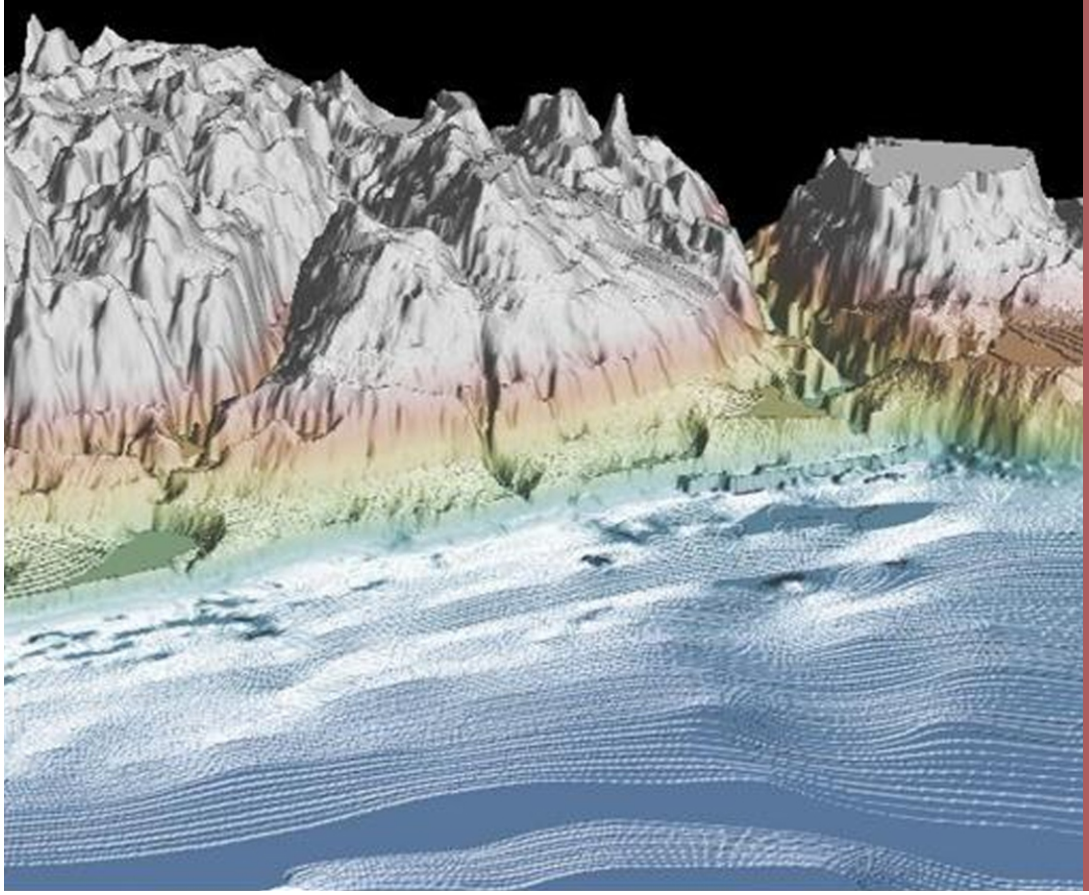
Appendix S
Gray & Pape
Cultural Resources Report

Literature Review and Recommendations for Area of Potential Effects and Historic Properties Identification Efforts for LEEDCo's Project Icebreaker, Cuyahoga County, Ohio



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JANUARY 14, 2014

LEAD AGENCY:
US Army Corps of Engineers –
Buffalo District

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Gray & Pape Project No.13-63601.001

GRAY & PAPE
INC.
CULTURAL RESOURCES CONSULTANTS

Project No. 13-63601.001

Literature Review and Recommendations for Area of Potential Effects and Historic Properties Identification Efforts for LEEDCo's Project Icebreaker, Cuyahoga County, Ohio

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ABSTRACT

Under contract to ENVIRON International Corporation (ENVIRON), Gray & Pape, Inc. has prepared a study to provide recommendations concerning the Area of Potential Effects and recommendations for subsequent cultural resources identification efforts for the Lake Erie Energy Development Corporation's proposed Project Icebreaker (Icebreaker). Icebreaker is a pilot project, funded in part by a grant from the Department of Energy, to study the feasibility of offshore wind energy development in Lake Erie. The project is subject to Section 106 of the National Historic Preservation Act of 1966, as amended, and applicable State and Federal regulations. The Lead Agency for the project is the US Army Corps of Engineers – Buffalo District. Icebreaker includes six wind turbines located in Lake Erie, approximately 7 miles (11 kilometers) to 9 miles (14 kilometers) offshore of Cleveland, Ohio.

Gray & Pape, Inc. recommends an Area of Potential Effects for direct effects limited to those areas that will be physically affected by the installation and operation of the turbine array. This area includes the footprint of the turbines and any associated construction workspace, the corridor of disturbance from the cables, and any on-shore construction. Within the lake, there are no objects to restrict one's view of the turbines. Therefore, we recommend an Area of Potential Effects that extends parallel to the shoreline for 29.6 statute miles (47.6 kilometers) on either side of the project area to ensure that navigation markers, lights, and traditional use areas within the lake that might have a view of the turbines are included. The Area of Potential Effects will extend out to the international boundary, beyond which the National Historic Preservation Act does not apply. Due to the amount of development along the lake shore, views of the lake are fragmentary or non-existent beyond the first road south of the lake shore. The Area of Potential Effects along the shore, therefore, has been limited to the area immediately adjacent to the lake, as bounded by easily identifiable roads.

Due to the limited construction disturbances at the Cleveland Public Power (CPP) Lake Road Substation and the nature of the material at the site (i.e., fill), only intrusive construction activities (i.e., excavation of the launch pit for the horizontal direction drilling) should be monitored for relevant cultural resources. . In order to locate any potentially significant submerged cultural resources that may be in the Area of Potential Effects, a marine remote sensing survey is scheduled for 2014. Federally recognized Indian Tribes and consulting parties, yet to be identified, should be consulted as necessary concerning the potential for traditional cultural properties within Lake Erie.

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1.0 INTRODUCTION

Under contract to ENVIRON International, Gray & Pape, Inc. (Gray & Pape) has prepared the following study to provide recommendations concerning the Area of Potential Effects (APE) and recommendations for subsequent cultural resources identification efforts for the Lake Erie Energy Development Corporation's (LEEDCo) proposed Project Icebreaker (Icebreaker). Icebreaker is a pilot project, funded in part by a grant from the Department of Energy, to study the feasibility of offshore wind energy development in Lake Erie. The project is subject to Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and applicable State and Federal regulations. These include the National Environmental Policy Act of 1969; the Archaeological and Historic Preservation Act of 1974; Executive Order 11593; and the regulations of the Advisory Council on Historic Preservation (36 CFR § 800). The Lead Agency for the project is the United States Army Corps of Engineers – Buffalo District (USACE).

1.1 Project Description

Project Icebreaker includes six wind turbines located in Lake Erie, approximately 11 kilometers (km) to 14 km (7 miles to 9 miles) offshore of Cleveland, Ohio (Figure 1-1).

1.1.1 Project Turbine Description

Project Icebreaker will consist of six 3-MW Siemens wind turbines (SWT-3.0-113) spaced approximately 950 meters (m) (3,117 feet) apart in a southeast to northwest linear orientation and occupying three submerged land lease grid cells. Water depth at the turbine locations is approximately 18 m (60 feet). Each turbine will be constructed with an 87.5 (287 foot) hub height and 120 m (394 foot) rotor diameter. Each of the three Siemens B55 blades is made of single-cast fiberglass-reinforced epoxy and is approximately 58.5 m (192 feet) long. The rotor swept zone is 27.5 m to 147.5 m (90 feet to 484 feet). The majority of the turbine, including the blades, will be painted light gray (RAL 7035). Red flashing lights will be mounted on the nacelle of each turbine and will flash synchronously.

A boat landing will be constructed around each turbine to provide access to turbine maintenance crews and also safe haven for recreational boaters in an emergency. The boat landing will include a 12.2 m (40 foot) access ladder to a work platform. The portion of the turbine between the low water datum and the work platform will be painted yellow. Green and red downshielded navigation lights will be affixed near the bottom of each tower, a few feet above mean lake water level.

The monopile foundation consists of a 5.6 m (18.5 foot) diameter monopile. The cylindrical portion of the monopile is 33.5 m (110 feet) long, with the additional tapered conical section having a length of 13 m (42.7 feet). The conical section uniformly tapers from 5.6 m (18.5 feet) diameter to 4.8 m (15.8 feet) at the top of the monopile. The monopile foundation includes a stone-filled friction wheel with a diameter of 25 m (82 feet) and a thickness of 3 m (10 feet; Figure 2-3C).

