






# Cuyahoga River - South

-  Regional Stormwater System in NEORS D Service Area
-  Regional Stormwater System not in NEORS D Service Area
-  Service Area
-  Community
-  District Culverted Stream

 **Northeast Ohio  
Regional Sewer District**

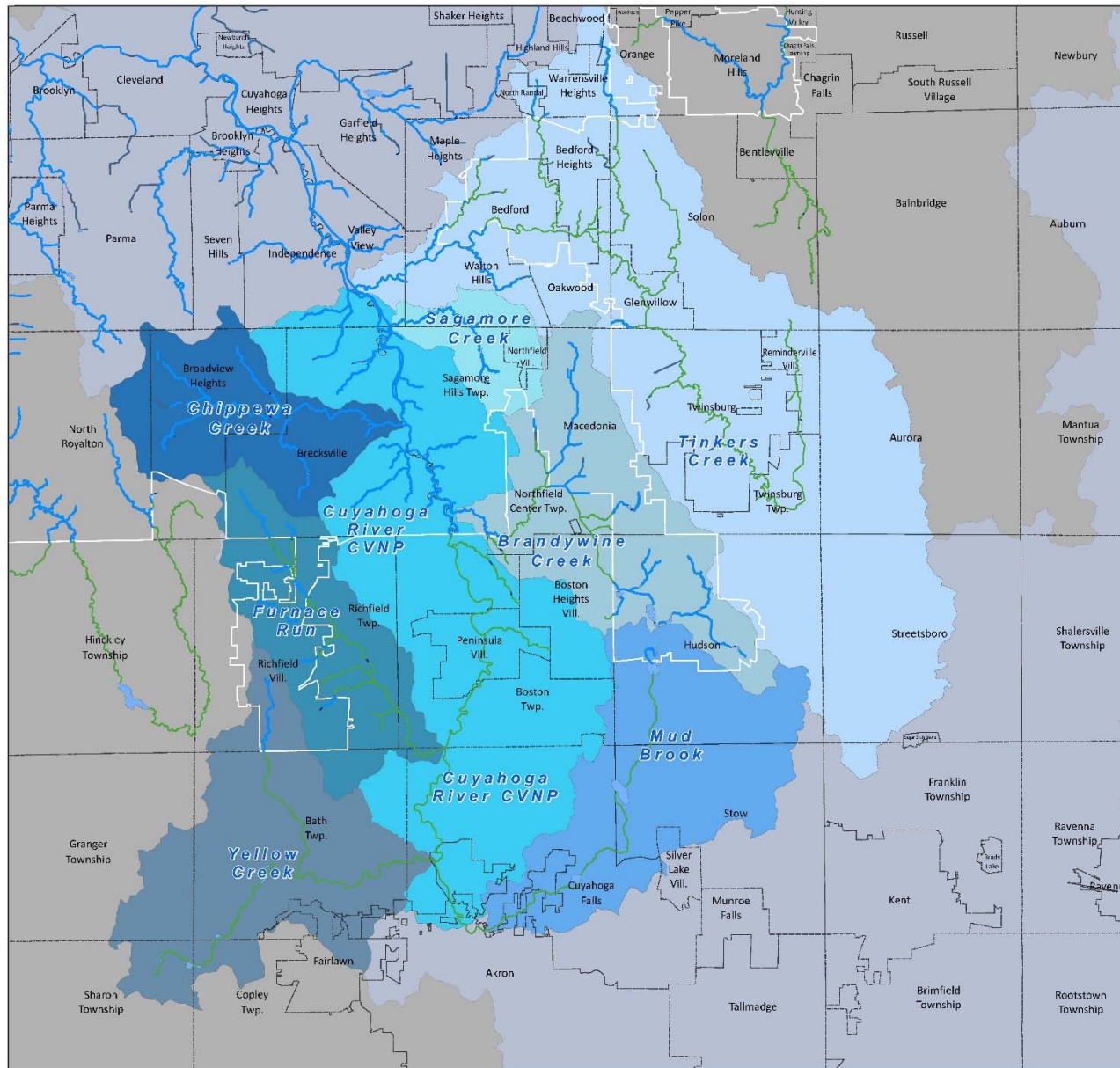
**Coordinate System :** Ohio State Plane North  
**Datum:** NAD 1983 , NAVD 1988  
**Projection:** Lambert Conformal Conic  
**Sources:** NEORS D GIS

**Map Created:** March 2017

**1:72,379**



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NORTHEAST OHIO REGIONAL SEWER DISTRICT



REGIONAL  
STORMWATER  
MANAGEMENT  
PROGRAM

# Regional Stormwater Management Program

## **Watershed Advisory Committee**

March 2017



*Your Sewer District* Keeping our Great Lake great.





# Agenda

- Welcome
- Stormwater Construction Plan
- Stormwater Master Plans
- Stormwater Inspection and Maintenance
- Program Update
  - Community Cost-Share
  - Phase II Services
  - SW Plan Review – Common comments/issues



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# Stormwater Construction Plan 2016-2017









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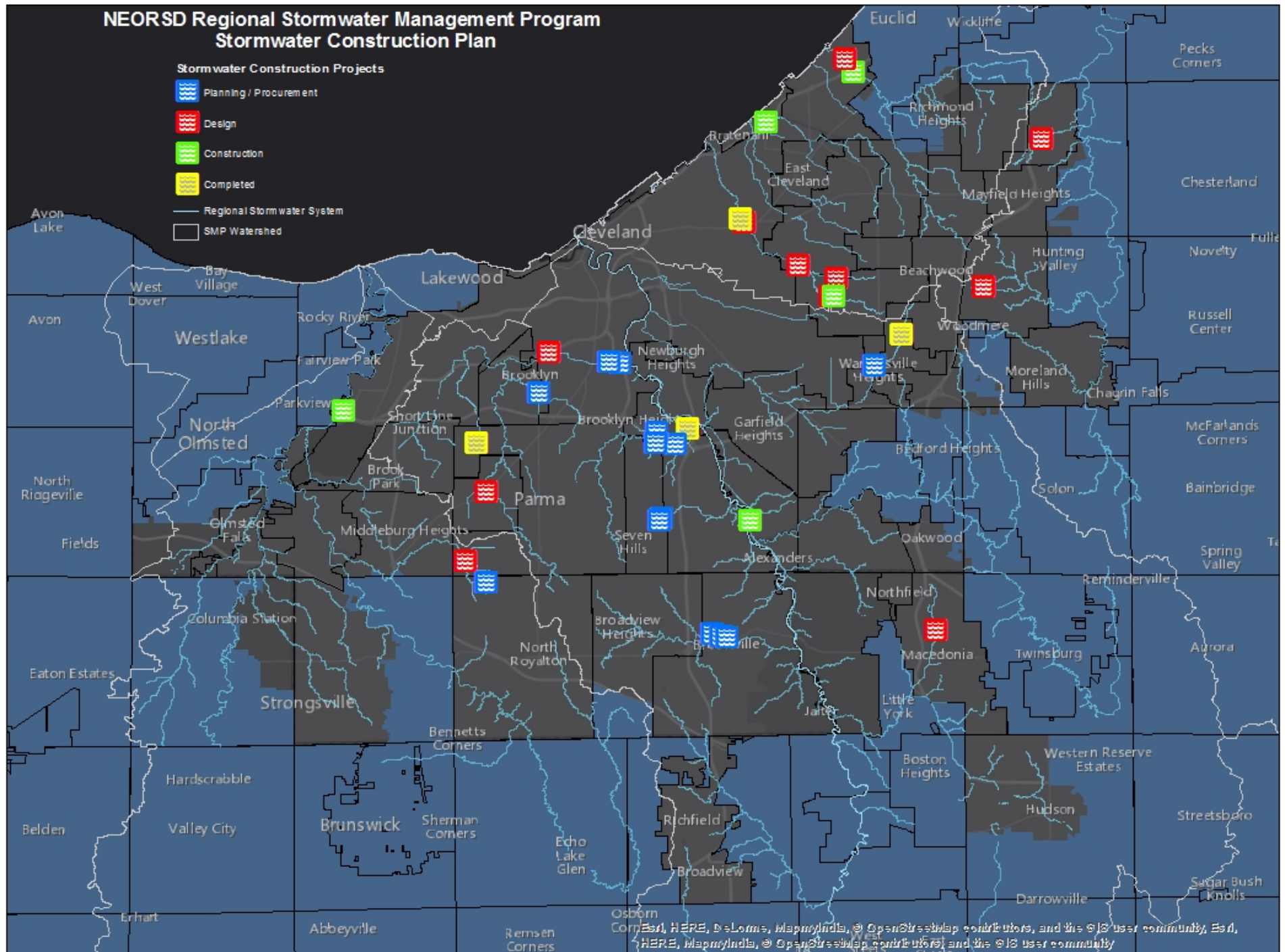




# NEORSD Regional Stormwater Management Program Stormwater Construction Plan

## Stormwater Construction Projects

-  Planning / Procurement
-  Design
-  Construction
-  Completed
-  Regional Stormwater System
-  SMP Watershed





# STORMWATER CONSTRUCTION PLAN

## Stormwater Construction Plan 2017-2018

State Development & Procurement
Design
Bidding
Construction
Final Completion
Close-out

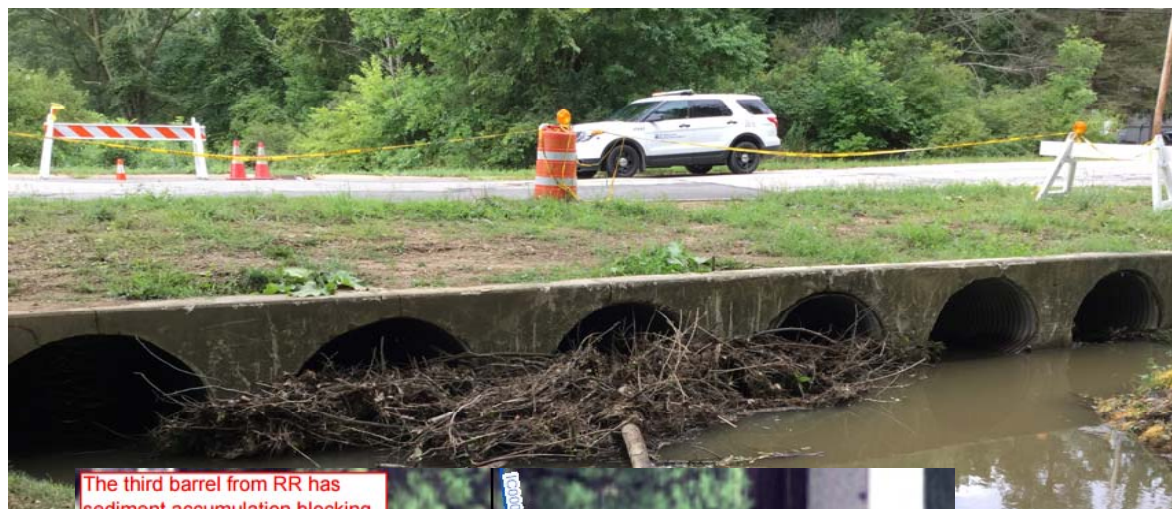
7-Mar-17

| Estimated Construction Cost                                                                                   | Jan. 2017 | Feb. 2017 | Mar. 2017 | Apr. 2017 | May 2017 | Jun. 2017 | Jul. 2017 | Aug. 2017 | Sep. 2017 | Oct. 2017 | Nov. 2017 | Dec. 2017 | Jan. 2018 | Feb. 2018 | Mar. 2018 | Apr. 2018 | May 2018 | Jun. 2018 | Jul. 2018 | Aug. 2018 | Sep. 2018 | Oct. 2018 | Nov. 2018 | Dec. 2018 |
|---------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1311 Highland Park Golf Course Stream Restoration                                                             |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1413 Chevrolet Blvd. Detention Basin (West Fork Niagara watershed budget, community funds, etc.)              |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1487 Shaver Brook Culverted Stream Rehabilitation (West Fork Niagara watershed budget, community funds, etc.) |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1384 Euclid Creek Concrete Spillway EC00008                                                                   |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1365 Shaker - Green Lake Dredging DB00101                                                                     |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1320 Shaker Lakes Dam Rehabilitation DB00056 & DB00101                                                        |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1410 Joan Brook Stream Stabilization DB00029                                                                  |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1411 Big Creek Stabilization BC00032                                                                          |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1409 Colombo Park BC00299                                                                                     |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1412 Cuyahoga River at Towpath Bank Stabilization CB00132                                                     |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1369 Beechers Brook and Pepper Creek Bank Stabilization CW00021 & CW00146                                     |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1490 Hemlock Creek Bank Stabilization                                                                         |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1491 Mill Creek Bank Stabilization MC00125                                                                    |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1498 Bellowin Cr. Bank Stabilization BD00259, BD00267                                                         |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD Bellowin Cr. Bank Stabilization BD00297                                                                   |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1492 Emerald Pkwy Culvert Repair                                                                              |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1496 Sioux Lane Culvert Replacement IC00079                                                                   |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1502 Ridge Road (Stickney Creek) Bank Stabilization and Utility Repair ST00209                                |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD Euclid Creek Flood Control Shoaling Removal                                                               |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1500 Chippewa Creek Bank Stabilization CC00030                                                                |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1499 Brecksville Condominium Stabilization CC00032                                                            |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| 1501 Brecksville Building Demolition CC00032                                                                  |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2014-0003 Big Creek Stabilization BC00004 and BC00010                                                  |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2015-0008 West Creek Trash Rack Repair and Replacement                                                 |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2016-0004 Bank Erosion Upstream of the Lancaster Bridge WC00067-68                                     |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2015-0020 West Creek Bank Stabilization WC00046-WC00066                                                |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2016-0018 Erosion and Bank Failure WB00108                                                             |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2016-0017 Culvert Repair CC00157                                                                       |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2016-0014 Chippewa Creek Bank Erosion CC00122                                                          |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |
| TBD SWD2016-0020 North Royallon Culvert Repair BD00296                                                        |           |           |           |           |          |           |           |           |           |           |           |           |           |           |           |           |          |           |           |           |           |           |           |           |

Please note, this is current as of the indicated date. This schedule will undoubtedly change. Please contact your Watershed Team Leader for the most current schedule for any particular project.



