Lower Euclid Creek Greenway Plan

Prepared by

Cuyahoga County Soil & Water Conservation District

In cooperation and support from

URS

Cuyahoga County Planning Commission
Cleveland Metroparks
Northeast Ohio Regional Sewer District

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EXECUTIVE SUMMARY

Historic development practices often overlooked Euclid Creek and failed to capitalize on this valuable asset. The purpose of this study is to assess the feasibility of a greenway in the Lower Euclid Creek, including trail and riparian restoration opportunities.

Feasible and fundable trail and riparian restoration projects are listed below.

1. Identification of preservation opportunities for over 4000 LF of stream corridor through Euclid Central School, and the Nottingham Water Plant.

2. Identification of a feasible route for an 8500 LF off road trail from Euclid Creek Metroparks north to St. Clair Avenue intended to provide a safe, tranquil, naturalized trail experience.

3. Identification of a feasible route for a roadside trail from St. Clair Avenue north to Lakeshore Boulevard, linking to Wildwood State Park.

4. Creekside trail development projects should integrate stabilization and restoration of Euclid Creek banks.

5. Identification of a several restoration opportunities in the oxbow area and at the mouth of Euclid creek to restore estuary functions and spawning grounds to dramatically enhance aquatic habitat, increase fish populations and species diversity for both Euclid Creek and the nearshore zone of Lake Erie through restoration of approximately 3 acres of wetland habitat, eradicate a severe invasive species infestation, and improve water quality filtration.

6. Installation of step pool structures at the East 185th interchange to remove a barrier to fish passage upstream into Euclid Creek Reservation.

7. Identification of numerous programmatic interpretation opportunities which may be incorporated into trail design projects. These opportunities include the estuary history, historic piers, and bridges, public education regarding urban watershed topics, urban water supply, as well as provide a land lab site adjacent to Euclid Central School.

8. Redevelopment opportunities adjacent to Euclid Creek at Lakeshore Boulevard and the I-90/E 185th interchange.

9. Restoration of the concrete channel south of Lakeshore Boulevard will require additional watershed studies to assess alternatives to significantly reduce flood flows in the watershed.

Cost estimates and potential funding sources are enclosed to provide an action plan for implementation of the Lower Euclid Creek Greenway projects.

Greenways are a low cost means to provide numerous ecological, economic, and aesthetic benefits to urban watersheds. In a built out urban neighborhood such as the Euclid Creek corridor, formation of a greenway is one of the few strategies capable of producing a transformational effect to increase the desirability of a neighborhood and improve Euclid Creek. It is hoped that implementation of the strategies recommended in this report will provide a demonstration of watershed restoration potentials over the entire 24 square mile Euclid Creek watershed. Building on the unique natural assets of Lake Erie and Euclid Creek thereby improves the competitive status of the Cleveland metropolitan region in a highly competitive national economy by providing healthy and green communities.

INTRODUCTION

Lower Euclid Creek Project Area

The Lower Euclid Creek Project Area is located on the east side of Cleveland and the western portion of the City of Euclid. It encompasses approximately1500 acres of land and 3 miles of stream. The Lower Euclid Creek Watershed is highly developed, and is crossed by several major transportation corridors, I-90, as well as major Conrail, and Norfolk Southern railroad tracks. Impervious cover estimated at over 25%. The project area begins at the northern end of Cleveland Metroparks Euclid Creek Reservation, south of Euclid Avenue, and continues north parallel to Dille /Nottingham Road until it reaches Wildwood State Park, north of Lakeshore Boulevard, where Euclid Creek empties into Lake Erie. The project area consists of the Cleveland Neighborhoods of North Collinwood and Nottingham as well as the City of Euclid's western commercial district and adjacent neighborhoods of Euclid-Green.

Figure 1.0 LOCATION OF THE LOWER EUCLID CREEK

Purpose of the Plan

The purpose of this plan is to assess the feasibility of a greenway including a trail and riparian restoration The plan is to include:

- a trail alignment from Wildwood State Park to the Cleveland Metroparks Euclid Reservation north entrance to expand recreational opportunities,
- concepts for ecological restoration and conservation that provides habitat re- introduction opportunities and facilitates storm water management needs,
- programmatic opportunities for stewardship and interpretation, and
- neighborhood enhancement and connections opportunities.

The resulting document is intended to provide an action plan for funding and implementation of feasible projects in the Lower Euclid Creek Greenway.

Planning Process

This plan advances the past conceptual planning efforts by various entities, including:

- Cuyahoga County Greenprint, 2004
- Euclid Creek Watershed Action Plan, 2006
- Euclid Creek Watershed Planning Guide, 2005
- St. Clair Avenue Revitalization Plan, 2002

This plan provides a critical step in the planning process to determine feasibility of these concepts and to establish next steps towards implementation of the recommendations that will benefit the residents and the natural resources of the Lower Euclid Creek.

Other Studies contributing to the recommendations include the Northeast Ohio Regional Sewer District DRAFT RIDE Study, of 2004, the Section 205 Local Flood Control Project, Euclid Creek, OH., Army Corps of Engineers, Buffalo District, 1983 and Images of

Figure 2. PROJECT STUDY AREA

America Euclid Creek, Roy Larick with Bob Gibbons and Edward Siplock, 2005.

The Cuyahoga SWCD established a Community Advisory Team of local agencies and local community representatives.
With funding assistance from Ohio Department of Natural Resources, Coastal Management Assistance Grant and support form Cuyahoga SWCD, Cleveland Metroparks, Northeast Ohio Regional Sewer District and Cuyahoga County Planning Commission, URS was selected to assist with the development of the plan.

This plan is a compilation of the work developed by URS and the guidance and recommendations provided by the Community Advisory Committee.

Public Involvement Process

To further seek input from the local community, three public meetings were conducted within the process. Two meetings focused on input from local residents on the proposed plan and the third meeting presented the draft plan to the Euclid Creek Watershed Council.

Public Meeting,
Tuesday, April 18, 2006 at Memorial-Nottingham Library, Cleveland, Ohio.

Public Meeting,
Thursday, May 4, 2006 at Euclid Central School, Euclid, Ohio

Watershed Council Meeting,
Thursday, May 18, 2006 at South Euclid City Hall

Why the Focus of Lower Euclid Creek Guiding Principles

It's the Coast

Euclid Creek has a unique value not found anywhere in Cuyahoga County and rarely available across the Ohio coastline; Access to Lake Erie. This access has its own economy of charter fishing, boating, fishing and swimming. The mouth of Euclid Creek was at one time an estuary where fish spawned and found refuge from its nearshore Lake Erie waters as well as used as a resting spot before heading upstream into the upper reaches of Euclid Creek. This project begins the conversation of revitalizing the estuary for economic purpose. Old Woman Creek in Huron and Arcola Creek in Lake County are active estuaries. The Euclid Creek estuary can be re-established that brings our native fish back and welcomes a destination for a recreational fishing economy within a highly populated region of the state.

Bridging Greenspace in the City

The Lower Euclid Creek Corridor is fortunate to have two anchor greenspaces of Wildwood State Park and Cleveland Metroparks Euclid Creek Reservation for residents to use. The local neighborhoods have an opportunity to expand their connection to greenspace by linking these two spaces together. Urban areas throughout the country are devoid of greenspace and a connection to natural systems in their community. How can we value the assets of Lake Erie and it's streams, if we can not see it, touch it and use it? Greenspace is an essential component to the livability of a City and Euclid Creek can be an essential component to the local residents to utilize.

Providing Human Health Benefits

Increasing access to trails for passive recreation can provide a benefit to improving the health of the watershed's citizens that live here. Studies have shown connection to greenspace can also lend to creativity and development in children. Residents both young and old will reap human health benefits by enhancing access to greenspace for their enjoyment and use.

Residents can be provided the opportunity to experience the outdoors and natural resources within their own neighborhood. Also areas where the corridor is directly accessible to places such as Euclid Central and other schools, the corridor can provide a number of outdoor activities that can correlate with curriculum and extra curricular activities. Activities such as cross-country practices, land labs, and hands-on learning for a variety of curricula can occur. The wellness of both body and mind for children and adults is a direct benefit to the community through the enhancement and expansion of greenway opportunities in the Euclid Creek corridor.

Celebrate our History

The Lower Euclid Creek Corridor has a rich history and heritage of the past and present. Remembering where we have been can educate our younger residents a lot about the place they live and what their place in that history can be. As the establishment of the Euclid Township nears its Bi-Centennial, the corridor can play a key role in sharing this heritage.

What's our Footprint for the Future

As with many of the streams in Cleveland and Euclid, Euclid Creek has seen better days. As we look to the future of living in the City, we must examine what our footprint on the land will be. Examination of how to maintain and increase human population while putting a softer footprint through more trees, best practices and hands-on stewardship is a great potential result of this project. Climate Change in the Great Lakes will continue to influence our coastal areas through water level changes and Euclid Creek stands to provide an opportunity to prepare for these changes and provide safe and green places to live in the City.

Benefits of Urban Greenways

An urban greenway has much to offer: providing flood relief, water quality, supporting native species, maintaining natural ecological processes, improving air quality, offering recreational linkage opportunities, as well as providing a very valuable aesthetic asset. Open space protection in a built out watershed becomes especially critical to preserve the remaining ecological functions of the watershed.

Preservation and enhancement of riparian buffer vegetation is a low cost means to provide numerous benefits in urban watersheds: stream bank stabilization, increases pollutant removal, preserves wildlife habitat, reduces stream warming, and improved property values

Historical development practices often overlooked Euclid Creek and failed to capitalize on this valuable asset. Urban open space has a measurable value. Recent surveys in the Minneapolis area indicate that almost two thirds of urban residents would pay between 10% and 25% more for properties within walking distance of open space. There are numerous examples in the Cleveland metropolitan area which demonstrate that properties adjacent to open space typically are worth 25% or more than surrounding properties.

Format of Assessment and Recommendations

The plan is formatted to provide information at a neighborhood level and by section of the greenway area. The Greenway project area has been divided into five sections to examine opportunities at a neighborhood scale.

Section 1: Lake Erie/Wildwood State Park to Lakeshore Boulevard

Section 2: Lakeshore Boulevard to Villaview Road/I-90

Section 3: I-90 to St. Clair Avenue

Section 4: St. Clair Avenue to Euclid Avenue

Section 5: Euclid Avenue to Cleveland Metroparks Euclid Reservation Highland Picnic Area

Each of these sections is reviewed for trail and greenspace areas, neighborhood connections, community development and stream and coastal restoration.

HISTORY OF THE LOWER EUCLID CREEK

The history of the Lower Euclid Creek area mirrors the history of Cleveland.

In 1796 members of the Moses Cleveland survey party, were the first to explore and survey Euclid Creek. The first permanent settlers in Euclid Creek were the members of the David Dille, Jr. family in 1803.

Three natural features drew settlers to Euclid Creek. First, waterfalls on the main and headwater branches provided power for numerous mill sites, which processed wood and grain. Second, the Cleveland-Buffalo Road crossed Euclid Creek at a deep chasm. Businesses catering to waiting stage coach travelers thus grew at Euclid Creek villages. Third, with its lake access, the Euclid Creek estuary saw the earliest industrial development. Pilings installed in the mouth, estuary area for shipyard. By 1820 clay was being imported to establish a stoneware kiln and, by 1840, a significant boatyard was launching schooners up to 400 tons. The estuary's port era lasted from 1830 to 1865.

In 1852 the CP&A Railway constructed a railroad bridge of native bluestone over Euclid Creek. Bluestone became a prime export, and the watershed's tempered climate produced exportable table fruit and wine. By 1868 a winery was setup on Chardon Hill, and several vineyards followed.

After the Civil War, the CP&A gave wealthy Clevelanders a means to seek summer refuge along Lake Erie. Camp Gilbert, a country resort, was constructed at the mouth of Euclid Creek in 1867. In 1874 the Ursuline Sisters purchased Camp Gilbert to become Villa Angela, a boarding academy for girls.
In 1881 the Norfolk Southern railroad was constructed parallel to the CP& A. Euclid Beach Park was constructed in 1895, the second electrified amusement park in US.

In 1917, the Cleveland Metropolitan Park Board purchased the

west branch of the gorge lands to create the Euclid Creek Reservation. Around 1910 CCC set up camp in Euclid Creek Metroparks. Cleveland's "Grand Canyon" is most used park in the Cleveland Metroparks system.

Initial construction of the Nottingham water plant occurred in the 1920s to supply the rapidly growing eastern suburbs. Manufacturing along the railroad lines in the watershed peaked during the post war era. Accompanying the manufacturing boom were the construction of thousands of bungalows and ranches in the late 1940s and 1950s.

One effect of historical watershed development was the removal of many meander bends of Euclid Creek as seen on Figure 1, a historical map of the Euclid Creek watershed. Interstate 90 was constructed in 1961. Its construction wiped out the Nottingham meander of Euclid Creek and constructed a low head spillway at the East 185th interchange to lower the elevation of Euclid Creek to convey flow in a triple barrel culvert under the interstate.

Severe flooding along Euclid Creek occurred four times in 1975 and on a more limited basis for the following decade. The most significant flood damage was concentrated in the vicinity of Lake Shore Boulevard where existing residential and commercial developments encroached into the floodplain.

In 1982 the former Euclid Beach Amusement Park, along with the former Villa Angela area became part of the Cleveland Lakefront State Park.

In response to these severe flooding episodes, Cleveland officials requested the Army Corps of Engineers assistance in alleviating the flooding, erosion, and water quality problems. After a study of numerous alternatives, the Corps of Engineers constructed a flood control project in 1988 to provide 100 year flood flows, construction of a flood levee to protect nearby homes, and straightening of the Euclid Creek channel in Wildwood State Park.

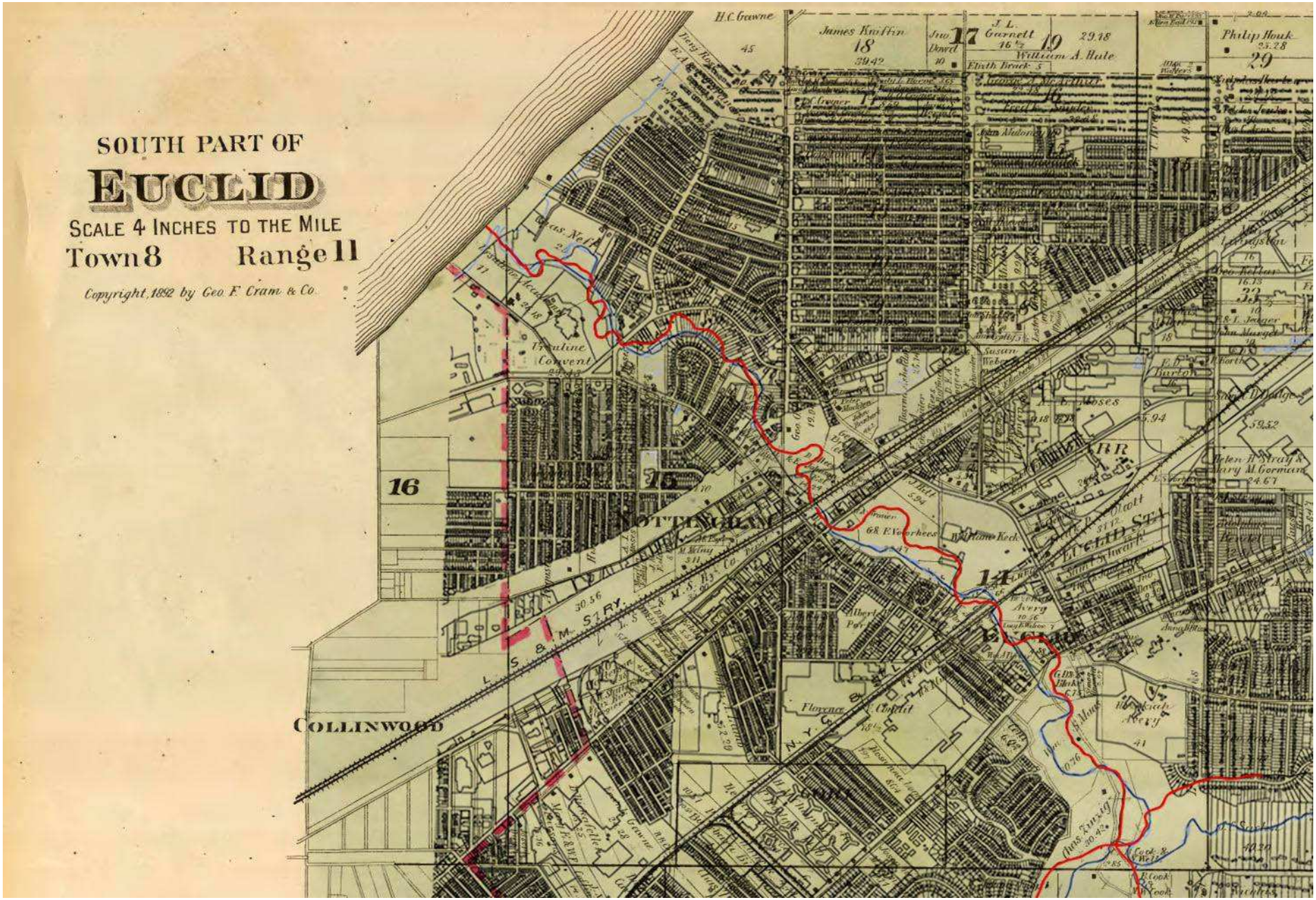


Figure 3: Historical Map of Lower Euclid Creek Watershed

PROJECT GOALS

To assess the feasibility of a greenway in the Lower Euclid Creek Watershed, goals were set to guide the assessment in deriving alternatives and recommendations.

Setting Goals

The goals were established with input from the Community Advisory Team and comments from the Public Meetings held.

Develop a Greenway corridor connecting Wildwood State Park with the Euclid Creek Metroparks Reservation.

Objectives

- Maximize neighborhood linkages to Lake Erie and Euclid Creek where feasible.
- Ensure safe routes and minimization of conflicts with pedestrian and auto circulation.
- Create Economic Redevelopment Opportunities that complement the creek's assets to the community and neighborhood.
- Increase Recreational Fishing opportunities.
- Protect and restore Euclid Creek's ability to manage storm water and be ecologically healthy.
- Celebrate the Cultural and Natural history of Euclid Creek.

Community Overview

The Lower Euclid Creek community has always been one of the most viable neighborhoods in the City of Cleveland and Euclid. The cities share the most industrial land acreage in the Euclid Creek Watershed and maintain a viable economy for their communities with the concentration of businesses. Its proximity to the highway and major thoroughfares and two major railroad routes and the adjacent Collinwood Yards continues to place the Lower Euclid Creek as a highly competitive location to conduct business. The Cities also share the East 185th Commercial District that has always been a strong retail corridor for both communities.

Between these industrial and commercial uses, neighborhoods exist that are family oriented due to the proximity of numerous schools in the community.

Its population, although declining, remains the highest in the Euclid Creek watershed and one of the densest in the Ohio Lake Erie Basin. In 2000, total population of the project area consisted of 9,852 residents which equates to 3,746 residents per square mile of the project area. This concentration of people has placed a burden on the Lower Euclid Creek as development in the past encroaches on the Creek and its viability. This high population concentration also can contribute an opportunity to provide access to the coastal region and Euclid Creek to a large amount of people within a very small area. Appendix G provides a general demographic analysis of the project area.

Connecting a population to additional greenspace will enhance the livability of their neighborhoods and increase the value of their homes due to the proximity to the coast and natural resource amenities.

The Lower Euclid Creek area will continue to maintain its neighborhoods and other land uses through preservation of existing areas and redevelopment of other areas. The maintenance of these neighborhoods and corridors can directly benefit to the enhancement of greenspace and creek improvements as the community looks to the comprehensive planning goals for development in the area for the future.

LOWER EUCLID CREEK GREENWAY TRAIL PLANNING SUMMARY

Project Goals

This planning study assessed the feasibility of constructing an all purpose trail connecting Euclid Creek Reservation to Wildwood State Park through the highly urbanized North Collinwood neighborhood. Benefits of the proposed trail are anticipated to include:

- increased linkages to recreation facilities,
- increased physical fitness opportunities,
- opportunities for interpretive topics,
- increased stream corridor protection,

The proposed trail corridor is approximately 12,600 lineal feet or 2.4 miles long as the crow flies and will serve a population of 20,000 ? within a 5/10 minute radius.

Trail Planning Guidelines

Every effort was made to identify a feasible off road (Class I) trail route adjacent to Euclid Creek in order to:

- maximize trail safety away from traffic hazards,
- provide a tranquil, enjoyable trail experience,
- increase public access to the natural creekside setting,
-

Where a creekside route was not feasible, a roadside (Class II) trail route was identified. Where a roadside route was not feasible, an on road (Class III) bike route was identified on low traffic volume streets.

Trail use is envisioned as dawn to dusk, therefore lighting of trails is not anticipated.

Bank stabilization and riparian enhancement is envisioned as incorporated into design of trail segments.

Trail Route Assessment Matrix

A variety of trail route alternatives were identified. Each trail route alternative was walked in the field, photographed, and assessed against a number of criteria, including:

- whether the route was on public property or on private property, potentially requiring acquisition,
- number of driveway crossings,
- number of street crossings,
- on street vs. off street,
- high visibility or low visibility locations,
- traffic speed and volume of adjacent roadways.

Safety factors such as the number of driveway and street crossings, and traffic volume were given primary emphasis in route assessment. Application of these criteria resulted in selection of Neff Road underpass route, selected due to lower traffic volume, and fewer driveways and ramps to cross.

