Watershed Advisory Committee Chagrin River/Lake Erie Direct Tributaries

March 18, 2021

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Agenda

- Welcome & Introduction
- Water Resource Project Acquisition
- Report a Flood Tool (RAFT) - Feature
- Master Planning
- Strategic Support
- Inspection and Maintenance
- Design & Construction
- Looking Ahead

Program Highlights

Frank Greenland, Director of Watershed Programs

Matt Scharver, Deputy Director of Watershed Programs

Community Cost-Share: 2021

CCS Funds Balance (2/28/21) $29,939,495

CCS funds available $18,138,054

Year1	CCS Spent
2016	$72,190
2017	$2,626,418
2018	$4,218,308
2019	$9,178,445
2020	$6,940,369
2021	$1,232,573
Total	**$24,269,243**

Community Cost-Share: 2021 Changes to Title V

The District is proposing minor changes to Title V Stormwater Management Code, Chapter 9 – Community Cost-Share Program (CCS). The language change will provide clarity in the implementation of the CCS Program.

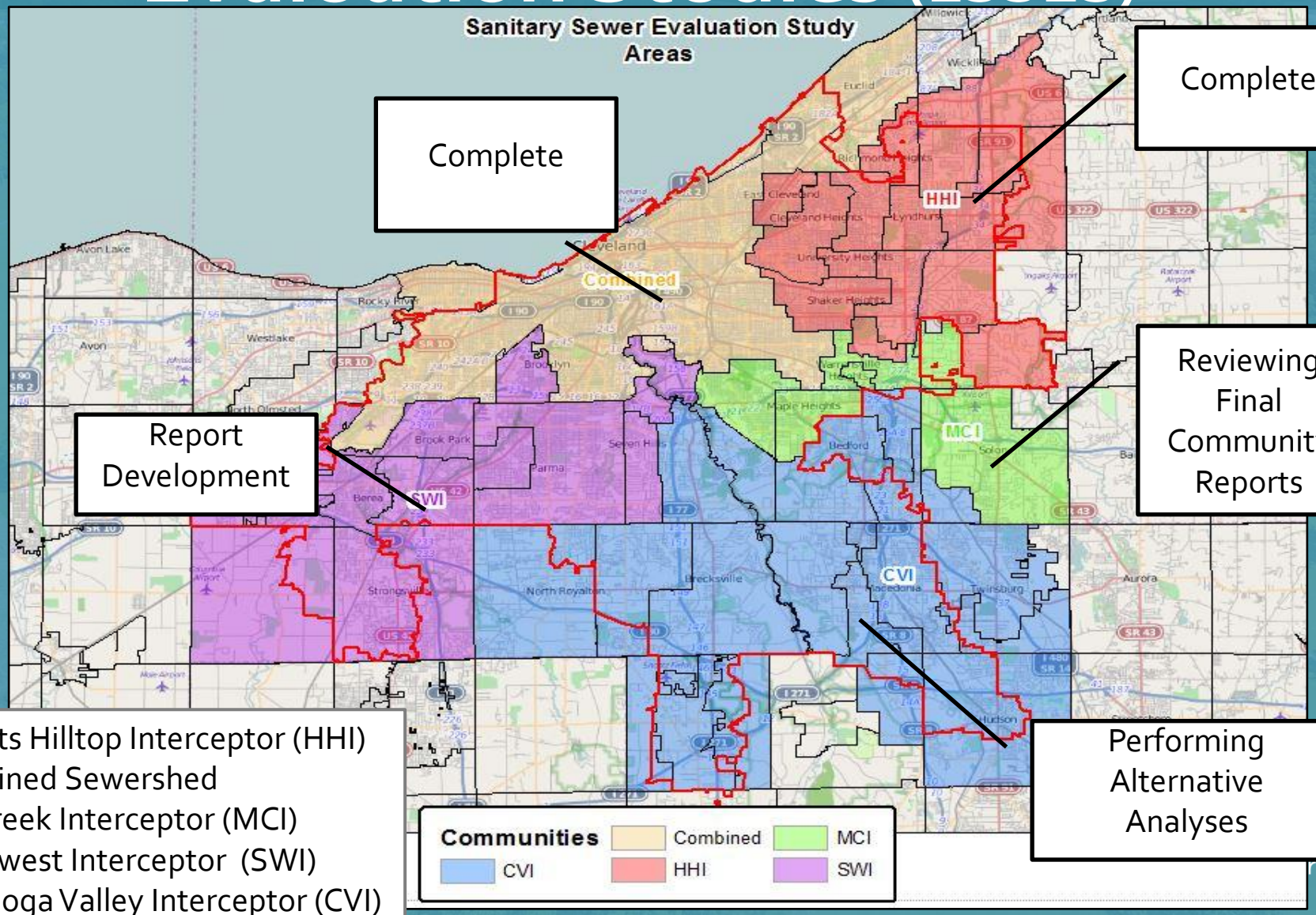
* NEORSD Title V Stormwater Management Code - *Change #1*:

  Section 5.0903: Eligible Community Cost-Share Program Activities – Member Communities may use Community Cost-Share Program funds for design, construction, operation, and maintenance of their Local Stormwater System… (the word "design" added for clarity)

*NEORSD Title V Stormwater Management Code - *Change #2*:

- **Section 5.0905 (b):** Member Communities may accumulate up to five (5) years of Community Cost-Share funds. Member Communities must apply by December 31st of Year Five to be able to receive their funds from Year One.

Local Sewer System Evaluation Studies (LSSES)



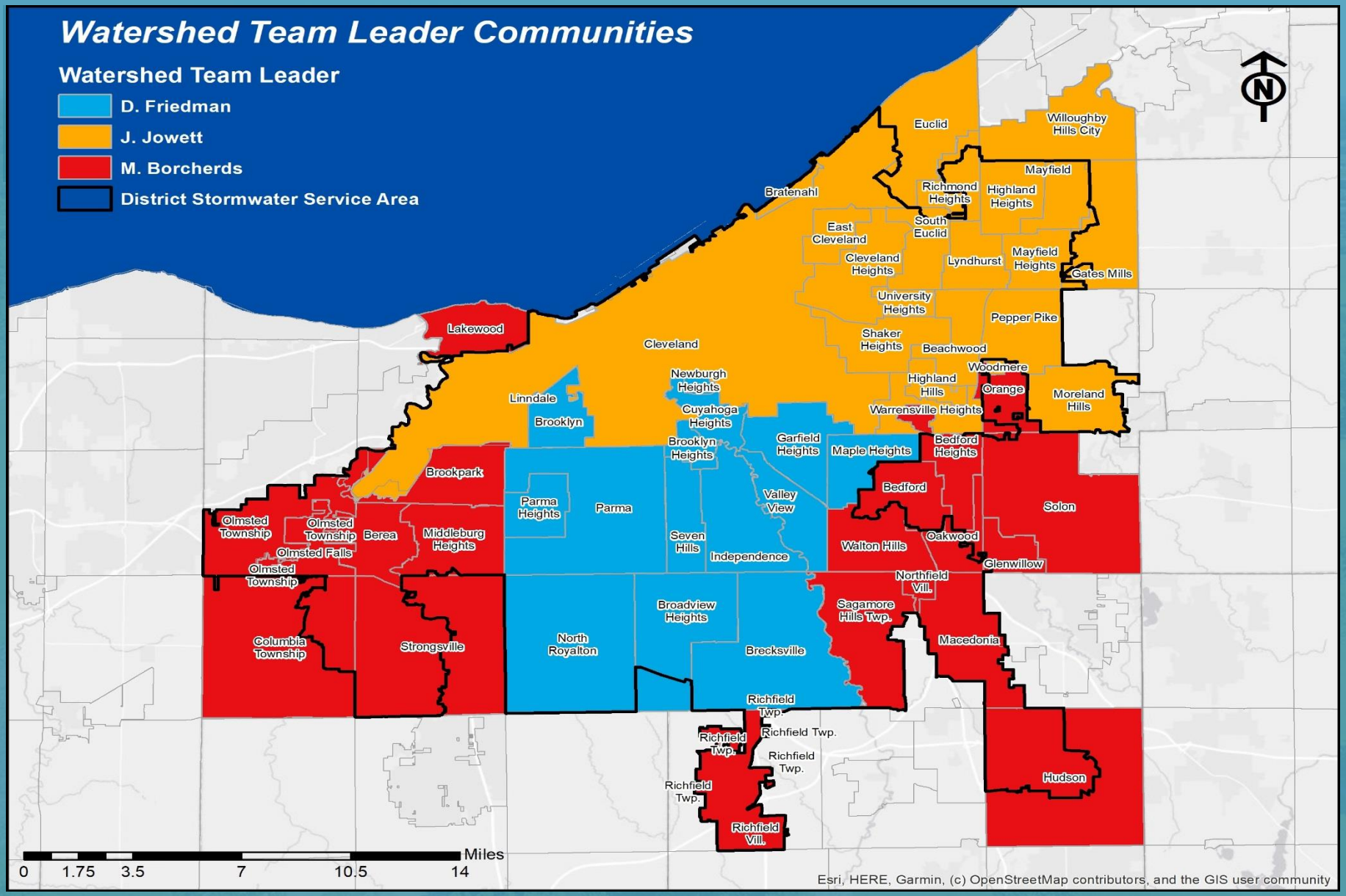
Heights Hilltop Interceptor (HHI)
Combined Sewershed
Mill Creek Interceptor (MCI)
Southwest Interceptor (SWI)
Cuyahoga Valley Interceptor (CVI)

2022 MCIP Funding

2022 MCIP funding level to be determined

Implementation Schedule:

- March: RFP Released
- April 22-29: Pre-Proposal Meetings
- May 21: MCIP Submissions Due Date
- June – July: Proposal Review Meetings
- September: Recommendations presented to Board



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Questions

Big Creek in Parma – Problem Area BC-PA-03

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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

Success to date: Threat Mitigation/ Asset Protection

- Fee Simple : 45/ $ 9,674,651
- Permanent Easements: 93/ $740,605

Success to date: Partnerships

- Flood / Erosion Mitigation: 23 homes
- District Dollars invested: $1,818,904
- Dollars Leveraged: $4,761,969

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Acquisition Process

- Outreach
- Appraisal
- Appraisal Review
- FMV Offer
- Board Approval
- Closing /Leasing
- Maintenance and Inspection
- Demolition
- Water Resource Project

Questions?

Lilah Zautner, Project Manager for Property Acquisition
zautnerl@neorsd.org
216.299.2751

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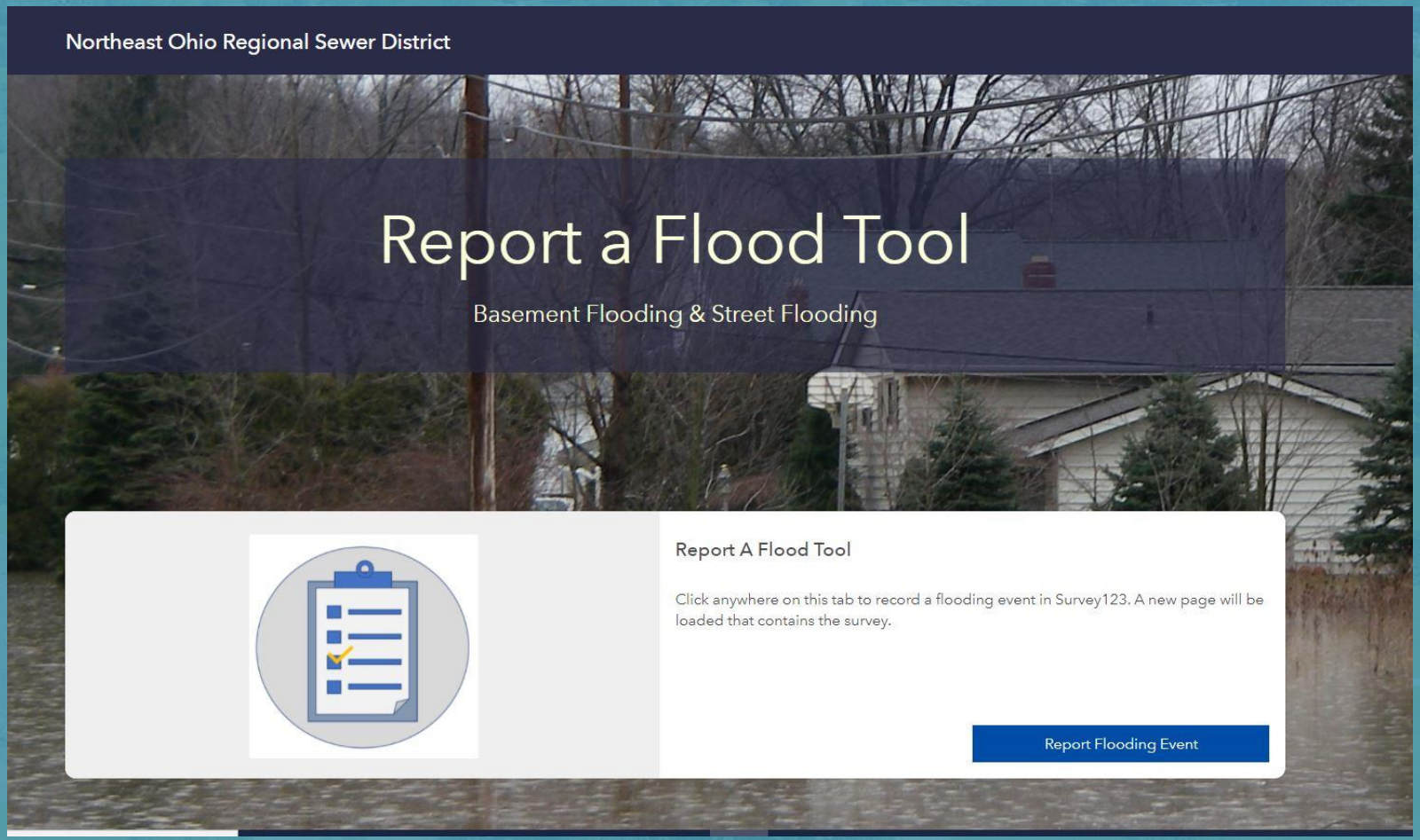
Report a Flood Tool



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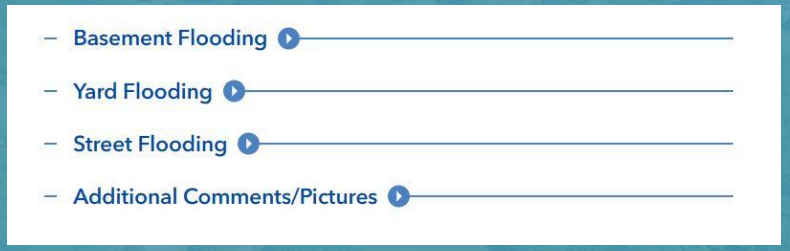
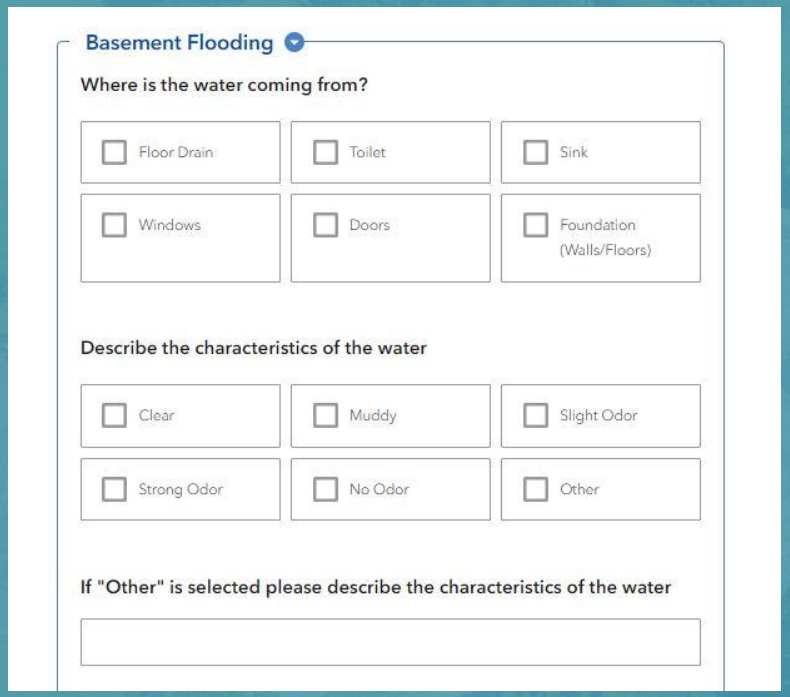
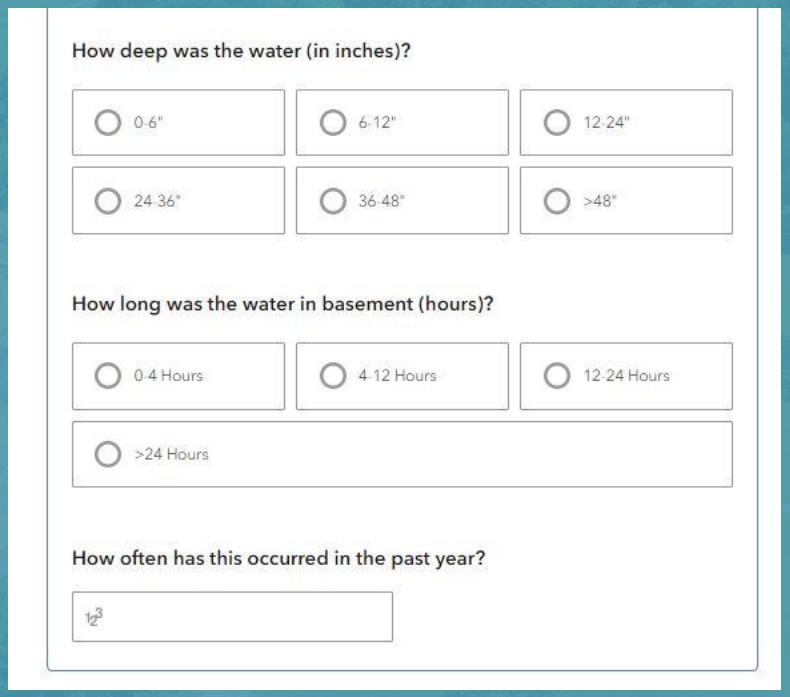
Report a Flood Tool – What is it?

