Watershed Advisory Committee
Lake Erie Direct Tributaries & Chagrin River

October 24, 2019

Northeast Ohio Regional Sewer District

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Agenda

- Sewer District Updates
- Stormwater Master Plan
- Stormwater Inspection and Maintenance
- Stormwater Design & Construction
- Stormwater Nomination Process
- Special Feature – Echo Lane Project

Program Highlights

Frank Greenland, Director of Watershed Programs

Matt Scharver, Deputy Director of Watershed Programs

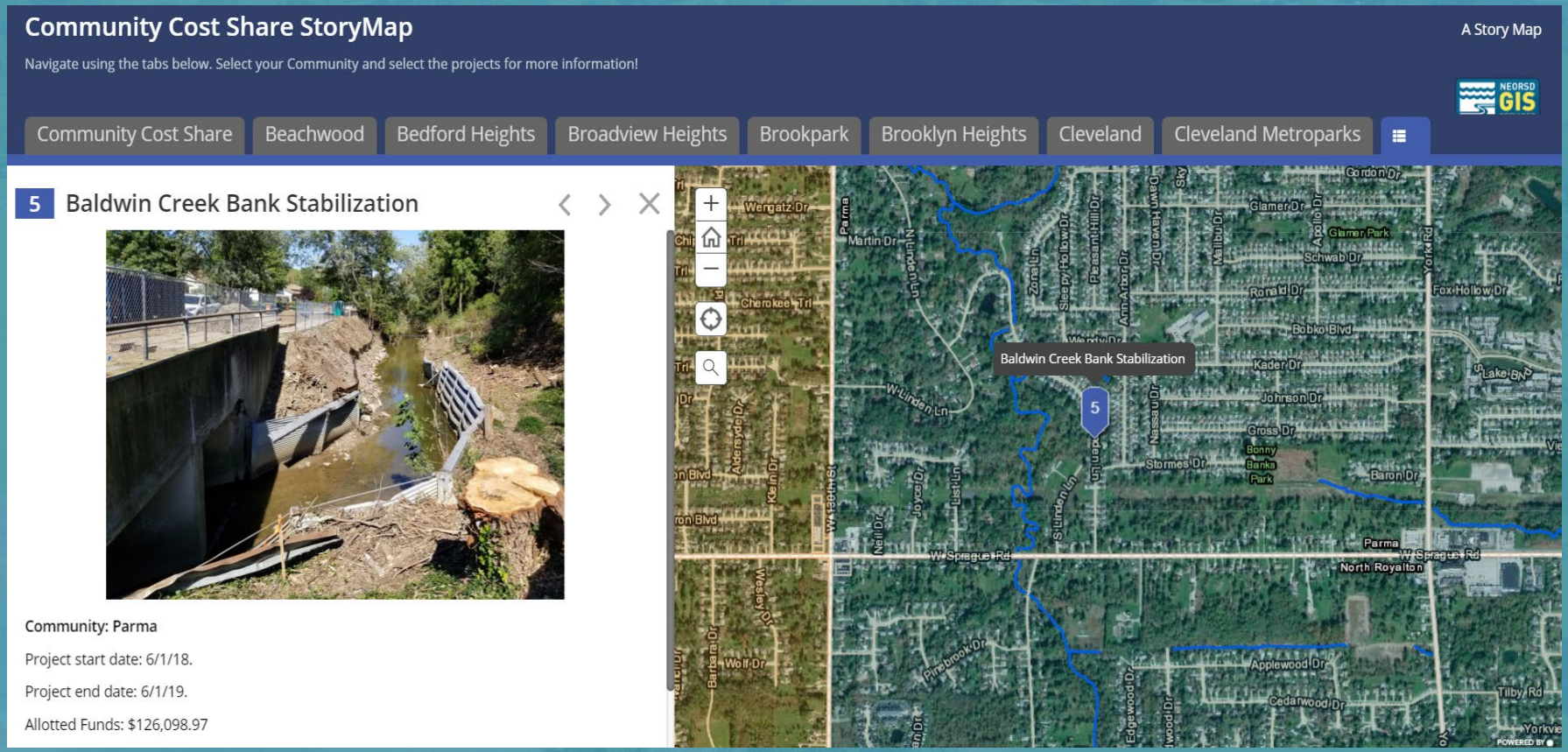
Community Cost-Share: 2019

• CCS Funds Balance (9/30/2019)	$25,180,562
• 53 projects w/ executed agreement	$ 8,728,844
• 12 projects w/ agreements in progress	$ 550,771
• 18 approved allocation agreements	$ 9,886,368
• CCS Funds available to Member Comm.	$ 6,014,579

35 of 55 Member Communities currently participating

51 of 55 Member Communities have participated

Community Cost-Share
Project Story Map



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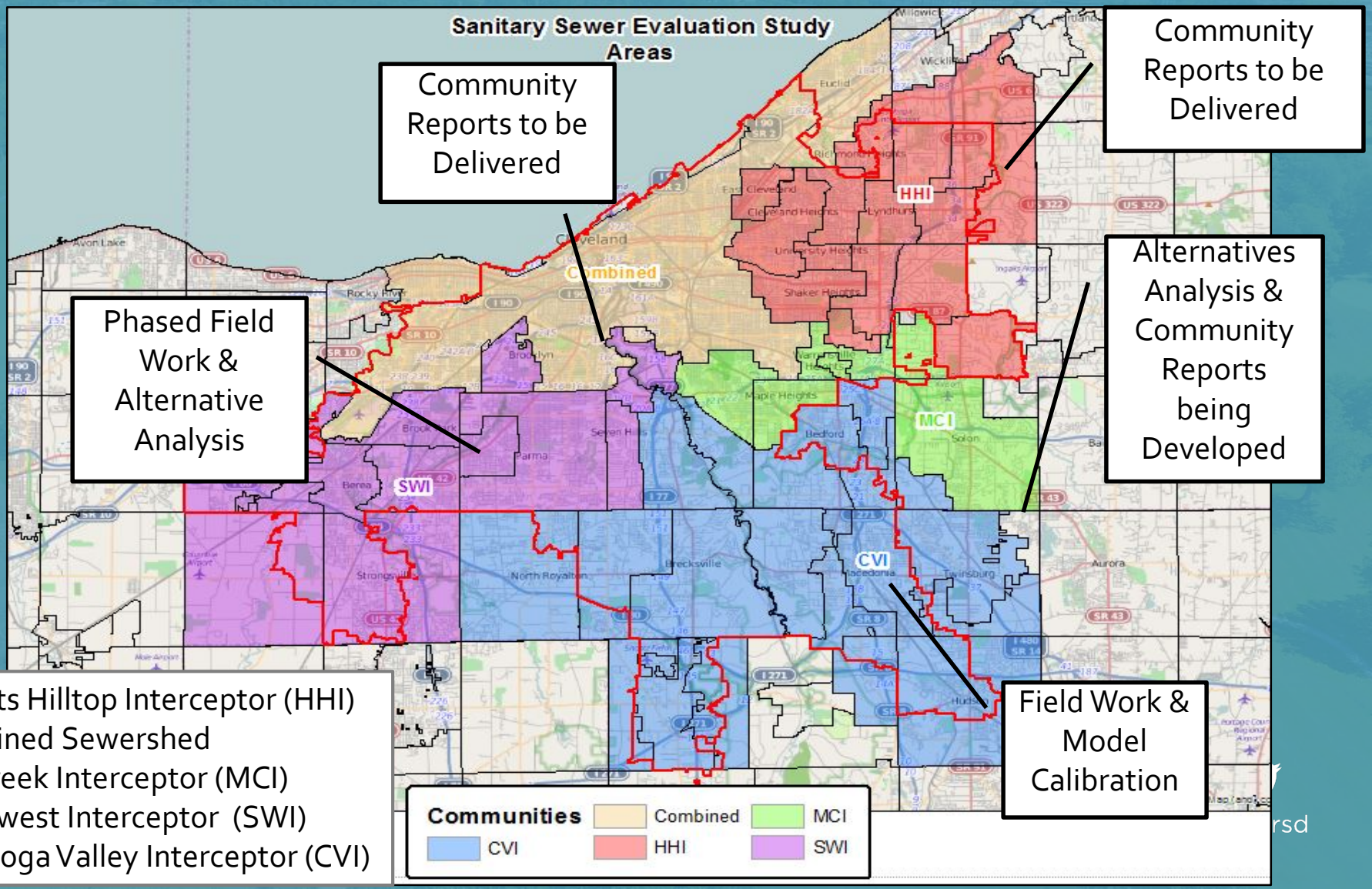
Local Sewer System Evaluation Studies



Heights Hilltop Interceptor (HHI)
Combined Sewershed
Mill Creek Interceptor (MCI)
Southwest Interceptor (SWI)
Cuyahoga Valley Interceptor (CVI)

Member Community Infrastructure Program

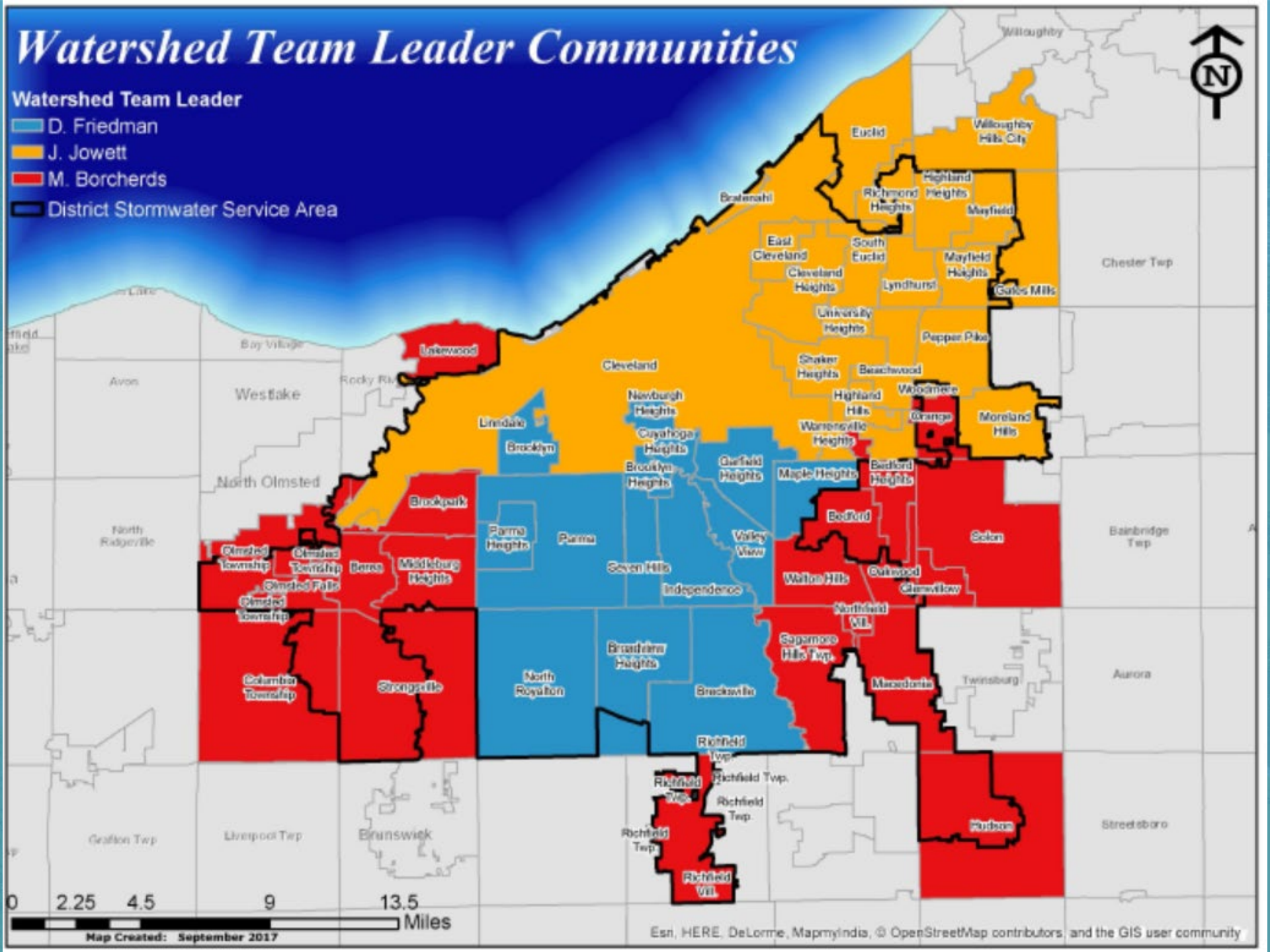
- Grant funding for local sanitary sewer rehabilitation targeted at reducing basement backups and human health issues
- LSSES early action project alternatives for the Southwest Interceptor area
- RFP will be released February 6, due on May 11
- MCIP Workshop March 13 (10am – noon) at the Watershed Stewardship Center

Cost-Saving Programs

- *Summer Sprinkling*
  - *Average winter consumption*
- *Crisis Assistance*
  - *$300 sewer credit*
  - *Experienced financial hardship within last 6 months*

Cost-Saving Programs

- *Homestead*
  - 65 and older *or* permanently disabled
  - Household income must not exceed $33,500
- *Affordability*
  - Annual income is at or below 200% of the poverty level


Watershed Team Leader Communities
Watershed Team Leader
D. Friedman
J. Jowett
M. Borcherds
District Stormwater Service Area
N
Willoughby
Euclid
Willoughby Hills City
Highland Heights
Richmond Heights
Mayfield
Bratenahl
East Cleveland
South Euclid
Mayfield Heights
Cleveland Heights
Lyndhurst
Gates Mills
Chester Twp
University Heights
Pepper Pike
Lakewood
Cleveland
Shaker Heights
Beachwood
Bay Village
Avon
Westlake
Rocky River
Newburgh Heights
Highland Hills
Woodmere
Lindale
Cuyahoga Heights
Warrensville Heights
Orange
Moreland Hills
Brooklyn
Garfield Heights
Brooklyn Heights
Maple Heights
Bedford Heights
North Olmsted
Brookpark
Bedford
Parma Heights
Parma
Valley View
Solon
North Ridgeville
Olmsted Township
Olmsted Township
Berea
Middleburg Heights
Seven Hills
Bainbridge Twp
Olmsted Falls
Olmsted Township
Walton Hills
Oakwood
Glenwillow
Independence
Northfield Vill.
Sagamore Hills Twp.
Broadview Heights
North Royalton
Brecksville
Twinsburg
Aurora
Columbia Township
Strongsville
Macedonia
Richfield Twp.
Richfield Twp.
Richfield Twp.
Richfield Twp.
Hudson
Streetsboro
Grafton Twp
Liverpool Twp
Brunswick
0
2.25
4.5
9
13.5
Miles
Map Created: September 2017
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Water Resource Project Property Acquisition

Program Goals:

- Support Design and Construction project needs
- Mitigate the threat of erosion and flooding
- Protect functioning regional stormwater assets
- Leverage acquisition dollars through partnerships
- Develop long term stormwater program acquisition strategy

Property tracking improvements:

- Updated property interest database
- Creation of Acquisition Referral Request system
- Creation of real-time property inspection App
- Proactive MLS (multiple listing service) monitoring in project areas

Programmatic improvements:

- Lease management and tenant communications
- Security and emergency protocols for leased and vacant property
- Property acquistion cost estimating and budget analysis
- Vacant property maintenance assignment process

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Water Resource Project Property Acquisition

Success to date: Threat Mitigation/ Asset Protection

- Flood / Erosion Mitigation: 25 homes
- Stream / Riparian length protected: 1.5 Miles

Success to date: Partnerships

- Flood / Erosion Mitigation: 17 homes
- District Dollars invested: $518,904.00
- Dollars Leveraged: $2,742,399.00

Looking forward

- 2020 and 2021 Property Acquisitions
  - 52 Properties contributing to approx. 16 projects

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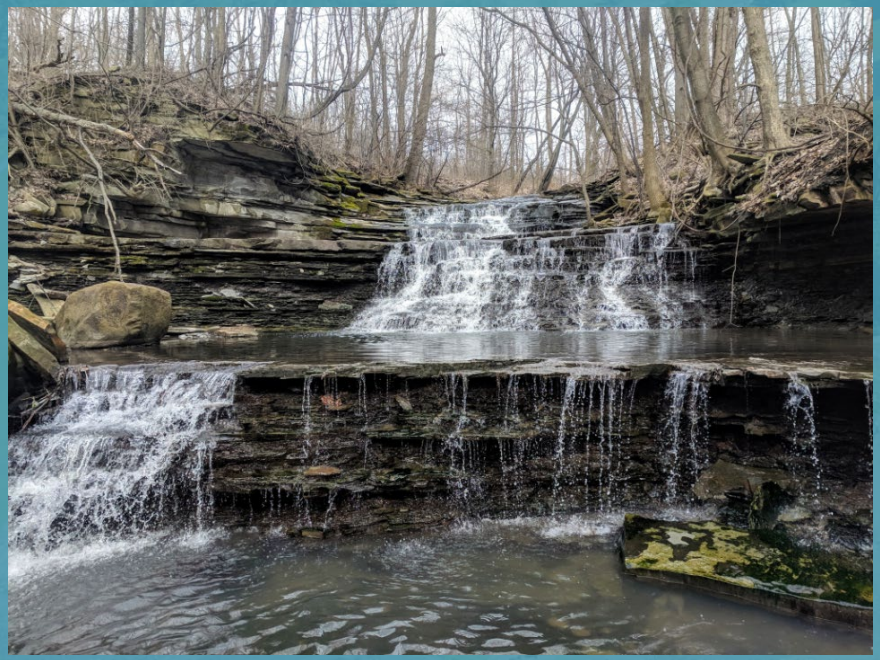
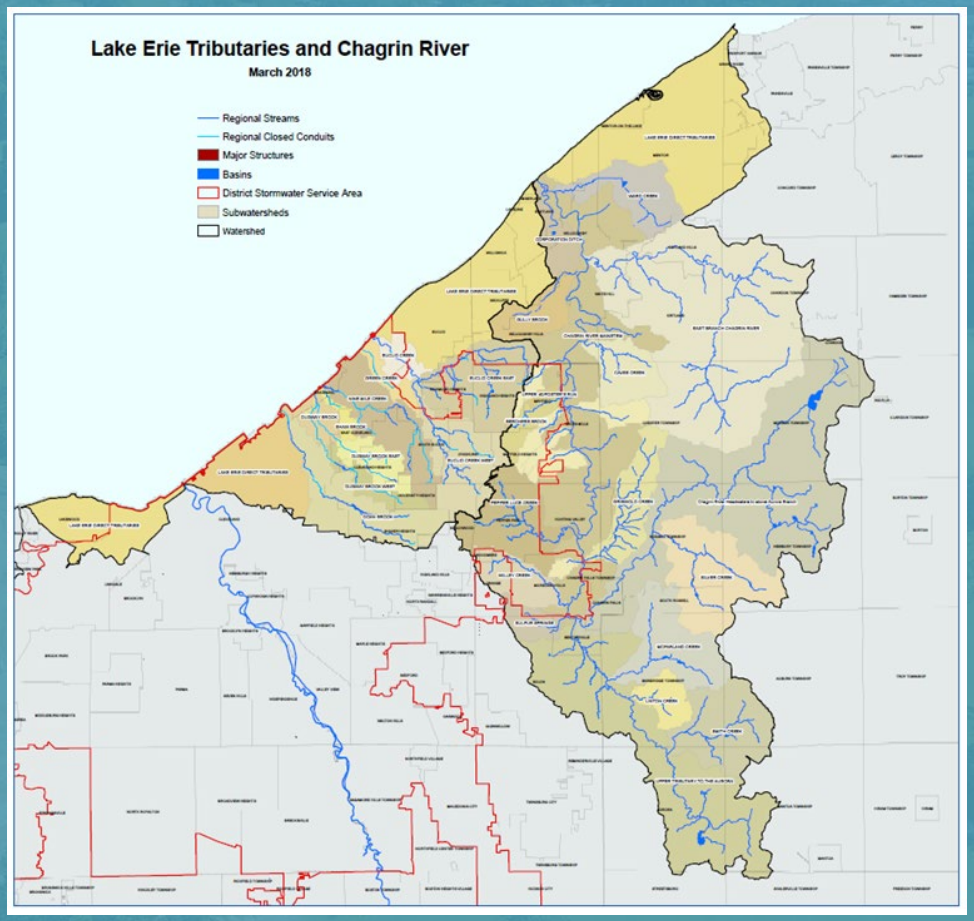
Stormwater Master Plan





