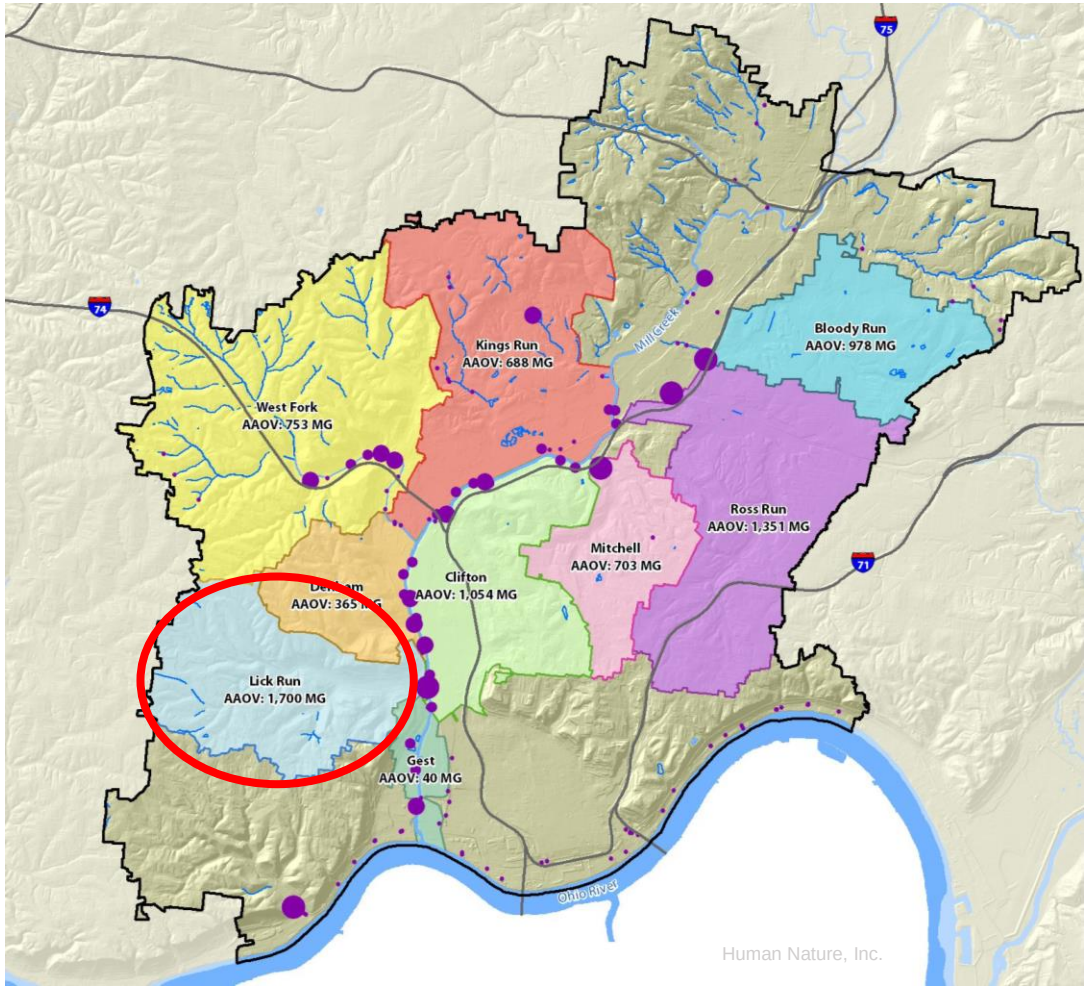
# Case Studies & Example Projects

- Lick Run Watershed – Metropolitan Sewer District of Greater Cincinnati
- Stormwater Master Plan – Village of Winnetka, IL
- Various Small Scale Examples

STRAND ASSOCIATES®

# Lick Run Watershed

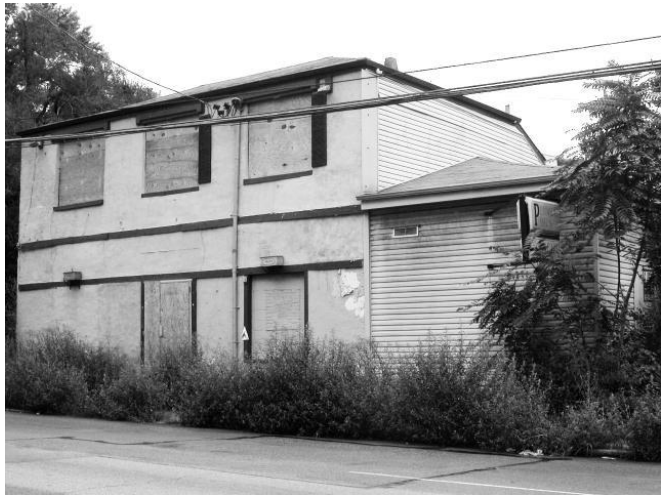

CSO #5, in the Lick Run Watershed, is MSDGC's largest CSO within the system.




STRAND ASSOCIATES®

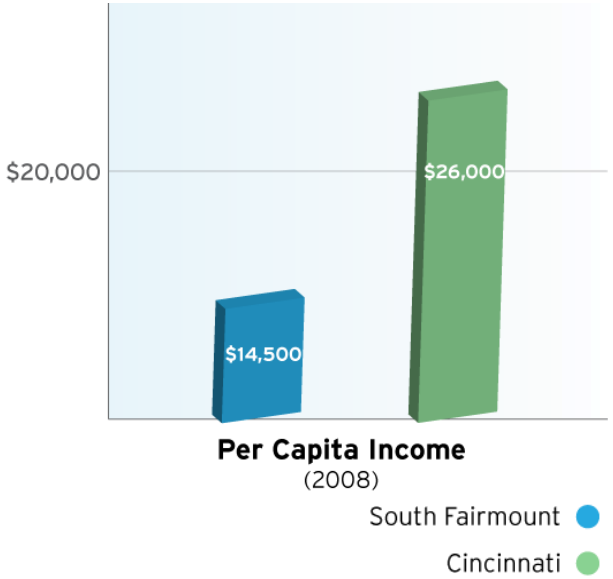
# Lick Run Watershed

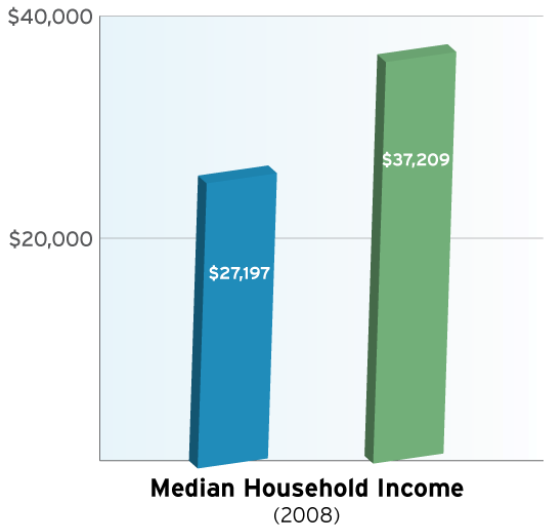
- MSD's largest CSO by volume
- Forested hillsides
- Urban core
- High vacancy/foreclosure
- High crime
- Declining population
- High unemployment
- 35%+/- impervious
- Busy transportation corridor