# Sioux Lane Culvert Replacement



**Completion Date: 4Q 2017**

**Construction Cost: \$300,000**

## Project Elements

- Replacement of 6 culverts with one large structure
- Improve transition from stream to culvert
- Provide scour and erosion protection along sides and outlet

The third barrel from RR has sediment accumulation blocking nearly half the culvert, the other barrels are relatively clean.

3302253

3300470

Sinkholes are in between pipes, not in the roadway

Six-barrel CMP culvert, the inverts have heavy rust, and some have rusted through

SIoux LN

Sinkhole in the edge of the roadway, about 15' from DS end of pipe

3301171

01607





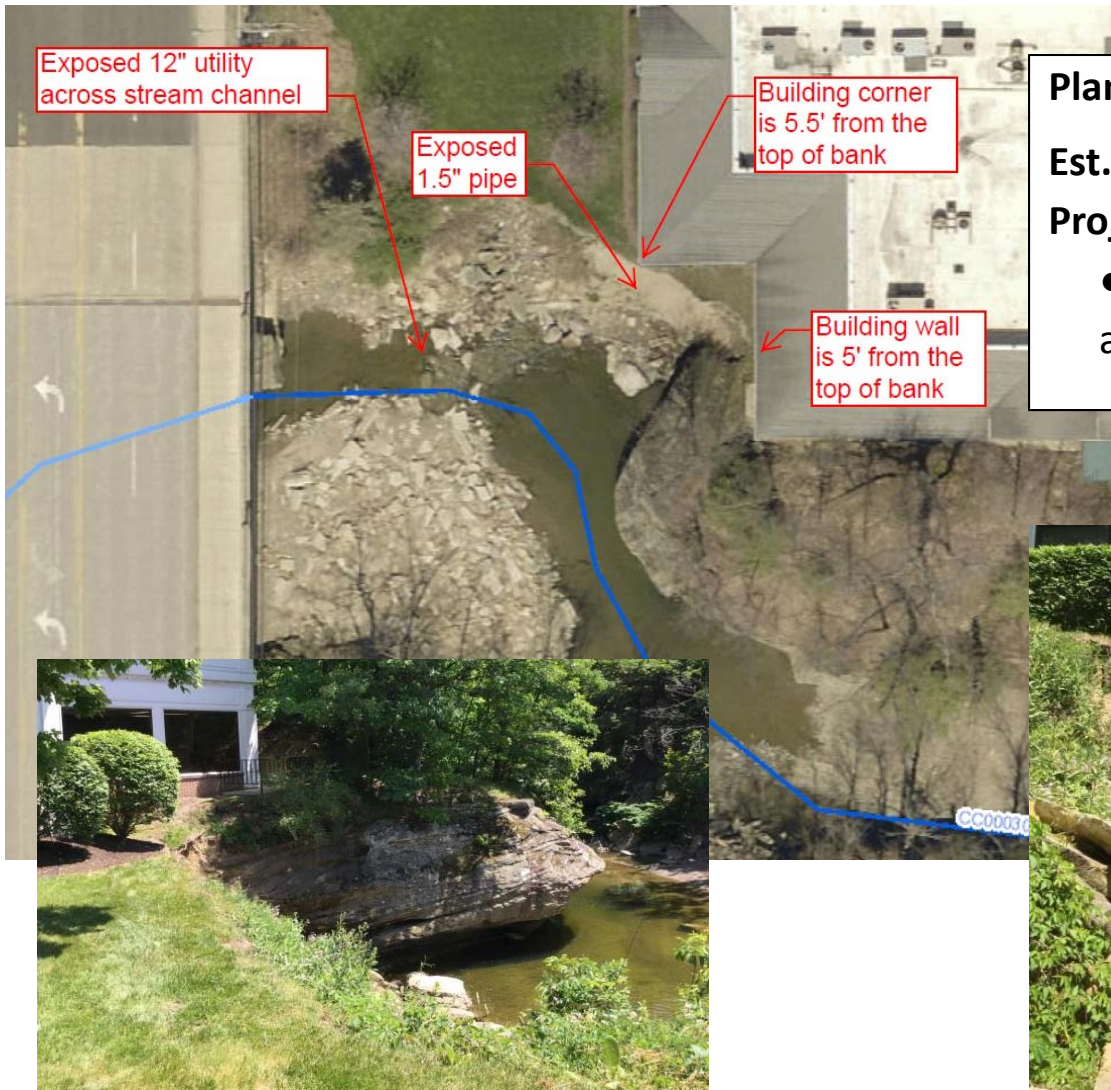
# Chippewa Creek Bank Stabilization CC00030

**Planning/Procurement Commencing: 2Q 2017**

**Est. Construction Cost: \$1.5 M**

## **Project Elements**

- Stabilize bank to protect structure and utility







# Chippewa Creek Bank Stabilization CC00032



**Planning/Procurement Commencing: 2Q 2017**

**Construction Cost: \$300,500**

## **Project Elements**

- Stabilize approximately 155 feet of eroding stream bank along condominium complex
- stabilize exposed stormwater pipe and headwall.







*Sioux Lane Culvert Replacement, Macedonia*

# Stormwater Construction Plan Annual Review Process

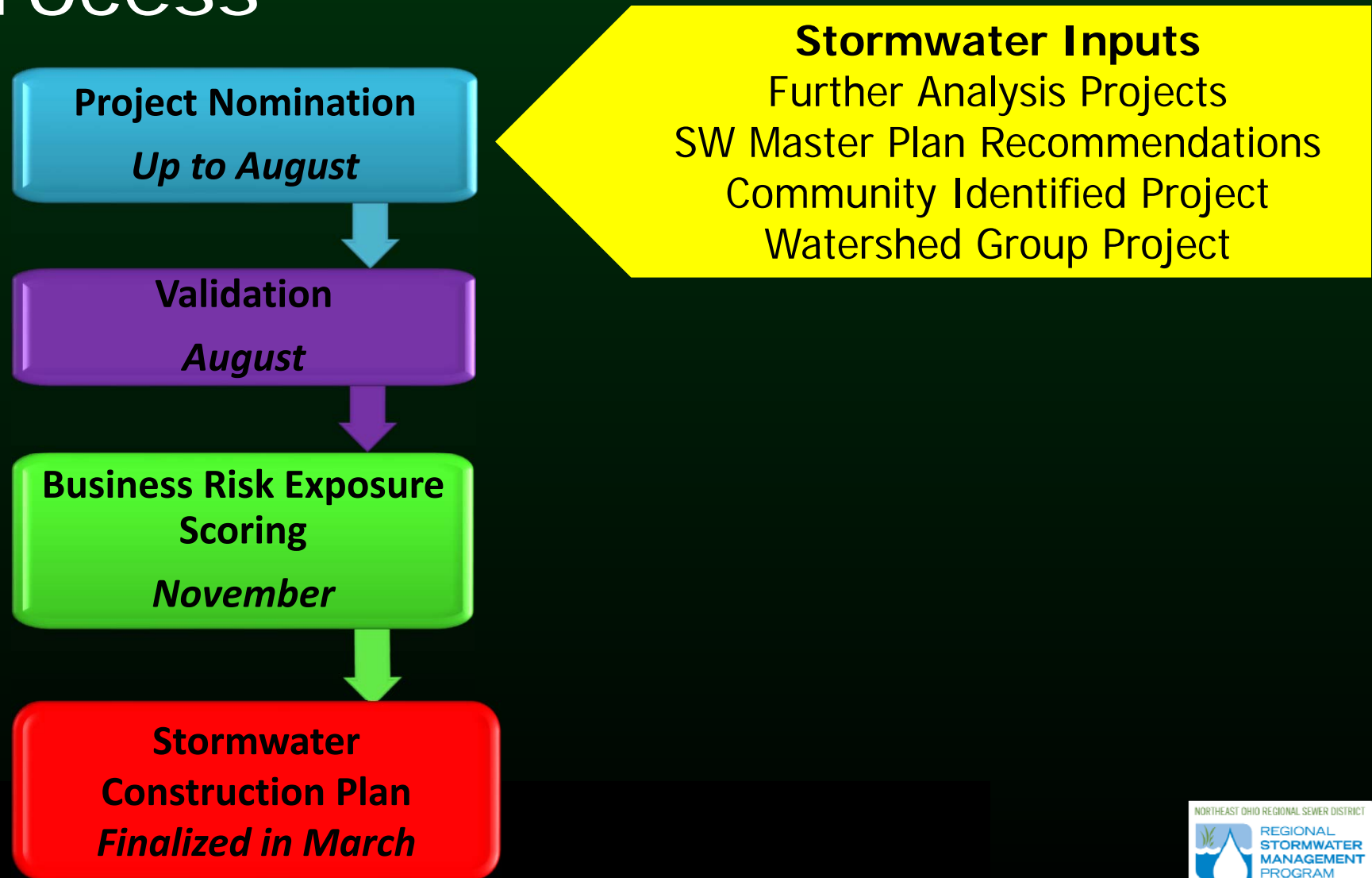


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# Stormwater Construction Plan Process



# Stormwater Construction Plan Community Nomination



## COMMUNITY PROPOSED STORMWATER PROJECT INFORMATION SUBMITTAL

The following information is necessary for the Northeast Ohio Regional Sewer District (NEORSRD) to evaluate proposed projects during the stormwater construction planning process under the Regional Stormwater Management Program. Complete information will aid in determining benefit to the Regional Stormwater System and facilitate the evaluation process. NEORSRD may request additional information to gain a better understanding of the project. NEORSRD can provide limited technical assistance for this submittal, however preliminary engineering studies are the responsibility of the community.

The submittal of this information is solely for the purposes of facilitating the Sewer District's evaluation of projects along the Regional Stormwater System proposed by communities. The submittal of this information does not obligate the Sewer District to participate in or implement the proposed project.

| Community Information          |  |
|--------------------------------|--|
| Community                      |  |
| Project Contact Name and Title |  |
| Address                        |  |
| Phone Number                   |  |
| Email Address                  |  |

| Project Information                                  |  |
|------------------------------------------------------|--|
| Project Name                                         |  |
| Project Location (Address and Attached Location Map) |  |
| Parcel Numbers                                       |  |
| Ownership                                            |  |
| Stream/Watershed                                     |  |
| Proposed Start Date                                  |  |
| Proposed Completion Date                             |  |
| Project Cost                                         |  |

## NORTHEAST OHIO REGIONAL SEWER DISTRICT COMMUNITY STORMWATER PROJECT INFORMATION FORM

### Project Description (please attach or provide the following information)

#### 1) Project Summary

Describe the project.

- Problem being addressed;
- Objectives and outcomes. Include explanation of the extent of specific improvements along the Regional Stormwater System;
- Vicinity maps, drawings, or figures of the site and the project;
- Other relevant project details that will facilitate NEORSRD's review.

#### 2) Background Information

Include studies and planning documents which support the need, and the proposed solution, if applicable.

- Site soils;
- Geotechnical studies;
- Wetlands, water quality, and listed species
- Preliminary hydrology and hydraulics (existing and proposed hydraulics to determine benefit to the Regional Stormwater System)
- Permitting (if initiated)
- Risks or constraints
- Known stakeholder outreach or input
- Current photos of the project site

#### 3) Budget Summary

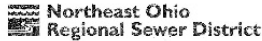
The Budget Summary should include details on materials and services including specific material cost and hourly rate. If there is a volunteer component, please identify the source of volunteers and the extent to which these volunteers are committed to the specific project. If outside funding is guaranteed, please include the amount to be paid from other sources. If outside funding is anticipated, please include information on sources, timelines, and likelihood. Include an engineer's estimate if available.