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Stormwater Master Planning
(status through 9/25/2019)

Cuyahoga River South

Completion Date: June 2019

100 % Complete

Cuyahoga River North

Completion Date: December 2019

89% Complete

Rocky River

Completion Date: April 2020

74.5% Complete

Chagrin River / Lake Erie Tribs

Completion Date: May 2021

34% Complete

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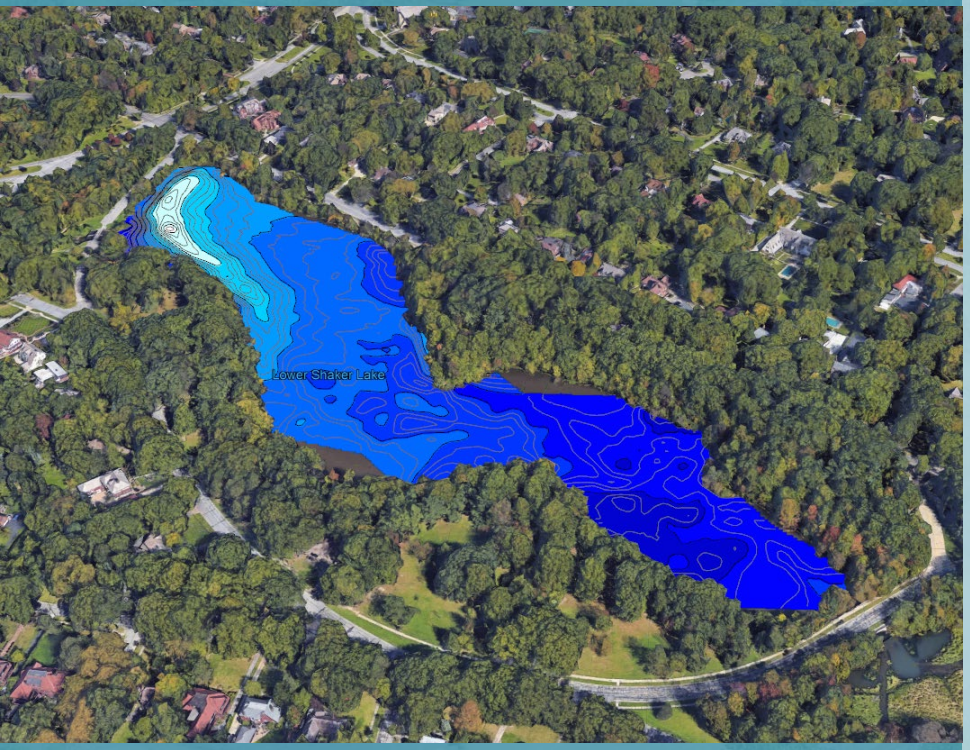
Stormwater Master Plan

Chagrin River / Lake Erie Direct Tributaries



Significant work: thru October 2019

- Spherical Imagery Collection
- Completion of Geomorphic Field Inspections
- Installation of 17 HWM Gauges & 9 Level Sensors
- CCTV/PACP Inspection of Culverts
- Field Inspection & Bathymetric Data Collection of Basins
- Commence Development of Doan Brook SWMM Model
- Development of SWMP Model Management Protocols

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Stormwater Master Plan

Field Work Project Status

Task Item Status – 62% Complete

CCTV Inspection

91% Inspected
81% QC Complete

Progress percent is based on asset count, not on miles inspected

28.4 miles completed
→ 23 miles Combined Sewer System
→ 5.2 miles Culverted Stream

Basin Inspection

48% Inspected
3% QC Complete

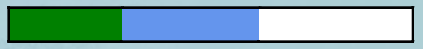
16 basins inspected

Geomorphic Inspection

100% Inspected
99% QC Complete

62.7 miles inspected (approximate)
→ 1115 reach segments drawn

Survey



62% Inspected
28% QC Complete

2/5 Complex Bridge
67/118 Cross Section
128/212 Culvert
96/154 Invert Only
57/78 Simple Bridge

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Stormwater Master Plan

Upcoming Milestones

- **Data Collection/Field Activities**
  - Review of existing background information
  - HWM Gauge/Level Meter Monitoring
  - Stream & Crossings Inspections & Surveys
  - Basin Infrastructure & Bathymetric Surveys
  - Culverted Stream CCTV Inspections
  - Condition Assessments completed for most SWMP assets
- **Model Development**
  - Refinement of Sub-catchments/RSS Terminus
  - Completion of SWMM models for primary streams: Doan Brook, Euclid Creek , Beechers Brook & Pepper Luce Creek
  - Problem Area ID for Beechers Brook

Stormwater Master Plan

Culverted Stream Condition Assessments

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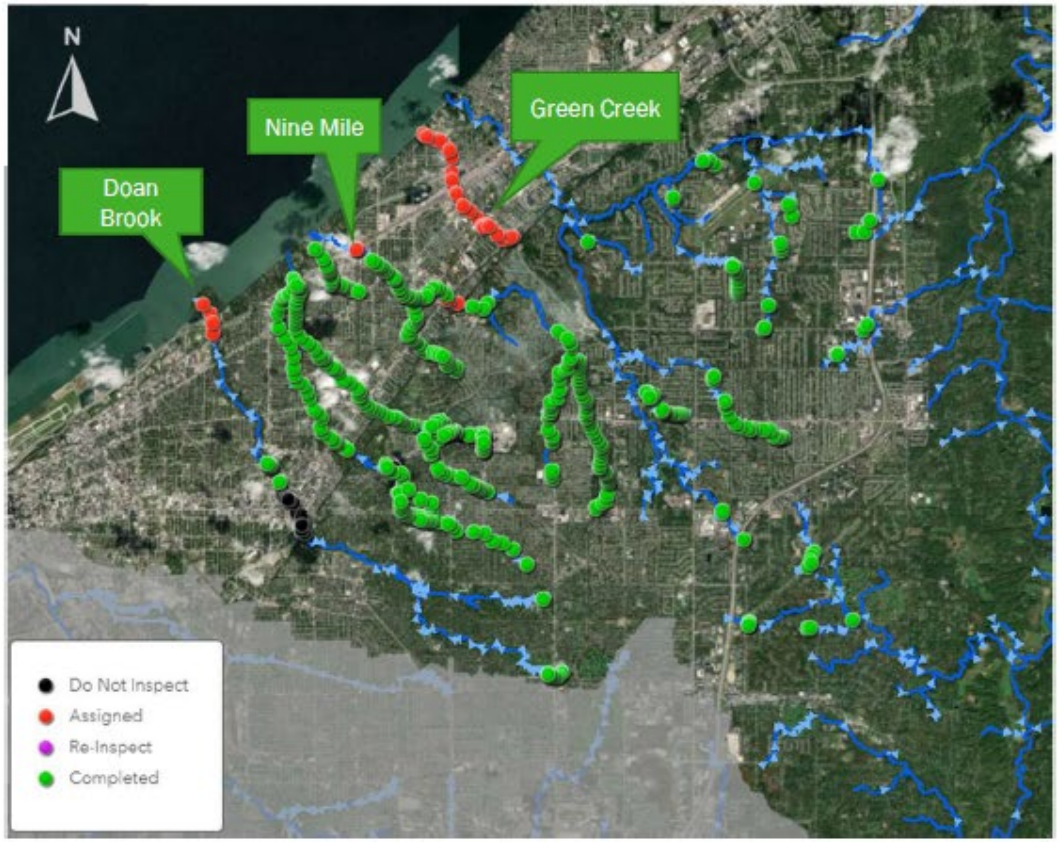
Stormwater Master Plan
Culverted Stream Inspection Progress

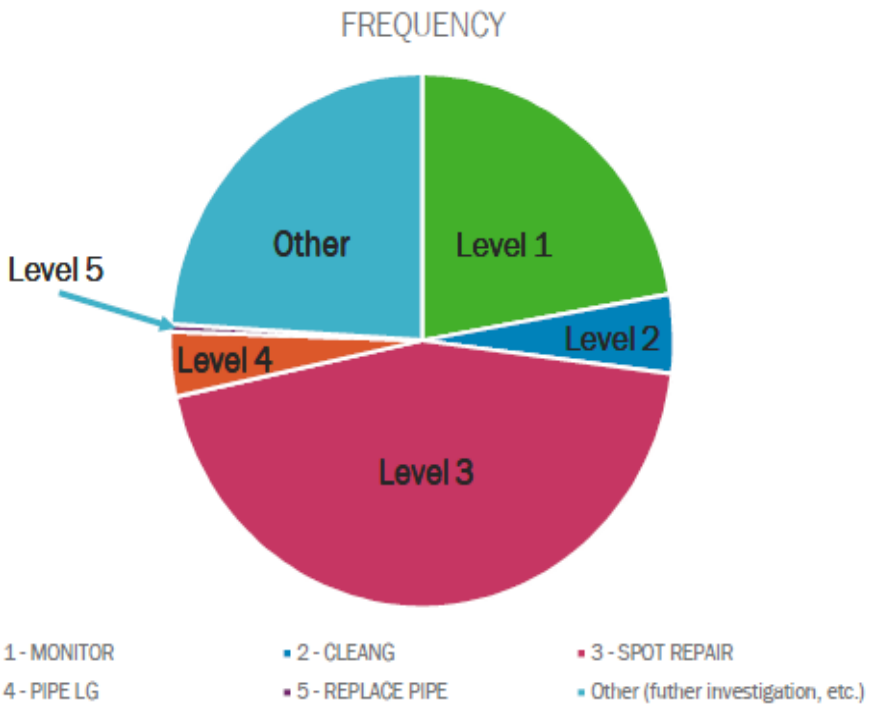
- 33 miles in scope
- 28 miles inspected
  - Remaining:
    - Nine Mile (0.3 mi)
    - Green Creek (3 mi)
    - Doan Brook (1 mi)
    - Shaw Brook (0.1 mi)
- 25 miles evaluated with rehab recommendations



Stormwater Master Plan
Culverted Stream Assessment Levels

25 miles evaluated

- Level 1 Monitoring – 15%
- Level 2 Cleaning – 3%
- Level 3 Spot Repairs – 56%
- Level 4 Pipe Lining – 4%
- Level 5 Pipe Replacement – 1%
- Other (further investigation, etc.) – 21%



Stormwater Master Plan

Community Communication

- Continued Coordination with Member Communities
- Meet with communities
  - Problem Area Review
- Recommendations and Community Report

Your Watershed Team Leader serves as the point of contact between the communities and the District

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Questions

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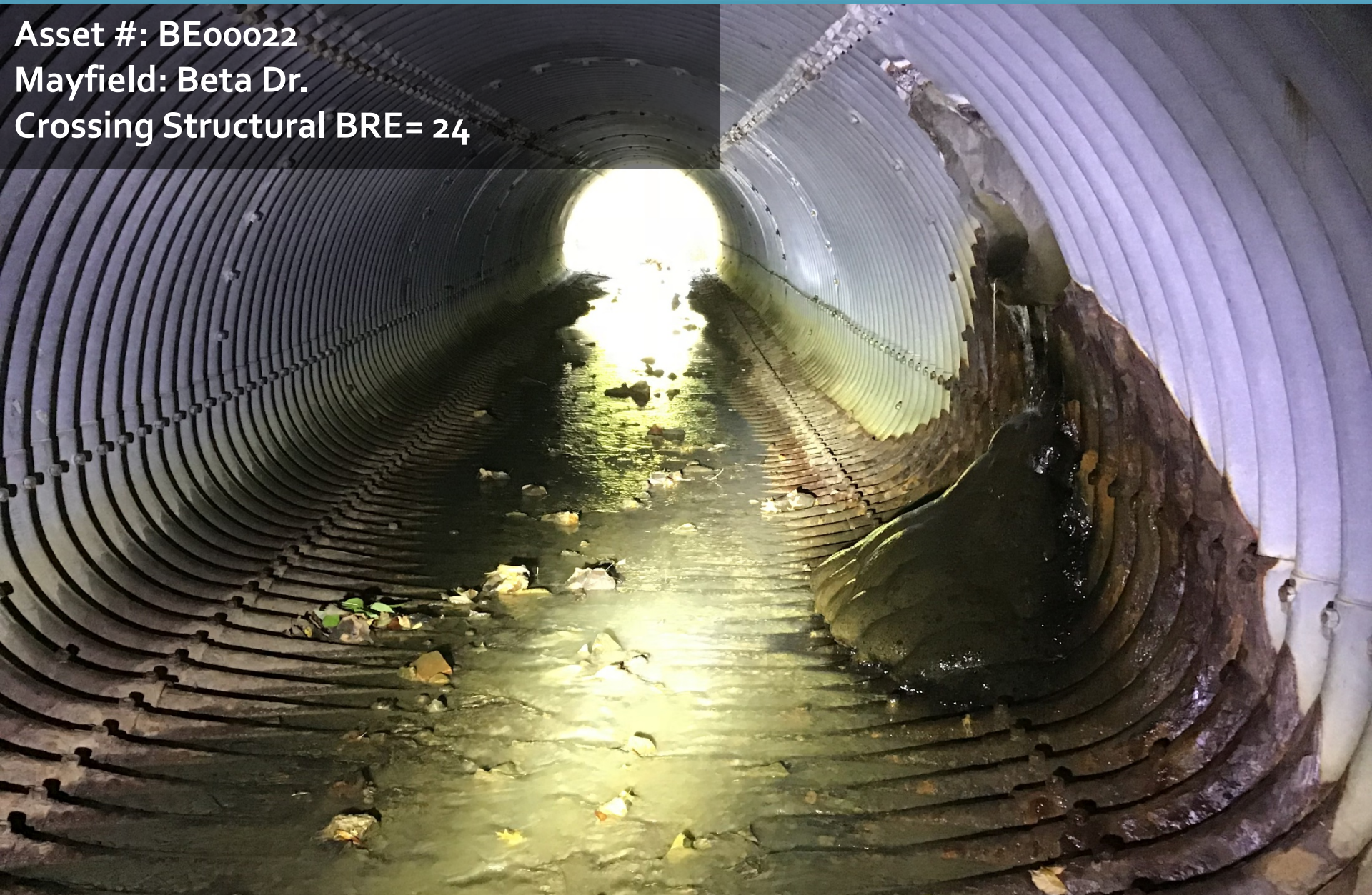
Stormwater Inspection and Maintenance (SWIM) Update

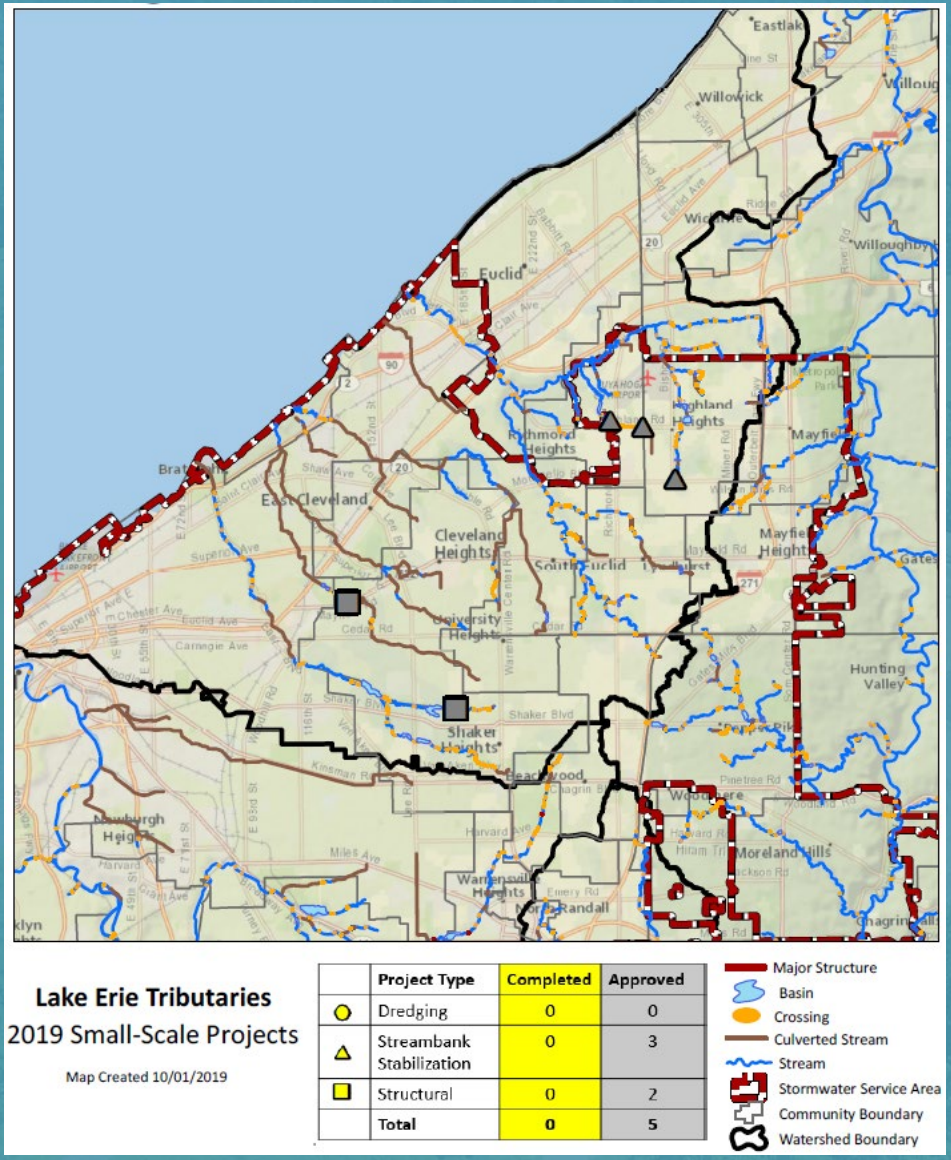
State of the Infrastructure: Crossing Beecher's Brook

