



Maintenance of Green Stormwater Infrastructure for Function and Aesthetics

PAUL KOVALCIK, NORTHEAST OHIO REGIONAL
SEWER DISTRICT

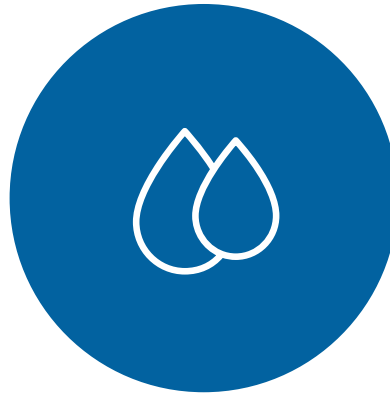


**Northeast Ohio
Regional Sewer District**

Overview



NORTHEAST OHIO
REGIONAL SEWER
DISTRICT



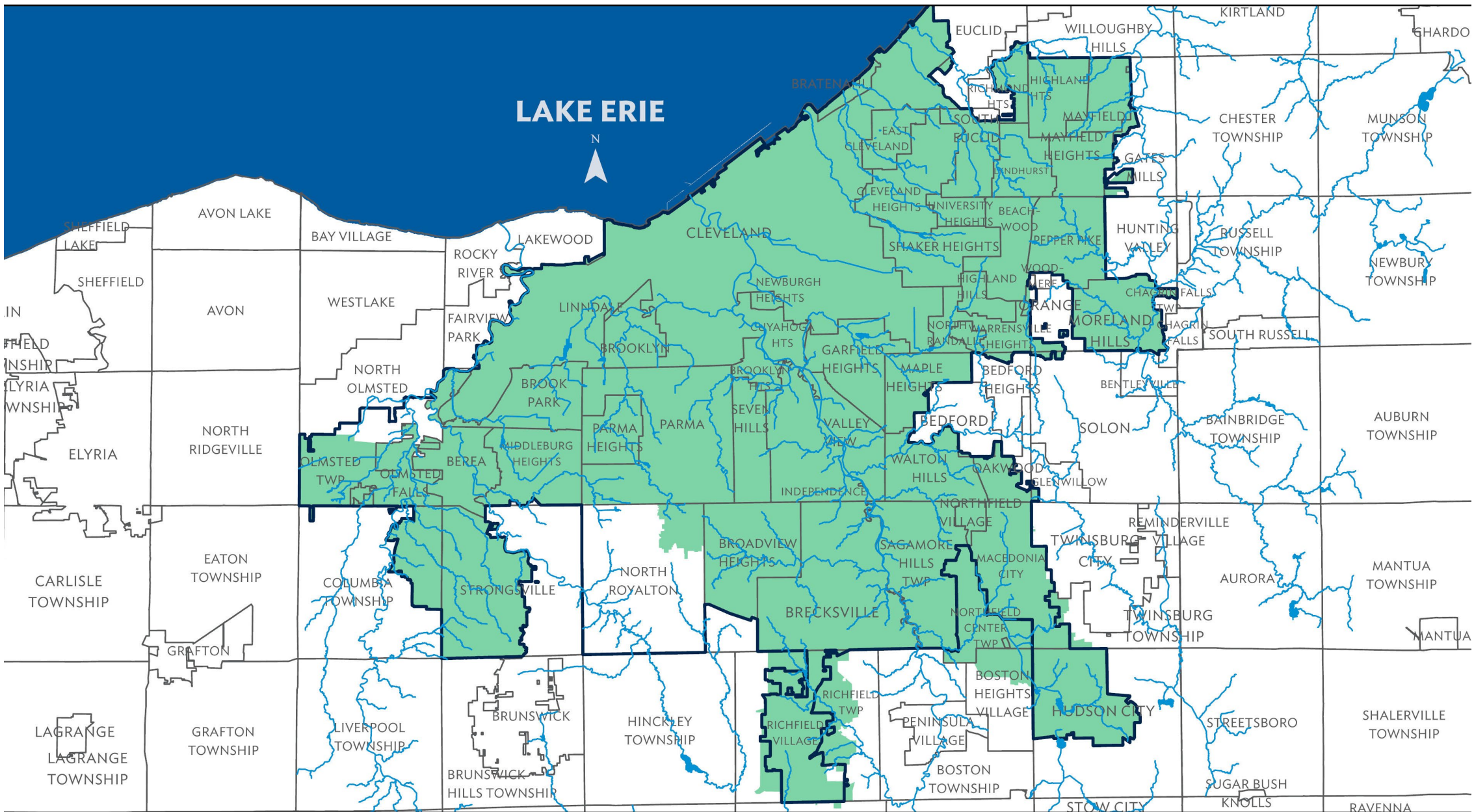
PROJECT CLEAN LAKE
AND APPENDIX 3 GI



ONGOING AND
FUTURE WORK



**Northeast Ohio
Regional Sewer District**



**Northeast Ohio
Regional Sewer District**

360 SQUARE MILE SERVICE AREA



Treatment plants

Easterly Wastewater Treatment Plant

Wastewater treatment

- 3 plants
- 90 billion gallons annually
- Certified lab
- Sewer fees



**Northeast Ohio
Regional Sewer District**



CSO control

Doan Valley Tunnel construction

Project Clean Lake

- \$3 billion, 25 years
- Cut annual CSO volume by 4 billion gallons (98% capture)
- Sewer fees



