Is The Grass Always Greener?

Brownfields, Green Infrastructure & Finding the Right Stormwater Solutions in Urban Settings

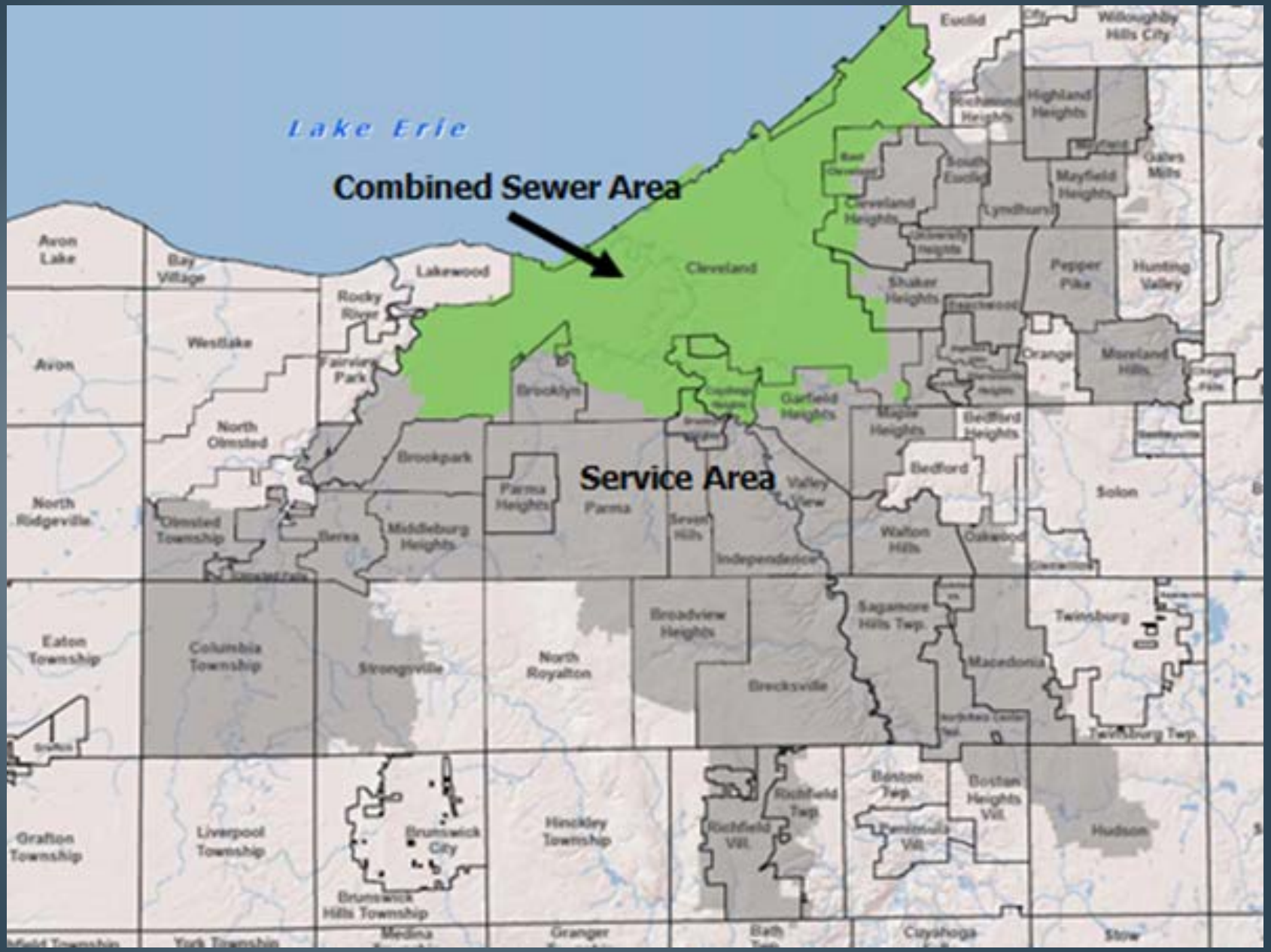
Overview

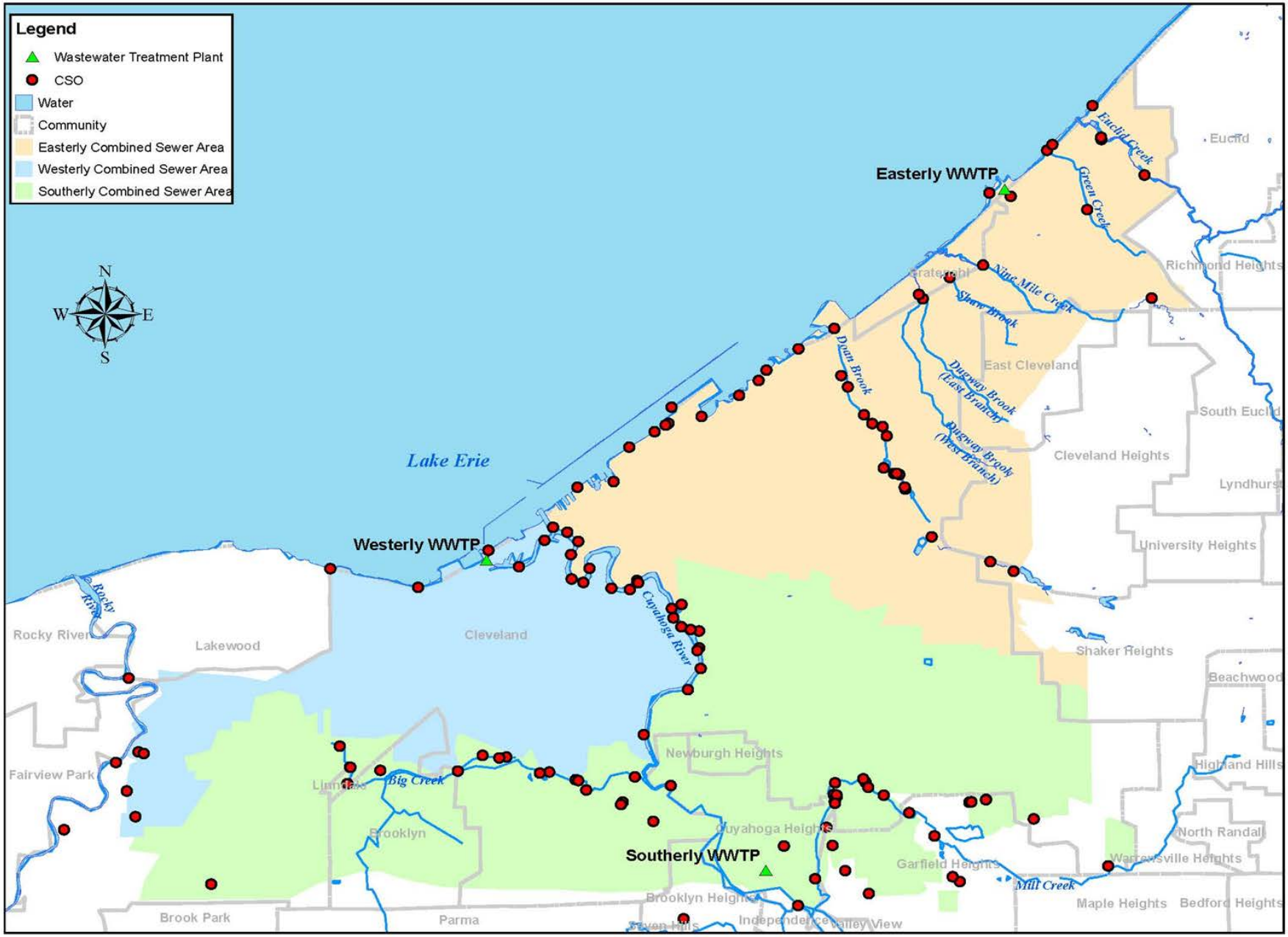
- What is a Combined Sewer Overflow (CSO)
- Solutions to CSOs
- What is Green Infrastructure (GI)
- Location Challenges for GI
- Key Considerations for Stormwater Management on Brownfields
- How do you design a GI/Stormwater (SW) basin on a Brownfield
- Case Study – Woodland/Central Green Infrastructure Project