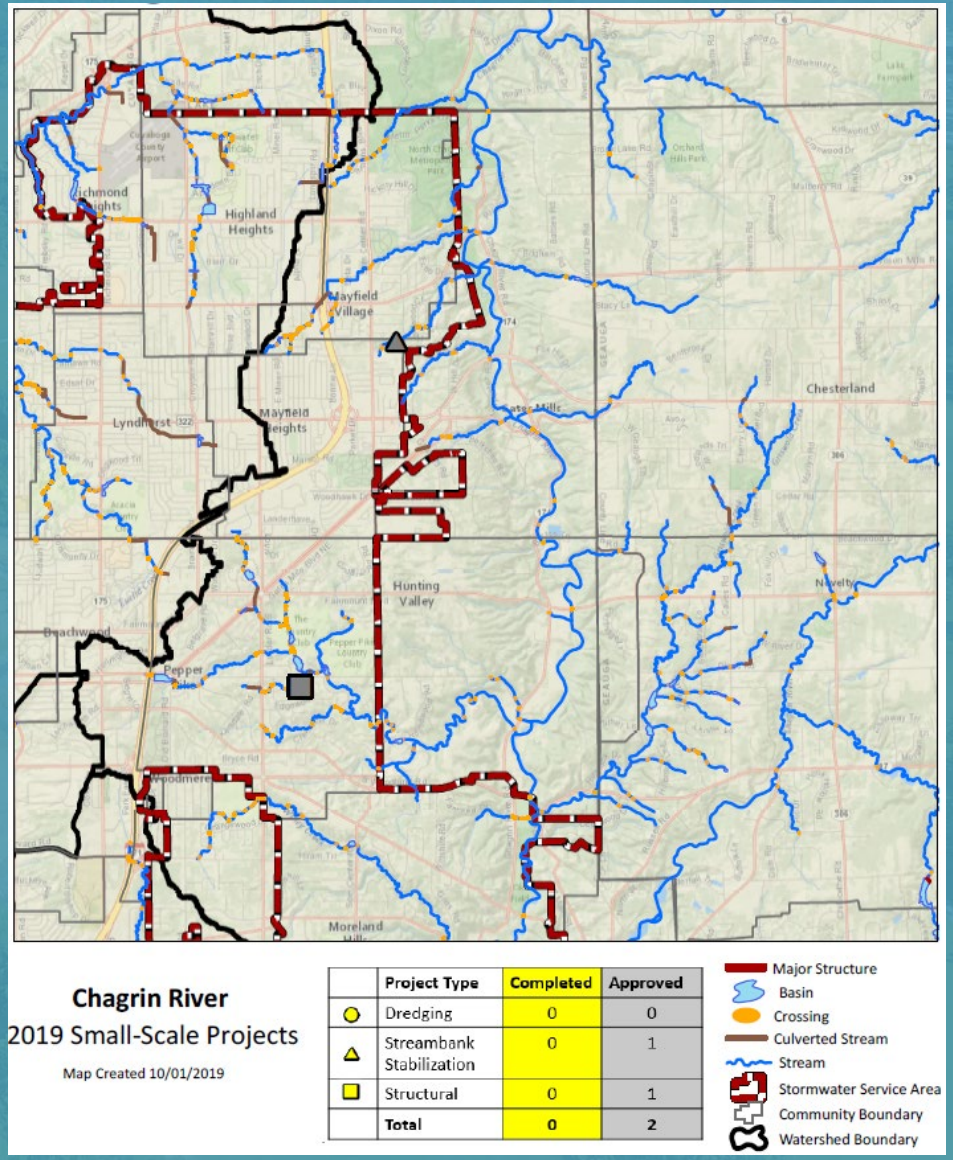


State of the Infrastructure: Stream & BTU
Chagrin River Mainstem

Asset #:CM00209
Moreland Hills:South Chagrin Reservation
Structural BRE= 15
BTU Structural BRE=20

Seven Small Scale Projects Approved in Chagrin and Lake Erie Tribs
Several Additional Projects will be Nominated this Year





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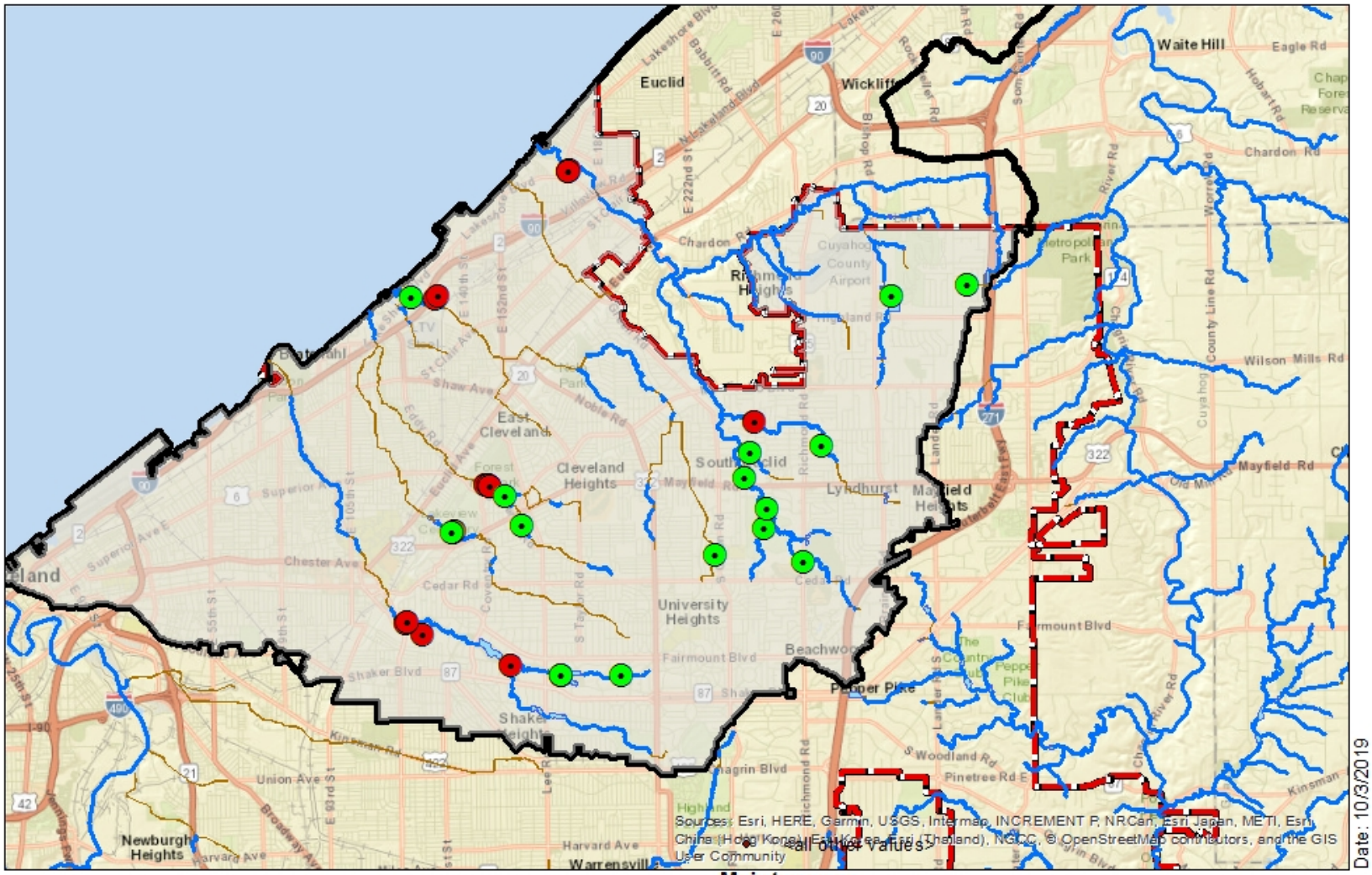
NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM



Date: 10/3/2019

Lake Erie Tributaries

Maintenance Projects
Along the Regional Stormwater System

37 Projects Completed

- Stream
- Basin
- Crossing
- Major Structure
- Culverted Stream

Maintenance

- Debris Removal - 332 Cubic Yards
- Sediment Removal - 66 Cubic Yards
- Other
- WAC Watershed
- District Stormwater Service Area

N

0 0.5 1 Miles

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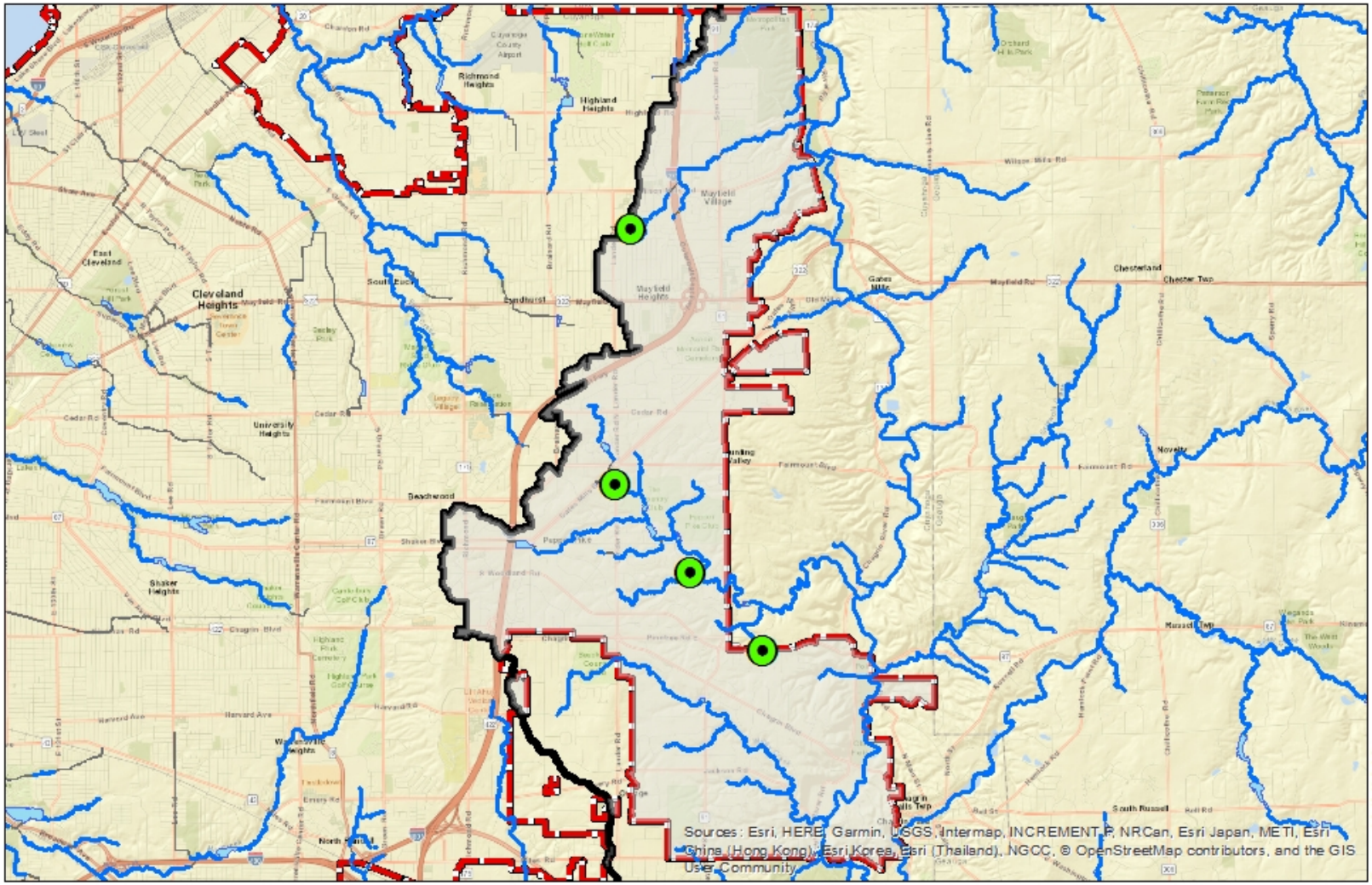
NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM



Chagrin River

Maintenance Projects
Along the Regional Stormwater System

4 Projects Completed

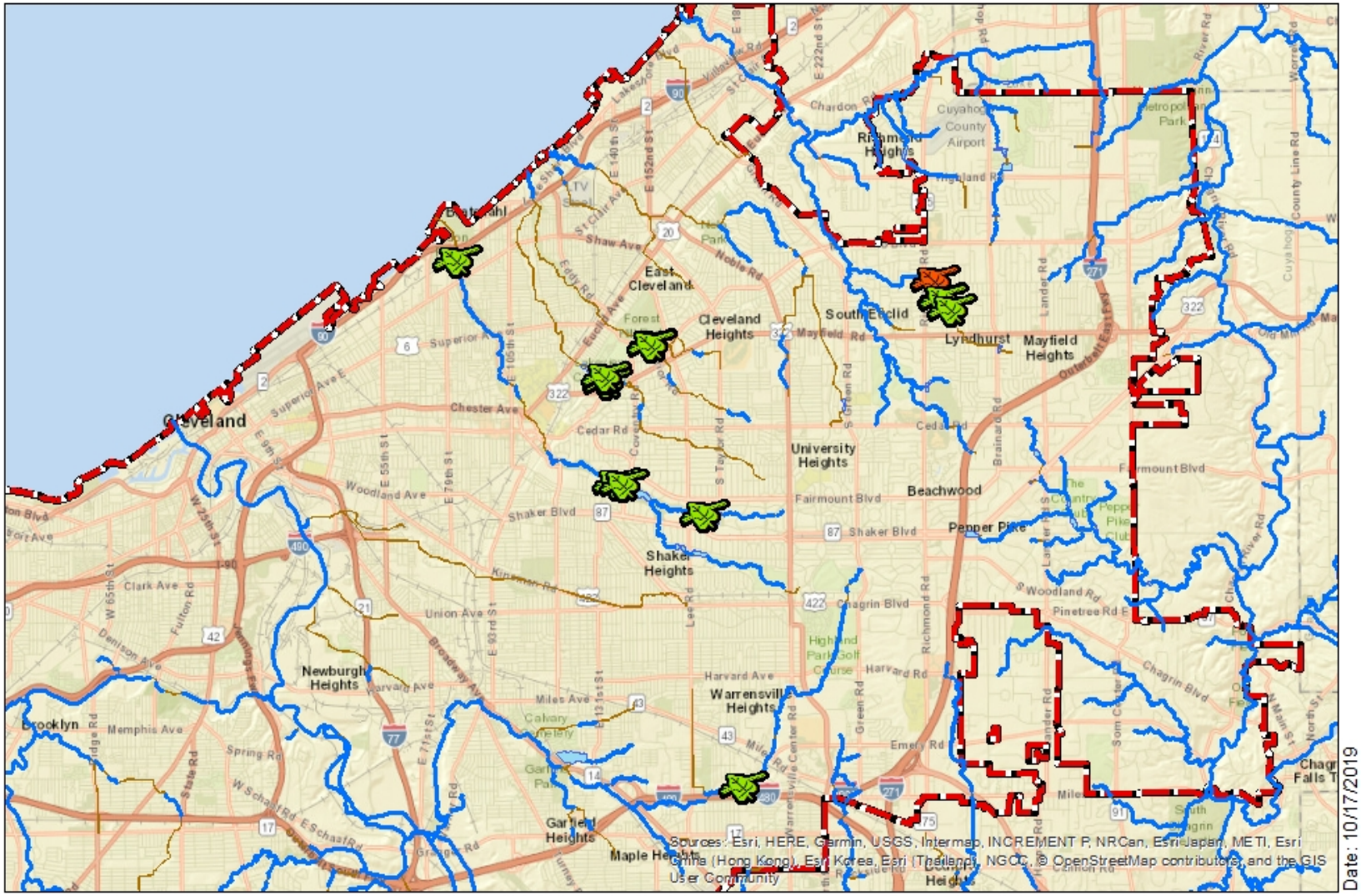
- Stream
- Culverted Stream
- Crossing
- Basin
- Major Structure
- Debris Removal: 34 Cubic Yards
- WAC Watershed
- District Stormwater Service Area