Regional Stormwater Management

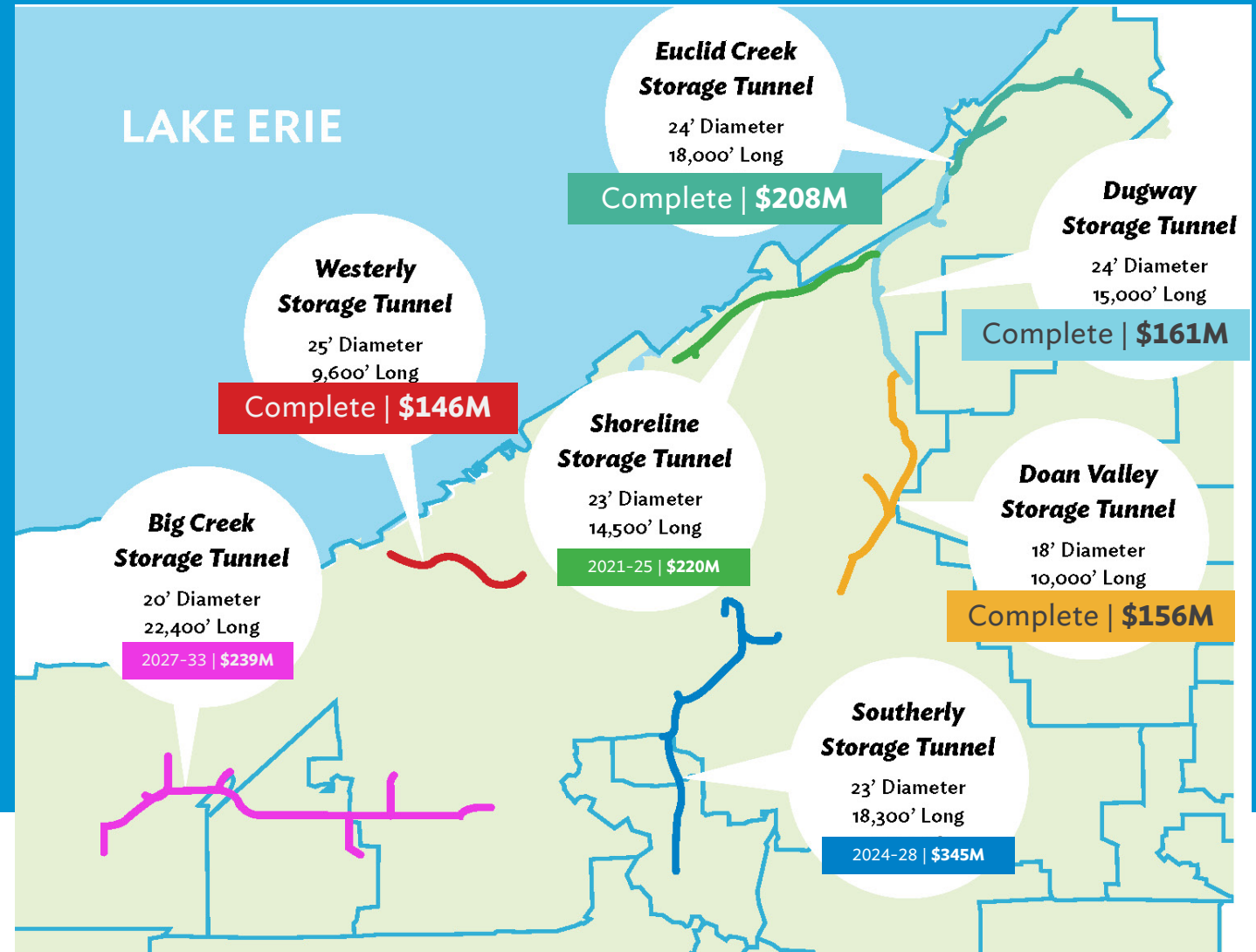
Willey Creek, Moreland Hills

Addressing flooding, erosion

