

Red Line/Healthline Extension Major Transportation Improvement Analysis

Environmental Red Flag Analysis



GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY

**RED LINE / HEALTHLINE EXTENSION
MAJOR TRANSPORTATION IMPROVEMENT ANALYSIS**

ENVIRONMENTAL RED FLAG ANALYSIS

VERSION 4



AECOM

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1. Introduction

The Greater Cleveland Regional Transit Authority (RTA) is examining potential Red Line/HealthLine rapid transit extensions. A series of initial alternatives have been defined by the study team after a series of public meetings held in the study area September 10-12, 2013. These initial alignments are being screened in accordance with the *Alternatives Analysis Methodology Report* (November 2013). The screening process includes subjecting alignments to two levels of sifting. The first level of sifting examines transit technologies that are suitable for operation along the alignment. The second level of sifting examines engineering constraints, environmental “red flags,” operational issues and travel market characteristics defined by the number of people and jobs within station catchment areas. This report examines environmental “red flags” following the guidance of the Ohio Department of Transportation (ODOT) for corridor studies.

Purpose of this Report

The overall purpose of this report is to identify potential environmental issues or locations of concern within the study area for the Red Line/Healthline Extension Study. Specifically, this report will identify potential environmental issues or locations of concern along the route of each of the initial build alternatives. The results of this report will be used as part of the evaluation of these alternatives in the Tier 1 Screening report. These locations or issues are referred to as “red flags”. If the Locally Preferred Alternative that results from this study requires changes to the existing environment, the “red flags” identified in this report may entail additional investigation and coordination if the LPA advances into the project development process. Creative management or design approaches, or increased right of way or construction costs may be required to mitigate potential impacts to the existing environment. The report also identifies any “fatal flaws” in the study area locations that must be avoided by any potential solutions.

Red flags can include both engineering issues and environmental or land use issues. Engineering topics investigated include existing roadway geometrics, bridges, pavement, drainage, flood hazards, utilities, and railroads. Environmental areas of investigation include cultural resources, ecological resources, hazardous materials, and environmental justice issues. This report addresses these topics in the following narrative, and presents a graphical summary on the Red Flag Summary Maps.

2.1 Project Study Area

The study area consists of three communities in Cuyahoga County as depicted in Figure 1, Appendix A, which shows the geographical context of the study area to Ohio. The study area consists of the Collinwood district of the City of Cleveland, the City of East Cleveland, and the City of Euclid.

2.2 The Study Area in the Metropolitan Context

Greater Cleveland has not escaped the low density suburban development patterns common in other metropolitan regions. Cleveland was the fifth largest city in the United States in 1930 with a population of 900,000. With approximately 300,000 people living in Cleveland’s suburbs, Cuyahoga County had a total population of 1.2 million back then. By 1950, the population of the City of Cleveland had grown to 914,800 and still exceeded the combined total of its suburbs. The total population of Cuyahoga County exceeded the combined population of the adjoining counties.

By 1960, the population in the City of Cleveland had declined to 876,000, while suburban population increased to nearly 772,000, bringing the total Cuyahoga County population to 1.6 million. By 1990, outmigration had completely reversed the distribution of population. The

adjoining counties had a combined population of 1.2 million, Cuyahoga County suburbs had a combined population of 906,524 and the central city population had been reduced to 505,616. Today, the City of Cleveland's population has declined even further to 396,800, which is less than the city's population of 100 years ago. Suburban population in Cuyahoga County has decreased to 883,300 people while population migrating to adjacent counties has dramatically increased, especially to Lake County. In 1950 the population of Lake County was 75,980 people, nearly triple what it was in 1910. Today the population has tripled again to 230,040.

The county level population projections issued by the state generally continues this pattern. Cuyahoga County's population is projected to decline to the year 2030. In Lake County, population is projected to be stable from 2010 on, while the other adjoining counties, of Geauga, Lorain and Medina, are projected to experience continuous growth. Over the 30-year horizon, Cuyahoga County is projected to lose another 120,000 people, while the remaining counties gain 107,000. This population shift will lower the Cuyahoga County's share of the five-county region from 65percent in 2000 to 60percent in 2030.

Employment and population migration from the City of Cleveland and its eastern suburbs of East Cleveland and Euclid to surrounding communities and adjoining counties has greatly affected land use and travel patterns. The causes of this trend are secular in nature and widely known. Continued suburbanization, especially shifts in employment from the central business district (CBD) to "Edge Cities", the relocation of manufacturing to other regions and countries, continued development of large regional shopping malls and the decline of retail in Downtown Cleveland, and the building of new residential communities in once rural areas in adjacent counties have all contributed to this shift in population.

The trend to outmigration away from Cleveland's east side has been so strong that even the Lake County communities that adjoin Cuyahoga County have seen a decline in residents and jobs in the last decade, as the outer portions of the county continue to grow.

This shift in population requires substantive transportation system investment. Most of the transportation investments made in the past 50 years were in highway infrastructure. This investment in highway infrastructure facilitated the reversal of population distribution, which has had a profound cumulative effect on public transportation usage. Since 1980, total RTA system ridership has been reduced by 62percent, from 129.6 million annual riders to about 48.2 million in 2012. RTA accounts for only 2percent of total person trips in the region and approximately 5.8percent of work trips.

RTA service is still concentrated on Downtown Cleveland-oriented trips. Although Downtown has enjoyed a renaissance, inter-county work trips have been rising dramatically. During this period, work trips from the surrounding six counties increased by 56percent. Region wide, vehicle miles traveled (VMT) were forecast to grow by almost 15percent from 1990 to 2010, reflecting growth in the number of households, trips per person, and average length of trip due to suburbanization. Between 1990 and 2010 actual VMT grew 12.7 percent in Cuyahoga and Lake Counties. However, in recent years, VMT in the study area has been decreasing. Since 2010 VMT in Cuyahoga and Lake Counties decreased 1.5 percent.

Suburb-to-suburb work trips far outnumber Downtown work trips. RTA has recognized a need to adapt its service to these changing travel needs of the community. RTA has constructed a series of suburban transit centers and Park - N-Ride lots served by rapid transit, trunk line commuter express buses, and local bus routes. These services are designed to re-orient the transit network toward suburb-to-suburb travel markets. These strategies, coupled with increased costs of using cars, have resulted in slow, steady growth in transit ridership.

The three Cuyahoga County communities in the study area have lived through this sea of change.

2.2.1 Cleveland/Collinwood

Collinwood is a district on the east side of Cleveland. Originally a village in Euclid Township, it was annexed by the City of Cleveland in 1910. Collinwood grew around the locomotive repair

shops and rail yards of the former New York Central Railroad (now CSX) and is divided by these same tracks into a North and South section. For much of the 20th century, Collinwood thrived due in large part to heavy industry. Besides the railroad yards, major corporations like General Motors, who operated its Fisher Body plant on Coit Road and General Electric with its Pitney Glass Works on East 152nd Street, employed thousands of workers. By the eve of World War II Collinwood's economic vitality had drawn large numbers of people.

However, in the 1980s railroad mergers made the locomotive repair shops and rail yards redundant. Cost cutting and modernization forced the closure of other manufacturing plants. Migration patterns changed the demographic profile of the community as people moved further east along the Lakeshore. Collinwood's population, which rebounded slightly in the 1990s, fell sharply from 2000-2010 declining by over 7,700 people or 19 percent of the total population. The district has begun to attract artists seeking low-cost urban places to live and work, a phenomenon that may foreshadow a neighborhood comeback. Collinwood's traditional business district at Five Points remains a focal point of activity and a priority for revitalization. Historically, one of Cleveland's major streetcar corridors was the St. Clair Line. Today Collinwood is served by several RTA local bus lines (Routes 30, 37, and 39).

East Cleveland

East Cleveland was Cleveland's first suburb, incorporated in 1911. The population was 17,843 at the 2010 census, 55percent less than the 40,047 recorded in 1950. There is an abundance of abandoned apartment buildings and vacant residential lots reflecting the severe decrease in population. Median household income is \$21,070, with 32percent of the total population living beneath the poverty line.

East Cleveland is well served by public transportation, with particularly good access to the major educational, cultural and medical institutions of University Circle. In addition to the Red Line and HealthLine rapid transit services, East Cleveland is served by several local RTA bus routes (Routes 1, 28, 30, 37, and 41), and over 17 percent of the working population commutes by public transportation.