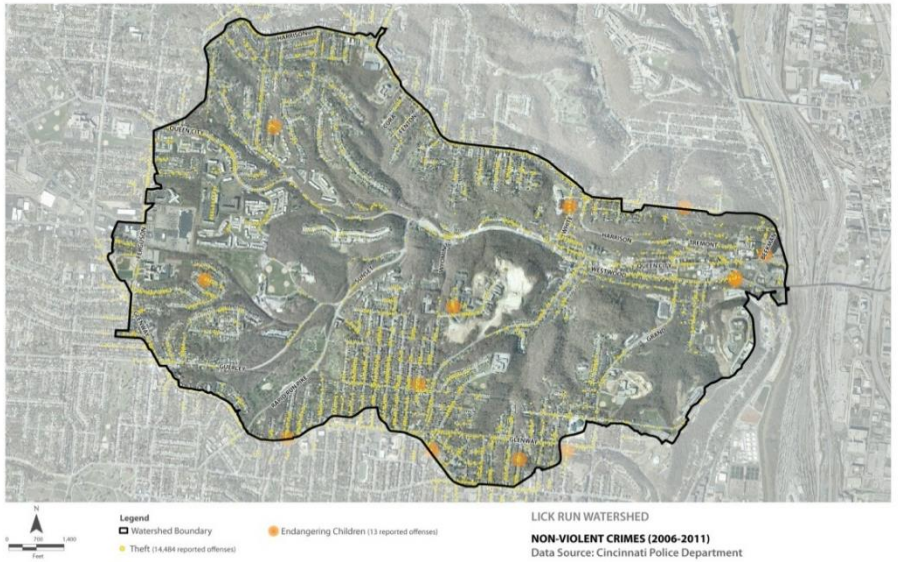


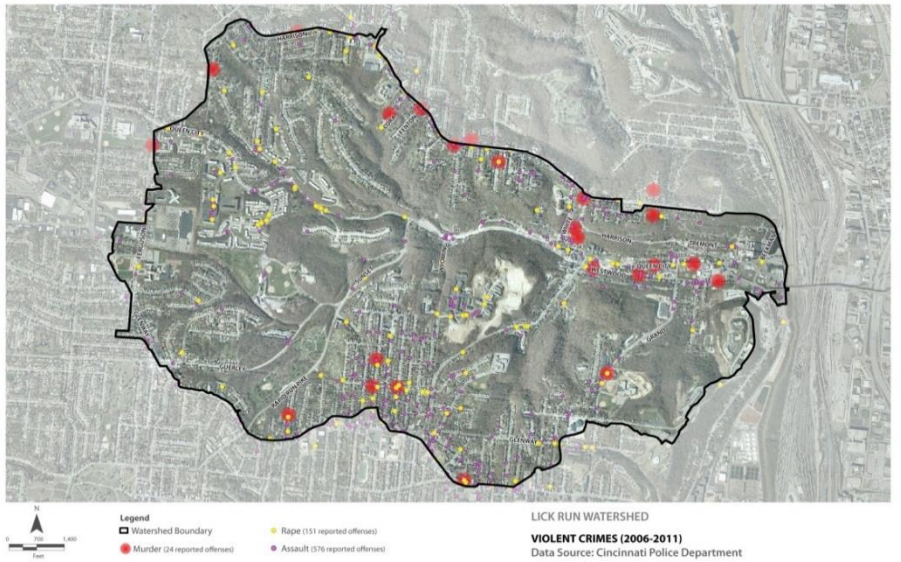
STRAND ASSOCIATES®

# Lick Run Watershed




STRAND ASSOCIATES®

# Lick Run Watershed – Community Challenges




STRAND ASSOCIATES®

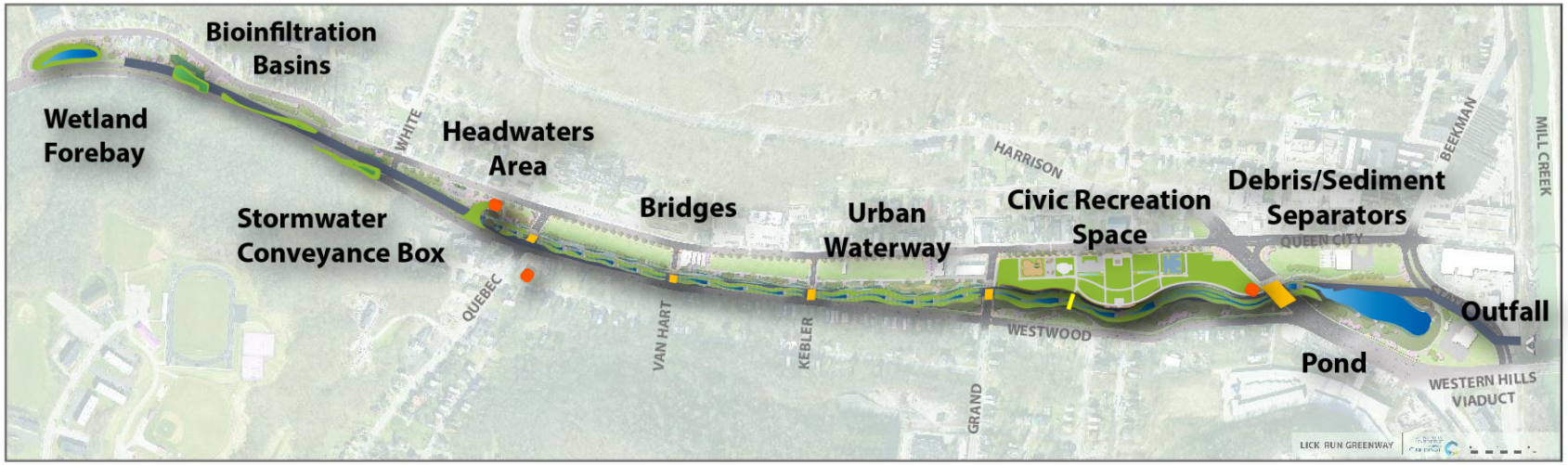
# Lick Run Watershed

STRAND ASSOCIATES®

# VCS Concept

**Multi-objective solution to maximize public dollars based on comprehensive planning**

- Key component of CSO Reduction to Mill Creek
- Provide flood control
- Improve water quality with a treatment train approach
- Maximize tangible benefits to the community
- Provide a catalyst for community revitalization