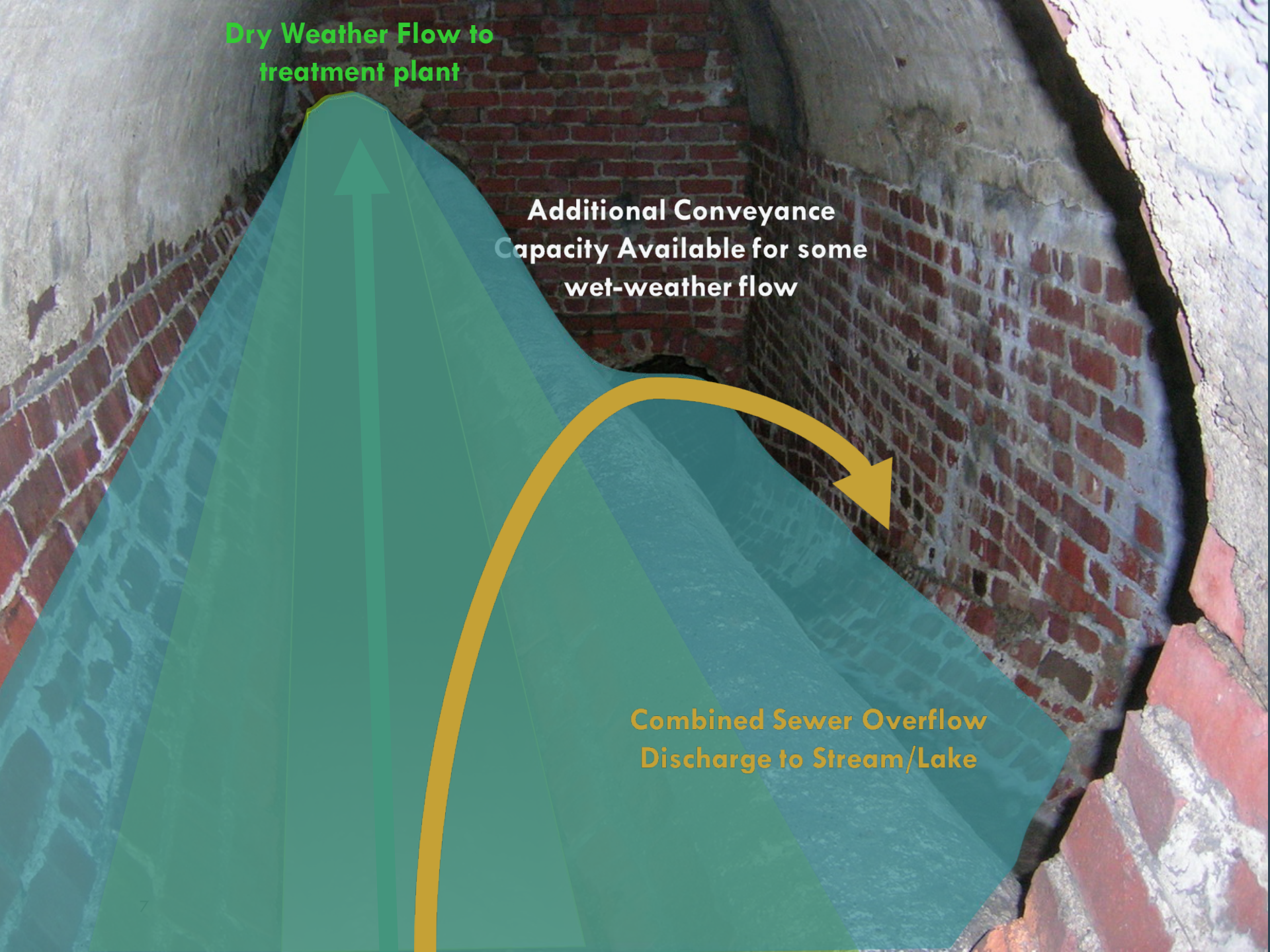
What is a CSO?

Combined Sewer System

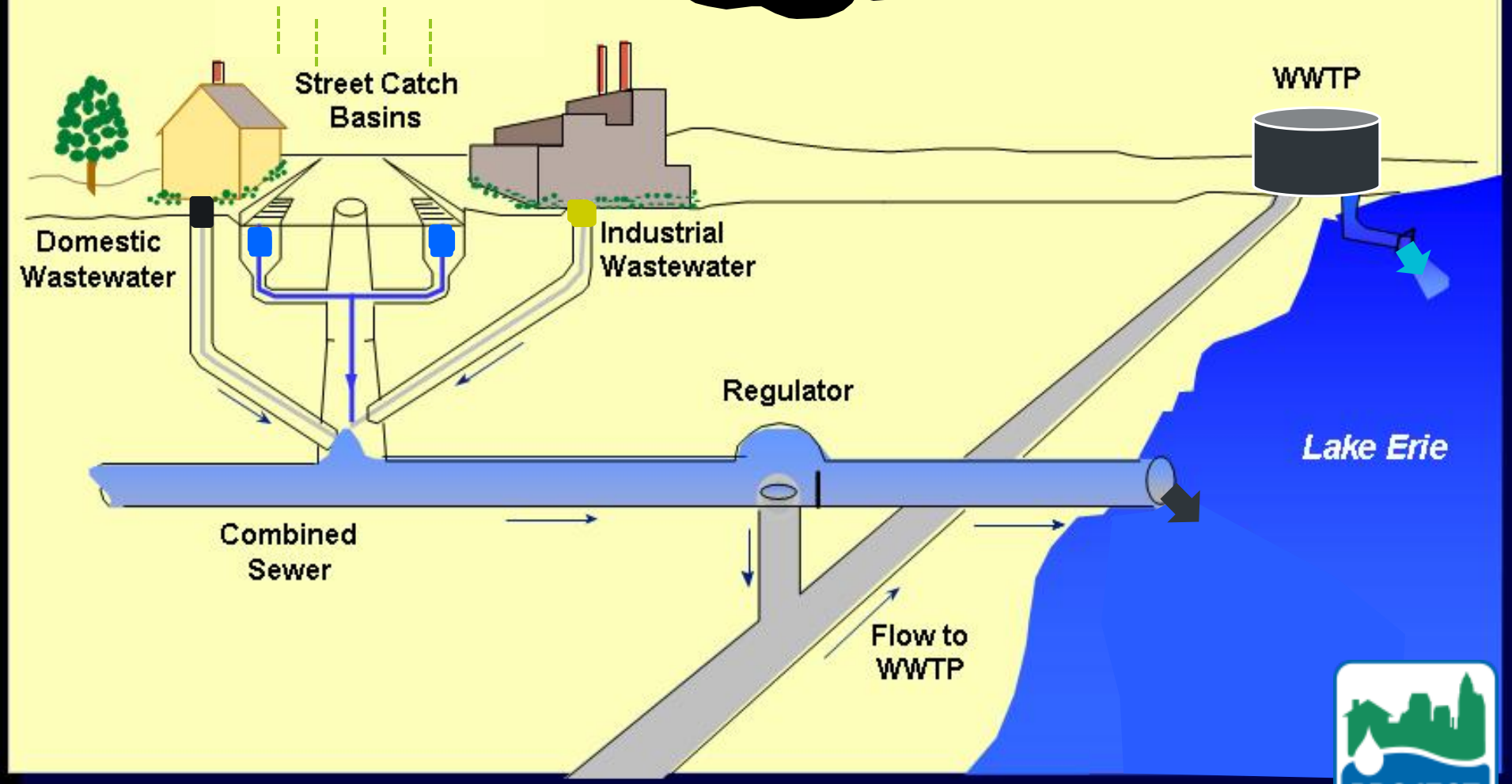
- Sewage collection System
- Collects
  - Sanitary Sewage
  - Surface runoff
- Conveys flows to WWTP
- Overflows to the environment


Lake Erie
Combined Sewer Area
Service Area
Euclid
Willoughby Hills City
Highland Heights
Gates Mills
Mayfield Heights
Lyndhurst
South Euclid
Cleveland Heights
Shaker Heights
Pepper Pike
Hunting Valley
Orange
Moreland Hills
Cleveland
Aron Lake
Bay Village
Lakewood
Rocky River
Westlake
Avon
Fairview Park
North Olmsted
Brooklyn
Garfield Heights
Maple Heights
Bedford Heights
Bedford
Solon
Brookpark
Parma Heights
Parma
Valley View
Seven Hills
Independence
Walton Hills
Oakwood
North Ridgeville
Olmsted Township
Berea
Middleburg Heights
Eaton Township
Columbia Township
Strongsville
North Royalton
Broadview Heights
Brecksville
Sagamore Hills Twp.
Macedonia
Twinsburg
Twinsburg Twp.
Grafton Township
Liverpool Township
Brunswick City
Brunswick Hills Township
Hinckley Township
Richfield Vill.
Richfield Twp.
Boston Twp.
Peninsula Vill.
Boston Heights Vill.
Hudson
Medina
Granger
Bath
Cuyahoga
Stow


Legend
Wastewater Treatment Plant
CSO
Water
Community
Easterly Combined Sewer Area
Westerly Combined Sewer Area
Southerly Combined Sewer Area
N
W
E
S
Easterly WWTP
Westerly WWTP
Southerly WWTP
Lake Erie
Euclid Creek
Green Creek
Nine Mile Creek
Shaw Brook
Dam Brook
Dugway Brook (East Branch)
Dugway Brook (West Branch)
Cuyahoga River
Rocky River
Big Creek
Mill Creek
Euclid
Richmond Heights
Gateway
East Cleveland
South Euclid
Cleveland Heights
Lyndhurst
University Heights
Shaker Heights
Beachwood
Highland Hills
North Randall
Warrensville Heights
Maple Heights
Bedford Heights
Cleveland
Lakewood
Rocky River
Fairview Park
Lincoln
Brooklyn
Newburgh Heights
Cuyahoga Heights
Garfield Heights
Brooklyn Heights
Independence
Valley View
Seven Hills
Parma
Brook Park


Dry Weather Flow to
treatment plant
Additional Conveyance
Capacity Available for some
wet-weather flow
Combined Sewer Overflow
Discharge to Stream/Lake

How Does a Combined Sewer System Work?



Water Quality Impacts of Combined Sewer Overflow….

WARNING: OVERFLOW EVENT

PUBLIC ADVISORY

STORMWATER AND SEWAGE OVERFLOWED TO THIS BEACH AREA ON _____.
DATE & TIME

As a result, the beach area and water may have been affected. Visitors – particularly children, the elderly, and those in ill health – are advised to avoid contact with the water and debris.