1.1.2 Project Transmission Cable Description

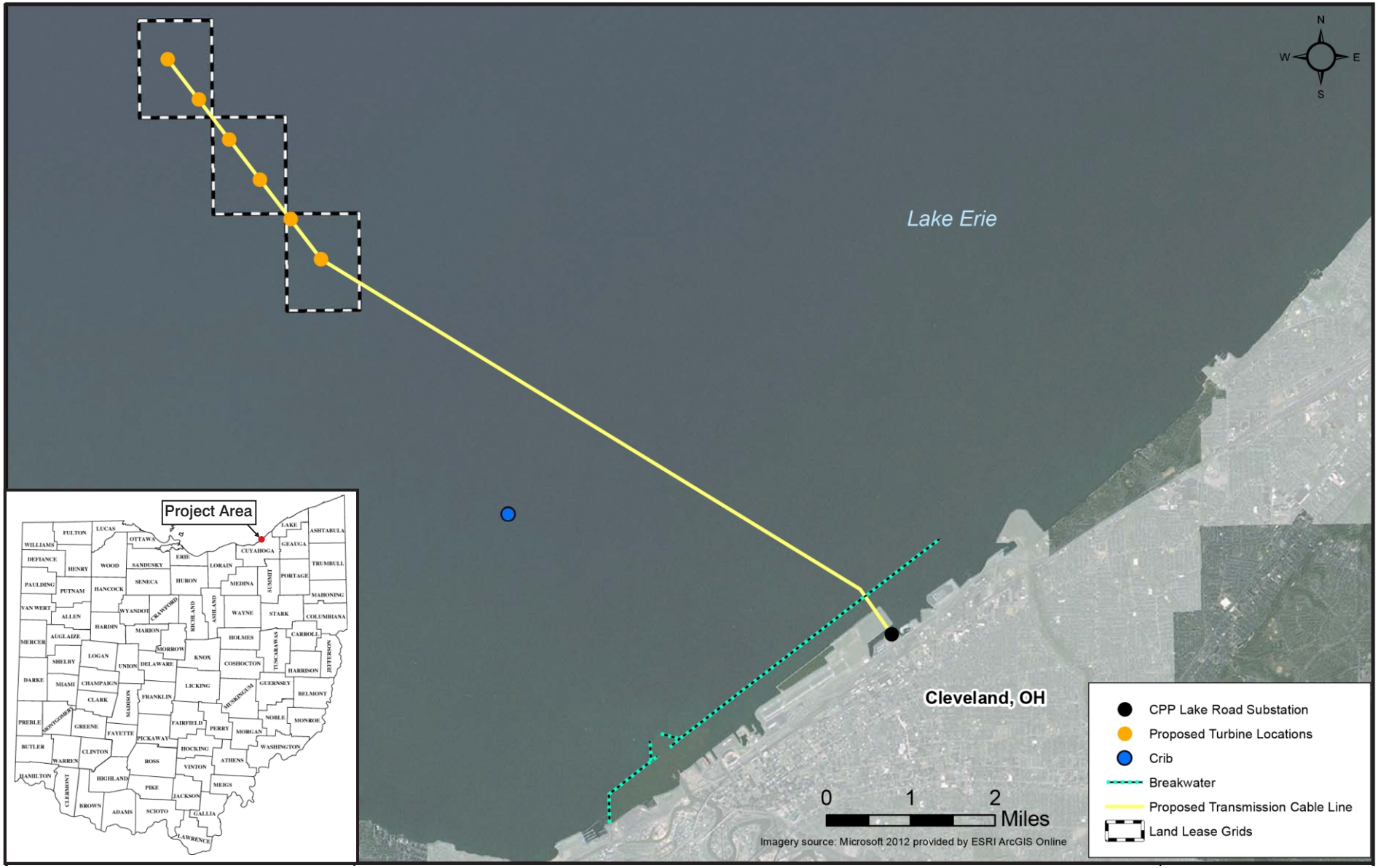
The transmission cable for Project Icebreaker will be connected to the turbines via J tubes designed to minimize potential ice impacts. The cable will then run along a diagonal path to just outside of the breakwater, where it will turn to be perpendicular to the shoreline as it passes under the confined disposal facility (CDF) 12[1] to the interconnection at the Cleveland Public Power Lake Road Substation (Figure 1-1). The cable will be installed in two sections. First, the portion from the shoreline to outside of the breakwater will be installed via horizontal directional drilling at approximately 3 m (10 feet) below the lake bottom. Once outside the breakwater, the cable will be installed via hydroplowing at a depth of approximately 0.9 m to 1.8 m (3 feet to 6 feet) below the lake bottom. Hydroplowing refers to use of a specially designed cable installation device with an adjustable blade, or plow, that rests on the lake bed and is towed by a surface vessel. The plow creates a narrow trench at a designated depth, while water jets fluidize the sediment within the trench. The cable is fed through the plow and is laid into the trench as it moves forward. The fluidized sediment then settles back down into the trench and buries the cable.

1.1.3 Project Construction Process

The tower, nacelle, blades, cable, and other construction materials and equipment will be transported from their individual points of origin to the Port of Cleveland and then direct-loaded onto the barges that are docked at the Port. The construction process will proceed as follows:

- Floating crane barge mobilized to the site and anchored
- Monopile to be driven
- Friction wheel to be placed over the monopile and embedded in bottom
- Soft soils within wheel to be excavated and side cast
- Gravel to be placed within wheel
- Transition piece with ice cone to be placed on top of monopile
- Floating barge demobilized
- Cables installed via horizontal directional drilling and hydroplowing
- Floating crane barge mobilized to the site and anchored
- Tower placed on monopile
- Nacelle placed on tower
- Rotor with blades to be attached to the nacelle
- Floating barge demobilized
- Commissioning

[1] CDF 12 was constructed by the USACE in 1974, with an original design capacity of 2,760,000 cubic yards.



Location of Proposed Project, Cuyahoga County, Ohio

1.2 About the Report

This report includes the following elements:

- A definition of the recommended APE
- A review of the relevant cultural resources of the project location
- A review of previously recorded sites in and adjacent to the recommended APE
- A discussion of the potential for submerged archaeological resources

The report was organized and compiled by Michael Striker, RPA. Mr. Striker supervised the background research for terrestrial sites and provided recommendations for future identification efforts of terrestrial resources. He was assisted by Julisa Meléndez, M.A., who conducted research concerning previously identified properties, and Anne M. Moore, MHP, who assisted in conducting research and compiling background information on terrestrial properties. Michael C. Tuttle, Ph.D., is the lead marine archaeologist for the project, and was responsible for compiling information about potential submerged properties. August G. Costa, Ph.D., served as the project geoarchaeologist, and was responsible for providing information about the geological history of Lake Erie.

2.0 DEFINITION OF AREA OF POTENTIAL EFFECTS

Section 106 of the NHPA is implemented through regulations presented in 36 CFR 800. These regulations provide an outline of the process and definitions of the terms involved. The regulations define an APE as:

> [T]he geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16[d]).

And:

> Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register (36 CFR 800.16[i])

The regulations also state that the Lead Agency (in this case, the USACE) shall determine and document the APE in consultation with the State Historic Preservation Office (SHPO). Therefore, the APE is not officially determined until the USACE consults with SHPO. The purpose of this document is to provide information relevant to the determination of the APE, and to make recommendations that can be considered by the Lead Agency, in consultation with the Ohio Historic Preservation Office (OHPO). We have separated our recommendations by areas where there may be a direct effect and areas where there may be an indirect effect.

In this context, we define direct effects as those that directly physically alter the property in question so that there is a change in the characteristics qualifying it for inclusion or eligibility for the National Register of Historic Places (NRHP). We define indirect effects as those effects that may alter the characteristics of a historic property qualifying it for inclusion or eligibility for the NRHP without causing direct physical alteration to the property. Indirect effects include, primarily, changes to the environment that affect the integrity of the property, i.e., its setting and feeling (US Department of the Interior 1997). Such changes may include the introduction of additional noise or visual elements not previously present in the environment.

To date, no offshore wind energy projects have been built in the United States. However, the Cape Wind Energy Project (Cape Wind) proposed to be constructed in Federal waters offshore Cape Cod Massachusetts, was the subject of Section 106 consultation (Jones 2010). This project will occupy approximately 25 square miles (64.75 km^2) of the outer continental shelf and consists of 130 wind turbine generators (WTG), each with a maximum blade height of 440 feet (134 m). The United States Department of Interior, Bureau of Ocean Energy Management, Regulation and Enforcement determined that the Cape Wind APE would be defined as follows:

> The Area of Potential Effect (APE) for the onshore component of the proposed project includes onshore and offshore areas where physical ground disturbance would occur during construction, operation and maintenance, and decommissioning (e.g., the seabed of Horsehoe Shoals and the areas along the overland route to the Barnstable Switching Station where the transmission cable will tie-in), as well as those areas within view of the site of the proposed project (e.g., historic properties on Cape Cod, Martha's Vineyard, and Nantucket from which open views of the visible components of the proposed project, e.g. WTGs would be possible). The APE for offshore archaeological resources includes the footprints of the WTG structures on the sea floor; the work area around each WTG where marine sediments may be disturbed; the jet plowed trenches for installation of the inner-array cables connecting the WTGs to the ESP; the jet plowed trenches for the transmission cable system from the ESP to the landfall site; and associated marine work areas such as anchor drop areas.