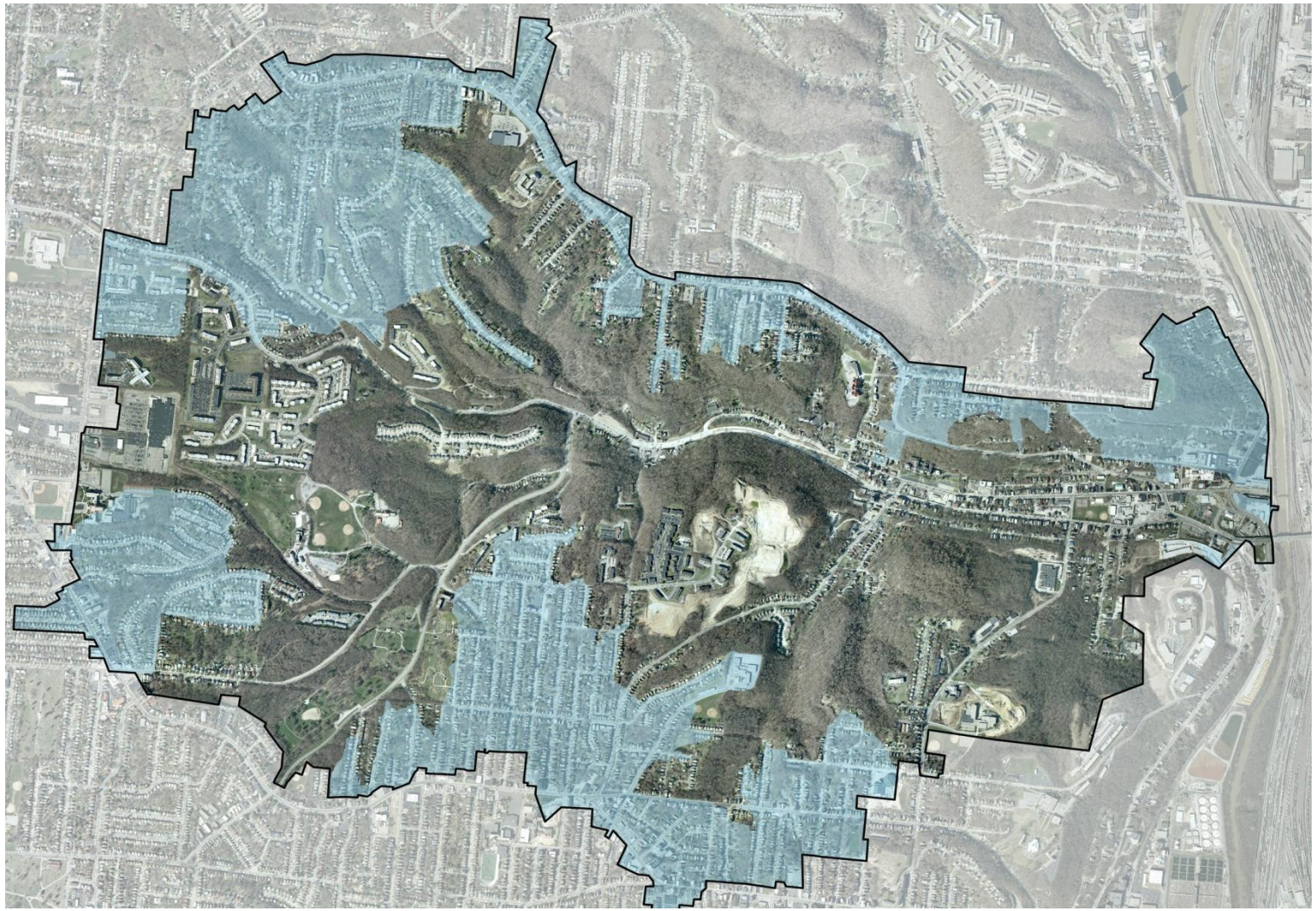

*Rendering courtesy of Human Nature*

STRAND ASSOCIATES®

# Lick Run Watershed

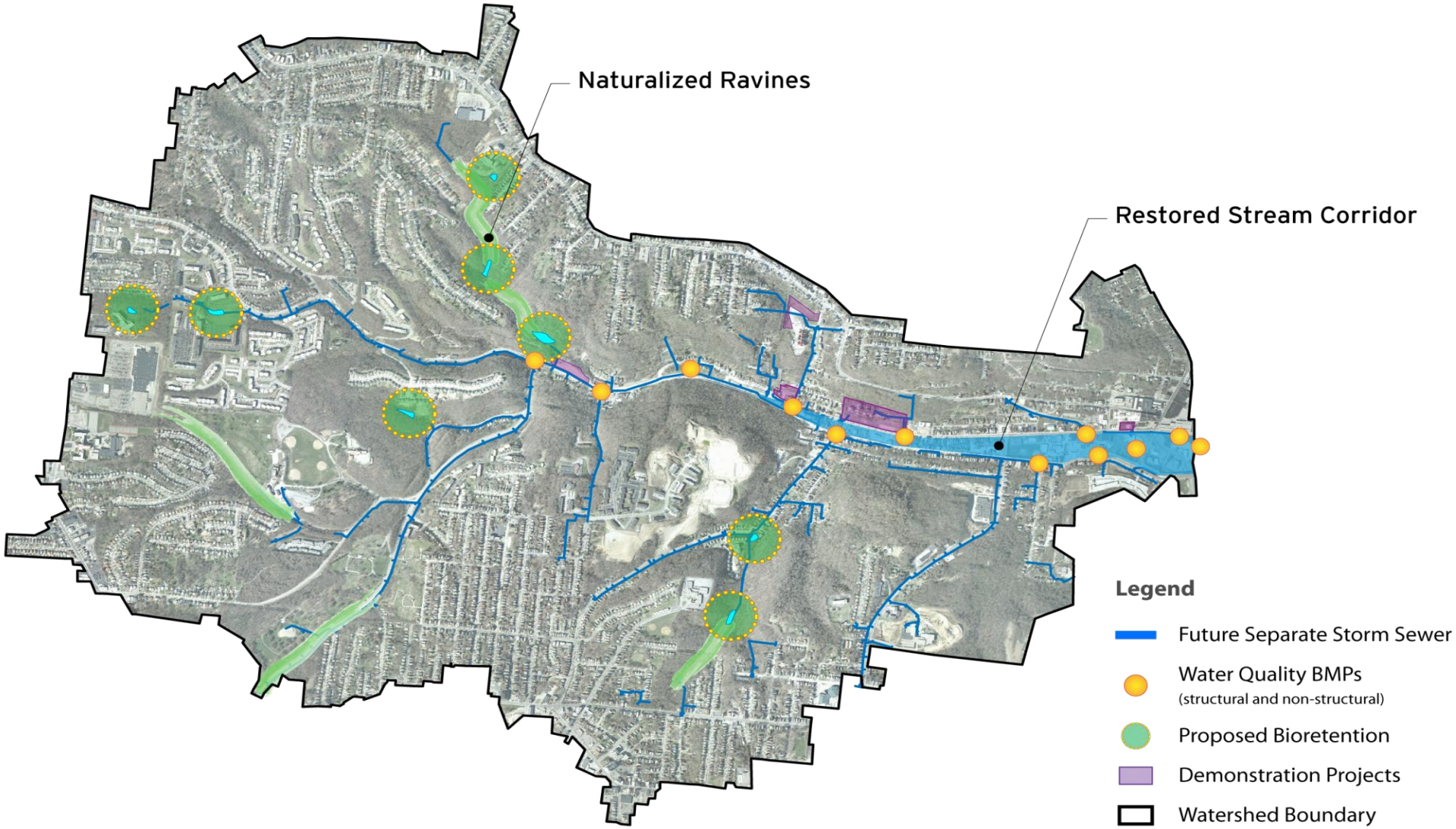

STRAND ASSOCIATES®

# Strategic Separation



STRAND ASSOCIATES®

# Watershed Wide Strategy




STRAND ASSOCIATES®

# VCS Vision


*Images courtesy of project partner Human Nature, Inc.*

STRAND ASSOCIATES®

*Image courtesy of project partner Human Nature, Inc.*

STRAND ASSOCIATES®

*Image courtesy of project partner Human Nature, Inc.*

STRAND ASSOCIATES®

# Lick Run Greenway



*Images courtesy of project partner Human Nature, Inc.*

STRAND ASSOCIATES®

# Village of Winnetka, IL

## Winnetka's Flooding Bouts are Legendary

***A look back at the village's damp legacy and what the powers that be have done to correct it.***

Winnetka-Glencoe, IL

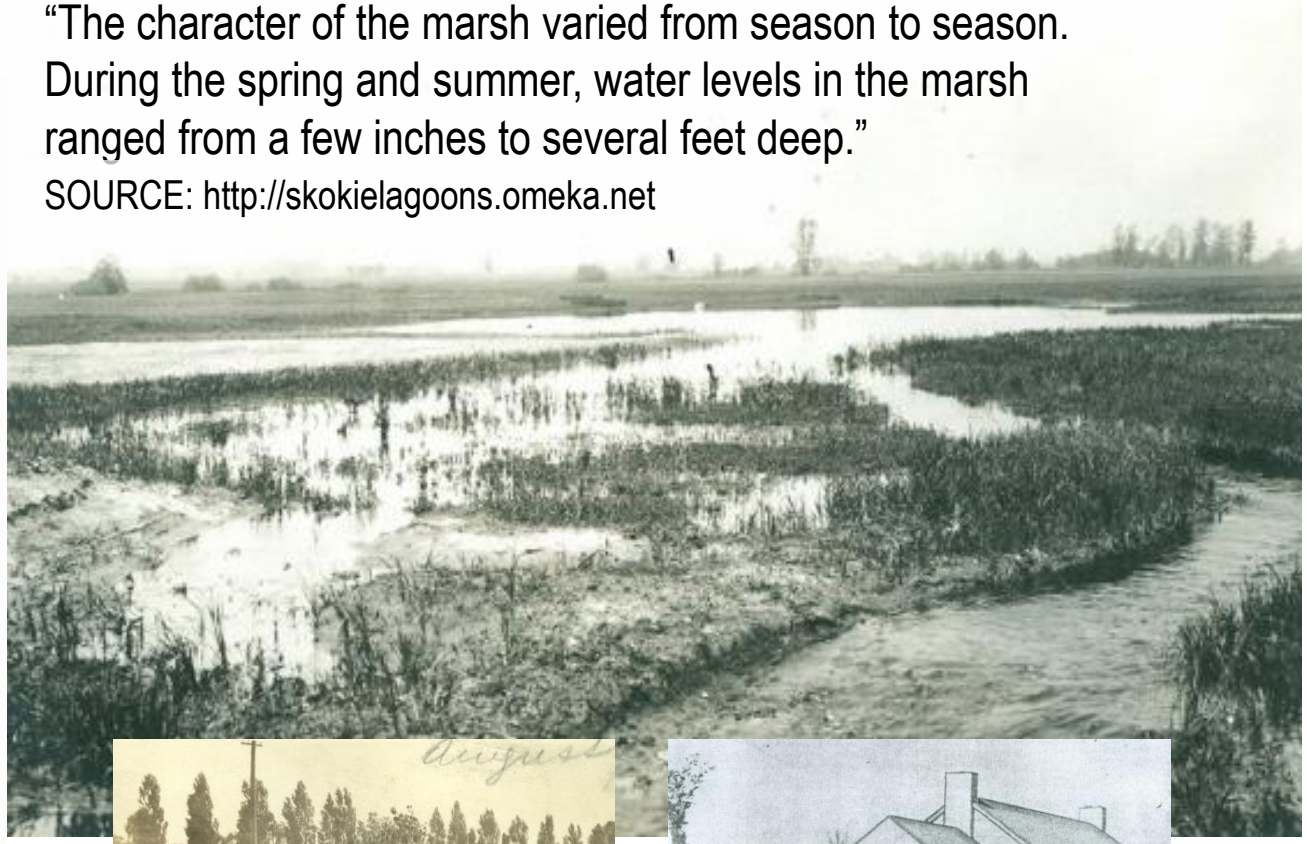
By **MATT KLINKERT** (Open Post)
September 13, 2011

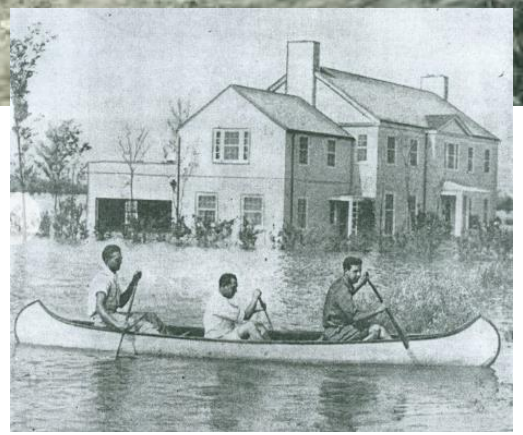
Winnetka-Glencoe Patch

It's no secret, Winnetka, there is an age-old problem.

"The character of the marsh varied from season to season. During the spring and summer, water levels in the marsh ranged from a few inches to several feet deep."