Euclid

Euclid is a city rich in history, tradition, and diversity. It was incorporated as a city in 1930, when its population was just 12,750. By 1950, Euclid's population had increased to over 41,400 as industry grew between the two major railroads that serve the city, today's CSX and Norfolk Southern. By 1970, the population had reached its peak of approximately 71,550 people. Today, it has receded to 48,900, with a median household income of \$36,683. Approximately 13percent are below the poverty line.

The city has launched several initiatives to restore its vitality by embracing livable community concepts. The "Euclid Waterfront Improvement Plan" provides for long-term lakefront development that will open close to three quarters of a mile of public access to the shores of Lake Erie. Fishing piers, walking trails, wildlife habitat areas along with a marina and other amenities in the future, are creating tremendous opportunities for investment, outside enjoyment, recreational activities and relaxation. The redevelopment of Downtown Euclid and the revitalization of the Euclid Avenue corridor are explicit city priorities and are being planned with grants from NOACA as part of the Transportation for Livable Communities Initiative (TLCI).

Euclid residents enjoy direct automobile access to Downtown Cleveland because of the Lakeshore Freeway (I-90). In addition RTA provides transit service on several bus routes (Route 1, 28, 30, 34, 39, 94, and 239) connecting Euclid to Downtown and to the Red Line terminus at Windermere. Several of these routes were originally operated by the former Euclid Municipal Transit System, whose operations merged with the RTA during the late 1970s.

While the study area encompasses Cuyahoga County, the Environmental Red Flag Analysis focused on the routes of the nine initial build alternatives and their termini. The figures also depict future expansion of the alternatives into Lake County with a dotted line.

2. Alignment Alternatives

All the alignment alternatives are illustrated in Appendix A.

3.1 Alignment A

Alignment Alternative A has several variants using differing technologies. They are explained below:

Alignment Option A1

Alternative A1 is an electrified heavy rail extension that diverges from the Red Line at Superior Station and runs north to Collinwood adjacent to the CSX Short Line freight railroad in the former Cleveland Union Terminal (CUT) right-of-way, which is owned by CSX. At Collinwood the alignment continues east adjacent to the CSX Chicago Line terminating near Euclid Square Mall located at Babbitt Road in Euclid. This line would have the potential to be extended to Lake County with stations in Wickliffe, Willoughby and potentially as far east as Mentor. Alternatives to the heavy rail technology option could be the utilization of FRA compliant diesel-electric hybrid rail technologies that could operate on Red Line tracks from University Circle and switch over to the CSX tracks near Superior Station or operate adjacent to the CSXT on the abandoned former CUT right-of-way. This is depicted in Figure 2 of Appendix A.

Alignment Option A2

Option A2 is light rail transit/streetcar variant of Alternative A. This option is an electrified rail rapid transit extension using high/low platform railcars (Rapid+) that diverges from the Red Line at Superior Station and runs north to Collinwood adjacent to the CSX Short Line freight railroad in the former CUT right-of-way. At Collinwood the alignment diverges from the railroad corridor leaving the CSX railroad right-of-way in favor of street running north at East 152nd Street in Collinwood and continuing east along Lake Shore Boulevard to Downtown Euclid. The route could potentially be extended to Shoregate Shopping Center in Lake County. This is depicted in Figure 3 of Appendix A.

Alignment Option A3

Option A3 is also a light rail transit/streetcar variant of Alternative A. This option is a Rapid+ technology option that diverges from the Red Line at Superior Station and runs north to Collinwood adjacent to the CSX Short Line freight railroad in the former CUT right-of-way. At Collinwood the alignment diverges from the railroad corridor leaving the CSX railroad right-of-way in favor of street running north at East 140th Street in Collinwood and continuing east along Lake Shore Boulevard to Downtown Euclid. The route could potentially be extended to Shoregate Shopping Center in Lake County. This is depicted in Figure 4 of Appendix A.

3.2 Alignment B

Alternative B is an electrified heavy rail Red Line extension that begins at Louis Stokes Station at Windermere and continues to run east adjacent to the Norfolk Southern (NS) freight railroad corridor. Alternative B would terminate at the Euclid Park-N-Ride near the intersection of St Clair Avenue and Babbitt Road in the vicinity of Euclid Square Mall. As seen in Figure 3, Appendix A1, this line could potentially be extended to Lake County with stations in Wickliffe, Willoughby and perhaps as far east as Mentor. An alternative to the heavy rail technology would be the utilization of diesel-electric hybrid commuter rail technologies that could operate on Red Line and Norfolk Southern tracks. This is depicted in Figure 5 of Appendix A.

3.3 Alignment C

Alternative C, Figure 6, Appendix A, is a HealthLine bus rapid transit or "Rapid+" LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs north to Hayden Avenue using the RTA-owned private right-of-way. The alignment continues north on Hayden Avenue

turning east along St. Clair Avenue traveling to Five Points, which is the intersection of St. Clair, Ivanhoe Road and East 152nd Street. At Five Points the alignment turns north on East 152nd Street and continues north across the CSX railroad on the bridge to Waterloo Road, then turning east through the Waterloo Arts District to East 156th Street. The alignment again turns north on East 156th Street until reaching Lakeshore Boulevard, where it turns east to Downtown Euclid, with a potential extension to the Shoregate Shopping Center in Lake County.

3.4 Alignment D

Alternative D is a HealthLine bus rapid transit or “Rapid+” LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs north to Hayden Avenue using the RTA-owned private right-of-way. The alignment, in Figure 7, Appendix A, continues north on Hayden Avenue turning east along St. Clair Avenue traveling to Five Points, which is the intersection of St. Clair, Ivanhoe Road and East 152nd Street. At Five Points the alignment continues east on St. Clair Avenue to Nottingham Road and turns north under the railroad overpass until reaching East 185th Street. At East 185th Street, the alignment turns northeast along East 185th Street serving the East 185th commercial district up to Lakeshore Boulevard. At Lakeshore Boulevard the alignment turns east to Downtown Euclid with a potential extension to the Shoregate Shopping Center in Lake County.

3.5 Alignment E

Alignment Alternative E has several variants using differing routes. They are explained below:

3.5.1 Alignment E1

Alternative E1, Figure 8, Appendix A, is a HealthLine bus rapid transit or “Rapid+” LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to Coit Road. At Coit Road the alignment turns northwest to East 152nd where it turns north and travels along East 152nd Street to Five Points at Ivanhoe and St. Clair. At Five Points the alignment continues north on East 152nd Street crossing over the CSX railroad on a bridge to Waterloo Road, then turning east through the Waterloo Arts District to East 156th Street. The alignment again turns north on East 156th Street until reaching Lakeshore Boulevard, where it turns east to Downtown Euclid, with a potential extension to the Shoregate Shopping Center in Lake County.

3.5.2 Alignment E2

Alternative E2, shown in Figure 9, Appendix A is similar to Alternative E1, however at Noble Road the alignment turns northwest to East 152nd Street where the route then turns north on East 152nd Street and travels to Five Points at St. Clair. At Five Points the alignment continues north on East 152nd Street crossing over the CSX railroad on a bridge to Waterloo Road, then turning east through the Waterloo Arts District to East 156th Street. The alignment again turns north on East 156th Street until reaching Lakeshore Boulevard, where it turns east to Downtown Euclid, with a potential extension to the Shoregate Shopping Center in Lake County.

3.5.3 Alignment E3

Alignment E3, Figure 10, is found in Appendix A and runs the same alignment as E1 and E2, however, at Ivanhoe Road the alignment turns north to East 152nd and St. Clair. At Five Points the alignment continues north on East 152nd Street crossing over the CSX railroad on a bridge to Waterloo Road, then turning east through the Waterloo Arts District to East 156th Street. The alignment again turns north on East 156th Street until reaching Lakeshore Boulevard, where it turns east to Downtown Euclid, with a potential extension to the Shoregate Shopping Center in Lake County.

3.6 Alignment F

Alternative F, Figure 11, Appendix A, is a HealthLine bus rapid transit or “Rapid+” LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to East 276th Street with a potential future extension to Wickliffe in Lake County.