N

0 0.5 1 Miles

Northeast Ohio Regional Sewer District

NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM



Storm Response

Maintenance Projects

Resulting from the 9-13-2019 Storm Event

11 Completed Projects (1 to be Completed)

Stream

Basin

Crossing

Major Structure

Project Complete

Project Scheduled

District Stormwater Service Area

N

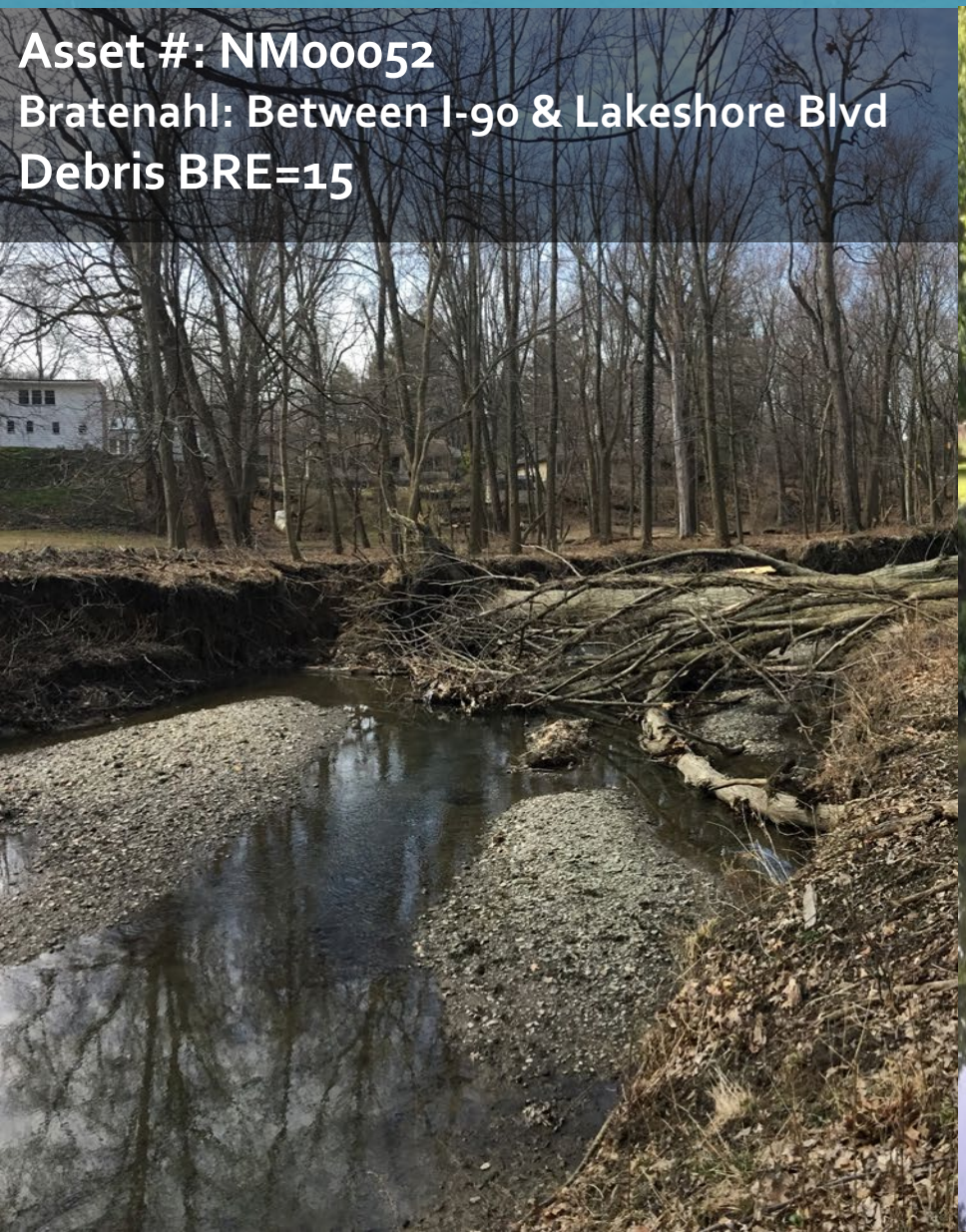
0 0.5 1 Miles

Debris Maintenance: Debris Removal
Euclid Creek West

Asset #: EW00057
Lyndhurst: Edenhurst Rd.
Debris BRE=24

Debris Maintenance: Debris Removal
Doan Brook

Debris Maintenance: Debris Removal
Nine Mile Creek



July 5th Storm Response Summary
Rainfall Stats

	Peak 5min	Peak 10min	Peak 15min	Peak 30-min	Peak 1-hr	Peak 2-hr		Peak 5min	Peak 10min	Peak 15min	Peak 30min	Peak 1-hr	Peak 2-hr
Rain Gage	in	in	in	in	in	in		in	in	in	in	in	in
SWI-RG03	0.18	0.28	0.33	0.54	0.98	1.04		4-mo	3-mo	2-mo	4-mo	1-yr	6-mo
SWI-RG06	0.16	0.25	0.31	0.45	0.47	0.51		3-mo	2-mo	2-mo	2-mo	<2-mo	
SWI-RG08	0.54	0.94	1.33	1.93	2.86	3.22		25-yr	25-yr	25-yr	50-yr	100-yr	50-yr
SWI-RG10	0.19	0.27	0.33	0.47	0.53	0.53		6-mo	2-mo	2-mo	2-mo	2-mo	
SWI-RG11	0.26	0.5	0.72	1.16	1.38	1.38		1-yr	1-yr	2-yr	5-yr	2-yr	1-yr
SWI-RG12	0.37	0.66	0.83	1.3	1.73	2.1		5-yr	5-yr	2-yr	5-yr	10-yr	10-yr
SWI-RG14	0.16	0.3	0.45	0.71	0.81	0.94		3-mo	4-mo	6-mo	9-mo	6-mo	4-mo
Brook Park	0.15	0.25	0.34	0.4	0.4	0.4		3-mo	2-mo	2-mo			
Mayfield Heights	0.13	0.21	0.28	0.35	0.44	0.44		2-mo					
Moreland Hills	0.16	0.29	0.35	0.39	0.41	0.41		3-mo	3-mo	3-mo			
North Royalton	0.36	0.68	0.99	1.55	1.72	2.29		2-yr	5-yr	10-yr	10-yr	10-yr	10-yr
Parma	0.35	0.59	0.79	1.34	1.63	1.64		2-yr	2-yr	2-yr	10-yr	5-yr	2-yr
Richfield	0.16	0.24	0.28	0.31	0.35	0.37		3-mo	2-mo				
Shaker Heights	0.2	0.28	0.31	0.56	0.79	0.8		6-mo	3-mo	2-mo	4-mo	6-mo	3-mo
South Euclid	0.23	0.43	0.48	0.56	0.57	0.57		9-mo	1-yr	6-mo	4-mo	2-mo	
Strongsville Foltz	0.17	0.31	0.4	0.51	0.58	0.58		4-mo	4-mo	4-mo	3-mo	2-mo	

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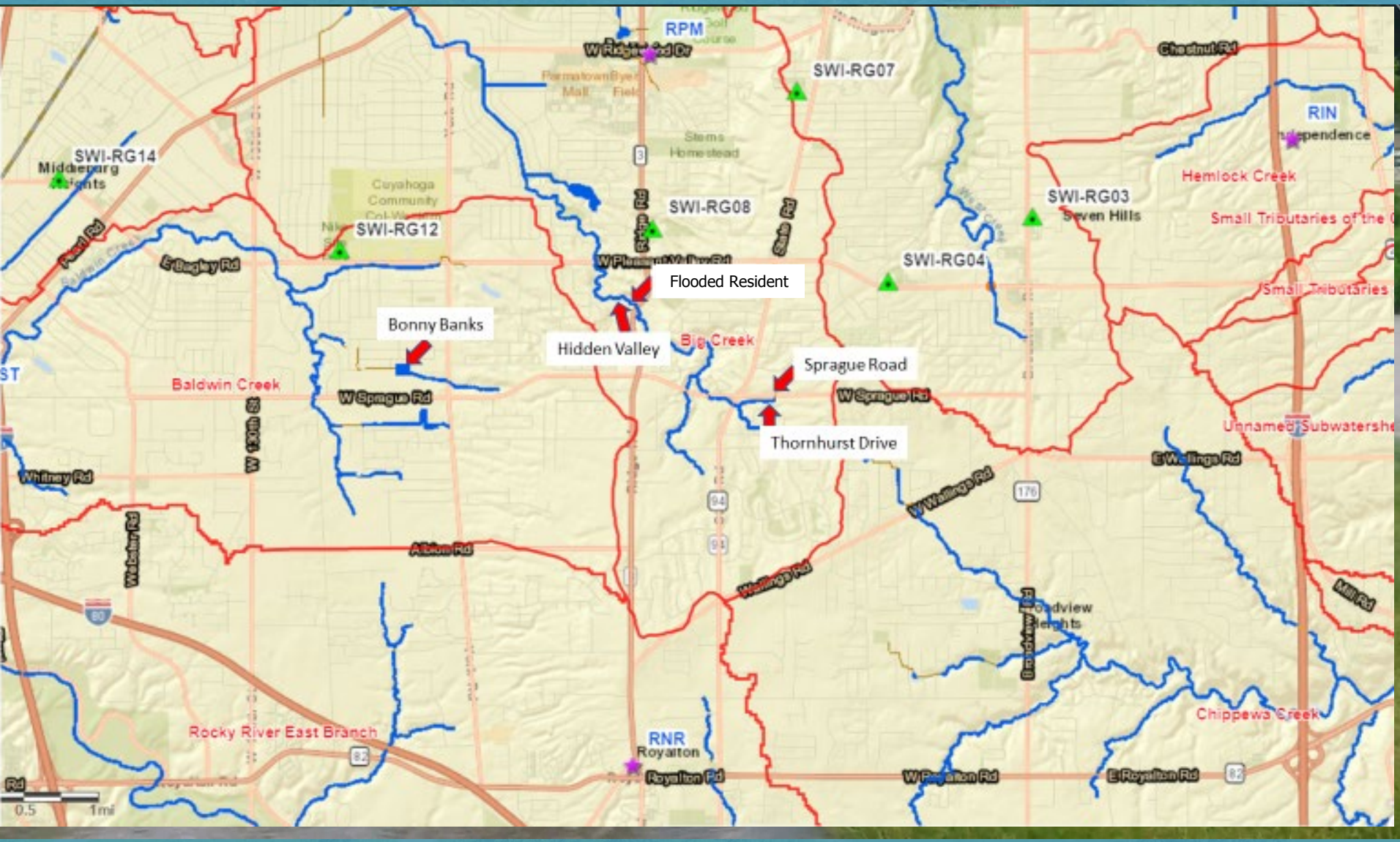
July 5th Storm Response Summary
Rainfall Figure

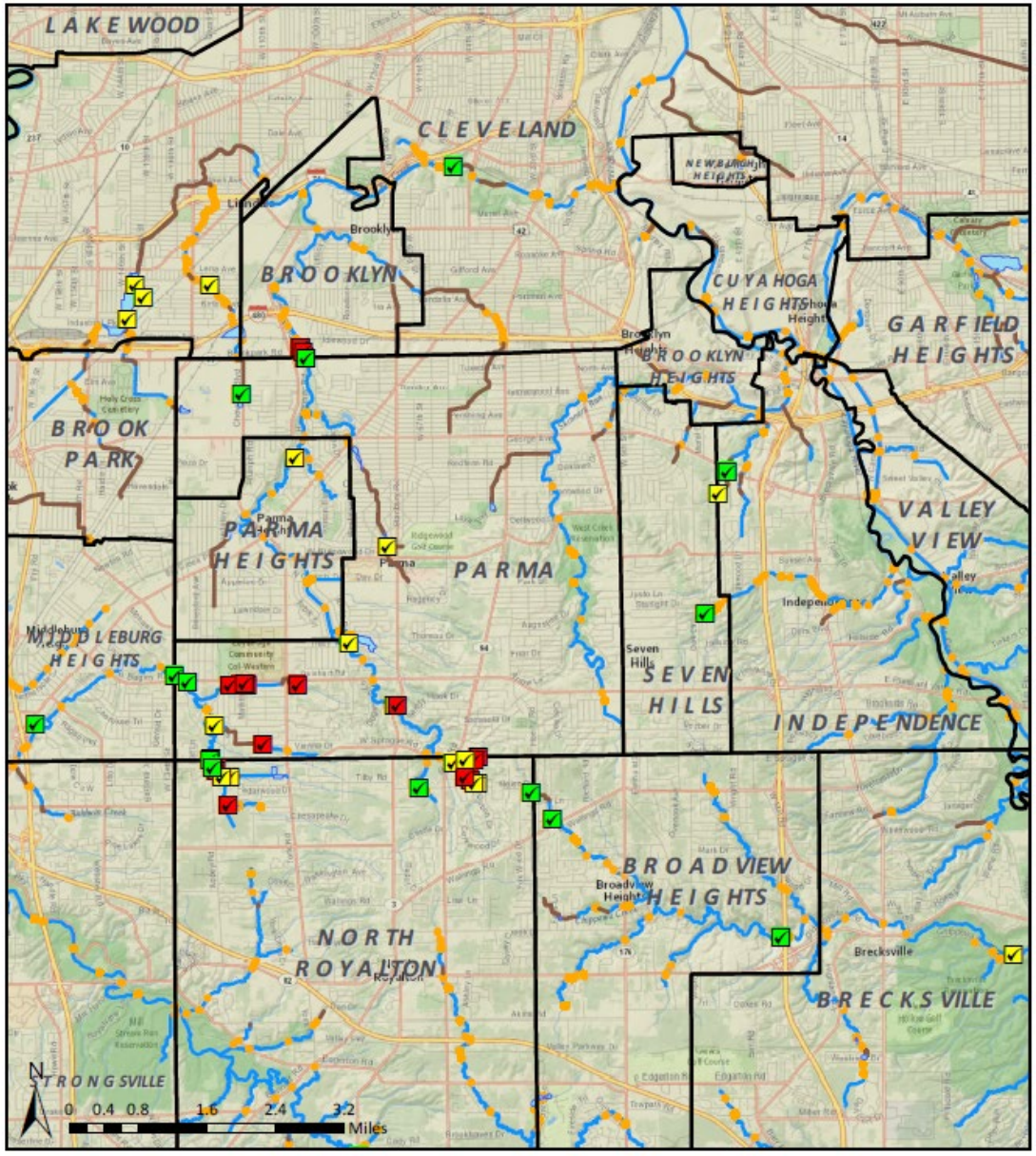


July 5th Storm Response Summary
Rainfall Figure

Resident's house looking east on Ridge Road

July 5th Storm Response Inspection Summary

- 51 Sites field visited
- 22 sites flooded
- Hardest hit areas were near RGs with peak rainfall



July 5, 2019 Rain Event
Regional SWIM Field Response
Map Created: September 25, 2019

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Estimated Peak Hydraulic Condition Score
- 1 or 2
- 3
- 4 or 5

Municipal Boundary
Basin
Culverted Stream
Crossing
Stream

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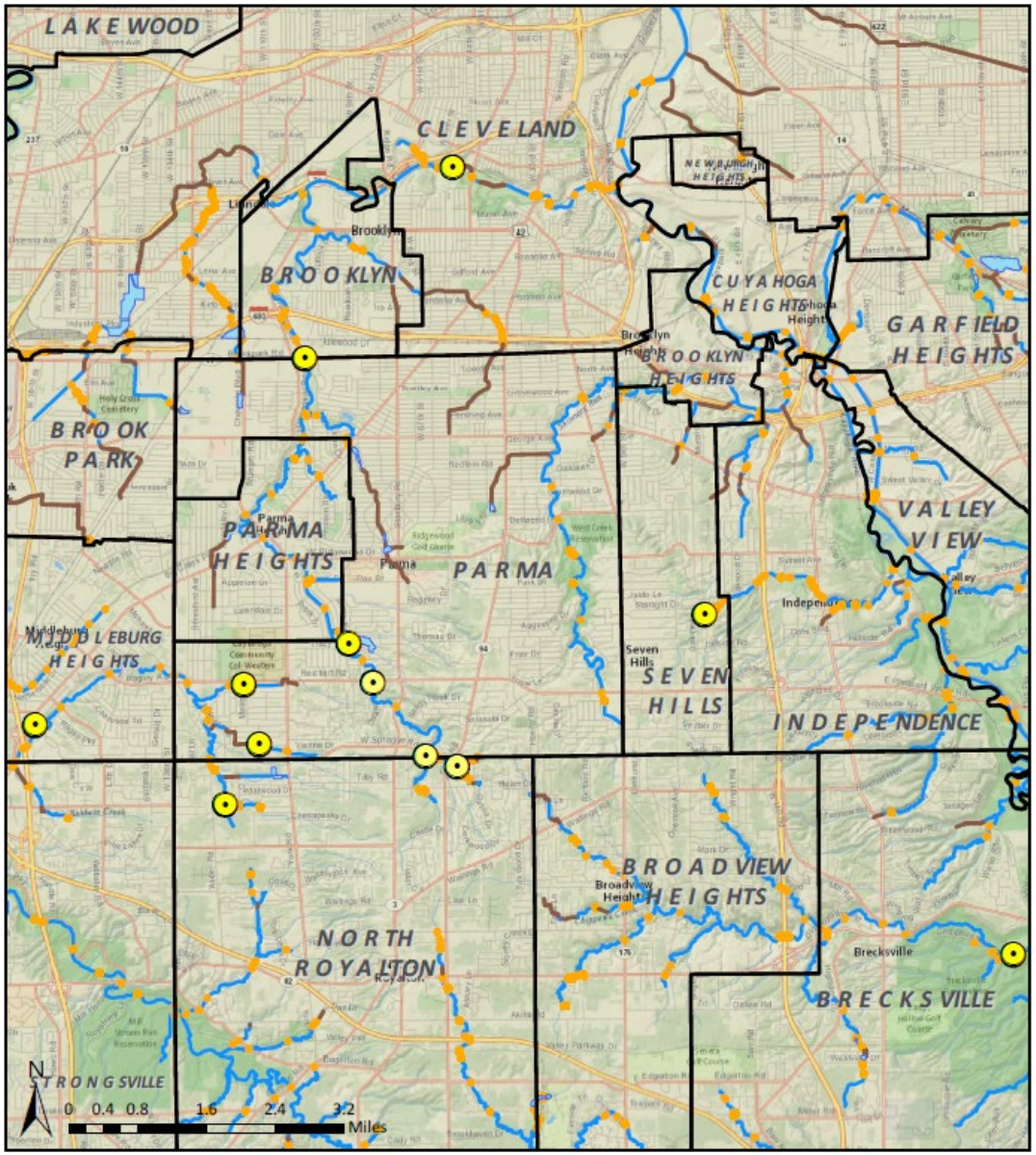
July 5th Storm Response Maintenance Summary



July 5, 2019 Rain Event
Regional SWIM Maintenance

Map Created: October 08, 2019

Northeast Ohio Regional Sewer District

Sediment & Debris Maintenance
Municipal Boundary
Basin
Culverted Stream
Crossing
Stream

- 12 sites with sediment or debris maintenance
- 362 CY removed

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State of the Infrastructure
Structural Integrity

SWSA	2,873	2,231	78%	B-	450	267
ASSET CLASS TYPE	**RSS COUNT**	**Condition Score Count**	**Percent Inspected**	**Report Card Grade (Avg Structural Condition)**	**Assets with Structural Condition 4 or 5**	**Assets with Structural BRE > 19**
Stream	1469	912	62%	B-	217	0
Crossing	1084	1062	98%	B-	143	168
Culverted Stream	208	151	73%	C	68	74
Basin	96	93	97%	B-	20	23
Major Structure	16	13	81%	B-	2	2

State of the Infrastructure
Structural Integrity

LET	444	391	88%	B	54	17
ASSET CLASS TYPE	**RSS COUNT**	**Condition Score Count**	**Percent Inspected**	**Report Card Grade (Avg Structural Condition)**	**Assets with Structural Condition 4 or 5**	**Assets with Structural BRE > 19**
Stream	214	204	95%	B	43	0
Crossing	150	149	99%	B+	7	12
Culverted Stream	57	16	28%	B+	2	2
Basin	23	22	96%	B	2	3
Major Structure	0	0	0%	0	0	0
CHA	191	176	92%	B	36	20
ASSET CLASS TYPE	**RSS COUNT**	**Condition Score Count**	**Percent Inspected**	**Report Card Grade (Avg Structural Condition)**	**Assets with Structural Condition 4 or 5**	**Assets with Structural BRE > 19**
Stream	97	85	88%	B	19	0
Crossing	79	79	100%	B	12	14
Culverted Stream	7	4	57%	D	3	4
Basin	8	8	100%	B-	2	2
Major Structure	0	0	0%	0	0	0