FOR MORE INFORMATION ABOUT COMBINED SEWER OVERFLOWS (CSOs):

NORTHEAST OHIO REGIONAL SEWER DISTRICT
CSO INFORMATION HOTLINE
(216) 432-7330 | www.NEORSD.org

FOR MORE INFORMATION ABOUT WATER-RELATED HEALTH CONCERNS:

CLEVELAND DEPARTMENT OF PUBLIC HEALTH
(216) 664-4292

OHIO DEPARTMENT OF HEALTH
(614) 466-1390

THIS SIGNAGE IS PROVIDED AS A COURTESY OF THE NORTHEAST OHIO REGIONAL SEWER DISTRICT

Solutions to CSOs

Potential Solutions

- Traditional (Gray)
  - Large Tunnels
  - Pump Stations
  - Relief Sewers
  - WWTP Improvements

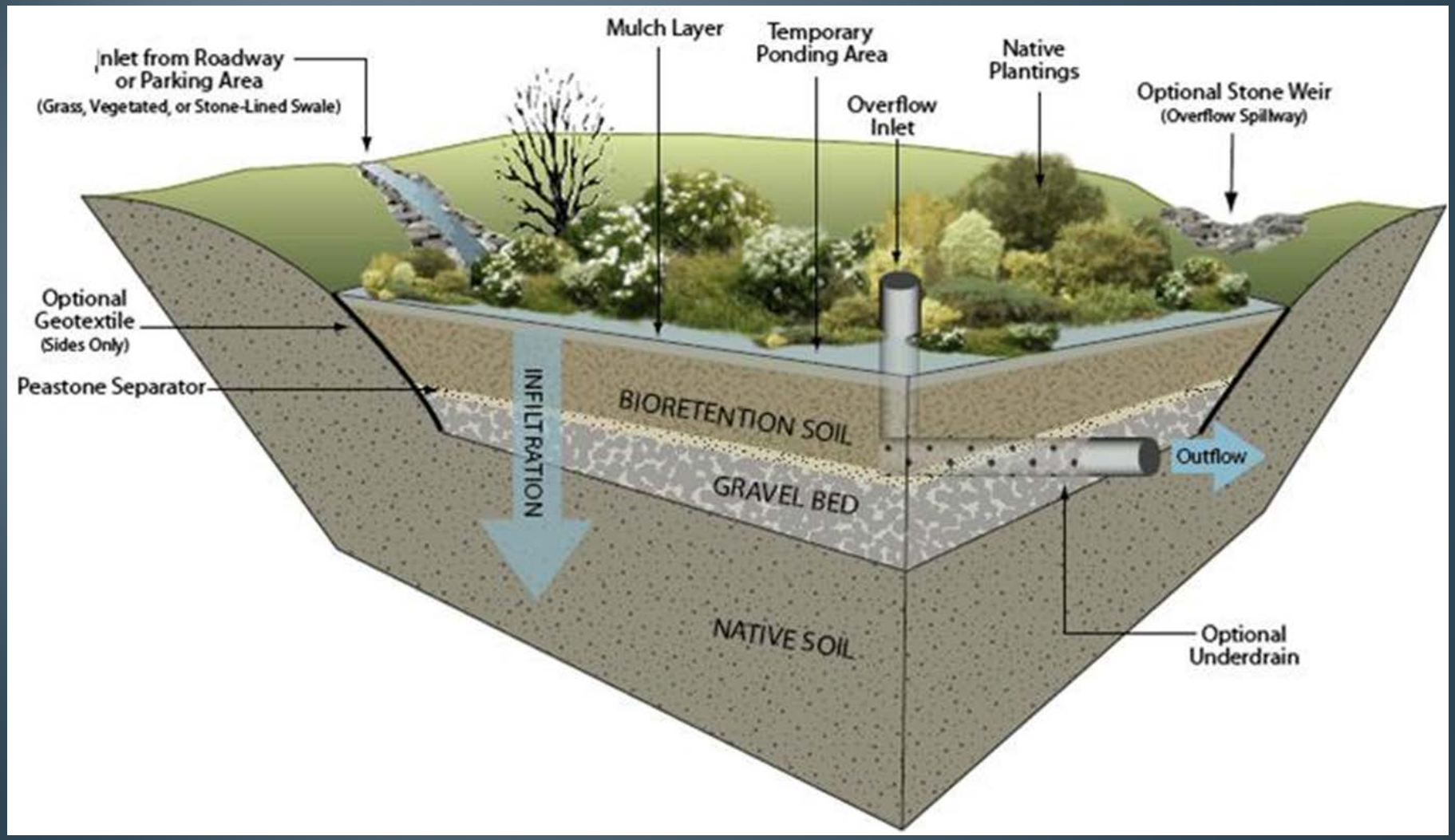
- Trending (Green)
  - Bioretention
  - Rain gardens
  - Pervious pavers
  - Green roofs
  - Rainwater harvesting

What is Green Infrastructure?

Green Infrastructure

- Manage Stormwater
- Store, infiltrate, or evapotranspirate stormwater
- Control Measures:
  - plant/soil systems
  - permeable pavement
  - stormwater harvest and reuse
- Reduce flows to the combined sewer system

Green Infrastructure - Bioretention

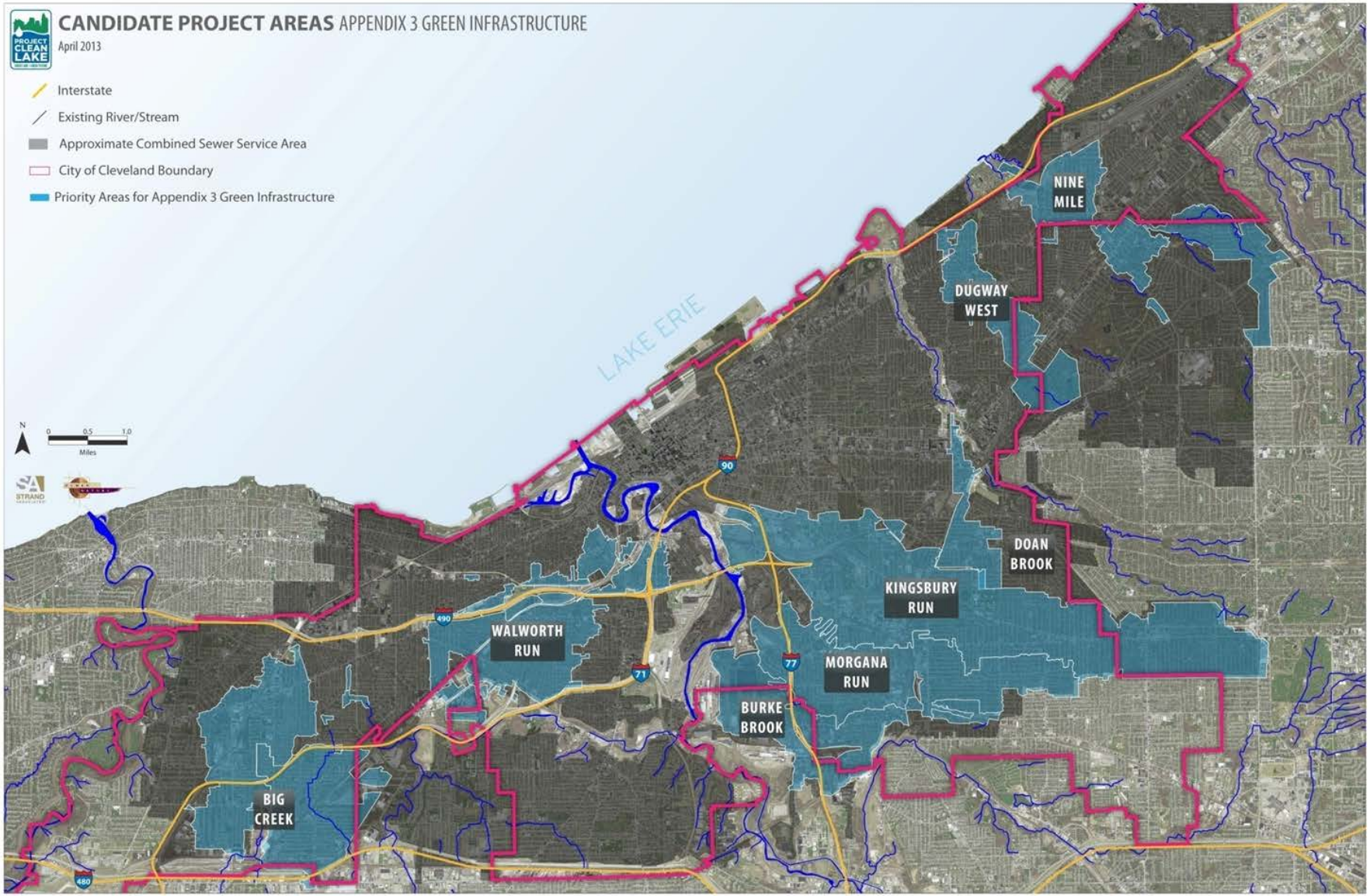


Examples of Bioretention Basins

Location, Location, Location

Location Requirements

- Remaining CSOs
- Connection to Waterway
- Available Space
- No other reuse Option
- Community Support


CANDIDATE PROJECT AREAS APPENDIX 3 GREEN INFRASTRUCTURE
April 2013
PROJECT CLEAN LAKE
Interstate
Existing River/Stream
Approximate Combined Sewer Service Area
City of Cleveland Boundary
Priority Areas for Appendix 3 Green Infrastructure
N
0 0.5 1.0
Miles
LAKE ERIE
NINE MILE
DUGWAY WEST
DOAN BROOK
KINGSBURY RUN
MORGANA RUN
WALWORTH RUN
BURKE BROOK
BIG CREEK
90
490
71
77
480

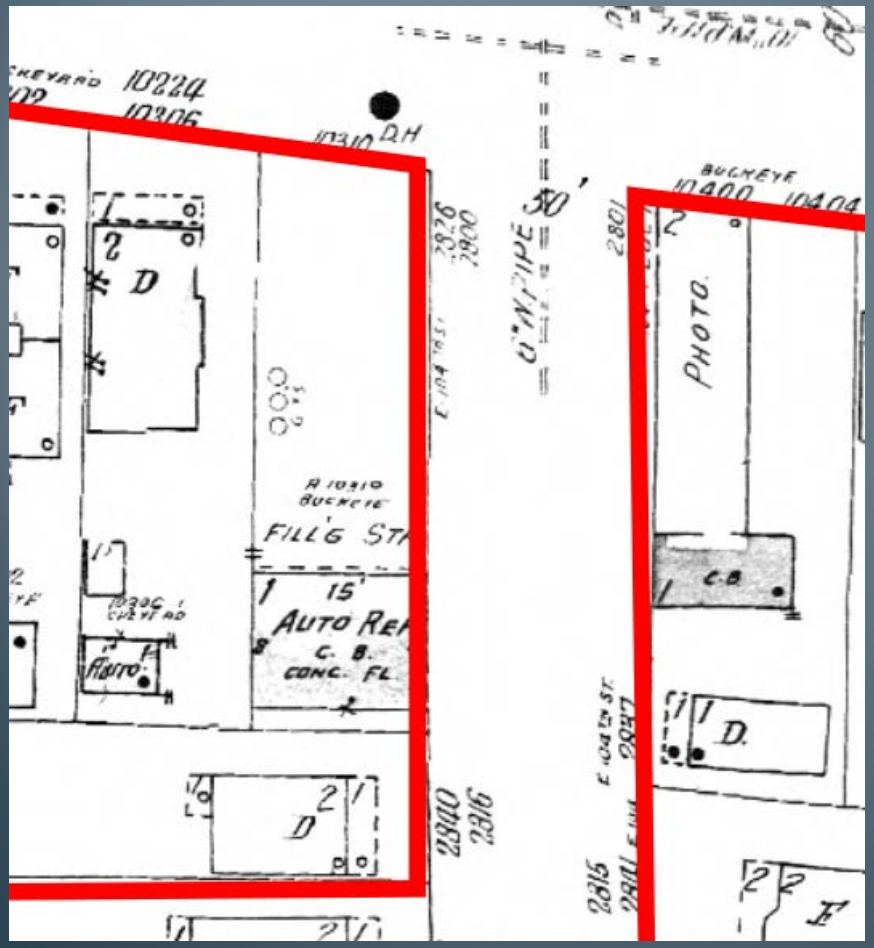
Options?