3.7 Alignment G

Alignment Alternative G has several variants using different routes. They are explained below:

3.7.1 Alignment G1

Alternative G1, Figure 12 in Appendix A, is a HealthLine bus rapid transit or “Rapid+” LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to either Coit or Ivanhoe Roads. At Coit Road the alignment turns northwest to East 152nd where it turns north and travels along East 152nd Street to Five Points at Ivanhoe and St. Clair. At Five Points the alignment turns east on St Clair Avenue to Nottingham Road and then turns north under the railroad overpass until reaching East 185th Street. At East 185th Street, the alignment turns northeast and travels along East 185th Street serving the East 185th commercial district up to Lakeshore Boulevard. At Lakeshore Boulevard the alignment turns east to Downtown Euclid with a potential extension to the Shoregate Shopping Center in Lake County.

3.7.2 Alignment G2

Alternative G2, Figure 13 in Appendix A, is also a HealthLine bus rapid transit or “Rapid +” LRT/streetcar extension, it begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to Noble Road. At Noble Road the alignment turns northwest to East 152nd Street where the route then turns north on East 152nd Street and travels to Five Points at St. Clair. At Five Points the alignment turns east on St Clair Avenue to Nottingham Road and then turns north under the railroad overpass until reaching East 185th Street. At East 185th Street, the alignment turns northeast and travels along East 185th Street serving the East 185th commercial district up to Lakeshore Boulevard. At Lakeshore Boulevard the alignment turns east to Downtown Euclid with a potential extension to the Shoregate Shopping Center in Lake County.

3.7.3 Alignment G3

Alternative G3, Figure 14 in Appendix A, is also a HealthLine bus rapid transit or “Rapid +” LRT/streetcar extension, it begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to Noble Road. At Ivanhoe Road the alignment turns north to East 152nd and St. Clair. At Five Points the alignment turns east on St Clair Avenue to Nottingham Road and then turns north under the railroad overpass until reaching East 185th Street. At East 185th Street, the alignment turns northeast and travels along East 185th Street serving the East 185th commercial district up to Lakeshore Boulevard. At Lakeshore Boulevard the alignment turns east to Downtown Euclid with a potential extension to the Shoregate Shopping Center in Lake County.

3.8 Alignment H

Alternative H, Figure 15, Appendix A, is a HealthLine bus rapid transit or “Rapid+” LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to East 222d Street where it turns northeast and terminates in Downtown Euclid. The alternative can be extended to the Shoregate Shopping Center in Lake County by turning east along Lakeshore Boulevard.

3.9 Alignment I

Alternative I is a HealthLine bus rapid transit or “Rapid+” LRT/streetcar extension that begins at Louis Stokes Station at Windermere and runs east along Euclid Avenue to Chardon Road where it turns northwest and runs to East 200th Street where it then turns northeast to

Lakeshore Boulevard. In Figure 16, Appendix A, at Lakeshore Boulevard the alignment turns east and terminates in Downtown Euclid. The alternative can be extended to the Shoregate Shopping Center in Lake County by continuing east along Lakeshore Boulevard.

3. Ecology and Environment

4.1 Ecoregions

The Red Line/Healthline Extension study build alternatives pass through portions of two ecoregions. Ecoregions are relatively large geographical areas that contain a distinct assemblage of natural communities and species. The flora, fauna, and ecosystems that make up an ecoregion are usually distinct from those in other similar ecoregions. These distinct Ecoregions as seen in Figure 17, Appendix A, include the Erie Drift Plain and the Erie Lake Plain Ecoregions. Summaries of each of these distinct ecoregions are provided below.

The Erie Drift Plain Ecoregion is found along the southern edge of the project study area. This ecoregion is characterized by glacial outwash and till overlying Paleozoic sandstone and shale throughout the gently to strongly rolling dissected plateau that is characterized by low rounded hills. The region features perennial and intermittent streams, generally low to moderate gradient, numerous wetlands, sphagnum bogs, and lakes in some areas. Alfisols are dominant with mesic soil temperature regimes and aquic and udic soil moisture regimes. Much of the Erie Drift Plain is now farms, many associated with dairy operations. Feed grains and forage crops are typical. Farm woodlots provide sawlogs for construction. Areas of urban development and industrial activity occur locally in larger towns and cities. Lake Erie's influence substantially increases the length of the growing season, winter cloudiness, and snowfall of the northernmost areas.

The Erie Lake Plain Ecoregion is located along the majority of the project area. This glaciated region displays rolling to level terrain with marine deposits as well as some bedrock outcrops. This ecoregion is characterized by its agricultural activity and high pockets of population density (Greater Cleveland Metro Area). Parts of the ecoregion that is closer to the Great Lakes experience an increased growing season, more winter cloudiness, and greater snowfall. Paleozoic sedimentary rocks are most typical. Alfisols, Inceptisols, and Spodosols soil types are common. Most of the region was intensively cultivated farmland. Although orchards, vineyards and vegetable farming are important locally, a large percentage of the agriculture within this ecoregion is associated with dairy farming.

4.2 Threatened and Endangered Species

The Red Line/Healthline Extension study alternatives are within the eastern portion of Cuyahoga County, Ohio. According to the US Fish and Wildlife Service, Cuyahoga County is within the historic ranges of five federally listed species. These five listed species consist of four endangered species and one special concern species. The species include the federally endangered Indiana bat (*Myotis Todalist*), Kirtland's warbler (*Setophaga kirtlandii*), piping plover (*Charadrius melodus*), and snuffbox mussel (*Epioblasma triquetra*), the bald eagle (*Haliaeetus leucocephalus*) is a federal species of concern.

The Ohio Department of Natural Resources (ODNR) Natural Heritage Database revealed no records of rare or endangered species within several miles of the alignment of the the Red Line/Healthline Extension study alternatives. The Natural Heritage Database did state that there is an Indiana bat (*Myotis Todalist*) capture record within a 5-mile radius of the area. In addition, the Natural Heritage database stated that there are no known nesting sites for the Kirtland's warbler and the piping plover. Further co-ordination would be required for the federally endangered Indiana bat.

A resource of note is the shoreline of Lake Erie. The Lake Erie shoreline would require site visits to determine if potential habitat Kirtland's warbler or piping plover habitat or individuals that are migrating are located within or adjacent the Lake Erie shoreline.

Natural Heritage Database records for state-listed species are for individuals of a species and include both recent and historic accounts of these individuals. These records are not an

indication of the number of species that may have had historical ranges that overlap the study area but rather of the number of accounts of a specific individual state-listed plant or animal species found in close proximity to the study corridor. The Natural Heritage Database inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although they Natural Heritage Database inventories all types of plant communities, the database only maintain records on the highest quality areas. Table 1 - ODNR Natural Heritage Database Record for Endangered Species lists the Indiana bat as the only endangered species in the study area.

Table 1 - ODNR Natural Heritage Database Record for Endangered Species

Species	Record
Indiana bat (<i>Myotis 8odalist</i>)	Capture record within a 5-mile radius of alternatives and sub-alternatives general area.

4.3 Section 4(f) Resources

Section 4(f) refers to the Department of Transportation (DOT) Act of 1966 which set the requirement for the consideration of publicly owned parks and recreation areas, publicly owned wildlife and waterfowl refuges, and public and privately owned historic sites. Section 4(f) applies when four conditions are met; project requires DOT funding and/or approval; project is transportation related; project requires the use of land from a Section 4(f) protected property; and no regulatory applicability rules or exceptions apply.

Table 3 and Figures 18-54, Appendix A, shows the approximate number of Section (4) f Resources and potential Section (4) f Resources within two parcels of the Red Line/Healthline Extension Study Alternatives. Only National Register of Historic Places (NRHP) listed or National Register of Historic Places – Determined eligible (NRHP-DOE) properties are known Section 4(f) Resources. Schools, playgrounds, trails/bikeways, public pools, state parks, parks, and Cleveland Landmarks are all potential Section 4(f) Resources that would require further investigation and co-ordination with Official with Jurisdiction (OWJ) to determine if Section 4(f) applies to these sites. In addition, it is likely that small community parks are within or near the Red Line/Healthline Extension Study Alternatives that have not been labeled on existing maps and would require further investigation and co-ordination to determine if Section 4(f) applies as the alternatives are developed further.