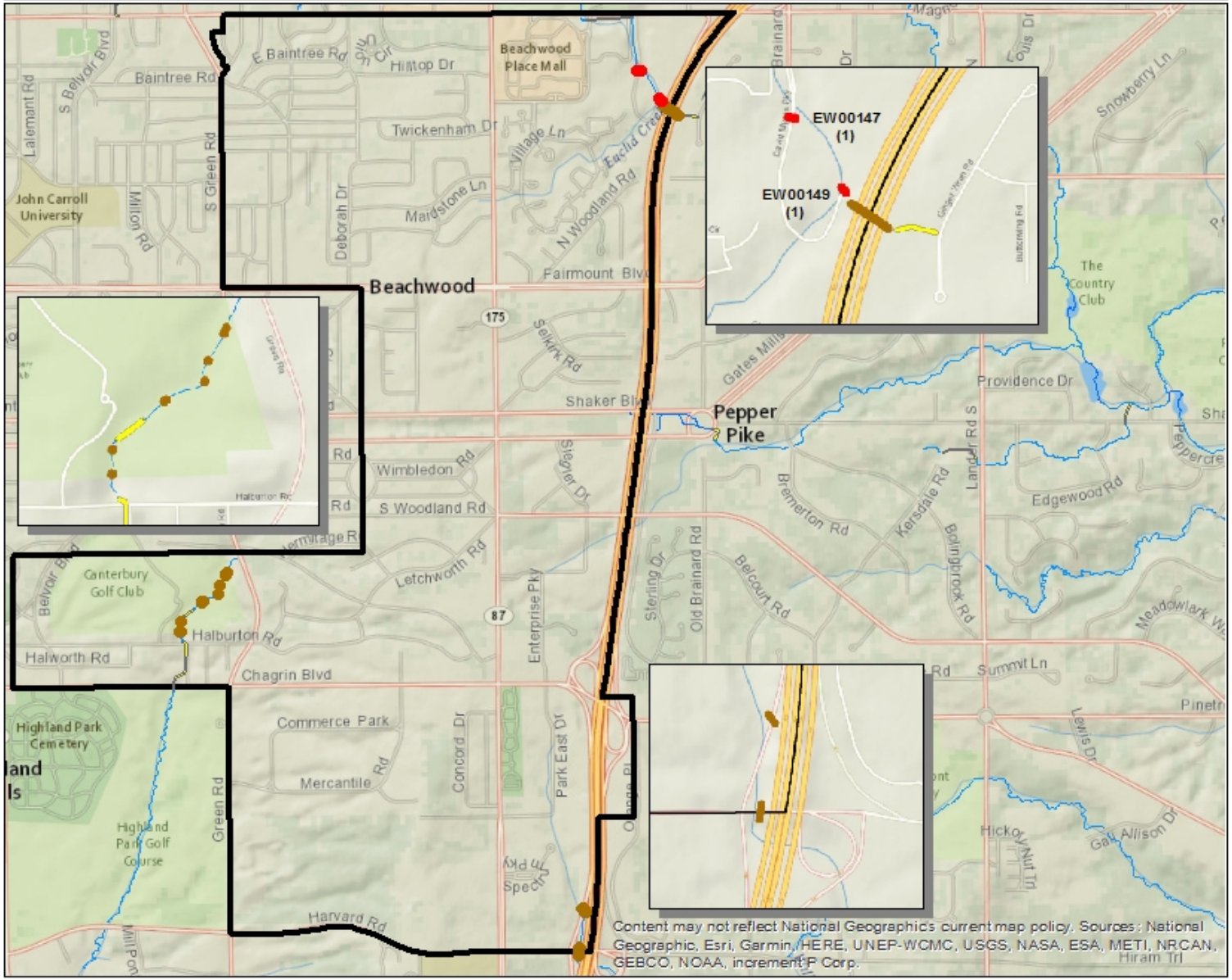
Community Crossing Meeting

Meeting Objectives:

- Review SWIM's Structural Condition Assessment
- Confirm Community's Ownership or Maintenance Responsibilities
- Discuss Crossings and Recommended Repairs
- Understand Community's Schedule to Address Known issues
- Discuss Potential Next Steps

Northeast Ohio Regional Sewer District

Beachwood Responsible Party Crossings: Structural Condition Scores



Legend

Responsible Pary

- Beachwood
- Other Entity

- Stream
- Culverted Stream
- Municipal Boundary

1:33,309

Coordinate System: Ohio State Plane North
Datum: NAD 1983
Projection: Lambert Conformal Conic
Sources: NEORSD GIS and Engineering

Map Created: 4/29/2016

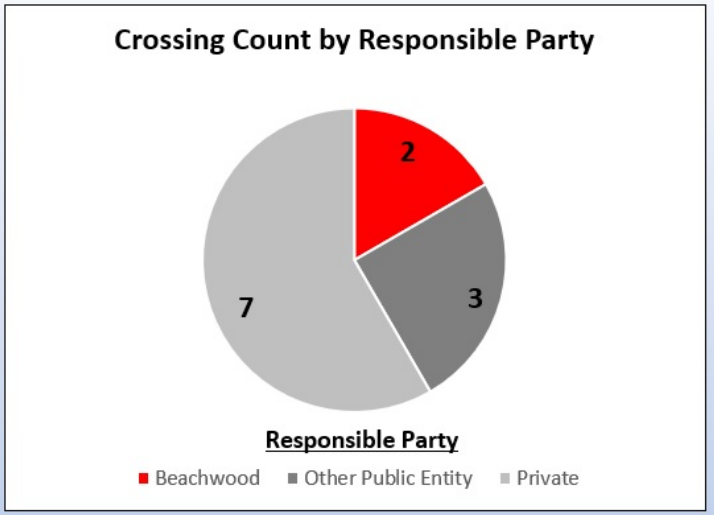
Notes

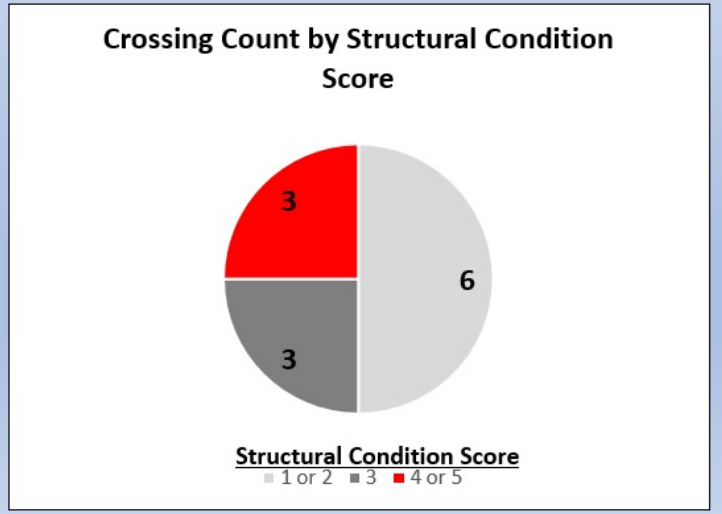
Community Crossing Meeting: Example Handout

Responsible Party	Crossing Count
Beachwood	2
Cuyahoga County	1
ODOT	2
Private	7
Total	**12**

Structural Score	Crossing Count
1 or 2	6
3	3
4 or 5	3
Total	**12**

Beachwood Crossings (4s & 5s)	
Asset ID	**Street**
None	





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Stormwater Design and Construction Program

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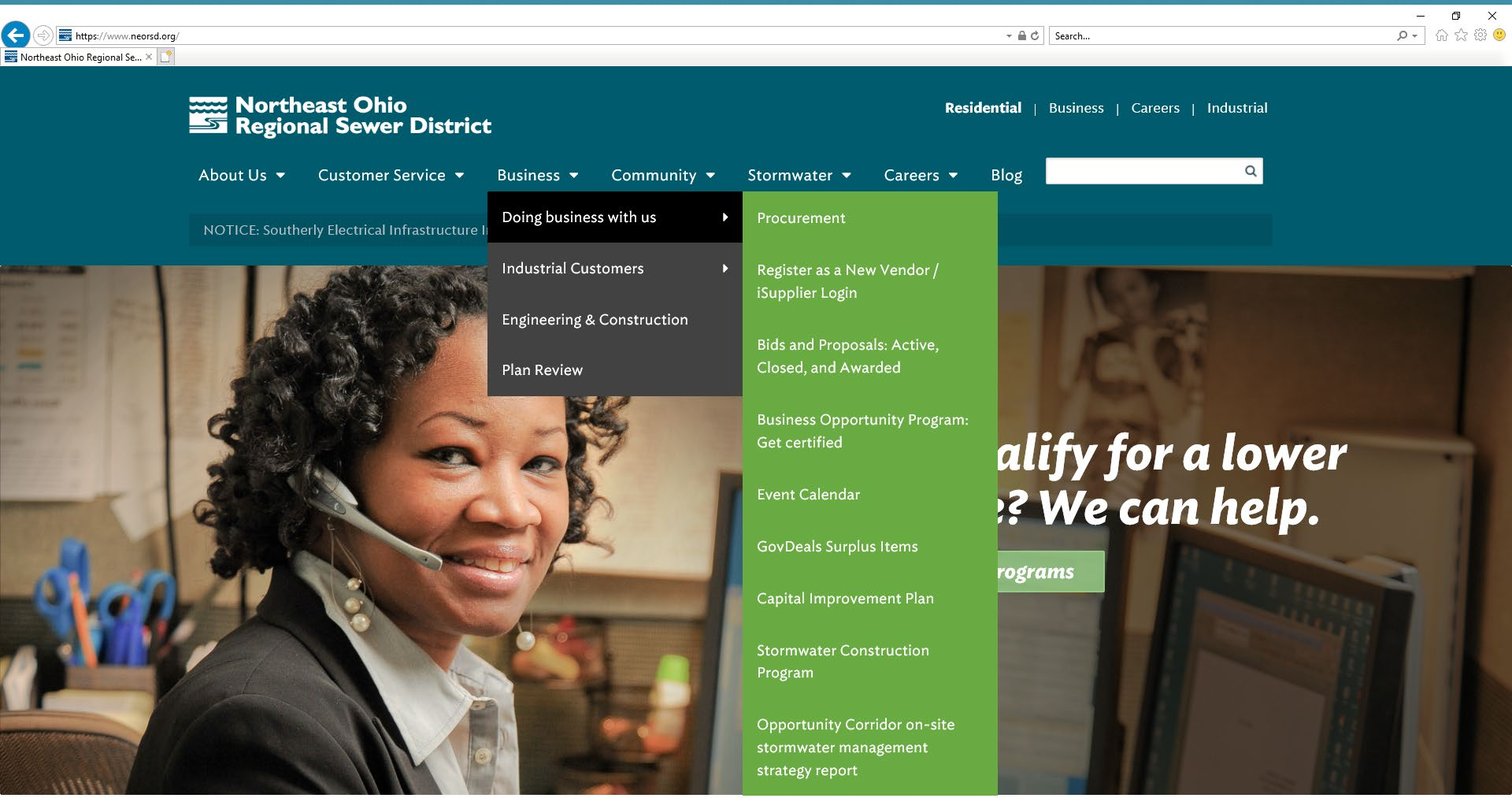
Stormwater Storymap



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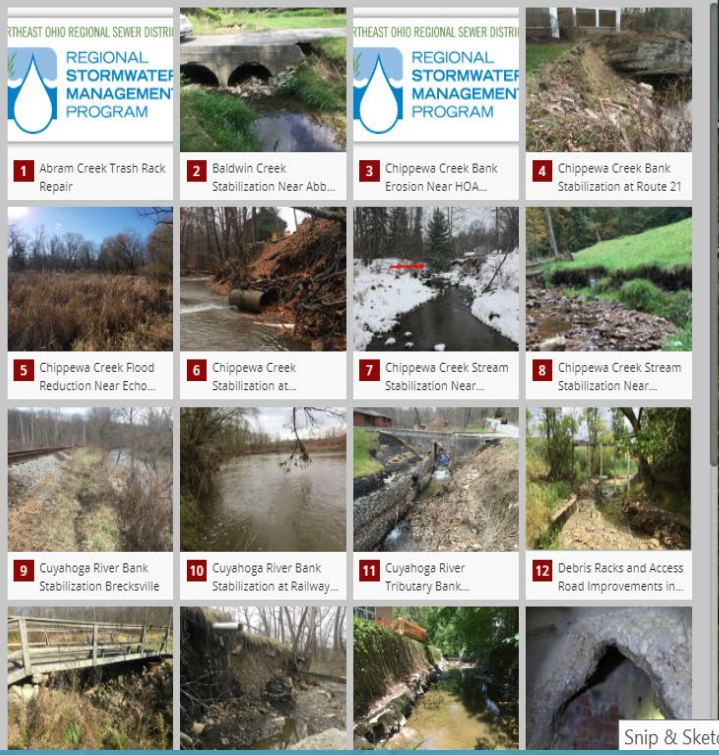
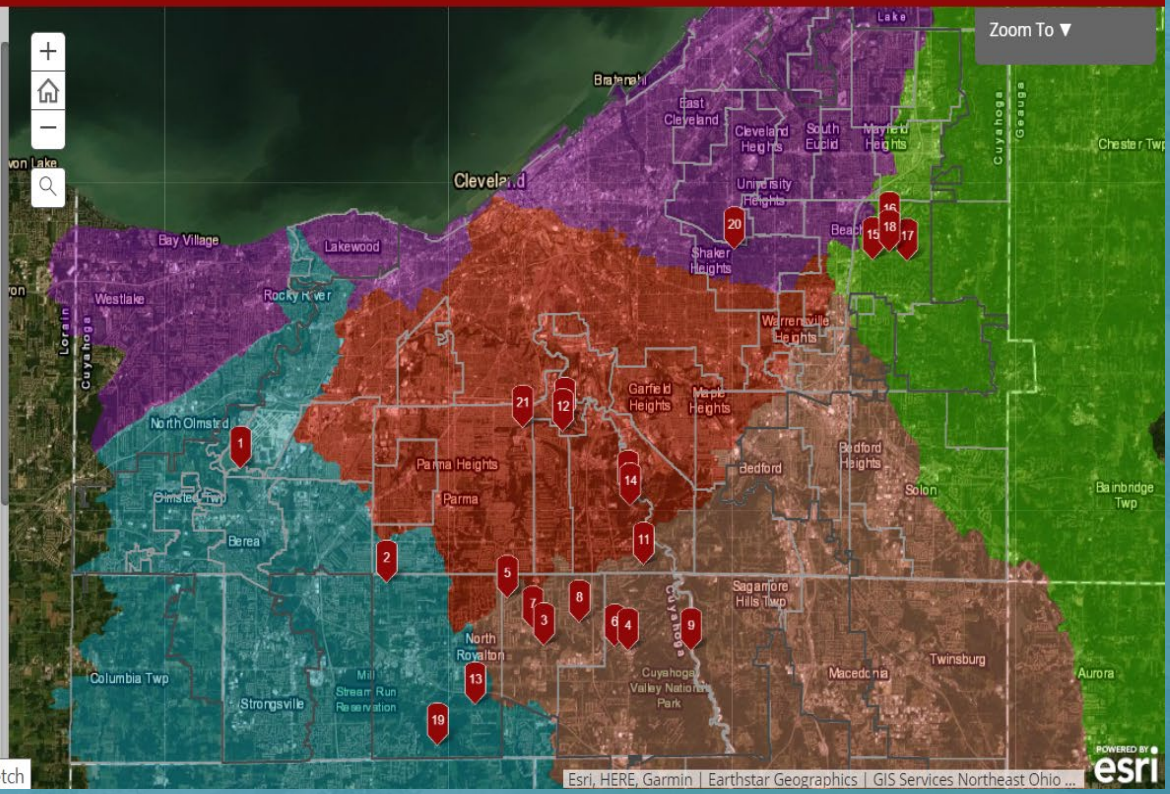
NEORSD Stormwater Design & Construction Program

Navigate using the tabs below and by clicking the images to view more details on our completed, current design, and current construction stormwater projects. Zoom in to view satellite imagery and Regional Stormwater System features (e.g. streams, culverts, conduits, etc). Use the "Zoom To" drop down menu to locate your watershed.

All Projects | Design | Construction | Complete





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NEORSD Stormwater Design & Construction Program

Navigate using the tabs below and by clicking the images to view more details on our completed, current design, and current construction stormwater projects. Zoom in to view satellite imagery and Regional Stormwater System features (e.g. streams, culverts, conduits, etc). Use the "Zoom To" drop down menu to locate your watershed.