This determination forms the basis of the recommendations provided here.

2.1 Direct Effects

We recommend an APE for direct effects limited to those areas that will be physically affected by the installation and operation of the turbine array. This area includes the footprint of the turbines and any associated construction workspace, the corridor of disturbance from the cable, and any on-shore construction. This area may change during the course of project design, and identification efforts for properties that may be directly affected should be timed to take place after final site selection and design has been completed.

2.2 Indirect Effects

Although it is a simple matter to state that there may be an adverse effect to historic properties within view of the project, it is more difficult to determine what will actually be within view. A recent study concerning the visual impact threshold of existing offshore wind turbine visibility (Sullivan et al. 2013) concluded that previous assessments of potential visual impacts have underestimated the distances at which turbines can be seen. This study states that "even small offshore wind facilities of a few dozen turbines can be seen easily at distances exceeding 25 km (15 mi)" (Sullivan et al. 2013:14). It is prudent, therefore, to be conservative in estimating the distance at which the turbines may be visible.

As stated in the project description, the Seimens 3.0 MW Direct-Drive turbines have a rotor diameter of 394 feet (120 m) and the hub will be positioned at 287 feet (87.5 m) above the water, indicating a total height of the turbine from water to maximum height of blade tip of 484 feet (147.5 m). Based on these proposed measurements and assuming a flat, unobstructed horizon, as is the case on the lake, it is possible to generate a maximum distance at which the tip of a rotor may be visible. The National Geospatial-Intelligence Agency (2013) provides an online calculator that determines the distance of the horizon from a given height, incorporating atmospheric refraction, according to the formula:

$$d = \sqrt{2R'h}$$

Wherein *d* is distance to horizon, *R* is the radius of the earth, and *h* is the height of the observation. Given the maximum elevation (*h*) of the turbines as 484 feet (147.5 m), the top of a turbine may be seen from as far away as may be visible from as far away as 29.6 statute miles (47.6 km).

At these distances, however, the apparent size of the turbines will be greatly reduced. Distant objects appear smaller than closer objects of the same size because their visual angle decreases. The relationship between distance and the apparent height of an object is an inverse-linear function:

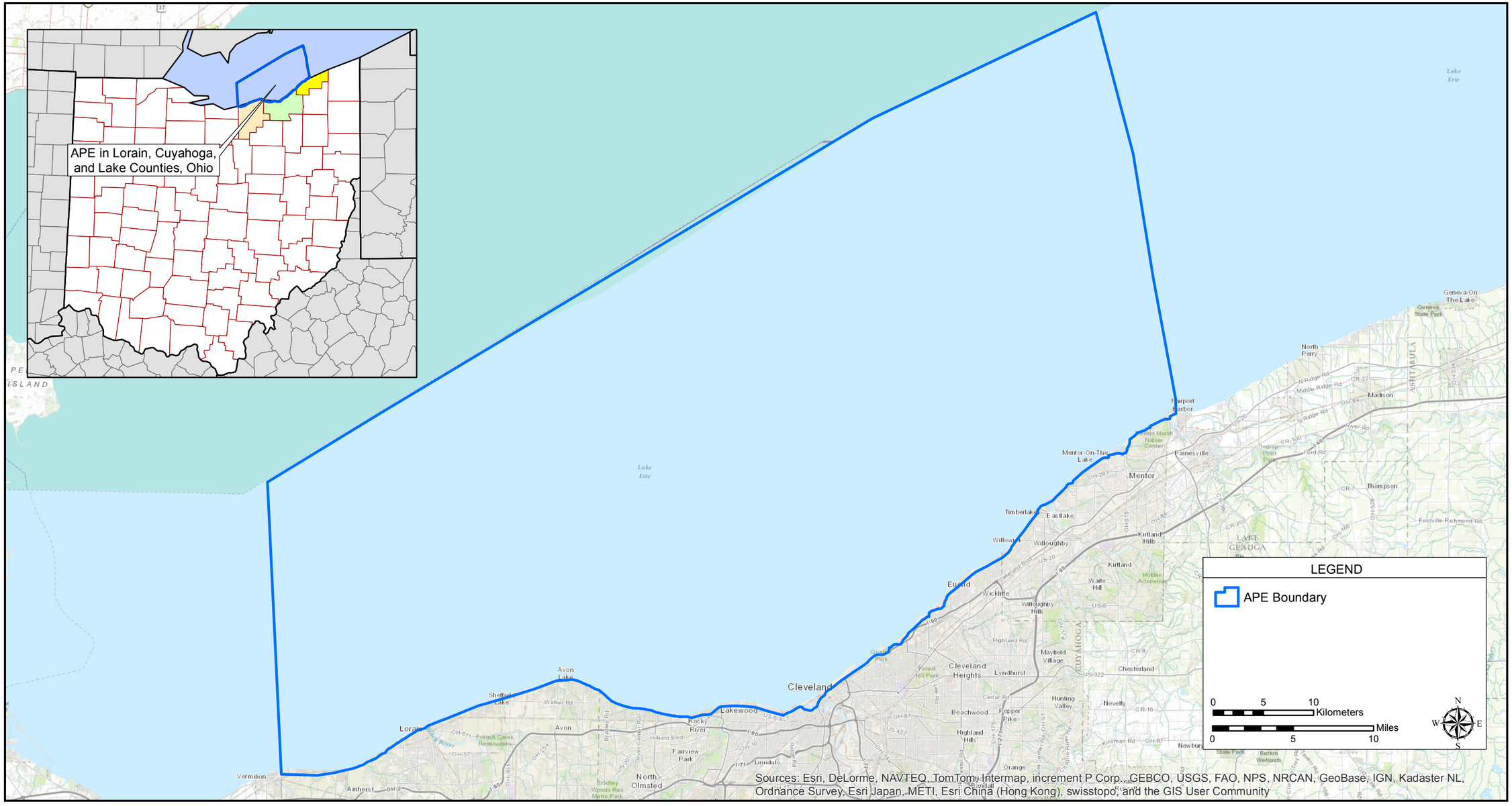
$$h = \frac{a}{d}$$

Wherein *h* is apparent height, *d* is the distance of the object, and *a* is the actual size of the object. From 5 miles (8 km) away, the approximate minimum distance from the shore to the proposed turbines, a 484-foot (147.5-m) turbine will appear to be less than an inch (2.54 centimeters [cm]) in height. That is not to say that the viewer will not perceive it as a large object, rather, while it will be visible on a clear day, it will be obscured by almost any object located along the shore.

Within the lake, there are no objects to restrict one's view of the turbines. Therefore, we recommend an APE that extends parallel to the shoreline for 29.6 statute miles (47.6 km) on either side of the project area to ensure that navigation markers, lights, and traditional use areas within the lake that might have a view of the turbines are included. We recommend that the APE should extend to the international boundary with Canada, approximately 18.5 miles (30 km) north of the nearest turbine, beyond which the NHPA does not apply. Due to the amount of development along the lake shore, views of the lake are fragmentary or non-existent beyond the first road south of the lake shore. Views are obstructed by other buildings or by trees at even short distances. The APE along the shore, therefore, has been limited to the area immediately adjacent to the lake, as bounded by easily identifiable roads (Figure 2-1). On shore, beginning at the west edge of the APE, the recommended APE extends south from the lake to US Route 6 from the Erie/Lorain county line east to the intersection of US Route 6 and the western entrance to Avalon Drive in Rocky River. The APE then extends south to Avalon Drive and east to its intersection with Ohio Route 6 at Rocky River. The APE then extends south to Route 2/I-90, running east to Lake Shore Boulevard. The APE extends south along Lakeshore Boulevard, running east to Beachview Road in Willoughby-on-the-Lake. From this point, the APE follows discontinuous roads along the lake shore, including Beachwood Road, Erie Drive, Sunset Trail, Cedarwood Road, Thunderbird Drive, and Salida Road before again following Lakeshore Boulevard beginning in Salida. From here, the southern boundary of the APE follows Lakeshore Boulevard to Harbor Drive,

which it follows to Headlands Drive. The southern boundary of the APE follows Headlands Drive to Williams Street at Headlands State Park. The APE encompasses Headlands State Park and ends at the mouth of the Grand River.