- \$48 million budget 2023
- Regional approach
- Impervious surface fee

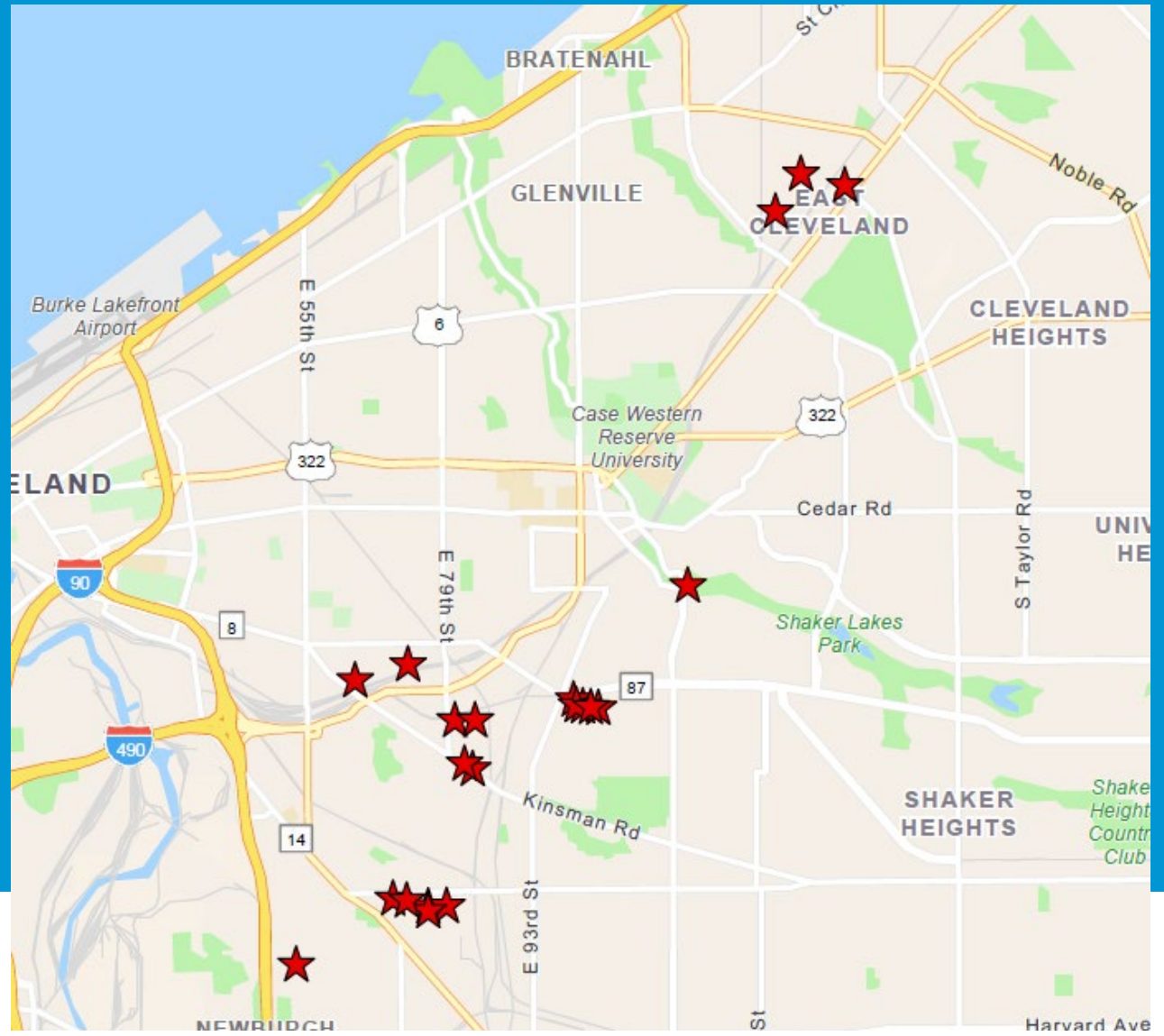
Project Clean Lake | Large Tunnel Program