- A web based data collection form managed by the District, available through the District's ArcGIS Online Platform
- Associated Web Application showing the locations of flooding incidents
- Data can also be collected via a custom excel sheet or paper form

Report a Flood Tool - Form







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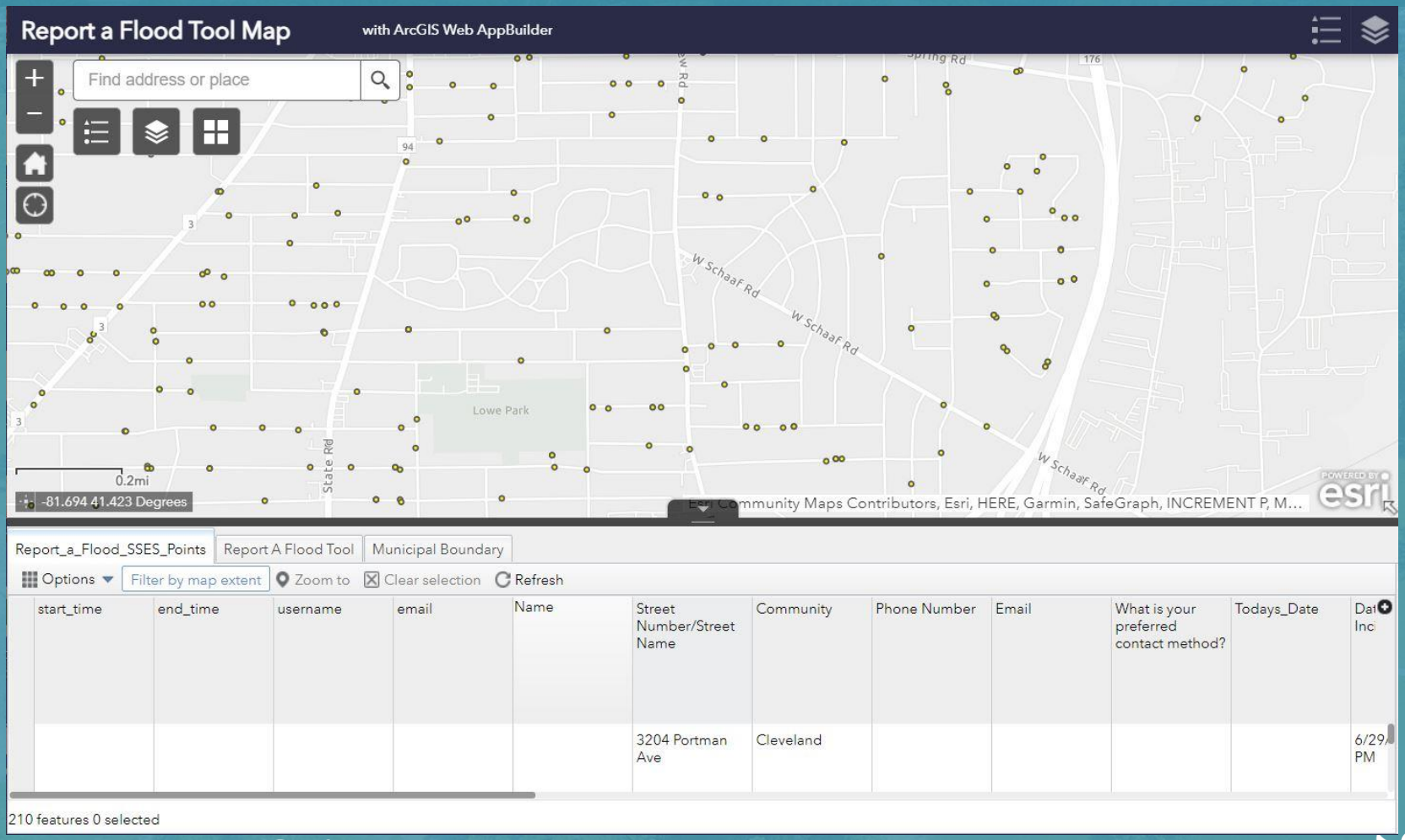
Report a Flood Tool - Map



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Report a Flood Tool - Questions

- How can I access the RAFT form?
- Will other people be able to access the data?
- Will training be offered?

Report a Flood Tool - Benefits

- Centralized repository for recording flooding incidents in a consistent format
- Understand what types of issues are occurring, how frequently, and where
- Prioritize projects based on incident type and frequency
- Help validate hydraulic models

Report a Flood Tool - Contacts

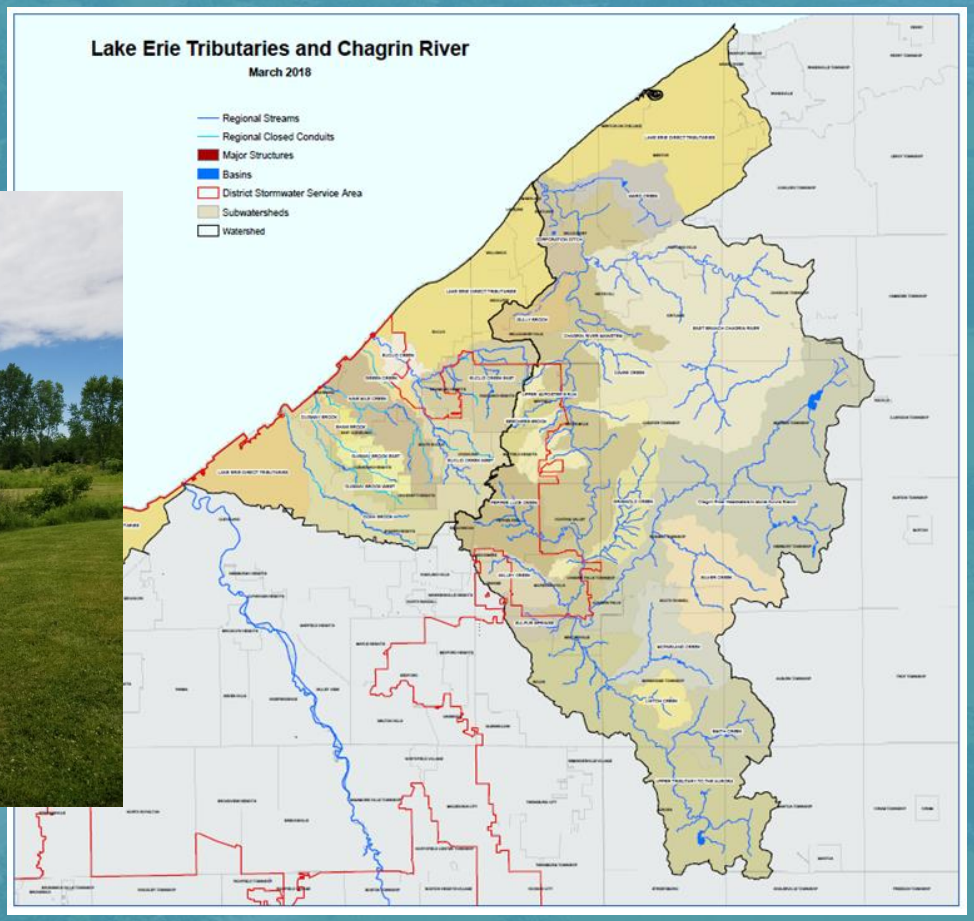
Eric J. Baker, GISP

bakere@neorsd.org

or

gis@neorsd.org

Chagrin River / Lake Erie Direct Tributaries Stormwater Master Plan



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Stormwater Master Planning
(Status through 2/22/2020)

Cuyahoga River South

Completion Date: June 2019

100 % Complete

Cuyahoga River North

Completion Date: July 2020

100% Complete

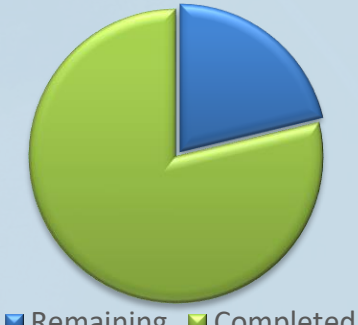
Rocky River

Completion Date: November 2020

100% Complete

Chagrin River / Lake Erie Tribs

Completion Date: September 2021



78% Complete

Chagrin River / Lake Erie Direct Tributaries Stormwater Master Plan

Culvert Inspection – Shaw Brook Subwatershed

Significant work thru March 2021

- Field Data Collection Task Completed
  - 33 basin inspections
  - CCTV inspections
  - Survey/Crossings
  - Open Stream inspections
- H/H Model Development Completed
- Covid-19 Pandemic Having Minor Impact On Project. Field Crews Following Pandemic Protocols

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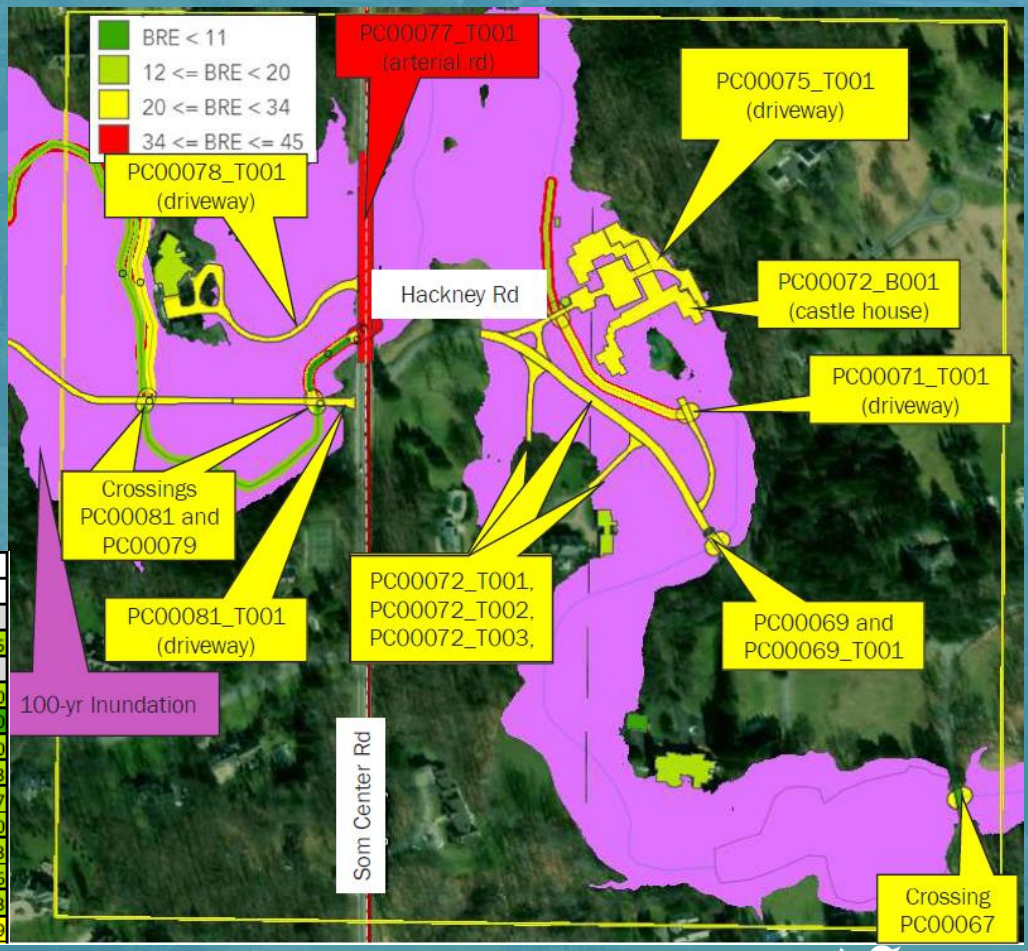
Chagrin River / Lake Erie Direct Tributaries SWMP - Problem Area Identification

Start comparing structural problem areas with flooding problem areas & developing alternative measures:

- Beecher's Brook
- Doan Brook
- Euclid Creek
- Pepper Luce Creek

ASSET_ID	Criticality	Overall_BRE	Inundation Depth (ft)						
			100-yr	50-yr	25-yr	10-yr	5-yr	2-yr	1-yr
Building BTUs									
PC00072_B001	6	30	2.8	2.2	1.6	0.8	0.2	-2.2	-3.5
Transportation BTUs									
PC00077_T001	8	40	2.5	2.0	1.4	0.0	-1.2	-2.9	-4.0
PC00069_T001	6	30	1.0	0.4	-0.3	-1.4	-2.4	-4.6	-6.0
PC00072_T001	6	30	4.9	4.3	3.7	2.8	2.1	-0.6	-2.0
PC00072_T002	4	20	3.6	3.0	2.4	1.5	0.7	-2.0	-3.3
PC00075_T001	4	20	3.5	2.9	2.3	1.6	0.9	-1.5	-2.7
PC00079_T001	4	20	5.0	4.4	3.7	2.4	1.0	-0.8	-2.0
PC00072_T003	4	20	2.6	2.1	1.5	0.8	0.1	-2.8	-4.3
PC00078_T001	4	20	2.9	2.4	1.8	0.4	-0.8	-2.5	-3.6
PC00071_T001	4	20	4.5	3.9	3.2	2.4	1.8	-0.9	-2.3
PC00081_T001	4	20	4.9	4.2	3.6	2.5	1.6	0.3	-0.9



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Chagrin River / Lake Erie Direct Tributaries SWMP – Community Coordination

- Continued Coordination with Member Communities
- Meet with communities
  - Problem Area Review
- SWMP Recommendations and Community Report – 3rd Quarter 2021

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

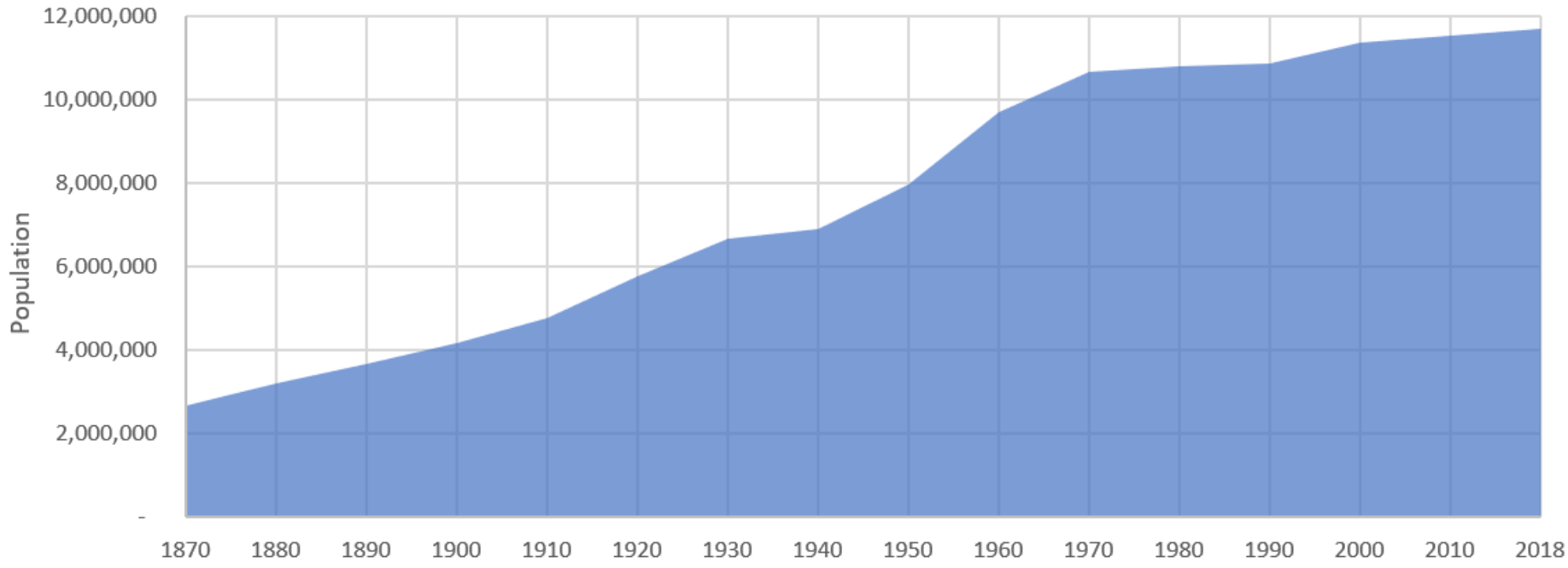
Questions

Lakeview Cemetery – Dugway Subwatershed

Stormwater Strategic Support
Roles & Responsibilities

- Manage the RSMP Stormwater Planning Level Models
- Assign stormwater related risk (and its probability) to help prioritize and phase RSMP Construction Projects
- Support the District's urgent storm response and reporting
- Provide assistance to local stormwater issues with RSS benefits.