All Projects | Design | **Construction** | Complete

1 Baldwin Creek Bank Stabilization at East...

2 Big Creek Stabilization

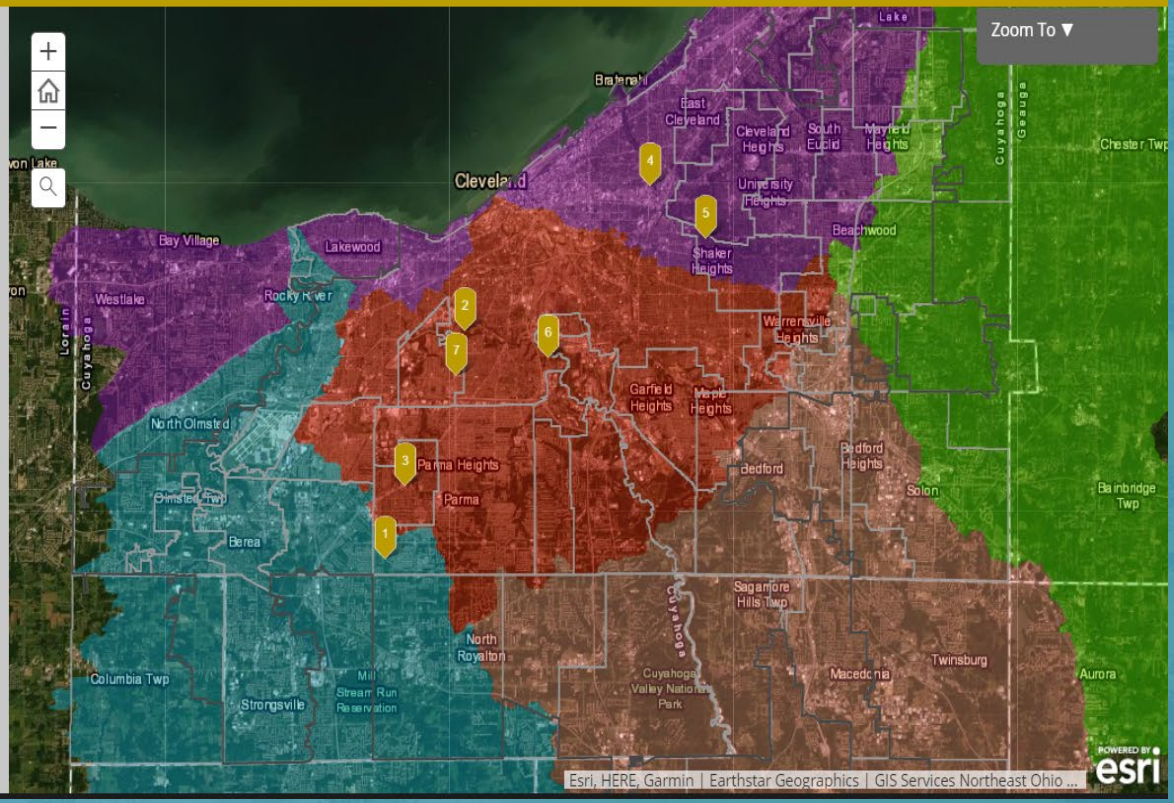
3 Colombo Park Stream Restoration

4 Doan Brook Stream Bank Stabilization

5 Shaker Lakes Dam Rehabilitation Phase I:...

6 Spring Creek Culvert Rehabilitation

7 Stickney Creek Restoration and Utility...



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Design

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Shaker Lakes – Upper Lake Dam Improvements

Goals:

- Repair Class 1 dam to meet ODNR requirements

Current Design Phase:
90% Design
Est. Construction Cost: $8M

Pepper Luce – Improvements at Gates Mills Blvd

Goals:

- Arrest bank erosion
- Improve stream function
- Increase storage
- Relocate collapsed culvert

Current Design Phase:
Pre-Design
Est. Construction Cost: $1M

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Pepper Luce at Shaker Blvd Culvert Daylighting

Goals:

- Alleviate flooding of Shaker Blvd and nearby homes
- Improve stream function

Current Design Phase:
Final Design

Total Project Cost: $750,000

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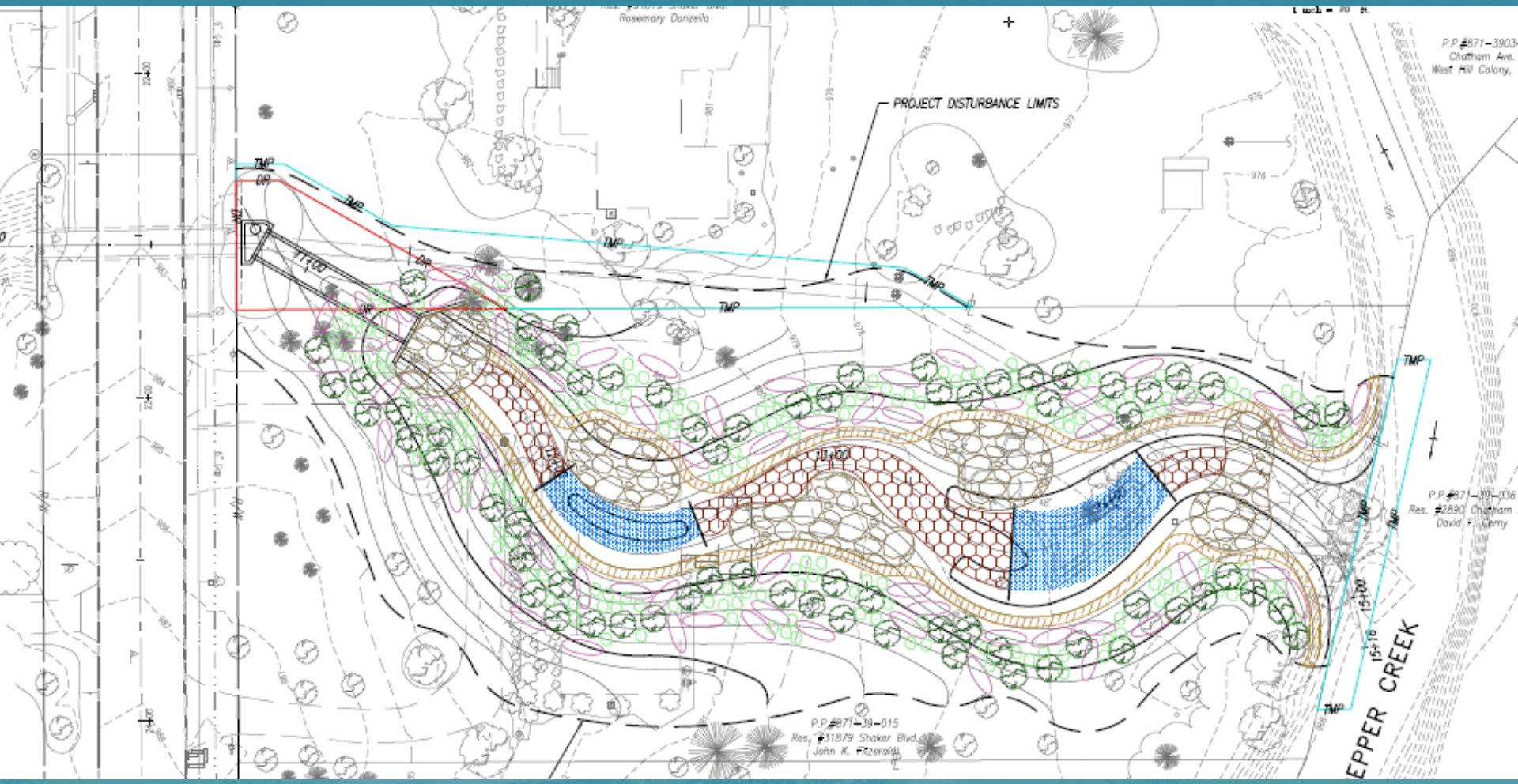
Pepper Luce at Shaker Blvd Culvert Daylighting



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Construction

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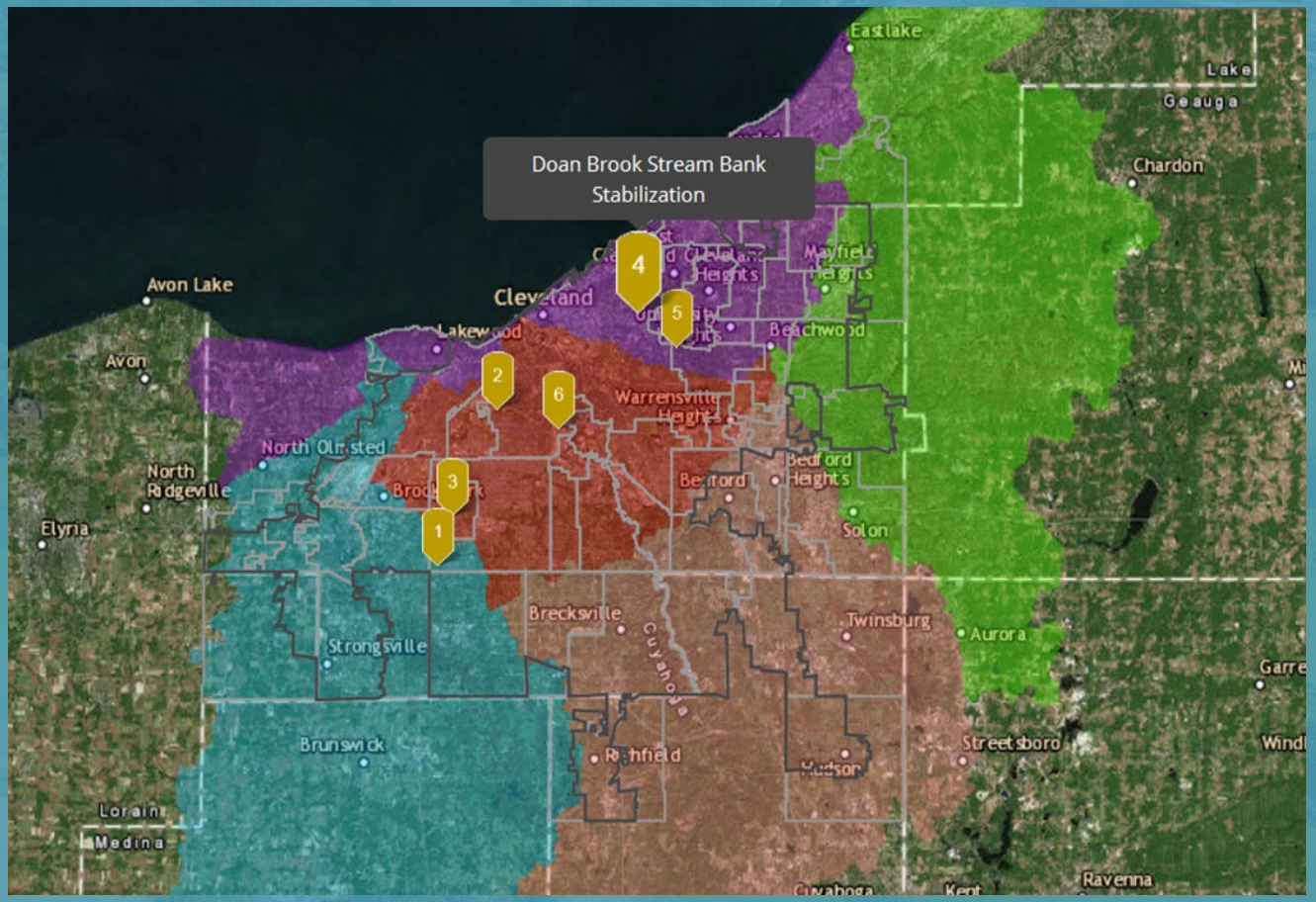
1410 Construction Update

Doan Brook Streambank Stabilization in Cleveland adjacent to MLK Blvd

Doan Brook is tributary directly to Lake Erie



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REGIONAL STORMWATER MANAGEMENT PROGRAM

Doan Brook Streambank Stabilization

- *1000lf stream rehabilitation*
- *Tie in from Nord Family Greenway to MLK Culvert*
- *$2.4M Construction Cost*

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REGIONAL STORMWATER MANAGEMENT PROGRAM

Doan Brook Streambank Stabilization

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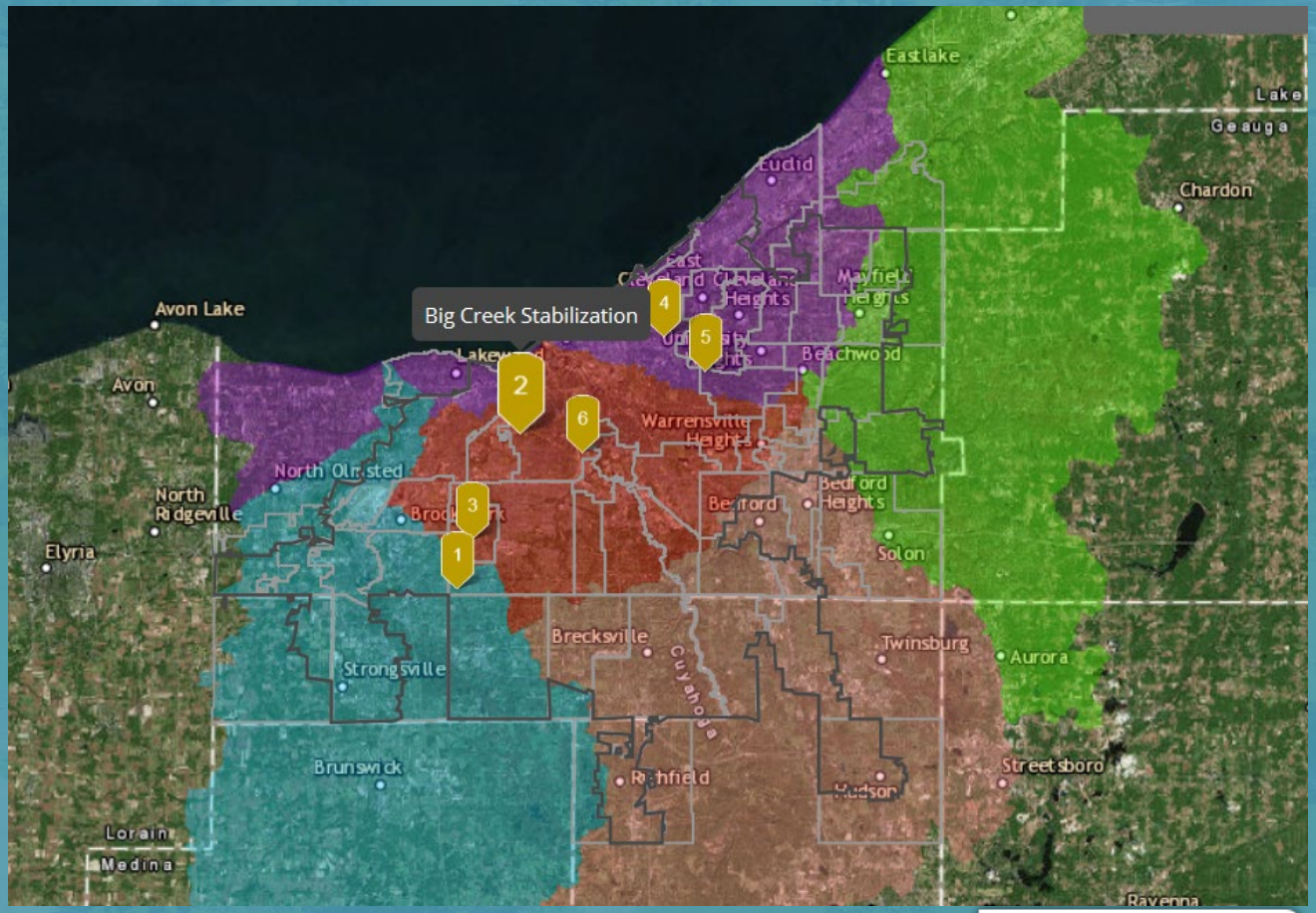
REGIONAL STORMWATER MANAGEMENT PROGRAM

1411 Construction Update

Big Creek Stabilization in Cleveland; tributary to Cuyahoga River

When I-71 was constructed in 1966, Big Creek was straightened



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Big Creek Stabilization

- Remove 1200lf of concrete lined channel
- Remove 30ft tall drop structure and replace with rock channel design
- $6.5M Construction Cost

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Big Creek Stabilization

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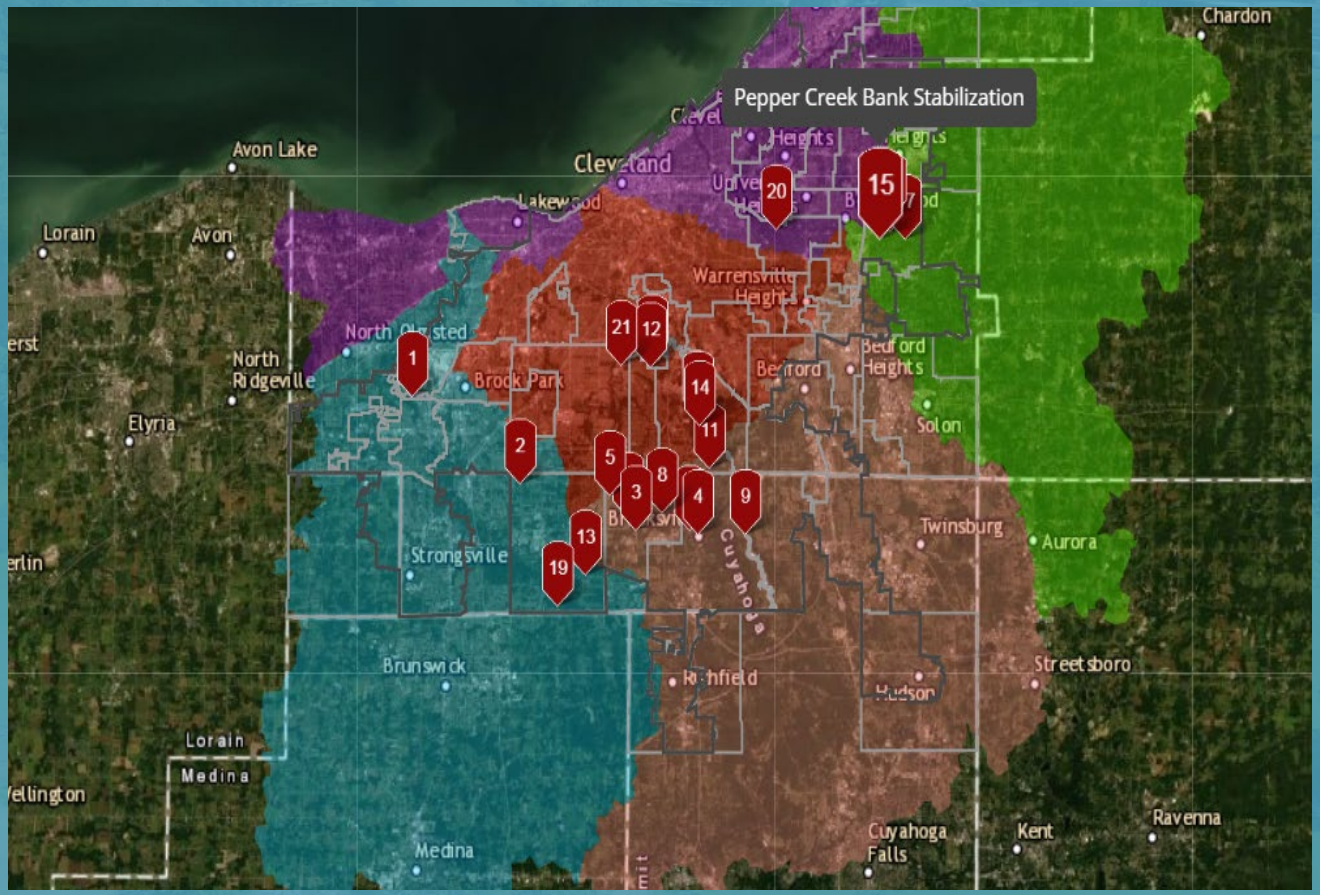
REGIONAL STORMWATER MANAGEMENT PROGRAM

1369 Construction Update

Pepper Creek Bank Stabilization in Pepper Pike; tributary to Chagrin River

Severely eroding stream segment near Shaker Blvd.