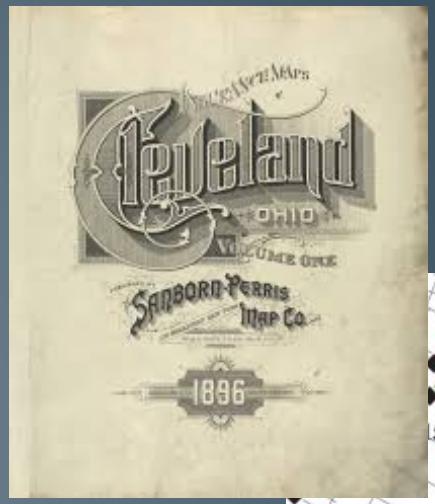
Brownfields

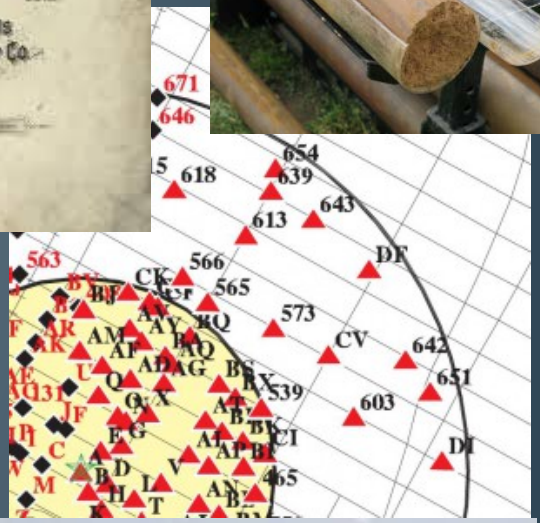
Considerations for Stormwater Management