Trail Option	Trail Description	# of Parcels	Public/Private	# of Driveways	# of Crosswalks	OnStreet/Offstreet	Trail Visibility (Safety)	Average Speed of Adjoining Streets
	Section 1:							
	North:Wildwood State Park **West**: Euclid Beach				**South**: Lakeshore Blvd. **East**: Neff Rd.			
1-A	Existing Trail traversing through Wildwood State Park from the Lake to Lakeshore Blvd.	1	Public	0	1	OFF	HIGH	10
1-B	Expand existing sidewalk along Neff Rd.	0	Public	5	2	ON	HIGH	25
	Section 2:							
	North: Lakeshore Blvd. **West**: Nottingham Rd.				**South**: Villaview Rd. **East**: Neff Rd.			
2-A	Expand existing sidewalk along Nottingham Rd.	0	Public	15	4	ON	HIGH	25
2-B	Expand existing sidewalk along Nottingham Rd. until southern entrance to ballfields (private property), travel along top of channel berm (private property)	23	Private	0	0	ON/OFF	HIGH/LOW	20
2-C	Travel through the existing parking lot of apartments, then on top of channel berm, travel through private property to a widened existing sidewalk Marcella Rd. then travel onto north or south onto E. 185th on a widened existing sidewalk, then onto Neff Rd. or E.185th south	46	Private	1	0	OFF	LOW	0
2-D	Expand existing sidewalk along Marcella Rd., expand existing sidewalk along E185th, travel north or south to Neff Rd. or e185th south.	0	Public	46	1	ON	HIGH	30
2-E	Expand existing sidewalk along Neff Rd.	0	Public	55	3	ON	HIGH	30
	Section 3:							
	North: Villaview Rd. **West**: Nottingham Rd.				**South**: St. Clair Ave. **East**: Neff Rd.			
3-A	Expand existing sidewalk along Villaview Rd. west to existing bike bridge (minor repairs to bridge required), expand existing sidewalk along Lanken Rd., joining E. 185th	0	Public	6	3	ON/OFF	HIGH	20
3-B	Expand existing sidewalk along the western side of E.185th St., expand sidewalk and reconstruct existing underpass	0	Public	3	4	ON	HIGH	30
3-C	Expand existing sidewalk along the eastern side of E.185th St., expand sidewalk and reconstruct existing underpass	0	Public	3	3	ON	HIGH	30
3-D	Expand existing sidewalk along Neff Rd.	0	Public	2	0	ON	HIGH	25
3-E	Use 3-A, 3-B OR 3-C alignment until Lanken Ave, traverse to eastern side of E. 185th, build a new rail underpass, connect with St. Clair Ave across from Fire Station	1	Private/Public	4	3	ON/OFF	HIGH	15
3-F	Use 3-A, 3-B OR 3-C alignment until Lanken Ave, traverse to western side of E. 185th, create new adjoining trail along Old Nottingham Rd., install new pedestrian bridge crossing over rail lines, connect with new adjoining trail along Old Nottingham Rd., connect with intersection of St. Clair Ave and E. 185th.	4	Private	0	0	OFF	LOW	0

Trail Option	Trail Description	# of Parcels	Public/Private	# of Driveways	# of Crosswalks	OnStreet/Offstreet	Trail Visibility (Safety)	Average Speed of Adjoining Streets
	Section 4:							
	North: St. Clair Ave. **West**: Nottingham Rd.				**South**: Euclid Ave. **East**: Chardon Rd.			
4-A	Expand existing sidewalk along Nottingham Rd. (1 at grade rail crossing)	0	Public	46	3	ON	HIGH	25
4-B	Create new trail along creek through Nottingham Water Treatment Facility, create floating trail under existing rail bridge, create new trail along creek through Euclid Memorial Junior High School	3	Private/Public	2	0	OFF	LOW	0
4-C	Expand existing sidewalk along Chardon Rd. (1 at grade rail crossing)	0	Public	15	2	ON	HIGH	25
	Section 5:							
	North: Euclid Ave. **West**: Nottingham Rd.				**South**: Euclid Creek Res., Heritage Picnic Area Ent. **East**: Chardon Rd.			
5-A	Expand existing sidewalk along western Nottingham Rd., after existing northern creek bridge go off-road into park, create a new trail bridge across creek, create new trail to parking lot	1	Public	0	1	ON/OFF	HIGH/LOW	20
5-B	Expand existing sidewalk along eastern Nottingham Rd.,cross Nottingham with new crosswalk and traffic signalization, create new trail to parking lot	0	Public	0	2	ON	HIGH	35
5-C	Create new trail through park along creek, crossing under existing northern creek bridge, create a new trail bridge across creek, create new trail to parking lot	1	Public	0	1	OFF	HIGH	0

Lower Euclid Creek Greenway
Trail Planning Summary

The largest physical obstacles to planning feasible trail routes are:
- underpasses at two major east/west rail lines,
- lack of a trail easement along the concrete channel west of Marcella Road.

The proposed trail route follows Euclid Creek as much as possible, for 65% of its length. The trail turns 2000 LF east to utilize the Neff road railroad underpass, considered a safer alternative than the Nottingham underpass due to lower traffic volume, fewer freeway ramps, and fewer driveways.

The remaining 35% of trail route is proposed as a combination of Class II routes along Neff, Villaview and E. 185th, and Class III bike routes on Marcella Road, utilizing bike route signs but no traffic lanes

Trail Crosswalks

The proposed trail requires crosswalk improvements at major streets including:
- Euclid Avenue, existing signal in place,
- St Clair/Neff, existing signal in place,
- E 185th/Villaview, existing signal in place,
- Lakeshore Boulevard requires new caution signal.

It is anticipated that intersections with existing signals will require cross walk upgrade and signal timing improvements to improve user safety.

Trail Structures

The proposed trail route requires new trail structures at:
- refurbishment of the Neff road underpass, improved signage, lighting,
- new pedestrian bridge under the existing Norfolk Southern railroad bridge north of Euclid School,
- modification of the paved slope under the Highland Road bridge to permit a trail underpass in Euclid Creek Reservation,
- a new trail bridge crossing Euclid creek in Euclid Creek Reservation,

Property/Easement Acquisition Requirements

Acquisition is required for approximately 40% of the proposed trail route. The proposed trail route requires route acquisition at the below locations:

Euclid Central School,	2.5 acres
Norfolk Southern Railroad	1.0 acre
Nottingham Water Plant	17 acres

All other route locations are under public ownership by Cleveland Metroparks, City of Cleveland ROW, ODOT ROW, or ODNR

LOWER EUCLID CREEK GREENWAY ECOLOGICAL RESTORATION PLANNING SUMMARY

Project Goals

This planning study assessed the feasibility of ecological restoration projects in the Lower Euclid Creek corridor, approximately 12,600 lineal feet or 2.4 miles long.

Aquatic Habitat Assessment

An Aquatic Habitat Assessment was conducted by Mr. Roger Thoma, formerly chief Aquatic Biologist for OEPA, in August 2006. Summarized below are his findings.

The physical/hydrologic setting of Euclid Creek's lower reaches offers numerous opportunities for environmental improvements. Three major hydrologic functions have been modified in the area. A dam exists near the mouth of the creek, which has disrupted the connection of the lower waters with the upper portions of the system. Wetlands, which normally exist at the mouths of Lake Erie tributaries, have been filled or otherwise modified in ways that have eliminated their connectivity with the Lake and land. Lastly, a breakwater constructed at the eastern end of Euclid Beach is preventing the natural function of barrier beach formation at the stream mouth. All three hydrologic modifications are having dramatic effects on Euclid Creek's biological community. This section provides a discussion of those system alterations, their impacts, and the possible remediation that could be implemented to correct them.

Dam

Situation: The obstruction created by the dam has disconnected the upper watershed from fish and amphibian species that enter the system from Lake Erie during their migrations. In addition, it has eliminated the winter/drought refuge provided by the lower mouth area, resulting in the loss of fauna and a depauperate fish community above the dam.

Solution: To correct the impairments created by the dam a fish passageway is needed. Elimination of the dam is not required, as sufficient room exists on the downstream side to construct a low flow side channel between the dam and the highway culverts. This channel will need to contain riffles and pools in a format that allows passage of both small and large fish, weak swimmers and strong swimmers. To achieve such a channel large boulder and cobble should be place to create a riffle/pool complex every six feet. Interstices should be filled with sand and gravel to create a bottom more habitable to small fishes and darters. Concrete walls and sills will be needed to hold the new substrate in place.

Concrete channel

Situation: Further exasperating the dam issues is a one-mile stretch of streambed downstream that has been concreted on both its sides and bottom. This also has eliminated potential winter and drought refugia thru loss of the natural riffle pool complexes that normally provide deep-water areas. In addition it creates a velocity barrier for many migratory fish species. The lack of bottom roughness (a physical streambed trait needed by weaker and smaller fish species) is preventing many species from ever reaching the dam on Euclid Creek. Currently only the strongest swimmers such as trout, suckers, and smallmouth bass can migrate up to the dam area. Once there, though, they cannot breach the dam.

Two additional impacts resulting from a lack of riparian created by cementing the stream banks are occurring to Euclid Creek's water quality, solar warming of the stream's waters and elimination of nutrient removal by tree roots. The warmer more nutrient rich waters are then impacting the system by promoting the growth of excess algae in the downstream lacustuary portions of the system.

Solution: Correction of these problems can be obtained by continuing the low-flow channel concept through the cemented portions of Euclid Creek. The channel can be designed to avoid impeding flood control attributes of the current structure by setting the low-flow channel deeper than the current streambed.

Wetlands

Situation: The loss of near Lake wetlands has negatively impacted numerous open lake and near shore fish, amphibian, reptile, and bird species by eliminating feeding, winter refugia, and nesting habitat. The nature of the area's modifications is such that the transitional zone from land to water is now missing. This is the habitat in which shallow water and its associated emergent plant life, amphibians, and young-of-year fish are found. The areas around the old oxbow and downstream to the stream's mouth currently provide excellent opportunities to reestablish this vital lacusturin habitat. Any restoration of Euclid Creek's wetland habitat will create positive results for numerous members of the previous mentioned species groups. Of greatest importance is the creation of nursery areas for young-of-year fishes that provide refuge from adult fish predators.

Solution: Shallow (6-12") sloping areas up to 6' wide should be created on all stream margins, where feasible. Native aquatic plants such as arrowroot, pickerelweed, and other emergent species should be planted in the newly created shallow water areas. Invasive cattail, phragmities, and purple loosestrife should be suppressed.

Barrier beach formation

Situation: Almost all Lake Erie tributary streams historically experienced the formation of barrier beaches at their mouths during the summer months of the year. Formation of these barriers played an important roll in the nursery functions of these tributaries by holding back young-of-year fishes until heavy rains and high waters breached the barriers thus releasing the young at a latter date and in a large group. This phenomenon enhances the survival of young fishes as they enter the Lake. Currently a breakwater is preventing the development of a barrier beach at the mouth of Euclid Creek.

Solution: An opening at the landward side of the breakwater at the east end of Euclid Beach would allow sand to flow into the area west of the Wildwood State Park Marina breakwater.

Summary

Reestablishing a barrier beach function in conjunction with wetland and nursery area creation, and reestablishment of upstream connectivity thru dam removal and modification of the cemented portions of the stream would greatly enhance fish spawning activity and success. This, in turn, would make Euclid Creek a positive contributor to Lake Erie's biological and chemical integrity.

Fish community benefits

Common fish species that would benefit most from the above work would be northern pike, smallmouth and largemouth bass, yellow perch, and numerous sucker species. Rare species such as spotted gar, pugnose minnow, pugnose shiner, blackchin shiner, blaknose shiner, and lake chubsucker could also benefit from these habitat improvements. It is likely such species would have to be actively reintroduced to the area. The USGS GAP program can be employed to develop a list of potential species for reintroduction to the system. Numerous other species of smaller fish such as sunfish, catfish, minnows, and darters would benefit from the individual improvements in Euclid Creek's habitat and contribute to the biological health of the upper reaches of the system.

It is unlikely full attainment of Ohio EPA biological criteria for the Euclid Creek basin can be achievable without improvements in habitat quality in the lower portion of the system. The benefits provided by a healthy, functioning lacustuary connected to the upper watershed cannot be over stated and are a vital component of the stream's rehabilitation. Many of the species that benefit from such habitat improvements are species of interest to the fishing public and better fishing opportunities will be created.

Watershed Impairment Summary

Two hundred years of watershed development in Euclid Creek has incrementally created impairments to watershed functions. Previous studies have identified the main problems in the watershed as flooding, water quality, and stream alteration. The Lower Euclid Creek corridor was walked in November 2005 and the following watershed impairments were noted:

- Creek Channelization

Concrete channel	3000LF
Culverts	1300 LF

- Water Quality

The single largest source of water pollution including lawn fertilizers, bank erosion, pet waste, trash, oil and paint is from stormwater runoff. Euclid Creek is a direct tributary of Lake Erie and contributes directly to water quality in Lake Erie; including the two beaches of Villa Angela and Euclid Beach State Park. Ohio EPA data indicates that over the last five years that Villa Angela beach has been closed 60% of the recreation season and Euclid State Park beach has been closed 38% of the recreation seasons due to high bacteria levels due to combined sewer overflows at the mouth of Euclid Creek.

- Lack of riparian vegetation

Over 5000 LF of Euclid Creek lacks riparian vegetation

- Bank erosion

- Fish barriers

High Velocity Concrete channel
Concrete Spillway at I-90
I-90 Culvert

- Lack of Aquatic Habitat

- Invasive Species

Restoration Concept Summary

- Barrier Beach Restoration

- Oxbow Restoration
  Potential to restore estuary functions to Euclid creek and near shore area of Lake Erie in a 3 acre wetland area.

- Fish Barrier removal

- Riparian Buffer restoration

- Bank stabilization with bioengineering methods

- Floodplain restoration

Concrete Channel Restoration Issues

- Conversion of the hydraulically efficient concrete channel to a forested naturalized channel would reduce its hydraulic capacity from 10,000 cubic feet per second to less than 5,000 cubic feet per second and result in reintroduction of flooding potentials.

- Conceptual review of the lower Euclid creek corridor indicates a potential of up to 75 acre feet of increased floodplain storage potential at 5 sites. Additional watershed studies are required to identify floodplain restoration sites throughout the watershed.

Feasibility Assessment
Section 1: Euclid Creek Harbor & Estuary

Introduction

The Wildwood State Park Area is the Euclid Creek Harbor area where the lake meets the creek. This dynamic is demonstrated along the Lake Erie coast at places such as Old Woman Creek to the west and Arcola Creek to the east. Re-establishing coastal features to the area is greatly increase the visitor experience to this great location. It is one of the few publicly accessible locations within Cuyahoga County and provides a variety of amenities to the community Wildwood State Park is administered by the Ohio Department of Natural Resources. Budget constraints and lack of a comprehensive plan for the next 20 years limits the viability of Wildwood to realize its full potential.

Area Data

Section 1 is defined by Wildwood State Park to the north and Lakeshore Blvd. to the south. The Western and eastern boundaries just slightly encompassing more than the watershed boundaries to include Euclid Beach to the West and Neff Rd. to the east

- Contains roughly **2,795** linear feet of Euclid Creek.

Section Existing Conditions

- Euclid Beach State Park to the west, residential housing to the east and Lake Erie to the north.
- Comprising roughly 125 acres of public property, this section contains Wildwood State Park, Memorial-Nottingham Library, and Euclid Beach.
- Has massive invasive species within the oxbow area
- 2 miles of existing trail.
- Has roughly 150 parking spaces
- has public restrooms at 2 facilities, drinking fountains, bike parking, public meeting rooms and a picnic shelter.

Trail Assessment

This Section currently has a paved trail in good condition along the creek from Lakeshore Boulevard at the Park Entrance to the Lakefront near the Wildwood Marina and onto Villa Angela and Euclid Beach State Park.

The lack of trail linkages from nearby amenities limits pedestrian access and connections to other community facilities. Planning and encouraging these additional linkages is highly recommended to be integrated in future projects and infrastructure improvements on Lakeshore Boulevard.

Proposed Trail Route Description

It is recommended to utilize the existing trail due to its good condition and current alignment along Euclid Creek. An at-grade street crossing is recommended at Lakeshore Boulevard near the park entrance. Due to the high traffic volume on Lakeshore, a traffic light and/or signaled crosswalk is recommended for safety purposes.

Alternatives Considered

No alternatives considered.

Neighborhood Linkage Potentials

- Improve linkage potentials to Nottingham Library between Park Trail and Library as a Community Center.
- Linkage to potential fishing pier at Euclid Beach to promote the entire areas as a destination for recreational fishing.
- Connection to Humphrey City Park and the adjacent proposed Recreation Center. Connecting recreation resources for the community can greatly enhance the amenities provided to residents.
- Trail Spurs directly to the Creek for fishing access.

LOWER EUCLID CREEK

TRAIL & GREENWAY PLAN

Figure 4: Trail Section 1

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

URS

LEGEND

- MAIN TRAIL ROUTE
- PROPOSED CONNECTOR/TRAIL
- EXISTING TRAIL
- WATERSHED BOUNDARY
- RESTORATION OPPORTUNITIES
- SECTION AREAS

NORTH

0 600

Scale: 1 " = 600'

Wildwood State Park

Lakeshore Boulevard at Wildwood State Park Entrance

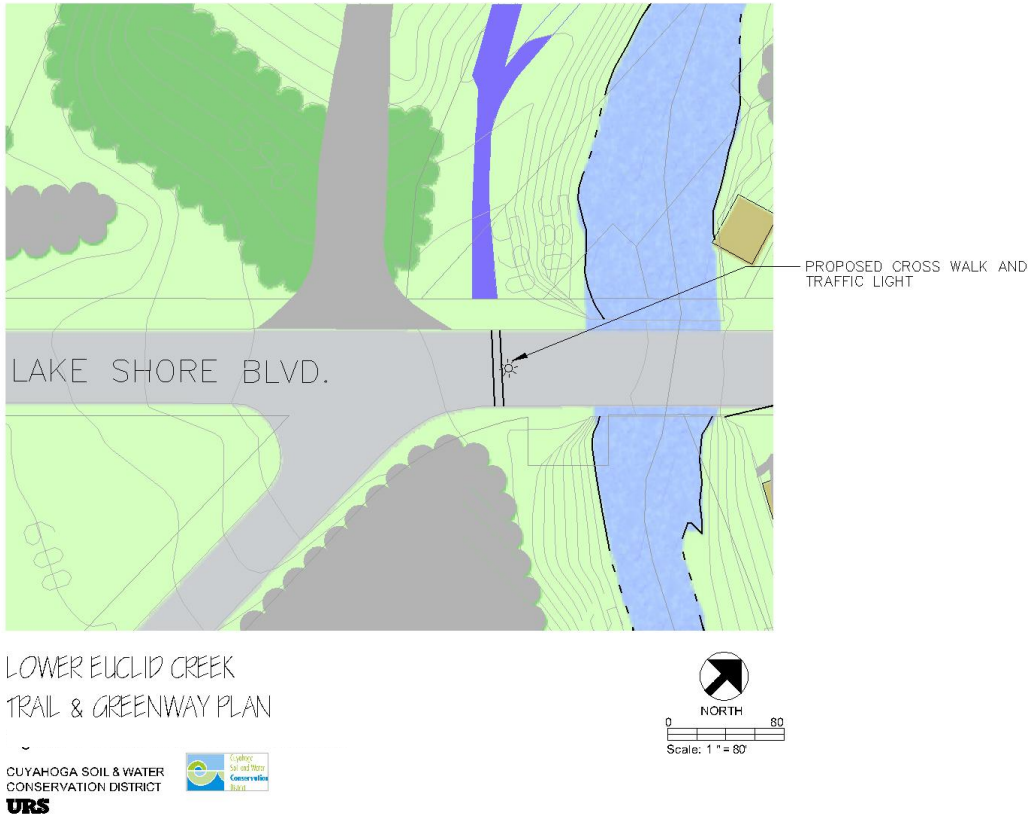


Figure 5

Section 1: Euclid Creek Harbor & Estuary Ecological Restoration Assessment

Section Characteristics

This section includes the mouth to Euclid Creek to Lake Erie, a designated coastal zone, the history of estuarine habitats and the presence of public ownership by the City of Cleveland. These elements provide this section as one of the most viable locations for ecological improvements while maintaining and enhancing the recreational access to the Lake for fishing and boating.

Watershed Impairments

- Loss of estuary functions at mouth of Euclid Creek.
- Lack of Riparian Vegetation results from widespread clearing and mowing of the banks of Euclid Creek.
- Invasive species are heavily infested within the oxbow area.
- Moderate Bank erosion is evident north of Lakeshore Blvd.
- Continuing persistent Combined Sewer Overflows and other upstream pollutant loads.

Proposed Restoration

- Barrier Beach Restoration: Barrier beach formation is a significant aid in increasing fish spawning in the mouth of Euclid Creek. Modification to existing sheetpiling is required to enable barrier beach formation.

Channel Bank Restoration: Bank regrading to allow aquatic vegetation growth would increase aquatic habitat.

- Oxbow Restoration: The oxbow area ½ mile from the mouth of Lake Erie represents a 5 acre opportunity to restore aquatic habitat functions to both the nearshore area of Lake Erie as well as Euclid Creek.
- Restore riparian vegetation: Vegetated buffer strips provide important benefits including bank stabilization and pollutant filtration. A minimum no mow zone of 10'-20' along the banks Euclid Creek is recommended to balance public access and bank stabilization.
- Invasive Species Control: Long term invasive species eradication is best served by reforestation of stream banks to shade out sun loving invasive species.
- Implementing Northeast Ohio Regional Sewer District's long –term control plan and reduction of nutrients will greatly improve the viability of fish populations.

Additional Studies Required

- Archaeological studies of the Oxbow area are recommended to identify Native American and Industrial historic resources suitable for preservation and interpretation.

Wildwood State Park

Oxbow Channel

Euclid Creek Mouth at Lake Erie

Figure 6: Oxbow Restoration Concept

Feasibility Assessment
Section 2: Lakeshore Boulevard to Villaview Road

Introduction

Section 2 is defined by Lakeshore Blvd to the north, Interstate 90 to the south, Neff Rd to the east and Nottingham Rd. to the west. This section contains **3,223** linear feet of Euclid Creek, of which, 1,650 linear feet is concrete encased. Euclid Creek is in close proximity to the East 185th Shopping District. This section has the highest population of residents in the Euclid Creek watershed with its adjacent neighborhoods. This section of the creek corridor is primarily privately owned by residents. Despite its alteration and high concentration of people, the creek still places the stage for the annual steelhead run in late fall and early spring up Euclid Creek from Lake Erie.

Existing Conditions

- This area is sided on both east and west by residential neighborhoods.
- Contains one private school – St. John's Lutheran School. As well as a Salvation Army Church, Community Center and park to the far west.
- Contains over **3,000** linear feet of concrete channel created by the Army Corp of Engineers in 1988 to control neighborhood flooding.

Trail Assessment

Proposed Trail Route Description

- Lakeshore crosswalk requires installation of crosswalk signalization and marked crosswalk.
- Roadside trail along south side of Lakeshore to Marcella Road.
- Bike Lane along Marcella Road to E. 185th,
- roadside trail along west side of E. 185th to Villaview intersection,
- upgrade signalization timing at E. 185th /Villaview intersection,
- roadside trail along north side of Villaview to Neff Road intersection,

The on-street alternative will need to be further examined due to entrance drives to businesses and how to minimize these occurrences.

Alternatives Considered

A future off road trail alternative exists as an existing maintenance easement held by the U. S. Army Corps of Engineers which includes the top of the embankment along the east side of the concrete channel. Working with property owners will need to examine the viability of this alternative. This alternative would reduce the conflict of pedestrians and vehicles for a safer route and provide a closer connection to Euclid Creek for residents to enjoy. Short term and long term strategies for implementation will need to be explored further with the neighborhood.

Neighborhood Linkage Potentials

- Loop connections to Neff and Nottingham Roads will create and enhance direct linkages to the shopping district from the neighborhoods.