Although this APE is not a uniform distance from the Lake and likely includes areas without direct lake views, it presents a convenient and logical southern limit. It is important to note that the APE is limited to areas where the project can affect the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP.



Location of Proposed APE in
Lorain, Cuyohoga, and Lake Counties, Ohio

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Figure 2-1

3.0 BACKGROUND RESEARCH

Background research for this report includes summaries of the prehistory and history of the area, a review of previously identified cultural resources in the immediate area, research concerning the geological history of the lake, and information concerning the navigational history of Lake Erie as it relates to the potential for shipwrecks in the vicinity of the project area.

3.1 CULTURAL OVERVIEW OF THE STUDY AREA

The following is an overview of the culture history of northern Ohio. The information presented here has been culled from primary and secondary references, and is intended to serve as a context for the later discussion of archaeological sensitivity of the study area. Dates are expressed using the familiar Gregorian calendar, which is divided into B.C. and A.D. For the sake of clarity and readability, the B.C. and A.D. designations are used when discussing prehistory, but A.D. is not used when discussing purely historical events.

3.1.1 Paleoindian Period (14,000 to 8000 B.C.)

Northeast Ohio, along the southern shore of Lake Erie, is characterized by flat terrain close to the lake, called the "Lake Erie Plain." However, much of the area southeast of Lake Erie (particularly the eastern regions of Ohio) is characterized by areas of high relief known as the "Glaciated Allegheny Plateau." These two dissimilar areas exist together within the greater Cleveland area, giving the region much diversity. The Wisconsin glacier began to retreat northward at the end of the last Ice Age around 13,000 to 12,000 B.C.; carving out the Lake Erie basin, which underwent several stages during the post-glacial period (see Section 3.3.2) (Waffen 2011). By the arrival of the first humans in the region 11,000 to 13,000 years ago, the area around the perimeter of the lake shore that these groups would have exploited has long since been submerged (Stothers and Abel 2001; Waffen 2011).

Most of what is known about this earliest cultural development must be inferred from sparse surface recoveries of artifacts, particularly the diagnostic fluted projectile points (Dorwin 1966; Prufer and Baby 1963). This information can be analyzed in conjunction with geochronological and paleoecological data to make generalized assumptions about the earliest post-Pleistocene inhabitants. Post-Pleistocene adaptive strategies were geared for coping with a harsh but rapidly changing environment. In general, Paleoindian sites are reflective of areas where small groups of people would perform specific tasks of short duration. This type of site maintains a very low archaeological profile across the landscape. It has been argued that the earliest subsistence strategies in the northeast were not typified by a lopsided harvest of elephant ancestors, but rather were characterized by a balanced hunting economy based on the exploitation of migratory game, especially caribou, and supplemented by foraged food (Fitting 1965:103-4; Ritchie and Funk 1973:336).

The Paleoindian period in northeastern Ohio is somewhat well-represented, largely due to the migration patterns of Paleoindian peoples moving into areas recently opened by the retreat of the glaciers (Prufer and Baby 1963). The earliest occupation of this area is believed to have

occurred around 11,000 to 10,000 B.C. (Pratt and Croninger 1982). At the Paleo Crossing site in Medina County, this migration pattern can be seen in the artifact assemblage. A large percentage (80) of the Paleoindian tool assemblage was manufactured with Wyandotte chert, which outcrops in southern Indiana and northern Kentucky, approximately 600 km in distance (Eren and Redmond 2011).

With more amenable environments created by the retreating glaciers, humans could have brought southern traditions to the north (Stothers 1982). The interaction could have been seasonal, or with annual rounds including northern migration to the "glacial edge" environments and back to the south. The later Plano complex (stretching along the southern shore of Lake Erie in northern Ohio, including the study area) is thought to be representative of a "transitional" Paleoindian derived from the Plains (Stothers 1982). Initial Paleoindian influence seems to have come from the south, and later from the west.

3.1.2 Archaic Period (8000 to 1000 B.C.)

Archaeologically, the transition to Archaic occurred at the time of a warmer forested environment with forest-dwelling animals. According to this Ritchie-Fitting model of temporal abandonment of the area, between 8000 and 6500 B.C. little game existed in the coniferous forests of the Great Lakes and northeast, but after 6500 B.C. more deciduous forests invaded from the south. This was a more conducive environment for game. Lake levels were rising and the climate was warmer and drier (Fitting 1975). By 3500 B.C. a modern environment existed.

This model of environmental uniformity has limitations. The southern portions of the Great Lakes culture area would have sooner provided the requisite biotic variety to support human occupation than the northern ranges. The southern borders of the area do show a "small but widely distributed human population from the beginning of Early Archaic times" (Fitting 1975; Funk 1978). As such, this area still would have been a more marginal area for subsistence until deciduous forests were established (Mason 1981), and indeed low population density is evidenced in the archaeological record (Funk 1978). The migration hypothesis, that southern Early Archaic bands expanded to the north as deciduous forests pushed north, is evidenced in the Early Archaic points of southern-derived chert in northern Ohio (Payne 1982). The well-established southeastern Archaic life way may have expanded north in part due to the budding off of larger donor populations.

In northeastern Ohio, Prufer (2001) notes that there is no lack of Archaic sites to be found, usually located on elevated glacial features in the region. Sites have also been documented in moderate numbers along rivers and larger stream drainages and Prufer attributes this to the nomadic lifeways of the Archaic hunters and gatherers (Prufer 2001). Redmond (2013) notes that Middle and Late Archaic sites make up most these large numbers, mainly due to changes in environment (as the deciduous forest grew increasingly northward after the retreating glacier).

In northern Ohio, Early and Middle Archaic sites are usually of two types: "those in which a single or a few points are included in a collection of material from other cultural periods, and

those in which Early or Middle Archaic materials predominate" (Stothers and Pratt 1980). The first type is the most prevalent. The latter occurs predominantly adjacent to stream drainages, appearing "to be small habitation/exploitation areas, usually located on the edge of the small valleys" (Stothers and Pratt 1980). The fall-winter sites represent inland encampments related to upland hunting, while spring-summer activities were conducted in riverine and/or lacustrine areas that are presently submerged by Lake Erie (Pratt 1981).

Site types within the region include mostly open air "base camps" that were occupied over long periods of time. These types of habitation sites are situated in prime locations, close to water sources and what would have had good hunting and gathering opportunities (Prufer 2001). Krill Cave, in Summit County is one of the only rockshelter Late Archaic sites in the region, yielding bifurcated stemmed points, bone tools, as well as burials (Prufer 2001). The McKibben site is an example of a recurring occupation, containing evidence for Archaic occupation as well as later time periods. The Erskine site in Mahoning County was unique in that minimal disturbance (i.e. no plowing) had taken place, allowing the excavation of in situ artifacts. Circular, shallow, stone-lined fire pits spoke to the more occasional nature of the site, one that was utilized intermittently over a long period of time (Prufer 2001).

3.1.3 Woodland and Middle Periods (1500 B.C. to A.D. 500)

The Early Woodland period (1000-100 B.C.) appears to represent a cultural expansion of the Late Archaic (Stothers and Abel 1993, 2009). It is characterized by a greater tendency toward territorial permanence and an increasing elaboration of ceremonial exchange and mortuary rituals. However, some of these traits, once believed to be indicative of Early Woodland, are now known to have their origins in the Archaic (Dragoo 1976; Griffin 1978).

The introduction of ceramics to the cultural inventory constitutes the most recognizable trait of the Woodland period. As in the Late Archaic, Early Woodland sites in northern Ohio are still "located in lacustrine or riverine environments and appear to represent spring-summer encampments. The populations of these small spring-summer villages apparently dispersed into the interior areas in order to exploit deer and nuts during the autumn and early winter" (Stothers and Pratt 1980). The association of ceramics, hearths, and charred nut hulls has led to the suggestion that nut processing to extract oils was practiced (Osker 1977). This would indicate an intensification of subsistence activities (Stothers and Pratt 1980). Elaborate mortuary practices continued during the Early Woodland period.

The Middle Woodland Period (100 B.C. to A.D. 500) represents a time of complex sociocultural integration across regional boundaries via networks of trade. In Ohio, and much of the Ohio and Illinois River valleys, the predominant Middle Woodland culture is Hopewell. It is characterized by elaborate geometric earthworks, enclosures, and mounds that are often associated with multiple burials and a wide array of exotic ceremonial goods. However, the Hopewell interaction sphere may not have extended as far north as the Great Lakes, and if it did, it may only have been a weak association.