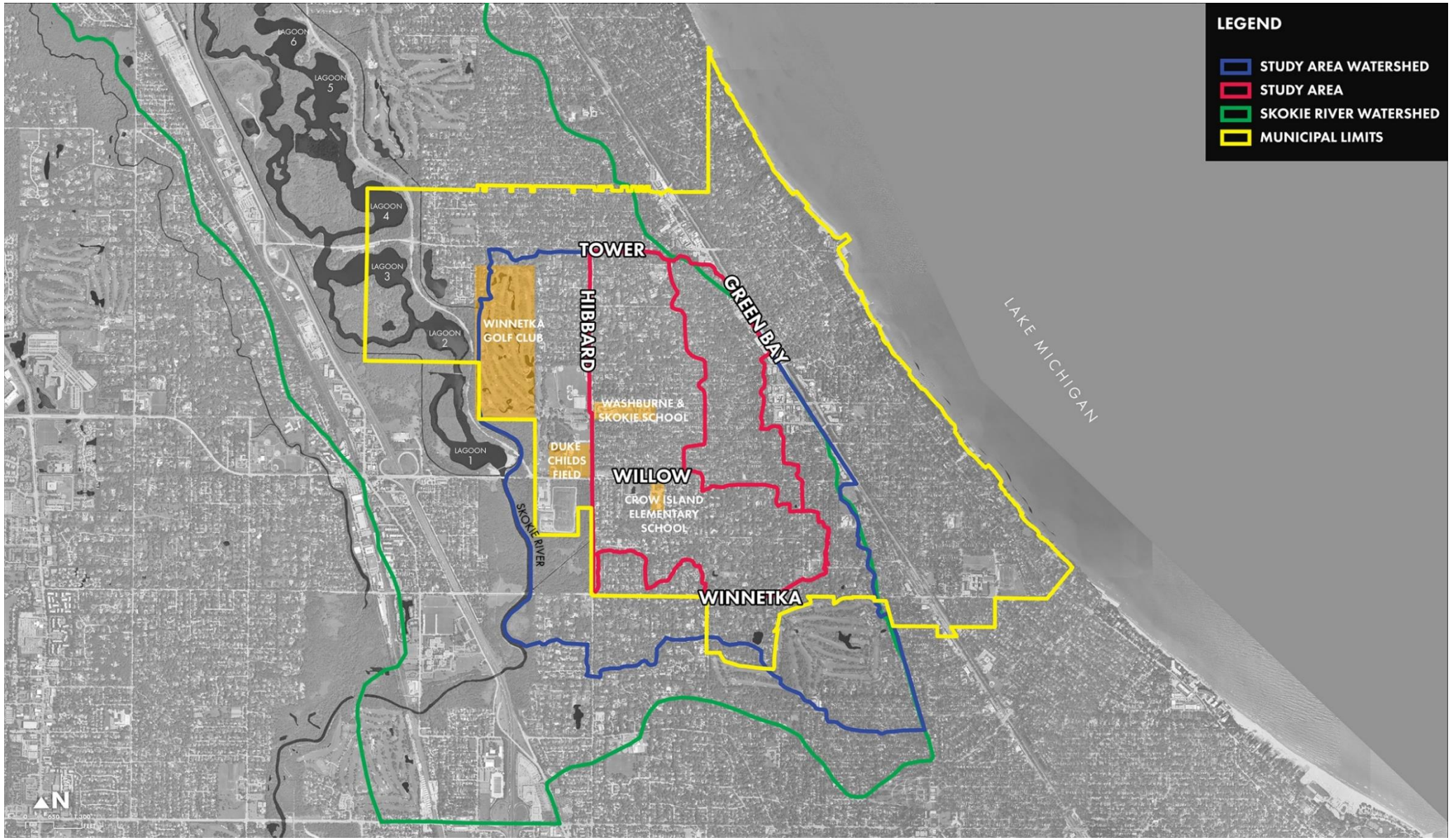
SOURCE: http://skokielagoons.omeka.net





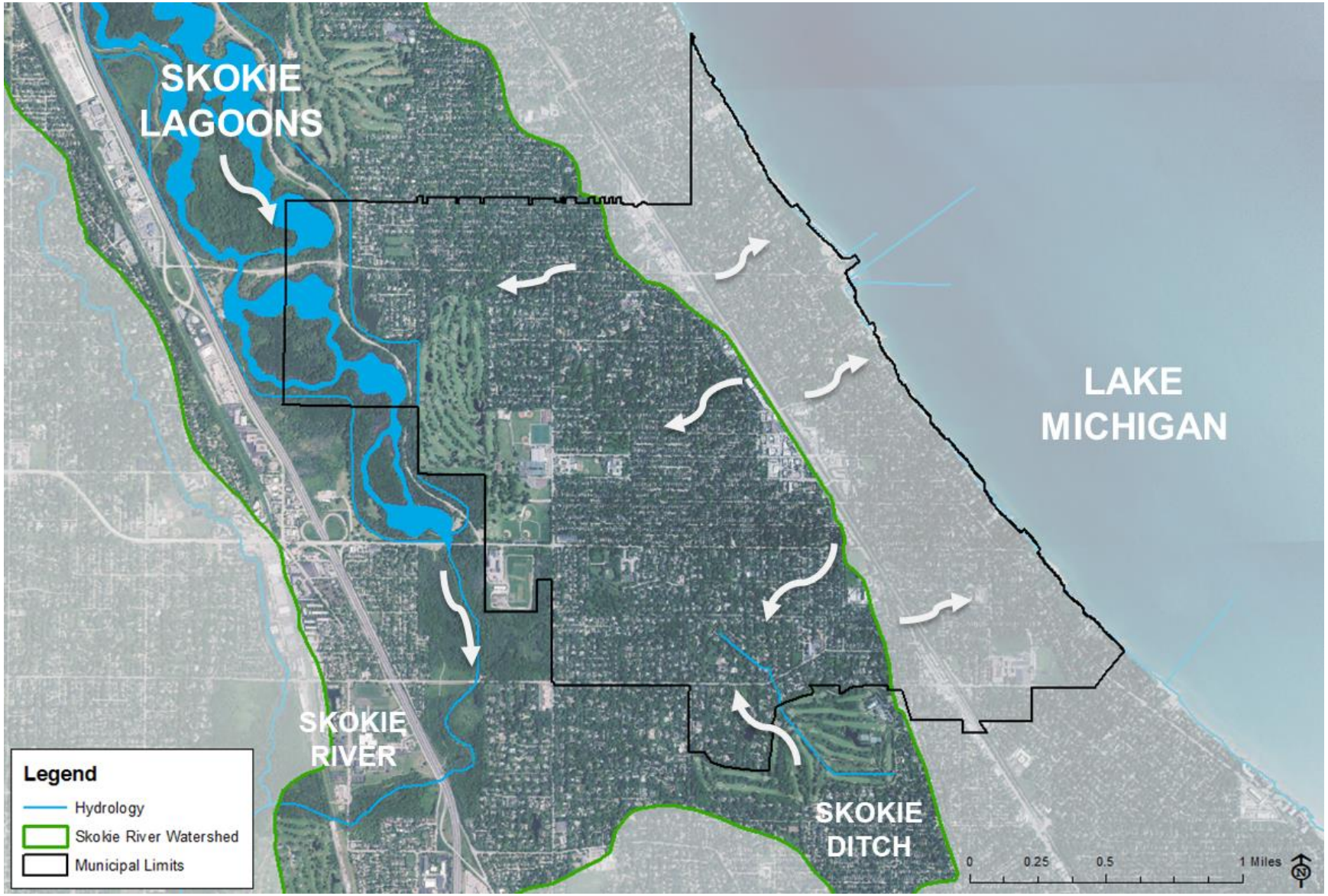
STRAND ASSOCIATES®

# Study Area Boundary



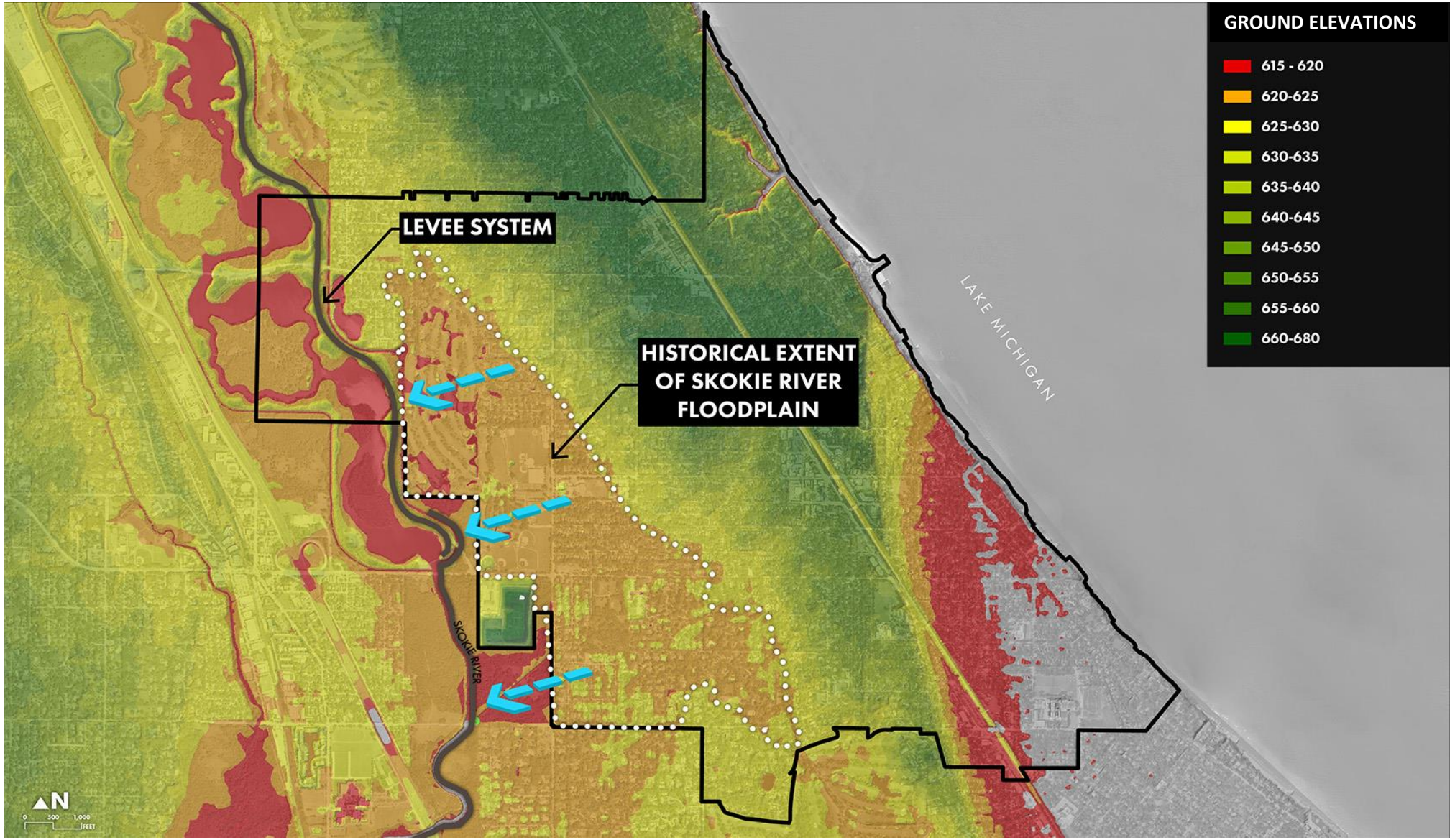

STRAND ASSOCIATES®

# Unique Drainage Patterns Contribute to Flooding



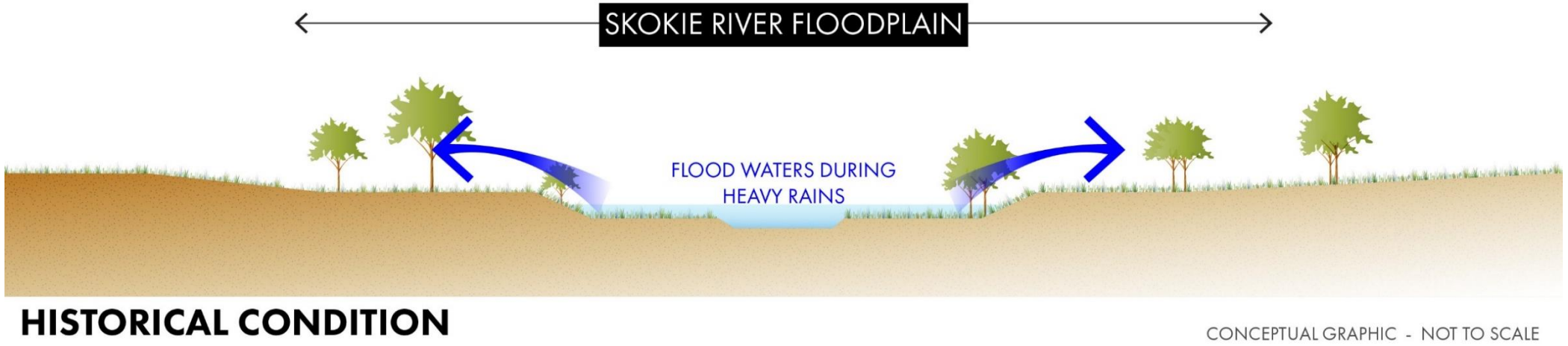

STRAND ASSOCIATES®

# Elevation Ranges



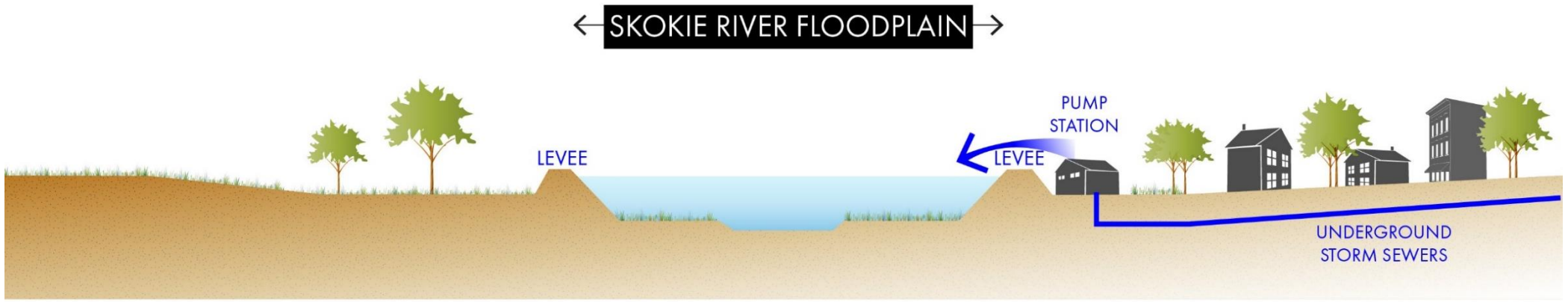

STRAND ASSOCIATES®

# Skokie River Drainage




**HISTORICAL CONDITION**

CONCEPTUAL GRAPHIC - NOT TO SCALE



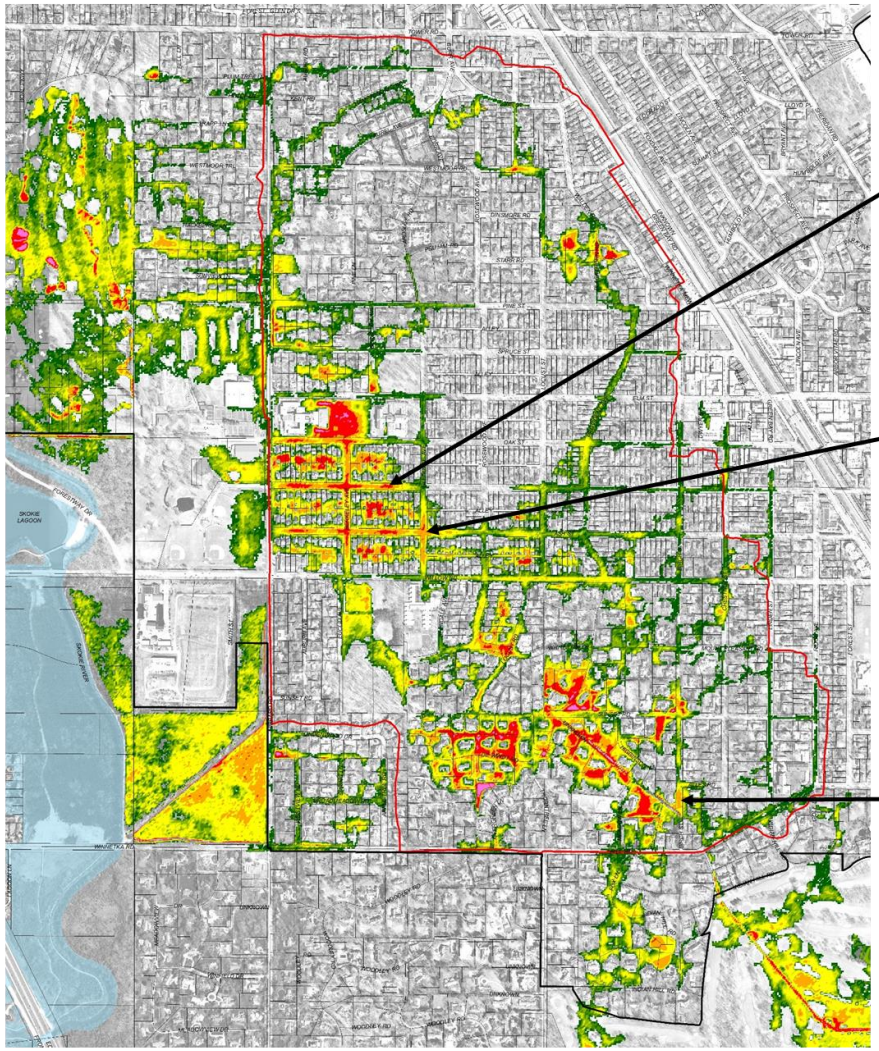

**CURRENT CONDITION**

CONCEPTUAL GRAPHIC - NOT TO SCALE

STRAND ASSOCIATES®

# Existing Conditions

**EXISTING CONDITIONS, 100-YR, 3-HR EVENT**



July 2011 – 1200 Block of Cherry