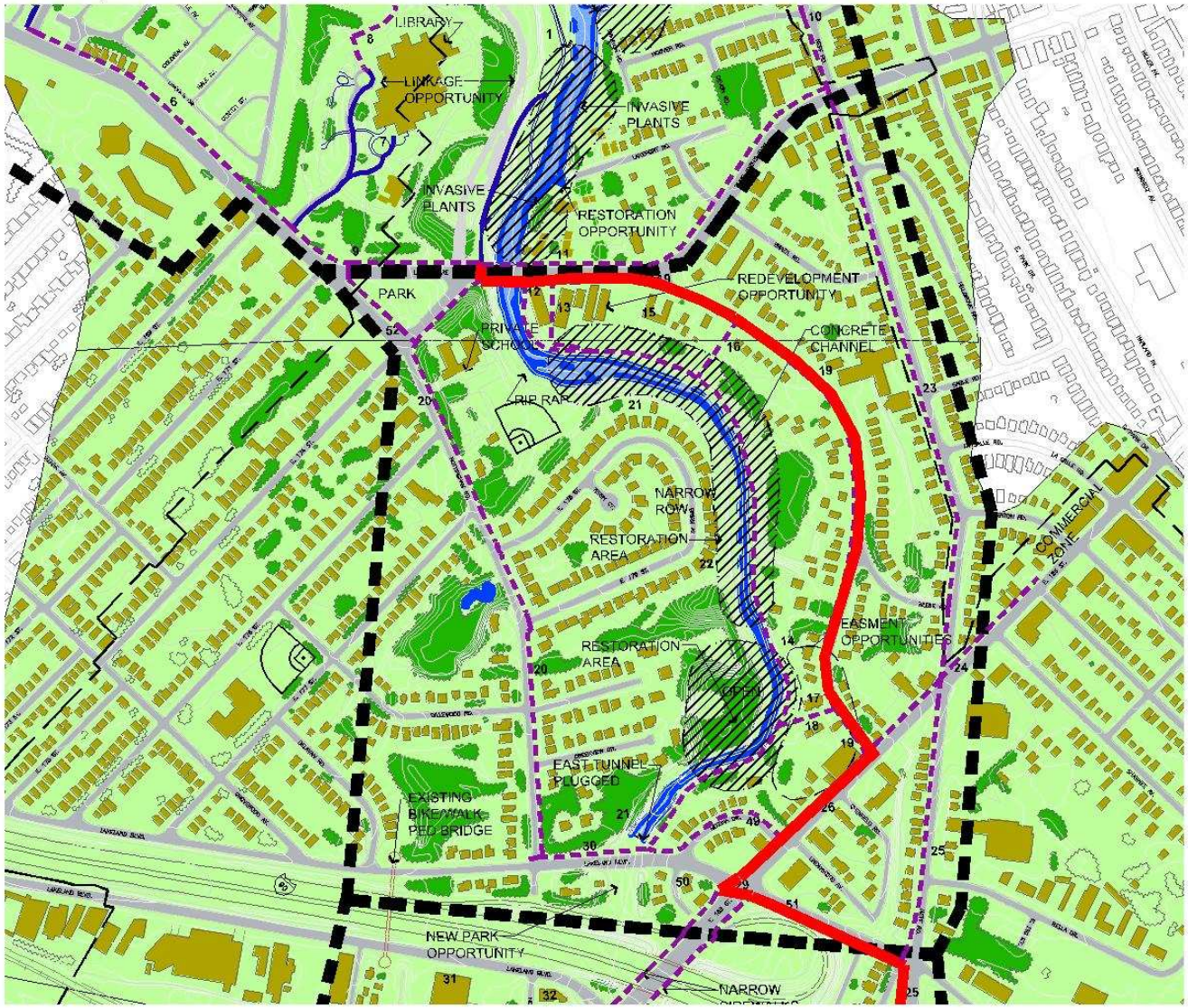
Acquisition Requirements

Further easement research and acquisition are to be part of an upcoming debris removal assessment project by Cleveland Water Pollution Control.

PROPOSED TRAIL ROUTE EAST ALONG LAKESHORE BLVD.

PROPOSED TRAIL ROUTE NORTH ALONG MARCELLA

PROPOSED TRAIL ALONG NORTH SIDE OF VILLAVIEW



LOWER EUCLID CREEK

TRAIL & GREENWAY PLAN

Figure 7: Trail Section 2

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

URS

LEGEND

- MAIN TRAIL ROUTE
- PROPOSED CONNECTOR/TRAIL
- EXISTING TRAIL
- WATERSHED BOUNDARY
- RESTORATION OPPORTUNITIES
- SECTION AREAS

NORTH

0 600

Scale: 1 " = 600'

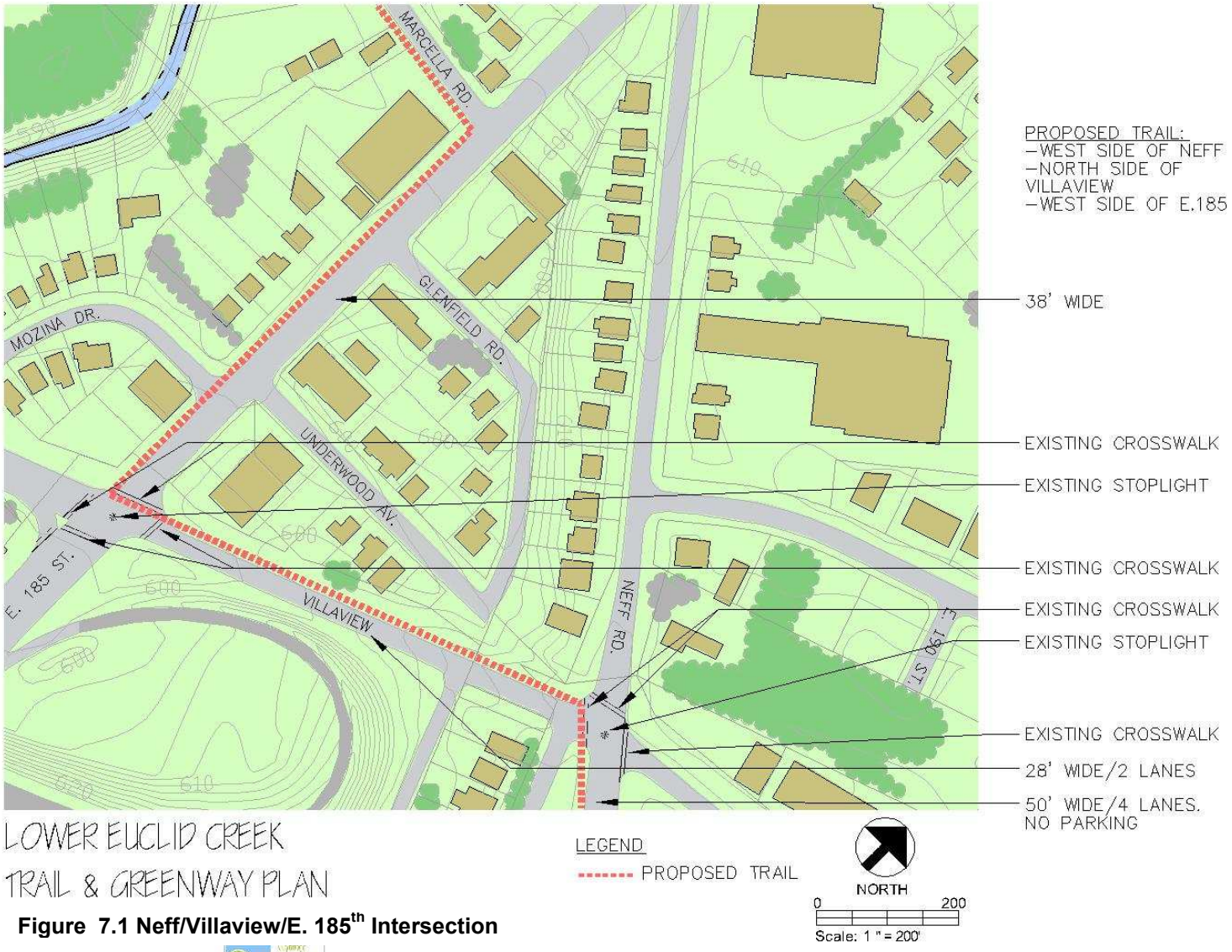


Figure 7.1 Neff/Villaview/E. 185th Intersection

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

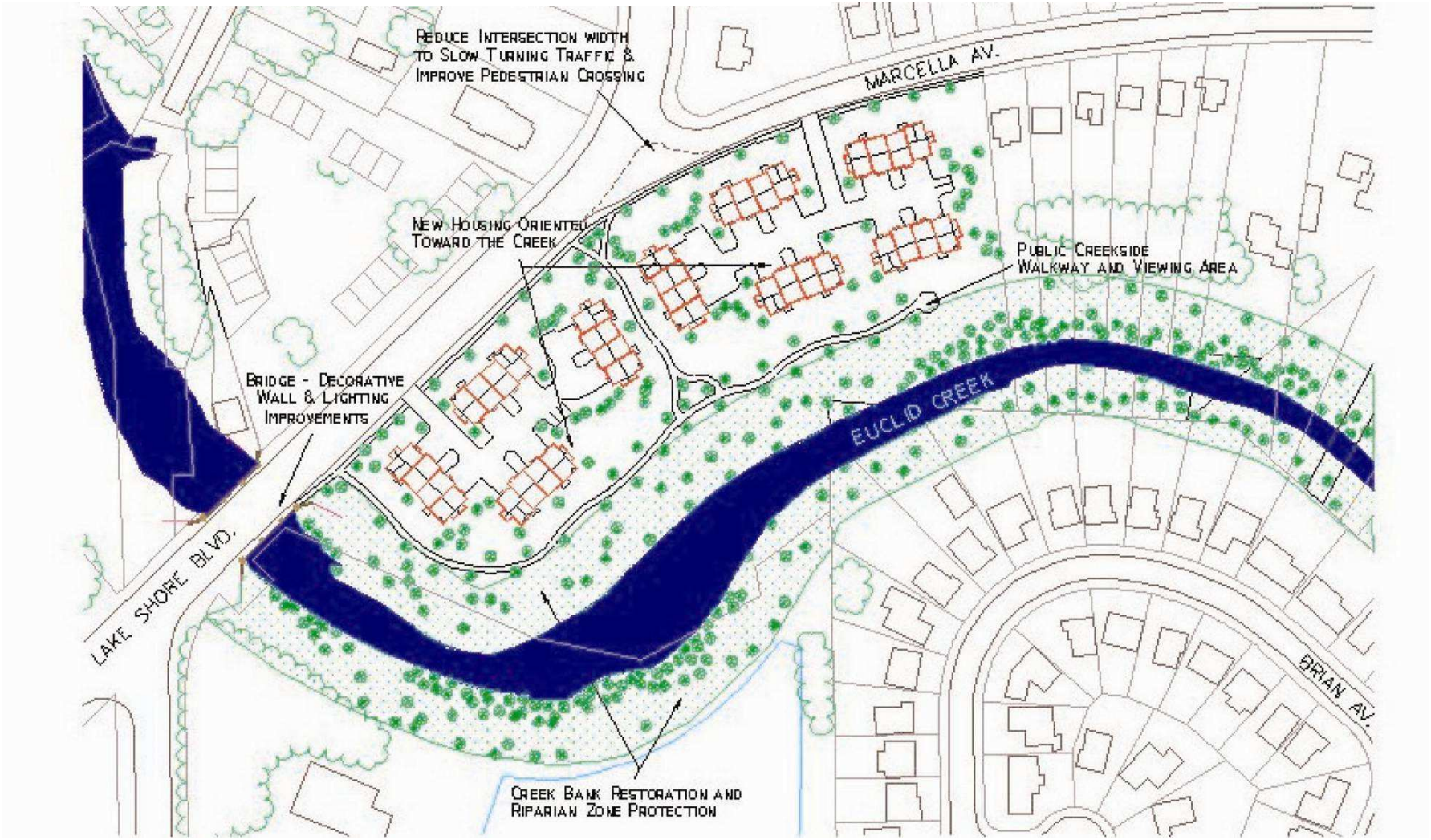
URS

LAKESHORE BOULEVARD REDEVELOPMENT SITE

Euclid Creek is an amenity that can add significant value to redevelopment projects. The townhouse development at Euclid Creek north of Lakeshore Boulevard represent a successful illustration of the marketability of new housing stock in a redevelopment setting which takes advantage of Euclid Creek as an amenity.

A similar redevelopment opportunity exists on the south side of Lakeshore Boulevard where a number of small apartment buildings now exist in close proximity to the Euclid Creek floodplain. The below site plan illustrates how these properties could be redeveloped with townhouses and incorporate a trail corridor along the edge of Euclid Creek.

Figure 8.0 Lakeshore Redevelopment Concept with Greenway



Ecological Restoration Assessment
Section 2: Lakeshore Boulevard to Villaview

Section Characteristics

This section of the stream is highly modified with the existing encased concrete channel. However, despite these modifications, fish migration from Wildwood continues to be active especially for larger species. Much of the forested vegetation typical of a stream corridor does not exist which can add increased temperature to the water and does not provide refuge for fish species during high water flows.

Area Data

Contains **3,223** linear feet of Euclid Creek, of which, 1,650 linear feet is concrete encased.

Land Use

- This area is sided on both east and west by residential neighborhoods.
- Contains one private school – St. John's Lutheran School. As well as a Salvation Army Church, Community Center and park to the far west.

Watershed Impairments

- Channelization/Loss of Habitat: Section 2 contains **1,650** linear feet of concrete encased Euclid Creek. This channel was created by the Army Corp of Engineers in the 1980s in response to a severe flooding event of 1975 to control flooding for the surrounding homes. The channel is to be maintained by the city of Cleveland.
- Debris accumulation: Large accumulations of woody debris have accumulated, resulting in reduction of the hydraulic conveyance capacity of the channel from a 100 year storm to approximately a 25 year storm.

Proposed Restoration Description

- Debris removal, Channel repair
- Potential future floodplain restoration 'B' west of Euclid Creek exists on the undeveloped rear of private properties.

Alternatives Considered

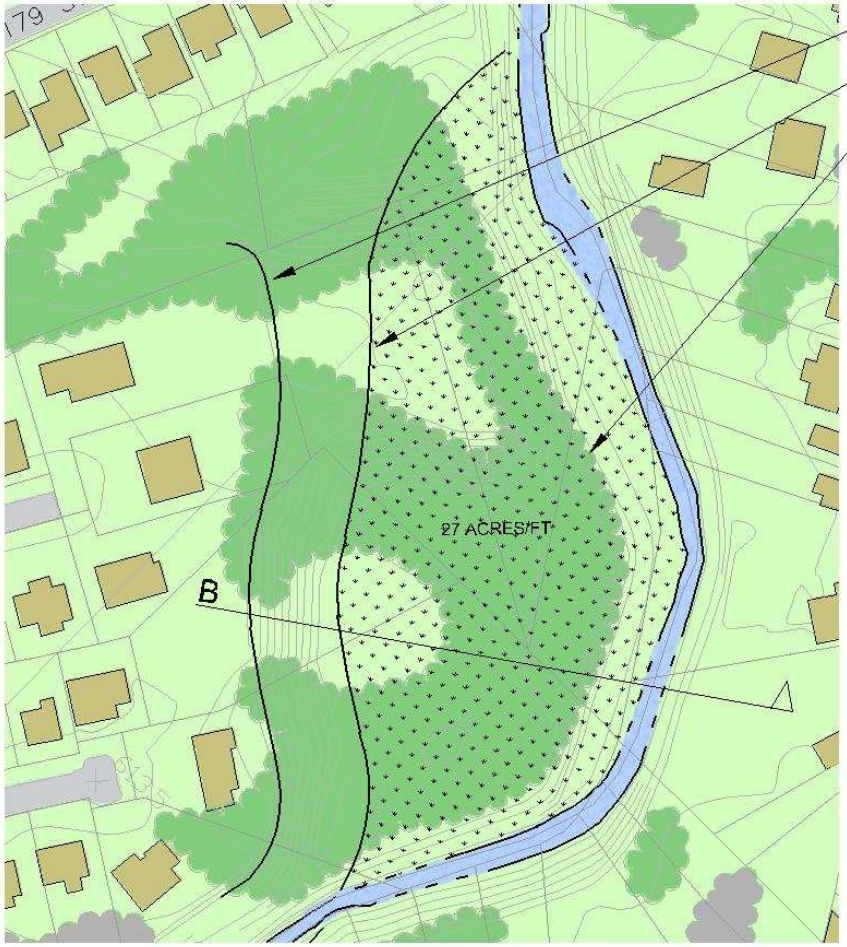
- Restoration of Concrete channel: Restoration of the concrete channel to a natural channel represents a significant watershed wide undertaking beyond the scope of this study.

Conservation Protection Opportunities

Establishing conservation easements along the streamsides of Euclid Creek will benefit the long term functions and health of the creek and further protect properties from flooding and drainage issues. Because of the predominant private ownership of property in this section, voluntary conservation easement agreements will be pursued with individual owners. Funding will continue to be pursued where acquisition is applicable.

CONCRETE CHANNEL, 3000 LF

DEBRIS ACCUMULATION
CONCRETE CHANNEL, 3000 LF



LOWER EUCLID CREEK

TRAIL & GREENWAY PLAN

Figure 9.0 Floodplain Restoration Opportunity – B

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

URS

Feasibility Assessment
Section 3: Villaview to St. Clair Avenue

Introduction

This section of the Euclid Creek corridor is the most modified in the entire watershed. It is home to one of the busiest intersections in the City of Cleveland and provides an entrance into the industrial areas of Collinwood through its access to Interstate 90. It corridor serves as an extension of commercial services from the East 185th Corridor and bridges to the St. Clair Corridor and the North Collinwood Neighborhoods. The creek is largely underground but is visible south of the I-90 exit which continues to be a popular fishing locale for steelhead.

Area Data

Section 3 is defined by Interstate 90 to the north, Saint Clair Ave to the south, Neff Rd to the east and the eastern most portion of the Nottingham rail yard to the west.

- Contains**1,578** linear feet of Euclid Creek, of which, 955 linear feet is engineered.
- There are 4 gas stations, many industrial building and the CSX multiple tracked rail system.
- This section has an existing bikeway bridge to the north across Interstate 90 as well as large open areas within the highway's off and on ramps.
- Has **955** linear feet of engineered Euclid Creek. 680 linear feet is constructed of 3 culverts that run under Interstate 90, and daylights just south of 185th Street by the Marathon Station. The creek daylights into a concrete channel for 300 feet. The south end of this concrete channel contains a 5' high spillway which lowers the elevation of the stream to flow under I-90. South of the spillway is a 275' long historic sandstone bridge crossing under the CSX railroad.

Trail Assessment

Due to the high volume of traffic and variety of transportation systems including, local roads, highway and railways, trail routing is especially challenging in this section. First the trail should not disrupt the existing transportation activity and routing. Secondly, trail users safety is of the highest consideration in examining feasibility of linkages. With these considerations in mind and existing conditions, the following alternatives were developed.

Proposed Trail Route Description

- Roadside trail along west side of Neff Road to railroad underpass,
- Utilize existing five foot wide sidewalk in Neff Road underpass,
- Roadside trail along west side of Neff Road to the north side of St. Clair Avenue,
- Crosses St. Clair at the existing traffic signal.

Alternatives Considered

A new bike trail tunnel under the CSX rail line was considered but judged to be cost prohibitive. The Nottingham Road underpass, although a more direct trail route, presents several drawbacks including:

- significantly more traffic volume,
- requires crossing more driveways,

Neighborhood Linkage Potentials

Connecting to St. Clair and Collinwood Neighborhoods through on-road designated bike lanes will provide a connection to residents to Euclid Creek from the neighborhood. Also potential linkages to the City of Euclid via St. Clair to East 222nd could be explored as on-road designated routes or off-road bike lanes within the street right-of-way.

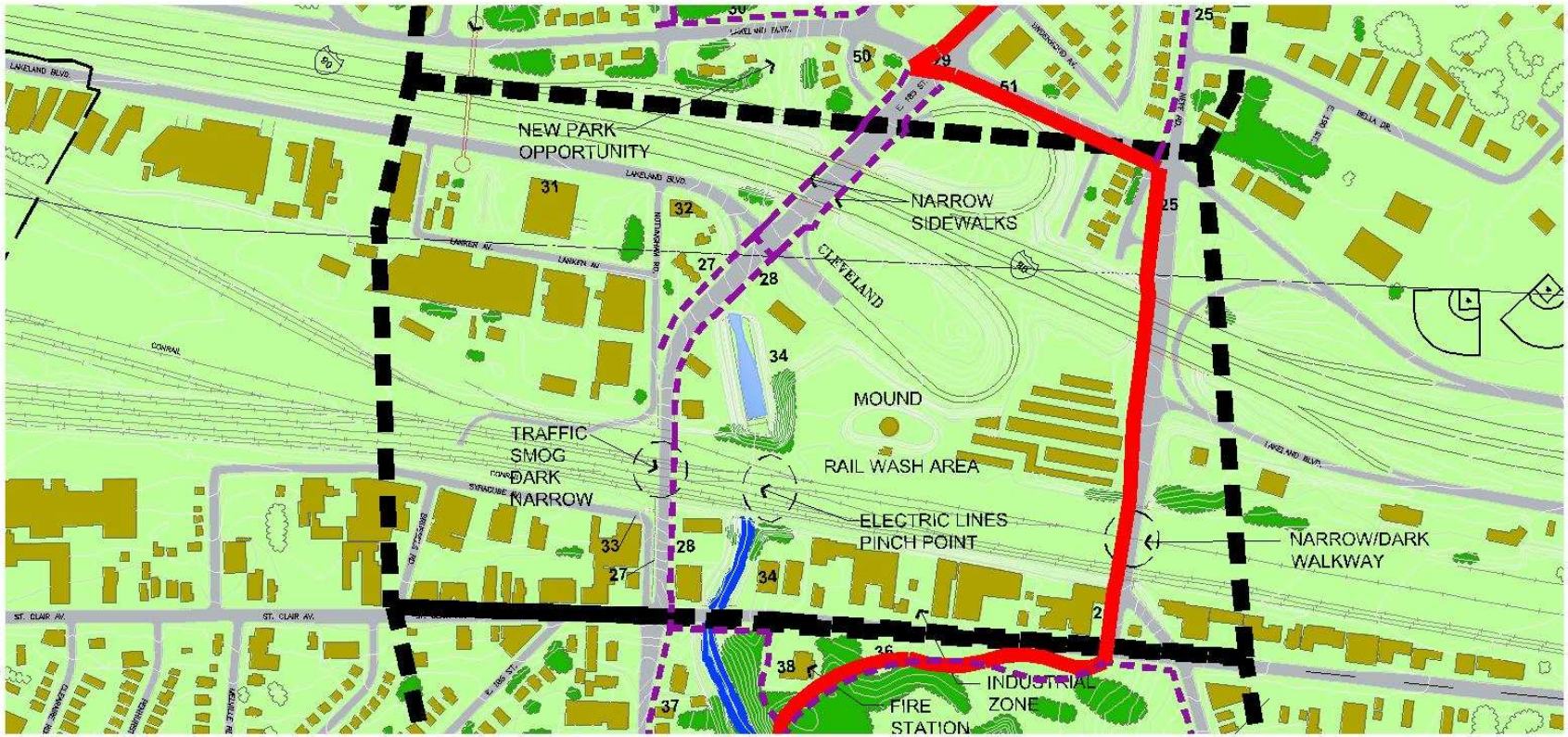
Acquisition Requirements

None required.