The Lake Erie area would have been in an environmentally transitional area outside the Lake Forest Biome characterizing most of the Hopewell interaction sphere. The very rich piscine

resources of the Great Lakes (Rostlund 1952) and the flora, fauna, and relatively mild Carolinian climate of the interior riverine area (Cleland 1966) created an area where groups could have selected from many combinations of subsistence options (Stothers and Pratt 1980).

The Huntington Road site in Lake County had a primarily Middle Woodland occupation, represented by tool manufacture type (Nolan 2004). Evidence for Hopewell interaction by the Huntington Road site inhabitants is provided by chert blade technology and material (Flint Ridge), but little else, suggesting limited interaction.

3.1.4 Late Woodland Occupation (A.D. 500 to 1650)

Research suggests that the development of an agriculturally-oriented subsistence strategy near the beginning of the Late Woodland period led to changes in habitation sites in northern Ohio (Prufer and Shane 1973). Waffen (2011) asserts that prior to A.D. 1200 the native inhabitants of the region almost exclusively settled within two miles (3.22 km) of the lake shore (i.e., Lake Erie or Sandusky Bay) along sand spits, prairies, and primary downstream drainages. However, shortly after the confirmed intensification of maize consumption around A.D. 1000, native groups became more sedentary and began moving inland. By A.D. 1200; most habitation sites consisted of agricultural village settlements that were located farther upstream and often at defensible river locations; primarily on or comprised of alluvium/terrace areas and beach ridges (Waffen 2011).

Climate change during this time period, as well as influence from outside groups, contributed to cultural change during the Late Woodland in northeastern Ohio. Winter camps tended to be located in upland bogs or springs while warmer season habitation sites concentrated along the lake shore or larger stream or creek drainages (Brose 2000). Ceramic production is characterized by grit-tempered plain or cordmarked pottery and lithic resources utilized local cherts (Brose 2000).

Around A.D. 1350, the Whittlesey Tradition is defined, based on ceramic production changes. Instead of using just grit, shell is added as a temper and decoration became more intricate (Brose 2000). The Whittlesey Tradition continues for several hundred years, characterizing this region during the Late Prehistoric. Brose (2000) states that by A.D. 1450, just prior to European contact, the region is dominated by habitation sites on high river bluffs that contain rectangular houses, plenty of crop production, and separate mortuary spaces (some containing more than 1,000 individuals).

3.1.5 Protohistoric and Historic Native American Occupation (A.D. 1650 to A.D. 1780)

In the decades following Columbus's reports of the New World, countries throughout Europe realized the economic potential of this new region. In due time, France entered the competition of empires, commissioning men and ships to explore the Americas. Because of the Spanish presence in Central America, South America, and the southwestern region of North America, the French concentrated their efforts on the exploration of Canada and the

Great Lakes region. The French explorers discovered a waterway that led them to the Great Lakes area and its river system; they found a wilderness abundant with plants, animals, fish, and other natural resources and occupied by several indigenous nations. It was the potential of fur-bearing animals (mainly the beaver) which particularly caught the attention of the French.

In order to harvest the furs, the French enlisted the aid of the Huron and Ottawa tribes in bringing the furs to trading posts, forts, and other rendezvous points. In exchange for these furs, the tribes received guns and ammunition, knives, iron kettles, blankets, whiskey, trinkets, and other goods. It was this trading system that sustained the French Empire in the New World. Because of the market for furs, new areas were explored and trading posts were built. It was these explorations for new trading regions that brought the French to Ohio.

The French explorer LaSalle arrived at the mouth of the Niagara River in January of 1679. The following year LaSalle sailed the Griffin the length of Lake Erie and into the chain of lakes beyond. Sanson's (1651) map of the lake, which most likely guided LaSalle's expedition, identifies "Lac du Chat" or "Lake of the Cat" after the Erie inhabitants whose name translates from Wyandot as "cat."

During the early seventeenth century, the Five Nations of the Iroquois Confederacy (Mohawk, Oneida, Onondaga, Cayuga, and Seneca) in northern and central New York had been carrying on a lucrative trade with the Dutch and the English, exchanging beaver pelts for manufactured goods. By the 1640s, however, the beaver supply in Iroquois territory had become severely depleted due to over trapping. Beginning in 1641 the Iroquois mounted a series of expeditions to the western Great Lakes region in order to gain control of the fur trade that the Huron and other western tribes had been carrying on with the French. The Iroquois were equipped with firearms procured from traders in New York and with the military superiority so obtained they succeeded in driving the Huron from their traditional territory. The "Beaver Wars" continued throughout the late seventeenth century, with the Iroquois sporadically dispatching military expeditions into New England, south to Chesapeake Bay and the southern Appalachians, north beyond the headwaters of the Ottawa, and westward into Illinois. As a consequence, the regions around Lake Erie, on the Ontario Peninsula, and the Ohio country south of the lake became essentially depopulated as the western groups were displaced to the south and farther west (Tanner 1987:30).

Beginning about 1680, western tribes and their French allies began a counteroffensive, to such effect that the Iroquois eventually sued for peace. In 1701, councils were held in Onondaga, Albany, and Montreal, involving the Five Nations, French, British, and more than 20 western, eastern, and northern Indian groups. A final council the same year in Montreal resulted in a comprehensive peace, ending the Beaver Wars (Tanner 1987:34).

It was not until the mid-eighteenth century, however, that French operations were commenced within the borders of present day Erie County. The majority of these activities were offensive and defensive maneuvers against increasing British settlement in the region (Aldrich 1978: 25). Subsequently, irreconcilable conflicts arose between the French and

British for control of North America, including King George's War (1744 to 1748) and the French and Indian War, also called the Seven Years War (1756 to 1763). When peace was finally attained after the signing of the Treaty of Paris in February 1763, Britain had won all of Canada and the vast interior east of the Mississippi, except for the port of New Orleans.

During these wars, Ohio tribes sided with the French. According to Hurt (1996: 41), this was a matter of expediency and the Native Americans fought to keep their land free from both British and French control. During the Seven Years War, "crop failure, famine, and smallpox swept the Ohio River Valley, inflicting misery on the Native Americans" (Hurt 1996: 45). Because of their French allegiance, their requests for British aid were rejected. Following the British victory in 1763, Pontiac united the Ottawa, Wyandot, Ojibwe, Miami, Delaware, and Shawnee against the British (Aldrich 1978: 27) in what was to be known as "Pontiac's Rebellion" (Hurt 1996: 45). British, American and member nations of the Iroquois Confederacy (minus the Seneca who aided Pontiac) burned Ohio villages and crops and eventually crushed Pontiac's forces.

After the Treaty of Paris ended the American Revolutionary War in 1783, the Old Northwest Territory, within which the study area is located, transferred to the United States. The treaty stated that the British were to recall all of their troops located in this territory. The British, however, failed to comply with this, and offered encouragement to the Indians not to concede the territory to the United States. Although the Northwest Ordinance of 1787 nominally opened the territory to American settlement, the Indians, principally the Shawnee insisted on the Ohio River as the approximate boundary between them and the American frontiersman. They warned that American settlements north of the river would not be tolerated. When such settlements were nevertheless established, the Indians undertook a series of raids designed to drive out the settlers and discourage further encroachments.

A peaceful means for allowing the settlement of the Indian lands was tried first. On January 21, 1785, a treaty was signed at Fort McIntosh between the American government and the leaders of the Wyandot, Delaware, Ojibwe, and Ottawa nations. Four years later, at Fort Harmar, another treaty was signed between the Americans and the leaders of the Wyandot, Ojibwe, Delaware, and Sac nations, who agreed to comply with the Fort McIntosh Treaty boundaries. However, these treaties became effectively moot when the principal Indian nations in the region, the Shawnee and Miami, having been intentionally excluded from the treaty negotiations, refused to abide by the terms. Thus, an excuse was provided the American government to resort to military force in order to clear the region for Euroamerican settlement.

In 1790 Colonel Josiah Harmar led an American expedition to punish the Indians and secure territory north of the Ohio River; this campaign ended in defeat for the American force. The following year, Arthur St. Clair led a second campaign. This time, the American force was routed calamitously. It was not until 1793-1794 that a successful American campaign was mounted, led by General Anthony Wayne and culminating with the American defeat of the Indians at the Battle of Fallen Timbers.

In July of 1795, leaders of the Ojibwe, Delaware, Eel River, Kaskaskia, Kickapoo, Miami, Ottawa, Piankeshaw, Potawatomi, Shawnee, Wea, and Wyandot arrived at Fort Greenville to negotiate a peace treaty with General Wayne. On August 3, 1795, the Treaty of Greenville was signed, allowing all but the extreme northwest corner of what is now Ohio to be opened for settlement.