On Brownfield Sites

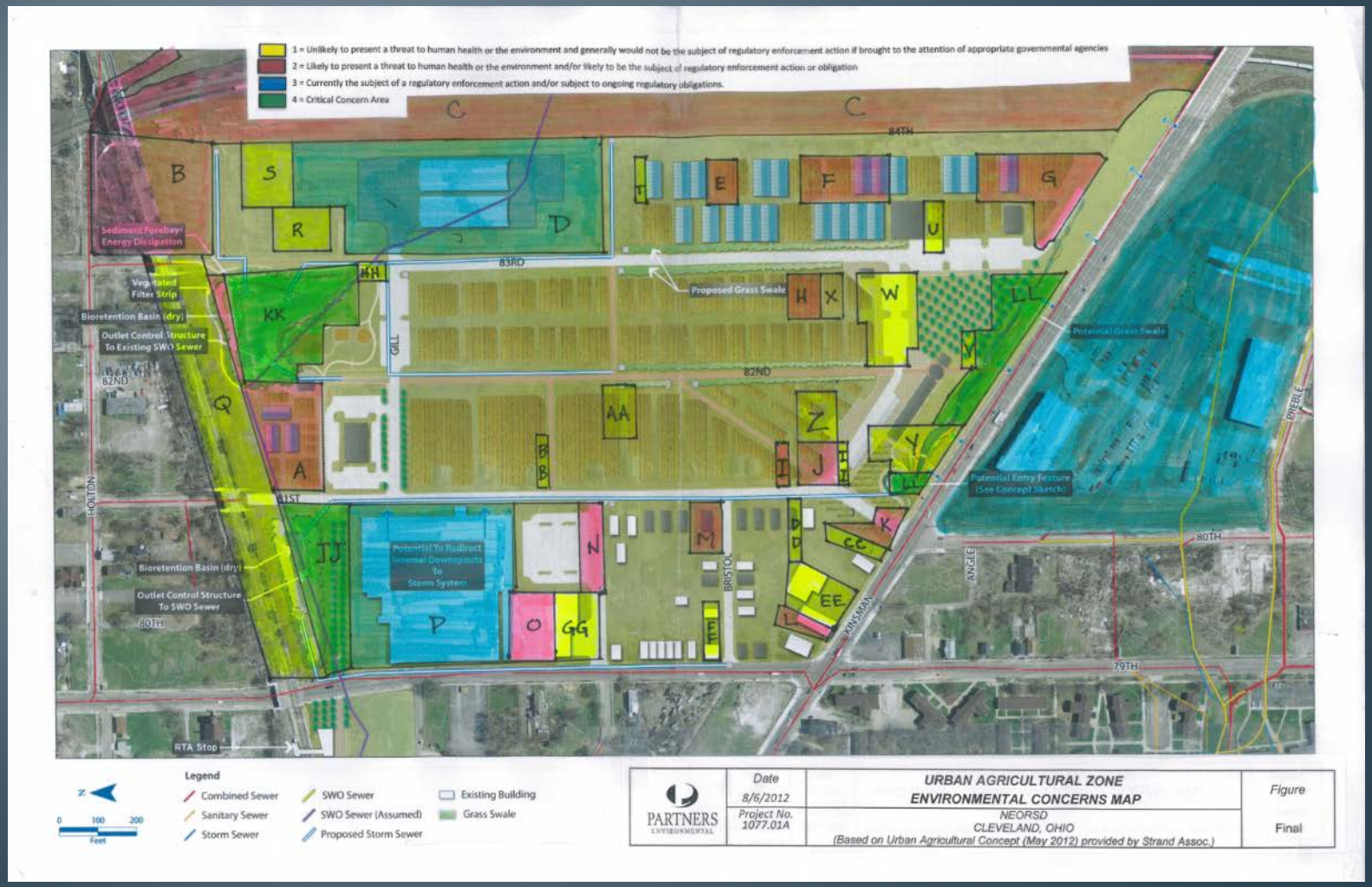
Key Considerations: Early Due Diligence



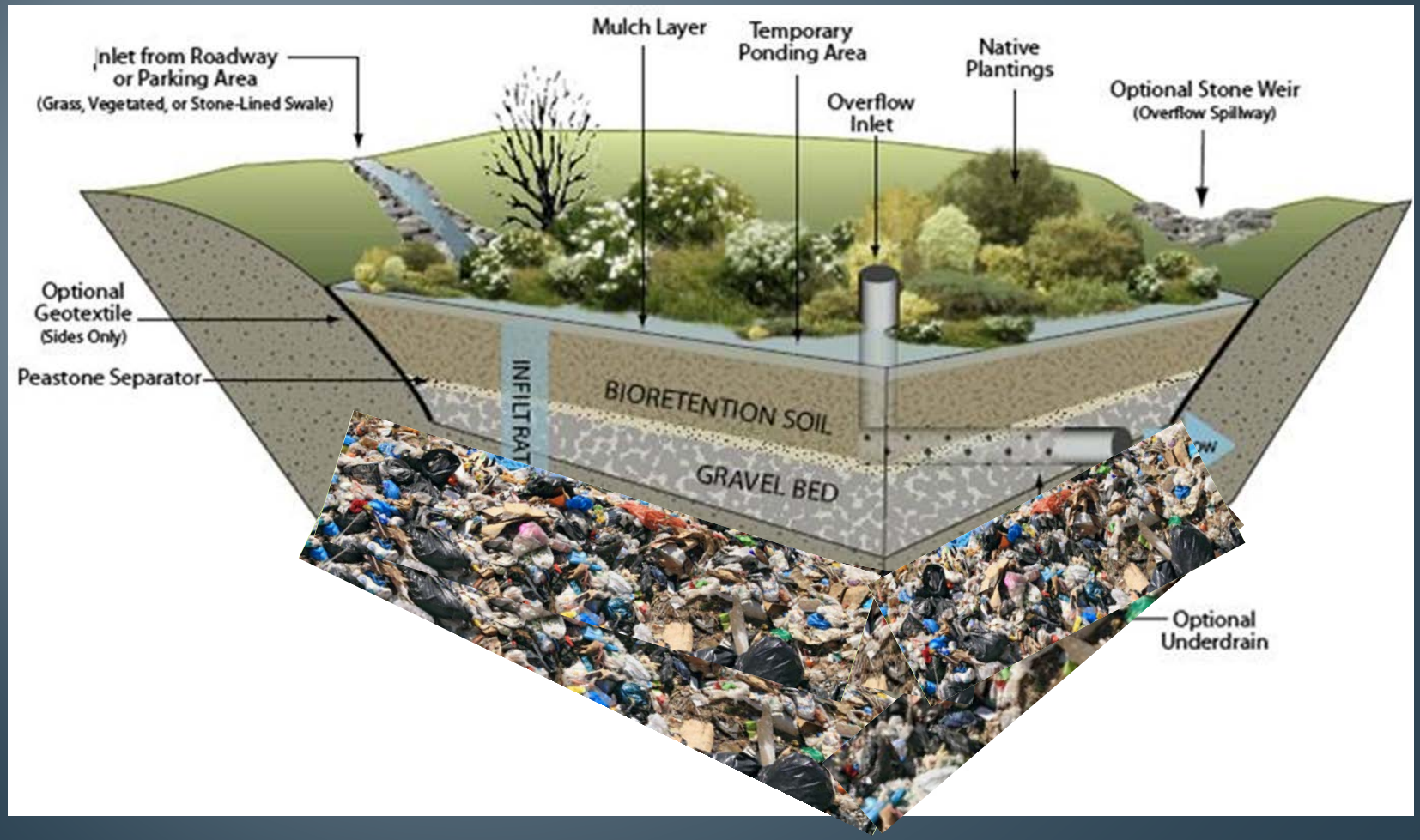




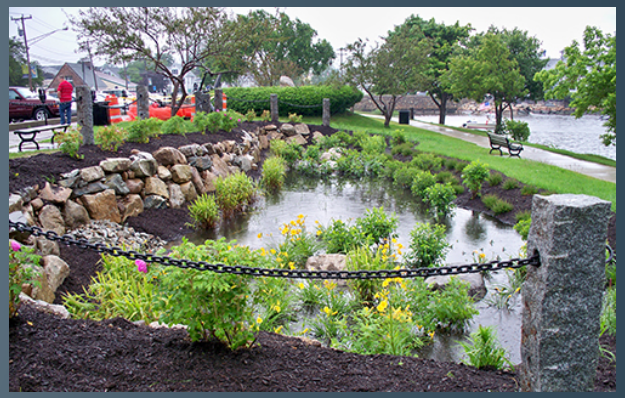
Key Considerations: Due Diligence



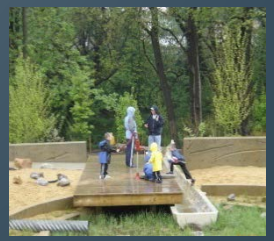
Key Considerations: Infiltration of Stormwater

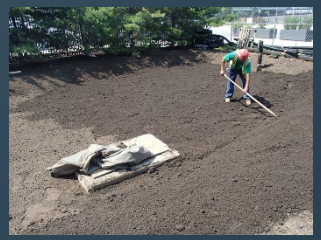


Key Considerations:
Depth of Basin



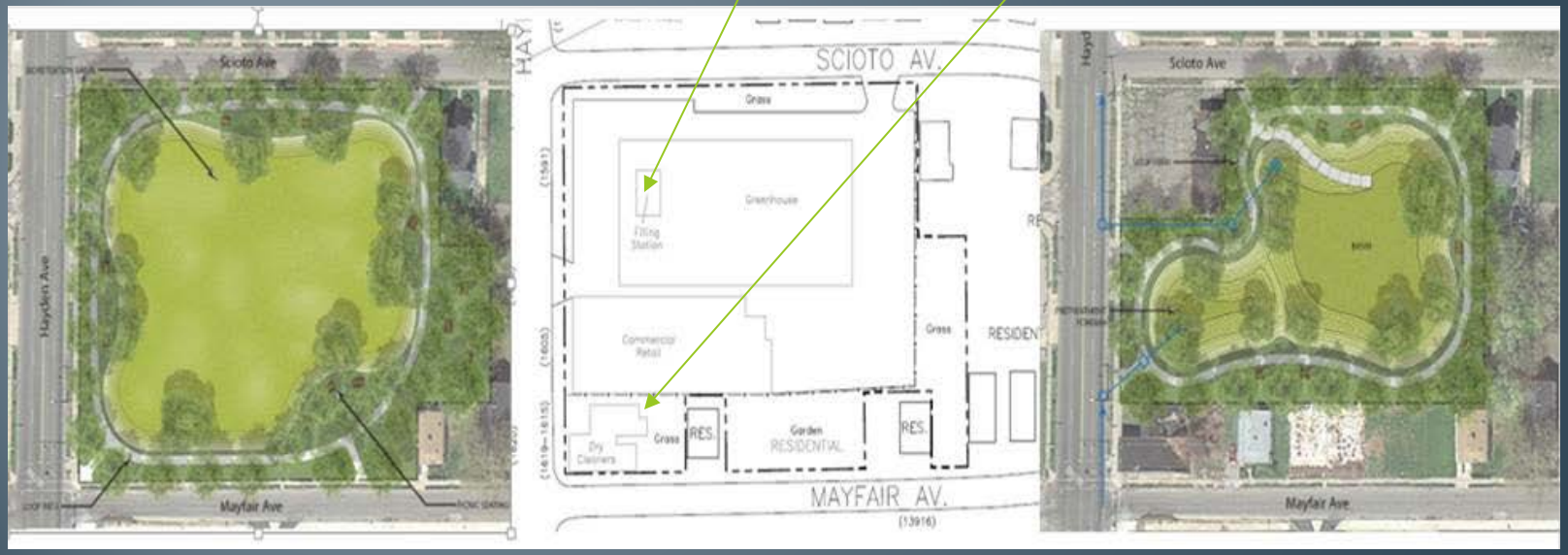
Key Considerations: End Use/Cleanup Standards





Key Considerations: Location of Basin

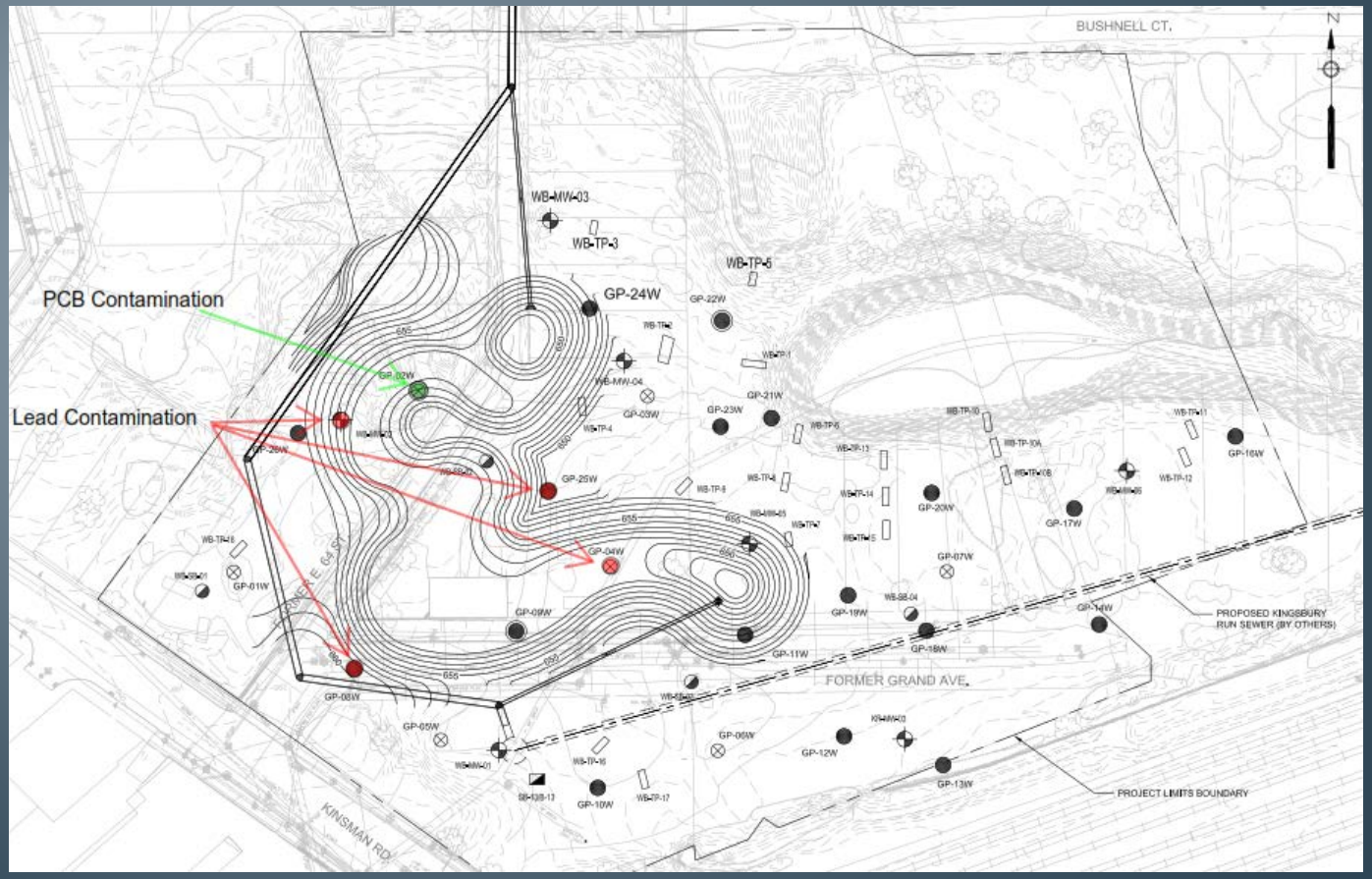
- Avoid Contamination?



From Left to Right: Conceptual model for bioretention basin, environmental concerns identified during environmental due diligence, and refined rendering of engineering design incorporating environmental findings.

Key Considerations: Location of Basin

- Address Contamination?