# Stormwater Construction Plan

## Community Nomination: Sioux Lane



### COMMUNITY/ORGANIZATION PROPOSED STORMWATER PROJECT INFORMATION SUBMITTAL

The following information is necessary for the Northeast Ohio Regional Sewer District (NEORSD) to evaluate proposed projects during the stormwater construction planning process under the Regional Stormwater Management Program. Complete information will aid in documenting projects to the Regional Stormwater System and facilitate the evaluation process. NEORSD may request additional information to gain a better understanding of the project. NEORSD can provide limited technical assistance for the submittal, however preliminary engineering studies are the responsibility of the community sponsor.

The submittal of this information is solely for the purposes of facilitating the Sewer District's evaluation of projects under the Regional Stormwater System program by community and/or organizations. The submittal of this information does not obligate the Sewer District to participate in or implement the proposed project.

| Organization/Community Information |                                         |
|------------------------------------|-----------------------------------------|
| Organization/Community             | City of Macedonia                       |
| Project Contact Name and Title     | Donald J. Sheehy, City Engineer         |
| Address                            | 22999 Foxboro Road, Oakwood, Ohio 44136 |
| Phone Number                       | 440-439-1533                            |
| Email Address                      | sheehydonald@macedonia.com              |

| Project Information                                  |                                                 |
|------------------------------------------------------|-------------------------------------------------|
| Project Name                                         | Sioux Lane Culvert Replacement                  |
| Project Location (Address and Attached Location Map) | Sioux Lane, between Chenook Run and Chenook Run |
| Parcel Numbers                                       | Sioux Lane, public right-of-way                 |
| Ownership                                            | City of Macedonia                               |
| Street/Highway                                       | Sioux Lane                                      |
| Project Start Date                                   | 02/15/16                                        |
| Proposed Construction Date                           | 20/17/16                                        |
| Project Cost                                         | \$215,000.00                                    |

### Sioux Lane Culvert Replacement City of Macedonia Proposed Storm Water Project Submittal June 21, 2016

#### 1) Project Summary

The Sioux Lane Culvert Replacement Project consists of the complete removal of the existing stream crossing, and installation of a concrete box culvert. The existing crossing consists of six CMP arches. The proposed concrete box will have an opening that is four feet in height and twenty feet in width. This project will address both the structural failings, and the hydraulic inefficiencies of the existing crossing. The existing CMP culverts are experiencing severe corrosion and joint separation, which is resulting in sinkholes on the roadway surface. The severity of those sinkholes has previously forced the City of Macedonia to close Sioux Lane to traffic. Given the structural deficiencies of the crossing, the City will need to proceed with the culvert replacement in the fall of 2016. The damage to the existing pipes has also resulted in partial blockages of the culvert, thus reducing the hydraulic capacity of the crossing. Finally, the six-barrel culvert design, and the relatively small opening size of each barrel, causes debris to gather at the upstream openings and further restrict flow. This causes the need for continual monitoring and cleaning of the culvert by both local and NEORSD forces. See attached mapping.

#### 2) Background Information

NEORSD performed a complete inspection of this culvert on May 20, 2016, the results of which are on file. In addition, we have performed preliminary hydraulic calculations for this culvert replacement. In summary, replacing the existing six-barrel crossing with a 4' x 20' box culvert will lower the upstream water surface elevation immediately upstream of Sioux Lane by two inches. This culvert replacement will have no effect on water surface elevations downstream of Sioux Lane. See the tables below. All water surface elevations given in feet above sea level.

| 25 Year Storm Event |                       |                      |         |                         |
|---------------------|-----------------------|----------------------|---------|-------------------------|
|                     | Approx. 300' Upstream | Immediately Upstream | Culvert | Approx. 300' Downstream |
| Existing Conditions | 1003.14               | 1002.88              | ---     | 1000.90                 |
| Proposed Conditions | 1003.04               | 1002.72              | ---     | 1000.43                 |

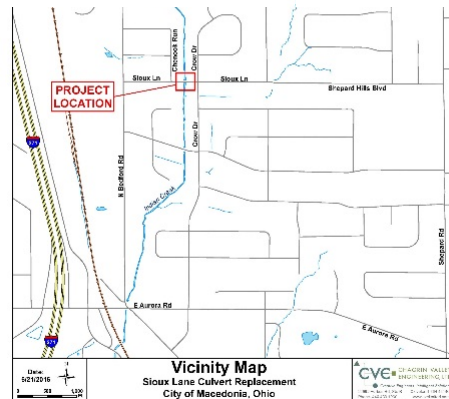
| 100 Year Storm Event |                       |                      |         |                         |
|----------------------|-----------------------|----------------------|---------|-------------------------|
|                      | Approx. 300' Upstream | Immediately Upstream | Culvert | Approx. 300' Downstream |
| Existing Conditions  | 1003.63               | 1003.41              | ---     | 1001.78                 |
| Proposed Conditions  | 1003.50               | 1003.24              | ---     | 1001.44                 |

#### 3) Budget Summary

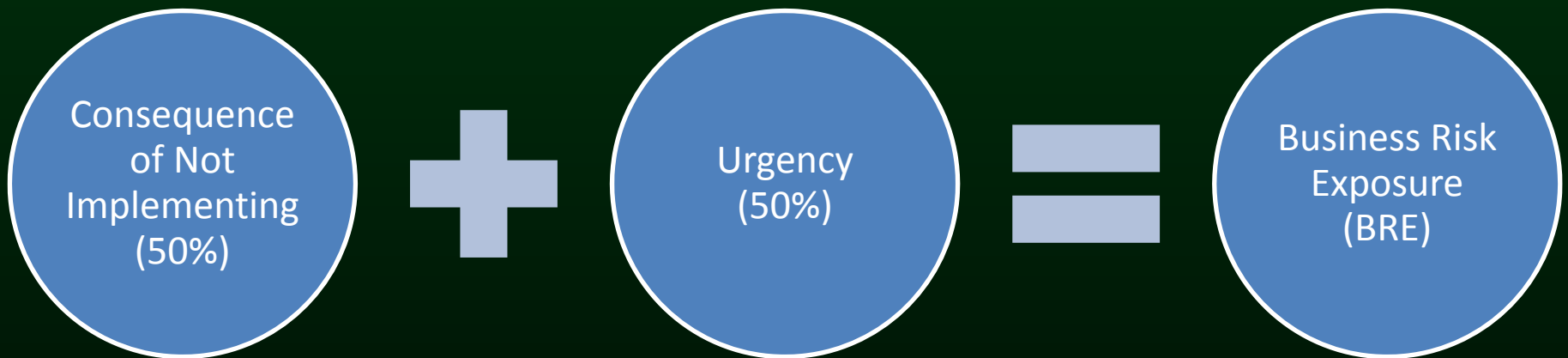
The preliminary project cost estimate is \$215,000.00. The NEORSD share for culvert and hydraulic improvements is estimated to be \$174,000.00. The City of Macedonia share for other utility and pavement improvements is estimated to be \$41,000.00.

| SIoux Lane Culvert Replacement<br>CITY OF MACEDONIA<br>PRELIMINARY PROJECT COST ESTIMATE<br>June 24, 2016 |                                                     |      |          |            |             |              |            |       |  |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------|----------|------------|-------------|--------------|------------|-------|--|
| Item                                                                                                      | Description                                         | Unit | Quantity | Unit Price | Total Price | NEORSD Share | City Share | Notes |  |
| 1                                                                                                         | REPLACE WITH 4' x 20' FOUR-SIDED BOX CULVERT        | AMP  | 1        | \$ 120,000 | \$ 120,000  | \$ 120,000   | \$ 0       |       |  |
| 2                                                                                                         | BOX CULVERT, 4' x 20', 10' LONG, 10' DEEP, 10' WIDE | LF   | 10       | \$ 1,000   | \$ 10,000   | \$ 10,000    | \$ 0       |       |  |
| 3                                                                                                         | CONCRETE TOP, 4' x 20', 10' LONG, 10' DEEP          | SF   | 100      | \$ 100     | \$ 10,000   | \$ 10,000    | \$ 0       |       |  |
| 4                                                                                                         | PRELIMINARY DESIGN                                  | HR   | 2        | \$ 5,000   | \$ 10,000   | \$ 10,000    | \$ 0       |       |  |
| 5                                                                                                         | CONCRETE CURB                                       | LF   | 20       | \$ 100     | \$ 2,000    | \$ 2,000     | \$ 0       |       |  |
| 6                                                                                                         | BOX CULVERT, 4' x 20', 10' LONG, 10' DEEP           | LF   | 2        | \$ 1,000   | \$ 2,000    | \$ 2,000     | \$ 0       |       |  |
| 7                                                                                                         | CONCRETE TOP, 4' x 20', 10' LONG, 10' DEEP          | SF   | 20       | \$ 100     | \$ 2,000    | \$ 2,000     | \$ 0       |       |  |
| 8                                                                                                         | CONCRETE CURB                                       | LF   | 40       | \$ 100     | \$ 4,000    | \$ 4,000     | \$ 0       |       |  |
| 9                                                                                                         | CONCRETE TOP, 4' x 20', 10' LONG, 10' DEEP          | SF   | 20       | \$ 100     | \$ 2,000    | \$ 2,000     | \$ 0       |       |  |
| 10                                                                                                        | CONCRETE CURB                                       | LF   | 40       | \$ 100     | \$ 4,000    | \$ 4,000     | \$ 0       |       |  |
| 11                                                                                                        | CONCRETE TOP, 4' x 20', 10' LONG, 10' DEEP          | SF   | 20       | \$ 100     | \$ 2,000    | \$ 2,000     | \$ 0       |       |  |
| 12                                                                                                        | CONCRETE CURB                                       | LF   | 40       | \$ 100     | \$ 4,000    | \$ 4,000     | \$ 0       |       |  |
| 13                                                                                                        | CONCRETE TOP, 4' x 20', 10' LONG, 10' DEEP          | SF   | 20       | \$ 100     | \$ 2,000    | \$ 2,000     | \$ 0       |       |  |
| 14                                                                                                        | CONCRETE CURB                                       | LF   | 40       | \$ 100     | \$ 4,000    | \$ 4,000     | \$ 0       |       |  |
| Total Preliminary Project Cost Estimate                                                                   |                                                     |      |          |            | \$ 215,000  | \$ 174,000   | \$ 41,000  |       |  |
| Total Preliminary Project Cost Estimate                                                                   |                                                     |      |          |            | \$ 215,000  | \$ 174,000   | \$ 41,000  |       |  |

Note: The costs shown represent an estimate of project costs and do not represent a final project cost. The City of Macedonia share for other utility and pavement improvements is estimated to be \$41,000.00.



# Scoring for Project Prioritization



## Analysis Components:

- Financial
- Social/Reputational
- Compliance
- Environmental
- Safety

- 2 years= 50 points
- 5 years= 20 points
- 10 years= 10 points
- 25 years= 5 points
- 50 years= 1 points
- 100 years= 0 points



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# Stormwater Construction Plan