St. Clair/Neff Road Intersection –Facing West

VILLAVIEW/NEFF RD. INTERSECTION

ST. CLAIR/CHARDON INTERSECTION



LOWER EUCLID CREEK TRAIL & GREENWAY PLAN

Figure 10: Trail Section 3

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

URS

LEGEND

- MAIN TRAIL ROUTE
- PROPOSED CONNECTOR/TRAIL
- EXISTING TRAIL
- WATERSHED BOUNDARY
- RESTORATION OPPORTUNITIES
- SECTION AREAS

NORTH

0 600

Scale: 1 " = 600'

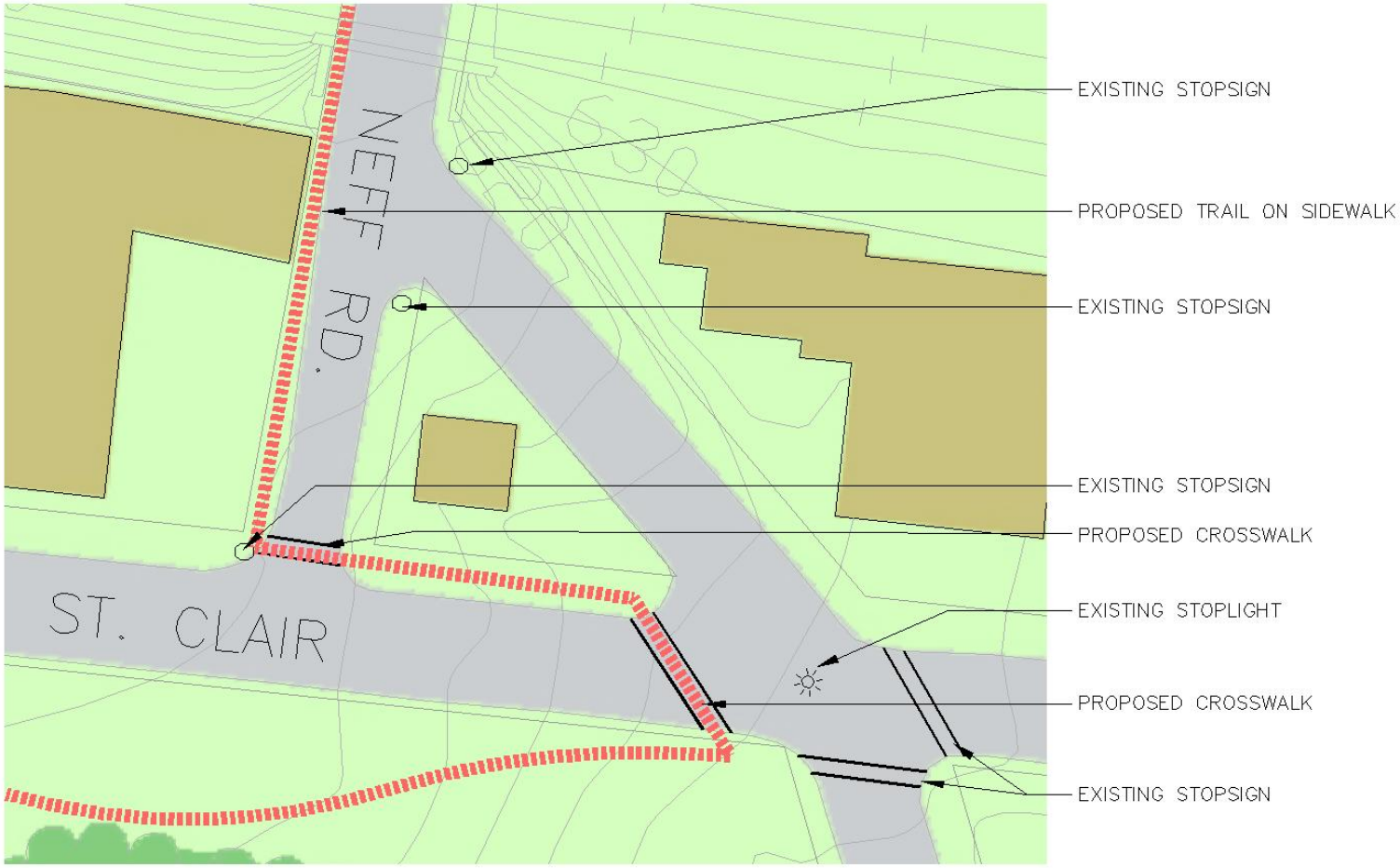


Figure 10.1 St. Clair/Neff/Chardon Intersection

Ecological Restoration Assessment
Section 3: Villaview to St. Clair Avenue

Section Characteristics

This section is highly modified which limits its ecological restoration opportunities without significant costs and alteration of existing land uses. Although this section is highly modified, it also poses one of the best opportunities to improve fish passage to the upper portion of the watershed and the Main Branches.

Area Data

Section 3 is defined by Interstate 90 to the north, Saint Clair Ave to the south, Neff Rd to the east and the eastern most portion of the Nottingham rail yard to the west.

- Roughly **1,530** linear feet as the crow flies.
- Contains**1,578** linear feet of Euclid Creek, of which,
- Contains 4 gas stations, many industrial building and a multi tracked rail line.
- **955** linear feet of engineered Euclid Creek. 680 linear feet is constructed of 3 arch culverts which run under I-90, and daylights just south of 185th by the Marathon Station. From there, the creek has a concrete bottom & concrete slopes for 300 feet.
- A 4' high spillway historic sandstone railroad bridge constructed to drop stream elevations to flow under I-90.

Watershed Impairments

- Channelization. Section 3 consists of 955 LF of culverted stream and 300 LF of concrete channel.
- Existing Spillway is a fish barrier for upstream migration.

Proposed Restoration Description

- Channel restoration. See enclosed redevelopment scheme intended to restore natural channel to Euclid Creek.
- Redevelopment at I-90/E. 185th interchange.
- Spillway removal and replacement with step pools configuration is currently being investigated by others.

Alternatives Considered

Short term and long term strategies will likely be the best approach to this section, due to the multiple private owners, and complexity of site. The short term strategy would include the introduction of fish passage opportunities to the upper portions of the creek over the spillway. The long term strategies would be to examine restoration of floodplain, re-establishment of wetlands next the creek on the northeast side of the creek near the spillway. Land ownership and site assessments will need to be examined on how best to implement improvements to the creek.

Original Euclid Creek Route at I-90 and East 185th Intersection, 1960's, Source: Cleveland State University

1000 LF TRIPLE ARCH CULVERT UNDER I-90

POTENTIAL REDEVELOPMENT SITE

DAM IS BARRIER TO FISH MIGRATION AT RAILROAD

REDEVELOPMENT OPPORTUNITIES
Marathon Station Brownfield Redevelopment

Project Description
At the I-90/East 185th interchange, Euclid creek emerges from a 1000 foot long culvert under I-90 to a concrete lined channel surrounded by 2 gas stations. Steelhead trout actually migrate to this point only to be stopped by a 5 foot high concrete spillway barrier at the Railroad track. This has become a popular fishing spot to catch steelhead trout. The project site presents both a restoration opportunity and a Brownfield redevelopment opportunity.

The intent of this exercise is to conceptually explore concepts for restoration of a riparian zone around Euclid Creek, creation of a suitable fishing access location, and for appropriate commercial redevelopment at a high visibility interstate interchange.

The project site is currently in use a Marathon gas station and a Railroad owned wash yard. Four gas stations are currently in operation at this interchange.

Redevelopment of a gas station property presents a number of remediation challenges. Listed below is an outline of the tasks required for redevelopment.

Task Sequence
1. Close tanks according to BUSTR regs (Jim Anderson)
   Estimated cost $ 100k

2. Conduct Phase 1 Site assessment for both properties.
   Typically required for property transfer.
   Estimate cost less than $10k.

3. Conduct Phase II likely to be necessitated due to RR proximity and ownership and due to alleged dumping history of site. Prepare risk assessment for recreational and commercial uses to determine remedial action plan.
   Estimated Cost $ 100k

4. Remediation, if required

5. Initiate Redevelopment

Funding Plan for Brownfield Redevelopment
1. Site Assessment: Cuyahoga County Dept of Development, or

1A. Clean Ohio Revitalization Fund for Acquisition and Assessment

2. Tank cleanup funding: Potential BUSTR funding for abandoned tank cleanup

3. Acquisition:
   Clean Ohio Revitalization
   Cuyahoga County Dept of Development
   City of Cleveland

Figure 11: Proposed East 185th Interchange Development and Creek Improvements

Trail

Feasibility Assessment
Section 4: St. Clair to Euclid Avenue

Introduction

The Euclid Creek section from St. Clair Avenue and Euclid Avenue consists of a natural green corridor with streamside forests and free-flowing streams. Its ownership of various public entities provides an opportunity for partnerships to extend the Euclid Creek Metroparks Reservation northward toward Lake Erie and Cleveland and Euclid neighborhoods.

Area Data

Section 4 is defined by St. Clair Avenue to the north, Euclid Avenue to the south, Neff Road to the east, and Nottingham road to the west.

- Contains **4,317** linear feet of Euclid Creek, with one small portion contained with a railroad bridge.

Existing Conditions

- The largest land owner in this are is the City of Cleveland Nottingham Water Treatment Facility. The second largest land owner is the Euclid Central Junior High School. Both lie between Euclid Creek and Chardon Rd.
- The Norfolk Southern rail line is an at-grade crossing on Nottingham Rd. and Chardon Road and a bridge crossing over Euclid Creek.
- Most landowners are commercial ventures fronting on Nottingham, to the west of the creek, there is a small pocket of residential.
- Taylor Playground – a city of Cleveland Park, located just off Nottingham Rd. and Firwood Road.

Trail Assessment

This section is largely uninhabited by structures or buildings and pose an opportunities to link regional greenspace with local neighborhoods and the outside program and wellness needs for adjacent Schools and Nottingham Plant employees. Alignment challenges for this section include the safety and access precautions on the Nottingham Plant property and alignment engineering under the Norfolk Southern railroad bridge. Initial evaluation by URS and NEORSD suggests that clearance from top of bridge for trail standards and clearance for large storm events could occur. More detailed evaluation of both of these standards needs to be conducted to determine design and engineering plans.

- Off Road trail paralleling the south side of St.Clair Road to the existing firehouse,
- Creekside trail along the east side of Euclid Creek outside the fence of the Nottingham Water Plant,
- New trail bridge passes under the existing railroad bridge
- Creekside trail along east side of Euclid Creek to Euclid Avenue.

Alternatives Considered

Chardon Road represents an alternative to acquisition of the Nottingham Water Plant route.

Neighborhood Linkage Potentials

- Neff Road at Euclid Central School
- Loop trail potential around the Nottingham Water Plant.

Acquisition Required

- Approximately 17 acre conservation easement required from Nottingham Water Plant.
- Approximately 1.5 acres owned by Norfolk Southern.
- Approximately 3.5 acres easement required from Euclid School District and adjacent private property owners.

Additional Studies Required

- A feasibility study is required for the proposed trail underpass under the Norfolk Southern Railroad bridge.

CHARDON/ST. CLAIR INTERSECTION FACING WEST

Norfolk Southern Railroad Bridge North of Euclid Central

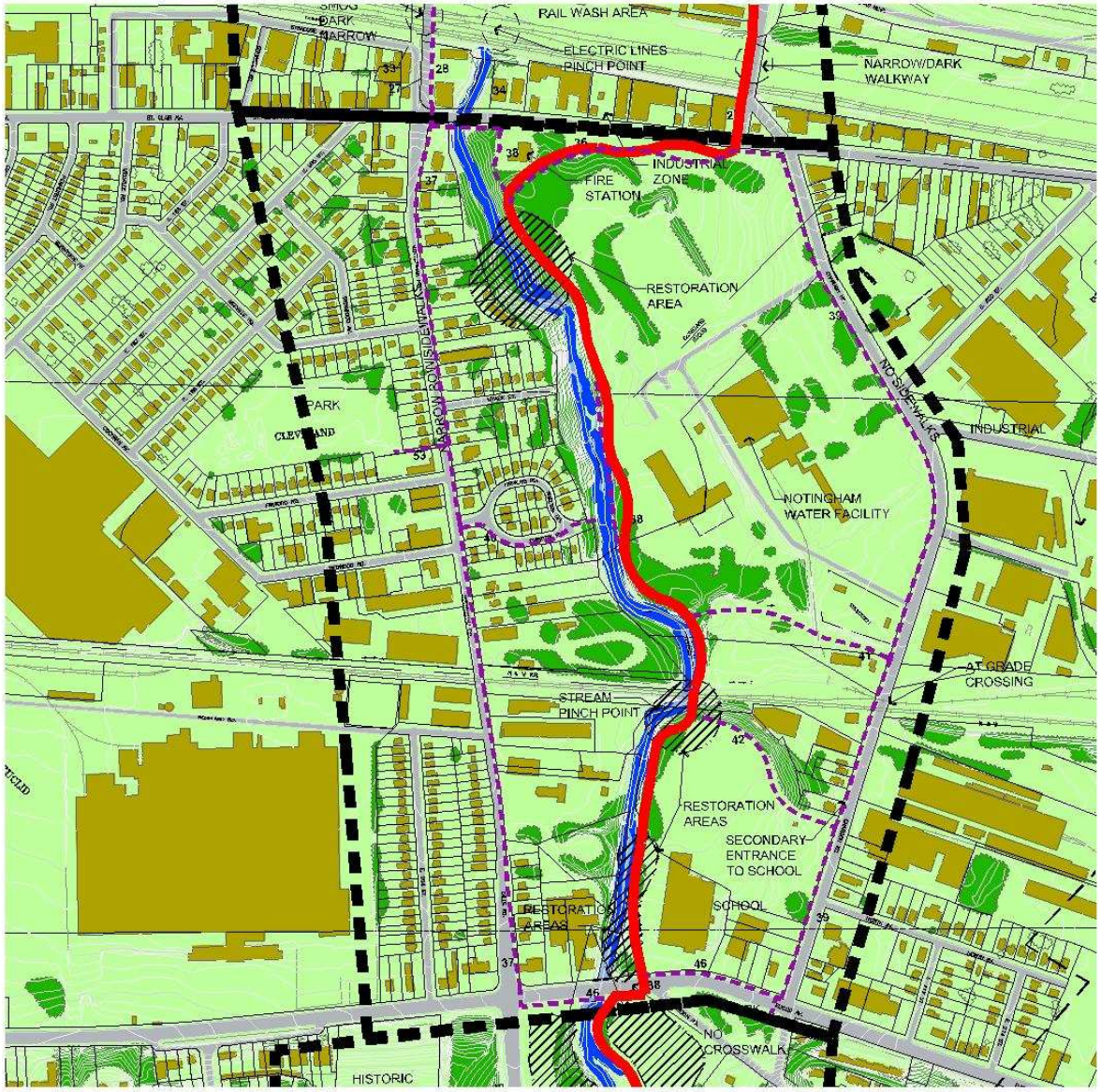
PROPOSED STREAMSIDE TRAIL OUTSIDE FENCE OF NOTTINGHAM WATERPLANT

Euclid Creek Corridor South of Railroad Bridge

Euclid Central School Next to Euclid Creek

Euclid Central School Next to Euclid Creek

Euclid Central School Intersection with Euclid Avenue


RAIL WASH AREA
ELECTRIC LINES PINCH POINT
NARROW/DARK WALKWAY
INDUSTRIAL ZONE
FIRE STATION
RESTORATION AREA
PARK
CLEVELAND
NO SIDEWALKS
INDUSTRIAL
NOTINGHAM WATER FACILITY
AT GRADE CROSSING
STREAM PINCH POINT
RESTORATION AREAS
SECONDARY ENTRANCE TO SCHOOL
SCHOOL
RESTORATION AREAS
NO CROSSWALK
HISTORIC
LOWER EUCLID CREEK
TRAIL & GREENWAY PLAN
Figure 12 Trail Section 4
CUYAHOGA SOIL & WATER CONSERVATION DISTRICT
URS
LEGEND
MAIN TRAIL ROUTE
PROPOSED CONNECTOR/TRAIL
EXISTING TRAIL
WATERSHED BOUNDARY
RESTORATION OPPORTUNITIES
SECTION AREAS
NORTH
0
600
Scale: 1 " = 600'

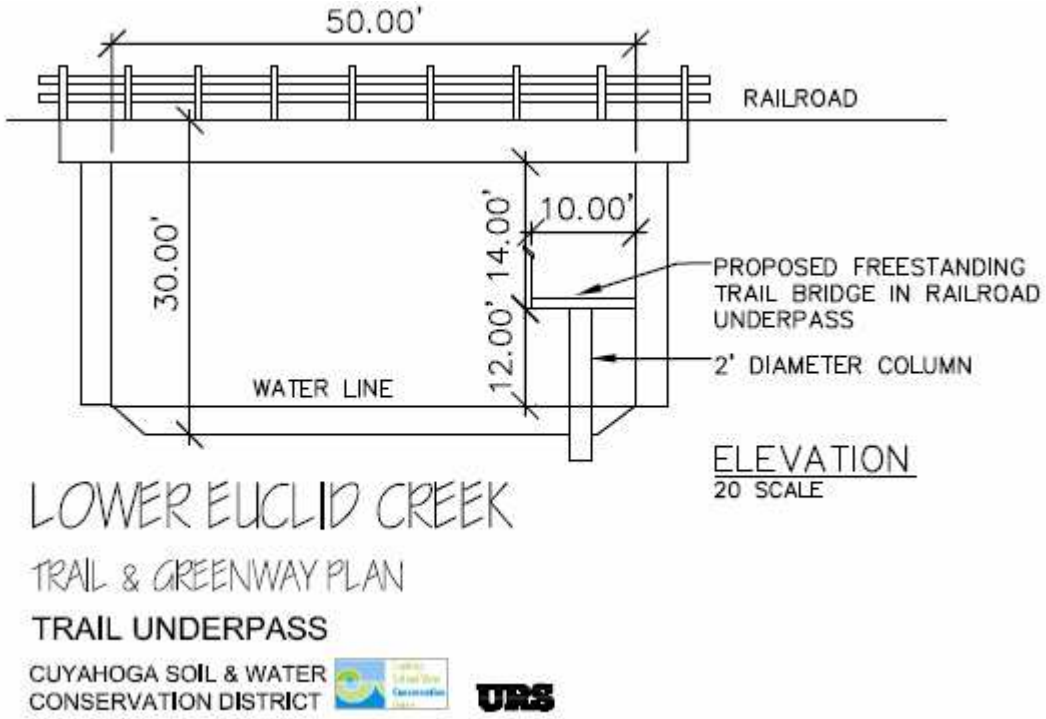


Figure 12.1 Elevation Concept of Trail Underpass at Norfolk Southern Railroad Crossing

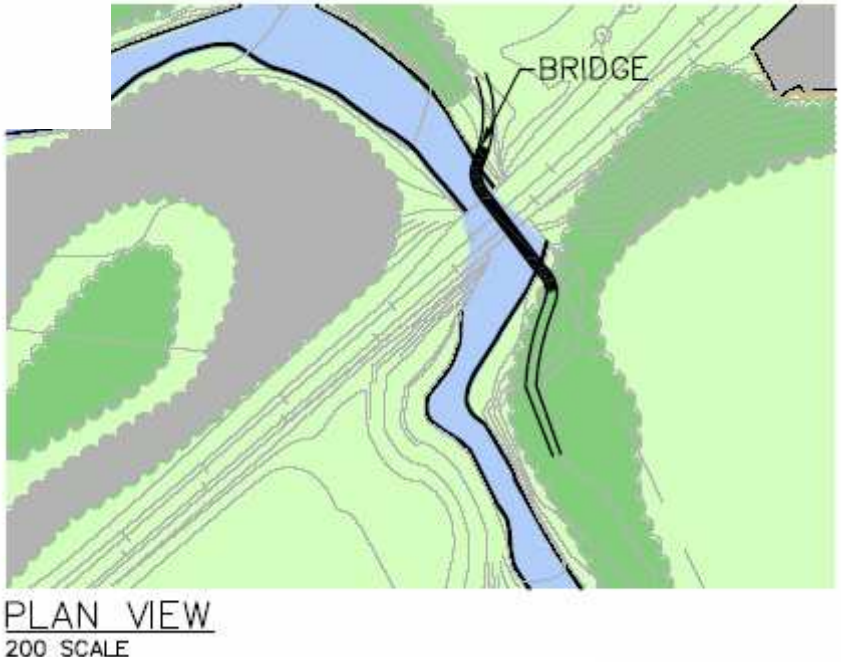


Figure 12.2 Plan View of Trail Underpass at Norfolk Southern Railroad Crossing

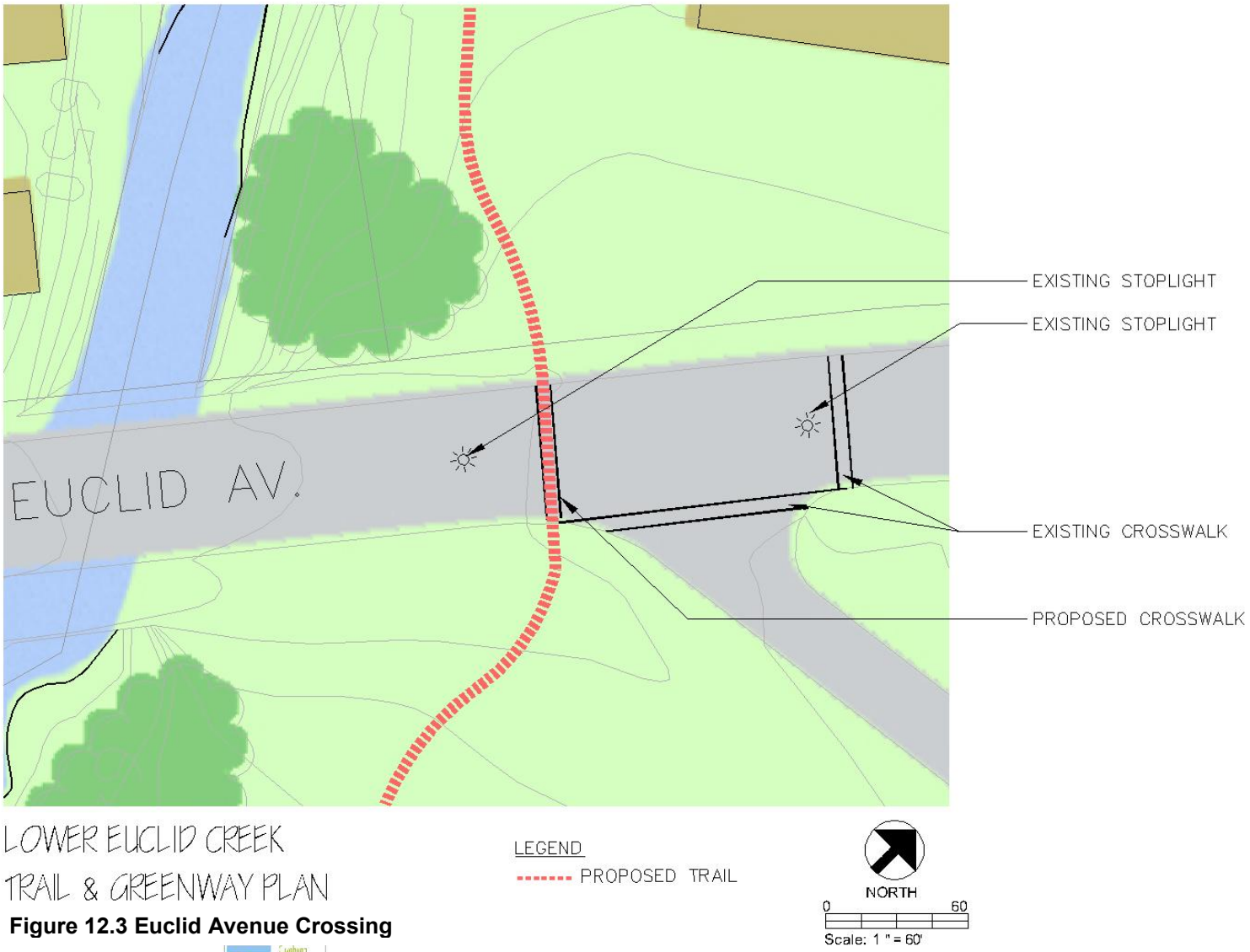


Figure 12.3 Euclid Avenue Crossing

Ecological Restoration Assessment
Section 4: St. Clair to Euclid Avenue

Section Characteristics

This section of the greenway has been the least modified and provides a natural stream channel with many areas of forest cover. One section near the water plan has a gabion streambank that has been stabilized. The channel does begin to enter into a ravine environment as it leaves the coastal estuary zone and enters into the escarpment valley of the creek corridor.