- 7 tunnels
- 18-25' diameter
- 1.7 to 4.2 miles long
- 100-200' deep

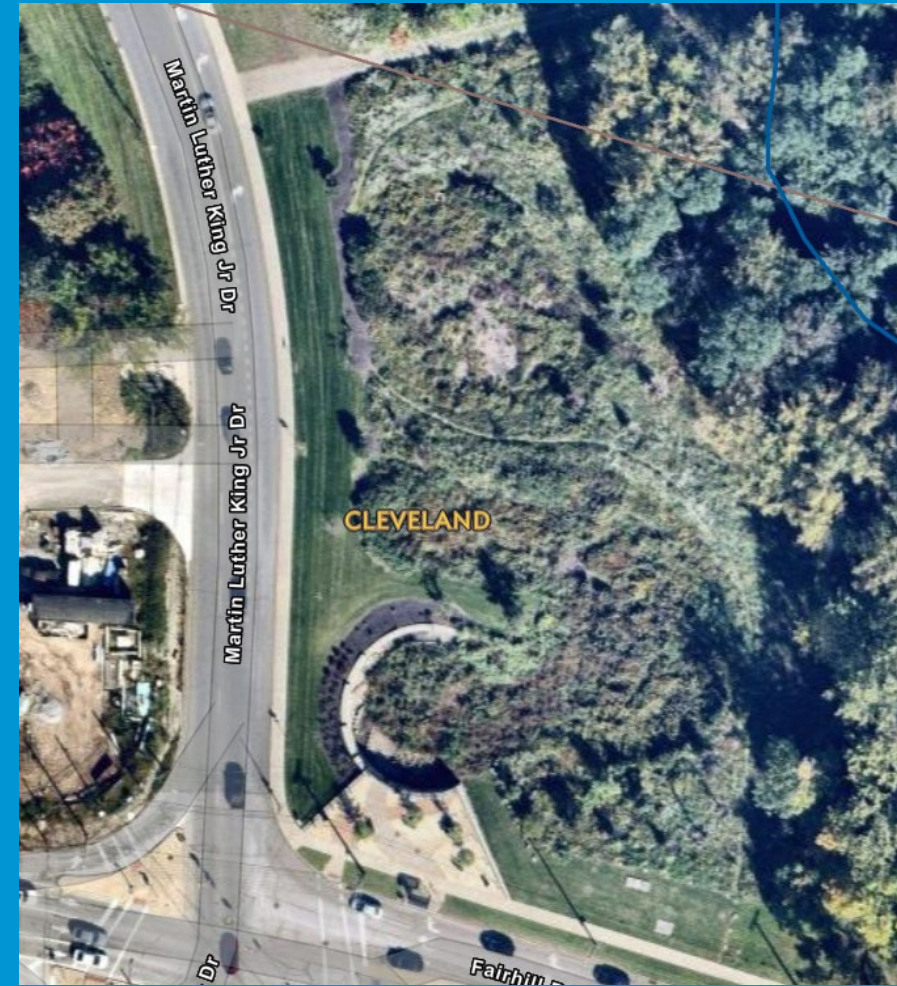


Project Clean Lake | Appendix 3 GI

- 16 Individual Sites/Areas
- Constructed between 2013 and 2020
- Bioretention, extended detention, and a permeable paver lot
- <0.1 to 10.5 acres
- Capture 1 to 100 acres of stormwater



Fairhill Rd/Martin Luther King Jr. Blvd.