Northeast Ohio Regional Sewer District

Show Project Summaries

2017 - 2021 Stormwater Program Summary As of Jan 31, 2017

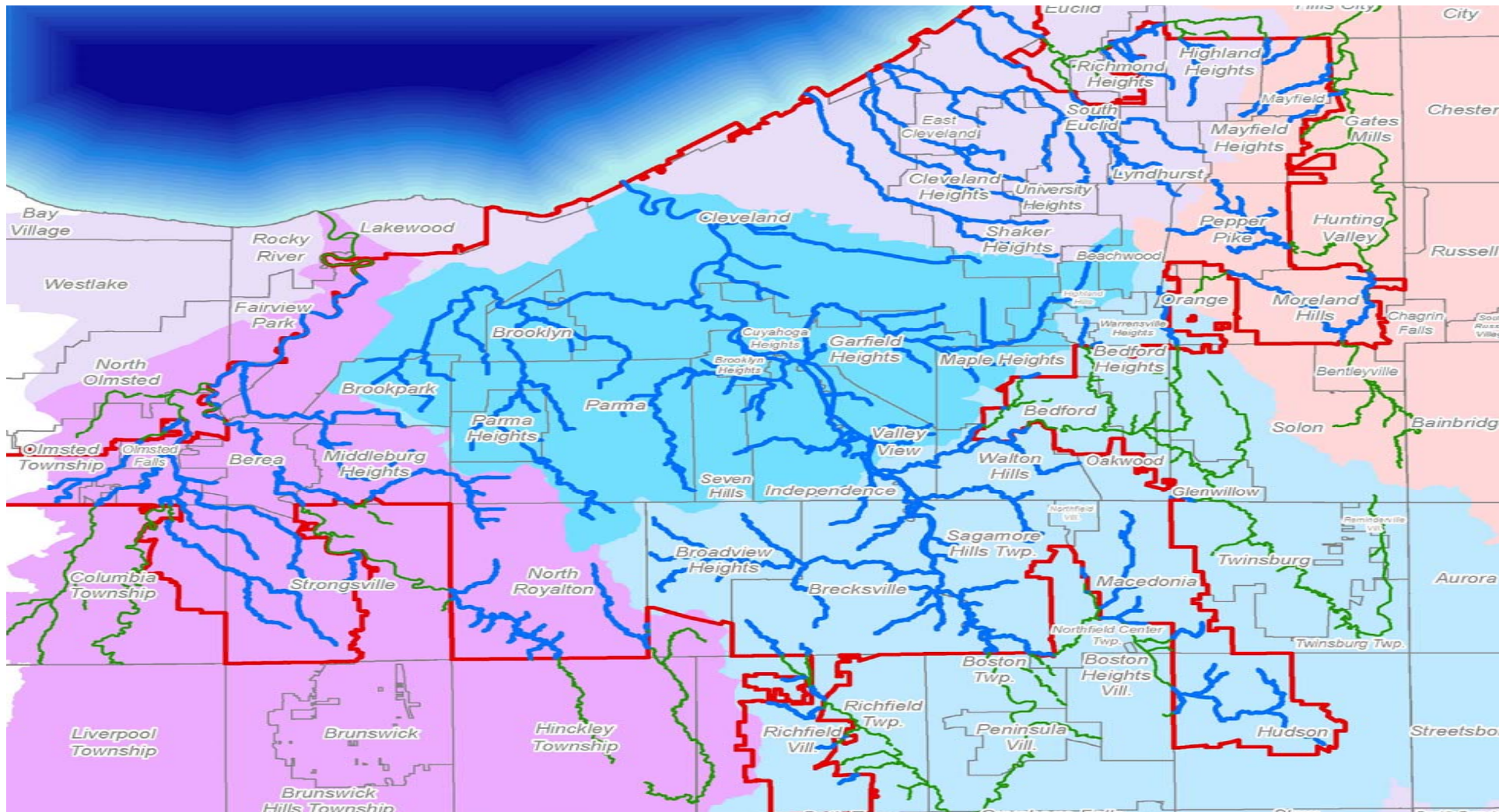
| Project Name and Location                          | RFP(1)           | Design(2)        | Award of Construction | Construction Est.(\$M) |
|----------------------------------------------------|------------------|------------------|-----------------------|------------------------|
| <b>Stormwater</b>                                  |                  |                  |                       |                        |
| <b>Cuyahoga South</b>                              |                  |                  |                       |                        |
| Sioux Lane Culvert Replacement IC00079             | 23-Mar-17        | 11-Aug-17        | N/A                   | N/A                    |
| Brecksville Condominium Stabilization CC00032      | 20-Jul-17        | 02-Nov-17        | 2nd Quarter 2019      | \$1.5                  |
| Chippewa Creek Bank Stabilization CC00030          | 20-Jul-17        | 02-Nov-17        | 2nd Quarter 2019      | \$1.5                  |
| Brecksville Building Demolition CC00032            | N/A              | N/A              | 17-Aug-17             | \$0.0                  |
| Chippewa Creek Bank Stabilization CC00084, CC00082 | 2nd Quarter 2019 | 3rd Quarter 2019 | 4th Quarter 2020      | \$0.8                  |
| Chippewa Creek Bank Erosion CC00122                | 4th Quarter 2018 | 1st Quarter 2019 | N/A                   | \$0.6                  |
| Chippewa Creek Erosion CC00223                     | 1st Quarter 2019 | 2nd Quarter 2019 | N/A                   | \$0.5                  |
| Culvert Repair CC00157                             | 4th Quarter 2018 | 1st Quarter 2019 | N/A                   | \$0.1                  |
| Cuyahoga Erosion DC Fitzwater Rd CY00179A          | N/A              | N/A              | 1st Quarter 2021      | \$0.6                  |

<http://www.neorsd.org/communitystormwaterresources.php>



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# Stormwater Master Plan



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# Stormwater Master Plans

## Goals and Objectives






- Multi-objective, watershed approach to developing solutions for broad suite of problems
- Prioritized list of construction and maintenance projects at the Watershed-level and Program-level
- Identification of early action projects



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-  Regional Stormwater System in NEORS D Service Area
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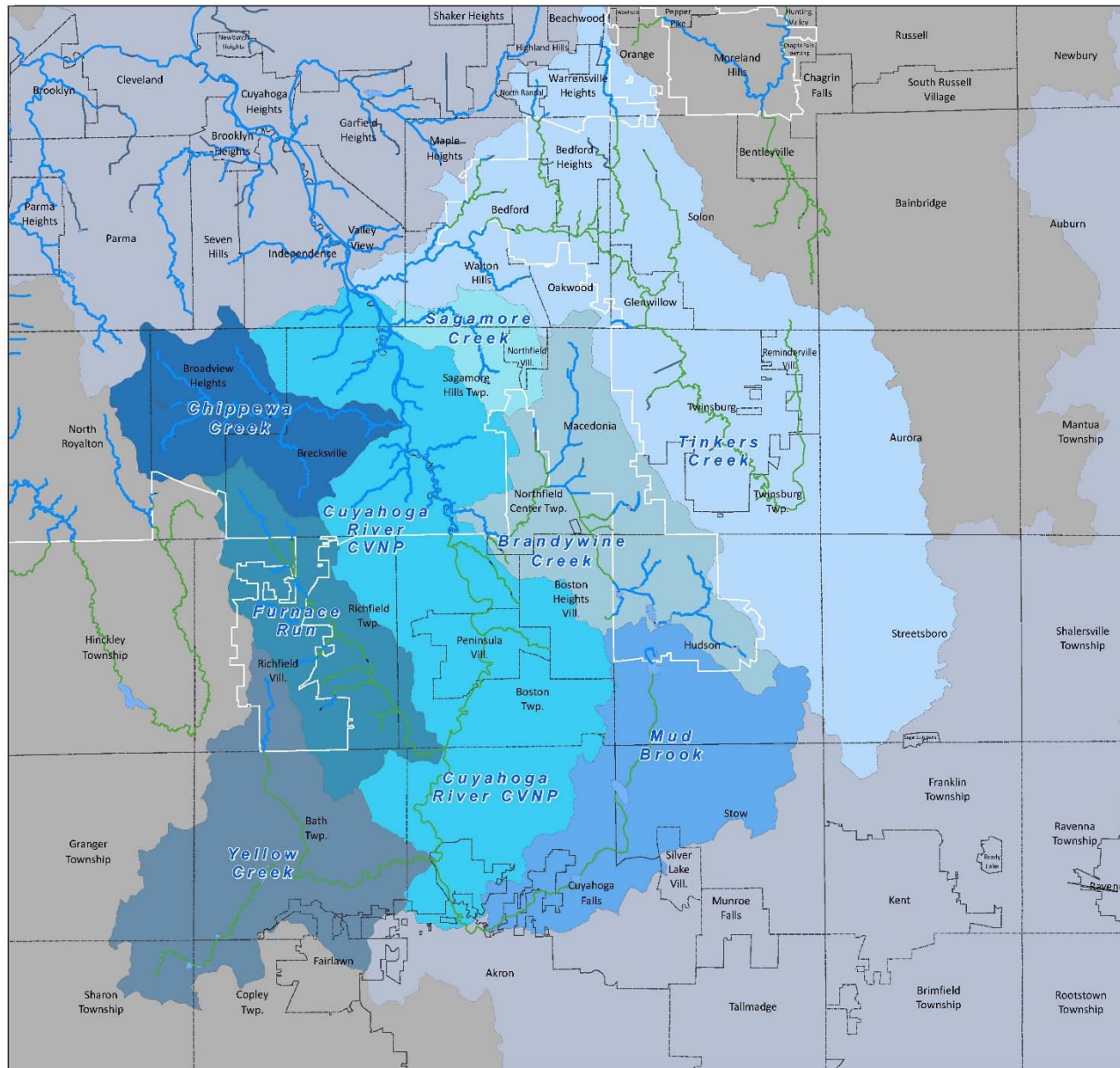
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# Stormwater Master Plans

## Cuyahoga River South - Update

- Project Phases
- Field condition assessment progress
- Member Community Work Plans
- SWMP Standards update
- Hudson Local Stormwater System SWMP
- What's next



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# Stormwater Master Plans

## Cuyahoga River South – Phase I

- Phase I: Indian Creek
  - Draft Phase I SWMP Recommendations – June 2017



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# Stormwater Master Plans

## Cuyahoga River South – Phase II

- Phase II Watersheds
  - Brandywine Creek
  - Chippewa Creek
  - Tinkers Creek
- Draft Phase II Alternatives Development – October 2017
- Draft Phase II SWMP Recommendations – December 2017



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# Stormwater Master Plans

## Cuyahoga River South – Phase III/IV

- Phases III Watersheds
  - Furnace Run
  - Mud Brook
  - Sagamore Creek
  - Yellow Creek
  - Small Tribs of Cuyahoga River Mainstem East
  - Small Tribs of Cuyahoga River Mainstem West
- Phase IV Watershed: Cuyahoga River Mainstem
- Alternatives development: 2018
- Project Completion: November 2018



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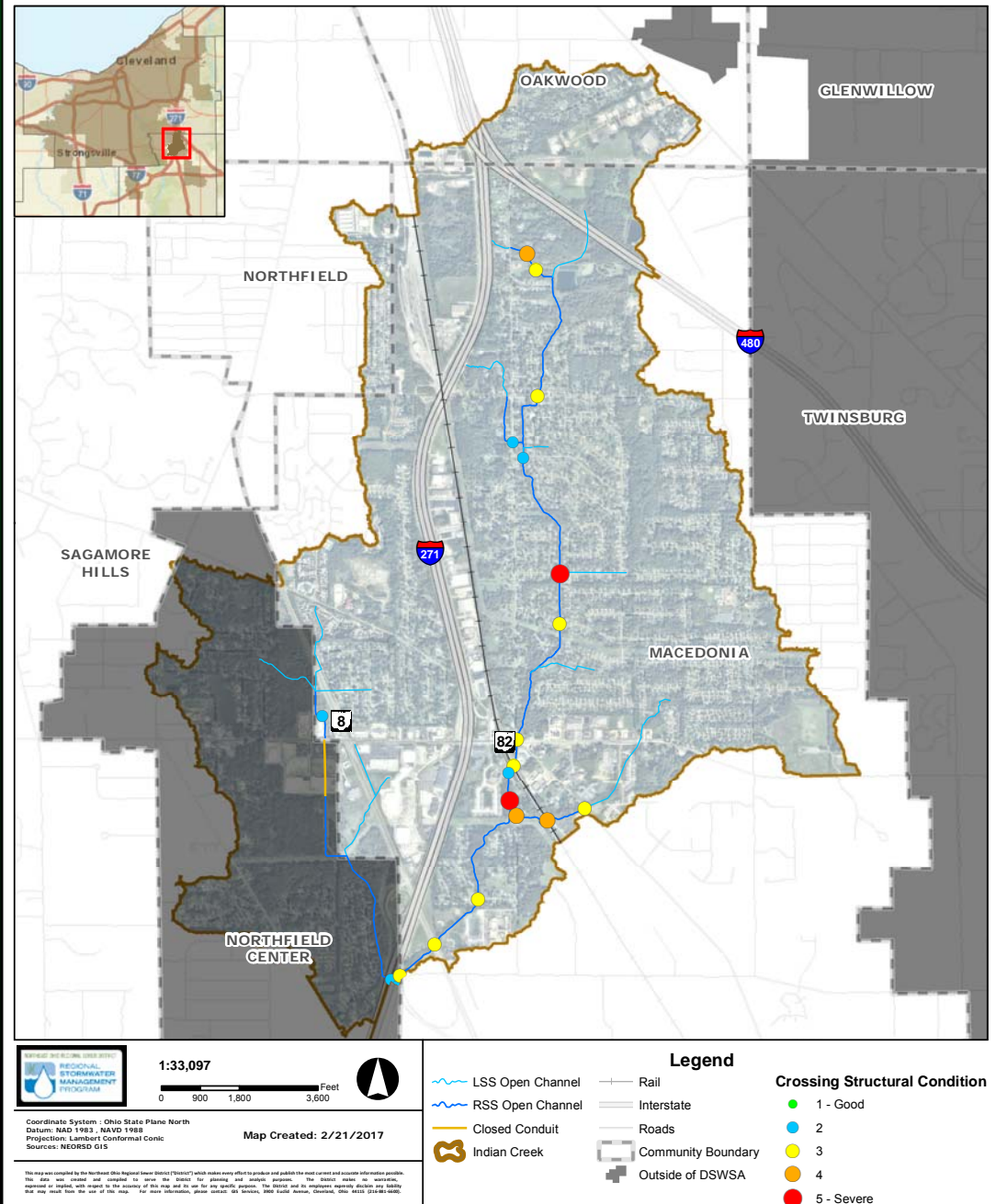




# Field Condition Assessment

- Oct 2016 – Feb 2017
  - 145 Stream locations
  - 227 Crossings
  - 20 Basins
  - 2,300 ft Culverted Stream
- Field Assessments to continue through April 2017