3.1.6 Early Development of Cleveland and Cuyahoga County, 1780–1860

Located on the southern side of Lake Erie, Cleveland was part of the Connecticut Western Reserve. Connecticut acquired the Western Reserve lands with the intention of using them to pay Connecticut veterans for their services in the Revolutionary War (Federal Writer's Project 1936:35). However, not long after the war, the Connecticut Land Company purchased most of the Western Reserve, including the land Cleveland is situated on, planning to sell it to settlers (Condon 1979:19). The proceeds of the land sales were to be used to fund public education in Connecticut. Before settlers could purchase lots, the Reserve had to be surveyed. In 1796, Moses Cleaveland, an investor in the Connecticut Land Company, led an expedition into the Reserve to survey the land and establish a town (Barrow 1999). The job of surveying the new town was given to Seth Pease and Amos Spafford, who designed the town on a grid plan with a central public square (Condon 1979:22–23). The land surrounding the public square was divided into two-acre lots. Bordering these lots were ten-acre lots, and beyond these were hundred-acre lots to be used for farmland (Barrow 1999). The grid plan with a central green is typical of New England towns, so it would have been familiar to the surveyors and settlers, who were from Connecticut.

Moses Cleaveland did not stay long in the town that was his namesake. He and his party left Cleveland in October of 1797, but he left behind a small band of settlers to maintain the new town (Condon 1979:24). Cleveland was slow to develop due to a number of factors. Foremost was a legal battle concerning who actually owned the Western Reserve. Disputes concerning ownership of the land grant wound through the court system for a number of years until President Adams signed the Quieting Act, which gave Connecticut clear title and claim to the Western Reserve in 1800 (Encyclopedia of Cleveland History [ECH] 1998c). The Cleveland tract was retained by the Connecticut Land Company, and the sale proceeds were used to defray overhead costs. Unfortunately for the investors in the Connecticut Land Company very little marketing of the tract was done. And it suffered from a number of inherent disadvantages: the Cuyahoga River and the area now known as the Flats was a malarial swamp when it wasn't frozen solid; the mouth of the river had no harbor; and the shoreline itself was rocky. Several years passed before Cleveland became a popular destination for settlers.

However, in 1807 Cleveland was chosen as the county seat for Cuyahoga County (Federal Writer's Project 1936:52). The first settler west of the Cuyahoga River was Gideon Granger, who sold his holdings in 1815 to a Mr. Brainard (Condon 1979:42). In 1810, the population of Cleveland was 57 (Ellis 1976:62).

Cleveland in the 1820s and early 1830s was still largely an agricultural market and regional commercial center. The construction of the Erie Canal led to the growth of industry in the

area in the 1830s. By 1837, Cleveland had four iron foundries, three soap and candle factories, two breweries, and several other factories (Stapleton 1997). The increase in population led to additional development of industry in the central area and the flats along the Cuyahoga River. Residential development was pushed outward, and the large outlots on the city's edge were either sold as large, expensive tracts for the estates of the wealthy, or divided up into smaller, less expensive tracts. By the mid-1840s, the Euclid Avenue area was already a fashionable residential area equipped with comfortable housing, churches, and schools to serve the area's residents (Gray & Pape 2000:10).

Transportation

Cleveland's ability to function as a port city was hampered by an unlikely culprit, the Cuyahoga River. The river meandered in a series of lazy S-curves as it approached Lake Erie, slowing the current and forming a sand bar at the river's mouth that prevented any type of boat traffic during the summer when the water level fell. The sand bar also acted as a dam that caused the Cuyahoga to stagnate during the summer when the river was at its seasonal low. The problem of the meandering Cuyahoga and the sandbar at its mouth was solved by constructing a new channel that increased the river's rate of flow. In 1825 the Federal government allotted $5,000 for work on the harbor and the construction of a pier on the east side of the river. This attempt was unsuccessful, but another pier was built to the east of the first and the channel was directed between the two piers (Chapman 1964:18). A lighthouse completed the harbor improvements in 1830 (Chapman 1964:22).

The opening of the Erie Canal in 1827 enabled Cleveland to grow from a village into a city—from an agricultural center into a regional mercantile and trading nexus. The canal was the dream of New York governor Dewitt Clinton, who envisioned linking New York to the Midwest. The canal connected the Hudson River to Lake Erie; its completion meant goods could be transported directly from the Atlantic to the Midwest. The canal brought an influx of trade to Cleveland, as well as an influx of settlers, including European immigrants. In fact, Ohio was caught up in a frenzy of canal building, and in 1832 the Ohio & Erie Canal connecting the Ohio River to Lake Erie was completed (Condon 1979:50). The terminus of the canal was in Cleveland, further sealing the fate of the city as a harbor town.

The east side and west sides of Cleveland were also solidly linked, though not happily, by the construction of the Columbus Street Bridge in 1836. It replaced a floating bridge that the City of Cleveland pronounced a hindrance to navigation. The new bridge bypassed Ohio City and channeled people through downtown Cleveland instead. Ohio City started a new bridge in response, but its construction was halted under orders from Cleveland. Several attempts at destroying the Columbus Street Bridge were attributed to the residents of Ohio City. Cooler heads did not prevail and a gun battle ensued, but the bridge remained. Any talk of unification with or annexation of Ohio City was put off for a number of years because of the incident (Poh Miller and Wheeler 1990:48).

The first attempt at public transportation came in 1834 with the building of the Cleveland and Newburgh Railway. The line extended from Public Square to E. 105th Street along Euclid Avenue on wooden rails and ties. Flatbed cars hauled freight from the east side to the docks

in the Flats; later, passenger cars were added. The line went bankrupt in 1840 and, despite massive public subsidies, ceased to operate in 1842 (ECH 1998b).

Horse-drawn omnibuses were used for the next 17 years in Cleveland. However, the poor street conditions, exacerbated by weather conditions, resulted in spotty service and often an unpleasant passenger experience (ECH 1998b). Corvee labor provided Cleveland's street repairs at the time. The inexperienced citizen crews were summoned for two-day stints and usually progressed slowly at the poor repairs they made to the streets (Chapman1964:29). Two franchises began operation in 1860 using horse-drawn omnibuses on iron tracks: the East Cleveland Railway and the Woodland Avenue Street Railcar Company (Young 1998). The idea proved viable and profitable, and eight other companies were formed by 1876 (Young 1998).

The next major event in the development of Cleveland transportation was the construction of the railroads, which fostered and fueled additional industrial growth. The first attempt was a line between Cleveland and Willoughby that fell victim to the Depression of 1837 and was not constructed (Rowan 1907:27). The first successful railroad in Cleveland was the Cleveland, Columbus & Cincinnati (CC&C), which was completed in 1851 (Grant 1997). Located along Cleveland's eastern lake shore because of the level terrain, the railroad precluded any recreational or residential development along the lake shore and irrevocably changed the nature of the city (Chapman1964:102). The Cleveland, Warren, & Pittsburgh Railroad opened in 1852, linking Cleveland to the east (Rowan 1907:27). Many additional railroads followed during the second half of the nineteenth century in Cleveland.

Industry

The milling industry grew quickly with the establishment of the canal system. Wheat from the interior of Ohio could be milled in Cleveland and shipped by canal to eastern markets. Flour production grew rapidly from 1832 to a peak in 1860 (Stapleton 1988:71).

The seeds of Cleveland's future heavy industries were also started during this period. The Cuyahoga Steam Furnace Co., organized in 1827, became Cleveland's first incorporated manufacturing plant in 1834 (ECH 1997k). The company started with mill gear castings but quickly expanded to marine engines and steam locomotives (ECH 1997k).

In 1850, the Cleveland Iron Mining Company was formed to explore the possibilities of iron mining in the Upper Peninsula of Michigan. The first load of iron ore was sent through the Sault Ste. Marie Canal in 1855 (Poh Miller 1997). This ore was of a higher grade than iron ore available in Ohio. The steel industry in Cleveland grew concurrently with the related industries of lake shipping and the railroads. The railroad line along the lake shore quickly spawned industrial complexes. In 1857, the King Wrought Iron Bridge Works built a shop along the line at Hamilton Avenue. Manufacturing employed only nine percent of Cleveland's workforce at this time (Poh Miller and Wheeler 1995:52), but the perfect combination of the cheap transportation, easily accessible raw materials, and cheap immigrant labor primed Cleveland for a leap from agriculture to industry.