Ohio's Population and Stormwater Management Regulations By Decade



Pipe Capacity	< 2-yr Capacity	2-yr to 5-yr Capacity	5-yr to 10-yr Capacity	
Floodplain Regulations	No Regulations		FEMA 100-yr	Stream Setback
SCMs	No Regulations		Flood Control	WQV

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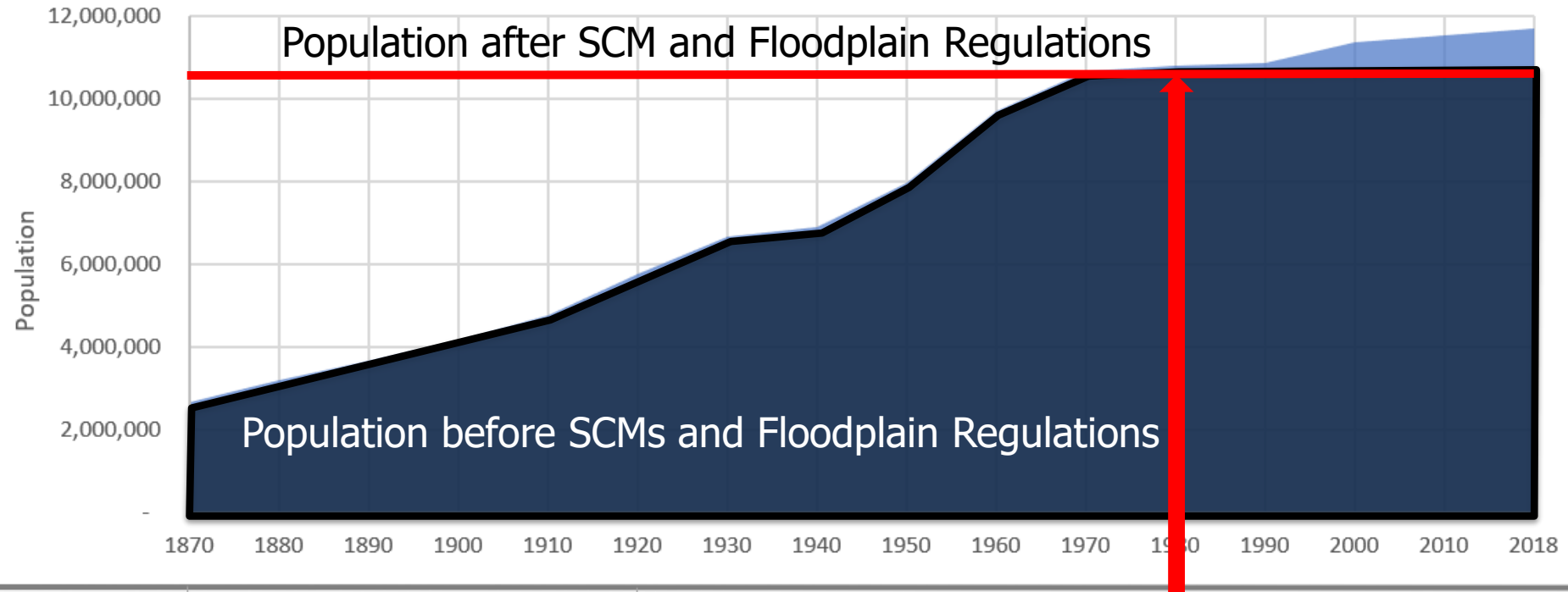
Ohio's Population and Stormwater Management Regulations By Decade



Pipe Capacity	< 2-yr Capacity	2-yr to 5-yr Capacity	5-yr to 10-yr Capacity	
Floodplain Regulations	No Regulations		FEMA 100-yr	Stream Setback
SCMs	No Regulations		Flood Control	WQV

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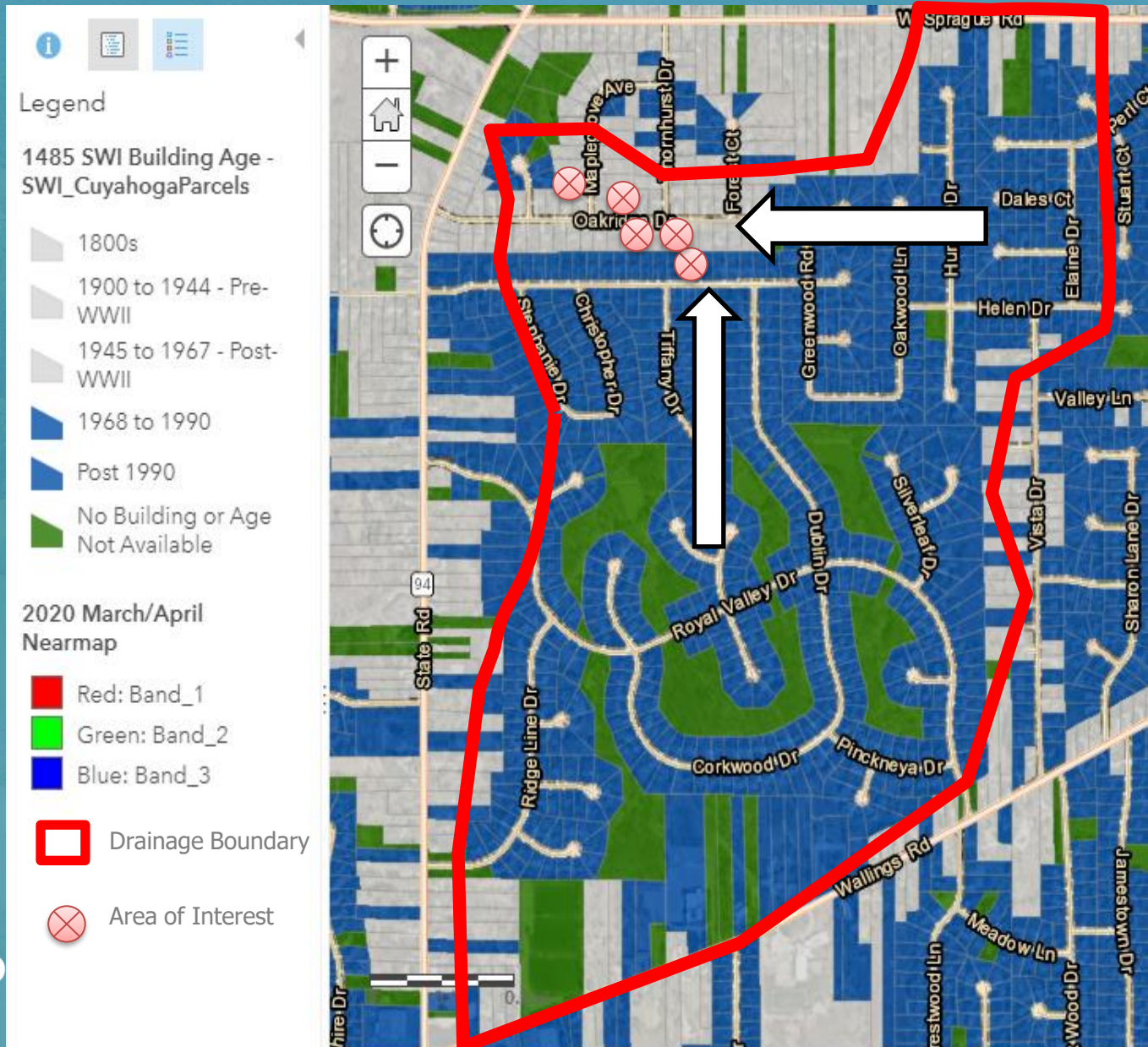
Development History

- Nearly all the houses upstream of the flooded properties were built later
- Several houses were built without any SCMs
- Some SCMs were constructed for flood control purposes



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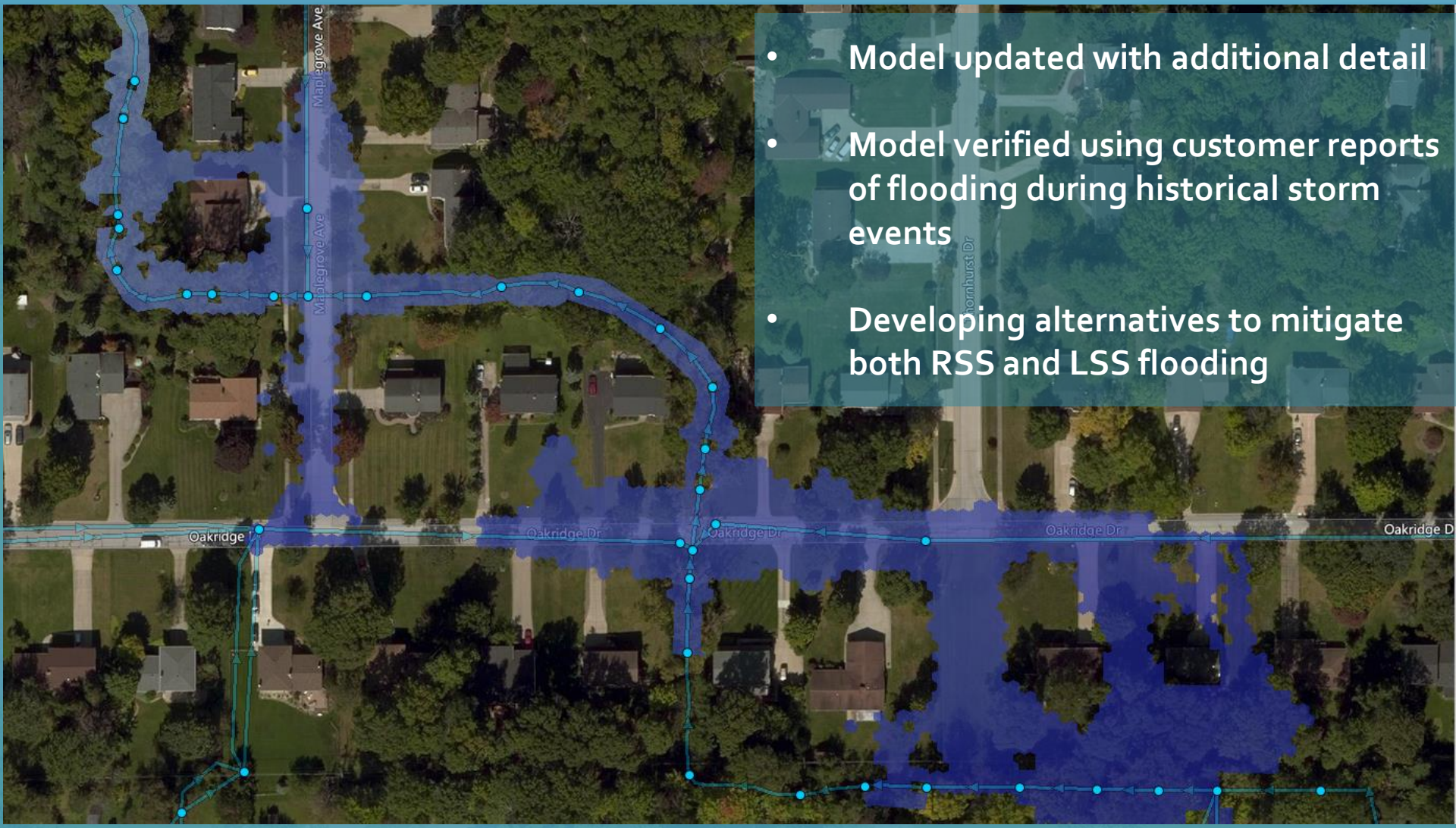
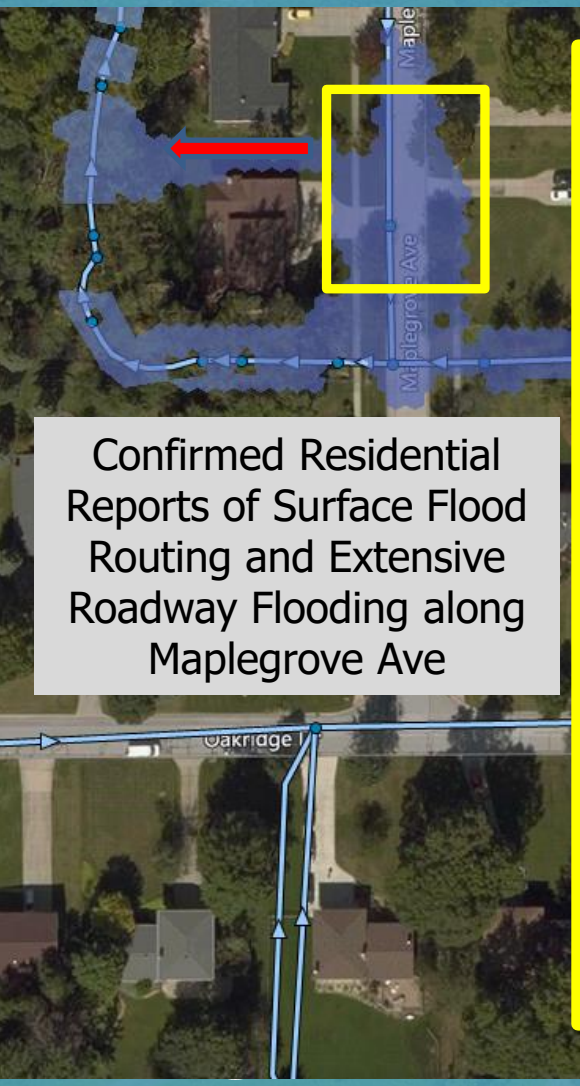
Big Creek North Royalton Problem Area [BCNR02]



- Model updated with additional detail
- Model verified using customer reports of flooding during historical storm events
- Developing alternatives to mitigate both RSS and LSS flooding

April 16, 2018 Urgent Storm Event: Street Flooding



Confirmed Residential Reports of Surface Flood Routing and Extensive Roadway Flooding along Maplegrove Ave