Section 4(f) Cultural Resources are discussed in Section 5. Note that although the McDonald's Drive-In is listed in the NRHP, it has been demolished and does not appear as a Section 4(f) resource.

- Alternative A includes approximately seven mapped Section 4(f) resources: one public school, two playgrounds, one park, and three NRHP-DOE properties.
- Alternative B includes approximately eight mapped Section 4(f) resources: two playgrounds, one public pool, four parks, and one NRHP-DOE property.
- Alternative C includes approximately 21 mapped Section 4(f) resources: two public schools, one playground, two trails/bikeways, one state park, six parks, three NRHP Listed or NRHP-DOE properties, and six Cleveland Landmarks.
- Alternative D includes approximately 19 mapped Section 4(f) resources: five public schools, one playground, one trails/bikeway, four parks, four NRHP Listed or NRHP-DOE properties, and three Cleveland Landmarks.
- Alternative E1 includes approximately 21 mapped Section 4(f) resources: one public school, one playground, two trails/bikeways, one state park, six parks, four NRHP Listed or NRHP-DOE properties, and six Cleveland Landmarks.
- Alternative E2 includes approximately 21 mapped Section 4(f) resources: one public school, one playground, two trails/bikeways, one state park, six parks, five NRHP Listed or NRHP-DOE properties, and six Cleveland Landmarks.

- Alternative E3 includes approximately 22 mapped Section 4(f) resources: one public school, one playground, two trails/bikeways, one state park, six parks, six NRHP Listed or NRHP-DOE properties, and six Cleveland Landmarks. Alternative F includes approximately eight mapped Section 4(f) resources: two public schools, one playground, two parks, and three NRHP Listed or NRHP-DOE properties.
- Alternative G1 includes approximately 18 mapped Section 4(f) resources: four public schools, one playground, two trails/bikeways, three parks, five NRHP Listed or NRHP-DOE properties, and three Cleveland Landmarks.
- Alternative G2 includes approximately 20 mapped Section 4(f) resources: four public schools, one playground, two trails/bikeways, three parks, seven NRHP Listed or NRHP-DOE properties, and three Cleveland Landmarks.
- Alternative G3 includes approximately 20 mapped Section 4(f) resources: four public schools, one playground, two trails/bikeways, three parks, seven NRHP Listed or NRHP-DOE properties, and three Cleveland Landmarks.
- Alternative H includes approximately 19 mapped Section 4(f) resources: three public schools, one playground, two trails/bikeways, one public pool, six parks, and six NRHP Listed or NRHP-DOE properties.
- Alternative I include approximately 16 mapped Section 4(f) resources: three public schools, one playground, two trails/bikeways, five parks, and five NRHP Listed or NRHP-DOE properties.

The Natural Heritage Database noted that the Cleveland Lakefront Park is within the study area. The Cleveland Lakefront Bikeway follows Lake Shore Blvd. through the project area, up to Lake County line. Co-ordination with Ohio Department of Transportation Office of Environmental Services would be required to determine if the bikeway is a Section 4(f) resource and if the bikeway continues into Lake County. The Cleveland Lakefront Bikeway has the potential to affect Alternatives C, D, E1, E2, E3, G1, G2, G3, H, and I. In addition, co-ordination will be required to determine if the public schools areas are Section 4(f) resources by verifying that the areas are open to the public and serve either organized or substantial walk-on recreation activities. The Natural Heritage Database did not list additional unique ecological sites, geologic features, and animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, parks or forests or other protected natural areas within or near the various project alternatives.

Table 2 – Section 4(f) Resources and Approximate Number of Potential Section 4(f) Resources

Alternative	Section 4 (f) Resource							
	School	Playgrounds	Trails Bikeways	Public Pools	State Parks	Parks	NRHP Listed or NRHP-DOE properties	Cleveland Landmarks
A	1	2	0	0	0	1	3	0
B	0	2	0	1	0	4	1	0
C	2	1	2	0	1	6	3	6
D	5	1	2	0	0	4	4	3
E1	1	1	2	0	1	6	4	6
E2	1	1	2	0	1	6	5	6
E3	1	1	2	0	1	6	6	6
F	2	1	0	0	0	2	3	0
G1	4	1	2	0	0	3	5	3
G2	4	1	2	0	0	3	7	3
G3	4	1	2	0	0	3	7	3
H	3	1	2	1	0	6	6	0
I	3	1	2	0	0	5	5	0

4.4 FEMA FIRM Floodplain

The Red Line/Healthline Extension study alternatives have the potential to impact Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) zones. The maps for the alternatives and all FEMA zones can be found in Appendix B, Figures 1 – 37. These numbers are only an approximation number of Zones based on available mapping. Each alternative crosses portion of the Euclid Creek floodplain. Alternative D and Alternatives G 1, G2, and G3 come close to crossing the Euclid Creek floodplain multiple times, and are counted separately.

- Alternative A is approximately within one FEMA FIRM floodplain zone.
- Alternative B is approximately within one FEMA Firm floodplain zone.
- Alternative C is approximately within one FEMA FIRM floodplain zone.
- Alternative D is approximately within two FEMA FIRM floodplain zones.
- Alternative E1 is approximately within one FEMA FIRM floodplain zone.
- Alternative E2 is approximately within one FEMA FIRM floodplain zone.
- Alternative E3 is approximately within one FEMA FIRM floodplain zone.
- Alternative F is approximately within five FEMA FIRM floodplain zones.
- Alternative G1 is approximately within two FEMA FIRM floodplain zones.
- Alternative G2 is approximately within two FEMA FIRM floodplain zones.
- Alternative G3 is approximately within two FEMA FIRM floodplain zones.
- Alternative H is approximately within one FEMA FIRM floodplain zone.
- Alternative I is approximately within two FEMA FIRM floodplain zones.

The Ohio Floodplain Management Handbook defines Special Flood Hazard Areas, SFHA, as land that would be inundated by the base flood (1.0percent chance flood event). It is also the area where the floodplain management regulations must be enforced by the community as a condition of participation in the National Flood Insurance Program (2005). Also included in SFHA are regulatory floodways, which is defined by FEMA as “[t]he channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.” The results of this search are found in Table 3 as follows:

Table 3 - Special Flood Hazard Areas Potentially Impacted by Alternative Alignments.

Type of Special Flood Hazard Area		Alternative(s) Effected	Latitude	Longitude
Regulatory	1.0% Chance			
X		A,B,C,D,E 1-3,F,G 1-3,H,I	41.5822	-81.5588
X		A,B,C,D,E 1-3,F,G 1-3,H,I	41.5743	-81.5474
X	X	A,B,C,D,E 1-3,F,G,H,I	41.5711	-81.5383
X	X	A,B,C,D,E,F,G,H,I	41.5682	-81.5362

Communities are required to regulate development in SFHA to ensure that there are no increases in upstream flood elevations. If impacts to SFHA are unavoidable Flood Hazard Area Development Permits must be obtained from the appropriate municipalities, Ohio Department of Natural Resources (ODNR), and/or FEMA before construction may proceed.

As the project develops, further studies of the FEMA FIRM floodplain maps should be conducted for more specific impacts.

Table 4 - Potential FEMA and/or FIRM Zones

Alternative	Approximate number of FEMA FIRM Zones
A	1
B	1
C	1
D	2
E1	1
E2	1
E3	1
F	5
G1	2
G2	2
G3	2
H	1
I	2

4.5 Hazardous Materials/Waste Records

The Red Line/Healthline Extension study alternatives have the potential to be impacted by or impact various potential parcels of concern. The Hazardous Materials/Waste Records were searched using ASTM-1527-05 Standard and the All-Appropriate Inquiry (AAI) guidance standard distances from the Red Line/Healthline Extension alternatives alignments. These distances range from 0.25 mi. to 0.50 mi. depending on database. Table 4 provides record information and site locations of those parcels that could be potential red flags for hazardous materials/waste. Information included with Table 4 and associated figures do not include all records within the Red Line/Healthline Extension study alternatives. These sites should be evaluated further once extension alignments have been narrowed down. One site, Cleveland Municipal Dump Site–Lakefront property, is not included on the figure due to coordinates showing the site at FirstEnergy Stadium. Appendix B, Figures 38-74 show a collection of Alternatives A through I and Hazardous Waste and Brownfield sites.