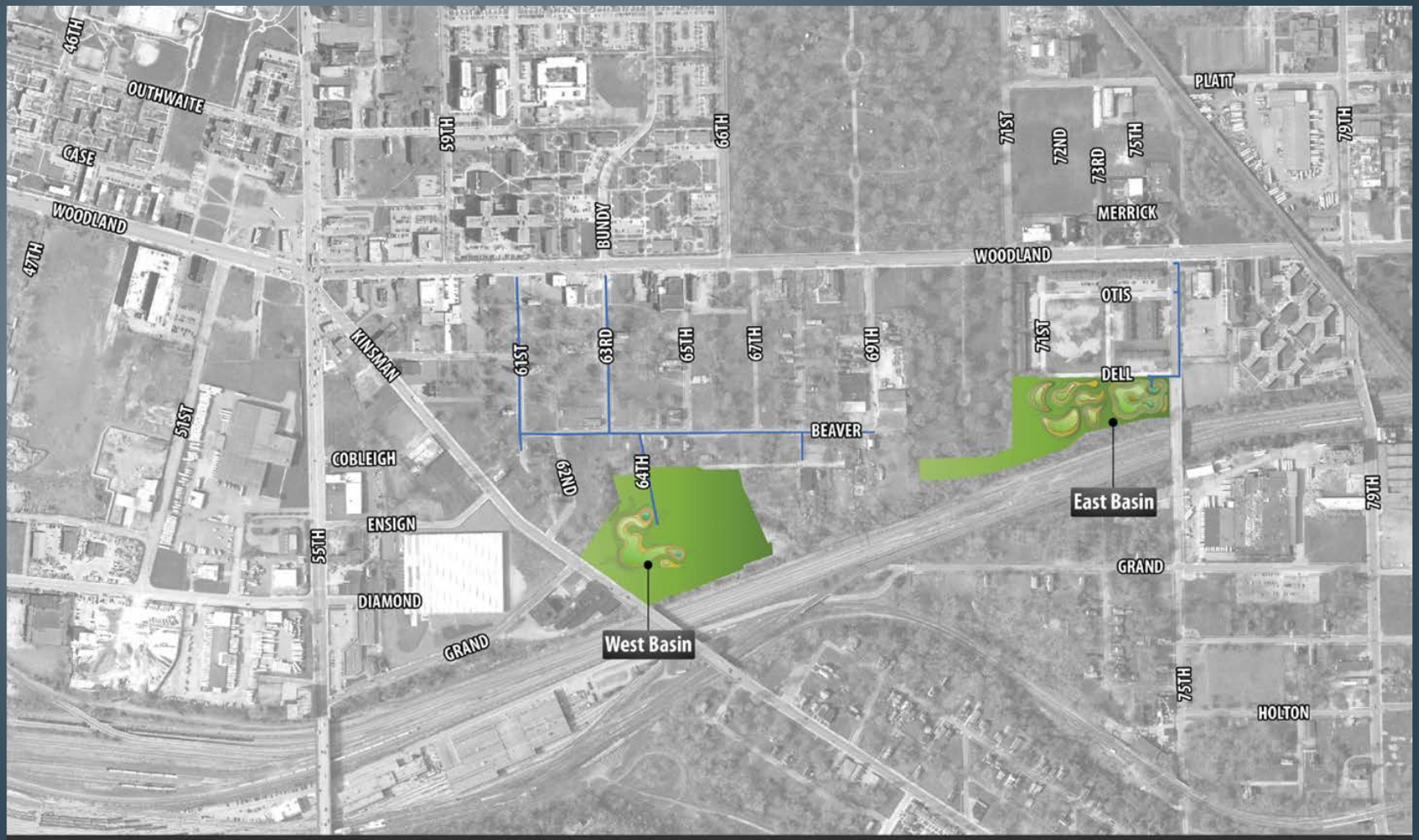
Key Considerations: Eligibility for Grants

Case Study

Woodland/Central Green Infrastructure Project – West Basin

NEORSD Green Infrastructure
Project Locations
PROJECT CLEAN LAKE
Green Infrastructure Locations
Waterways
0 0.5 1 2
Miles
N
E. 140th St. Consolidation and Relief Sewer project
University Circle GI Demonstration Project
Fairhill-MLK
Woodland Central
Buckeye
Urban Agriculture
Union
Fleet Avenue Green Infrastructure
Slavic Village Demonstration Project
Cleveland
East Cleveland
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

Woodland/Central GI Project

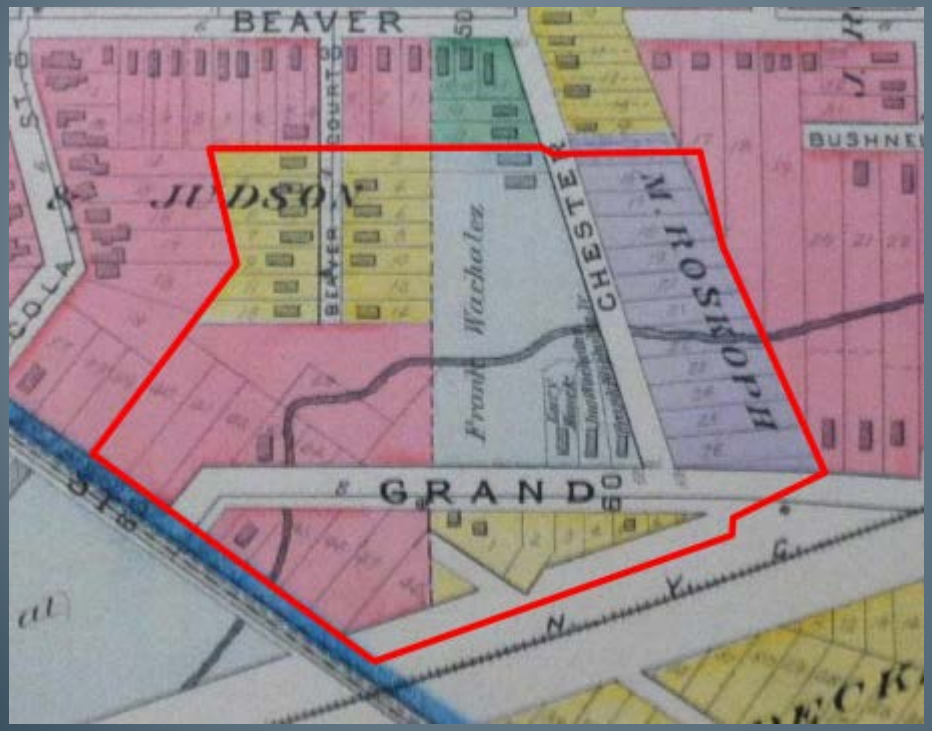


West Basin

59TH
WOODLAND
61ST
63RD
65TH
67TH
68TH
69TH
GRISWOLD
KINSMAN
BEAVER
BUSHNELL
62ND
GRAND
KINGSBURY RUN CULVERT
LEGEND
PROPOSED CATCH BASIN
PROPOSED STORM MANHOLE
EXISTING DISTRICT SEWER
FUTURE DISTRICT SEWER
EXISTING STORM SEWER
SUBCATCHMENT BOUNDARY
PROPOSED STORM SEWER DIAMETER
INLET LEAD
15-INCH
36-INCH
24-INCH
48-INCH
30-INCH
54-INCH
ch2m: HUMAN NATURE
N
0 100 200 FEET
PRELIMINARY DRAFT FOR DISCUSSION PURPOSES ONLY
WEST BASIN PROPOSED STORM SEWERS
WOODLAND CENTRAL GREEN INFRASTRUCTURE

Site History

- Late 1800s - Residential area around ravine



1892 Atlas Map

1896 Sanborn Map

Site History

- 1910-20s – Commercial/industrial development and filling of ravine (off-Property)

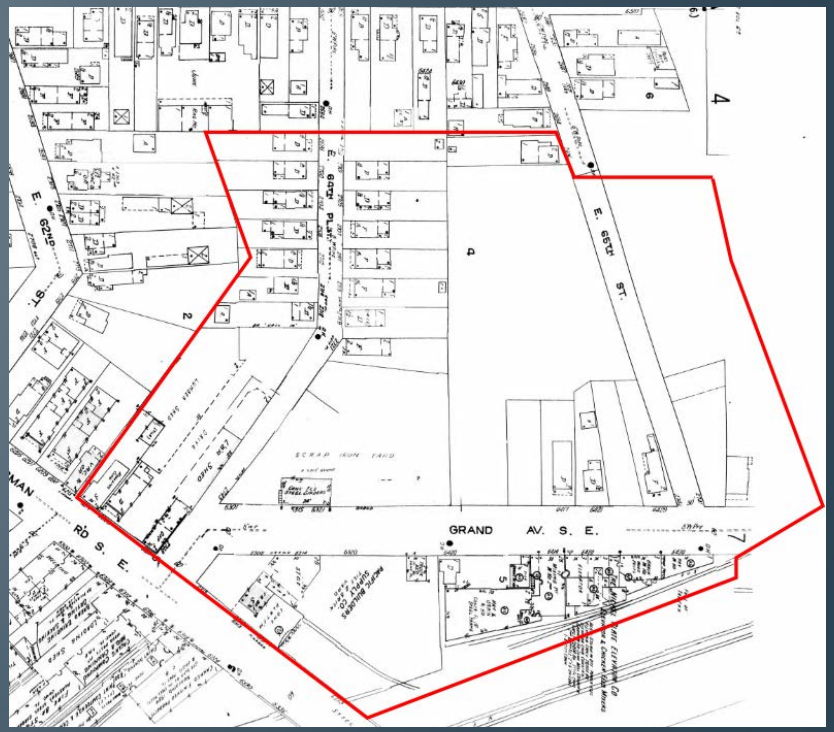
1913 Sanborn Map

1922 Atlas Map

Site History

- 1950s-60s – Filling of ravine continues; recycled lumber yard becomes salvage material yard

1951 Aerial Photo



1962 Sanborn Map

Site History

- 1970s – Homes/commercial structures removed and scrap yard expands

1970 Aerial Photo

1977 Aerial Photo

Site History

- 1980s – Addition of auto towing/wrecking

1982 Aerial Photo

1988 Aerial Photo

Site History

- 2014 – Cuyahoga County Environmental Crimes Task Force raids site and court case is filed

1994

2000

2004

2013

Authorities raid Cleveland business suspected of illegal dumping

By Brandon Blackwell, Northeast Ohio Media Group
Email the author | Follow on Twitter
on May 08, 2014 at 10:48 AM, updated May 08, 2014 at 10:52 AM

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CLEVELAND, Ohio – Local authorities on Thursday morning are raiding a Cleveland scrap yard accused of illegally dumping tires.

Cleveland police, sheriff's deputies and members from other city, state and federal agencies descended on CPC's Towing and Recycling on Kinsman Road about 10 a.m.