General Topic: Informative Flooding Photos
Building, Street, & Property Flooding

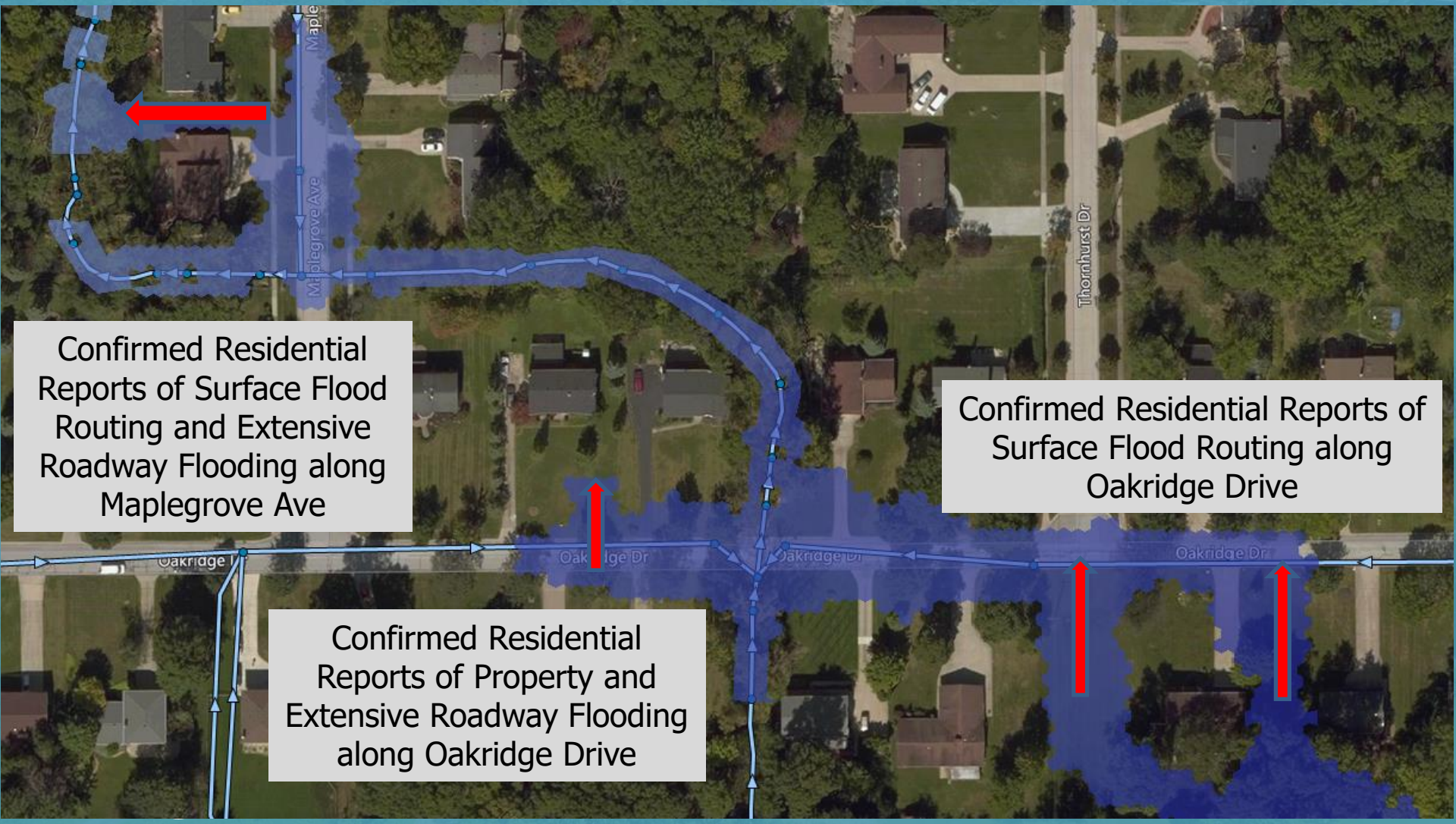
Hemlock Creek, Seven Hills

General Topic: Informative Flooding Photos
Property Flooding

General Topic: Informative Flooding Photos
Building Flooding

Hemlock Creek, Seven Hills

April 16, 2018 Urgent Storm Event: Street Flooding



CRN SWMP Model: 10-year design storm

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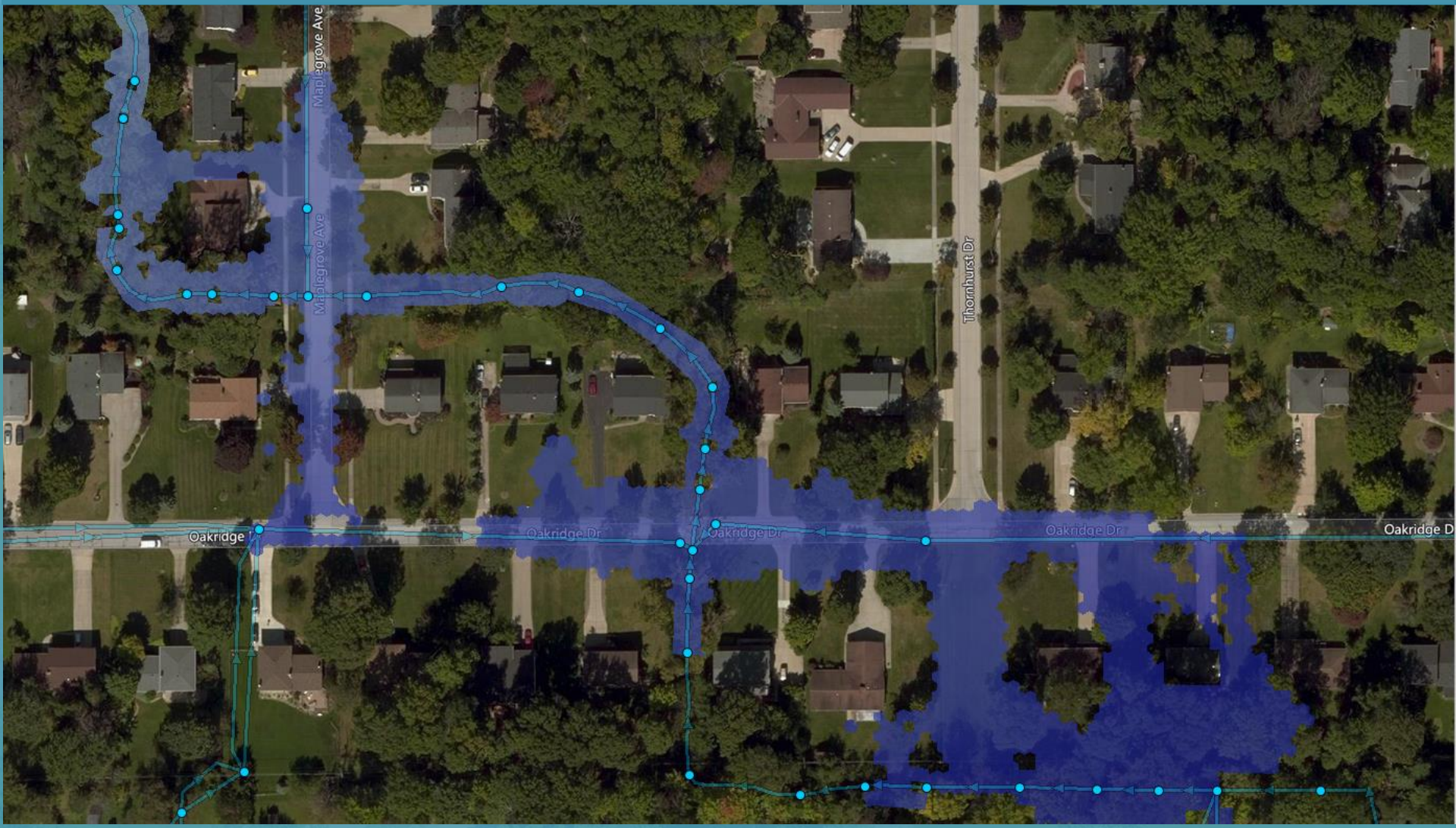
Updated Model: 10-year design storm



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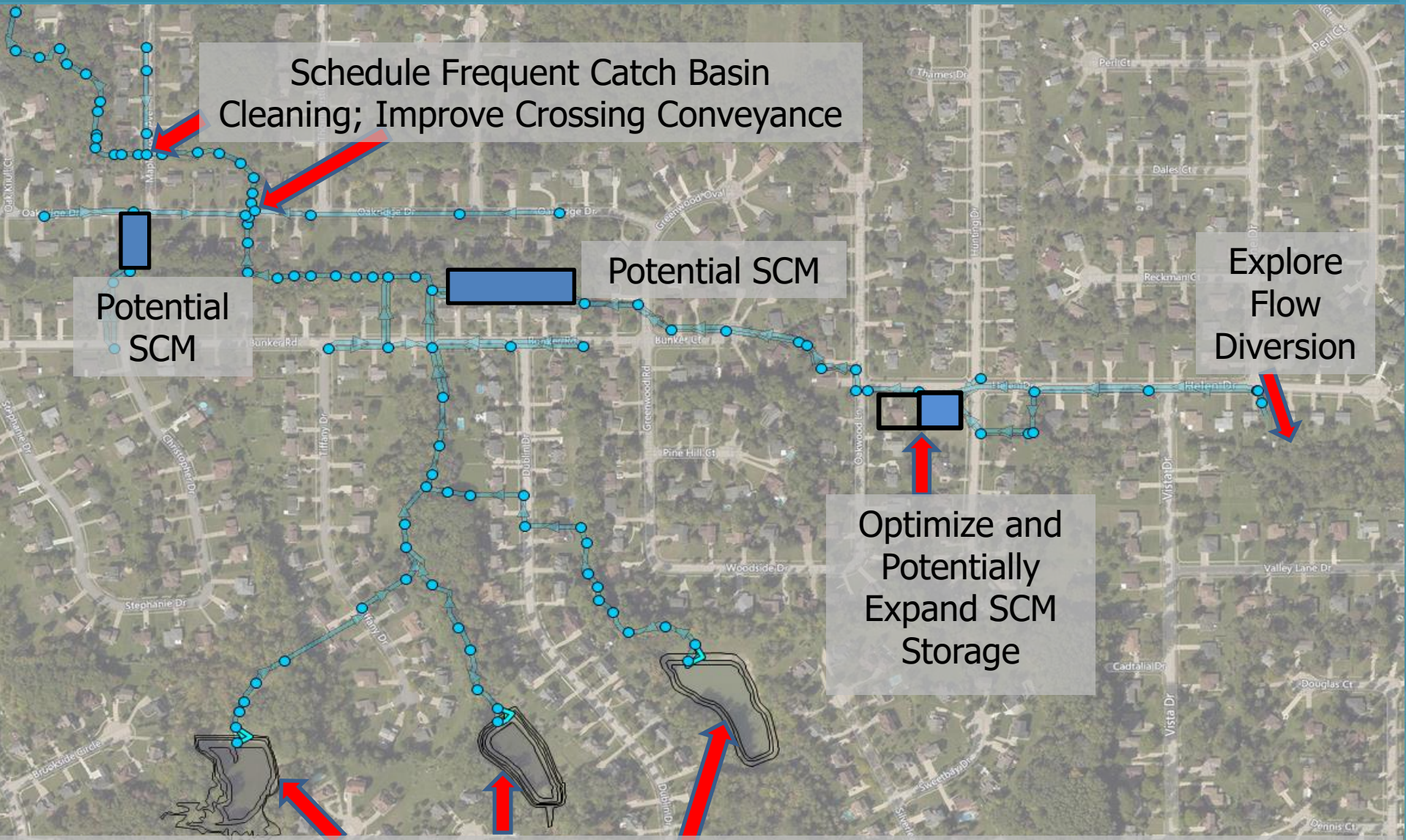
BCNR02: Alternative Development & Evaluation



Optimize Existing SCM Storage – Explore Converting Some Wet Storage to Dry Storage

Questions

Stormwater Inspection & Maintenance (SWIM)

- Inspection Program
- Root Cause Failure Analysis (RCFA)
- Maintenance Program

SWIM
2021 Inspection Program

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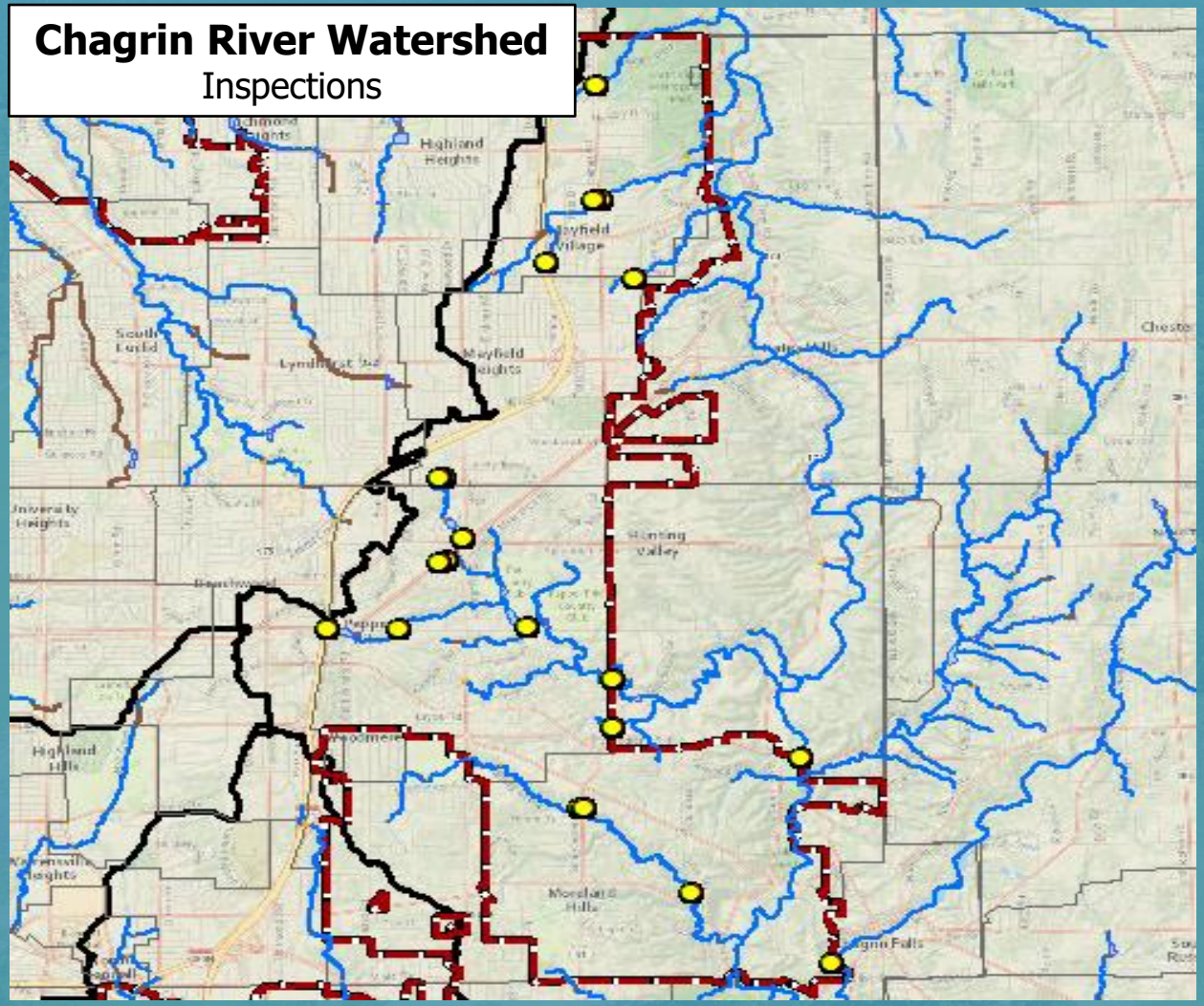
SWIM
2021 Inspection Program

Chagrin River Watershed
Inspections



Completed Inspections
10/2020 - 02/2021
23 Total Inspections

- 15 SWIM Inspections
- 8 Responsible Party Benchmark Inspections

Inspections
Watershed Boundary
Stream
Major Structure
Basin
Crossing
Culverted Stream
Stormwater Service Area
Community Boundary