- Alternative A includes 37 mapped hazardous material/waste sites: two Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), six CERCLIS-No Further Remedial Action Planned (CERCLIS-NFRAP), two Resource Conservation and Recovery Act - Treatment, Storage and Disposal (RCRA-TSDF), 11 Resource Conservation and Recovery Act - Large Quantity Generators (RCRA-LQG), three US BROWNFIELD (U.S. Brownfields), and 13 Ohio Division of Emergency & Remedial Response's Database (OH DERR) sites.
- Alternative B includes 54 mapped hazardous material/waste sites: one CERCLIS, nine CERCLIS-NFRAP, four RCRA-TSDF, 20 RCRA-LQG, six US BROWNFIELD, and 14 OH DERR sites.
- Alternative C includes 11 mapped hazardous material/waste sites: one CERCLIS-NFRAP, one RCRA-LQG, five US BROWNFIELD, three OH DERR and one Ohio Brownfields (OH BROWNFIELD) sites.
- Alternative D includes 22 mapped hazardous material/waste sites: five CERCLIS-NFRAP, three RCRA-LQG, seven US BROWNFIELD, six OH DERR, and one OH BROWNFIELD sites.
- Alternative E1 includes 18 mapped hazardous material/waste sites: two CERCLIS, one RCRA-TSDF, six RCRA-LQG, five US BROWNFIELD, three OH DERR, and one OH BROWNFIELD sites.

- Alternative E2 includes 15 mapped hazardous material/waste sites: two CERCLIS-NFRAP, two RCRA-LQG, five US BROWNFIELDs, five OH DERR, and one OH BROWNFIELDs sites.
- Alternative E3 includes 18 mapped hazardous material/waste sites: two CERCLIS, one RCRA-TSDF, five RCRA-LQG, five US BROWNFIELDs, four OH DERR, and one OH BROWNFIELDs sites.
- Alternative F includes 24 mapped hazardous material/waste sites: one CERCLIS, three CERCLIS-NFRAP, three RCRA-TSDF, seven RCRA-LQG, five US BROWNFIELDs, and five OH DERR sites.
- Alternative G1 includes 31 total mapped hazardous material/waste sites: two CERCLIS, four CERCLIS-NFRAP, one RCRA-TSDF, nine RCRA-LQG, seven US BROWNFIELDs, seven OH DERR, and one OH BROWNFIELDs sites.
- Alternative G2 includes 30 total mapped hazardous material/waste sites: two CERCLIS, four CERCLIS-NFRAP, one RCRA-TSDF, eight RCRA-LQG, seven US BROWNFIELDs, seven OH DERR, and one OH BROWNFIELDs sites.
- Alternative G3 includes 27 mapped hazardous material/waste sites: six CERCLIS-NFRAP, five RCRA-LQG, seven US BROWNFIELDs, eight OH DERR, and one OH BROWNFIELDs sites.
- Alternative H includes 33 mapped hazardous material/waste sites: one CERCLIS, five CERCLIS-NFRAP, four RCRA-TSDF, 11 RCRA-LQG, six US BROWNFIELDs, and six OH DERR sites.
- Alternative I includes 28 mapped hazardous material/waste sites: two CERCLIS, three CERCLIS-NFRAP, three RCRA-TSDF, eight RCRA-LQG, seven US BROWNFIELDs, and five OH DERR sites.

Table 5 - Potential Hazardous Material/Waste Site Red Flags.

Federal and State Records	Approximate Number of Records within the Proposed Alternatives												
	A	B	C	D	E1	E2	E3	F	G1	G2	G3	H	I
CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System	2	1	0	0	2	2	0	1	0	2	2	1	2
CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned	6	9	1	5	0	0	2	3	6	4	4	5	3
RCRA-TSDF: Resource Conservation and Recovery Act - Treatment, Storage and Disposal	2	4	0	0	1	1	0	3	0	1	1	4	3
RCRA-LQG: Resource Conservation and Recovery Act - Large Quantity Generators	11	20	1	3	6	5	2	7	5	9	8	11	8
US BROWNFIELDs: U.S. Brownfields	3	6	5	7	5	5	5	5	7	7	7	6	7
OH DERR: Ohio Division of Emergency & Remedial Response's Database	13	14	3	6	3	4	5	5	8	7	7	6	5
OH BROWNFIELDs: Ohio Brownfields Inventory	0	0	1	1	1	1	1	0	1	1	1	0	0

In addition to the information above, Table 6 provides the approximate number of the additional records within AAI and ASTM standards from the Red Line/Healthline Extension alternatives alignments. These sites should be evaluated further once extension alignments have been narrowed down due to the large volume of sites and close proximity to each other. The information does not include all reported contamination within the general alternatives study area, only those that could be parcels of concern, as the project develops, that might warrant further studies.

Table 6 Additional Hazardous Material/Waste Sites of Concern.

Federal and State Records	Number of Material/Waste Sites of Concern ¹
RCRA-SQG: RCRA - Small Quantity Generators	102
RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators	81
OH LUST: Ohio Leaking Underground Storage Tank File	79
OH UNREG LTANKS: Ohio Leaking UST File	13
OH UST: Ohio Underground Storage Tank File	62
OH ARCHIVE UST: Ohio Archived Underground Storage Tank Sites	84
OH SPILLS: Ohio Emergency Response Database	438

¹Approximate number of records within the AAI and ASTM standard distances from the extension alternatives.

4.6 Water Resources

The section below evaluates the following water resource categories for alternative routes A through I:

- Watercourses & Shoreline (i.e., streams, rivers, jurisdictional ditches, coastal management areas)
- Lakes/Ponds & Wetlands
- Special Flood Hazard Areas

For a visual representation of these water resources, please see the Water Resources Red Flag Summary maps included in Appendix C.

4.6.1 Watercourses & Shoreline

A desktop survey and field visit were used to identify the following features along the proposed alternatives. In total there are 55 watercourses that may be impacted by alternatives A-I (Table 7). Of these watercourses, 51 have subsurface flow (i.e., culverted, underground streams), and a permit may be needed from the Ohio EPA and/or United States Army Corps of Engineers (USACE) if water from any of these underground watercourses is to be diverted or impounded. The remaining four watercourses are surface water features for which permits from the Ohio EPA and/or USACE must be obtained if impacts are unavoidable. Two of these features are ephemeral streams that flow from the south toward Euclid Avenue, and have been identified as stream crossings 50 and 51 (Figure 6, Appendix A3). The two largest streams are Nine-Mile Creek and Euclid Creek, both of which are perennial (flowing year-round). Nine-Mile Creek is stream crossing 1, and Euclid Creek is identified as stream crossings 2A-2E, Figures 1-13, Appendix C.

Nine-Mile Creek has been identified as a Warmwater Habitat (WWH) by the Ohio EPA. Portions of the stream flow underground in intensely urbanized areas, while segments in less developed areas are visible as open surface channels. The habitat and biological communities were most recently evaluated by the Northeastern Ohio Regional Sewer District (NEORS) in 2010. At river mile 0.40, which is located just north of Lake Shore Boulevard, the creek received a Qualitative Habitat Evaluation Index (QHEI) score of 74.5 (NEORS, 2012). The habitat in this reach received a narrative rating of excellent. Electrofishing was conducted by NEORS to sample the community and calculate an Index of Biological Integrity (IBI) score at the 0.40 river mile reach of the creek. The IBI score was 20, which is below the standard of 38 for wading sites (Ohio EPA, 2005). The majority of fish within Nine-Mile Creek are highly tolerant and intermediately tolerant fish, which is an indicator of impaired water quality. Overall, Nine-Mile Creek has suffered degradation due to increased input of wastewater and significant

loss of riparian buffer. A Watershed Action Plan (WAP) and Total Maximum Daily Load (TMDL) reduction process have been recommended to help restore Nine-Mile Creek. The implementation of these measures is currently in the preliminary stage.