Fairhill Rd/Martin Luther King Jr. Blvd.

STORMWATER PLUG MIX #1

SPECIES	SIZE	SPACING	INDICATOR STATUS
<i>Bromus ciliatus</i> Fringed Grome	PLUG	18" O.C.	FACW
<i>Juncus effusus</i> Common/Soft Rush	PLUG	18" O.C.	OBL
<i>Liatris pycnostachya</i> Prairie Blazing Star	PLUG	18" O.C.	FAC-

STORMWATER PLUG MIX #2

SPECIES	SIZE	SPACING	INDICATOR STATUS
<i>Carex vulpinoidea</i> Brown Fox Sedge	PLUG	18" O.C.	OBL
<i>Lobelia siphilitica</i> Blue Lobelia	PLUG	18" O.C.	FACW+
<i>Spartina pectinata</i> Prairie Cord Grass	PLUG	18" O.C.	FACW+

STORMWATER PLUG MIX #3

SPECIES	SIZE	SPACING	INDICATOR STATUS
<i>Veronica fasciculata</i> Ironweed	PLUG	18" O.C.	FACW
<i>Silphium perfoliatum</i> Cup Plant	PLUG	18" O.C.	FACW-
<i>Andropogon gerardii</i> Big Bluestem	PLUG	18" O.C.	FAC
<i>Monarda fistulosa</i> Wild Bergamot	PLUG	18" O.C.	FACU



STORMWATER PLUG MIX #4

SPECIES	SIZE	SPACING	INDICATOR STATUS
<i>Panicum virgatum</i> Switchgrass	PLUG	18" O.C.	FAC+
<i>Sorghastrum nutans</i> Indian Grass	PLUG	18" O.C.	FACU+
<i>Veronica fasciculata</i> Ironweed	PLUG	18" O.C.	FACW
<i>Andropogon gerardii</i> Big Bluestem	PLUG	18" O.C.	FAC

STORMWATER PLUG MIX #5

SPECIES	SIZE	SPACING	INDICATOR STATUS
<i>Carex comosa</i> Bottlebrush Sedge	PLUG	18" O.C.	OBL
<i>Carex scoparia</i> Broom Sedge	PLUG	18" O.C.	FACW+
<i>Eupatorium maculatum</i> Joe-pye-weed	PLUG	18" O.C.	OBL
<i>Lobelia cardinalis</i> Cardinal Flower	PLUG	18" O.C.	OBL