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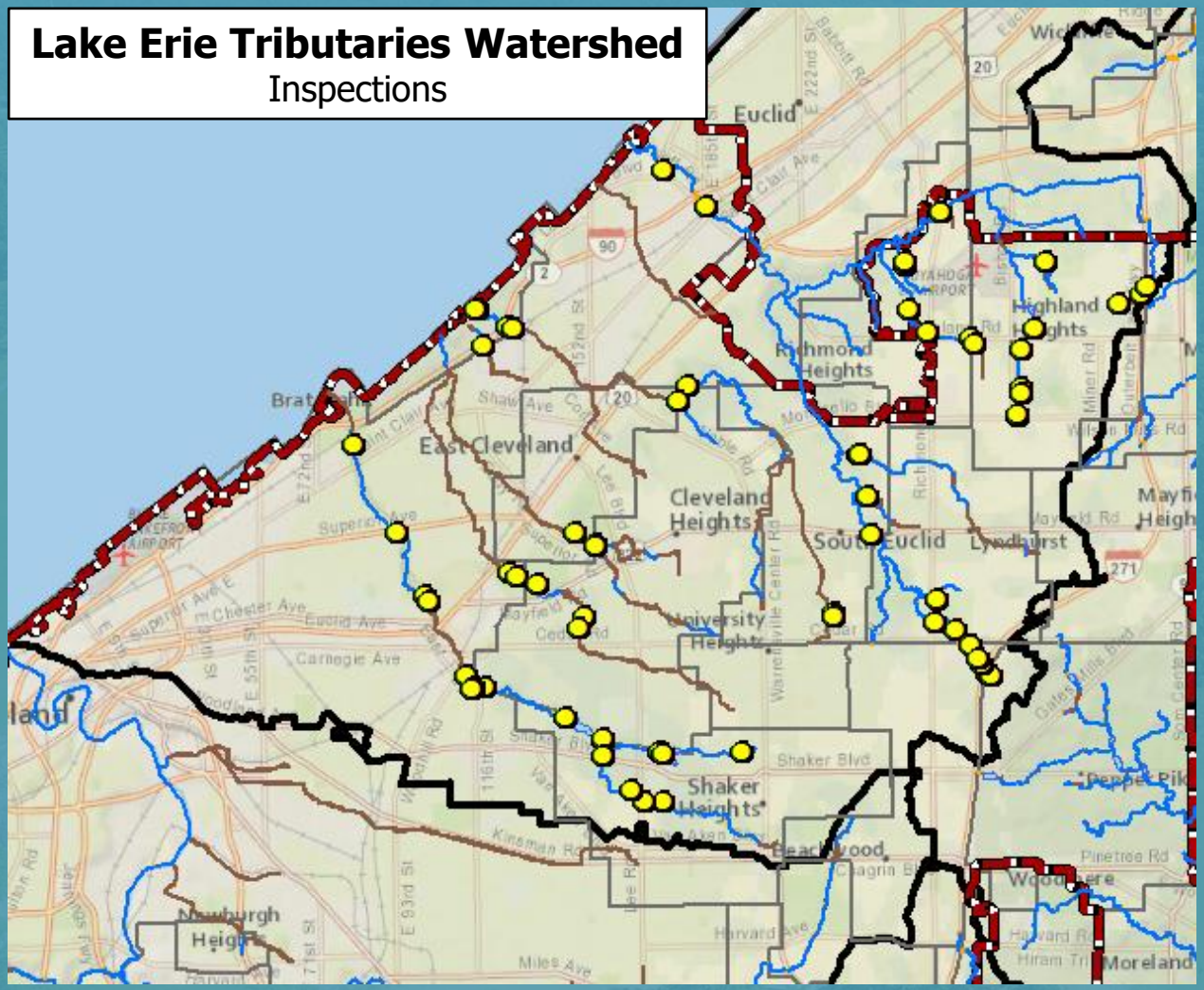
SWIM
2021 Inspection Program

Lake Erie Tributaries Watershed
Inspections



Completed Inspections
10/2020 - 02/2021
76 Total Inspections

- 67 SWIM Inspections
- 9 Responsible Party Benchmark Inspections

Inspections
Watershed Boundary
Stream
Major Structure
Basin
Crossing
Culverted Stream
Stormwater Service Area
Community Boundary

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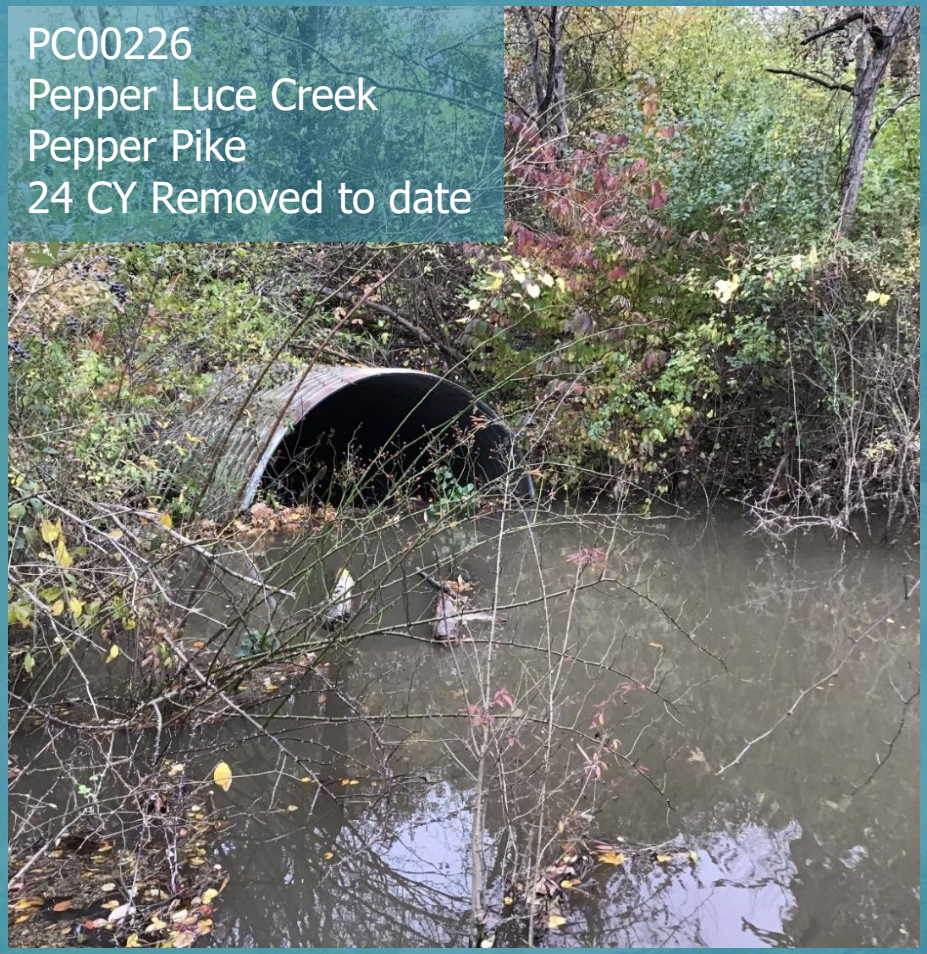
SWIM
2021 Inspection Program

PC00226
Pepper Luce Creek
Pepper Pike
24 CY Removed to date



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SWIM
2021 Inspection Program

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SWIM

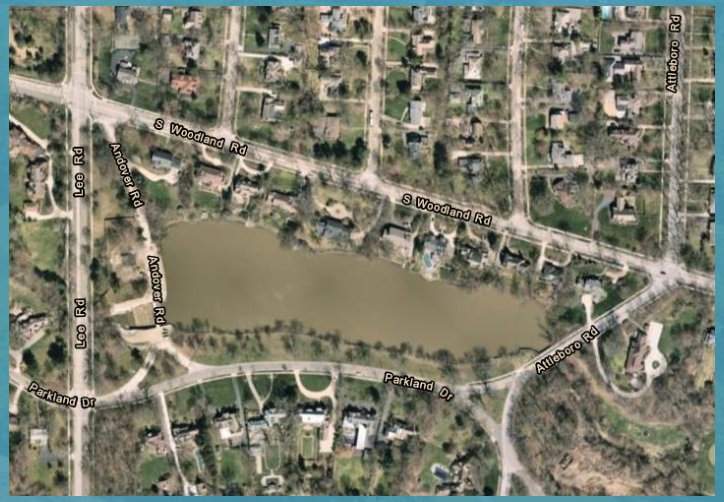
Root Cause Failure Analysis (RCFA)

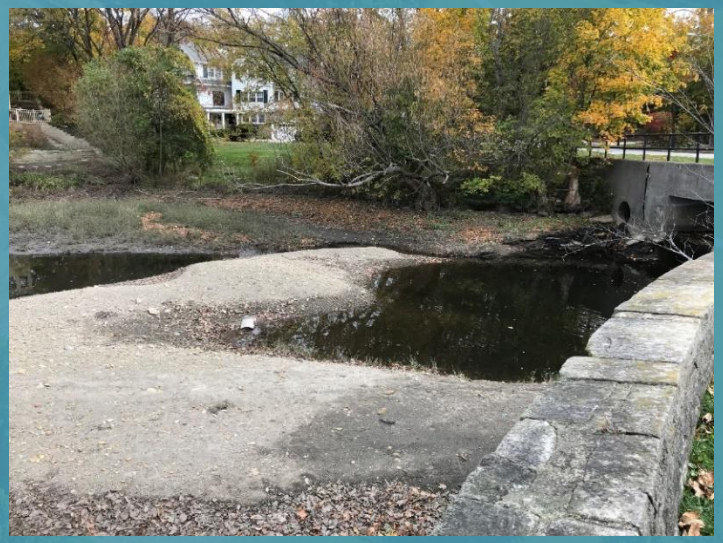
SWIM

Root Cause Failure Analysis (RCFA)

Problem Identification

- Green Lake in Shaker Heights, Doan Brook Subwatershed
- Systemic erosion throughout the upstream tributary
- Sediment accumulation in Green Lake requires repeated maintenance





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SWIM

Root Cause Failure Analysis (RCFA)

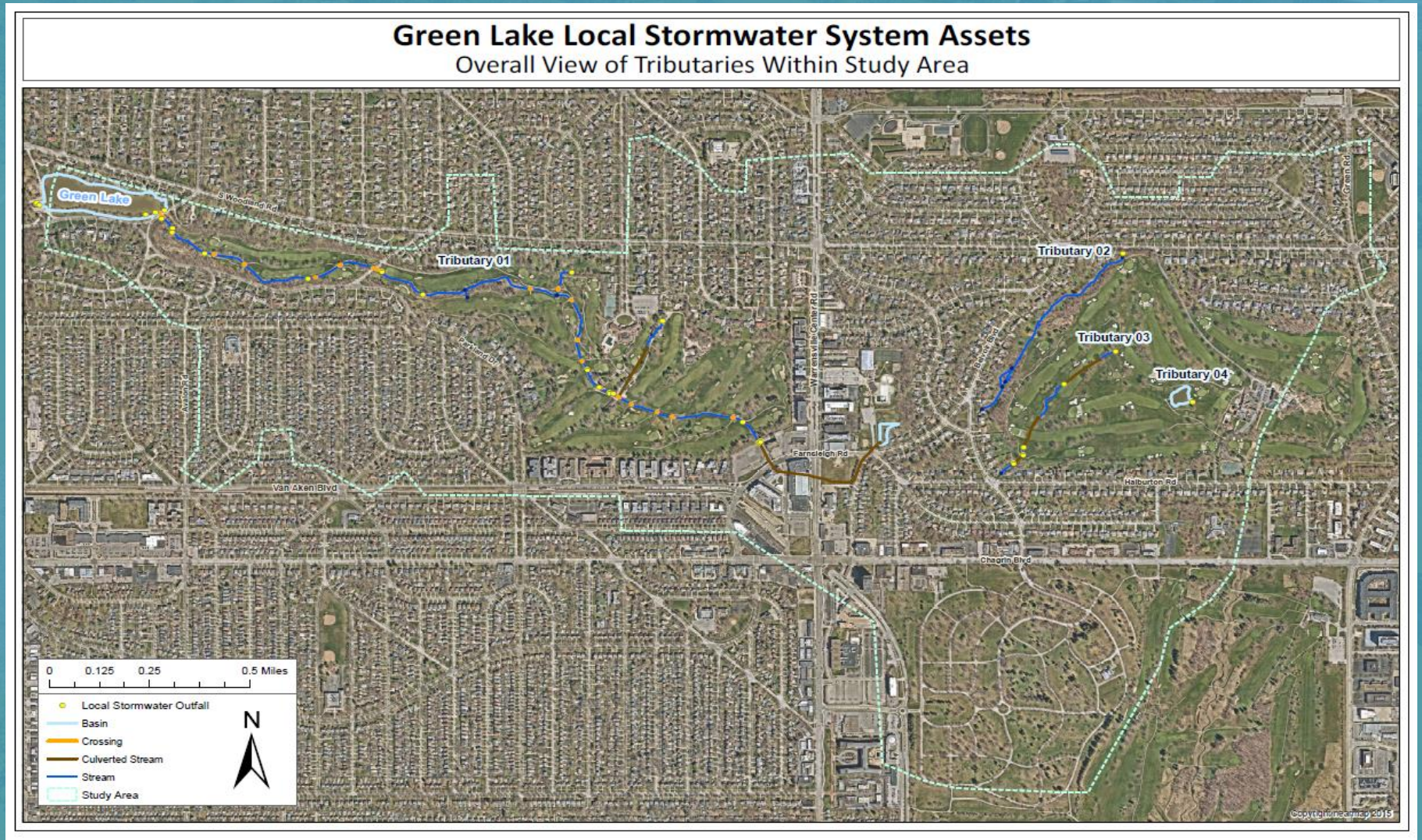
Data Collection

- Goal: Identify the source of the sediment.
- Mapped the drainage area to Green Lake, including all outfalls 12” or greater in diameter.
- Performed STEPL analysis on all stream segments draining to Green Lake
- Height and length measured on each eroding bank
  - Assigned a Lateral Recession Rate for each bank, ranging from .01’ to .5’ per year based on bank material and surface protection (lack thereof).
  - Calculated volume of sediment from each segment.

SWIM

Root Cause Failure Analysis (RCFA)

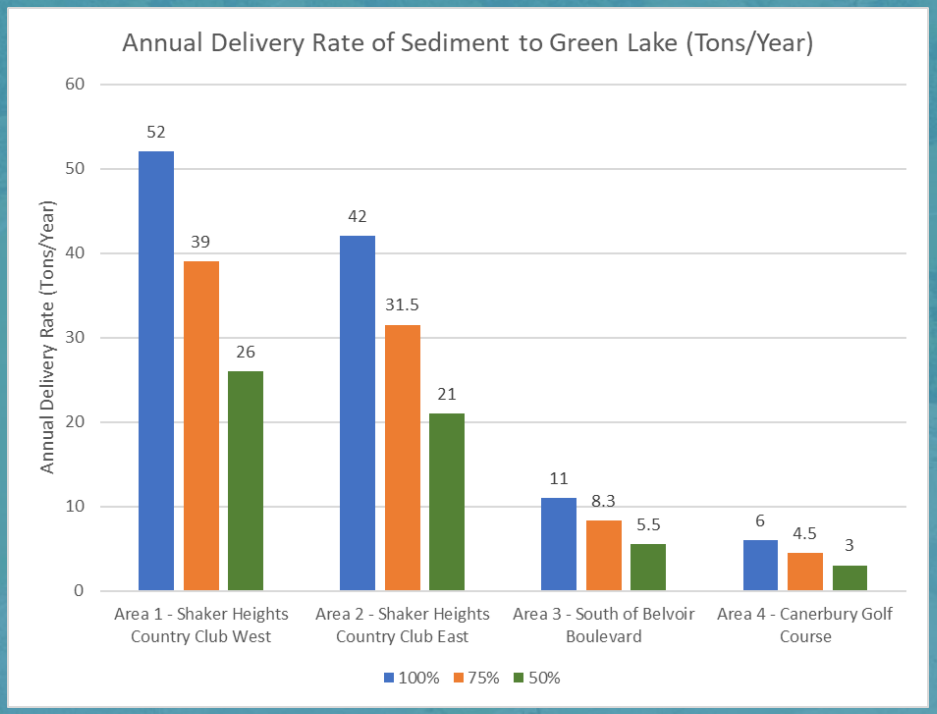
Study Area

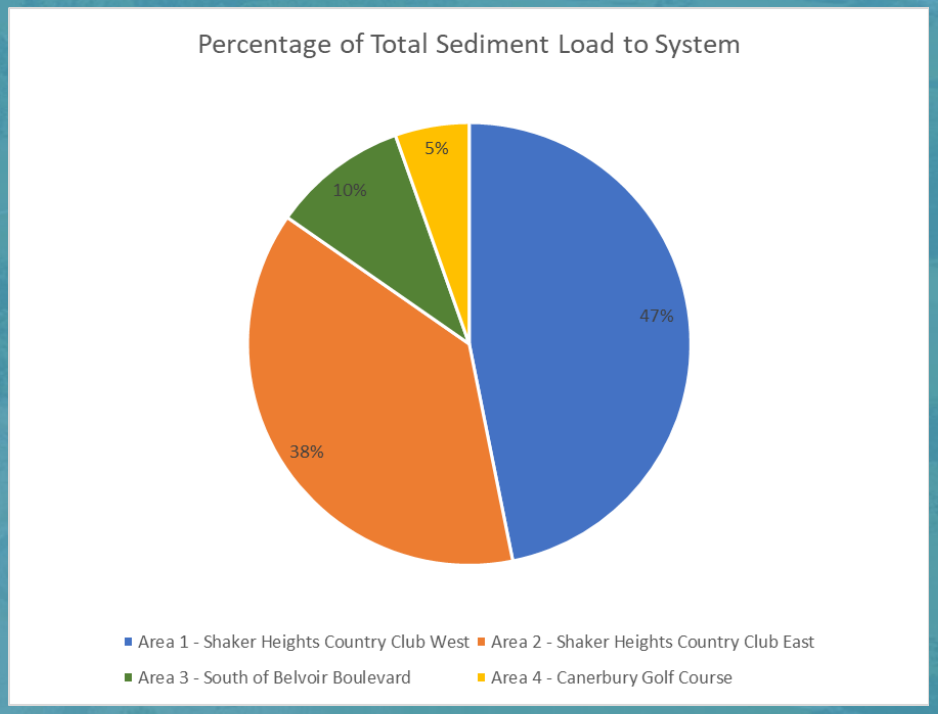


SWIM

Root Cause Failure Analysis (RCFA)

Data Analysis





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SWIM
Root Cause Failure Analysis (RCFA)
Recommendations

Address the top 5 "worst offenders"

- Incorporate streambank stabilization projects prioritized by highest sediment contributors.
- Projects incorporate grading back the banks to more gradual slopes, installation of native plantings with dense root structures, establishing clearly defined riparian buffer zones, installation of rip-rap protection, and hard armament where necessary.