Euclid Creek has been designated as a WWH and limited resource water (LRW) by the Ohio EPA. It has also been identified as a 303(d) impaired water by the United States Environmental Protection Agency (USEPA). Neither fish nor invertebrate populations are currently in attainment of their aquatic life use designation (Ohio EPA, 2012). The macroinvertebrate community was previously in attainment, but as of 2010, the community was downgraded. The fish community exhibits low diversity and is primarily composed of pollution-tolerant species. The creek lacks top carnivores, which is indicative of a disturbed system. The IBI scores for the fish community range from 24-32, which receive narrative ratings of poor. Overall, Euclid Creek has suffered degradation due to the loss of riparian buffer and increased input of wastewater from industrial and residential sources. A WAP and TMDL reduction process have been implemented to facilitate the restoration of Euclid Creek. No Traditionally Navigable Waters (TNW), State Scenic Rivers, or Coastal Barrier Resource System Areas (COBRA) exists along any of the alternative routes.

Table 7 - Watercourses Potentially Impacted by Alternative Alignments

# Stream Crossing	Alternative(s) Affected	Latitude	Longitude	Flow Regime	Watershed (sq. mi.)	Assessment Method ¹	Name
1	A	41.5555	-81.5913	Surface	7.80	QHEI	Nine-Mile Creek
2A	A	41.5755	-81.5481	Surface	22.40	QHEI	Euclid Creek
2B	B	41.5714	-81.5384	Surface	22.20	QHEI	Euclid Creek
2C	C,E1, E2, E3	41.5823	-81.5586	Surface	23.10	QHEI	Euclid Creek
2D	D,G1,G2,G3	41.5765	-81.5498	Surface	22.60	QHEI	Euclid Creek
2E	F,H,I	41.5681	-81.5361	Surface	22.00	QHEI	Euclid Creek
3	A	41.5809	-81.5373	Subsurface	0.59	N/A	N/A (unnamed)
4	A,H	41.5858	-81.5288	Subsurface	1.07	N/A	N/A (unnamed)
5	A,B,C,D,E1,E2,E3 ,F,G1,G2,G3,H,I	41.5307	-81.5852	Subsurface	0.05	N/A	N/A (unnamed)
6	B	41.5354	-81.5807	Subsurface	1.14	N/A	N/A (unnamed)
7	B	41.5880	-81.5128	Subsurface	0.07	N/A	N/A (unnamed)
8	B	41.5895	-81.5103	Subsurface	0.38	N/A	N/A (unnamed)
9	C,D	41.5399	-81.5865	Subsurface	1.36	N/A	N/A (unnamed)
10	C,D	41.5477	-81.5866	Subsurface	0.12	N/A	N/A (unnamed)
11	C,D	41.5510	-81.5827	Subsurface	5.59	N/A	N/A (unnamed)
12	C,E1,E2,E3	41.5592	-81.5755	Subsurface	0.05	N/A	N/A (unnamed)
13	C,E1,E2,E3	41.5606	-81.5756	Subsurface	0.20	N/A	N/A (unnamed)
14	C,E1,E2,E3	41.5681	-81.5754	Subsurface	0.67	N/A	N/A (unnamed)
15	C,E1,E2,E3	41.5789	-81.5712	Subsurface	0.24	N/A	N/A (unnamed)
16	C,E1,E2,E3	41.5793	-81.5699	Subsurface	0.19	N/A	N/A (unnamed)
17	C,E1,E2,E3	41.5797	-81.5680	Subsurface	1.34	N/A	N/A (unnamed)
18	C,E1,E2,E3	41.5881	-81.5557	Subsurface	0.19	N/A	N/A (unnamed)

# Stream Crossing	Alternative(s) Affected	Latitude	Longitude	Flow Regime	Watershed (sq. mi.)	Assessment Method ¹	Name
19	C,E1,E2,E3	41.5906	-81.5542	Subsurface	0.89	N/A	N/A (unnamed)
20	C,D,E1,E2,E3,G1,G2,G3	41.5952	-81.5499	Subsurface	1.68	N/A	N/A (unnamed)
21	C,D,E1,E2,E3,G1,G2,G3,I	41.6019	-81.5392	Subsurface	1.56	N/A	N/A (unnamed)
22	C,D,E1,E2,E3,G1,G2,G3,I	41.6042	-81.5354	Subsurface	1.31	N/A	N/A (unnamed)
23	C,D,E1,E2,E3,G1,G2,G3,H,I	41.6099	-81.5265	Subsurface	0.47	N/A	N/A (unnamed)
24	C,D,E1,E2,E3,G1,G2,G3,H,I	41.6144	-81.5188	Subsurface	3.03	N/A	N/A (unnamed)
25	C,D,G1,G2,G3,H,I	41.6228	-81.4980	Subsurface	0.42	N/A	N/A (unnamed)
26	C,D,G1,G2,G3,H,I	41.6249	-81.4931	Subsurface	1.06	N/A	N/A (unnamed)
27	D,G1,G2,G3	41.5564	-81.5715	Subsurface	0.04	N/A	N/A (unnamed)
28	D,G1,G2,G3	41.5609	-81.5656	Subsurface	0.04	N/A	N/A (unnamed)
29	D,G1,G2,G3	41.5621	-81.5641	Subsurface	0.44	N/A	N/A (unnamed)
30	D,G1,G2,G3	41.5626	-81.5632	Subsurface	0.10	N/A	N/A (unnamed)
31	D,G1,G2,G3	41.5645	-81.5605	Subsurface	0.32	N/A	N/A (unnamed)
32	D,G1,G2,G3	41.5695	-81.5538	Subsurface	0.97	N/A	N/A (unnamed)
33	D,G1,G2,G3	41.5714	-81.5513	Subsurface	0.16	N/A	N/A (unnamed)
34	E1,E2,E3,F,G1,G2,G3,H,I	41.5328	-81.5791	Subsurface	0.05	N/A	N/A (unnamed)
35	E1,E2,E3,F,G1,G2,G3,H,I	41.5339	-81.5786	Subsurface	0.04	N/A	N/A (unnamed)
36	E1,E2,E3,F,G1,G2,G3,H,I	41.5365	-81.5749	Subsurface	0.89	N/A	N/A (unnamed)
37	E1,E2,E3,F,G1,G2,G3,H,I	41.5389	-81.5729	Subsurface	0.67	N/A	N/A (unnamed)
38	E1,E2,G1,G2	41.5457	-81.5755	Subsurface	5.39	N/A	N/A (unnamed)
39	E1,E2,G1,G2	41.5472	-81.5754	Subsurface	0.57	N/A	N/A (unnamed)
40	E2,E3,F,G3,H,I	41.5444	-81.5670	Subsurface	0.04	N/A	N/A (unnamed)
41	E3,F,G3,H,I	41.5461	-81.5659	Subsurface	4.24	N/A	N/A (unnamed)
42	E3,F,H,I	41.5466	-81.5649	Subsurface	0.05	N/A	N/A (unnamed)
43	F,H,I	41.5488	-81.5619	Subsurface	0.04	N/A	N/A (unnamed)
44	F,H,I	41.5550	-81.5529	Subsurface	0.07	N/A	N/A (unnamed)
45	F,H,I	41.5589	-81.5475	Subsurface	0.64	N/A	N/A (unnamed)
46	F,H	41.5713	-81.5282	Subsurface	0.52	N/A	N/A (unnamed)
47	F	41.5728	-81.5248	Subsurface	0.05	N/A	N/A (unnamed)
48	F	41.5730	-81.5242	Subsurface	0.14	N/A	N/A (unnamed)
49	F	41.5743	-81.5209	Subsurface	0.07	N/A	N/A (unnamed)
50	F	41.5760	-81.5180	Surface	0.06	N/A	N/A (unnamed)
51	F	41.5774	-81.5157	Surface	0.08	N/A	N/A (unnamed)

# Stream Crossing	Alternative(s) Affected	Latitude	Longitude	Flow Regime	Watershed (sq. mi.)	Assessment Method ¹	Name
52	F	41.5793	-81.5129	Subsurface	0.06	N/A	N/A (unnamed)
53	F	41.5840	-81.5077	Subsurface	0.27	N/A	N/A (unnamed)
54	F	41.5878	-81.5017	Subsurface	0.30	N/A	N/A (unnamed)
55	F	41.5955	-81.4889	Subsurface	0.73	N/A	N/A (unnamed)

¹ All surface water stream segments with drainage areas less than one square mile are designated primary headwater habitat and shall be classified using the Headwater Habitat Evaluation Index (HHEI) unless site-specific data indicate a different aquatic life use designation or an alternative drainage area delineation is appropriate and the specific stream is so identified in rules 3745-1-08 to 3745-1-32 of the Administrative Code (Ohio EPA, 2012). Stream segments with drainage areas greater than 1 square mile shall be evaluated using the Qualitative Habitat Evaluation Index (QHEI). Subsurface streams are not subject to assessment methods put forth by the Ohio EPA, but are subject to permitting if impacts are unavoidable.