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Pepper Creek Bank Stabilization

- Restore 850LF feet of stream
- Reestablish a more natural stream alignment
- $1.1M Construction Cost

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Pepper Creek Bank Stabilization

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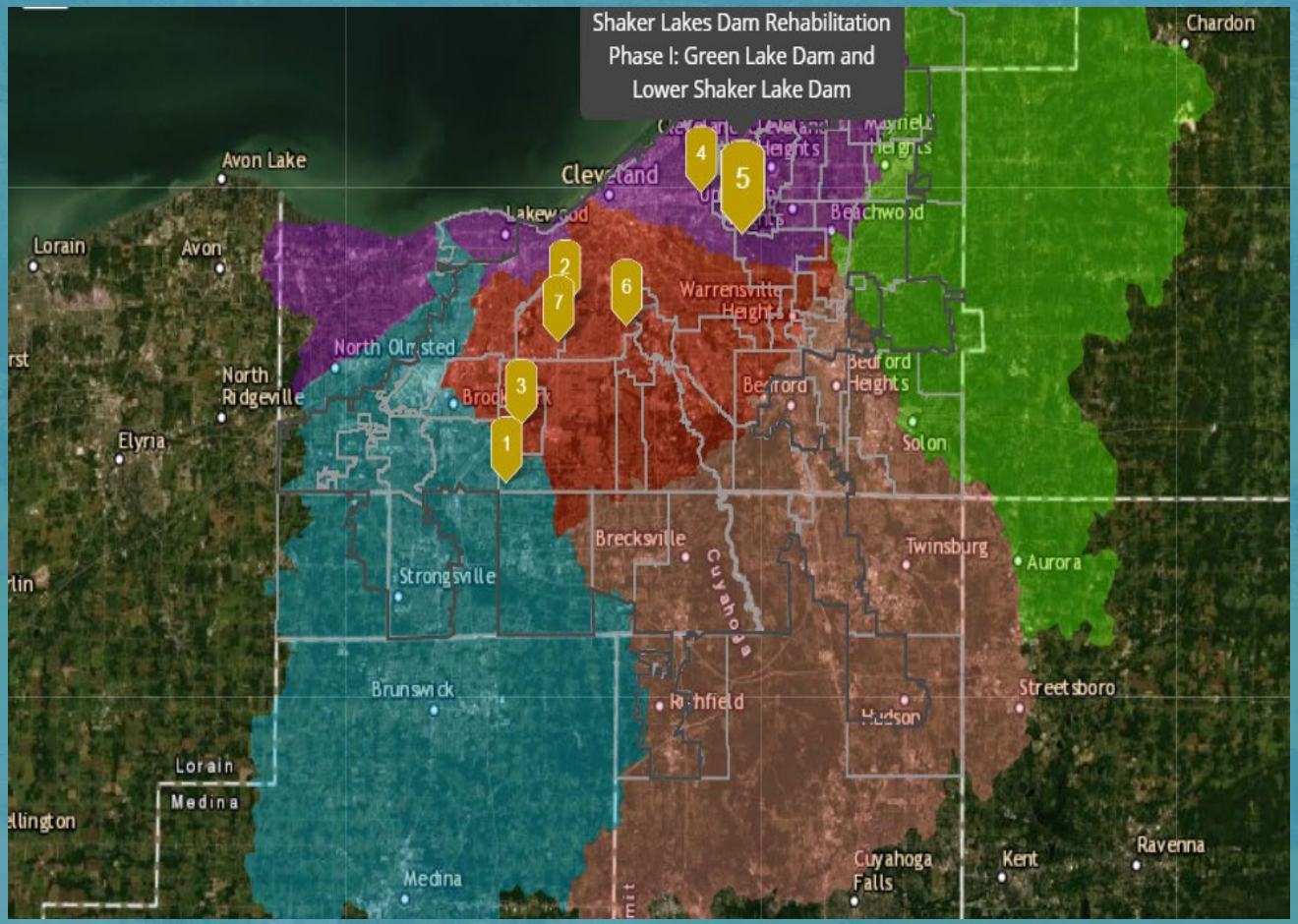
NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL
STORMWATER
MANAGEMENT
PROGRAM

1565 Construction Update

Dam improvements in Cleveland Heights and Shaker Heights

Helping community compliance with ODNR Dam Safety Program



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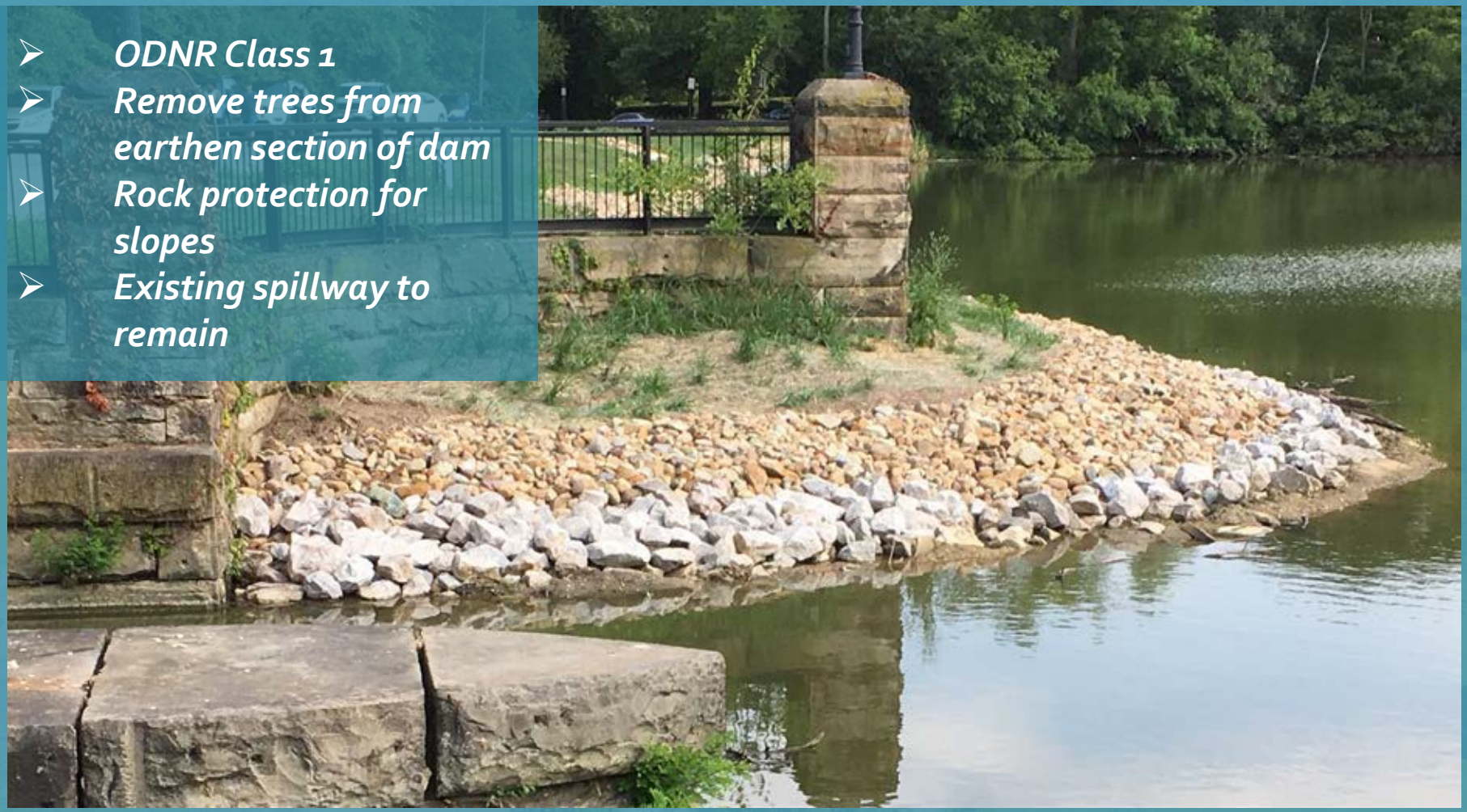
REGIONAL STORMWATER MANAGEMENT PROGRAM

Lower Lake Dam Rehabilitation

- ODNR Class 1
- Remove trees from earthen section of dam
- Rock protection for slopes
- Existing spillway to remain



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Green Lake Dam Rehabilitation

- ODNR Class 2
- Previously a dredging project
- New CIP primary 75lf spillway
- Between historic preservation sites

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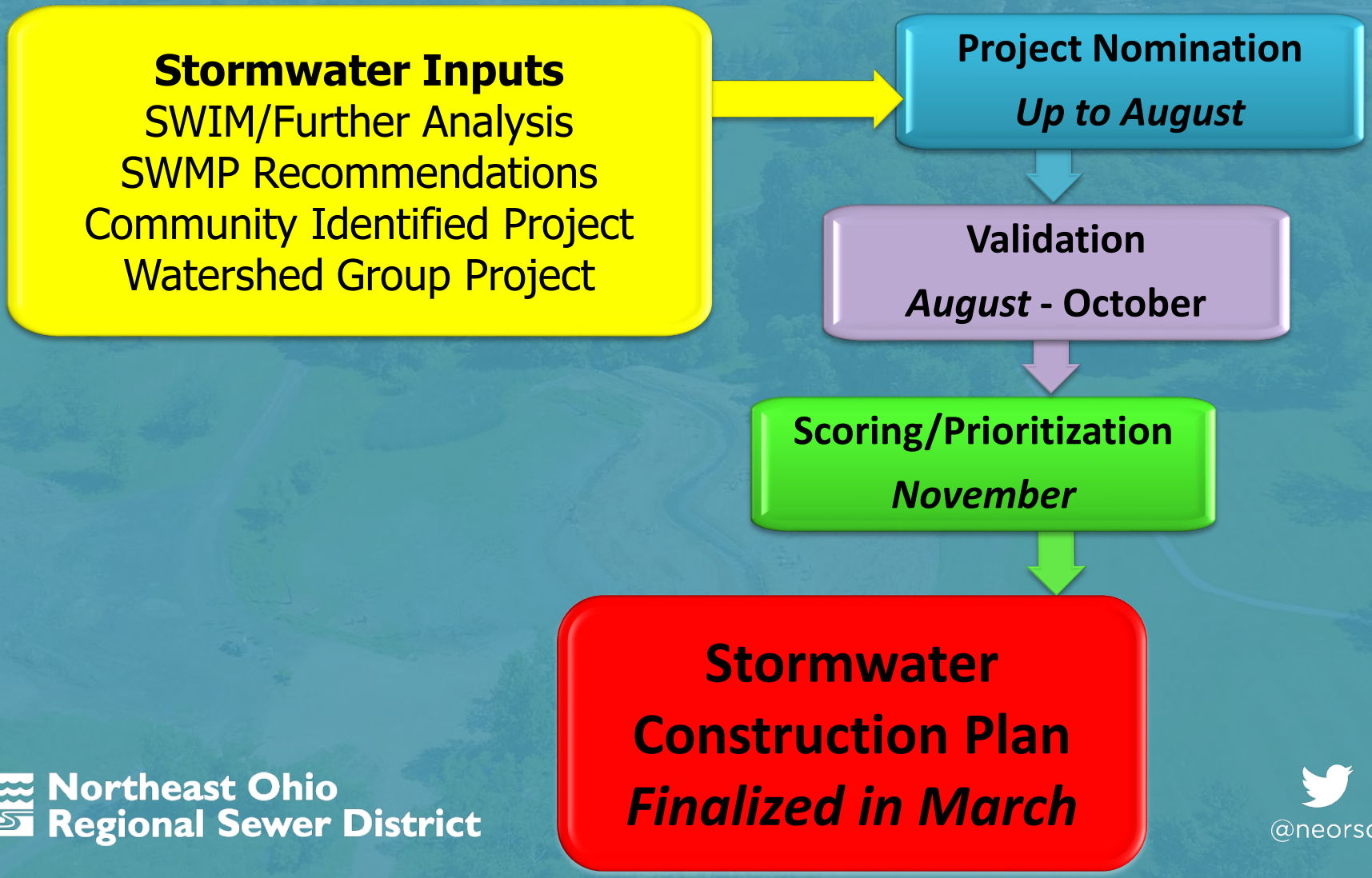
REGIONAL STORMWATER MANAGEMENT PROGRAM

Stormwater Nomination Process



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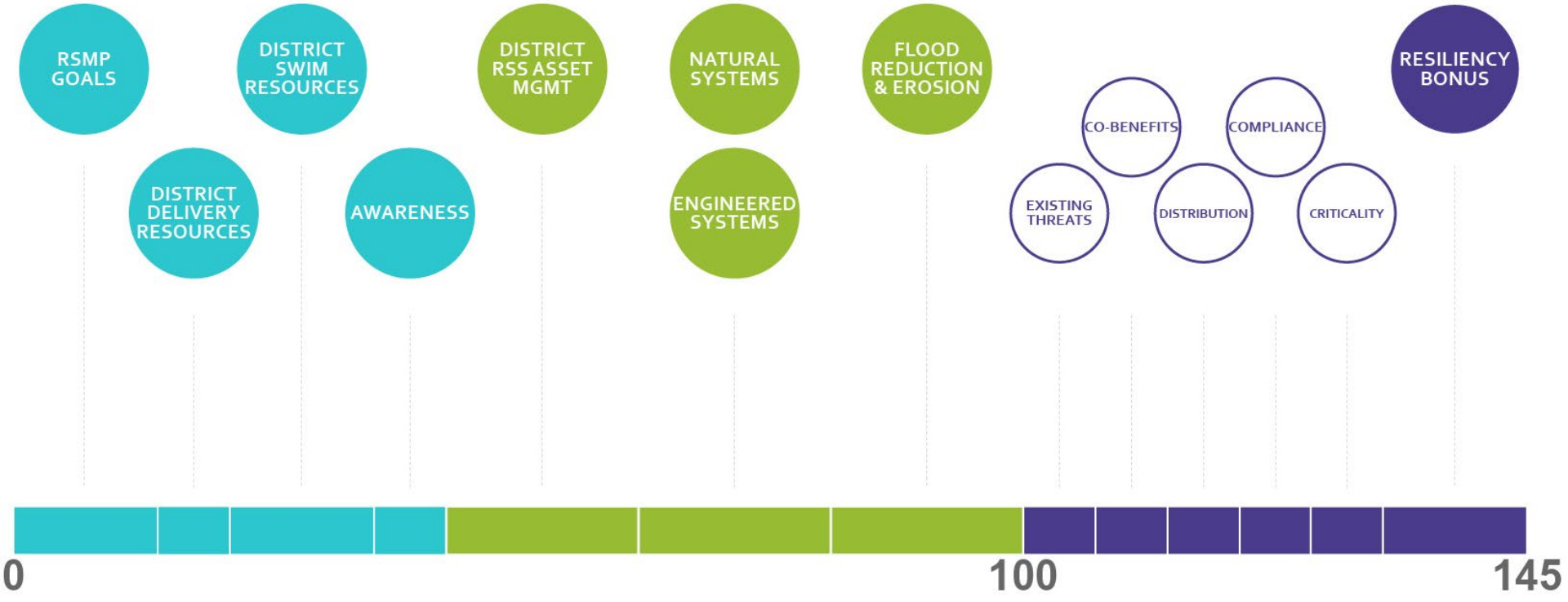
Nomination Process

- Previous risk-based system

Nomination Process

- Benefit-based system



Nomination Process

- Project Nomination Numbers
  - **80** new project nominations in 2019
    - Includes **73** from SWMPs
  - **20** reevaluated from previous years

Questions

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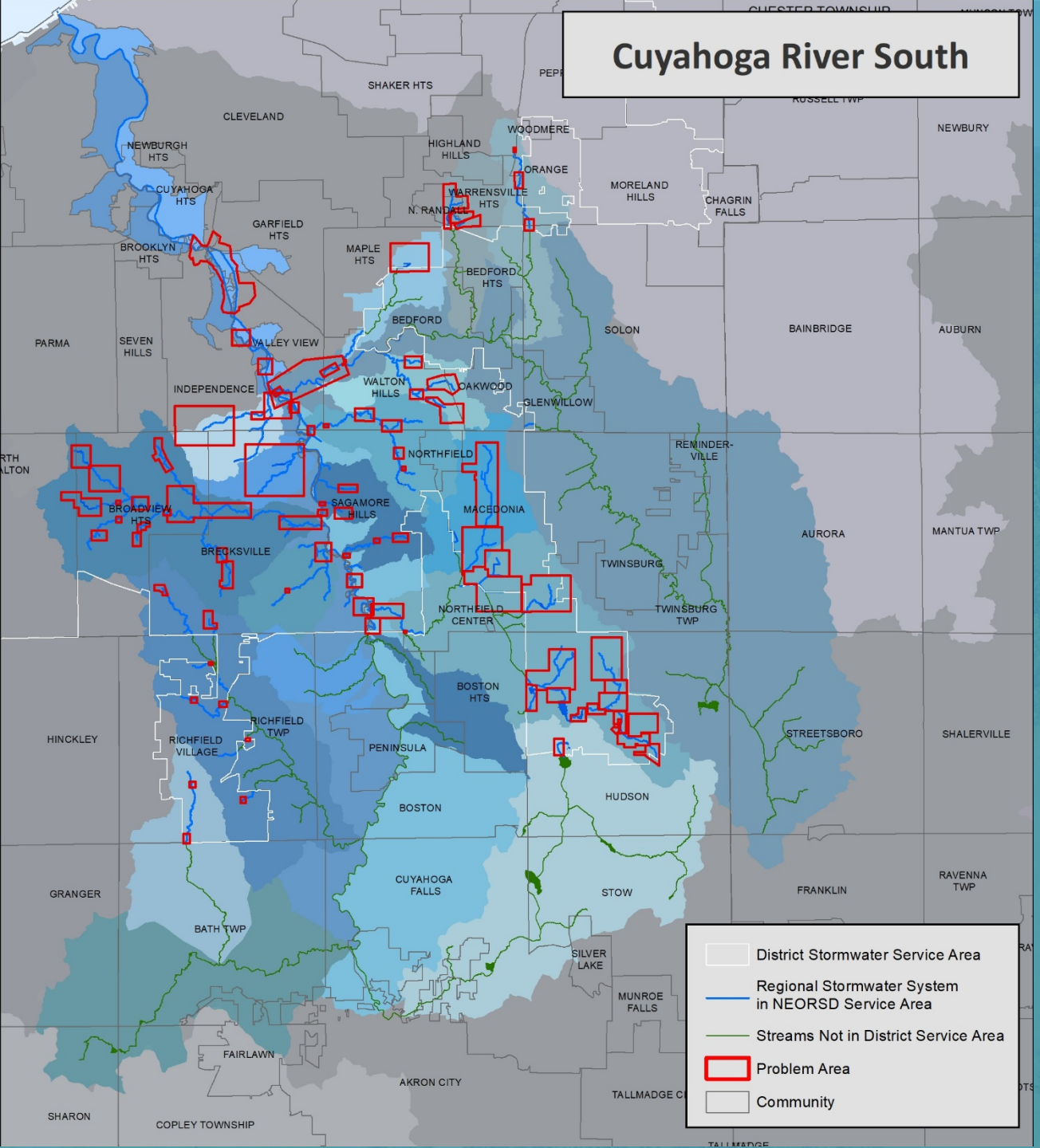