## Crossing Structural Condition



# Stormwater Master Plan Field Condition Assessment

- Assets in Critical Condition
- Water quality issues
- Refer interested residents to WTL to report flood observations



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# Stormwater Master Plan

## Member Community Work Plans

- Project scope
- Schedule
- Data request
  - Plans for crossings, bridges, etc.
  - Local assets that may effect RSS
  - Hydraulic studies
  - Capital projects along the RSS
  - Anticipated development near/along RSS
- Community coordination



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# Stormwater Master Plan

## Member Community Work Plan - Schedule

- Phase I: Macedonia ✓
- Phase II – Spring 2017:
  - Bedford
  - Bedford Heights
  - Glenwillow
  - Hudson
  - Macedonia ✓
  - North Royalton
  - Oakwood
  - Sagamore Hills Township
  - Solon
  - Valley View
  - Walton Hills



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# Stormwater Master Plan

## Member Community Work Plan - Schedule

- Phase II & III: remaining member communities - Summer 2017
  - Brecksville
  - Broadview Heights
  - Independence
  - North Randall
  - Northfield Village
  - Richfield
  - Warrensville Heights
  -



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# Stormwater Master Plan

## Standards Update

| Section                                             | Major Refinements                                                | Schedule   |
|-----------------------------------------------------|------------------------------------------------------------------|------------|
| PERFORMANCE EVALUATION - Regional Stormwater System |                                                                  |            |
| Asset Condition and Criticality                     | Criteria for stream structural stability                         | March 2017 |
| Data Collection & Management                        | Member community data requests                                   |            |
| Inspection                                          | Field data collection parameters                                 |            |
| Monitoring                                          | Rainfall for long-term model simulations                         |            |
| Modeling Strategy & Standards                       | Design storms, runoff parameters, testing/calibration/validation |            |
| PROJECT ALTERNATIVE EVALUATION AND RECOMMENDATIONS  |                                                                  |            |
| Acceptable Level of Risk                            | Pending pilot SWMP findings                                      | June 2017  |
| Alternatives Evaluation                             |                                                                  |            |
| Master Plan Recommendations                         |                                                                  |            |
| Prioritization                                      |                                                                  |            |



# Stormwater Master Plan

## Data Collection/Inspection Standard Update

- Assets that do not impact study
  - Typically Crossings
    - Too Large
    - Too Small
    - Removed

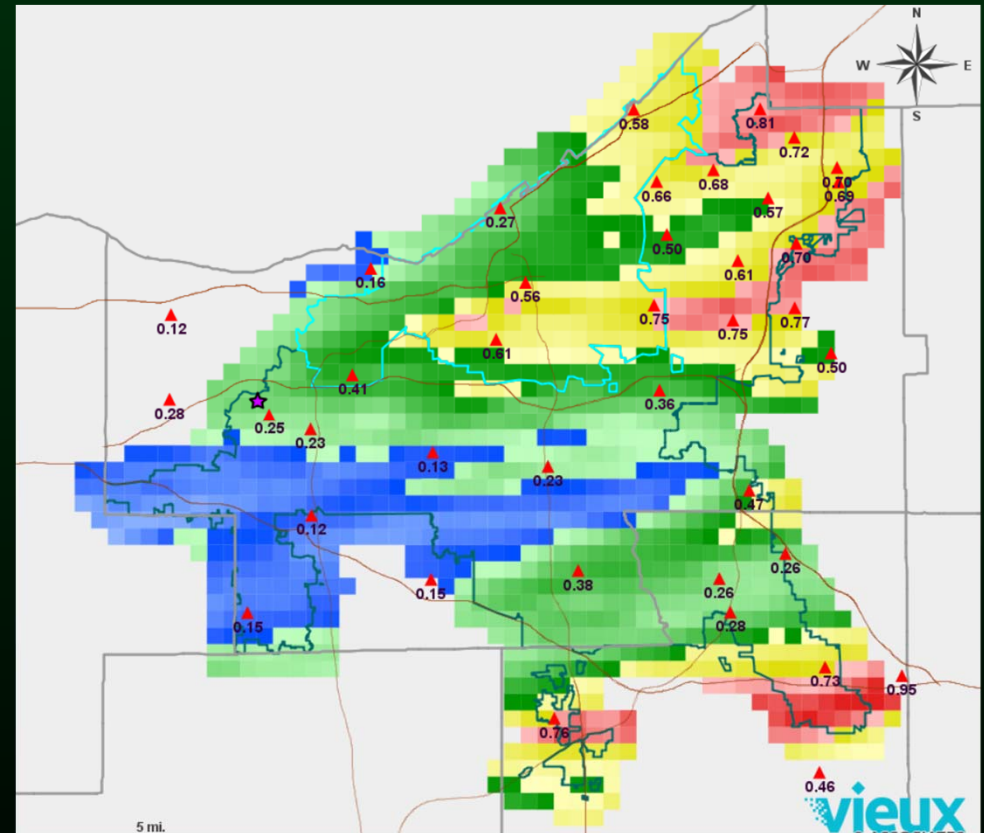


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# Stormwater Master Plan

## Monitoring Standard: Rainfall Data

- New data source:  
District subscription for  
gage-adjusted radar  
rainfall
- Verify NEORSD rainfall  
data for selected events with:
  - Nearby rain gauges  
by other entities
  - Gauge-adjusted  
radar rainfall



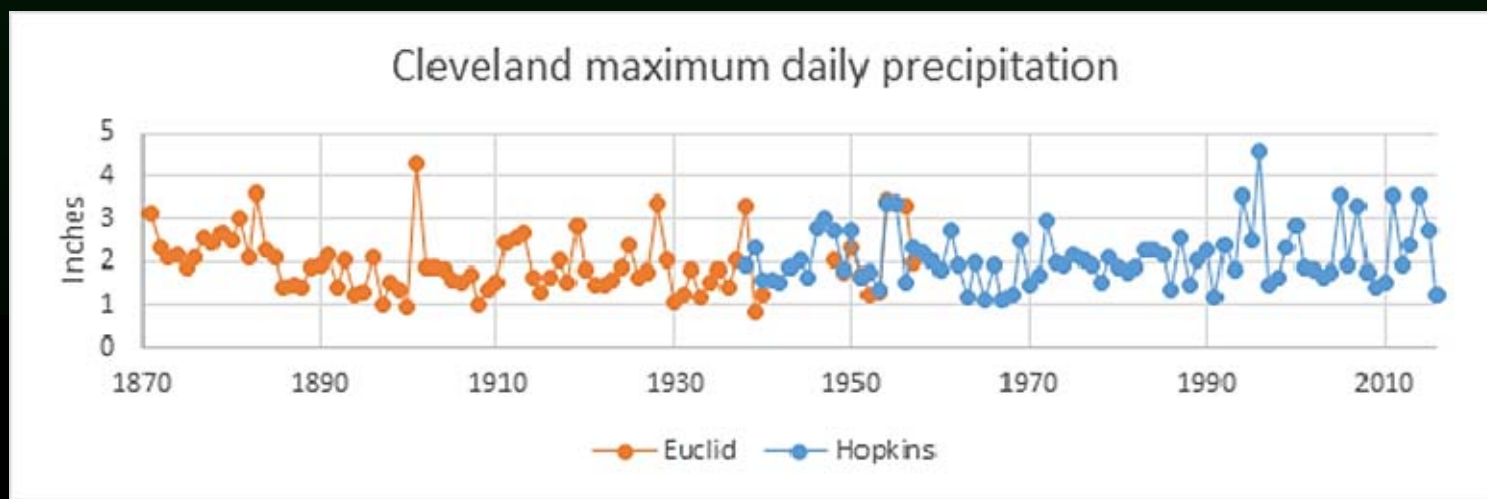
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# Stormwater Master Plan

## Modeling Standard: Rainfall for Design Storms Analyses

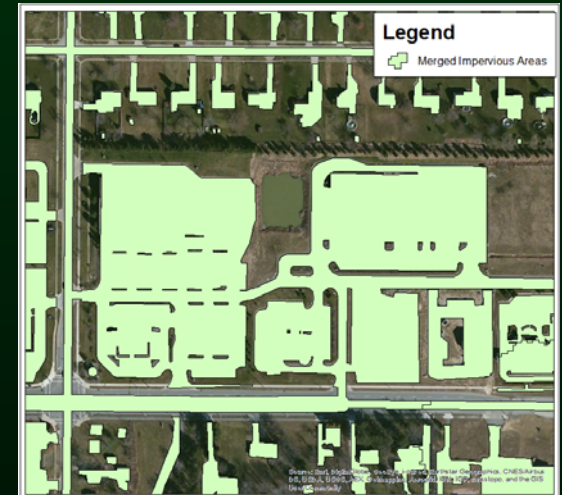
- Regional design storm depths have increased since NOAA Atlas 14 (1896-2000)
  - 1896-2016 → 5% higher than 1896-2000
  - 1966-2016 → 10%-12% higher than 1896-2000
- Conclusion: Use NOAA Atlas 14 for design storms
  - Alternatives evaluation considers cost effectiveness of larger design storms, thereby addressing this risk





# Stormwater Master Plan

## Modeling Standard: Impervious Area inside Service Area



Cuyahoga Co.  
road polygons

Summit Co.  
centerline offset

District  
impervious layer

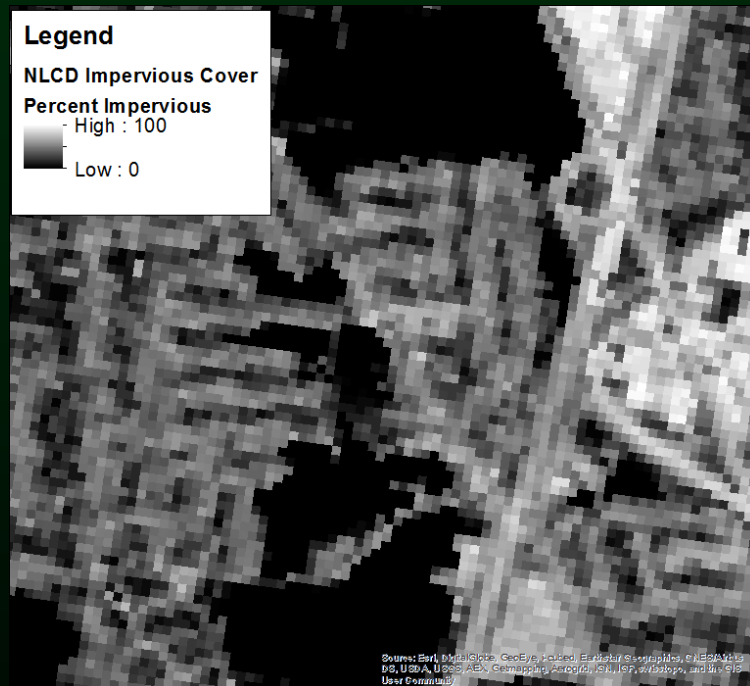


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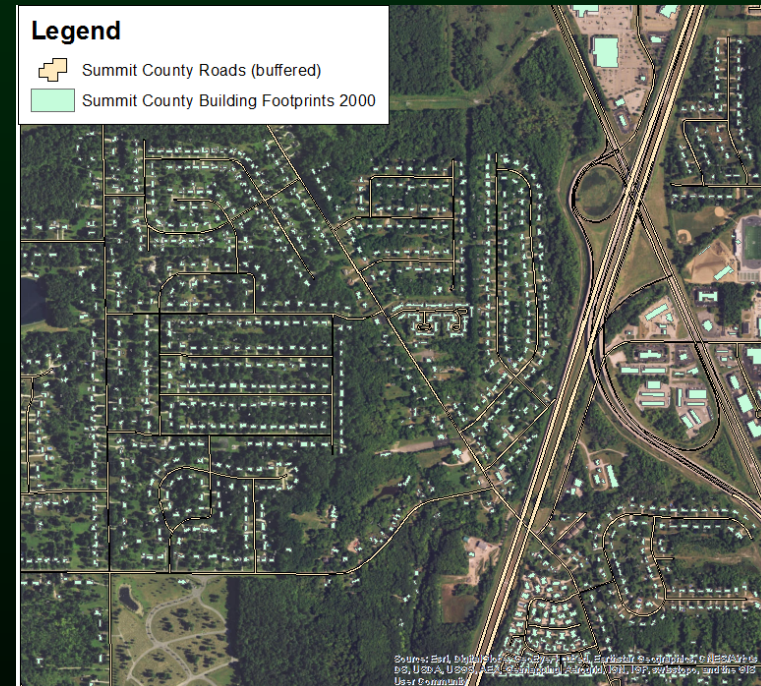


# Stormwater Master Plan

## Modeling Standard: Impervious Area outside Service Area



National Land Cover  
Database (NLCD)