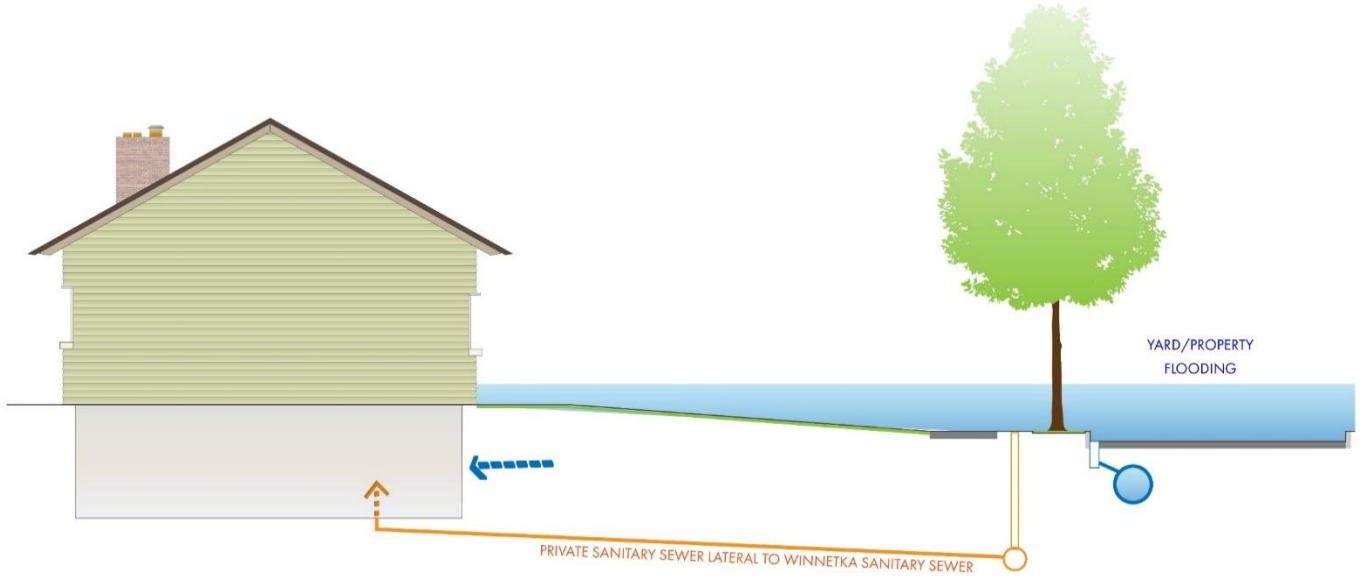

July 2011 – Ash and Glendale

April 2013 – Birch and Alles

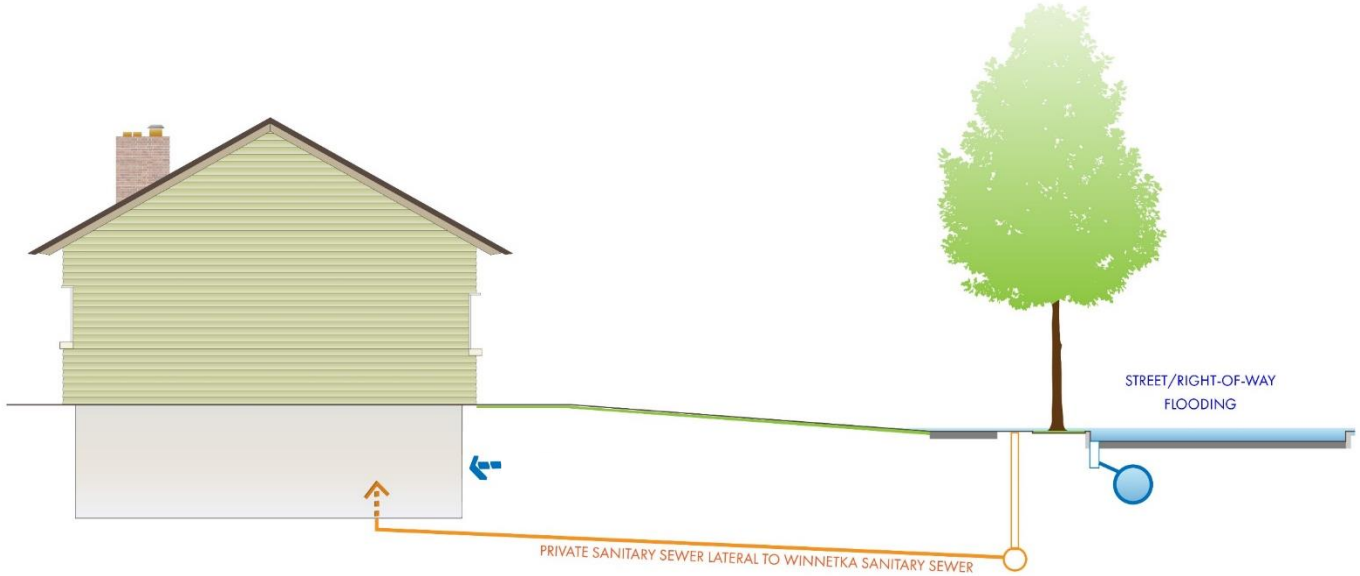
STRAND ASSOCIATES®

# Target Level of Service – Protection

**CURRENT LEVEL OF SERVICE**



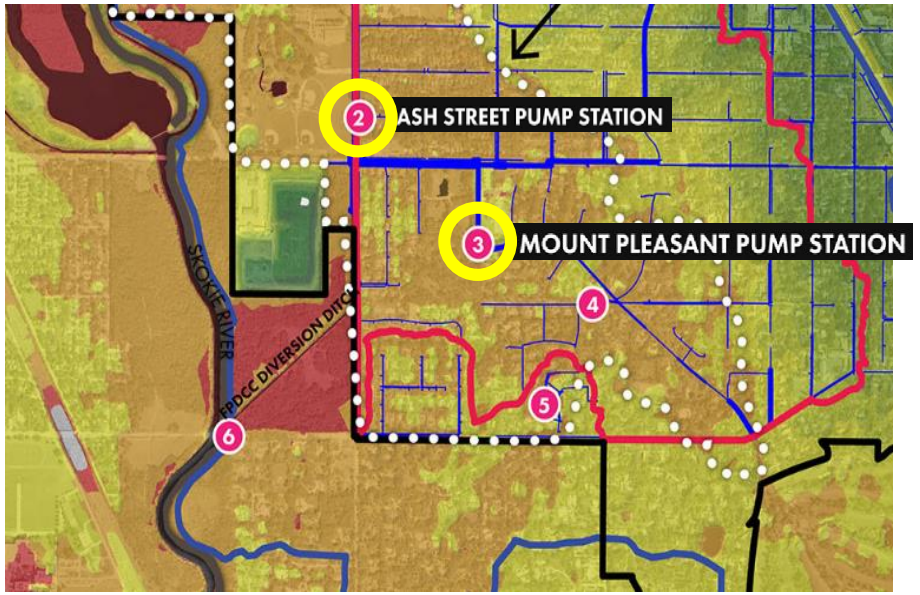

**TARGET LEVEL OF SERVICE**




STRAND ASSOCIATES®

# Opportunities Evaluation – Increased Pumping

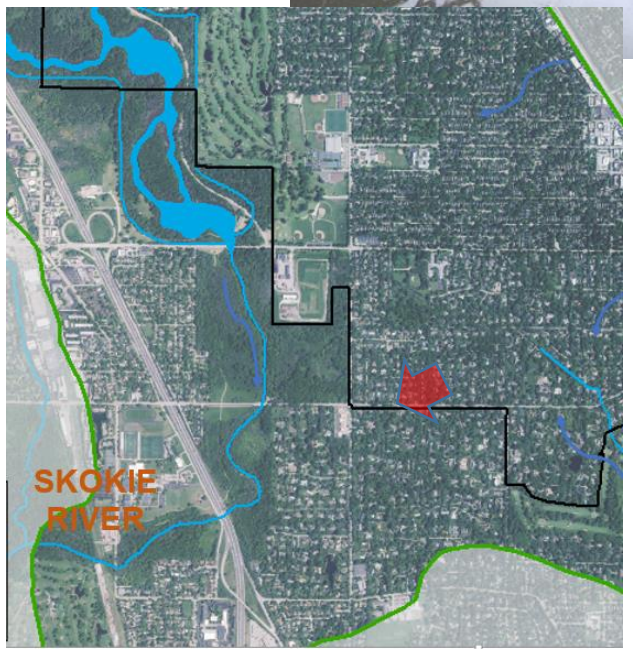
- Increase the Capacity of the Ash St. and Mt. Pleasant St. PS to provide Target LOS
  - Current Ash St. PS capacity = 8 cfs
  - Required PS capacity = 125 cfs (15.6x)
  - Current Mt. Pleasant St. PS capacity = 22 cfs
  - Required PS capacity = 319 cfs (14.5x)