4.6.2 Lakes/Ponds & Wetlands

National Wetlands Inventory (NWI) maps of the East Cleveland and Mayfield Heights, Ohio USGS 7.5 minute quadrangles were reviewed for the possible occurrence of wetlands within the project area. The results of this search are as follows:

Table 8 NWI Mapped Wetlands That May Be Impacted by Alternative Alignments

Wetland Identifier	Approximate Size (acres)	Alternative(s) Effected	Latitude	Longitude
PUBGx (Excavated Pond)	<0.5	F	41.5737	-81.5217
PSS1C (Scrub-Shrub Wetland)	<0.5	F,H,I	41.5675	-81.5353

In addition to the mapped wetland features, eight small (<0.5-acre) suspect wetland areas were noted along the alternative routes (Table 9) and found in Appendix C, Figures 1 – 13. All of these features are dominated by common reed grass (*Phragmites australis*), which is an invasive species. These features were identified by the prevalence of wetland vegetation, topography, and relationship to surface water features.

Table 9 Suspect Wetland Areas Potentially Impacted by Alternative Alignments

Wetland Identifier	Alternative(s) Effected	Latitude	Longitude
A	E	41.5799	-81.5667
B	A	41.5858	-81.5282
C	A	41.5853	-81.5284
D	F	41.5899	-81.4980
E	F	41.5911	-81.4955
F	F	41.5955	-81.4907
G	F	41.5953	-81.4903
H	F	41.5960	-81.4893

If impacts are proposed to any of the mapped or suspect wetland areas, a full wetland delineation and characterization to determine the presence, size, and quality of wetlands will be required. All delineated wetlands will be characterized using the Ohio Rapid Assessment Method for Wetlands (ORAM v. 5.0). If impacts to wetlands cannot be avoided, permits must be acquired from the Ohio EPA and/or USACE.

4. Cultural Resources Literature Review

5.1 Cultural Resources Literature Search Data

The following existing inventories were consulted to identify cultural resources of local, state, or national historic significance:

- Ohio Historic Preservation Office's (OHPO) Online Mapping System and related inventory and administrative files (includes historic properties listed in and determined eligible for listing in the National Register of Historic Places and cemeteries)
- Ohio Department of Transportation's (ODOT) Historic Bridge List and Buckeye Assets (bridges and structures listed in and determined eligible for listing in the National Register of Historic Places)
- Cleveland Landmarks Commission (locally designated landmarks)
- Euclid Landmarks Commission (locally designated landmarks).

Combined, the 13 alternatives contain seven properties listed in the National Register of Historic Places, one of which has been demolished; five properties determined eligible for the National Register of Historic Places; four cemeteries and one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known; and seven properties designated Cleveland Landmarks and whose eligibility for the National Register of Historic Places is not known. All maps for the alternatives and cultural resources can be found in Appendix C, Figures 14 – 50.

Alternative A contains three properties determined eligible for the National Register of Historic Places, and one cemetery whose eligibility for the National Register of Historic Places is not known. See Table 10.

Table 10 Cultural Resources Within or Adjacent to Alternative A.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
1743-49 Eddy Road	Z17 E450902 N4597157	Unknown	Unknown	Determined eligible under Criterion C, 1995, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
CUY-786-11	Z17 E451216 N4600923	1920	Industrial building	Determined eligible under Criterion C, 2008, condition unknown
Glenville Cemetery	Z17 E450602 N4598832	Unknown	Cemetery	Not determined, condition unknown

Alternative B, Table 11, contains one property determined eligible for the National Register of Historic Places.

Table 11- Cultural Resources Within or Adjacent to Alternate B.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
1743-49 Eddy Road	Z17 E450902 N4597157	Unknown	Unknown	Determined eligible under Criterion C, 1995, condition unknown

Alternative C, Table 12, contains three properties listed in the National Register of Historic Places, one property determined eligible for the National Register of Historic Places, one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known,

and six Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 12 Cultural Resources Within or Adjacent to Alternate C.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-789-11, Tabernacle Baptist Church	Z17 E452270 N4602394	1906	Late Gothic church	Cleveland Landmark
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark
CUY-8-11, Euclid Beach Park Gate	Z17 E452331 N4602960	1901	Exotic Revival gate	Cleveland Landmark
St. John Nottingham Church and School	Z17 E453440 N4603190	Unknown	Church and School	Cleveland Landmark
Beachland Presbyterian Church	Z17 E453930 N4604380	Unknown	Church	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark

Alternative D contains four properties listed in the National Register of Historic Places, one property determined eligible for the National Register of Historic Places, one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and three Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known. See Table 13.

Table 13 - Cultural Resources Within or Adjacent to Alternate D.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-900-11, Lasalle Theater	Z17 E454169 N4603619	1925–1929	Classical Revival commercial building	Listed June 25, 2011, condition unknown

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark
CUY-767-11, Nottingham United Methodist Church	Z17 E454068 N4602131	1913	Gothic Revival church	Cleveland Landmark

Alternative E1, Table 14, contains three properties listed in the National Register of Historic Places, two properties determined eligible for the National Register of Historic Places, one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and six Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 14 - Cultural Resources Within or Adjacent to Alternate E1.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-789-11, Tabernacle Baptist Church	Z17 E452270 N4602394	1906	Late Gothic church	Cleveland Landmark
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-8-11, Euclid Beach Park Gate	Z17 E452331 N4602960	1901	Exotic Revival gate	Cleveland Landmark
St. John Nottingham Church and School	Z17 E453440 N4603190	Unknown	Church and School	Cleveland Landmark
Beachland Presbyterian Church	Z17 E453930 N4604380	Unknown	Church	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark

Alternative E2, Table 15, contains five properties listed in the National Register of Historic Places, two properties determined eligible for the National Register of Historic Places, one cemetery and one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and six Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 15 - Cultural Resources Within or Adjacent to Alternate E2.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
CUY-1241-21	Z17 E452360 N4598690	1905	Colonial Revival house	Determined eligible under Criterion C, 2008, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark

OHI/OAI Number/Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-789-11, Tabernacle Baptist Church	Z17 E452270 N4602394	1906	Late Gothic church	Cleveland Landmark
CUY-8-11, Euclid Beach Park Gate	Z17 E452331 N4602960	1901	Exotic Revival gate	Cleveland Landmark
St. John Nottingham Church and School	Z17 E453440 N4603190	Unknown	Church and School	Cleveland Landmark
Beachland Presbyterian Church	Z17 E453930 N4604380	Unknown	Church	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark

Alternative E3, Table 16, contains four properties listed in the National Register of Historic Places, two properties determined eligible for the National Register of Historic Places, one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and six Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 16 - Cultural Resources within and adjacent to Alternate E3.

OHI/OAI Number/Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1239-21, First Church of Christ in Euclid	Z17 E452720 N4599150	1875–1899	Church	Listed November 28, 1978, condition unknown
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
CUY-1241-21	Z17 E452360 N4598690	1905	Colonial Revival house	Determined eligible under Criterion C, 2008, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
Nelaview Cemetery	Z17 E452742 N4599163	Unknown	Cemetery	Not determined, condition unknown
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown

OHI/OAI Number/Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark
CUY-789-11, Tabernacle Baptist Church	Z17 E452270 N4602394	1906	Late Gothic church	Cleveland Landmark
CUY-8-11, Euclid Beach Park Gate	Z17 E452331 N4602960	1901	Exotic Revival gate	Cleveland Landmark
St. John Nottingham Church and School	Z17 E453440 N4603190	Unknown	Church and School	Cleveland Landmark
Beachland Presbyterian Church	Z17 E453930 N4604380	Unknown	Church	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark

Alternative F, Table 17, contains two properties, listed in the National Register of Historic Places, one property determined eligible for the National Register of Historic Places, and three cemeteries whose eligibility for the National Register of Historic Places is not known.

Table 17 - Cultural Resources within or adjacent to Alternate F.