Area Data

Contains **4,317** linear feet of Euclid Creek, with one small portion contained with a railroad bridge.

Land Use

- The largest land owner is the Nottingham Water Treatment Facility owned by the City of Cleveland. The second largest land owner is the Euclid Central Junior High School owned by the Euclid City School District.
- There is a low traffic rail line that is an at-grade crossing on Nottingham Rd. and Chardon Rd. There is a bridge for this rail line over Euclid Creek.
- To the west of the creek, there is a small pocket of residential, but most landowners are commercial ventures fronting on Nottingham.
- Taylor Playground – a city of Cleveland Park, located just off Nottingham Rd. and Firwood Road.

Watershed Impairments

- Bank Erosion is widespread through the Nottingham and Euclid School Property

Proposed Restoration Description

- Stream bank stabilization: Bioengineering methods for bank stabilization and habitat enhancement are recommended.

Conservation Protection Opportunities

- Approximately 17 acre conservation easement potential from Nottingham Water Plant.
- Approximately 1.5 acres of property owned by Norfolk Southern.
  Approximately 3.5 acres easement potential from Euclid School District

MODERATE BANK EROSION AT EUCLID CENTRAL SCHOOL

MODERATE BANK EROSION AT NOTTINGHAM WATER PLANT

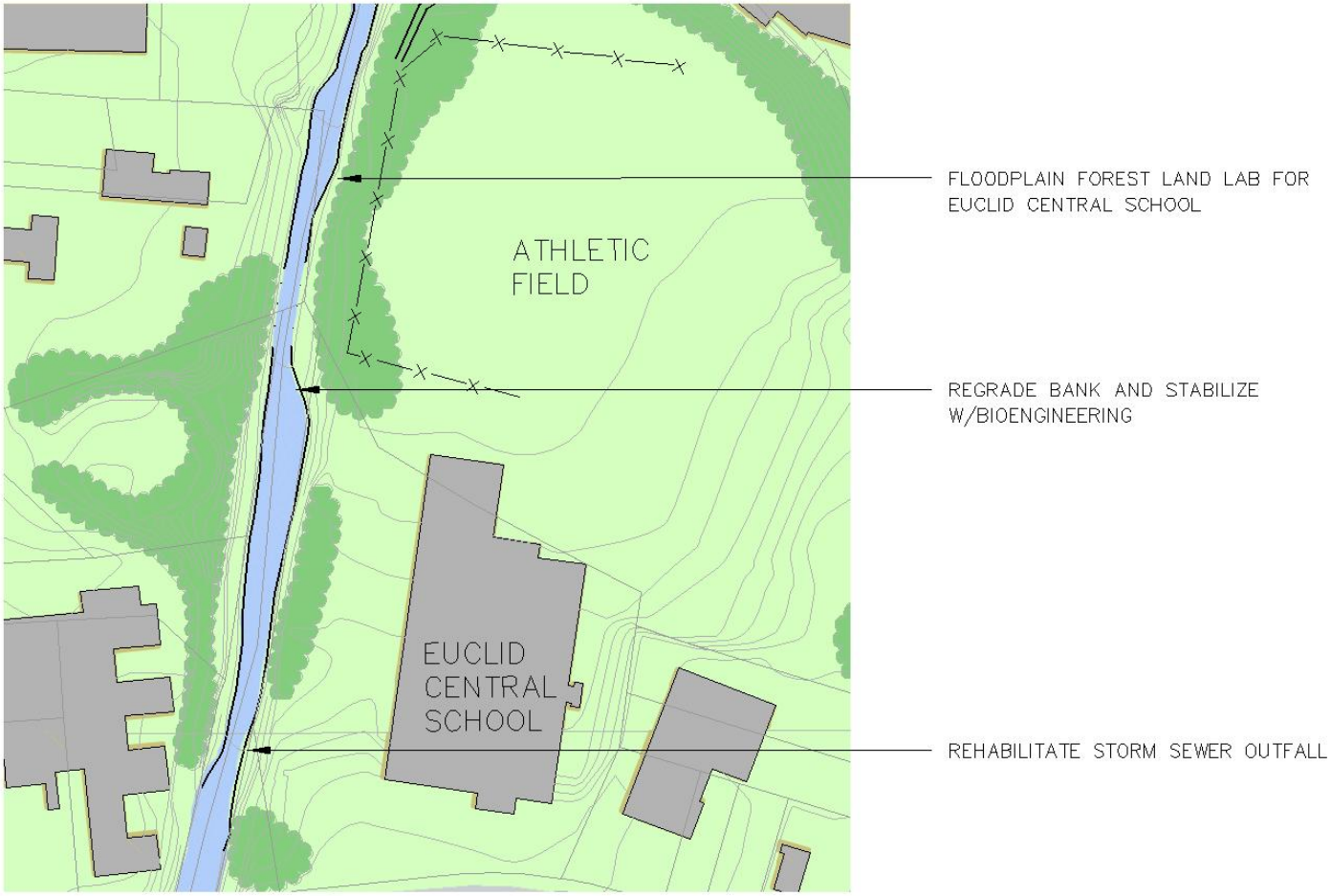
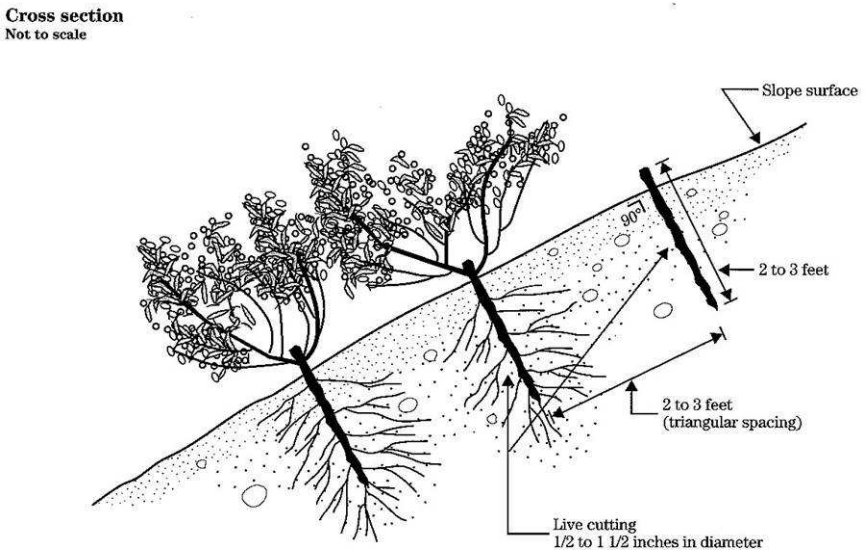
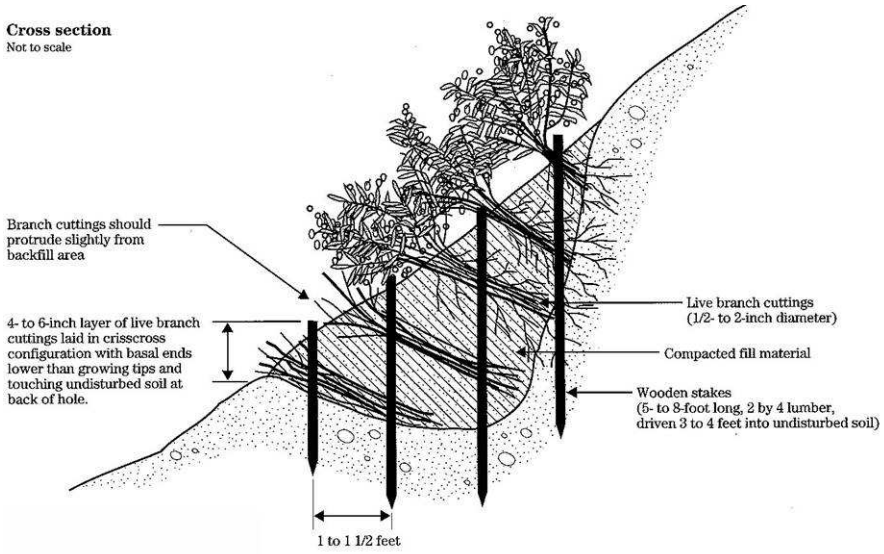


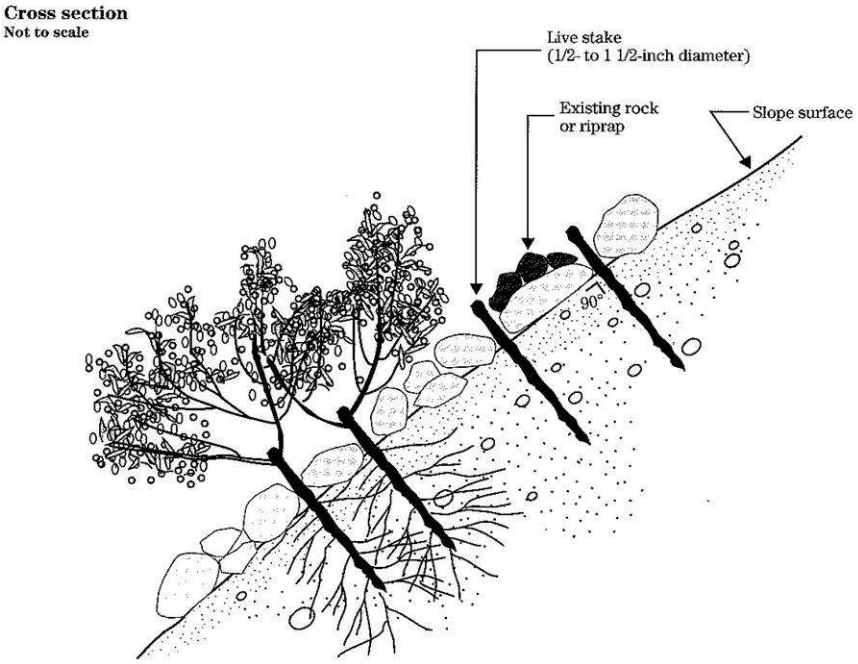
Figure 12.4 Section 4 Restoration Plan

CUYAHOGA SOIL & WATER
CONSERVATION DISTRICT
URS

Figure 13 PROPOSED BANK STABILIZATION METHODS







Feasibility Assessment
Section 5: Euclid Avenue to Metroparks Highland Picnic Area

Introduction
The Cleveland Metroparks Euclid Creek Reservation is considered the third smallest within its regional parks system but the third most visited. The Euclid Creek Reservation provides one of the largest parks in proximity to a very densely populated portion of Cuyahoga County and the City of Cleveland. Extending this great resource north provides an opportunity to extend the access of a natural setting to residents in urban areas where greenspace is limited. The Metroparks presence can also provide stream restoration and floodplain restoration opportunities that can be explored due to its natural setting and lack of buildings next to the creek.

Area Data
Section 5 is defined by Euclid Avenue to the north, Euclid Creek Parkway to the south, Chardon Road to the east, and Glenridge Road to the west.

- Contains **4,193** linear feet of Euclid Creek, with two lengths going under Nottingham Rd.

Existing Conditions

- The largest land owner is Cleveland Metroparks, with 354 acres. The second largest land owner is the Sister's of St. Joseph & St. Mark Convent with Our Lady of Lourdes Shrine.

- The majority of this section is public land, surrounded by residential property. Euclid Ave is fronted by commercial properties.
- There is Historic Euclid Park Located in the triangle piece of land created by Euclid Ave. and Chardon Rd.

Trail Assessment

The existing trail in the Euclid Creek Metroparks Reservation ends at Highland Road and the Euclid Creek Parkway intersection. Extending the existing trail to Euclid Avenue off road on Metroparks property is critical to connecting and extending a trail northward toward Lake Erie and the neighborhoods nearby and enhancing other neighborhood loop opportunities. Options explored included on-road and off-road routes. Due to the high traffic volume on Highland Road and Euclid Avenue, off road routes is highly recommended and deemed feasible at a planning level. Trail routing under two existing road bridges for bridge clearance and storm water flows will need to be evaluated further to determine design and engineering needs.

Proposed Trail Route Description

- From Euclid Avenue Crosswalk follow eastside of Creek to Highland Road bridge,
- Modify paved slope under the Highland Road bridge to allow trail passage,
- Creekside trail along eastside of Euclid Creek; west of Highland Road,
- New trail bridge required to cross Euclid Creek,
- Meet existing trail at Euclid Creek Parkway

Neighborhood Linkage Potentials

Connections to a proposed neighborhood loop to the Glenridge neighborhood in the City of Euclid and reconnecting at Monticello Boulevard are being examined by the Cities of Euclid and South Euclid to provide additional recreation and greenway corridor linkages to its residents and neighborhoods. This neighborhood loop will provide an asset to the existing park system and future corridor connections to Lake Erie.

Acquisition Required

None required due to Metroparks ownership.

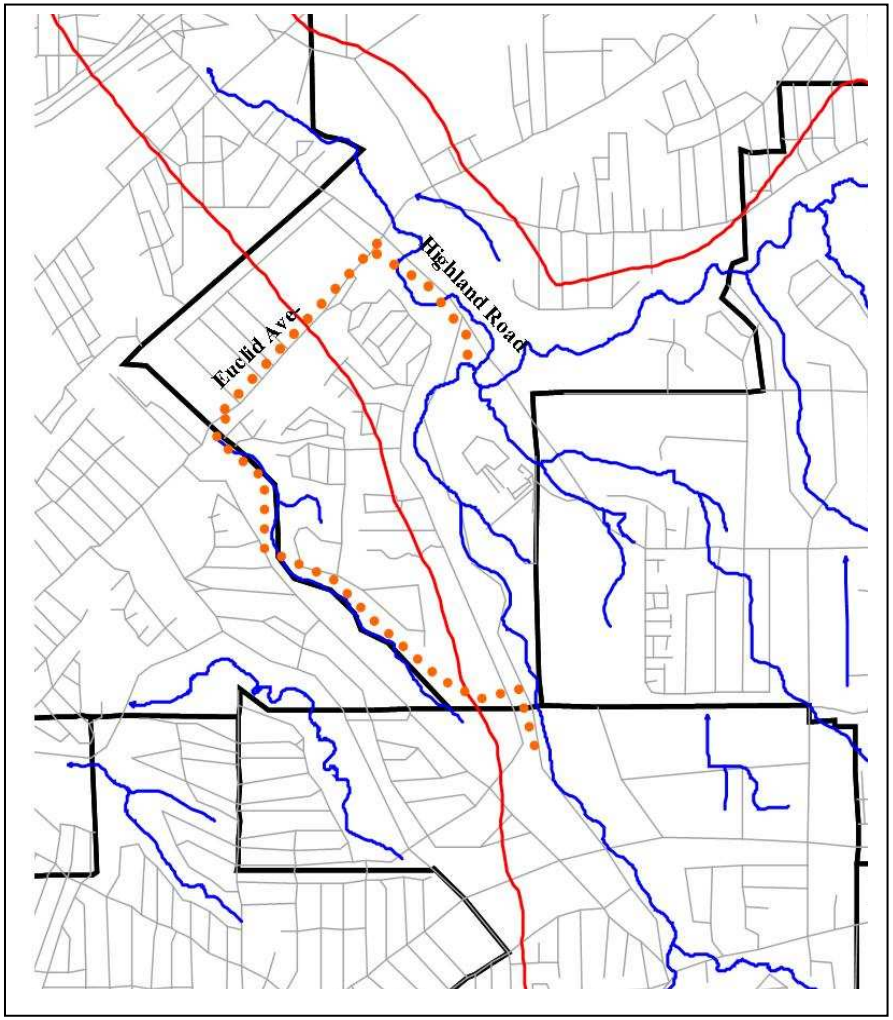


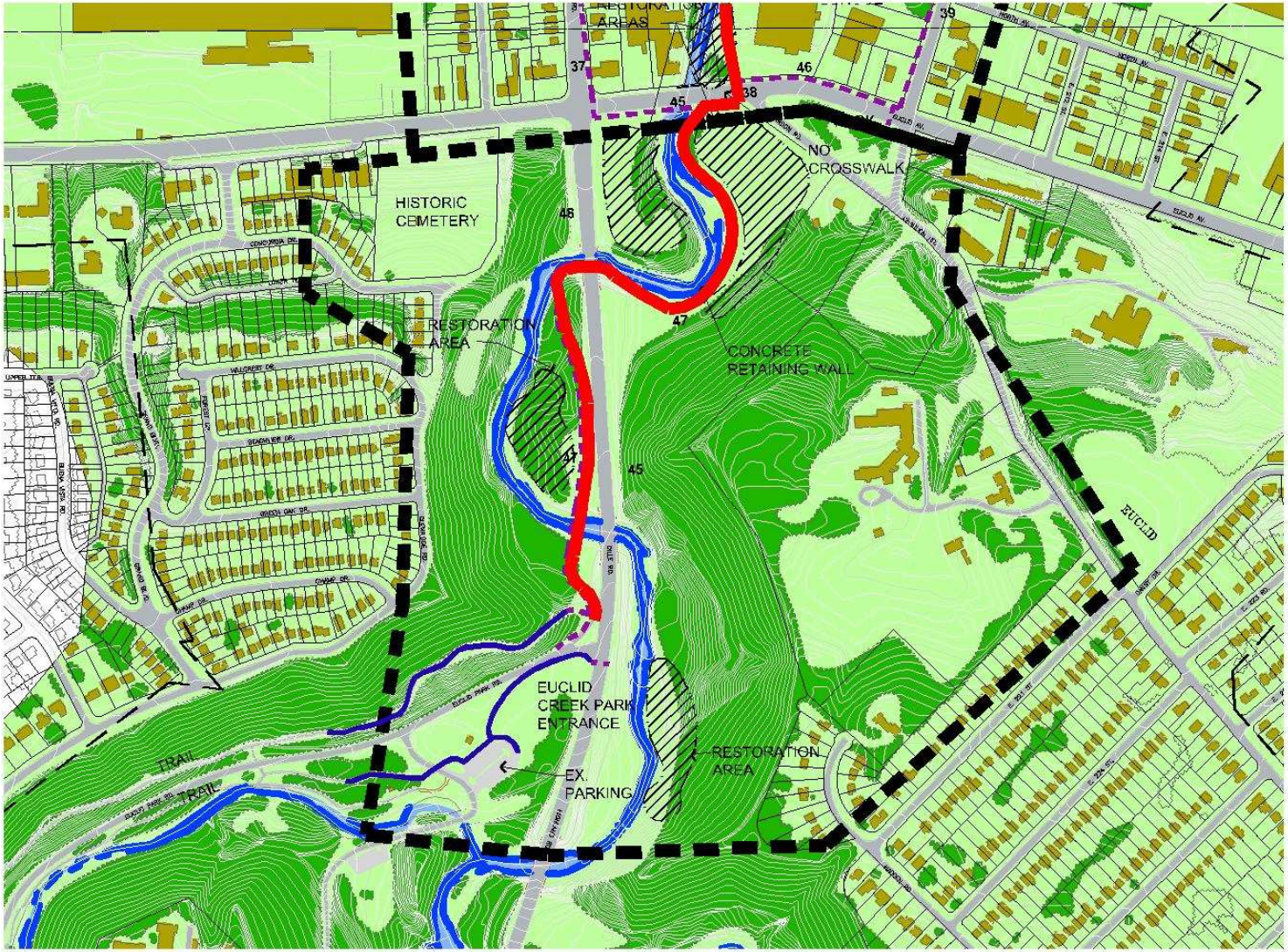
Figure 13 Euclid-South Euclid Neighborhood Greenway Connector

PROPOSED STREAMSIDE TRAIL IN EUCLID RESERVATION

PROPOSED TRAIL CROSSWALK AT EUCLID CREEK PARKWAY

PROPOSED TRAIL UNDERPASS AT HIGHLAND ROAD

Entrance to Euclid Creek Reservation at Highland Road



LOWER EUCLID CREEK

TRAIL & GREENWAY PLAN

Figure 14 Trail Section 5

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

URS

LEGEND

- MAIN TRAIL ROUTE
- PROPOSED CONNECTOR/TRAIL
- EXISTING TRAIL
- WATERSHED BOUNDARY
- RESTORATION OPPORTUNITIES
- SECTION AREAS

NORTH

0 600

Scale: 1 " = 600'

Ecological Restoration Assessment
Section 5: Euclid Avenue to Metroparks Highland Picnic Area

Section Characteristics

Due to the lack of buildings and structures in this section, the creek consists of a winding natural channel. The exception is a concrete wall along the creek to protect an main utility line traveling through the park. Its natural environment and lack of buildings poses opportunities to restore floodplain functions to the watershed that can benefit the Lower Euclid Creek corridor and its creek flows and migration of fish to the Metroparks.

Area Data

The section is defined by the Euclid Creek Metroparks Reservation Area to the south, Chardon Rd to the east, and Glenridge Rd. to the west.

- Contains **4,193** linear feet of Euclid Creek, with two lengths going under Nottingham Rd.

Land Use

- The largest land owner is Cleveland Metroparks, with 354 acres. The second largest land owner is the Sister's of St. Joseph & St. Mark Convent with Our Lady of Lourdes Shrine to the east.

Watershed Impairments

- Severe Bank erosion
- Channelization: An existing concrete retaining wall lines 500 LF of Euclid Creek.

Proposed Restoration Description

- Stream bank stabilization: Bioengineering methods for bank stabilization and habitat enhancement are recommended.