- Still requires gravity conveyance to deliver stormwater to the pumping stations
- Still requires land to build it
- Requires pumping to someplace
- Relies on mechanical systems




STRAND ASSOCIATES®

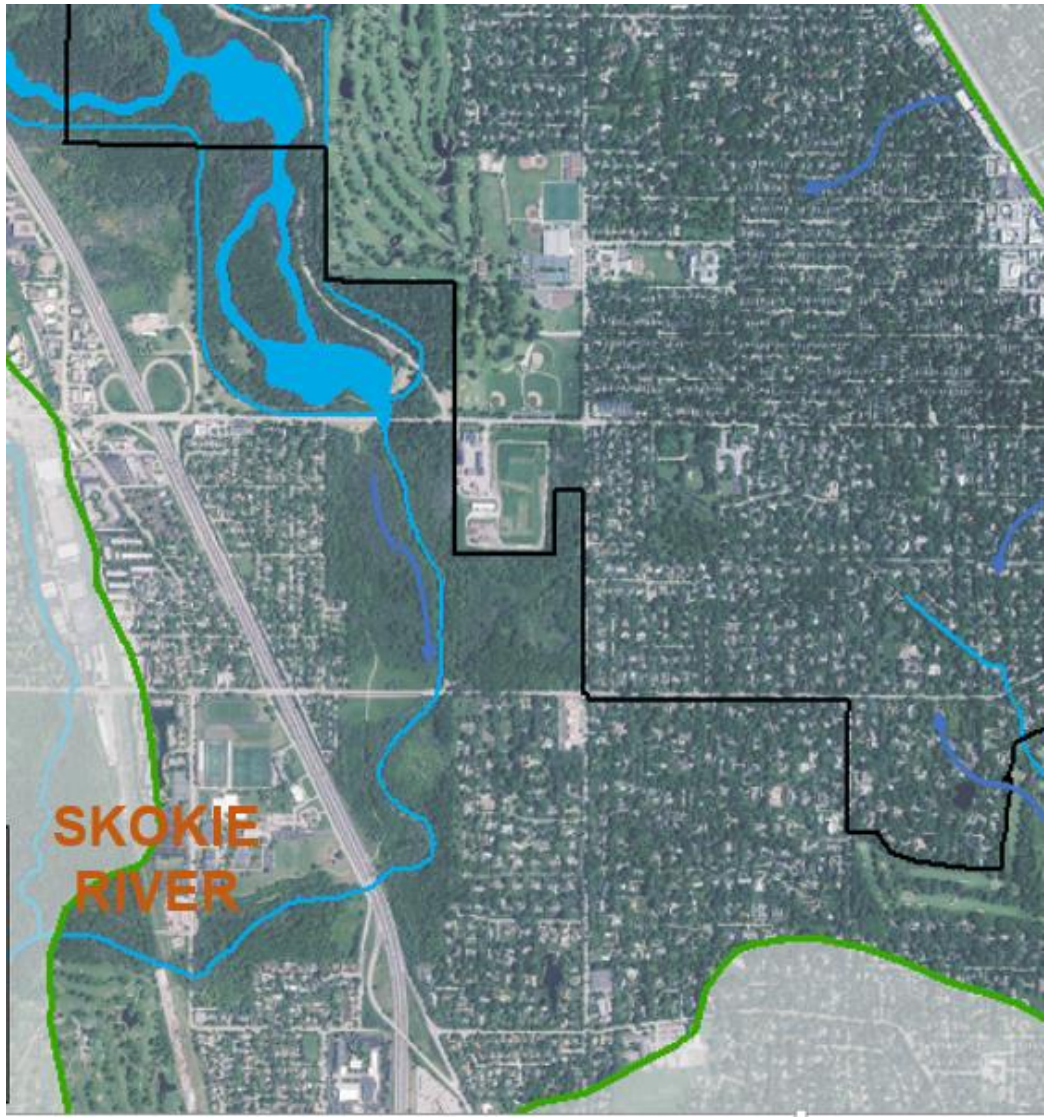
# Opportunities Evaluation – Increased Pumping at Winnetka Avenue Pump Station

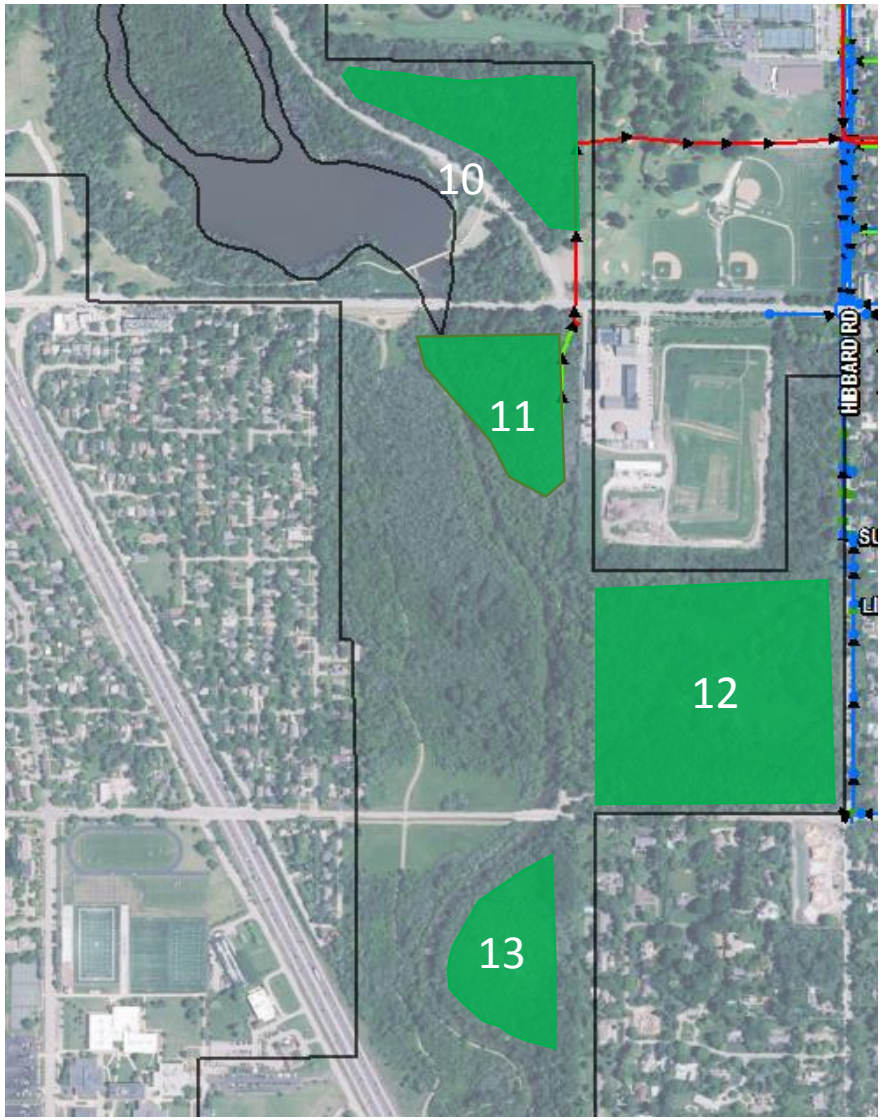
- Increase the capacity of the Winnetka Ave. PS to offset the need for providing flood storage
  - Current PS capacity = 134 cfs
  - Required PS capacity = 525 cfs (4x)
- Significant increases in peak flows could have adverse impacts to receiving flood prone waterways (Skokie River & N. Branch Chicago River)
- Likely not permitted by IDNR
- Increases reliance on mechanical systems