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SWIM

Root Cause Failure Analysis (RCFA)

Recommendations

Reduce stormwater runoff into the local system

- Best management practices incorporated throughout the upstream watershed communities can redirect and reduce stormwater volumes entering the local system.
- Examples include rain gardens, bioswales, bioretention basins, permeable pavers, and underground storage detention chambers.

SWIM
2021 Maintenance Program

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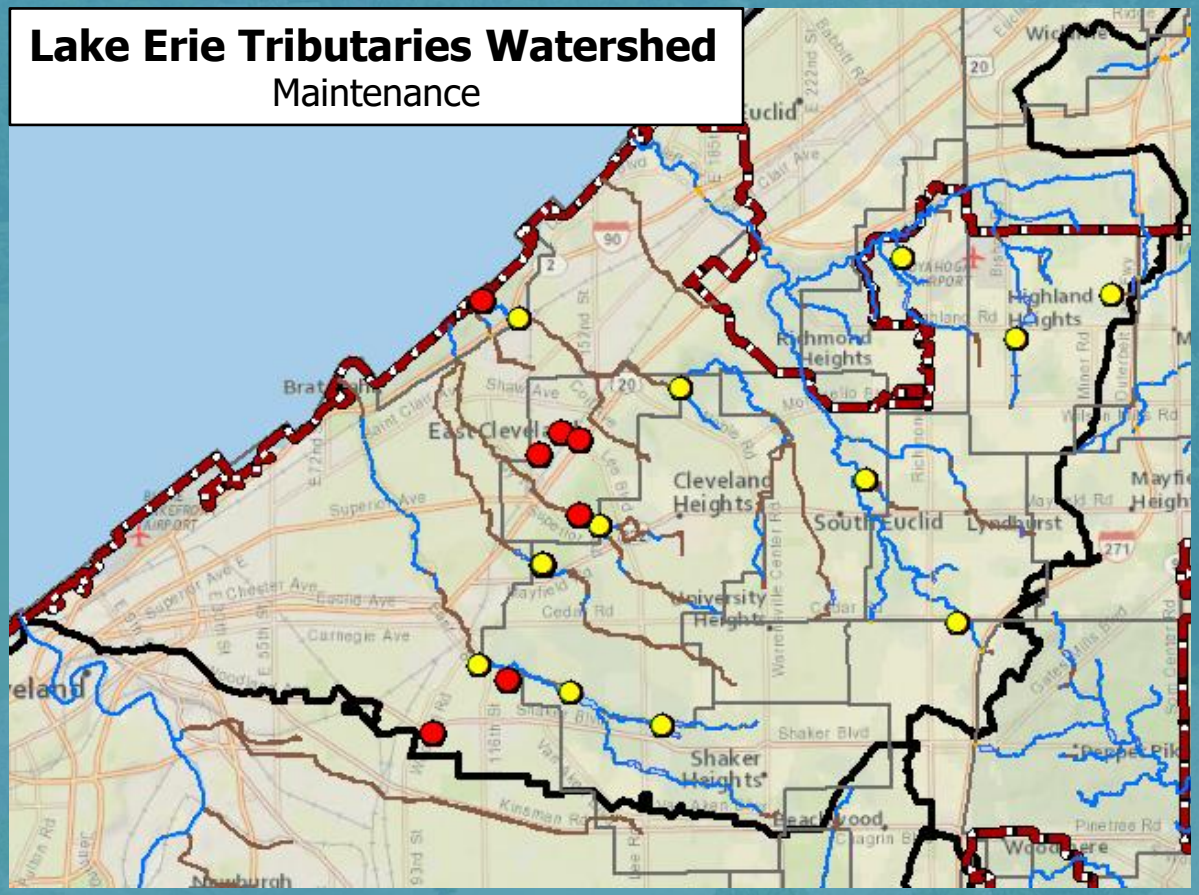
SWIM
2021 Maintenance Program



Maintenance Projects 10/2020 - 02/2021

Project Type	Projects (Count)	Debris Removed (CY)	Sediment Removed (CY)
Sediment & Debris	14	399	5
Other	8		
Total	**22**	**399**	**5**

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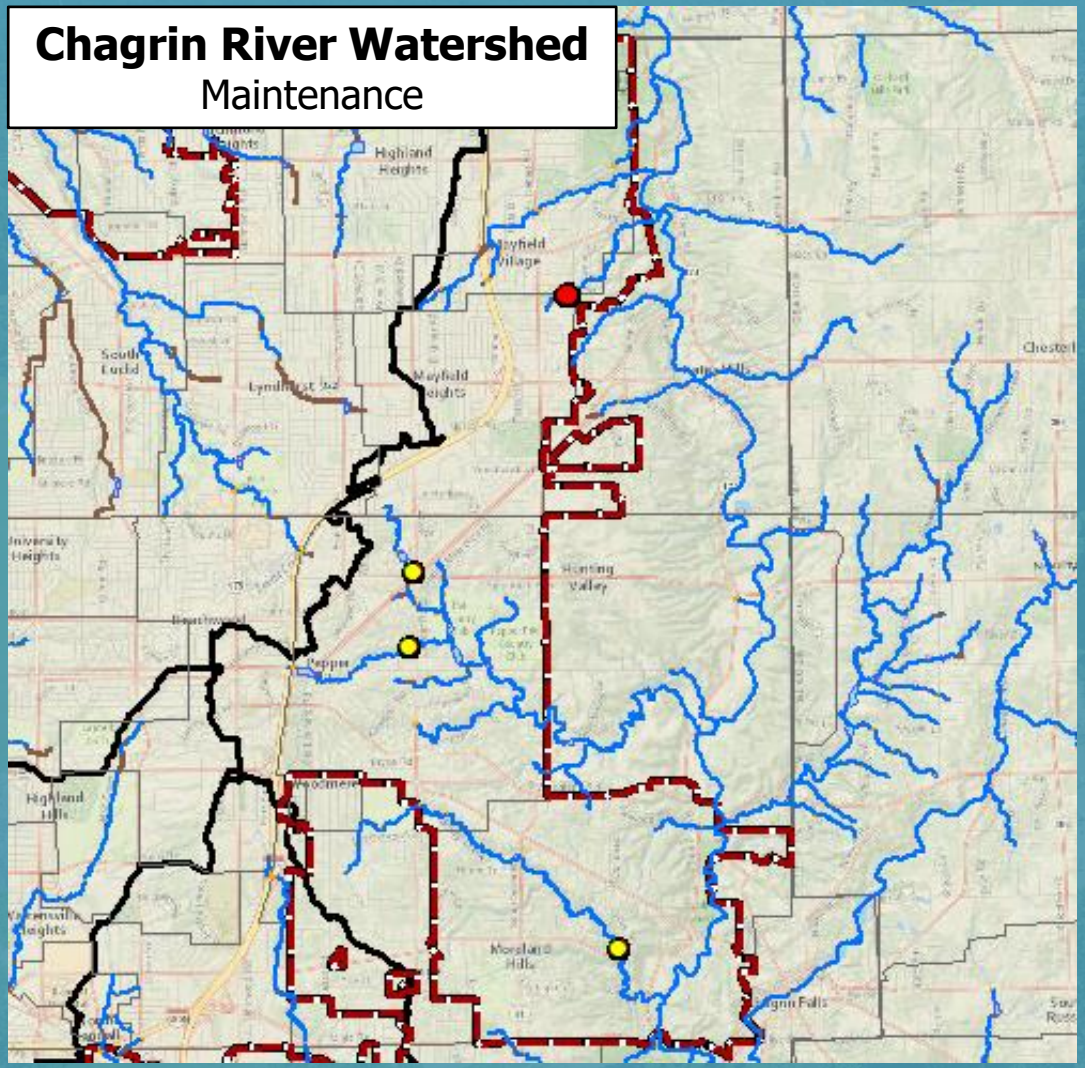
SWIM
2021 Maintenance Program

Chagrin River Watershed
Maintenance



Maintenance Projects 10/2020 - 02/2021			
Project Type	**Projects (Count)**	**Debris Removed (CY)**	**Sediment Removed (CY)**
Sediment & Debris	4	136	0
Other (Bank Stabilization)	1		
Total	**5**	**136**	**0**

Maintenance Type
- Other
- Debris/Sediment Removal

- Watershed Boundary
- Stream
- Major Structure
- Basin
- Crossing
- Culverted Stream
- Stormwater Service Area
- Community Boundary

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SWIM Maintenance Task

Doan Brook

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SWIM Maintenance Task

Euclid Creek East Branch

EE00225
Richmond Heights
35 CY LWD Removed

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Small Scale Maintenance Project

Euclid Creek East Branch

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Questions?

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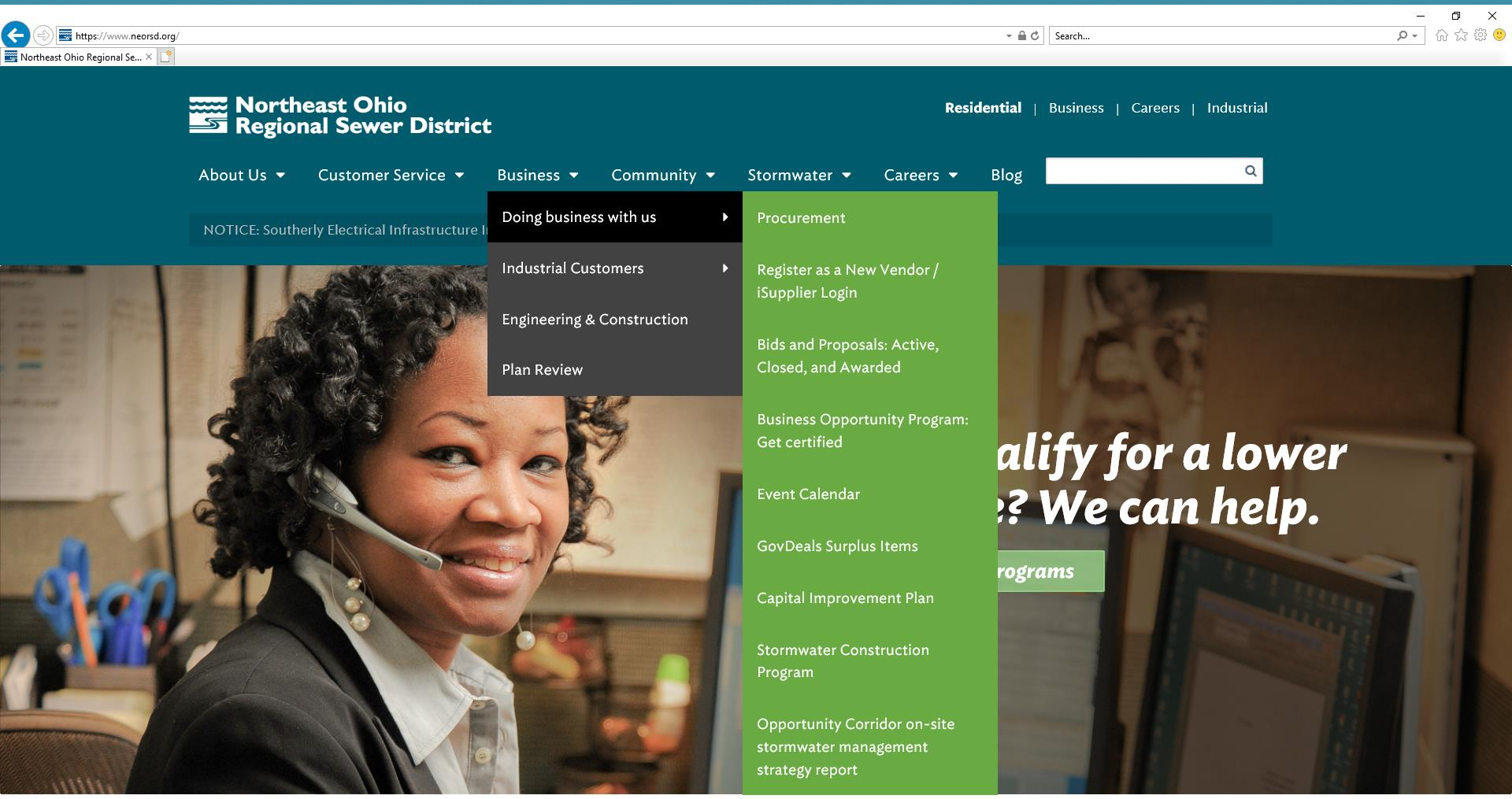
Stormwater Design and Construction Program

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 watershed.

All Projects | Design | Construction | Complete

1 Abram Creek / Big Creek Parkway Detention...

2 Baldwin Creek Bank Stabilization at East...

3 Baldwin Creek Bank Stabilization at Pleasan...

4 Baldwin Creek Stabilization Near Abb...

5 Bear Creek Culvert Removal

6 Beechers Brook Bank Stabilization

7 Big Creek Chevrolet Boulevard Detention...

8 Big Creek Stabilization

9 Big Creek Stream Stabilization Upstream...

10 Brandywine Creek - Barlow Community...

11 Brandywine Creek - Owen Brown Bridge...

12 Chippewa Creek Bank Stabilization at Harris...

13 Chippewa Creek Bank Stabilization at Route 21

14 Chippewa Creek Floodplain Control...

15 Chippewa Creek Flood Reduction Near Echo...

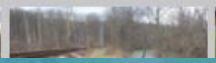
16 Chippewa Creek Stabilization at...