Commerce

Samuel Jones and Alexander Campbell built a trading post in 1800 featuring a still that produced two quarts of "strong waters" a day (Ellis 1976:50). This production of distilled spirits was the first recorded manufacturing in Cleveland. Cleveland's growth was hindered initially by the lack of cheap and viable transportation to eastern markets for its goods, which generally had low profit margins. Agricultural products such as corn and hogs could not be shipped to the east without the profits being absorbed by the shipping costs. Even processing corn into whiskey did not achieve the margin needed to make trading with the eastern states profitable. Therefore, agriculture remained a subsistence activity during the early years of Cleveland's history (Ellis 1976:101). Products that were sent east included grindstones and furs, which were traded for salt, garments, iron, brass, and glass. The Zephyr, a 30-ton ship, was constructed in Cleveland for this purpose in 1809 (Ellis 1976:62). Commercial activity slowly grew. Levi Johnson started a sawmill in 1809 that fueled a building expansion in Cleveland. It also started Cleveland's foray into shipbuilding with the Zephyr. 1816 marked the formation of the first bank, the Commercial Bank of Lake Erie. However, the bank failed during the Panic of 1819 when it was unable to back its currency (Ellis 1976:79).

The opening of the first stretch of the Ohio & Erie Canal between Cleveland and Akron in 1827 increased trading and agribusiness opportunities in Cleveland. In 1831, the city had nine large warehouses, a steam flouring mill, a stream engine manufactory, 20 kinds of stores, a dry dock, and a brewery (Chapman1964:46).

The canal boom and mercantilism ended Cleveland's poor, pastoral agricultural phase and tied it inextricably to national economic trends. Land speculation was rampant during the mid-1830s as the Federal Government disposed of its western land holdings, and people moved west. Many people hoped to purchase property that would be close to a town, railroad, or canal, and then sell it quickly for a tidy profit. In August of 1836, Andrew Jackson issued the Specie Circular, which mandated that the United States Treasury would no longer accept the paper banknotes that various regional banks had been issuing but instead would accept only gold and silver for land payments. This government action prompted a run on the nation's banks as people scrambled to exchange their paper notes for gold and silver. Banks and businesses failed on a massive scale. Capital-intensive new business ventures, such as railroads, were shelved. The country did not recover from the economic shock for six or seven years (Poh Miller and Wheeler 1990:36). However, Cleveland's industrial and commercial fortunes grew quickly after 1850 with the expansion of the railroads.

3.1.7 Continued Development and Industrialization, 1860–1900

During the Civil War, industrial development in Cleveland expanded rapidly. The city benefited from being away from the front lines of the conflict but on major lines of transportation (Poh Miller and Wheeler 1995:31). Cleveland's proximity to raw materials and its access to cheap transportation continued to be a draw for businesses and individuals. During this period, industry in Cleveland progressed from processing raw materials to producing increasingly complicated machine tools, electrical equipment, and hardware. This change required not only raw materials and access to transportation, but also invention and

entrepreneurship (Fogarty et al. 2002:21), and Cleveland profited from a skilled immigrant workforce and an educated and innovative business class.

Innovations in public transportation led to increased mobility and social stratification. As immigrant mill and factory workers progressed up the economic ladder, they moved to outlying neighborhoods, which spurred the growth of the city. Successive waves of immigrants flocked to entry-level factory and mill jobs, usually living close to their place of employment since they often could not afford mass transit (Weiner and Beal 1988:34).
The northern portion of the APE, from Lake Erie down to Carnegie, became a mix of heavy industry and immigrant neighborhoods that supplied a workforce to the burgeoning heavy industries and attendant shops.

By the 1880s, Euclid Avenue was at its height as an address for the city's most prominent citizens; the street was compared by some to the Champs-Elysees in Paris. Electric streetcars came to the city in the 1880s: the Garden Street Electric Railway in 1884 and the East Cleveland Railway in 1889. These lines allowed workers to live farther out from the city center. The early railroad lines, such as the CC&C may have started the decline of Euclid Avenue and other major residential boulevards in inner Cleveland, as high traffic made these streets less desirable for upscale residences and more attractive for commercial shops. The CC&C Railroad crossed Euclid and E. 55th, and in 1870, Younglove Manufacturing, a maker of farm implements, moved to this intersection and spurred industrial development in the area. Industrial plants required sidings, servicing sheds, and material storage areas, none of which is compatible with high-end residential development (Chapman 1964:104). As early as the 1880s, some western portions of Euclid Avenue were already beginning to see commercial development replace residential land use, a pattern that would continue into the twentieth century (Gray & Pape 2000:12).

The area south and east of downtown, composed of the Haymarket section and the Central Woodland Orange corridor, continued to expand with increased immigration. The growing industrialization of Cleveland led to industrial and residential development in this area. In 1874 the area south of downtown was a mix of industries and residential properties. The area south of University Road was also developed during the latter half of the nineteenth century. The area to the east of downtown along what was then the lake shore had residential plats, some larger lots, and the facilities of the Lakeshore Railroad Repair Shops.

Transportation

The horse-driven streetcars of the 1860–1880 period were slow, and many housing developments built during that time and even as late as the turn of the century were still densely packed and located close to factories.

Road conditions improved gradually throughout this period as advances in paving improved what were originally seas of mud, garbage, and manure. Nicholson paving was introduced in the 1860s in Cleveland. The Nicholson system was a combination of wooden blocks and asphalt that did not fare well in Cleveland weather and required constant repair (Chapman 1964:112). Experiments with macadam (aggregate layers with a cementing agent) began in

1870, and the city acquired a steamroller in 1872. However, most minor roads in Cleveland were still graded gravel roads until the turn of the century (Chapman 1964:112).

Before mass transit, social and economic stratification dictated not only how far people lived from their places of employment but also the population density of neighborhoods, since almost everyone had to walk to work. The transition from densely packed neighborhoods near factories to less dense suburban areas happened gradually. From the 1860s through the 1890s, the introduction of horse-drawn streetcars, followed by the electric versions, allowed middle-class workers to live farther from downtown and farther from their workplaces. The construction of the Central Viaduct in 1887–1888 also stimulated economic growth by linking southern suburban areas like Brooklyn and Tremont to the downtown and its surrounding industrial area in the Cuyahoga Valley.

Rail transportation connected Cleveland with its growing suburbs beginning in the late 1860s. In 1868, the Cleveland and Newburgh Railroad started operating a line that ran from E. 55th Ave. and Woodland to Broadway and Miles. This steam engine railway was defunct by 1877 due to numerous accidents (Young 1998). Other lines included the Rocky River Railroad, organized in 1867, which was important in the establishment of suburbs such as Lakewood (Young 1998).

In 1873, Cleveland City Council purchased the Ohio & Erie Canal rights within the city limits from the State of Ohio. Various interests in the city saw the potential of the canal right-of-way for a railroad corridor and other development (Tamburro 2002). The city planned the Superior Viaduct and lowered the Cleveland, Columbus & Cincinnati Railroad through the canal bed near Columbus Street (Tamburro 2002). The Valley Railroad filled the canal with ballast in preparation for building the tracks. The canal, however, was not totally abandoned. The weigh lock was rebuilt on Dille Street by Independence Road in 1874, and the canal remained important for trade with the interior of Ohio for several more decades (Tamburro 2002).

The New York, Chicago & St. Louis Railroad (Nickel Plate Road) was completed in 1882, a mere 600 days after its inception; the railroad stretched from Chicago to Buffalo. However, soon after the railroad was completed, a controlling interest was purchased by a pair of Clevelanders who turned out to be agents for William Vanderbilt and the New York Central Railroad. Vanderbilt was keen to curb any competition for the Lake Shore & Michigan Railroad, whose tracks paralleled the newly constructed Nickel Plate Road (ECH 1997h). The western section of the New York Central was the Lake Shore & Michigan Southern. This line was originally the Cleveland, Painesville & Ashtabula Railroad and in 1852 connected with the New York Central in Buffalo. In 1869, the Lake Shore & Michigan Southern merged with the New York Central, providing continuous service between New York and Chicago (ECH 1997h). The former provided a right-of-way to the east and the latter the right-of-way in the west. With the acquisition of the Nickel Plate, the New York Central now had a monopoly on all east-west rail traffic between Buffalo and Chicago.

Streetcars began to be electrified in the late 1870s, and the process was completed by 1894 (Young 1998). Since the beginning of the 1880s, future populist mayor and streetcar line owner Tom Johnson battled Republican power broker and Cleveland Railway owner Marcus Hanna in a fierce business competition and ideological battle concerning the fare structure in Cleveland. No transfer privileges were given; passengers had to pay another fare to switch lines. Tom Johnson supported a 3-cent fare and cooperation between rail lines concerning transfers (Lawrence and Schattinger 1979:85). Marcus Hanna and his backers advocated the existing 5-cent fare, which was too expensive for most working people, and no fare cooperation between lines (Weiner and Beal 1988:36).

In 1903, Tom Johnson was elected mayor of Cleveland, and one of his planks was the 3-cent fare and municipal ownership of the streetcar lines. Marcus Hanna and many politicians failed to agree and the battle raged in the courts and the state legislature until 1909, when a compromise agreement mandated a private franchise with public oversight. The 3-cent fare was implemented in 1911, along with a guaranteed return of 6 percent for the investors in the privately held streetcar company (Campbell 1997).