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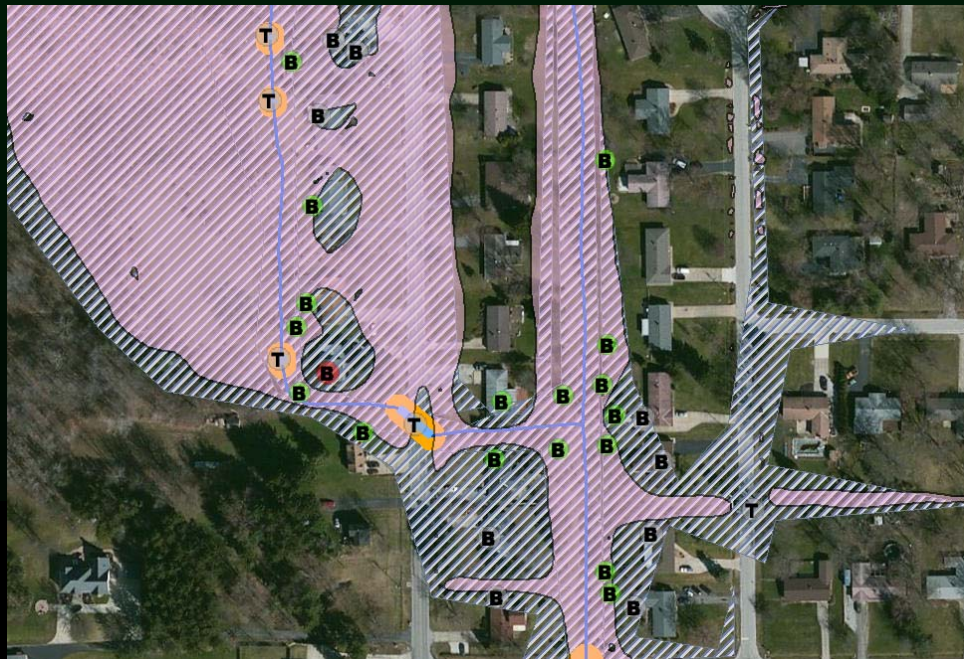




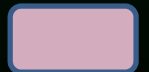
# Stormwater Master Plan

## Asset Condition & Criticality Standard

- Compare model results to FEMA
  - ID BTUs added / removed from 100YR flood area



CRS SWMP model results



FEMA 100YR Flood Area





# Stormwater Master Plan

## Alternatives Evaluation Standard (DRAFT)

### STEP 1: Identify and Screen Alternatives

- ID Opportunities / Constraints
- Protect Existing Function
- Increase Function
  - Reduce runoff / restore stream-floodplain
  - Enhance storage-conveyance
- Property Acquisition or reduce acceptable Level of Risk
- Community and owner input



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# Stormwater Master Plan

## Alternatives Evaluation Standard (DRAFT)

### **STEP 2: Evaluate 2 Alternatives**

- Size to achieve acceptable Level of Risk
- Estimate cost
- Define multiple benefits
- ID Business Case (triple bottom line)
  - Includes FEMA Hazus
- Select Alternative
- Check watershed-wide performance
- Community input

# City of Hudson Brandywine Creek LSS SWMP





# Stormwater Master Plan

## Cuyahoga River South – What's Next

- Continued field investigations
- Member Community Work Plans
- High Water Mark request and notification to Building Dept.
- Phase I: Indian Creek: SWMP Recommendations – June 2017
- Phase II: Brandywine Creek, Chippewa Creek, Tinkers Creek -
  - Draft Phase II Alternatives Development – October 2017
  - Draft Phase II SWMP Recommendations – December 2017

# Stormwater Master Plan

## High Water Mark Monitoring

- 12 crossing locations
  - Bedford
  - Bedford Heights
  - Brecksville
  - Broadview Heights
  - Cuyahoga Falls
  - Hudson
  - Oakwood
  - Richfield Twp
  - Sagamore Hills Twp
  - Walton Hills
- Methods
  - 10 Crest-stage gauge
  - 2 cameras (automated)
- Installation April 2017
- Monitor 1 year
  - District's Consultant will visit gauges after significant storm events
  - District SWIM will maintain cameras

**Notification letters to Building Department,  
Engineers and Service Directors to be sent this week**



Chippewa Creek — Broadview Heights

# Stormwater Inspection and Maintenance



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# Stormwater Inspection & Maintenance

All actions begin with an Inspection

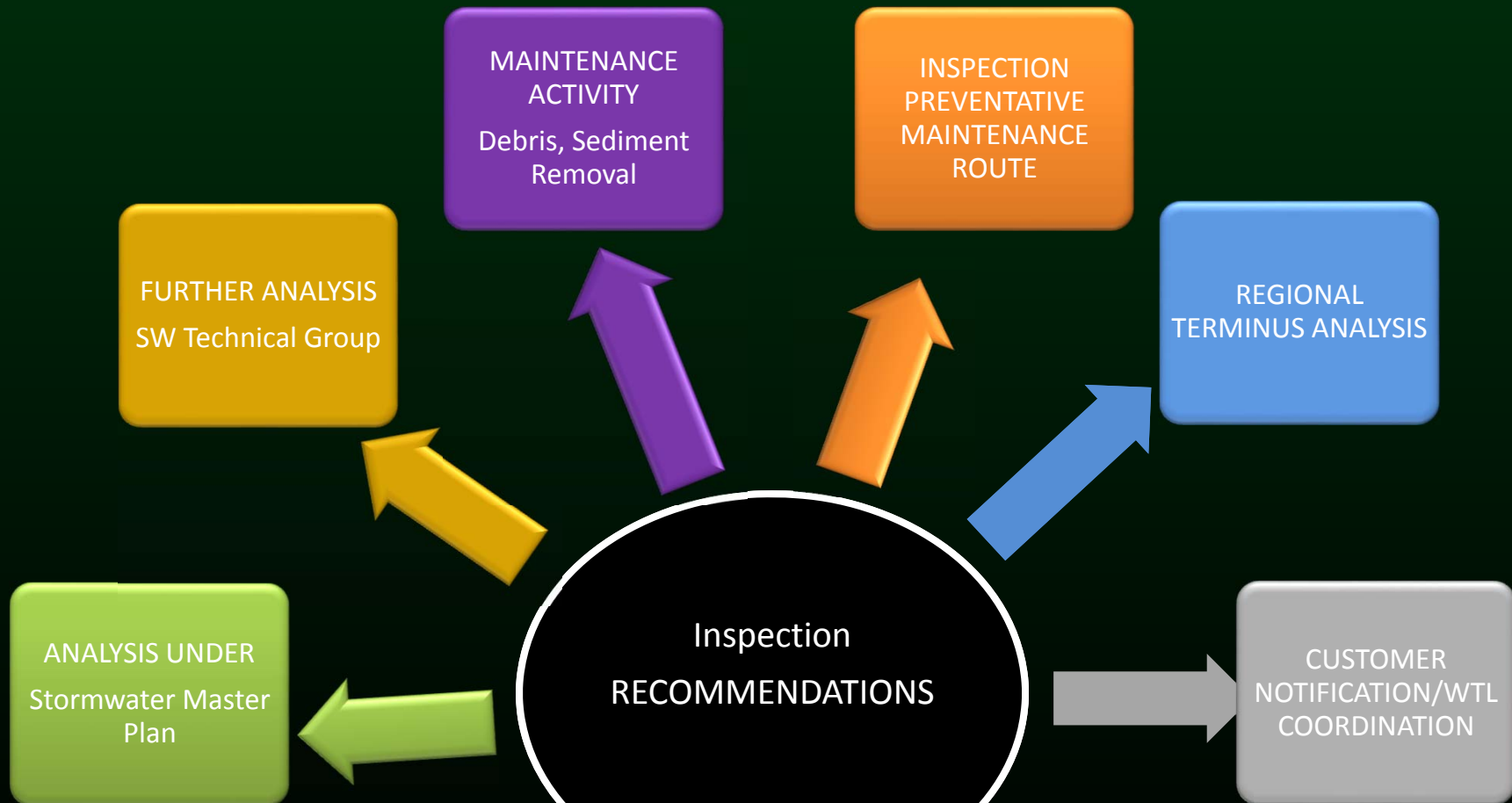


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# Stormwater Inspection & Maintenance

## Inspection Recommendations



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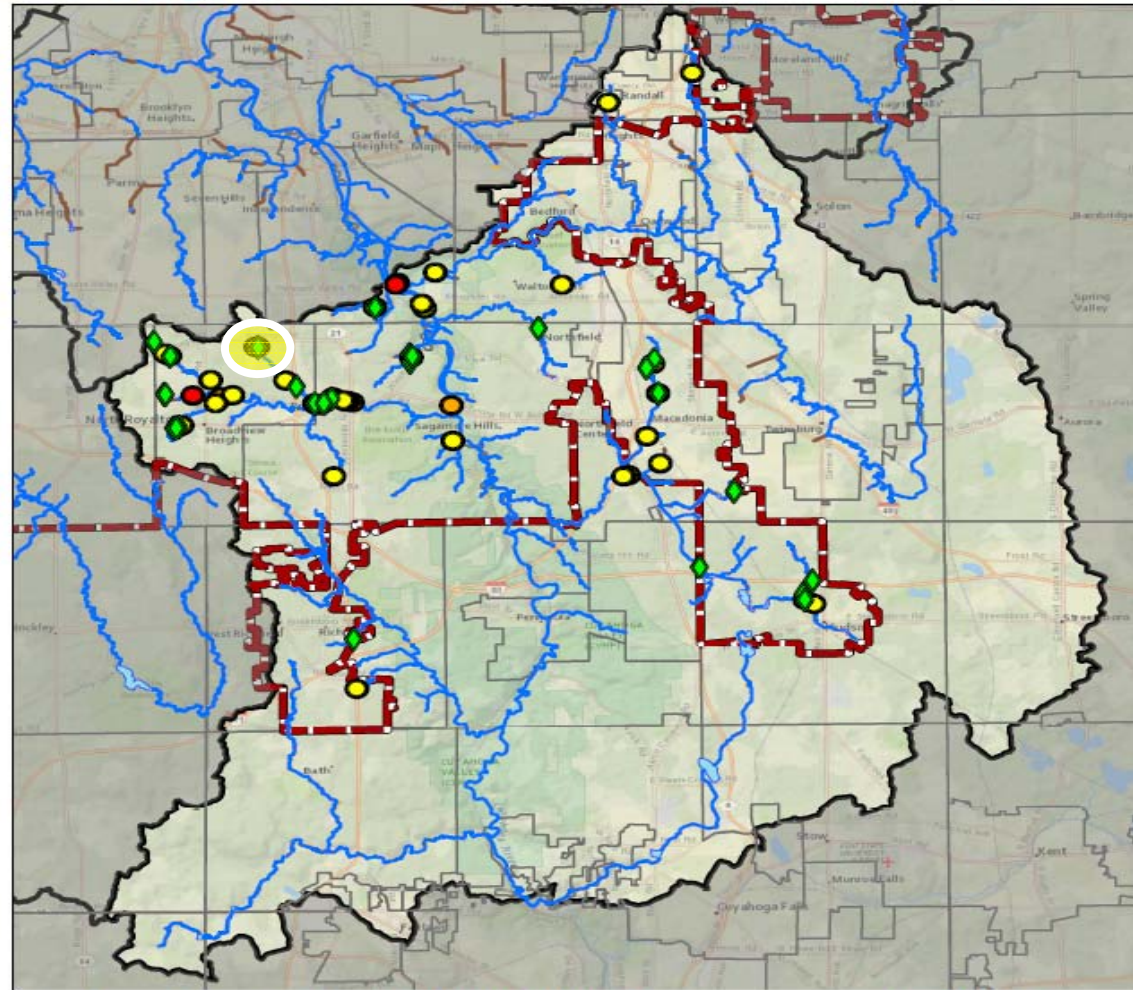


# Stormwater Inspections

## Cuyahoga River – South: 2016 Summary

**Northeast Ohio  
Regional Sewer District**

NORTHEAST OHIO REGIONAL SEWER DISTRICT  
REGIONAL  
STORMWATER  
MANAGEMENT  
PROGRAM



**Cuyahoga River South  
Watershed**  
Monitoring Sites and  
2016 Customer Inquiries

**Monitoring Frequency**

- 90 Days (3 Sites)
- 180 Days (6 Sites)
- 365 Days (36 Sites)



Customer Inquiries (27)



District Stormwater Service Area



Community Boundary



Watershed Boundary

— District Stream

— District Major Structure

— District Basin

— District Crossing

— District Culverted Stream

**27 Customer Inquiries**  
**(132 in Service Area)**

**45 Sites being monitored**  
**(190 in Service Area)**

NORTHEAST OHIO REGIONAL SEWER DISTRICT  
REGIONAL  
STORMWATER  
MANAGEMENT  
PROGRAM



# Stormwater Inspections

Cuyahoga River – South: Chippewa Creek



Asset #: CC00084

Broadview Heights

BTU: Exposed Utility  
(Sanitary Line)