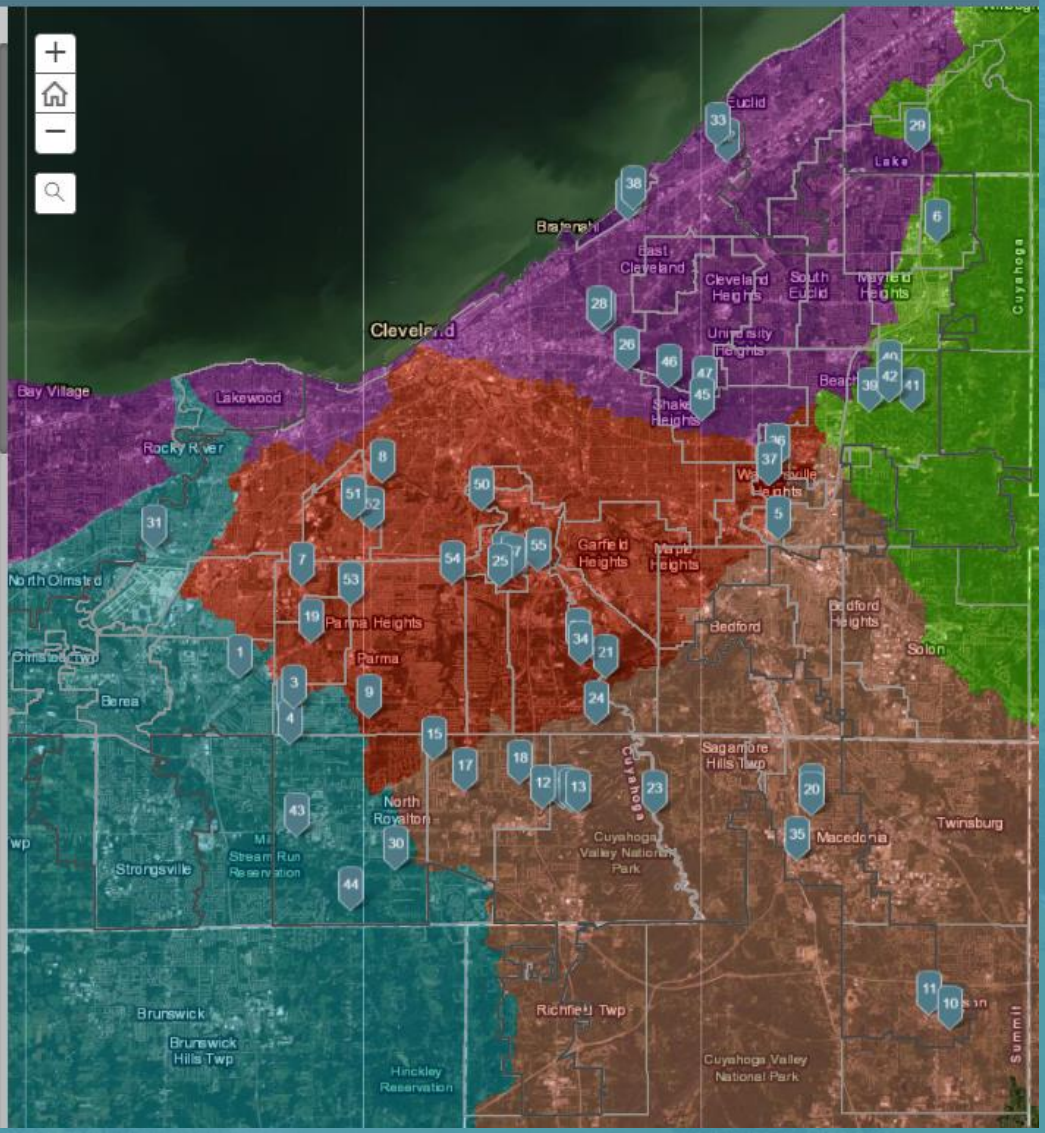
17 Chippewa Creek Stream Stabilization Near...

18 Chippewa Creek Stream Stabilization Near...

19 Colombo Park Stream Restoration

20 Culvert Repair at Berkshire Drive





Projects in Design and Construction

Project Name	City	Next Step/Submittal	Estimated Construction NTP	Estimated Construction Cost
West Creek Bank Stabilization by Sandpiper Drive	Parma	Construction	17-Jun-20	**$ 1,295,090.00**
Chippewa Creek Stabilization at Condominiums	Brecksville	Construction	28-Aug-20	**$ 1,282,013.50**
Rocky River Trib Re-alignment along Ridge Road	North Royalton	Construction	1-Dec-20	**$ 438,471.10**
Pepper Luce Creek Stabilization Near Lander Road	Pepper Pike	Construction	23-Nov-20	**$ 593,034.90**
Doan Brook Culvert Debris Removal	Cleveland	Construction	10-Nov-20	**$ 543,900.00**
Strongsville SR82 Culvert	Strongsville	Construction	1-Jan-21	**$ 500,000.00**
Debris Racks and Access Road Improvements	various	GMP	1-Apr-21	$ 1,500,000.00
Rocky River Stabilization & Sewer Protection	North Royalton	Bid Docs	1-Sep-21	$ 839,000.00
Chippewa Creek Stabilization Route 21	Brecksville	Bid Docs	15-Sep-21	$ 1,295,000.00
Chippewa Creek Stream Stabilization near Broadview Road	Broadview Hts	Bid Docs	29-Sep-21	$ 1,738,000.00
Baldwin Creek Stabilization near Abbey Road	North Royalton	100% Design	18-Aug-21	$ 775,600.00
Bear Creek Culvert Improvements	North Randall	Bid Docs	16-Feb-22	$ 1,021,900.00
Big Creek Flood Reduction near Sprague Road	various	90% Design	17-Nov-21	$ 742,000.00
Pepper Luce Creek Stabilization Near Gates Mills Blvd	Pepper Pike	90% Design	5-Jan-22	$ 2,200,000.00
West Creek Stabilization	Brooklyn Hts	90% Design	19-Jan-22	$ 16,554,000.00
Abram Creek - Big Creek Prky Flood Reduction Phase 1	Middleburg Hts	-	2021	$ 787,938.00
Brandywine Creek Barlow Dam Improvements	Hudson	70% Design	1-Oct-21	$ 1,354,000.00
Chippewa Creek Flood Reduction Project Near Echo Lane	Broadview Hts	60% Design	23-Mar-22	$ 8,200,000.00
Brandywine Creek - Owen Brown Bridge Replacement	Hudson	50% Design	2022	$ 1,106,500.00
Big Creek Phase 1 BCPA07 - Ridgewood Basins	Parma	50% Design	2-Feb-22	$ 1,000,000.00
Baldwin - Stormes Drive Basin	Parma	50% Design	16-Mar-22	$ 2,500,000.00
Abrams Creek Flooding at Sheldon Road	various	FUNDING	2023	$ 2,000,000.00
Hemlock - Seven Hills Phase 1	Seven Hills	Design RFP	1-Dec-22	$ 2,000,000.00
Hemlock Creek near Hemlock Road	Independence	D/B RFQ/RFP	2023	$ 1,200,000.00
Shaker Lakes Dam Modifications: Phase II - Upper Lake Dam	various	Final Design	1-Mar-22	$ 8,500,000.00
Big Creek Near Ridge Road	Parma	Pre-Design BODR	2023	tbd

For this meeting, we will focus mostly on projects under construction, and briefly discuss in-house design projects.

- 7 projects under construction contract
- 20 projects in some procurement or design phase
- 4 projects under reimbursement contract to community

* Upcoming projects subject to change

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What Do Stream Restoration Projects Look Like?

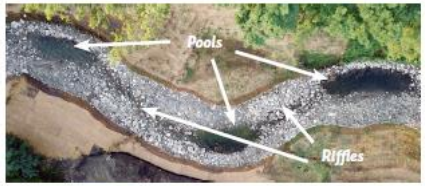
What Do Stream Restoration Projects Look Like?

Beechers Brook Stabilization Project in Mayfield Village:

Stickney Creek Stream Restoration & Utility Repair Project in the City of Brooklyn:

Baldwin Creek Stabilization Project in the City of Parma:

What are the Typical Components of Stream Restoration Projects?



Rocks
Sometimes referred to as "riprap," rocks are used to stabilize streambanks and line the bottom of the stream to make it less vulnerable to erosion. Sizing of the rocks depends on the amount of flow that the stream experiences. Limestone and sandstone are commonly used.

Pools & Riffles
Pools are deeper sections of the stream usually built on the outside of bends. *Riffles* are shallow areas of the stream with protruding rocks at the surface. Both structures work together to reduce the energy of the stream.

Floodplains
Floodplains are areas where streams can flow out of their main channels during large storm events to provide some temporary flood storage and dissipation of stream energy. After a large storm event, water on the floodplains will infiltrate or slowly flow back into the stream channel. Floodplains also have a positive impact on water quality by allowing sediment and nutrients to settle out and not be carried downstream.

Vegetation
Vegetation typically installed on stream restoration projects include:

- Trees and shrubs;
- Live stakes, which are woody cuttings harvested from trees in the dormant season. They are installed along streambanks and develop dense root systems to help hold the soil together and minimize future erosion;
- Herbaceous plugs and seeding.

Northeast Ohio Regional Sewer District

Pepper Luce Creek at Lander Road
City of Pepper Pike

Pepper Luce Creek Streambank Stabilization

- Arrest streambank erosion
- Protect utility assets
- Create & expand floodplain

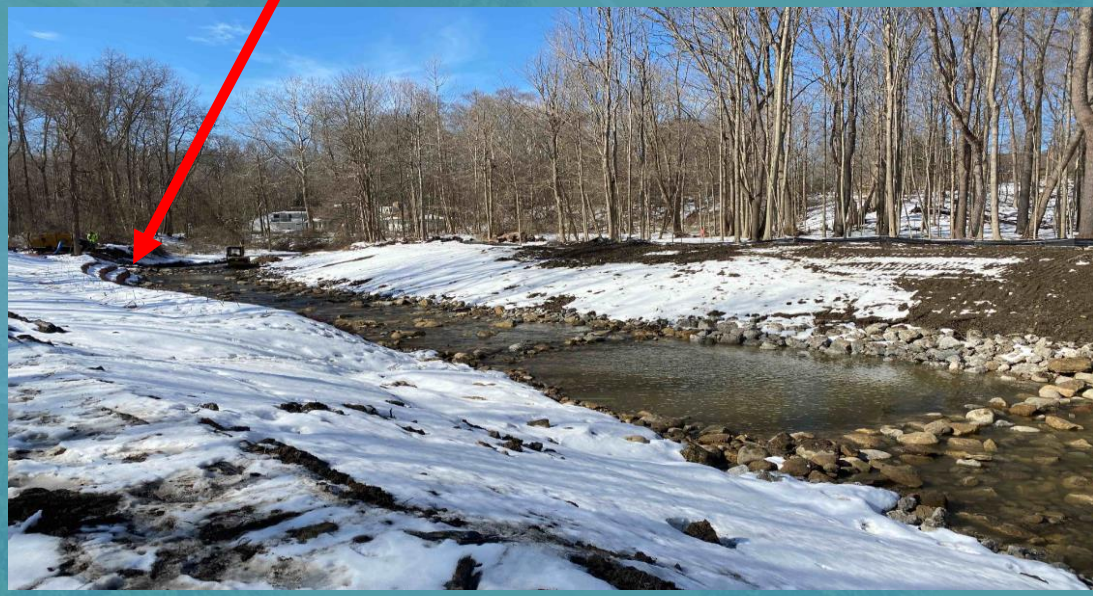
Professional Service Firm:	Jacobs
Contractor:	Tucson
Construction Phase:	NTP - 11/23/20
Bid Estimate:	$760,000.00
Award:	$593,034.90

Failed gabion baskets & streambank erosion

Northeast Ohio Regional Sewer District

Pepper Luce Creek at Lander Road
City of Pepper Pike

- Purchased 1 residential property and acquired easements on several others
- Installation of Fabric Encapsulated Soil Lifts (FESLs)
- Expanding floodplain
- Tied into gabions at downstream end of project (had to shorten project due to easement refusal from 1 property owner)



Northeast Ohio Regional Sewer District

Pepper Luce Creek at Lander Road
City of Pepper Pike

before

after

Northeast Ohio Regional Sewer District

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Doan Brook Culvert Debris Removal

Remove 1950 cubic yards

Northeast Ohio Regional Sewer District

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Doan Brook Culvert Debris Removal

Construction Complete

Doan Brook Culvert in Cleveland

University Circle around Euclid Ave and Chester Ave

before

after

Northeast Ohio Regional Sewer District

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Chippewa Creek Stabilization at Condominiums in Brecksville

- Eroding streambank within 12 ft of the condominiums
- Erosion within 6 ft of local sanitary sewer
- Stream infrastructure more cost effective than acquisition
- Construction Award: $1,282,013
- Excavate Floodplain on left bank

NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM

Chippewa Creek Stabilization at Condominiums in Brecksville

West Creek Stabilization by Sandpiper Drive

- *Stream infrastructure more cost effective than acquisition*
- *Large area of property impacted including large trees*
- *Construction Award: $1,295,090*

Northeast Ohio Regional Sewer District

NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM

West Creek Stabilization by Sandpiper Drive

Construction Complete

City of North Royalton - Ridge Road Repair and Rocky River Tributary Stabilization

Problem: Bank erosion adjacent to Ridge Road

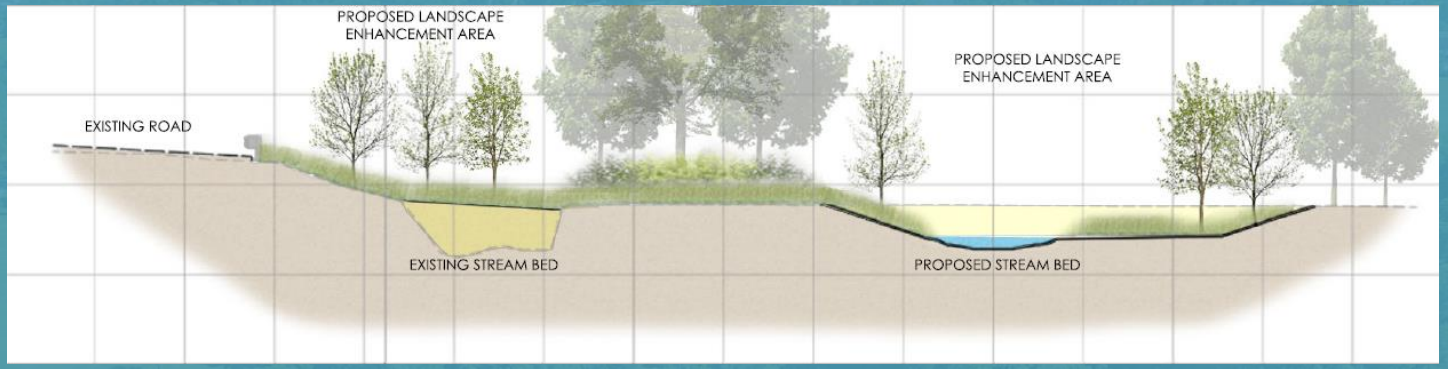
Project benefit to RSS:

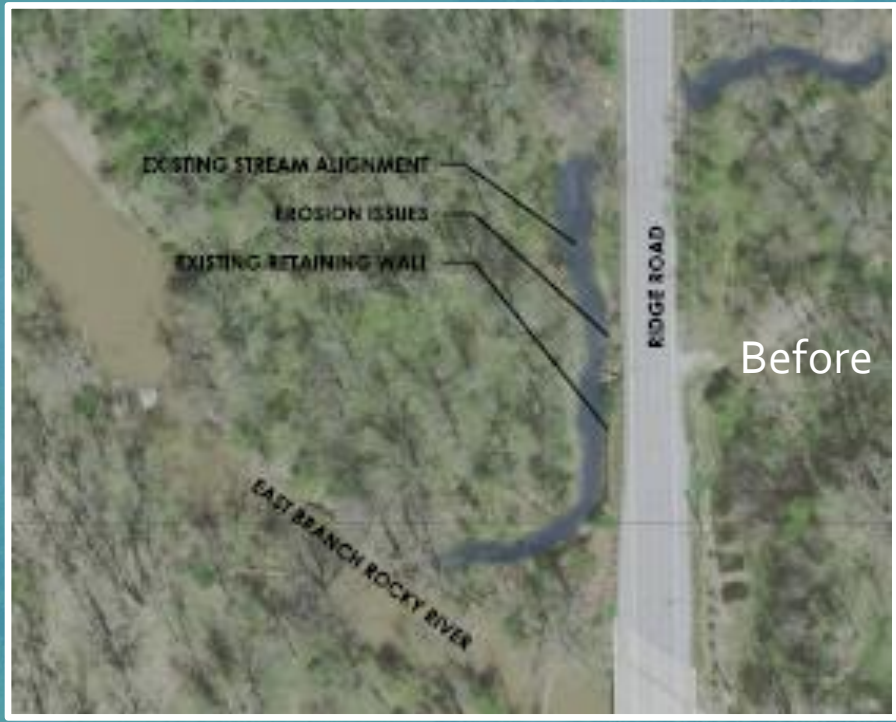
- Reduces sediment deposition
- Creates a new stable stream channel