Authorities on Thursday raid a Cleveland scrapyard suspected of illegally dumping tires.

Brandon Blackwell, Northeast Ohio Media Group

Used tires and junk vehicles litter the run-down business, which sits on a handful of

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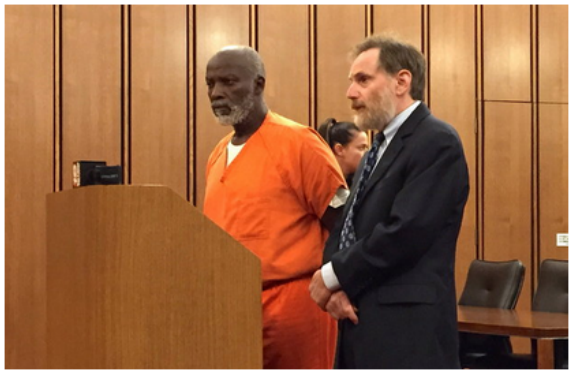
Site History

- 2015 – Previous owner required to clean-up the property

Cleveland man must clean up illegal scrap yard or go to prison, judge says



Joe Cooper, 65, stands in court with his attorney Gary Levine ahead of his sentencing. *(Ida Lieszkovszky, NEOMG)*

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By Ida Lieszkovszky, Northeast Ohio Media Group
Email the author
on June 02, 2015 at 1:56 PM

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Email

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CLEVELAND, Ohio – A Cleveland man accused of running an illegal scrap yard received a chance Tuesday to avoid 10 years in prison and a $50,000 fine by clearing his property of cars, tires, asbestos and other material.

Investigators took dozens of photos of the 25,000 square foot property belonging to Joe Cooper.

Ida Lieszkovszky, NEOMG

At a sentencing hearing, Cuyahoga County Common Pleas Judge Steven Gall said property owner Joe Cooper has until Sept. 8 to at least produce a cleanup plan that includes the asbestos that permeates the soil.

"Nobody's better off because you're in prison, nobody's better off because you're $50,000 light in the pocket," Gall said. "Everybody's better off when this property is taken care of. However, it needs to be done."

SPOTLIGHT: COURT CASES

Rape Kits Investigation

Cuyahoga County in Crisis

"Nobody's better off because you're in prison, nobody's better off because you're $50,000 light in the pocket," [Judge] Gall said. "Everybody's better off when this property is taken care of. However, it needs to be done."

Site IS History

Existing Conditions

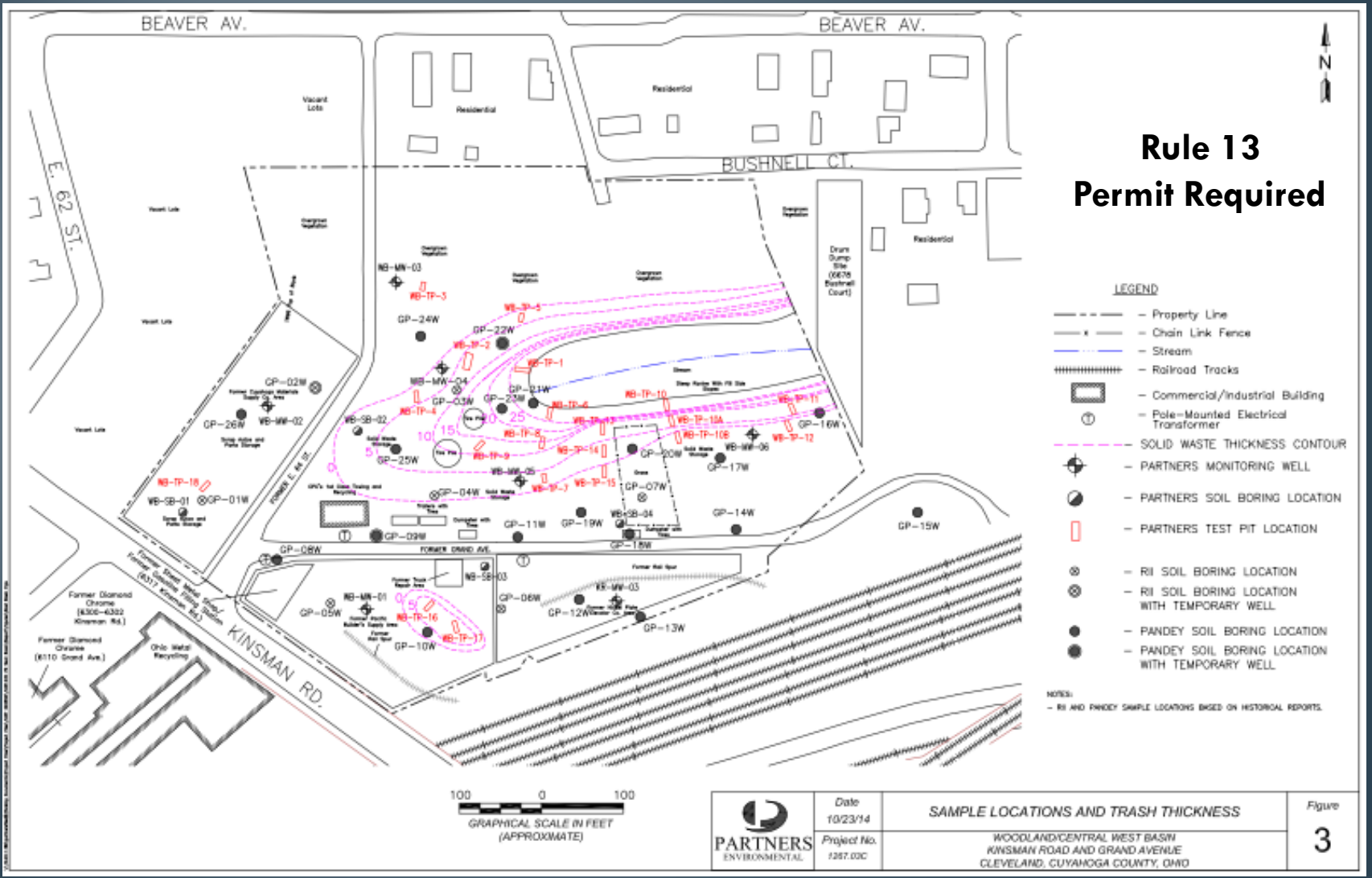
- Site and Wetlands filled with:
  - Scrap materials and tires
  - Demolition debris
  - Solid waste
  - Industrial waste

- Contaminants of Concern:
  - Polynuclear aromatic hydrocarbon (PAH) compounds
  - Lead
  - Polychlorinated Biphenyls (PCBs)

Existing Conditions

Existing Conditions

Existing Conditions



Existing Conditions

Analysis of Cleanup Alternatives

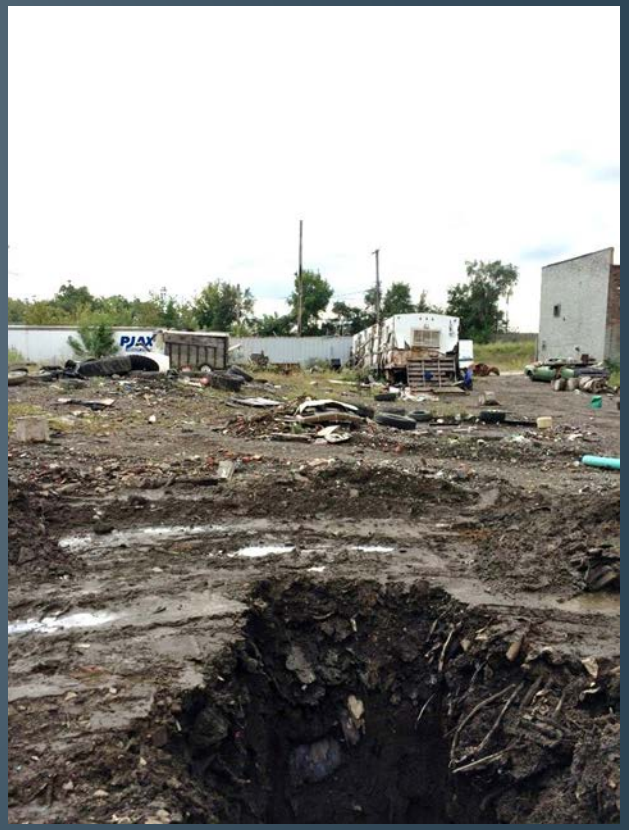
Minimal Action

- No additional solid waste/trash would be excavated or removed from beyond the perimeter or bottom of the planned basin in this alternative.
- This alternative would not be effective at reducing the toxicity, mobility, or volume of solid waste/trash and would leave solid waste in place.
- Cost approximately $320,000.