STRAND ASSOCIATES®

# Potential Storage Opportunities




STRAND ASSOCIATES®

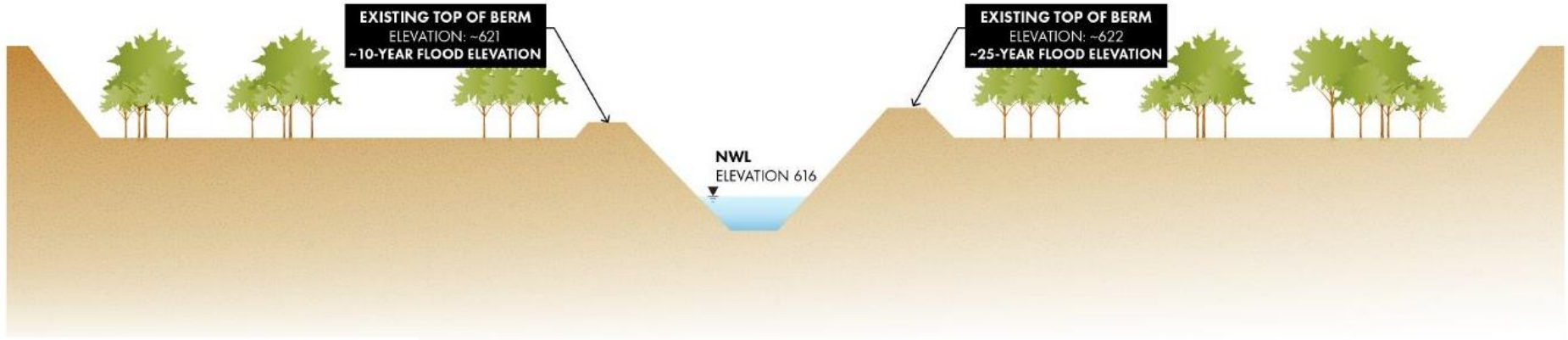
# Aligning Assets with Needs Can Create Mutually Beneficial Partnerships



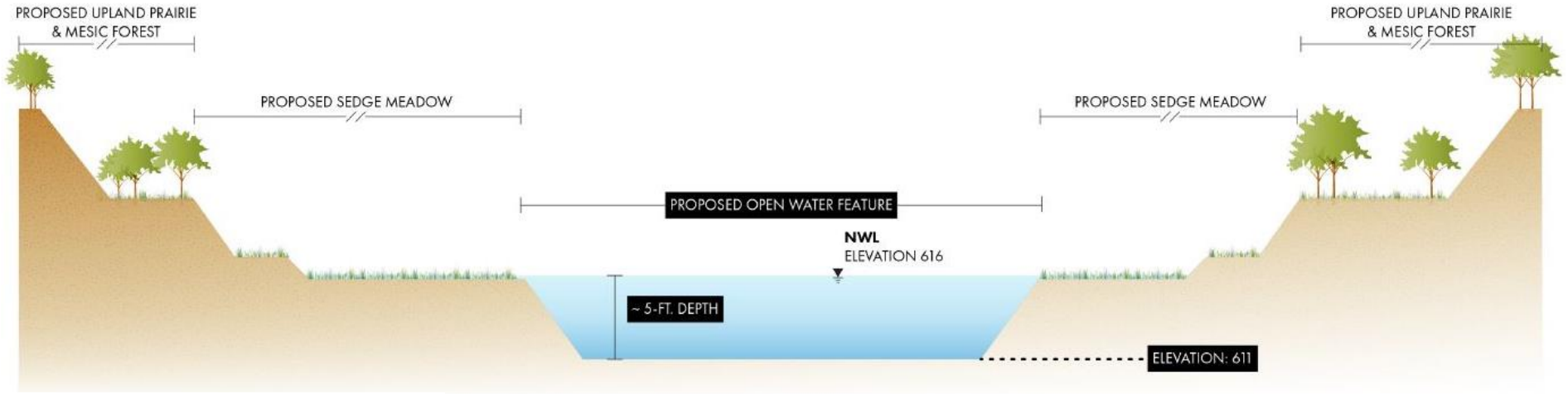

STRAND ASSOCIATES®

# Stormwater Management Opportunities – Storage

## Forest Preserve Example




**Forest Preserve Ditch** (NOT TO SCALE; SCHEMATIC IS VERTICALLY & HORIZONTALLY EXAGGERATED)




**Forest Preserve Ditch** (NOT TO SCALE; SCHEMATIC IS VERTICALLY & HORIZONTALLY EXAGGERATED)

Image courtesy of project partner Human Nature, Inc.