Alternatives Considered

- Floodplain restoration: It is estimated that approximately 75 acre/feet of additional floodplain storage volume capacity exists in the Lower Euclid Creek corridor.
  Floodplain storage is envisioned as excavation and revegetation of floodplain areas adjacent to Euclid Creek

intended to store storm water to reduce peak discharges in order to facilitate concrete channel restoration.

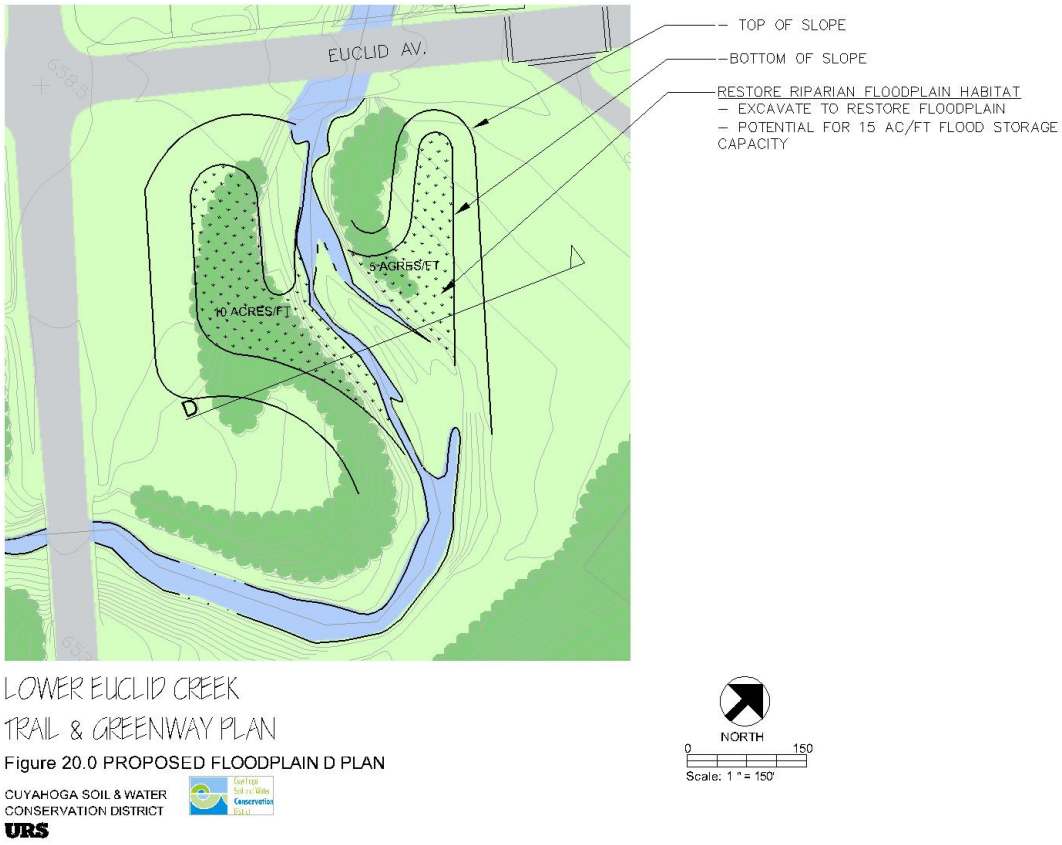
Conservation Opportunities

None. Maintain ownership by Cleveland Metroparks and enhance land conservation opportunities adjacent to the Metroparks and the upper portions of the watershed.

SEVERE BANK EROSION IN EUCLID CREEK RESERVATION

SEVERE BANK EROSION & CHANNELIZATION IN EUCLID CREEK RESERVATION

Figure 14.1 Proposed Floodplain D Plan



Biodiversity Plan

The lower Euclid Creek watershed has been profoundly affected by anthropogenic disturbances, which has transformed native plant communities in the remaining open space, particularly the areas adjacent to the Creek. An important step toward restoring biodiversity in the lower watershed involves controlling the spread of non-native invasive plant species, such as Japanese knotweed, common reed, multiflora rose, bush honeysuckles (*i.e.,* Tartarian and Bell's honeysuckle), garlic mustard, reed canary grass, Japanese honeysuckle, and glossy buckthorn. Some of these, such as Japanese knotweed, are pervasive and their control or eradication poses difficult problems. Others, such as the bush honeysuckles and garlic mustard, are also problematic, but can be effectively controlled by mechanical means. Most of the other invasive species will require some type of herbicide treatment for control.

Following are examples of treatment programs that might be used for demonstration projects for a few invasive plan species. A larger program of invasive species treatment should involve a careful assessment of areas to be treated, and individual treatment programs should be tailored to specific circumstances and available resources. In most cases, effective control of established invasive species populations will require several treatments, often over several years. Finally, replacement of dense stands of invasive plants with native plant communities will typically require that a planting plan be implemented in conjunction with the treatment plan. This may be as simple a placing a native seed mix, or may involve planting native trees and shrubs. Establishing a tree canopy is a long-term, but effective treatment for many invasive plant species that thrive in direct sunlight.

Example treatment scenarios:

Treatment of Buckthorns (*Rhamnus frangula* and *R. cathartica*) and Bush Honeysuckles (*Lonicera tatratica, L. x bella, L. morowii*)

- Small plants can be manually pulled from damp soil;
- Leverage tools (*e.g.*, the Honeysuckle Popper) can be used to remove larger plants
- Cut and treat with 20% a.i. glyphosate or 12.5% triclopyr† in oil using a low pressure hand sprayer, wick applicator, sponge or brush;
- Treatment is best done in late fall as these plants retain their leaves longer than native plant species;
- [spring foliar treatment before native plant leaf emergence is another option;]
- brush can placed in piles, chipped, and/or removed from site to eliminate seeds;
- need to consider replanting native species after treatment of dense stands;

Garlic Mustard (*Alliaria petiolata*)

Garlic Mustard is a biennial plant that forms a rosette the first year, then flowers and sets seed the second year.

- first-year plants can be pulled anytime – can be composted, mulched, or bagged/removed from site to prevent re-rooting;
- pull slowly to remove entire root;
- flowering plants must be bagged at they will set seed even after removal from soil;
- cutting or mowing close to soil surface can be effective for dense stands – best if timed just prior to flowering when stems begin to elongate;
- best to thoroughly weed a small area, rather than partial treatment of large area;
- need to revisit more than once per year; usually requires several successive years;
- if treating a sizable area, can consider piling plants near center of a dense stand;
- pulled plants can be buried in an area that will not be disturbed.

Common Reed (*Phragmites australis*) and Reed Canary Grass (*Phalaris arundinacea*)

These invasive grasses can be controlled by repeated close mowing, or by repeated hand pulling of small infestations. However, the most efficient control will be realized by a combination of cutting (or burning) and herbicide treatment†. Herbicide treatment (1.5-2% glyphosate solution with surfactant†) is most effective in late summer or fall when the plants are translocating sugars to the roots for winter storage. Excavation and removal/burial of soil will require follow-up selective herbicide application (especially with *Phragmites*, which typically has deep-seated roots and rhizomes).

Japanese Knotweed (*Polygonatum cuspidatum*)

This pernicious weed dominates streambanks in Wildwood State Park as well as other areas in to the lower Euclid Creek corridor, and is particularly difficult to eradicate. The proposed oxbow restoration in Wildwood State Park will involve substantial excavation, which would remove some of this weed that chokes-out native plants, limits fishing access, and provides very little, if any, wildlife value. Planting native trees and shrubs is likely the best long-term solution to shade-out the knotweed.

Hand pulling or close mowing can be used to control small infestations or to reduce the vigor of established stands of knotweed. However, repeated herbicide application (3% glyphosate), followed by planting of native species will be required for effective control of all but the smallest stands of this invasive plant. Another effective control for smaller areas involves placement of black plastic over dense stands, which will shade the plants.

Purple loosestrife (*Lythrum salicaria*)

This noxious weed prefers moist, open sites, especially wetlands. Small infestations can be controlled by a combination of cutting/removal of flowing parts and selective herbicide application to remaining portions of the plant†. Plants that have begun to flower must be removed from the site, as they will set seed even if pulled from the soil. As with many invasive species, the most effective control involves early detection and removal of a few plants when first introduced to an area.

Larger stands of purple loosestrife have been effectively controlled though the use of introduced beetles (*Gallerucella spp.*) and weevils, which have been tested for safe biological control of this species. [1]

† Use approved formulations over water/wetland areas; recommend certified herbicide applicators only

PROGRAMMATIC INTERPRETATION PLAN

The Lower Euclid Creek Greenway corridor is rich with interpretive opportunities. It provides a journey from the escarpment and Appalachian Plateau to the Lake Erie coastal plains. It also is the journey of water from Lake Erie for us to drink, to the water that enters back into the creek and travels back out to Lake Erie. The cities of Cleveland and Euclid and all of the Euclid Creek communities have an opportunity to tell the story of history, water and the value of urban greenspace and its natural functions to its residents and visitors across the region and across the Great Lakes. The topics summarized below represent opportunities to enrich the trail experience, tell the historic story, and present public education topics. Potential interpretive topics include:

- History of the Estuary
- Aquatic habitat restoration
- Benefits of Riparian Buffers
- Desirable Fish Species,
- Invasive Plant Species, Desirable Plant Species
- Combined Sewer Overflows
- Historic stone bridge structures
- Early settlement along Euclid Creek
- Early agriculture along Euclid Creek
- Removal of fish barriers
- Water Cycle, Water Treatment
- Floodplain forest land lab
- Stream Morphology, Stream Erosion Dynamics

Further partnerships will need to be developed by the Cities, Cleveland Metroparks and Ohio Department of Natural Resources to pursue the interpretive and programmatic opportunities and funding to realize the potential to tell the story along the greenway for all to enjoy. It is recommended that an interpretive program plan be developed in conjunction with the greenway as the project is developed with the project partners.

The attached Programmatic Interpretation Master Plan identifies potential interpretive opportunity locations.

Our Future Footprint in the Lower Euclid Creek Corridor

The Lower Euclid Creek is the most impacted by its development patterns the past 150 years than any other part of the Euclid Creek Watershed. Managing our storm water from our rooftops, driveways and home and business sites will lessen the volume in Euclid Creek and the impacts that extra storm water places on the system. Impacts include flooding, erosion on the streambanks and streamside property, and overloading our infrastructure investments.

Watershed retrofit options include:

- Implementation of Stormwater Management Ordinances for Redevelopment Projects. Examples of neighborhood storm water practices that can be incorporated into the built environment of the Lower Euclid Creek are included in this section of the report to demonstrate their application and where funding sources could provide improvements in an existing community.

- Urban Tree Canopy: Increasing urban tree canopy throughout the watershed can measurably reduce runoff. According to a USEPA study, a 42% urban tree canopy in a residential area of Milwaukee reduces stormwater flow by up to 22%. On average trees in Milwaukee sample sites reduced total runoff volume by 5.5% and reduced peak flow by 9.4%.

- Restoration of floodplain functions: Floodplain storage can significantly reduce peak rates of discharge as well peak velocities causing stream bank erosion. A review of an 1892 map of Euclid Creek indicates that 200 years of development has removed more than 10 meanders from Euclid Creek in the lower 3 mile segment alone. Floodplain and wetland filling for development has resulted in no wetlands and very little floodplain remaining.

- Green roofs: Although green roof construction in Cleveland is in its infancy, more wide spread use is foreseeable. The City of Chicago already provides incentives for implementing green roofs on new construction. Green roofs can reduce runoff by up to 50%.

- Bioretention: Bioretention basins are now a regularly specified as a stormwater management requirement as an effective tool to filter runoff pollutants. A secondary benefit is increasing groundwater discharge. Bioretention areas reduce runoff by increasing infiltration and filter more than 50% of pollutants from runoff.

- Pocket wetlands: Even in urban areas like the Lower Euclid Creek, there are numerous areas to re-introduce small wetland areas as part of the landscape and mimic the historical marshlands of the coastal plains this area inhabited in the 19th century. They also provide storm water management functions that can relieve Euclid Creek from increased flooding occurrences.

Bioswale/Bioretention Cell

Description: Shallow landscaped depressions which collect and hold stormwater allowing pollutants to settle and filter out as water soaks in to the ground. (Image: City of Portland Website)

Pocket Wetland

Description: Pocket wetlands (a.k.a. stormwater or constructed wetlands) are structural practices that incorporate wetland plants in a shallow pool. As stormwater runoff flows through the wetland, pollutant removal is achieved by settling and biological uptake within the practice. [www.stormwatercenter.net] (Image: NC State Univ Watershed Education Network Website)

Enhanced Water Quality Swales

Description: A variation on the bioswale/bioretention concept, enhanced water quality swales are long narrow landscaped depression used to collect and covey storm water runoff, allowing pollutants to settle and filter out as the water infiltrates into the ground or flows from one bay to the next through the facility. In addition to providing pollution reduction, these swales also slow and pool water for a certain period of time. (Image: City of Portland Website)

The photograph below shows a project in Portland, Oregon. This project captured runoff from approximately 9,300 square feet of paved surfaces. The curb extensions convert about 590 square feet of pavement to landscape. (Image: City of Portland Website)

Rain Garden

Description: A bowl-shaped garden, designed to absorb stormwater runoff (a small-size bioswale) on smaller sites. (Image: www.urbanwaterquality.org)

Reforestation/Protection

Restoring the urban tree canopy and protecting the remaining forested areas along the streambank of at least 50 feet on both sides of the stream will further maintain the creek's stability to manage storm water and protect property and residents. Encouraging tree planting throughout the project area and establishing conservation easements along the streambanks are low cost strategies in creating greenspace in Euclid Creek.

Opportunities in Lower Euclid Creek

To demonstrate storm water management opportunities in the Lower Euclid Creek, the Cuyahoga County Planning Commission has developed potential scenarios of restoring areas that have developed in the past without impacting their function as a facility.

Bioretention at Humphrey Park – Parking Lot

Pocket wetland at Nottingham Library Front Entrance

Safety/Management/Maintenance

A greenway's viability as a healthy asset to the community relies on forethought to the long-term stewardship of it by it citizens and community partners. Safety, management and maintenance are key components maintain a resource for the enjoyment and function for everyone and protect the creek.

Safety

Keeping a safe greenway both in the accessible and non-accessible areas is a key component to a successful greenway. The Cleveland Metroparks and other park districts across the country have realized that the more users, the safer the greenway is. The Greenway can become self-regulated by the users to an extent. The presence of law enforcement rangers at the Euclid Creek Metroparks Reservation and Wildwood State Park has the potential to expand their jurisdiction along the greenway areas if financially feasible. The Euclid Creek Metroparks Reservation has very low to none crime activity due to the high usership and the monitoring of local park rangers.

A safety plan and strategy will need to be developed prior to the implementation of any additional trail corridors within the greenway.

Management

The greenway will need to be managed to maintain trail facilities such as the trail, signage and other components. The presence of the Cleveland Metroparks provides an opportunity to extend their service area with the appropriate resources. A management plan will need to be developed with project partners including the Cities of Euclid and Cleveland and the appropriate organizations.

Agreements on management activities will need to be established based upon the management plan for its implementation and formalizing a strategy.

Maintenance

Maintenance is the other critical component to maintain a corridor for use over the long term. Understanding the maintenance needs, schedule of those needs and associated costs will need to be identified as part of the management plan for the corridor. A maintenance plan with these elements is recommended to be developed in conjunction with the management and safety plan to derive the best and most efficient and effective strategy to address these needs.

Implementation Strategy

If a plan doesn't have an implementation strategy it will never be realized. The Community Advisory Team has assembled roles and responsibilities to guide steps needed to implement the recommendations derived from this plan. These implementation strategies are aimed for the next three years.

Cuyahoga Soil & Water Conservation District

Develop grants for implementation f projects identified in plan. Priority Projects for funding include for 2007-2008 include:

Oxbow Restoration
Land Conservation along creek corridor
East 185th Spillway Fish Passage
Storm water best practices retrofit projects.

- Coordinate with Community Advisory Members on actions and activities.
- Work with City of Euclid to discuss with Norfolk Southern on conservation access.
- Work with City of Cleveland to discuss with CSX conservation access.
- Work with Euclid Creek Watershed Council in developing a hydrologic analysis and build out analysis of entire watershed to inform impacts in the Lower Watershed for both restoration projects and storm water management.
- Work with City of Euclid to develop funding for the Upper Euclid - Green Corridor
- Introduce opportunities to re-introduce urban forestry areas within watershed.
- Continue to coordinate and increase awareness of Euclid Creek in Lower Euclid Creek with local organizations and institutions.

City of Cleveland

- Include Euclid Creek Greenway into Citywide Plan and future Lakefront Planning efforts. Identify coordinated efforts with infrastructure and development projects adjacent to project area. (City Planning)
- Coordinate with SWCD on restoration projects in Wildwood and Army Corps Channel to facilitate informed design and long-term benefits. (Div of Water Pollution Control)
- Coordinate with Cuyahoga SWCD on permanent conservation of 17 acres of the Nottingham Property. (Div of Water)
- Submit Project to NOACA's TIP project list. Also include Trail recommendations on City's Bikeway Capital Improvement Budget for 2009. (City Planning)
- Explore opportunities for interpretive kiosk at St. Clair Avenue. (City Planning)

City of Euclid

- Continue to invest in infrastructure improvements to limit impacts to Euclid Creek.
- Work with City of South Euclid, Cleveland Metroparks and Watershed Coordinator to develop Euclid-South Euclid Neighborhood Connector Greenway.
- Assist with coordination with Watershed Coordinator and Euclid Schools to establish greenway.
- Coordinate with Watershed Coordinator on conservation opportunities with Dille Road property owners and future planning objectives of Dille Road and Euclid Avenue corridor.

Councilmen Polensek/Gruber

- Introduce Joint Resolution supporting the implementation or the recommendations and request Metroparks management and enhancement of the corridor section from Euclid Avenue to St. Clair once easements are in place.
- Work with City staff, Watershed Coordinator and Legislative Representatives to provide support for funding applications and funding appropriations where applicable.

- Coordinate with City Staff, Watershed Coordinator on opportunities on redevelopment projects to incorporate forested open space, recreation needs and storm water management benefits.
- Assist with property owner communication and coordination where necessary

Northeast Shores Development Corporation/Collinwood-Nottingham Development Corporation

- Explore the viability of cost-share purchasing opportunities along the Euclid Creek Corridor with Cuyahoga SWCD for development and conservation collaboration.
- Continue to promote linkages of public access to Lake Erie and Euclid Creek for recreational use.
- Encourage the integration of Euclid Creek with nearby commercial districts as an amenity to the community through exploring partnerships with local merchant associations.
- Coordinate with Cuyahoga SWCD to meet with property owners when opportunities arise to implement recommendations.
- Incorporate and promote innovative storm water management and water quality best management practices with developers, architects and landscape architects in early planning stages of developments.

Northeast Ohio Regional Sewer District

- Assist Watershed Coordinator and Cities on funding and technical assistance for restoration and storm water management projects identified.
- Coordinate with Watershed Coordinator on future mitigation opportunities that can utilize identified projects in this plan to meet requirements.
- Continue to make improvements to existing CSO's to reduce impacts to Euclid Creek.

Cuyahoga County Planning Commission

- Incorporate recommendations of the plan into the Cuyahoga Greenprint Implementation strategy.
- Work with Cleveland and Euclid on future Master Plans and zoning regulations to facilitate Euclid Creek conservation and stewardship goals.
- Continue to work with Cuyahoga SWCD on Neighborhood Storm Water retrofit strategy planning and implementation..

Cleveland Metroparks

- Incorporate extension of Euclid Creek Reservation all-purpose trail to Euclid Avenue in Metroparks Capital Improvement Budget. Determine schedule for engineering and construction associated with Metroparks overall capital budget needs. (Planning Division)
- Continue to work with Watershed Coordinator on programming and interpretive opportunities along the Corridor north of the existing Reservation and potential partnerships with Wildwood State Park program staff.
- (North Chagrin Interpretive Staff)

ODNR/Wildwood & Euclid Beach State Park Administration

- Work with City of Cleveland and Cuyahoga SWCD on wetland restoration and stream stabilization projects when funded.
- Identify programming opportunities to partner with Cleveland Metroparks along the Euclid Creek corridor.
- Work with Cuyahoga SWCD on incorporating best practices on the grounds of the park to improve water quality and enhance biodiversity.
- Partner with Euclid Creek Watershed Coordinator on participatory and service learning activities at Wildwood including Beach monitoring, stream monitoring, invasive pulling and native plantings.

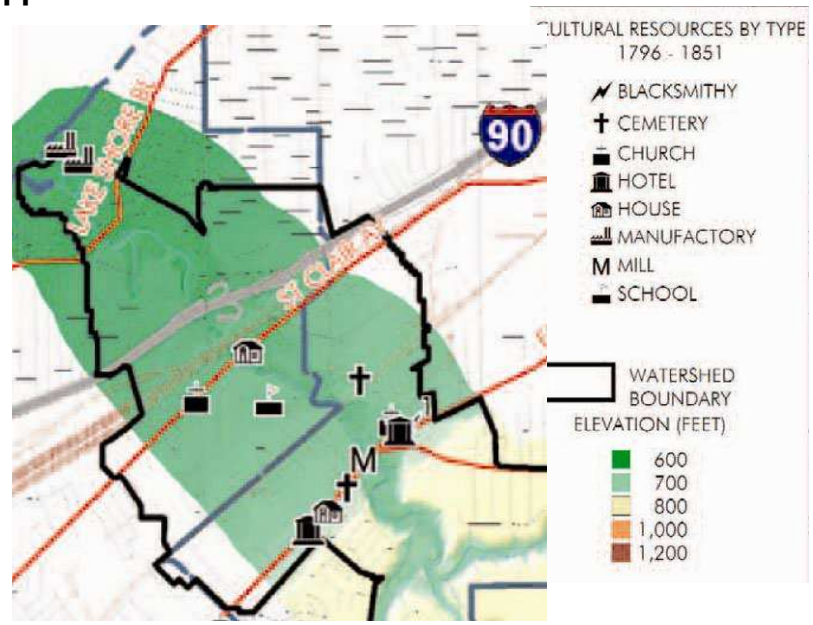
Community Stewardship

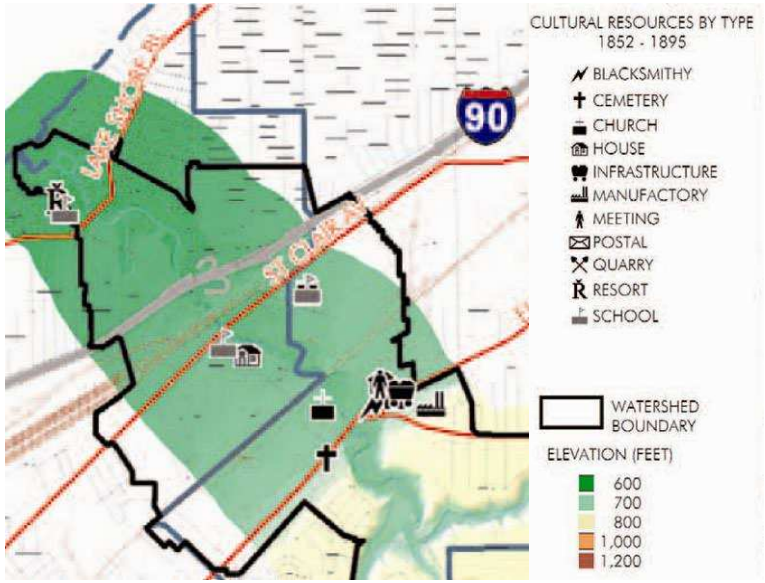
The act of community is where a place begins to revitalize itself or to maintain the values and history of a place. The Lower Euclid Creek Greenway project has an opportunity to involve the community in a project that complements the great places in the community. The greenway links the residents to greenspace, its local creek and its lake that is missing in the neighborhoods today. Community stewardship will play a significant role in the realization of the project recommendations. Stewardship can be helping inform residents of the opportunities to planting native plants along the banks of Euclid Creek or simply going fishing and enjoy the beauty of Euclid Creek. The Greenway will continue to foster community stewardship to bring Euclid Creek back as an asset into the community.