Analysis of Cleanup Alternatives

Complete Cleanup

- Excavated solid waste/trash fill layer would be properly disposed off-site at a landfill.
- Solid waste/trash on the surface of the areas outside the basin footprint would also be removed and properly disposed off-site at a landfill.
- Reducing the volume of solid waste/trash at the Property, but the entire volume of solid waste/trash removed from the Property would merely be relocated to an off-site landfill.
- Cost approximately $1,100,000



Analysis of Cleanup Alternatives

Modified Cleanup Solid Waste/Trash Separation

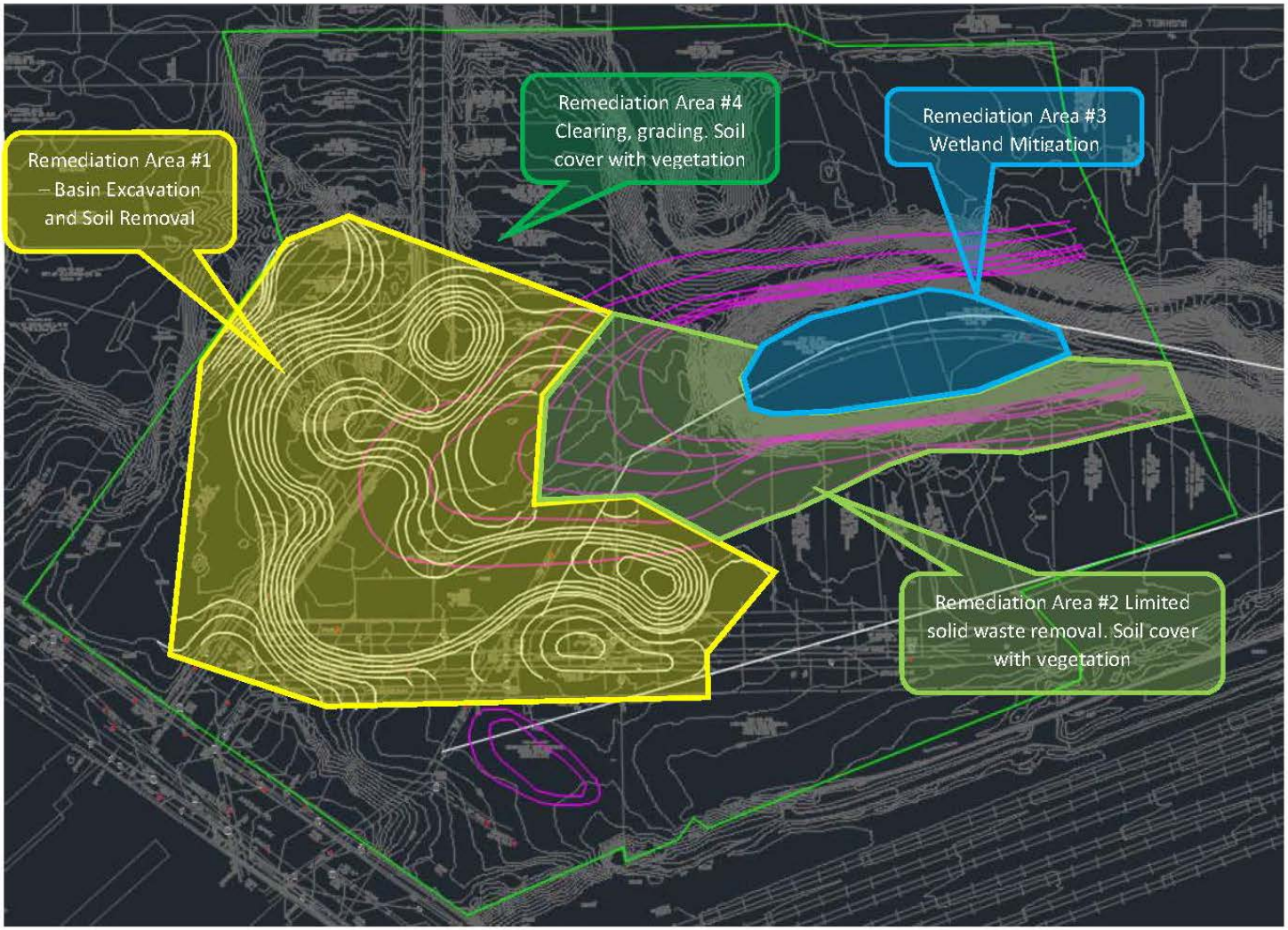
- Excavated solid waste/trash fill layer would be sorted to separate the tires, solid waste/trash materials, recyclables, and soil.
- The surficial solid waste/trash would be excavated to a depth of two (2) feet in the areas outside the basin footprint and sorted/disposed.
- All of the sorted material will be properly disposed off-site at a landfill or recycled.
- This alternative would be effective at reducing the volume of solid waste/trash and would render the Property safe for its intended future use.
- Cost approximately $750,000

Modified Cleanup

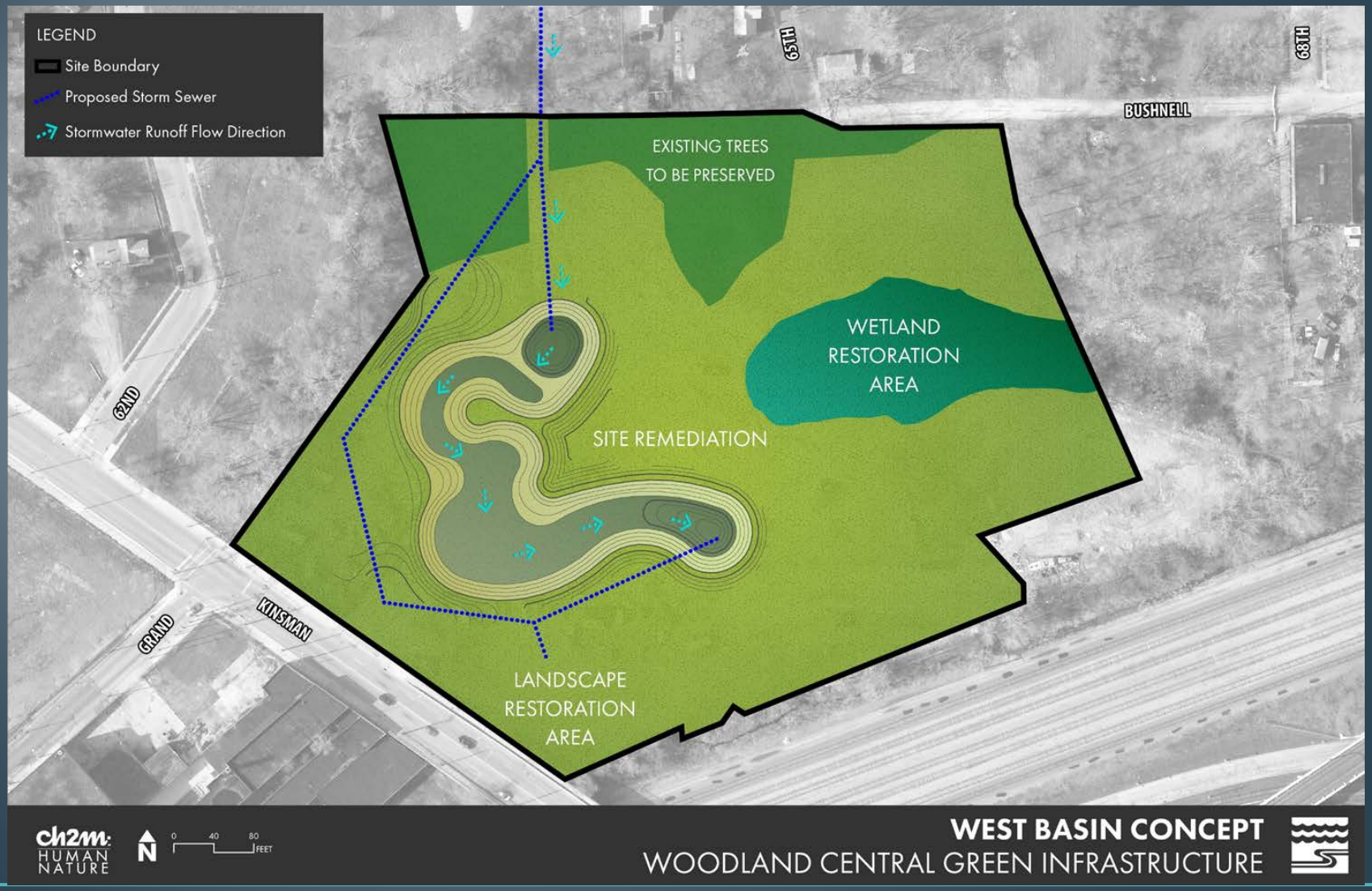
- Removal of "hot spots" for lead, PCBs and PAHs
- Removal/Recycling of trash
- Cover remaining buried solid waste
- Restore Wetland

Site Meets Recreational Use Standards

Environmental Remediation Zones



Modified Cleanup



Brownfield Cleanup Grant Funding

Brownfields 2015 Cleanup Grant Fact Sheet

Northeast Ohio Regional Sewer District, Cleveland, OH

EPA Brownfields Program

EPA's Brownfields Program empowers states, communities, and other stakeholders to work together to prevent, assess, safely clean up, and sustainably reuse brownfields. A brownfield site is real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. In 2002, the Small Business Liability Relief and Brownfields Revitalization Act was passed to help states and communities around the country cleanup and revitalize brownfields sites. Under this law, EPA provides financial assistance to eligible applicants through four competitive grant programs: assessment grants, revolving loan fund grants, cleanup grants, and job training grants. Additionally, funding support is provided to state and tribal response programs through a separate mechanism.

Cleanup Grants

$400,000 for hazardous substances

EPA has selected the Northeast Ohio Regional Sewer District for two brownfields cleanup grants. Hazardous substances grant funds will be used to clean up the Bioretention Basin property at 6417-6429 Grand Avenue and 2696-2700 East 65th Street in Cleveland, and the Greenspace property at 6507-6517 Grand Avenue in Cleveland. Both properties were historically developed with residential buildings, with portions used as a salvage material yard. They are both contaminated with polynuclear aromatic hydrocarbons and metals. Grant funds at both sites also will be used to conduct community involvement activities.

Contacts

For further information, including specific grant contacts, additional grant information, brownfields news and events, and publications and links, visit the EPA Brownfields Web site (http://www.epa.gov/brownfields).

EPA Region 5 Brownfields Team
(312) 353-8827
EPA Region 5 Brownfields Web site
(http://www.epa.gov/region5brownfields/)

Grant Recipient: Northeast Ohio Regional Sewer District
(216) 701-4593

The information presented in this fact sheet comes from the grant proposal; EPA cannot attest to the accuracy of this information. The cooperative agreement for the grant has not yet been negotiated. Therefore, activities described in this fact sheet are subject to change.

Success

Success

- Stop illegal dumping.
- Provide CSO capture.
- Remove solid waste and "hot-spots."
- Improve socioeconomic conditions.
- Available for recreational use.
- Wetland restoration.
- Reforestation including native meadow vegetation.
- Stabilize disposal areas.

Questions

Robin Halperin

Manager of Regulatory Compliance

Northeast Ohio Regional Sewer District

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Cleveland, Ohio 44115

216.881.6600

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440.248.6005

dbrown@partnersenv.com