STORMWATER PLUG MIX #6

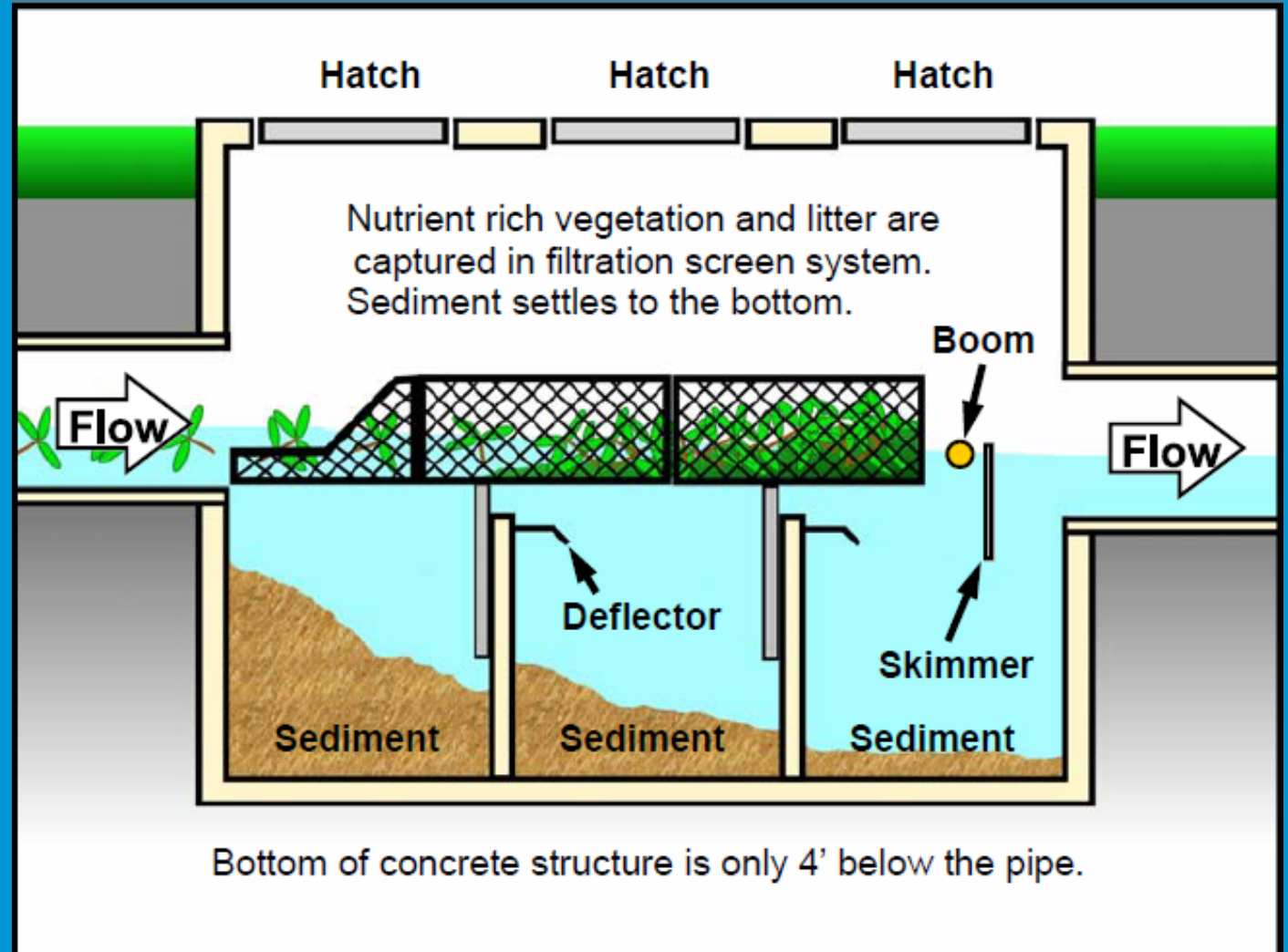
SPECIES	SIZE	SPACING	INDICATOR STATUS
<i>Zizia aurea</i> Golden Alexanders	PLUG	18" O.C.	FAC+
<i>Sporobolus heterolepis</i> Prairie Dropseed	PLUG	18" O.C.	FACU-
<i>Bouteloua curtipendula</i> Sideoats Grama	PLUG	18" O.C.	UPL
<i>Agastache foeniculum</i> Giant Hyssop	PLUG	18" O.C.	UPL



Fairhill Rd/Martin Luther King Jr. Blvd.