OHI/OAI Number/Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1239-21, First Church of Christ in Euclid	Z17 E452720 N4599150	1875–1899	Church	Listed November 28, 1978, condition unknown
CUY-1241-21	Z17 E452360 N4598690	1905	Colonial Revival house	Determined eligible under Criterion C, 2008, condition unknown
Nelaview Cemetery	Z17 E452742 N4599163	Unknown	Cemetery	Not determined, condition unknown
Euclid Cemetery	Z17 E455157 N4601458	Unknown	Cemetery	Not determined, condition unknown
Euclid Stop 8 Cemetery	Z17 E455284 N4601846	Unknown	Cemetery	Not determined, condition unknown

Alternative G1, Table 18, contains four properties listed in the National Register of Historic Places, one property determined eligible for the National Register of Historic Places, one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and three Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 18 - Cultural Resources within or adjacent to Alternate G1.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-900-11, Lasalle Theater	Z17 E454169 N4603619	1925–1929	Classical Revival commercial building	Listed June 25, 2011, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark
CUY-767-11, Nottingham United Methodist Church	Z17 E454068 N4602131	1913	Gothic Revival church	Cleveland Landmark

Alternative G2, Table 19, contains six properties listed in the National Register of Historic Places, two properties determined eligible for the National Register of Historic Places, one cemetery and one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and three Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 19 - Cultural Resources within or adjacent to Alternate G2.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-900-11, Lasalle Theater	Z17 E454169 N4603619	1925–1929	Classical Revival commercial building	Listed June 25, 2011, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-1241-21	Z17 E452360 N4598690	1905	Colonial Revival house	Determined eligible under Criterion C, 2008, condition unknown
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
East Shore Methodist Church	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark
CUY-767-11, Nottingham United Methodist Church	Z17 E454068 N4602131	1913	Gothic Revival church	Cleveland Landmark

Alternative G3, Table 20, contains five properties listed in the National Register of Historic Places, two properties determined eligible for the National Register of Historic Places, one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known, and three Cleveland Landmarks whose eligibility for the National Register of Historic Places is not known.

Table 20 - Cultural Resources Within or Adjacent to Alternate G3.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
McDonald's Drive-in	Z17 E452025 N4600060	1950–1974	Commercial building	Listed March 1, 1990, demolished 2003
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1239-21, First Church of Christ in Euclid	Z17 E452720 N4599150	1875–1899	Church	Listed November 28, 1978, condition unknown
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-900-11, Lasalle Theater	Z17 E454169 N4603619	1925–1929	Classical Revival commercial building	Listed June 25, 2011, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
CUY-1241-21	Z17 E452360 N4598690	1905	Colonial Revival house	Determined eligible under Criterion C, 2008, condition unknown

OHI/OAI Number/Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
Lake Shore & Michigan Southern Shops and Collinwood Yard District	Z17 E452590 N4601660	ca. 1880–1955	Railroad yard	Determined eligible under Criterion A and C, 1997, partially demolished
Nelaview Cemetery	Z17 E452742 N4599163	Unknown	Cemetery	Not determined, condition unknown
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
CUY-775-11, Collinwood High School	Z17 E452100 N4600100	1907	Georgian Revival school	Cleveland Landmark
CUY-898-11, St. Joseph Christian Life Center	Z17 E453970 N4604720	1943	Georgian Revival church	Cleveland Landmark
CUY-767-11, Nottingham United Methodist Church	Z17 E454068 N4602131	1913	Gothic Revival church	Cleveland Landmark

Alternative H contains four properties listed in the National Register of Historic Places, two properties determined eligible for the National Register of Historic Places, and three cemeteries and one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known. See Table 21.

Table 21 - Cultural Resources Within or Adjacent to Alternate H.

OHI/OAI Number/Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1239-21, First Church of Christ in Euclid	Z17 E452720 N4599150	1875–1899	Church	Listed November 28, 1978, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
CUY-1645-22	Z17 E456117 N4605152	1938	Government building	Determined eligible, date unknown, condition unknown
Nelaview Cemetery	Z17 E452742 N4599163	Unknown	Cemetery	Not determined, condition unknown
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
Euclid Cemetery	Z17 E455157 N4601458	Unknown	Cemetery	Not determined, condition unknown
Euclid Stop 8 Cemetery	Z17 E455284 N4601846	Unknown	Cemetery	Not determined, condition unknown

Alternative I, Table 22, contains four properties listed in the National Register of Historic Places, one property determined eligible for the National Register of Historic Places, and three cemeteries and one columbarium/cemetery whose eligibility for the National Register of Historic Places is not known.

Table 22 - Cultural Resources within or Adjacent to Alternate I.

OHI/OAI Number/ Property Name	UTM Coordinates	Date Built/Period of Significance	Style and Type of Building/Structure	National Register Eligibility Status/ (Reference/Date)/Current Condition
CUY-1655-22, Shore High School	Z17 E456140 N4606060	1920–1949	Classical Revival school	Listed February 10, 2000, condition unknown
CUY-1240-21, St. Paul's Episcopal Church of East Cleveland	Z17 E452420 N4598860	1825–1899	Gothic Revival church	Listed October 18, 1984, condition unknown
CUY-1239-21, First Church of Christ in Euclid	Z17 E452720 N4599150	1875–1899	Church	Listed November 28, 1978, condition unknown
CUY-8066-22, Albert W. Henn Mansion	Z17 E456540 N4607000	1900–1949	Craftsman house	Listed April 28, 2000, condition unknown
CUY-1241-21	Z17 E452360 N4598690	1905	Colonial Revival house	Determined eligible under Criterion C, 2008, condition unknown
Nelaview Cemetery	Z17 E452742 N4599163	Unknown	Cemetery	Not determined, condition unknown
East Shore Methodist Church Columbarium	Z17 E456412 N4606672	Unknown	Columbarium/Cemetery	Not determined, condition unknown
Euclid Cemetery	Z17 E455157 N4601458	Unknown	Cemetery	Not determined, condition unknown
Euclid Stop 8 Cemetery	Z17 E455284 N4601846	Unknown	Cemetery	Not determined, condition unknown

5. Summary of Analysis

A high level environmental assessment will be completed for the preferred alternative as part of the Business Case documentation. For the Tier 1 screening of the alternatives analysis the environmental review consisted of a fatal flaws or “Red Flags” analysis. This high level review consisted of a GIS mapping exercise and a strategic review of potential environmental effects. There were no fatal flaws in the alternatives that advanced to the Tier 2 screening (Alternatives B, D, E and G). Alternatives A and B are in freight railroad corridors. The noise from the heavy rail rapid transit trains are masked by the freight railroad trains. Noise generated by bus rapid transit vehicles and LRT/streetcars in Alternatives C through I are not a factor because of the existing high ambient noise levels. It is expected that the slight or moderately adverse impacts identified for all the other alternatives could be mitigated with appropriate environmental mitigation strategies. Therefore, environmental “red flags” cannot be used as a discriminator in the Tier 1 screening among the rail, BRT and rapid+ Alternatives A through I.

All alignments were rated on a scale of 1 -3, 1 being no effect and 3 being significant effect, in regards to the environmental concerns described in this report. Table 23 shows the ratings for the various environmental resources that were presented in this report. Table 24 below summarizes the environmental ratings and mostly all were rated consistently even.

Table 23 - Environmental Ratings for Alignments

Alignment	Endangered Species	4(f)	FEMA	Flood ones	Haz Waste	Brownfields	Water Resources	Wetlands	Cultural
A	1	1	1	3	3	1	3	3	2
B	1	1	1	3	3	2	3	1	1
C	3	3	2	3	1	2	3	1	3
D	3	3	1	3	3	3	3	1	3
E1	3	3	1	3	2	2	2	3	3
E2	3	3	1	3	2	2	2	3	3
E3	3	3	1	3	1	2	2	3	1
F	1	2	3	3	2	2	1	3	3
G1	2	3	2	1	2	3	2	1	2
G2	2	3	2	1	3	3	2	1	3
G3	2	3	2	1	2	3	2	1	3
H	1	2	1	3	3	2	1	1	3
I	3	2	2	3	3	3	1	1	3

Table 24 - Summary of Environmental Ratings

Alignment	Rating
A	2
B	2
C	2
D	2.5
E1	2.4
E2	2
E3	2.4
F	2
G1	2
G2	2
G3	2
H	2
I	2

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