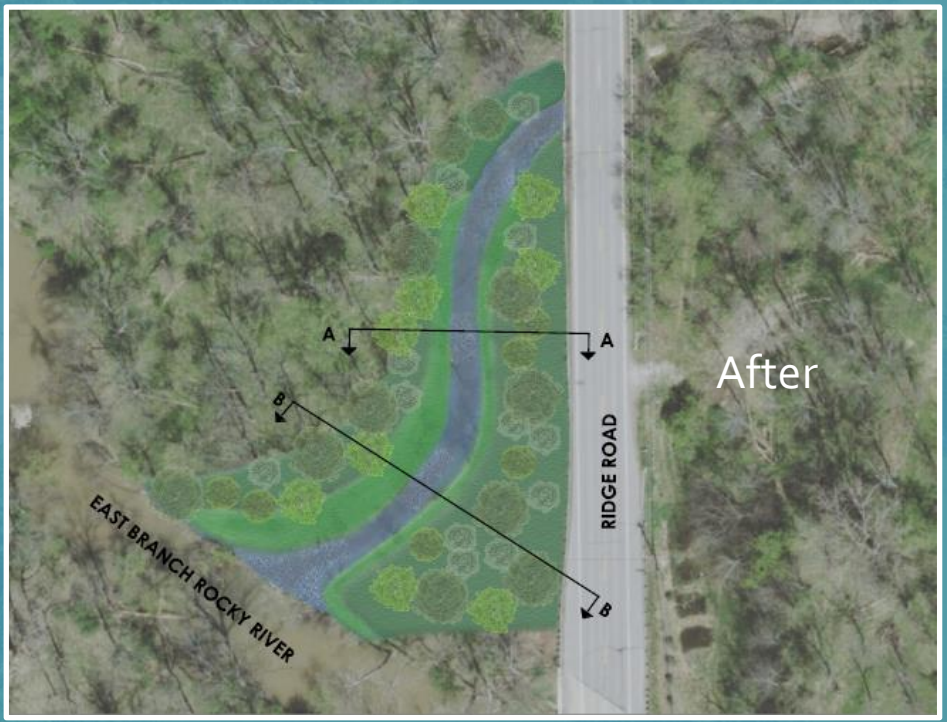
Construction Award:
$438,471

Northeast Ohio Regional Sewer District

City of North Royalton - Ridge Road Repair and Rocky River Tributary Stabilization



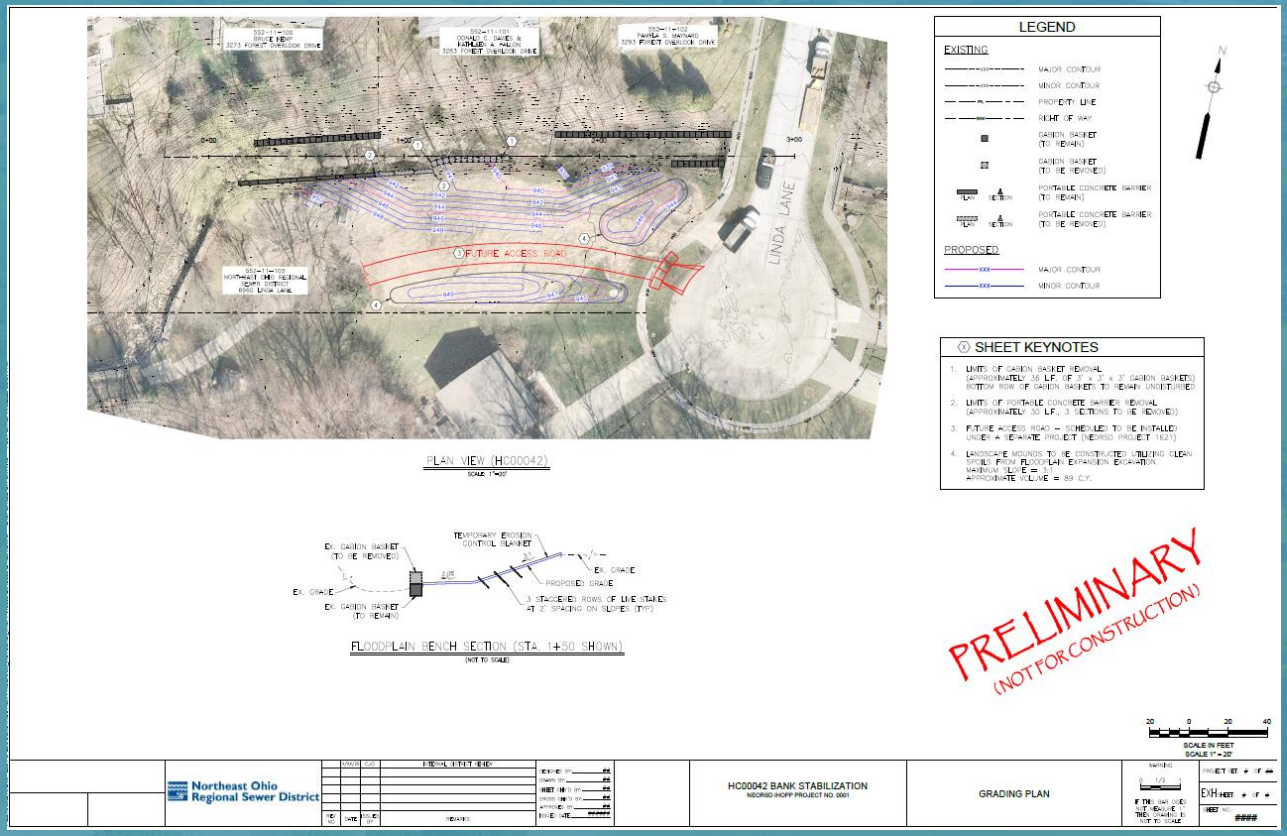




In-House Design Projects

Hemlock Creek in Seven Hills

- Excavate and grade south bank of stream to increase cross section and create more floodplain area to reduce energy on north eroding bank
- To be constructed 2nd Qrt 2021



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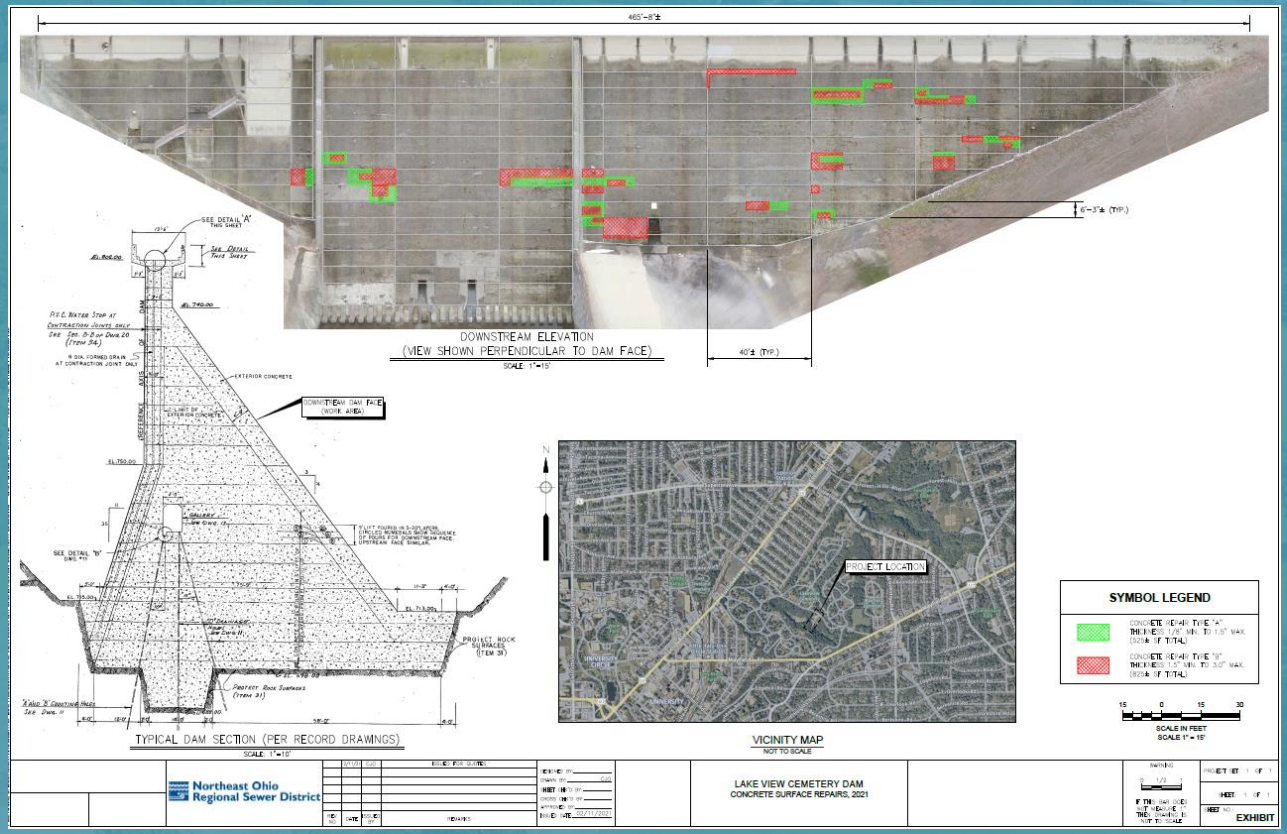
In-House Design Projects

Lakeview Dam Repairs

- ODNR inspection report maintenance items
- Concrete surface repairs on downstream face of dam
- Air vent modifications
- To be constructed 2021



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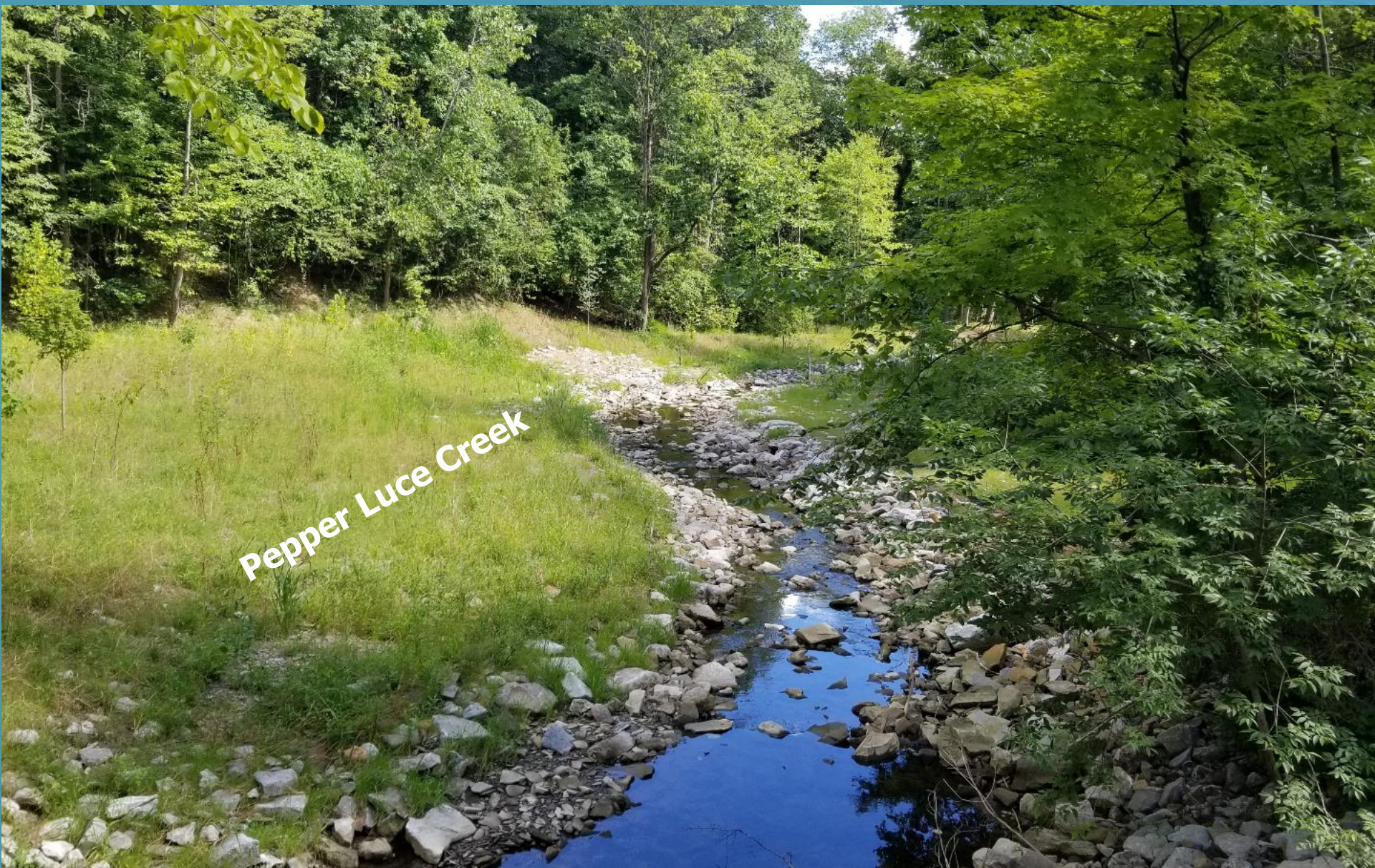
Questions



Cost-Saving Programs

- *Crisis Assistance*
  - *Up to $300 sewer credit*
  - *Experienced financial hardship within last 6 months (loss of job, loss of income, death in family, medical expenses, etc.)*

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

Customer Service: (216) 881-8247

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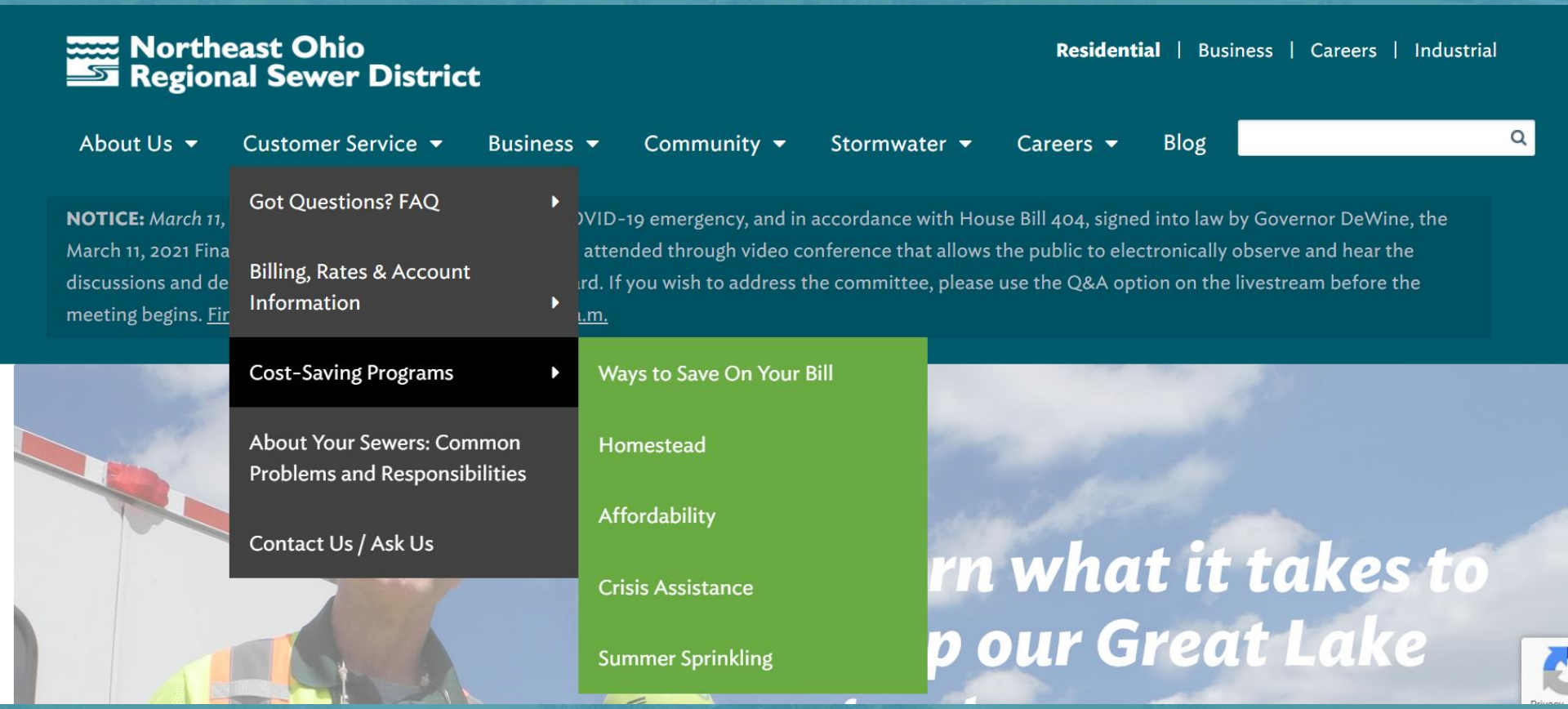
Cost-Savings Programs



Northeast Ohio Regional Sewer District

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jowettj@neorsd.org

NORTHEAST OHIO REGIONAL SEWER DISTRICT
REGIONAL STORMWATER MANAGEMENT PROGRAM

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