## Structural Integrity:

- Concrete Encasement lost
- Toe Scour
- Eroding behind utility

## Recommendation:

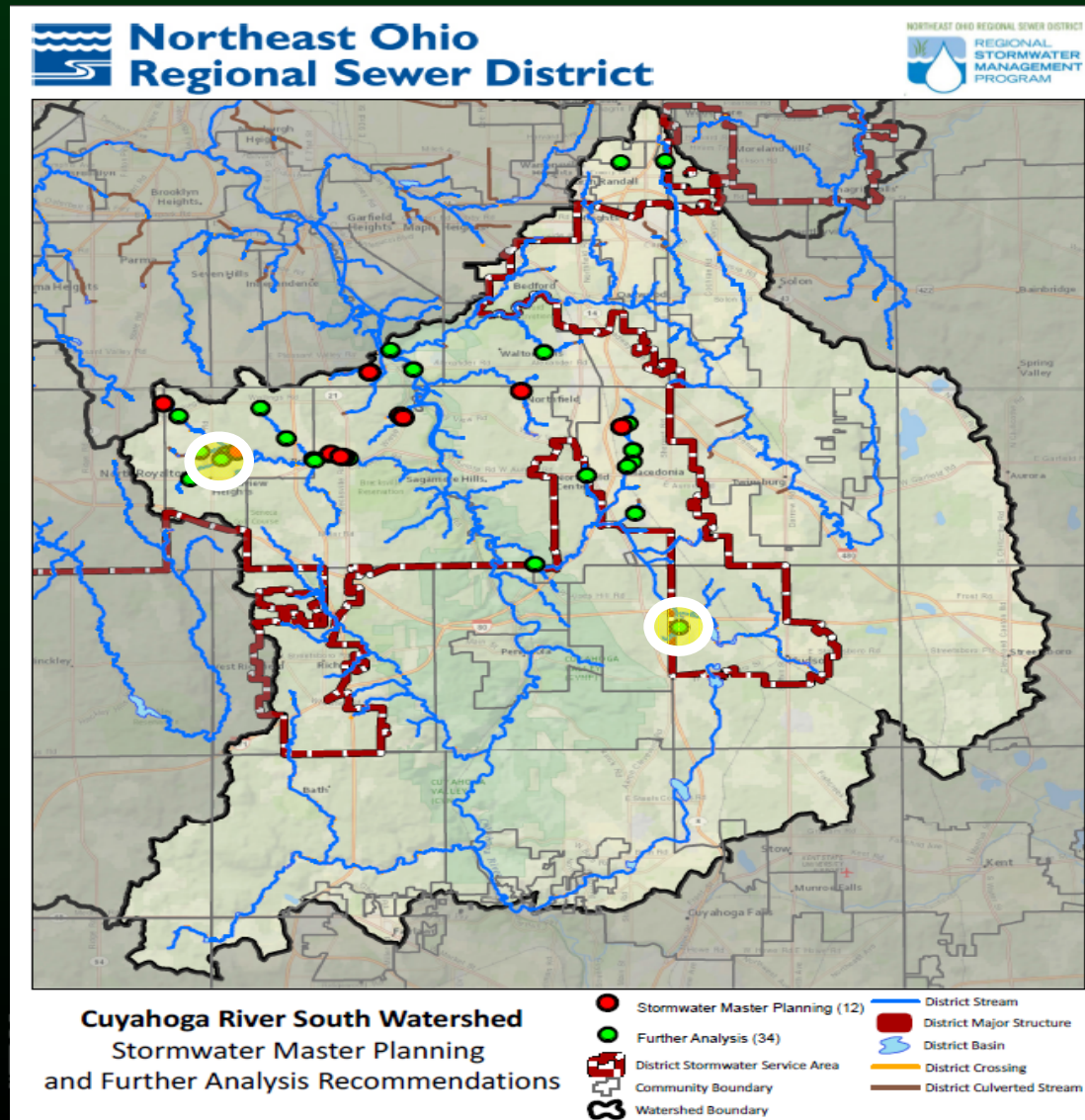
- ✓ Monitoring
- ✓ Notify Owner



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# Stormwater Inspection: Further Analysis/SW Master Plan Cuyahoga River – South: 2016 Summary



**12 Assets**  
recommended for  
SW Master Plan  
(**37** in Service Area)

**34 Assets**  
recommended for  
Further Analysis  
(**120** in Service  
Area)



# Stormwater Inspection: Further Analysis/SW Master Plan

## Cuyahoga River – South: Chippewa Creek



Asset #: CC00122  
Broadview Heights  
BTU: HOA Pool  
& Playground

### Structural Integrity:

- Eroding bank
- Scour at the toe of slope

### Recommendation:

- ✓ Further Analysis
- ✓ Monitoring
- ✓ Notify Owner



# Stormwater Inspection: Further Analysis/SW Master Plan

## Cuyahoga River – South: Brandywine Creek



Asset #: BR00175  
Hudson  
Boston Mills Road  
BTU: Local Road

### Structural Integrity:

- Significant spalling at headwall
- Exposed rebar on headwall
- Exhibit cracking, staining, seepage
- Scour at inlet and outlet

### Recommendation:

- ✓ Further Analysis
- ✓ Notify Owner

| ODOT<br>Condition Rating | NEORS<br>Condition<br>Rating | Criticality | BRE Score |
|--------------------------|------------------------------|-------------|-----------|
| 3 A                      | 4                            | 6           | 24        |

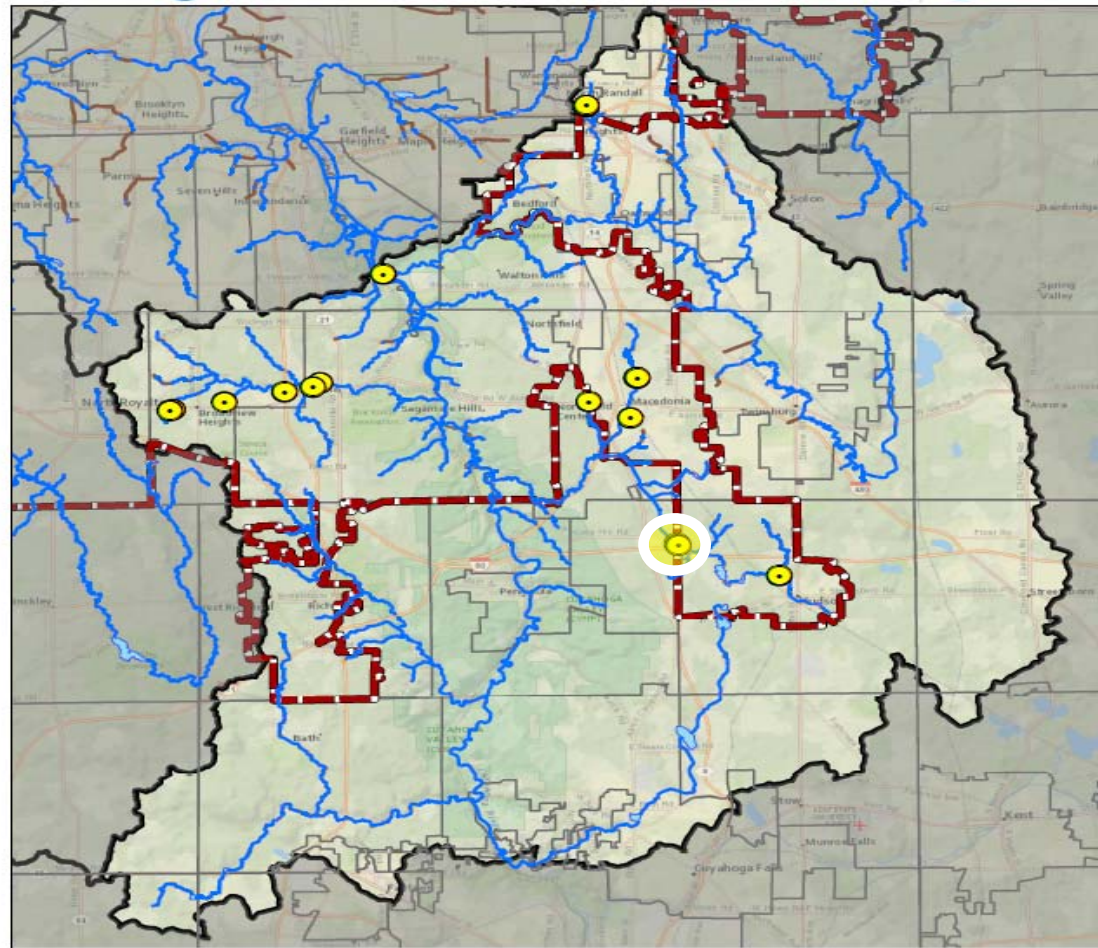


# Stormwater Maintenance

## Cuyahoga River – South: 2016 Summary

**Northeast Ohio  
Regional Sewer District**

**NORTHEAST OHIO REGIONAL SEWER DISTRICT  
REGIONAL  
STORMWATER  
MANAGEMENT  
PROGRAM**



**Cuyahoga River South Watershed**  
2016 Maintenance Projects

- Maintenance Locations (17)
- District Stormwater Service Area
- Community Boundary
- Watershed Boundary
- District Stream
- District Major Structure
- District Basin
- District Crossing
- District Culverted Stream