Pre-Treatment



E 140th/Page Ave





Fleet Avenue



Fleet Avenue



ECT-5 Bioretention



December 2021



**Northeast Ohio
Regional Sewer District**

BIORETENTION

ECT-5 Bioretention



December 2022



**Northeast Ohio
Regional Sewer District**

BIORETENTION

ECT-5 Bioretention



December 2022



**Northeast Ohio
Regional Sewer District**

BIORETENTION

ECT-5 Bioretention



June 2023



**Northeast Ohio
Regional Sewer District**

BIORETENTION

Easterly Tunnel Dewatering Pump Station



July 2022



**Northeast Ohio
Regional Sewer District**

BIORETENTION

Easterly Tunnel Dewatering Pump Station



June 2024



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BIORETENTION

Easterly Tunnel Dewatering Pump Station



June 2024



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BIORETENTION

Easterly Tunnel Dewatering Pump Station



August 2024



**Northeast Ohio
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BIORETENTION

Slavic Village E 75th Green Infrastructure



October 2014



**Northeast Ohio
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BIORETENTION

Slavic Village E 75th Green Infrastructure



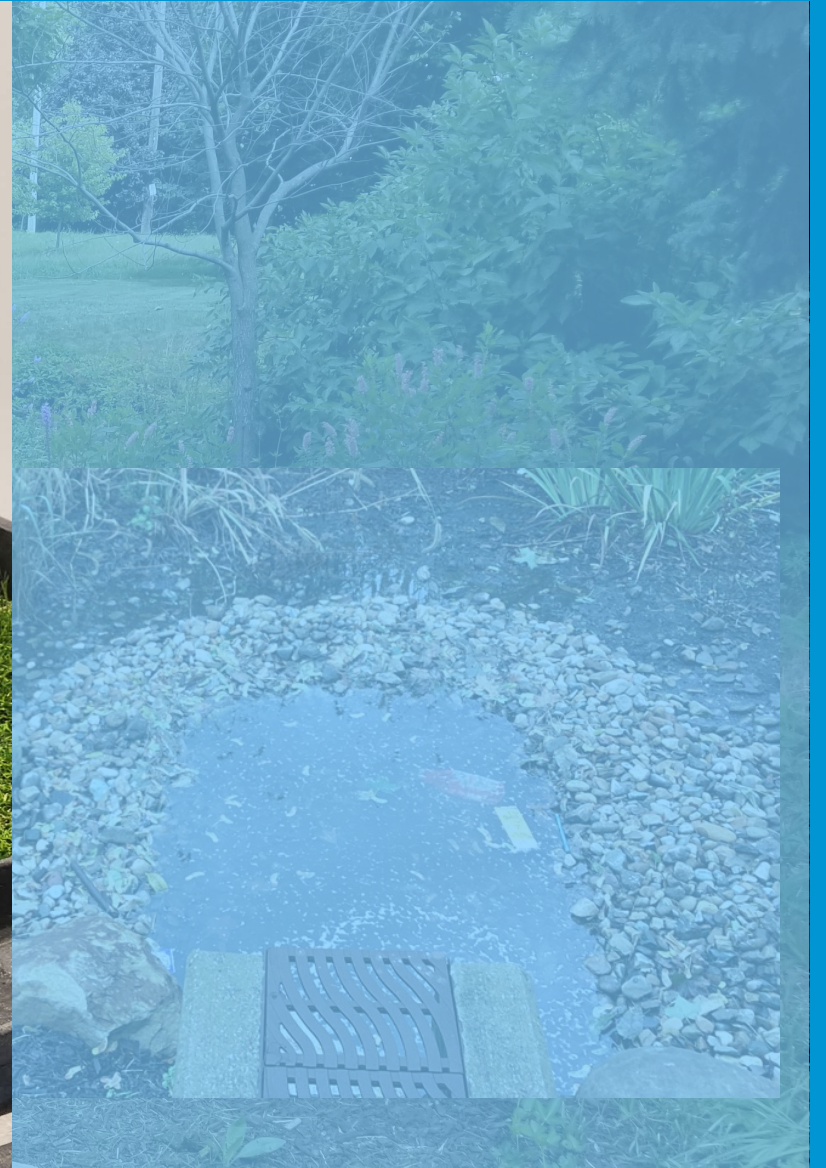
October 2014



**Northeast Ohio
Regional Sewer District**

BIORETENTION





Ongoing and Future Work – Inspection and Maintenance



Ongoing and Future Work – Adaptive Management of Vegetation



Ongoing and Future Work – Public Access/Use

5 laps around
this basin equal
one mile.



**Northeast
Ohio Regional
Sewer District**

**PROJECT
CLEAN LAKE**

This basin and two others like it in East Cleveland collectively filter more than 60 million gallons of stormwater a year.



**Northeast Ohio
Regional Sewer District**

INVITING THE COMMUNITY

Goals and Vision



Functional green infrastructure sites that invite passive recreation and provide a restorative experience.



Questions?



**Northeast Ohio
Regional Sewer District**

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