Cuyahoga River South Stormwater Master Plan

80+ Problem Areas with Planning Level Recommendations

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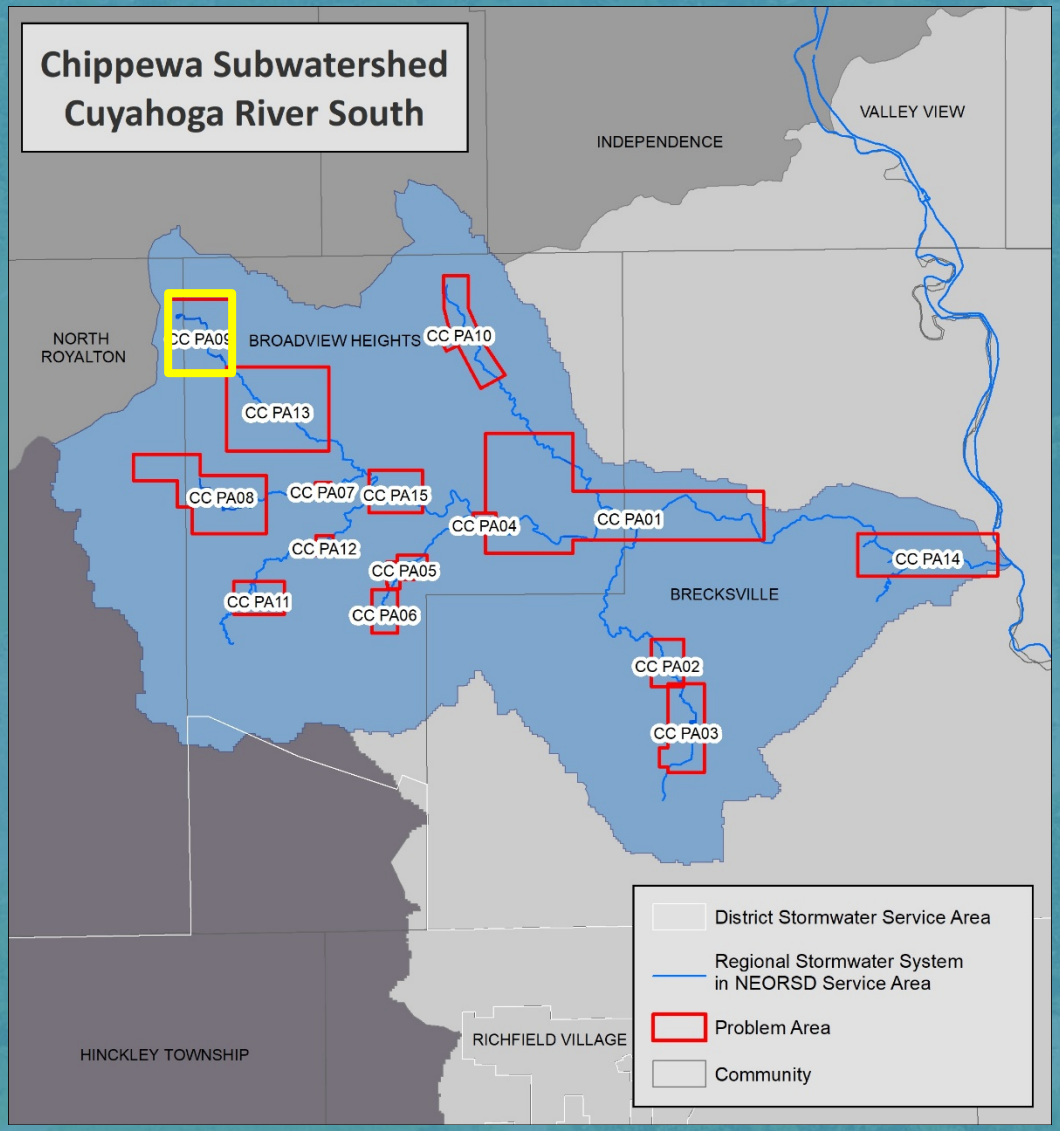
CRS SWMP - First Out Project



- Chippewa Creek Problem Area CC-PA09
- Echo Lane area on border between North Royalton and Broadview Heights

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Chippewa Creek - CC PA09

Broadview Heights/North Royalton

- Community request due to repeated flooding – November 2016
- SWIM inspection and recommendation – November 2016: *Determine if should be included in RSS. If yes, refer to SWMP.*

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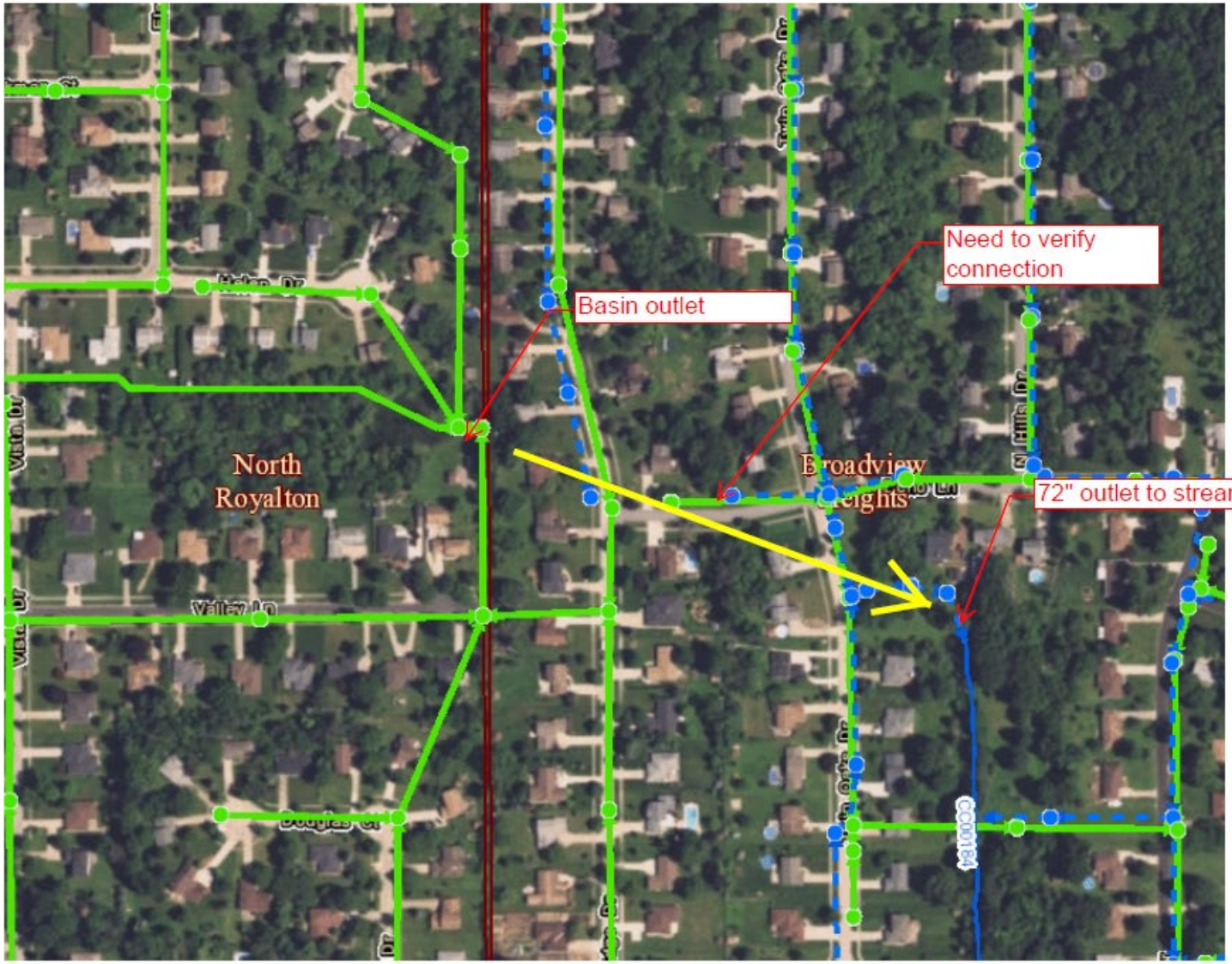
Protecting Your Health and Environment

Basin Inspection- Broadview Heights/North Royalton



Legend

- All Industrial Users
- RSS Artificial Flow Path
- RSS Closed Conduit
- RSS Stream
- RSS Basin
- Local Manhole
  - Sludge
  - OverUnder
  - Combined
  - CSO Overflow
  - Culverted Stream
  - Sanitary
  - STORM
- Local Sewer Pipe
  - COMBINED
  - CSO OVERFLOW
  - CULVERTED STREAM
  - FORCE
  - SANITARY
  - SANITARY OVERFLOW
  - STORM
- Municipal Boundary

1:4,513

Coordinate System: Ohio State Plane North Feet
Datum: NAD 1983 (NAVD 1988)
Projection: Lambert Conformal Conic
Sources: NEORSD Collection System GIS, Cleveland GIS, Cuyahoga County GIS, Summit County Auditor and DOES, Lorain County Auditor, Lake County GIS

Map Created: 11/14/2016

Notes

CC00184
1632029.01
ITL #224826

Problem Area
CC PA09

- CRS SWMP reviewed
  - RSS terminus extension - stream drainage area < 300 acres, but inter-community drainage causing flooding
- Problem Area includes:
  - Stormwater basin
  - Two Culverts through private property
  - Flooding impacts to 8 homes and 4 roads

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Problem Area

CC PA09

Preferred Alternative:

- A101- Enlarge and deepen the basin
- A102 - 1,200 lf of channel restoration w/connected floodplain
- A103 - Demolish existing culverted stream; create 630 linear feet of channel restoration with connected floodplain

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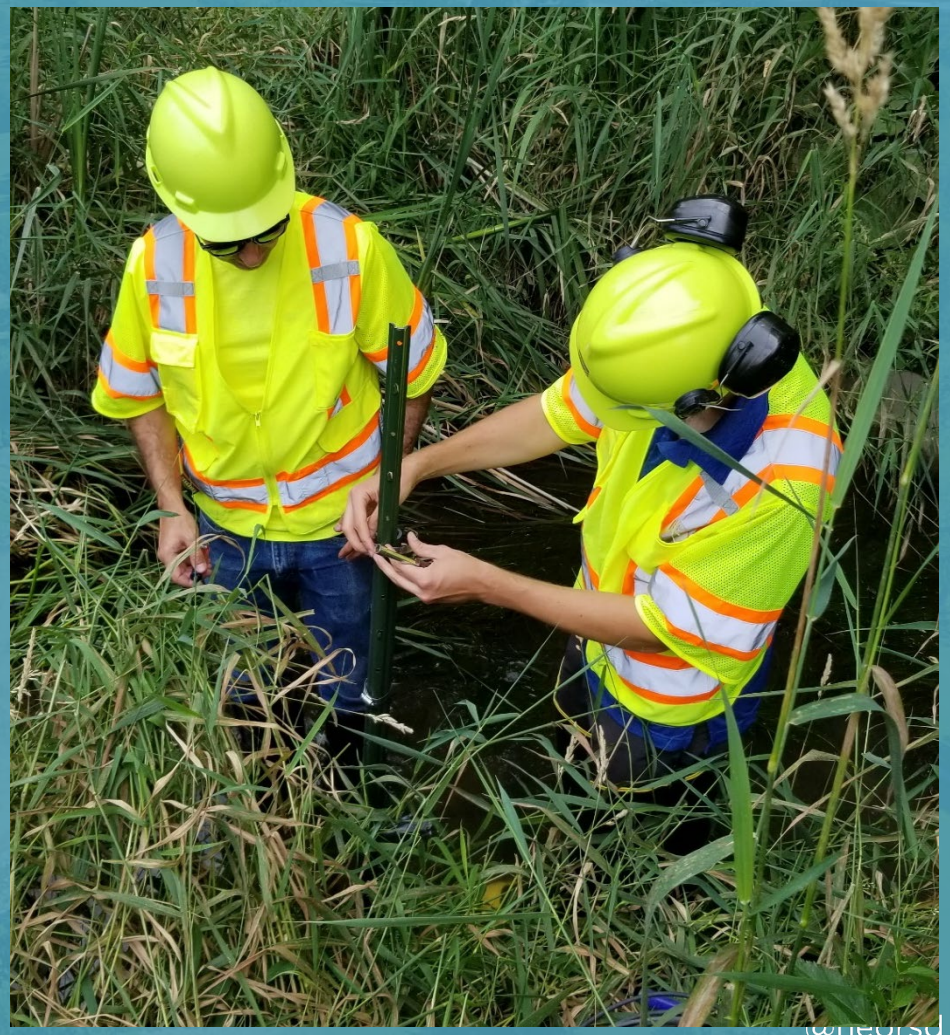
Problem to Project Timeline

- SW Construction Plan prioritization - *Fall 2018*
- RFP Preparation - *January to March 2019*
- Proposals due - *April 2019*
- Flow monitoring by District began - *July 2019*
- Consultant selected and design started - *September 2019*



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Problem Area Components

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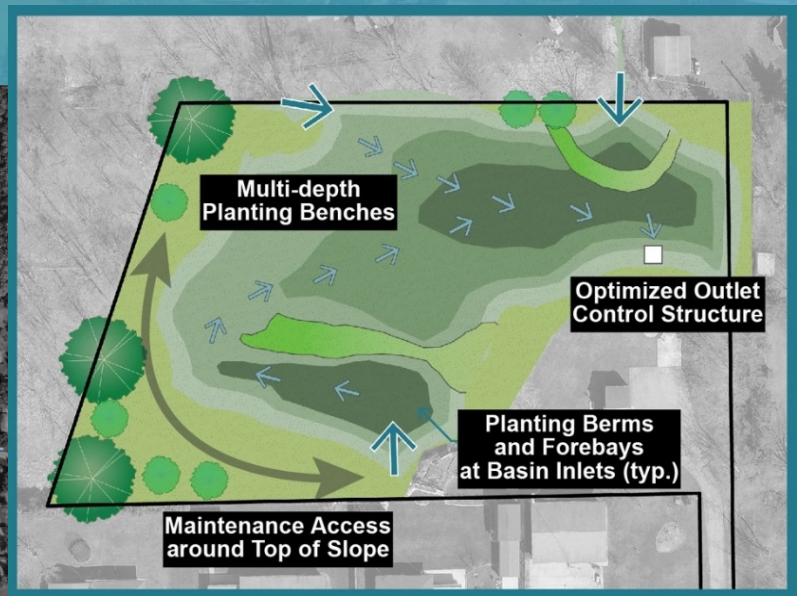
Proposed Project

Stream CC00184 Conceptual Cross Section Looking Downstream



Basin CC00231 Conceptual Plan

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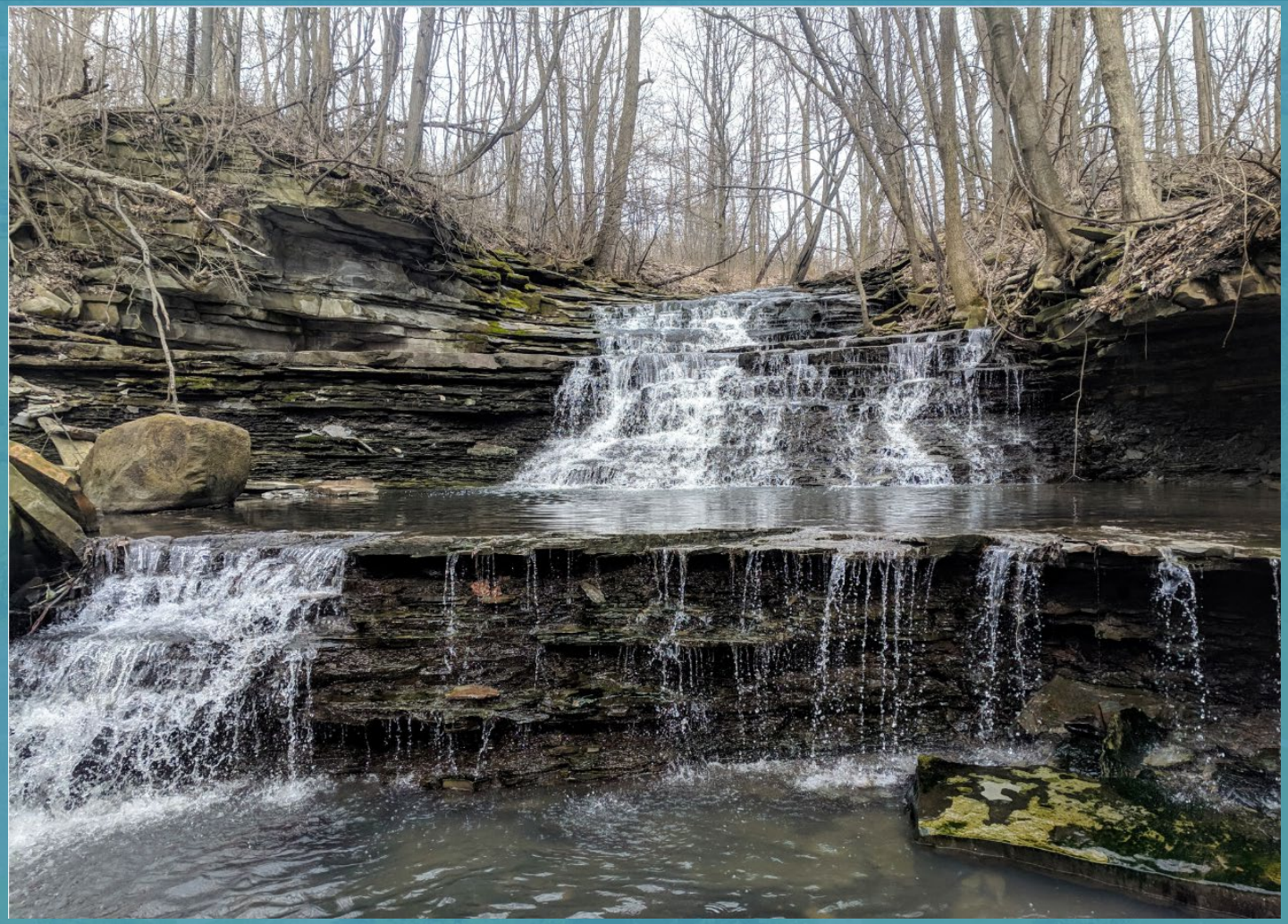
Project Goals

- Reduce flood risks to residential structures and roads
- Improve hydrology of basin by maintaining baseflow and regulating storm flow
- Increase channel roughness and sinuosity and reconnect channel to floodplain
- Biological and chemical water quality goals to be determined following collection of baseline data by WQIS

Anticipated Project Timeline

- Data collection phase: *September 2019 to February 2020*
- Complete design: *Summer 2021*
- Begin construction: *Late 2021/early 2022*
- Potential to accelerate construction of basin-related project elements

Questions



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WTL Contact

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Cell: 216 630 1433
jowettj@neorsd.org

NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM

Stormwater Program: Community Resources
http://www.neorsd.org/communitystormwaterresources.php