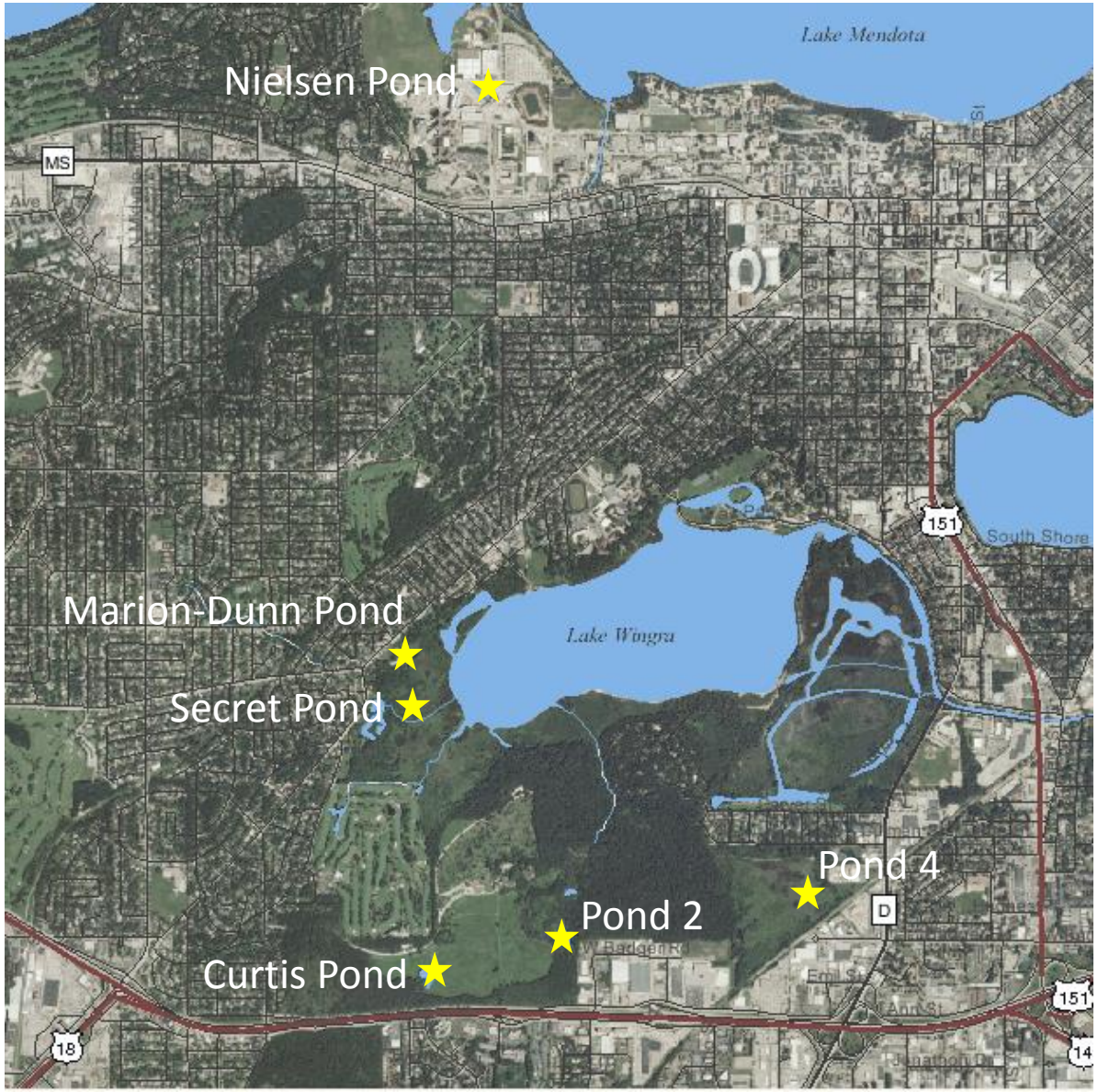
STRAND ASSOCIATES®

# Forest Preserve Property

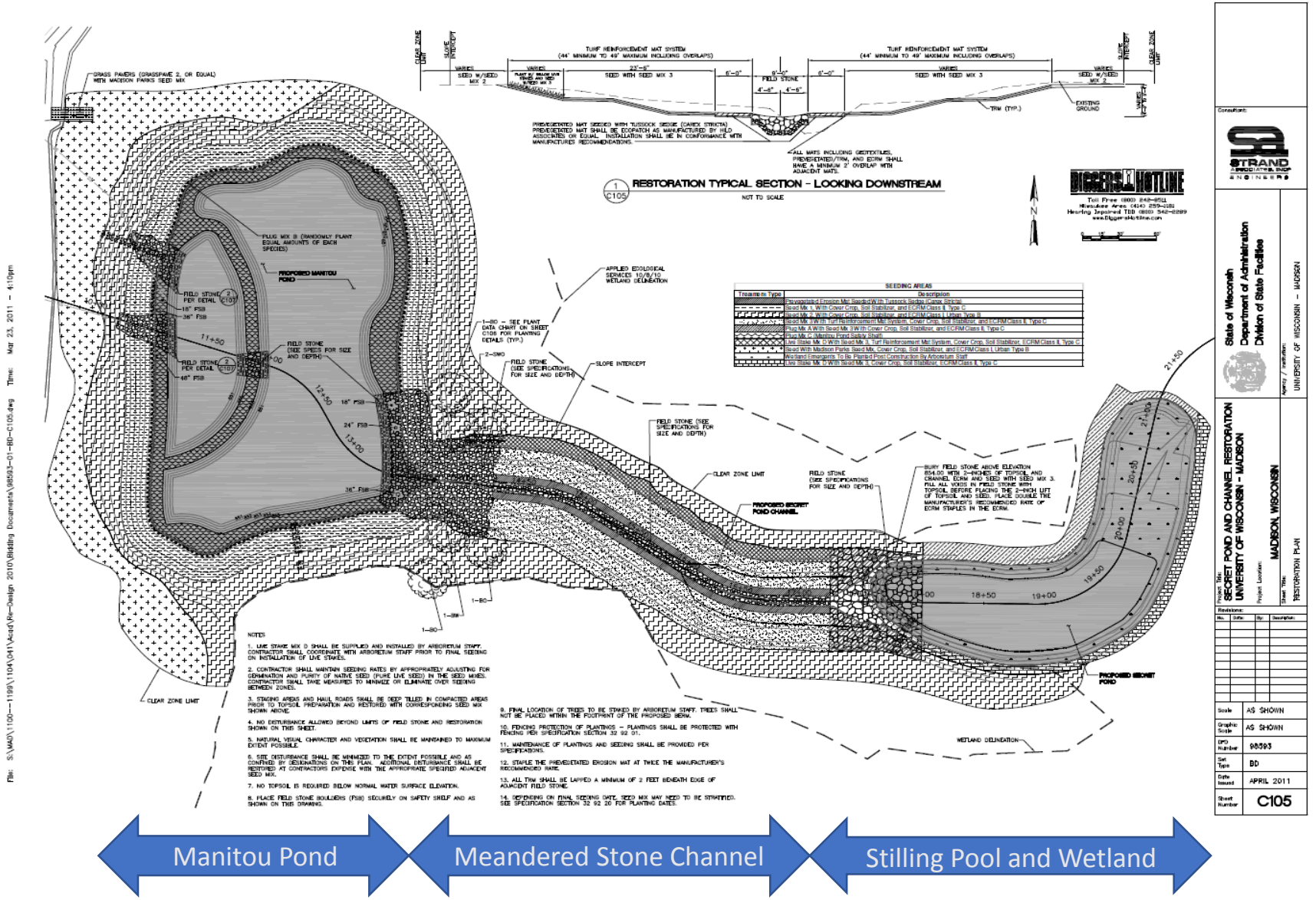

Image courtesy of project partner Human Nature, Inc.

STRAND ASSOCIATES®

# Secret Pond – Madison, WI



# Secret Pond – Madison, WI



# Secret Pond – Madison, WI

Pond partially filled with water prior to a large rain event that filled the pond completely.

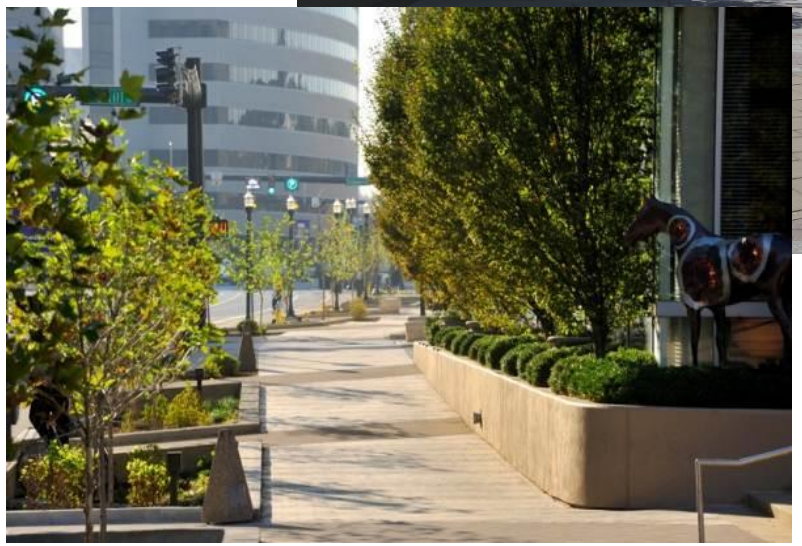
# Secret Pond – Madison, WI

Looking downstream at the natural channel and stilling pool/wetland restoration.

STRAND ASSOCIATES®

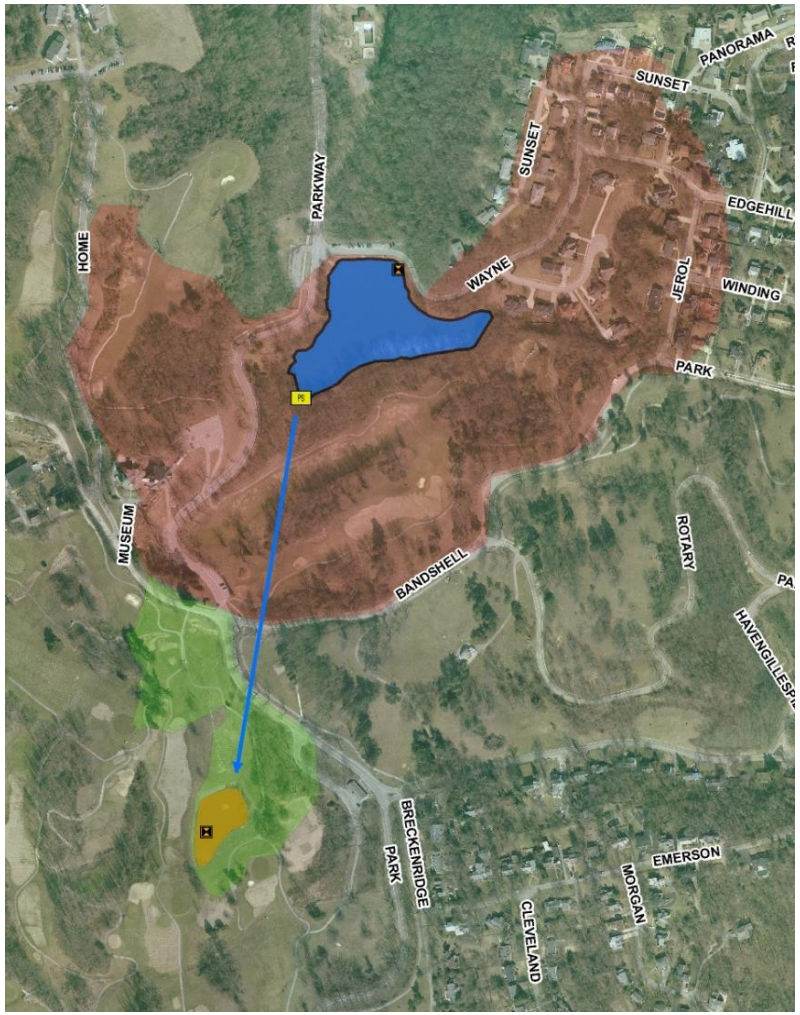
# Downtown Streetscape – Lexington, KY

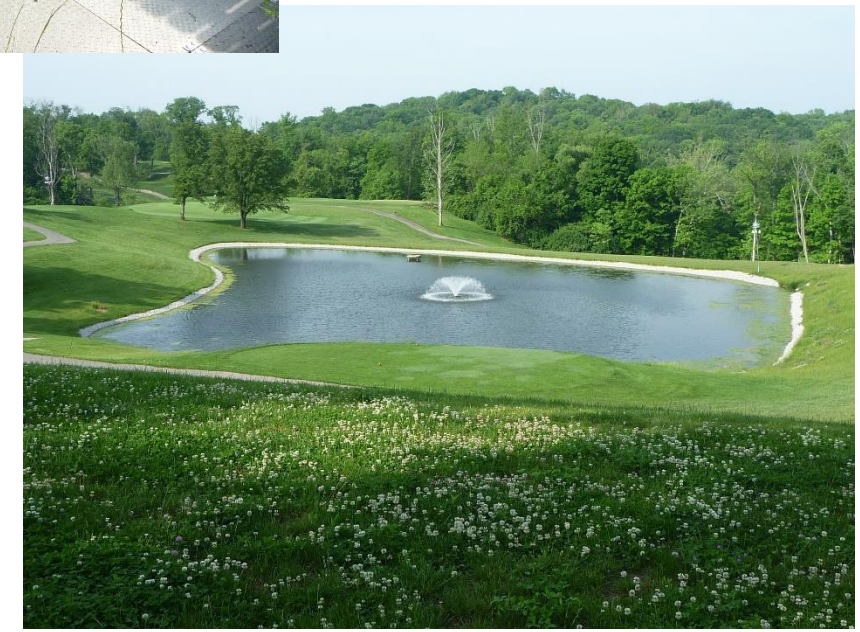




STRAND ASSOCIATES®

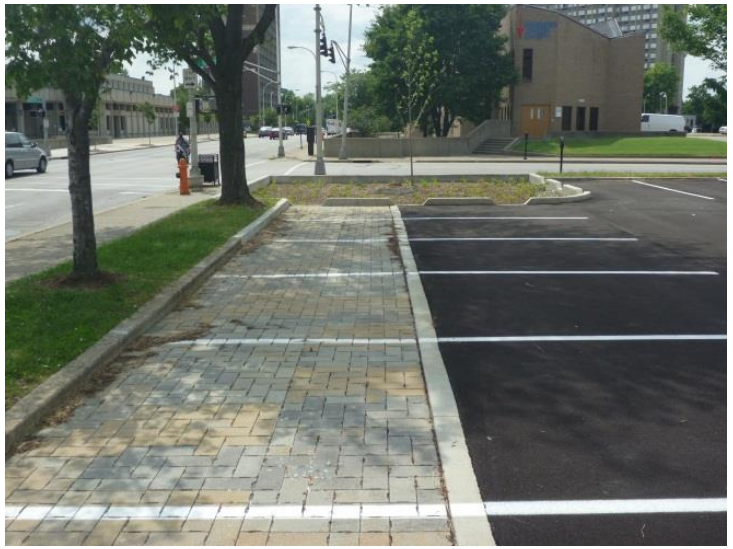
# Prisoner's Lake – Covington, KY



STRAND ASSOCIATES®

# Office of Employment and Training – Louisville, KY



STRAND ASSOCIATES®

# 12th Street – Covington, KY

STRAND ASSOCIATES®

# St. Francis Bioretention Basin – Cincinnati, OH

STRAND ASSOCIATES®

# Conclusion

Look for opportunities to enhance project benefits

- improved aesthetics
- Improved water quality
- rainwater re-use
- community revitalization
- reduced impervious surface
- grant opportunities

Think holistically

- Avoid the “silo” trap (quantity, quality, stream erosion)
- Don’t just “move” the problem
- Think long term

STRAND ASSOCIATES®

# Questions?

**John T. Lyons, P.E. – Strand Associates, Inc.**

john.lyons@strand.com

www.strand.com
(p) 513.861.5600