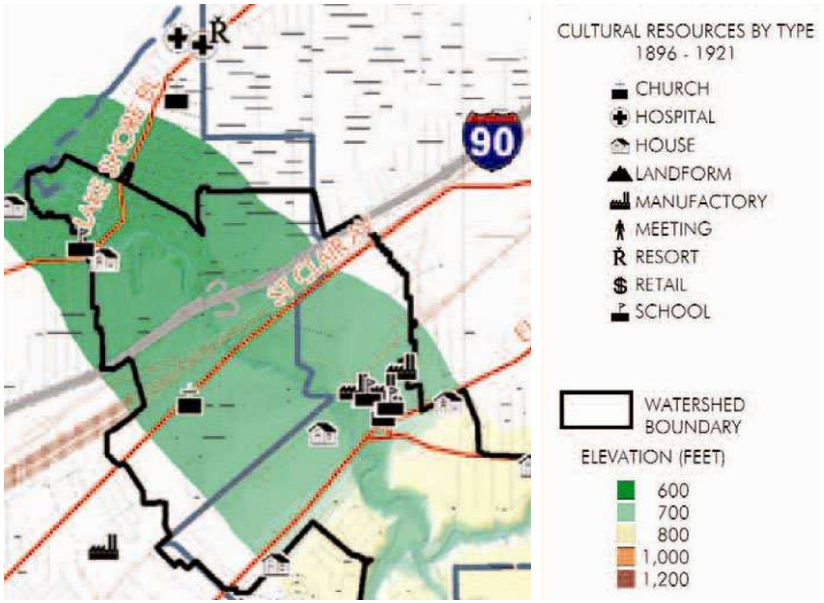
Conclusion

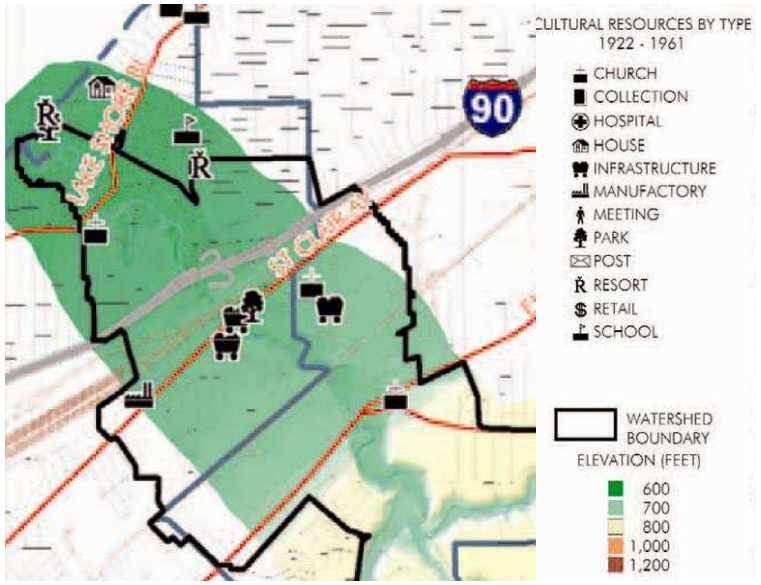
At first glimpse, the Lower Euclid Creek corridor appears to be lost from any restoration or expansion of greenspace. But peering deeper into the community, vast opportunities arise to increase greenspace, provide amenities to neighborhoods and restore the ecological functions of Euclid Creek. This project has begun to identify feasible projects that can be completed in five years with the appropriate funding. The project also sets the strategy for longer term efforts over the next 20 years through many partnerships with the community and our institutions that sustain and revitalize the strong community history the Corridor embodies. Urban greenway corridors have the highest level of return for the community due to its density of population and significant contribution to returning the ecological value of urban landscapes for the benefit of our Lake Erie. As we look at the Lower Euclid Creek's future, it is bright, green, and healthy for all of the residents that live here.

Appendix A. Historic Places

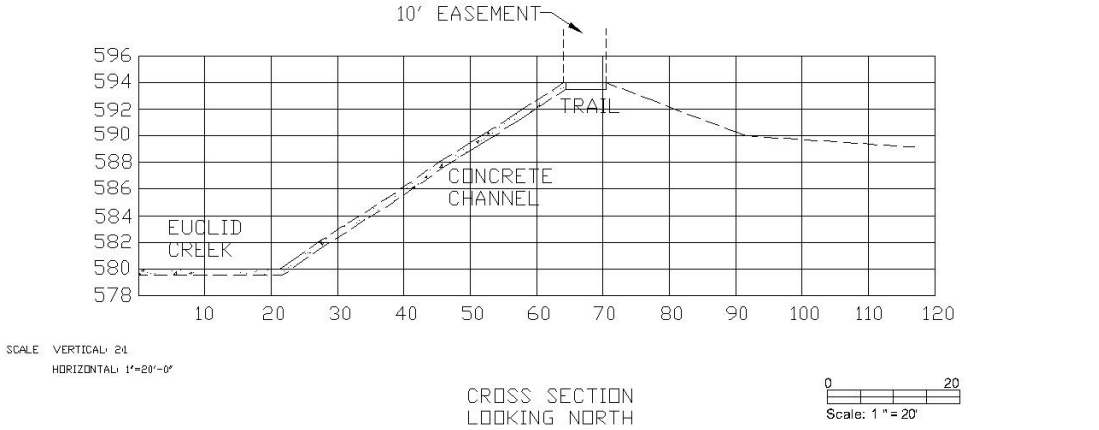








Appendix B. Trail Cross -Sections



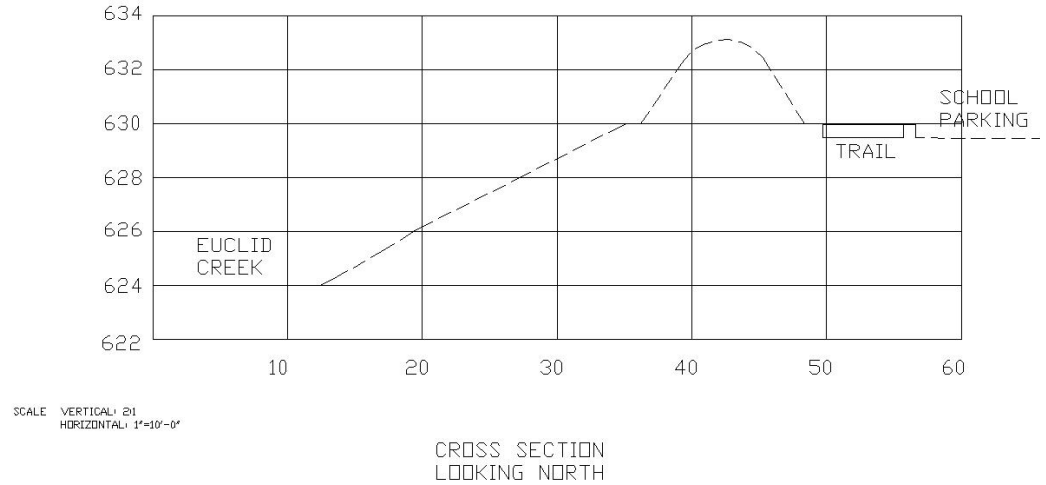


Figure 6.2 EUCLID SCHOOL TRAIL SECTION

CUYAHOGA SOIL & WATER CONSERVATION DISTRICT

URS

Appendix C: Costs Estimates

10/17/2006

Lower Euclid Creek Trail,
Conceptual Construction Cost Estimate

Section 1:

North:Wildwood State Park
West: Euclid Beach
South: Lakeshore Blvd.
East: Neff Rd.

Section 1-A

Utilize existing Trail traversing from Euclid Beach State Park through Wildwood State Park to Lakeshore Blvd.

Ex. Crosswalk	1	EA	$0	$0
Ex. Trail	4150	LF	$0	$0
				$0
				$0
Subtotal				$0
Contingency @10%				$0
Total				**$0**

Section 2:

North: Lakeshore Blvd.
West: Nottingham Rd.
South: Villaview Rd.
East: Neff Rd.

Section 2-C

4300 LF Trail Segment, From Lakeshore Crosswalk, roadside trail on south side of Lakeshore for 350 LF, bike route along Marcella Road, roadside trail along west side of E. 185th, roadside trail along north side of Villaview Road to Neff Road intersection.

Demolition	1	LS	$25,000	$25,000
Erosion Control	1	LS	$10,000	$10,000
10' Roadside Asphalt Trail	1600	LF	$85	$136,000
Bike Route Signage	1	LS	$10,000	$10,000
Caution Signal at Lakeshore.	1	EA	$70,000	$70,000
Upgrade Exist Traffic Signal at E 185/Villaview	1	EA	$70,000	$70,000
Construction Subtotal				$321,000
Construction contingency @10%				$32,100
Engineering: Survey, Traffic, Plans & Specs, Const Admin.				$75,000
Combine with 3D				
Total				**$428,100**

Section 3:

North: Villaview Rd.
West: Nottingham Rd.
South: St. Clair Ave.
East: Neff Rd.

Section 3-D

1700 LF Trail Segment, Along West side of Neff Road, thru existing RR underpass, to St. Clair.

Demolition	1	LS	$25,000	$25,000
10' Roadside Asphalt Trail	1300	LF	$85	$110,500
Railroad Underpass Repair	1	LS	$30,000	$30,000
Bike Route Signage	1	LS	$10,000	$10,000
Upgrade Exist Traffic Signal @ Neff/St. Clair	1	EA	$70,000	$70,000
Construction Subtotal				$245,500
Construction Contingency @10%				$24,550
Engineering: Survey, Combined with 2C				
Total				**$270,050**

10/17/2006

Lower Euclid Creek Greenway, Restoration Conceptual Cost Estimate

Section 1:

North: Wildwood State Park **South:** Lakeshore Blvd.
West: Euclid Beach **East:** Neff Rd.

Section 1-A

WILDWOOD RESTORATION

Restore Riparian Vegetation through Wildwood State Park from the Lake to Lakeshore Blvd.

Item	Quan	Unit	Unit Cost	Item Cost
Mobilization	1	LS	$5,000	$5,000
Invasives Treatment	1	LS	$10,000	$10,000
Soil Prep, Seeding, Native Mix	10000	SY	$4	$40,000
Streambank Grading	3000	CY	$10	$30,000
Dec. Trees, 2" Cal.	25	EA	$400	$10,000
Dec Trees, 1" Cal.	200	EA	$200	$40,000
Erosion Matting	10000	SY	$4	$40,000
Dec Shrubs	500	EA	$50	$25,000
Live Whips	3000	EA	$5	$15,000
Construction Subtotal				$215,000
Construction Contingency @ 10%				$21,500
Engineering: Mapping, Plans & Specs, Const. Admin.				$35,000
Total				**$271,500**

Section 1-B

OXBOW RESTORATION

Mobilization	1	LS	$10,000	$10,000
Construction Layout	1	LS	$15,000	$15,000
Filter Fabric Fence	3000	LF	$2	$6,000
Clearing & Grubbing	1	LS	$20,000	$20,000
				$0
Excavation and On Site Grading	18000	CY	$10	$180,000
				$0
Soil Fertility Amendment	1000	CY	$25	$25,000
Invasives Spraying	1	LS	$10,000	$10,000
Erosion Mat	5000	SY	$4	$20,000
Temp Seeding	25000	SY	$1	$12,500
Seeding, Upland	15000	SY	$1	$11,250
Seeding, Wetland	15000	SY	$2	$22,500
Dec Trees, 2" Cal	50	EA	$400	$20,000
Dec Trees, 1" Cal	200	EA	$200	$40,000
Dec Shrubs, 18"	200	EA	$50	$10,000
Perennials	500	EA	$15	$7,500
Live Whips,	2000	EA	$5	$10,000
Boardwalk	0	LF	$350	$0
Construction Subtotal				$419,750
Construction Contingency @ 10%				$41,975
Engineering: Survey, Geotech, Permitting, Archaeology, Plans & Specs, Const Ad				$150,000
Total				**$611,725**

Section 2:

North: Lakeshore Blvd. **South:** Villaview Rd.
West: Nottingham Rd. **East:** Neff Rd.

Section 2-A

Item	Quan	Unit	Unit Cost	Item Cost
				$0
				$0
				$0
				$0
				$0
				$0

Section 2-B

FLOODPLAIN RESTORATION B

Floodplain Restoration West Side of Concrete Channel to create 25 Ac/Ft Flood Storage Volume

Mobilization	1	LS	$10,000	$10,000
Construction Layout	1	LS	$15,000	$15,000
Filter Fabric Fence	5000	LF	$2	$10,000
Clearing & Grubbing	1	LS	$15,000	$15,000
Topsoil Strip	2000	CY	$5	$10,000
Excavation	60000	CY	$10	$600,000
Excavation, Haul	60000	CY	$15	$900,000
Topsoil Spread	2000	CY	$5	$10,000
Erosion Mat	3000	SY	$4	$12,000
Temp Seeding	15000	SY	$1	$7,500
Seeding, Upland	10000	SY	$1	$10,000
Seeding, Wetland	10000	SY	$2	$15,000
Dec Trees, 2" Cal	50	EA	$400	$20,000
Dec Trees, 1" Cal	200	EA	$200	$40,000
				$0
Perennials	1000	EA	$15	$15,000
Live Whips,	2000	EA	$5	$10,000
Construction Subtotal				$1,699,500
Construction Contingency @ 10%				$169,950
Engineering: Survey, Geotech, Hyd. Modeling, Plans & Specs, Const Admin				$100,000
Total				**$1,969,450**

SUBTOTAL SECTIONS 1-2 **$2,852,675**

Lower Euclid Creek Greenway, Restoration Conceptual Cost Estimate

Section 3:

North: Villaview Rd. **South:** St. Clair Ave.
West: Nottingham Rd. **East:** Neff Rd.

Section 3-A

SPILLWAY RESTORATION
Channel and Floodplain Restoration at "Marathon" Site,
Brownfield Remediation Not Included

Item	Quan	Unit	Unit Cost	Item Cost
Mobilization	1	LS	$10,000	$10,000
Construction Layout	1	LS	$10,000	$10,000
Filter Fabric Fence	5000	LF	$2	$10,000
Demolition of Conc Channel	1	LS	$75,000	$75,000
Excavation	40000	CY	$10	$400,000
Excavation, Haul	40000	CY	$15	$600,000
Topsoil Import	1500	CY	$35	$52,500
Temporary Pump Around	30	Days	$300	$9,000
Step Pools	3	EA	$50,000	$150,000
Native Rock, Bank Stabilization	700	CY	$80	$56,000
Erosion Mat	2000	SY	$4	$8,000
Temp Seeding	15000	SY	$1	$7,500
Seeding, Upland	15000	SY	$1	$15,000
Seeding, Wetland	5000	SY	$2	$7,500
Dec. Trees, 2" Cal	50	EA	$400	$20,000
Dec Trees, 1" Cal	100	EA	$200	$20,000
Dec Shrubs, 18"	500	EA	$50	$25,000
Perennials	1000	EA	$15	$15,000
Live Whips,	2000	EA	$5	$10,000
Construction Subtotal				$1,500,500
Construction Contingency @ 10%				$150,050
Engineering: Survey, Geotech, Permitting, Hyd Modeling, Plans, Const Admin				$175,000
Total				**$1,825,550**

Section 3-B

ST CLAIR RESTORATION
Channel Restoration Between RR Tracks and St Clair

Item	Quan	Unit	Unit Cost	Item Cost
Soil Prep, Seeding,	4000	SY	$5	$20,000
Dec Trees, 1" Cal	30	EA	$200	$6,000
Dec Shrubs, 18"	200	EA	$50	$10,000
				$0
Live Whips,	500	EA	$5	$2,500
Construction Subtotal				$38,500
Construction Contingency @ 10%				$3,850
Engineering: Combine with 4A				
Total				**$42,350**

Section 4:

North: St. Clair Ave. **South:** Euclid Ave.
West: Nottingham Rd. **East:** Chardon Rd.

Section 4-A

NOTTINGHAM RESTORATION
Bank Stabilization at Nottingham Water Plant, Assume 1/3 Requires Stabilization

Item	Quan	Unit	Unit Cost	Item Cost
Mobilization	1	LS	$10,000	$10,000
Invasives Treatment	1	LS	$10,000	$10,000
Topsoil Strip	2000	CY	$5	$10,000
Streambank Grading	7000	CY	$10	$70,000
Culvert Rehab	1	LS	$5,000	$5,000
Headwall Rehab	1	LS	$10,000	$10,000
Topsoil spread	2000	SY	$5	$10,000
Erosion Mat	6000	SY	$4	$24,000
Seeding, Native Mix	15000	SY	$2	$22,500
				$0
Dec Trees, 1" Cal.	200	EA	$200	$40,000
Dec Shrubs	500	EA	$50	$25,000
Live Whips	2000	EA	$5	$10,000
Construction Subtotal				$246,500
Construction Contingency @ 10%				$24,650
Engineering: Survey, Geotech, Permitting, Hyd Modeling, Plans, Const Admin				$100,000
Total				**$371,150**

Section 4-B

EUCLID SCHOOL RESTORATION

Item	Quan	Unit	Unit Cost	Item Cost
Mobilization	1	LS	$10,000	$10,000
Invasives Treatment	1	LS	$5,000	$5,000
Topsoil Strip	1000	CY	$5	$5,000
Streambank Grading	5000	CY	$10	$50,000
Culvert Rehab	1	LS	$5,000	$5,000
Headwall Rehab	1	LS	$10,000	$10,000
Wetland Pools in Land Lab	5	EA	$2,000	$10,000
Topsoil Spread	1000	CY	$5	$5,000
Interpretive Signage for Land Lab	5	EA	$2,000	$10,000
Erosion Mat	2500	SY	$4	$10,000
Seeding, Native Mix	10000	SY	$2	$15,000
Dec Trees, 1" Cal.	50	EA	$200	$10,000
Dec Shrubs	200	EA	$50	$10,000
Live Whips	2000	EA	$5	$10,000
Construction Subtotal				$165,000
Construction Contingency @ 10%				$16,500
Engineering:				$100,000
Total				**$181,500**

SUBTOTAL SECTIONS 3-4 **$2,049,400**

Section 4:

North: St. Clair Ave. **South:** Euclid Ave.
West: Nottingham Rd. **East:** Chardon Rd.

Section 4-B

5000 LF Trail Segment From Neff/St. Clair interesection, along south side of St. Clair, then along east side creek through Nottingham Water Treatment Facility, bridge structure under existing railroad bridge, then along east side of creek through Euclid Central School to Euclid Avenue.

Demolition/Clearing	1	LS	$25,000	$25,000
Erosion Control	1	LS	$15,000	$15,000
10' Off Road Asphalt Trail	4900	LF	$85	$416,500
C. L. fence Relocation	500	LF	$20	$10,000
Headwall Rehab	2	LS	$10,000	$20,000
10' wide Trail Bridge	160	LF	$1,000	$160,000
Bike Route Signage	1	LS	$20,000	$20,000
Crosswalk @ Euclid Ave.	1	EA	$70,000	$70,000
Construction Subtotal				$736,500
Construction Contingency @10%				$73,650
Engineering: Survey, Bridge, RR coord, Plans & Specs, Const Admin.				$100,000
Total				**$910,150**

Section 5:

North: Euclid Ave. **South:** Euclid Creek Res.
West: Nottingham Rd. **East:** Chardon Rd.

Section 5-C

3300 LF Trail Segment From Euclid Avenue crosswalk, trail follows east bank of creek through Metropark, crossing under Highland Road bridge, new trail bridge across Euclid Creek, then new trail to Euclid Creek Road.

Demolition/Clearing	1	LS	$10,000	$10,000
Erosion Control	1	LS	$10,000	$10,000
10' Off Road Asphalt Trail	3300	LF	$85	$280,500
Modify Bridge Underpass	1	LS	$50,000	$50,000
Reforestation, 1" Cal Trees	50	EA	$200	$10,000
Bike Route Signage	1	LS	$10,000	$10,000
10' wide Pedestrian Bridge	160	LF	$1,000	$160,000
Construction Subtotal				$530,500
Construction Contingency @10%				$53,050
Engineering: Survey, Bridge, Plans & Specs, Const Admin.				$90,000
Total				**$673,550**

GRAND TOTAL, SECTIONS 1-5 **$2,281,850**

Lower Euclid Creek Greenway Restoration Conceptual Cost Estimate

Section 5:

North: Euclid Ave.
West: Nottingham Rd.
South: Euclid Creek Res.
East: Chardon Rd.