**17 Maintenance  
Projects**  
(112 in Service Area)

**912 CY sediment  
and debris removed**  
(3,646 CY in Service  
Area)

**NORTHEAST OHIO REGIONAL SEWER DISTRICT  
REGIONAL  
STORMWATER  
MANAGEMENT  
PROGRAM**



# Stormwater Maintenance

Cuyahoga River – South: Brandywine Creek

Asset ID: BR00168A

Community: Hudson/Boston Heights Border

Maintenance Project: Debris Removal - 72 CY

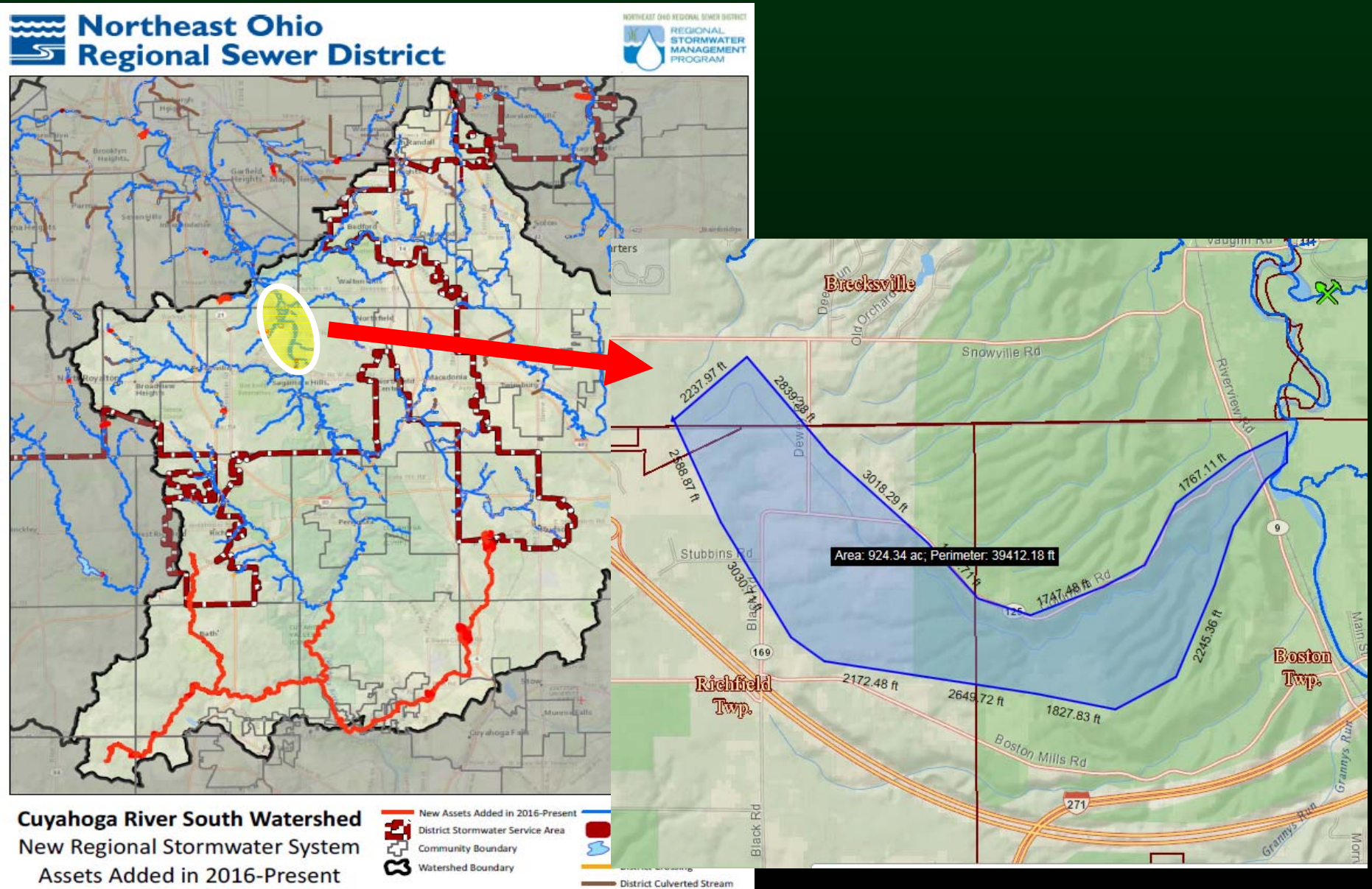


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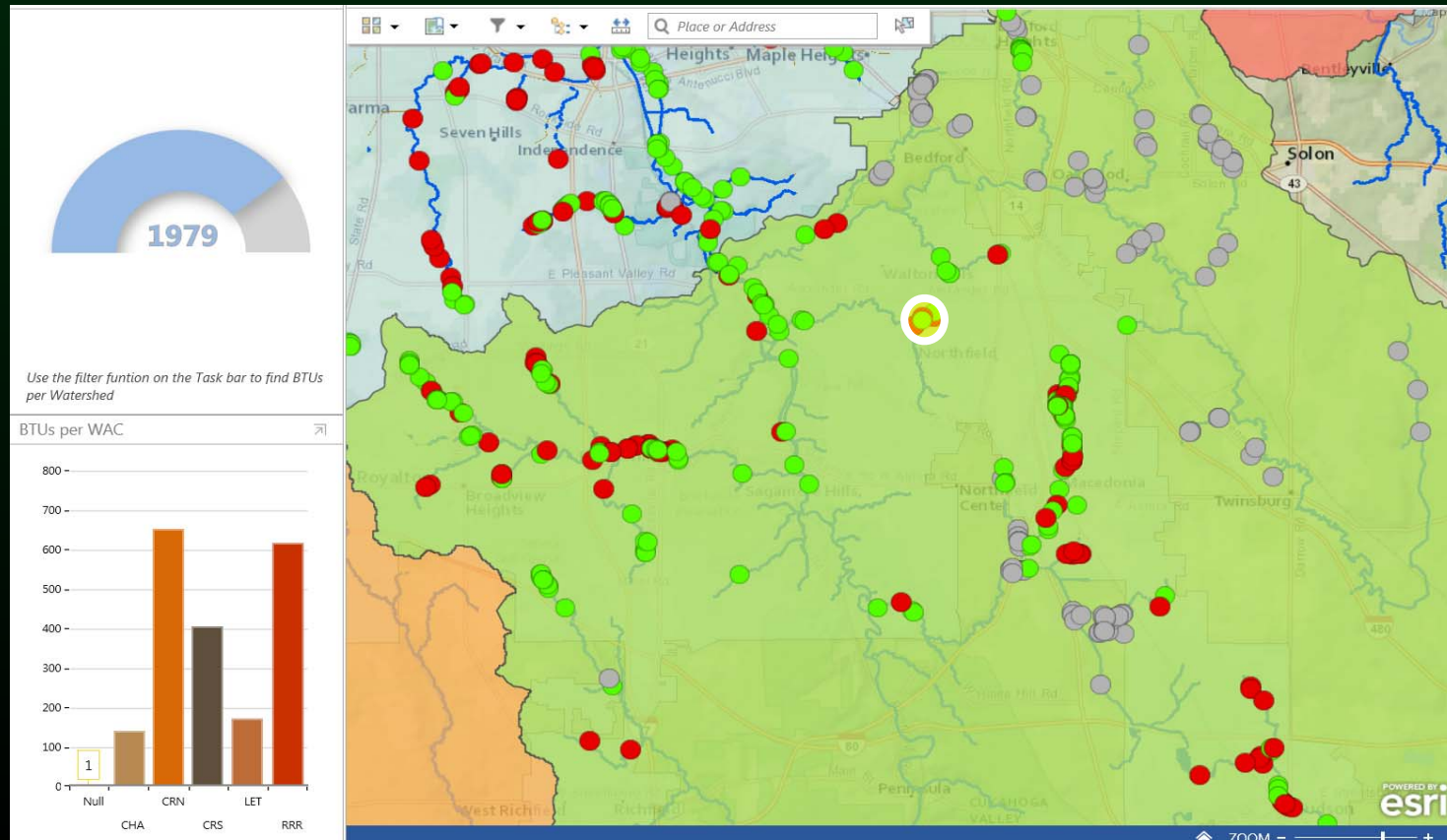
# Regional Stormwater System New Assets (Mostly Terminus Extensions)



# Potentially Threatened Infrastructure: Buildings, Transportation and Utilities (BTU)

**114** BTUs (out of 613) along streams in Cuyahoga River South  
have been recommended for assessment

**360** BTUs (out of 1,979) in Service Area recommended to date



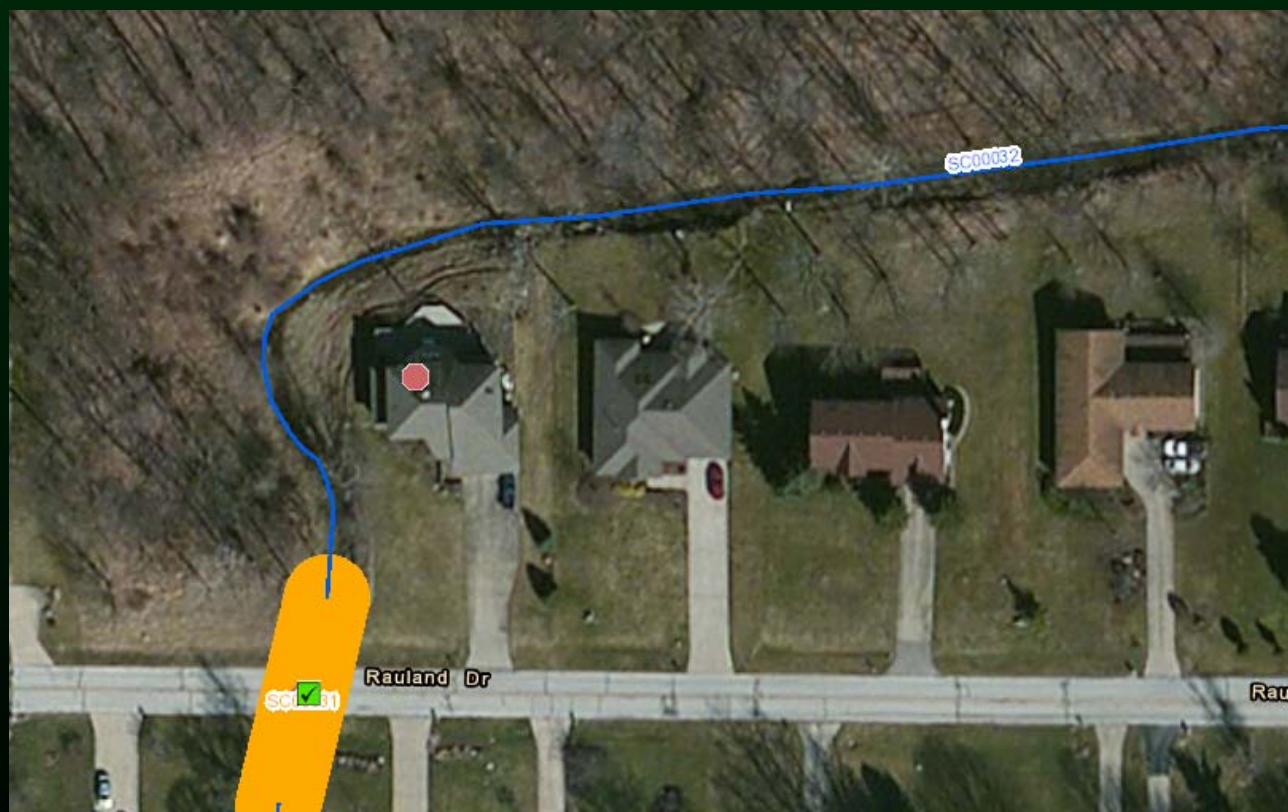


# Threatened Infrastructure: BTUs

## Cuyahoga River - South: Sagamore Creek

Community: Walton Hills

BTU: Residential Building, Recommended for SWMP



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# Stormwater Inspection & Maintenance 2017 Agenda

- Continuing to collect RSS data through SWMP Community Work Plans:
  - Record drawings
  - Responsible party infrastructure: culverted streams, bridges, culverts, basins, major structures
  - Gather historical inspections reports
- **Data request to be made via Member Community Work Plans and individual agency requests**



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# Stormwater Inspection & Maintenance 2017 Agenda

- Planning to pilot new maintenance project types:
  - Basin Dredging
  - Structural Repair
  - Streambank Stabilization (small scale/low cost/low risk)
- Looking for potential locations
- **Contact SWIM representative (Mark Link, George Remias) with ideas**



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A photograph showing a flooded industrial area. In the foreground, murky brown floodwater covers the ground. In the middle ground, several large, light blue and white industrial trailers are partially submerged. To the right, a long, single-story brick building with a dark roof is visible. A utility pole with power lines stands behind the trailers. The sky is overcast and grey.

# Questions

Independence, OH





# Community Cost-Share



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# Community Cost-Share

- \$9,946,579.37 available across communities
- 32 approved projects, totaling \$3,041,990.58
- 6 completed projects, totaling \$199,529.74
- Vendor Registration  
[http://www.neorsd.org/isupplier\\_homepage.php](http://www.neorsd.org/isupplier_homepage.php)
- Policy Update



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# Community Cost-Share

## Policy Update Example – Shaker Heights

- Allocation Agreement: Underground Stormwater Detention
- Construction Costs \$750,000
  - City to apply for reimbursement annually over seven (7) years



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# Community Cost-Share

## Policy Update Example - Parma

- Allocation Agreement: Equipment Purchase
  - Jet/Vacuum Machine: \$550,000
  - Mechanical Broom Sweeper: \$325,000
  - Maintenance: \$40,000 x 5 years = \$ 200,000
- Total = \$1,075,000
- Application Approved January
- Apply for \$215,000/year reimbursement as funds accrue



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# Community Cost-Share

## Policy Update

Allocate CCS funds to a project before funds have accumulated in the Member Community's CCS account

1. Submit CCS application for the project to WTL
2. District reviews application for compliance with CCS Policy
3. Execute CCS project agreement with District for allocation of CCS funds
4. Implement project
5. Submit reimbursement request to District for CCS funds
6. Repeat step 5 until the Member Community has requested and received the total amount needed for project

# Community Cost-Share Community Resources Website

<http://neorsd.org/communitystormwaterresources.php>



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# Questions



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# Title V Requires Phase II Support Services for Certain MCM's

- MCM #1: Public Education and Outreach
- MCM #2: Public Participation and Involvement
- MCM #3: Illicit Discharge Detection and Elimination
- MCM #6: Pollution Prevention/Good Housekeeping for Municipal Operations



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# Providing Services with Established Providers

- Cuyahoga County Board of Health
  - 48 communities offered services
  - 1 community has declined
- Cuyahoga Soil & Water Conservation District
  - 48 communities offered services
  - 1 community has declined
- Summit County Combined General Health District
  - 5 out of 5 communities
- Summit Soil & Water Conservation District
  - 5 out of 5 communities



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# Title V – SW Mgmt Plan Review

## Recurring Issues/Comments

- Lack of detail on SCM outlet structure to guard against “leaks”
  - Ensure wall penetrations, and weir wall inserts/seams are watertight
- SCM inspection & maintenance plans
  - Lack of detail to define dredging needs to maintain function of the SCM
- Considerations to maximize future stormwater fee credits



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# Title V – SW Mgmt Plan Review

## Recurring Issues/Comments

- Incorrect WQv calcs for redevelopment
  - Calculate minimum required WQv for the site as a whole
  - SCMs must be designed for the WQv of its watershed - must meet or exceed the minimum required WQv
- Inaccurate drainage area delineations and curve number interpretations
  - Need to account for offsite run-on



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# Questions

*Highland Park Golf Course Stream Restoration, Highland Hills*



# What's Next...

- WAC Meetings – March 2017
  - Lake Erie/Chagrin River: March 13
  - Cuyahoga River – North: March 15
  - Cuyahoga River – South: March 20
  - Rocky River Watershed: March 22
- Next Round in October 2017

# Questions

**Rachel Webb**

Senior Watershed Team Leader






216-881-6600 Ext. 6645

webbr@neorsd.org

**Stormwater Program: Community Resources**

<http://www.neorsd.org/communitystormwaterresources.php>

# Cuyahoga River - South

-  Regional Stormwater System in NEORS D Service Area
-  Regional Stormwater System not in NEORS D Service Area
-  Service Area
-  Community
-  District Culverted Stream

 **Northeast Ohio  
Regional Sewer District**

**Coordinate System :** Ohio State Plane North  
**Datum:** NAD 1983 , NAVD 1988  
**Projection:** Lambert Conformal Conic  
**Sources:** NEORS D GIS

**Map Created:** March 2017

**1:72,379**



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