Section 5-A

METROPARK RESTORATION SITE A

Floodplain Restoration in Euclid Creek Reservation South of Euclid Ave.to create 15 Ac/Ft Flood Storage

Item	Quan	Unit	Unit Cost	Item Cost
Mobilization	1	LS	$10,000	$10,000
Construction Layout	1	LS	$15,000	$15,000
Filter Fabric Fence	5000	LF	$2	$10,000
Clearing & Grubbing	1	LS	$15,000	$15,000
Topsoil Strip	2000	CY	$5	$10,000
Excavation	40000	CY	$10	$400,000
Excavation, Haul	40000	CY	$15	$600,000
Native Rock, Bank Stabilization	700	CY	$80	$56,000
Topsoil Spread	2000	SY	$5	$10,000
Erosion Mat	5000	SY	$4	$20,000
Temp Seeding	25000	SY	$1	$12,500
Seeding, Upland	25000	SY	$1	$25,000
Seeding, Wetland	5000	SY	$2	$7,500
Dec Trees, 1" Cal	100	EA	$200	$20,000
Dec Shrubs, 18"	400	EA	$50	$20,000
Perennials	1000	EA	$15	$15,000
Live Whips,	2000	EA	$5	$10,000
Construction Subtotal				$1,256,000
Construction Contingency @ 10%				$125,600
Engineering: Survey, Geotech, Permit., Hyd Model, Plans & Specs, Const Admin				$100,000
Total				**$1,481,600**

Section 5-B

METROPARK RESTORATION SITE B

Floodplain Restoration in Euclid Creek Reservation, West of Highland Road to create 15 Ac/Ft Flood Storage

Mobilization	1	LS	$10,000	$10,000
Construction Layout	1	LS	$15,000	$15,000
Filter Fabric Fence	2000	LF	$2	$4,000
Clearing & Grubbing	1	LS	$10,000	$10,000
Topsoil Strip	1500	CY	$5	$7,500
Excavation	18000	CY	$10	$180,000
Excavation, Haul	18000	CY	$15	$270,000
				$0
Topsoil Spread	1500	CY	$5	$7,500
Erosion Mat	2000	SY	$4	$8,000
Temp Seeding	10000	SY	$1	$5,000
Seeding, Upland	10000	SY	$1	$10,000
				$0
Dec Trees, 1" Cal	50	EA	$200	$10,000
Dec Shrubs, 18"	200	EA	$50	$10,000
Perennials	500	EA	$15	$7,500
Live Whips,	2000	EA	$5	$10,000
Construction Subtotal				$564,500
Construction Contingency @ 10%				$56,450
Engineering: Survey, Geotech, Permit., Hyd Model, Plans & Specs, Const Admin				$100,000
Total				**$720,950**

Section 5-C

METROPARK RESTORATION SITE C

Floodplain Restoration in Euclid Creek Reservation, East of Highland Road to create 10 Ac/Ft Floodplain Storage

Mobilization	1	LS	$10,000	$10,000
Construction Layout	1	LS	$15,000	$15,000
Filter Fabric Fence	2000	LF	$2	$4,000
Clearing & Grubbing	1	LS	$10,000	$10,000
Topsoil Strip	1000	CY	$5	$5,000
Excavation	10000	CY	$10	$100,000
Excavation, Haul	10000	CY	$15	$150,000
				$0
Topsoil Spread	1000	CY	$5	$5,000
Erosion Mat	2000	SY	$4	$8,000
Temp Seeding	10000	SY	$1	$5,000
Seeding, Upland	10000	SY	$1	$10,000
Dec Trees, 1" Cal	50	EA	$200	$10,000
Dec Shrubs, 18"	200	EA	$50	$10,000
Perennials	500	EA	$15	$7,500
Live Whips,	2000	EA	$5	$10,000
Construction Subtotal				$359,500
Construction Contingency @ 10%				$35,950
Engineering: Survey, Geotech, Permit., Hyd Model, Plans & Specs, Const Admin				$100,000
Total				**$495,450**

SUBTOTAL SECTION 5	**$2,698,000**
GRAND TOTAL, SECTIONS 1-5	**$7,600,075**

Potential Restoration Funding Sources

Clean Ohio Conservation Fund, 2006 is final authorized year
Riparian restoration projects are eligible

OEPA, Watershed Resource Restoration Sponsor Program,
Requires a wastewater project sponsor,
Water resource restoration is eligible.

USEPA, Great Lakes National Program Office,
Ecological (Habitat) Restoration are eligible

Army Corps, Great Lakes Wetland and Habitat Program
Section 206 Aquatic Restoration Authorization
Section 1135 Habitat Restoration for Fish and Wildlife Resources

ODNR, Coastal Zone Management,
Coastal Management Action Grant,
(funds watershed planning)

Great Lakes Congressional Funding

Stream Mitigation

Local Match Potentials

Local Funds
In Kind Services
Value of donated land or easements
Value of donated earthwork

Lower Euclid Creek Greenway Priority Projects, Potential Funding Plan

Riparian Restoration

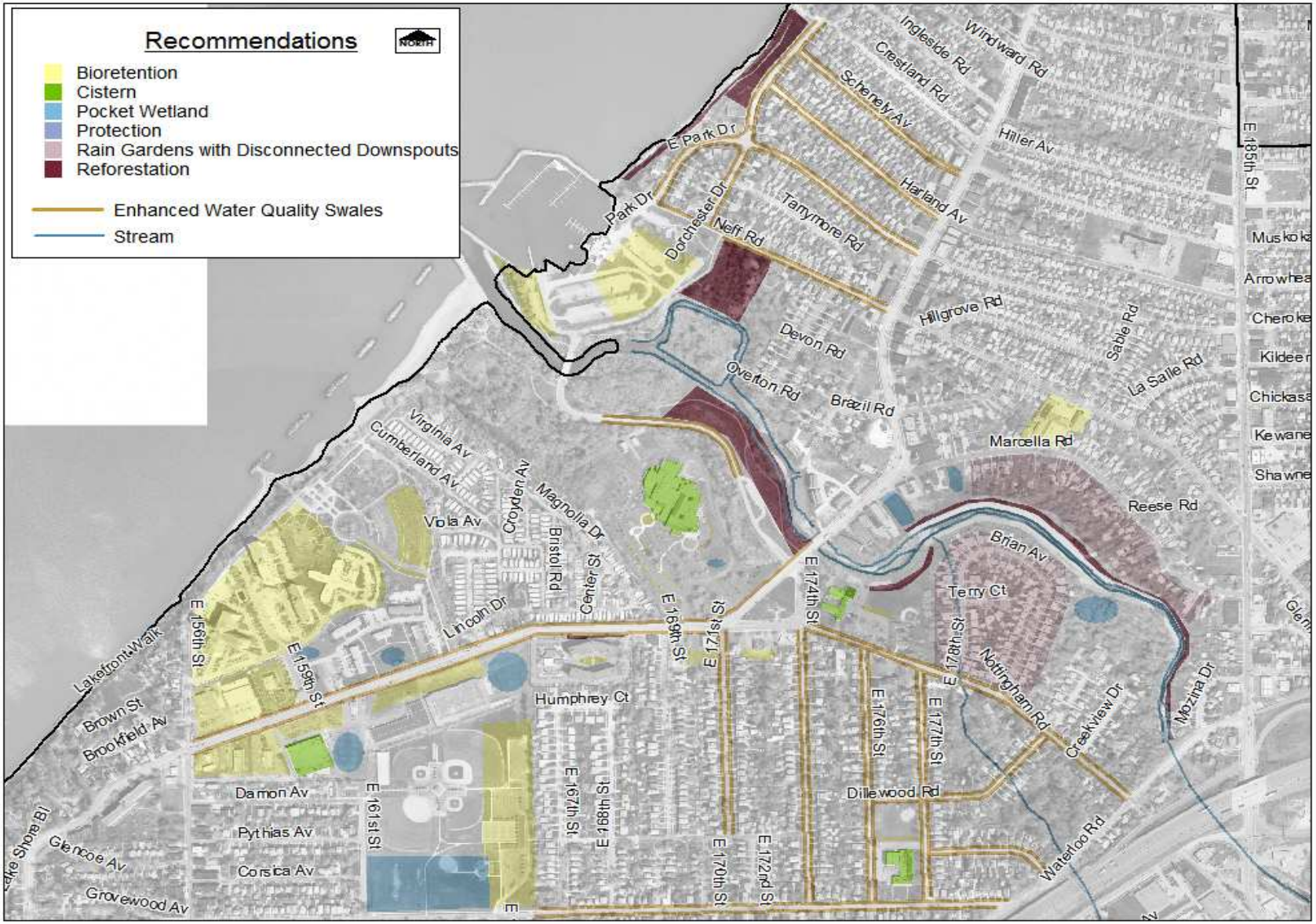
Project: Oxbow Restoration in Wildwood State Park

Est. project cost: $ 650 k

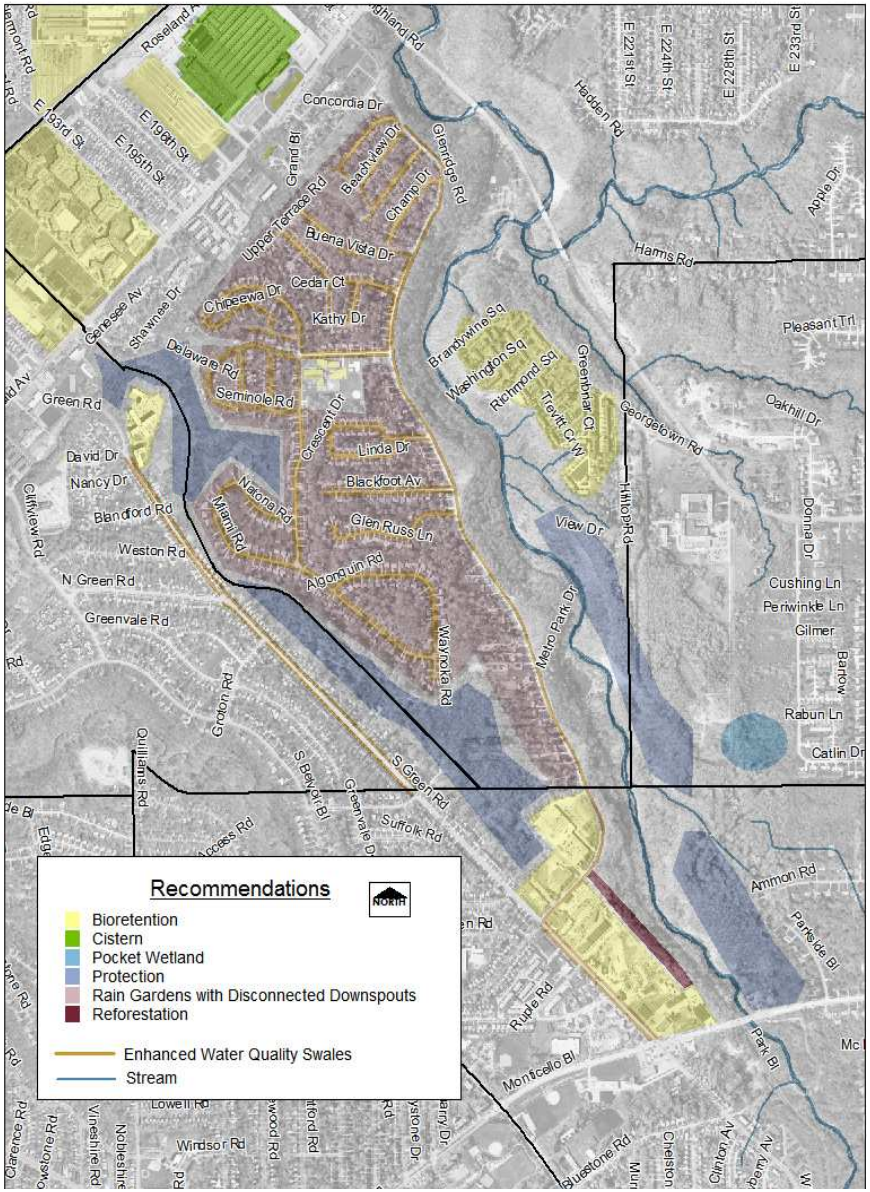
Local Match: Cleveland WPC Channel Restoration Project,
Est. Value $900k

Potential Funding: Clean Ohio Conservation Fund $ 650k
25% Minimum Local Match Req'd

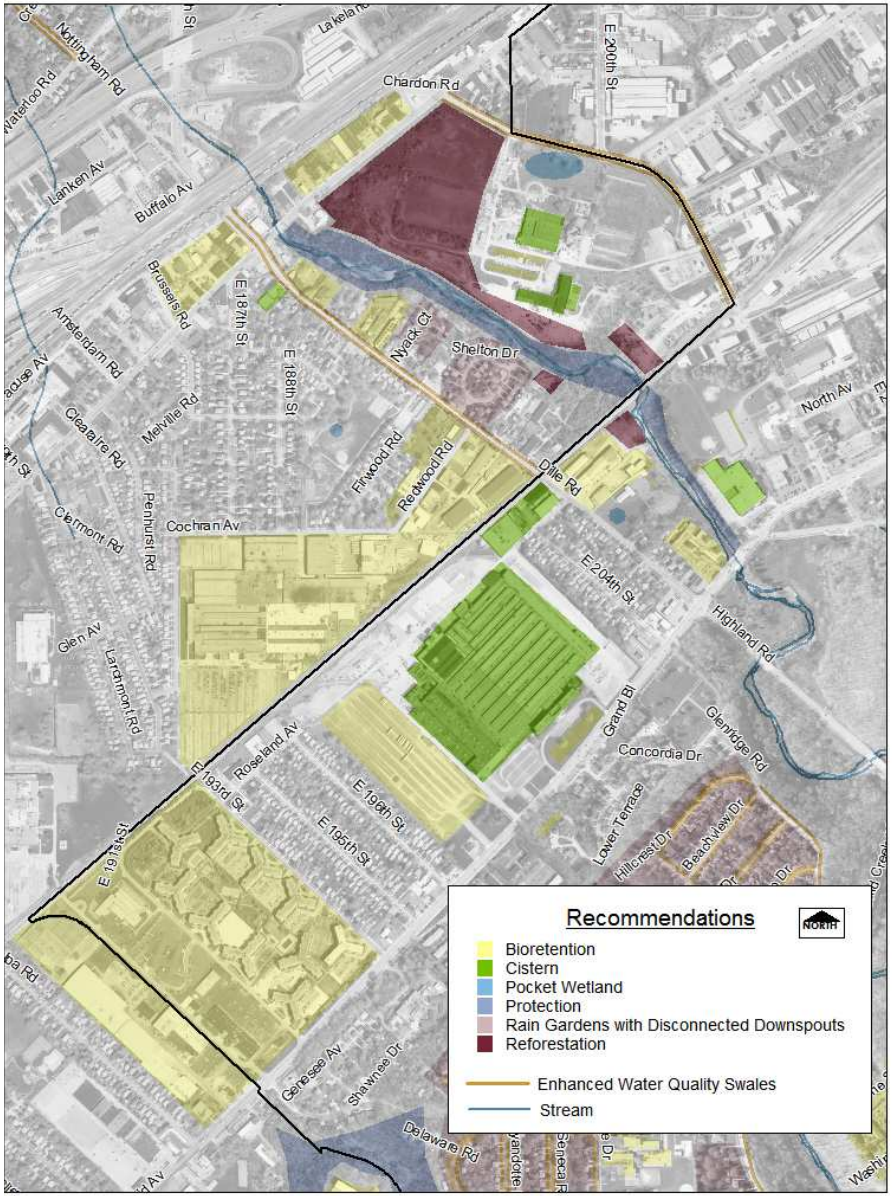
Appendix D: Neighborhood Storm Water Quality Management Opportunities
Waterloo Road to Lake Erie



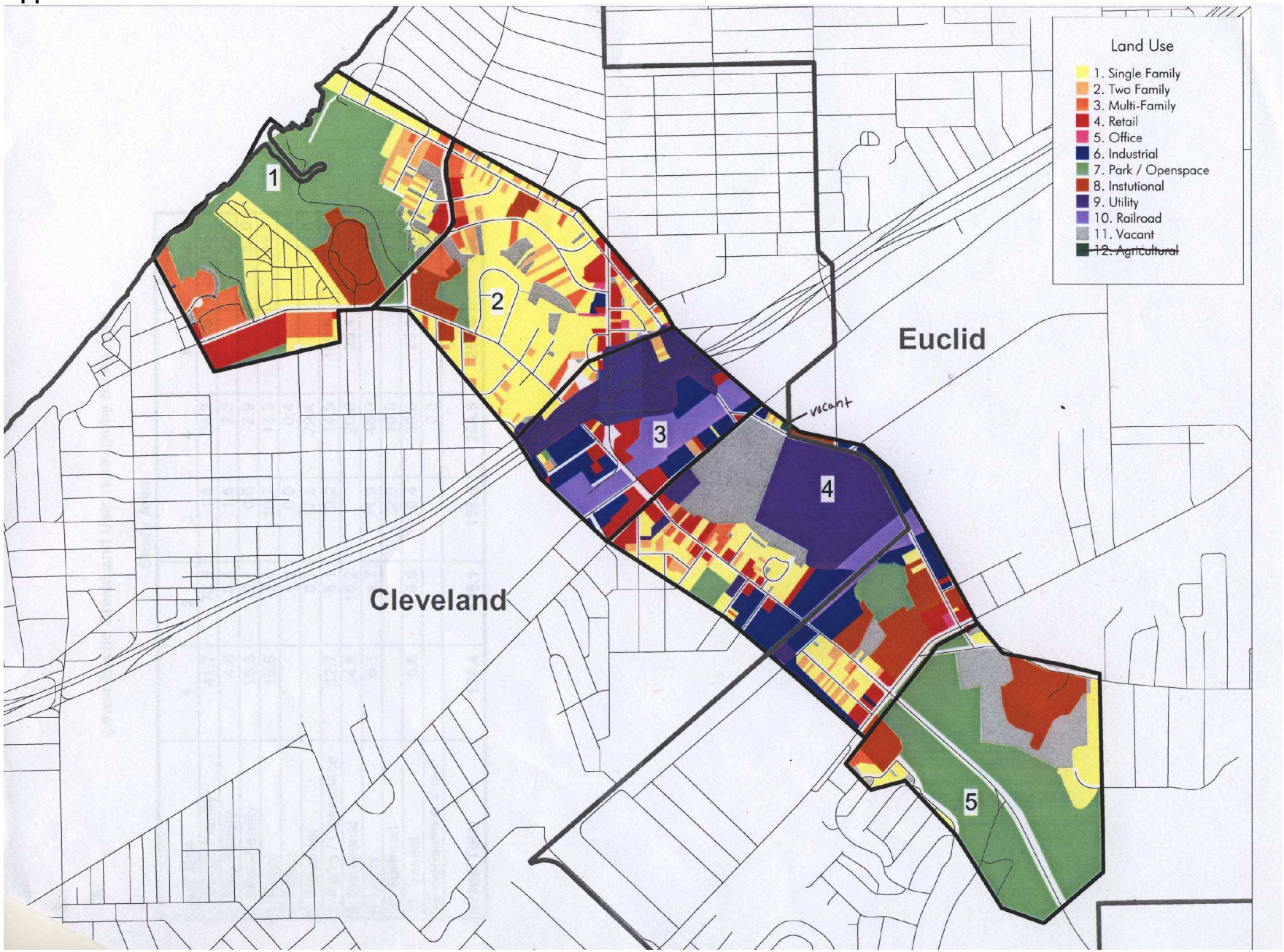
Glenridge Neighborhood, City of Euclid



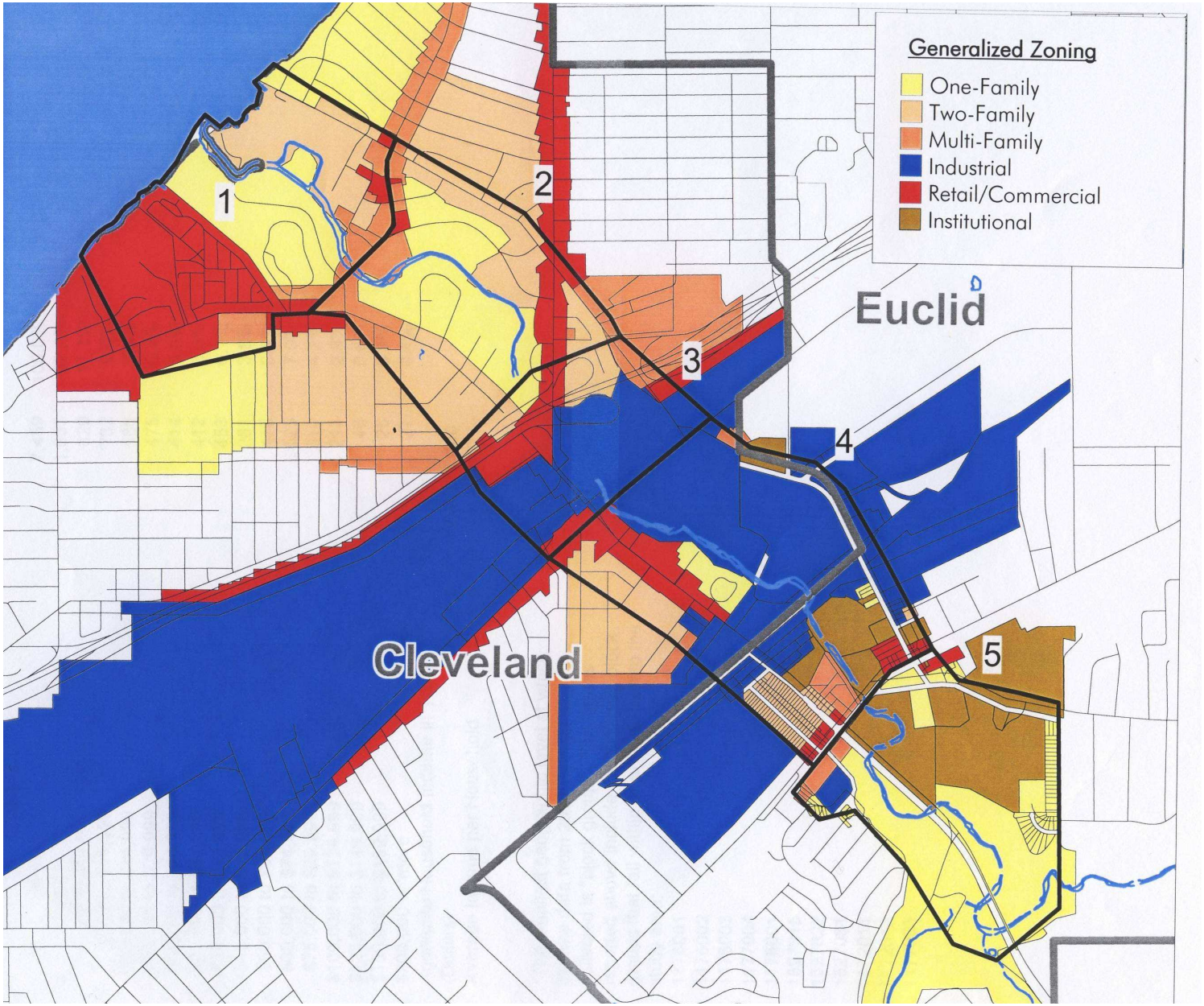
Nottingham Neighborhood, City of Cleveland



Appendix E: Land Use



Appendix F: Zoning



Appendix G: General Demographic Information

Housing Age: Number of Units

Year	Total Units
1820-1920	117
1920-1940	360
1940-1950	110
1950-1960	162
1960-1980	130
1980-Present	5
Date NA	82
Grand Total	**966**

Population

Year	Total
1990	10,042
2000	9,854
Total Area	2.63 square miles
Population Density	3,746 persons/sq. mile

Population – Age

Age	Total
Under 5 years old	556 (5.6%)
5-17 years old	1,146 (11.6%)
18-21 years old	258 (2.6%)
22-29 years old	788 (8%)
30-39 years old	1,254 (12.7%)
40-49 years old	1,168 (11.8%)
50-64 years old	1,534 (15.5%)
65 years old and over	3,150 (31.9%)

Source: 2000 U.S. Census Data – Cuyahoga County Planning Commission

Land Use

Land Use	Acres
Single Family	156 (17%)
Two Family	22 (2.5%)
Multi-Family	32 (3.6%)
Retail	42 (4.7%)
Office	1.5 (0.16%)
Industrial	47.5 (5.3%)
Parks/Open Space	292 (32.8%)
Institutional	70 (7.8%)
Utility	122.5 (13.7%)
Railroad	33 (3.7%)
Vacant	69.5 (7.8%)
Total	**888**