Industry

Cleveland industry expanded rapidly between 1860 and 1900, producing an increasingly complicated array of products (Fogarty et al. 2002). The variety and increasing complexity of the industrial products from Cleveland set the stage for continued growth for the next 100 years. This growth was possible through a golden combination of skilled immigrant labor, business innovation, and Cleveland's central location.

Industries and individuals in Cleveland that benefited from the Civil War included the Cuyahoga Steam Furnace Company, which made railroad rails for the Union cause. John D. Rockefeller made his initial fortune selling supplies to the Union Army. The Civil War also jump-started the garment industry, with the establishment of the German Woolen Company, the first woolen cloth manufacturer in Cleveland (Stark 1998).

The nascent petroleum industry became a major force in Cleveland during this period and faded by the end of it. John D. Rockefeller, founder of the Standard Oil Company, came to dominate the petroleum industry. Rockefeller began in 1864 with the purchase of a kerosene refinery. Rockefeller purchased competing refineries in Cleveland and throughout the east. Standard Oil began to dominate the industry through elimination of the competition. The transient nature of oil field discovery and the quick depletion of fields meant that major refineries and pipelines moved quickly out of Ohio, as the location of preferred fields migrated, from Pennsylvania to western Ohio and eventually to the western United States. Oil refining reached a peak in Cleveland in 1886 and ceased to be a major industry in Cleveland by 1900 (Stapleton 1988:77). Standard Oil itself moved its headquarters to New York City in 1885 in order to be close to regulatory bodies, courts, and the competition.

Because the petroleum refinery process uses sulfuric acid, the heavy chemical industry grew in tandem with the petroleum industry. For example, Eugene Graselli began producing sulfuric acid in Cincinnati but moved to Cleveland in 1866 to be closer to the refineries and thereby reduce transportation costs (Livesay 1988:58). The heavy chemical industry

continued to thrive after the refinery industry had begun to fade. Sulfuric acid was also used in the burgeoning steel industry.

Henry A. Sherwin purchased the Standard Oil cooper shop at 601 Canal Road in 1873, and the Sherwin-Williams Company began to market ready-mixed paint in 1875 (ECH 2005b). Before Sherwin manufactured paint, the average person engaged in the questionable practice of making homemade paint. Sherwin invented equipment that would grind pigment fine enough to allow it to remain in suspension. This method of manufacture ensured standard results and quality paint. He also invented the metal paint can (Lawrence and Schattinger 1979:55). Glidden and Joy manufactured paint and varnishes in Cleveland beginning in 1876, locating their factory along the CC&C line through the east side of Cleveland (Chapman 1964:104).

Cleveland became famous for electrical equipment, due in large part to the inventions and efforts of Charles Brush. In 1880, Brush patented an open dynamo for generating electricity, and he started the Brush Electric Company that same year (ECH 2006). Brush Electric merged with Thomson Houston Electric in 1889, and that company merged with Edison Electric in 1891 to form General Electric (ECH 2006). Brush Electric Light and Power also combined with the Cleveland Electric Company in 1892 and built a power-generating plant on Canal Road that began operation in 1895 (Lawrence and Schattinger 1979:81). The combined companies became the Cleveland Illuminating Company. Charles Brush is also noted for constructing the first automatically operating wind turbine, which reportedly generated electricity for 20 years.

Cleveland continued to benefit from its central location and from being on the forefront of industrial innovation. In 1873, Otis Iron and Steel Co. became the first company formed for open-hearth steel production. Production began in 1880 at their mill on the lake shore and E. 33rd Street (ECH 1997a), east of downtown and within the study area for this project. A second major post–Civil War steel maker in Cleveland was the Cleveland Rolling Mill Company, which in 1868 became one of only two mills in the country to have a Bessemer furnace (Stapleton 1988:75). Another major player in the steel industry was Pickands, Mathers & Company, which was organized in 1883 to sell iron ore, pig iron, and coal. John D. Rockefeller started an iron ore fleet in 1891 that by 1901 had become the largest fleet in the world (Lawrence and Schattinger 1979:64). By 1880, the iron and steel industries made up 20 percent of the city's industrial production.

In 1901, United States Steel, owned by J. P. Morgan, purchased the interests of John D. Rockefeller and Andrew Carnegie in the Mesabi Range, as well as parts of American Steel and Wire (Lawrence and Schattinger 1979:67). During the 1880s, Cleveland firms, such as American Wire and Steel, produced barbed wire, wire nails, and related products for the developing nation. Other firms produced nuts, bolts, screws, and farm implements (Fogarty et al. 2002:25).

The number of metal-working firms rapidly increased in the period from 1880 to 1890. Companies that produced hardware and metal components spawned other businesses that

manufactured increasingly complex items such as steamships, bridges, carriages, rail cars, and sewing machines (Fogarty et al. 2002:28). These industrial activities also produced a large number of patents, compared to other areas of the country. The Cleveland area developed a strong sense of expertise in areas that facilitated the leap from producing bulk commodities to complex goods. Many patents enabled the manufacture of production equipment for factories (Fogarty et al. 2002:30-31).

The Globe Iron Works started in 1853 but did not begin building ships until 1882. In 1887, the company acquired the Cuyahoga Steam Furnace Company and began a second shipyard on the site. Shipbuilding advanced as technological advances were made in steel processing. The first iron freighter with a bow-mounted pilot house, the Okono, was built in 1882. The Bessemer process allowed the first steel ship, the Spokane, to be built at the Globe Iron Works in 1888 (Lawrence and Schattinger 1979:61). In 1899, Globe Iron Works, Cleveland Ship Building, and Ship Owners Dry Dock Company merged to form American Ship Building.

An accidental discovery at the Cleveland Rolling Mill plant led to an industry that is still important in Cleveland today. Operating in an environment devoid of zoning and safety regulations, mill workers drilling for natural gas at their steel plant in 1868 discovered brine instead of gas. Since salt is used to produce soda ash, an ingredient in glass, paper, caustic soda, and bicarbonate, the well was not a total bust. This discovery initiated the recovery of salt in Cleveland, first from brine, and then from mines (Nordahl 2003).

Commerce

Much of Cleveland's commerce depended on the export of its products. In 1882, machinery led the list of products; railroad equipment was second; and garment manufacturing and iron and steel came further down the list. This time period marked a shift from the production of bulk goods to more complex industrial items (Kennedy 1896:461). Other major commercial products were electric lights, carriages, fertilizers, and flour (Kennedy 1896:461).

3.1.8 High Point of Industrial Development, 1900–1945

The early twentieth century was a time of rapid growth for Cleveland. While some families who owned industries, such as the Rockefellers, moved away, the industrial plants themselves grew robustly in Cleveland during the first three decades of the twentieth century. The 1920s in particular were golden years for Cleveland. In 1920, Cleveland achieved the status of fifth-largest city in the United States (Condon 1979:159). Manufacturing was a major industry for Cleveland, and it provided many lower-middle-class jobs to the immigrants pouring into the city.

However, the highpoint of innovation and industry marked the beginning of the decline of Cleveland industry as the nature of invention changed during the first decades of the 20th century. Innovation in Cleveland industry had come from independent inventers who capitalized on the business opportunities that presented themselves. At the beginning of the century, invention became more science based, and the focus shifted toward the corporate research center and the university. While these labs focused on developing ideas for existing

industries, innovative growth industries shifted to other regions (Fogarty et al. 2002:57). In 1930, Ohio had 566 patents per million people, while in 2004, Ohio had only 299 patents per million people (Federal Reserve Bank of Cleveland 2005:15). Nonetheless, until 1929, growth in Cleveland was prolific.

The area of the city east and southeast of downtown shared in this growth. The 1912 edition of Cleveland Sanborn maps shows the area was a mix of factories, some commercial development, and residential development. Even with the advent of electric streetcars, many working-class neighborhoods were still densely packed with small houses on narrow lots. In some cases, small dwellings were fitted in on the backs of residential lots behind the main house, facing rear alleys. The result was an incredibly dense urban environment with large numbers of families packed into a small area. Commercial buildings on street corners served the needs of the many residents.

By 1912, the area also housed a significant number of industries, including steel, boxboard, oils and varnish, candy, and tool and die, as well as warehouse storage. The factories ranged in size from tiny to fairly large. One of the largest factories was the Otis Iron & Steel Company Plant, a large facility with furnaces, melting houses, and machine shops, located east of downtown near the Lake Erie shoreline along Lakeside Avenue. Initially an acid open-hearth steel mill, it became a mill for castings and forgings after 1912.

Growth continued in Cleveland through the economic boom of the 1920s as factory construction continued in the areas east and south of downtown. Along Superior Avenue, large industrial loft buildings accommodated a robust garment industry. The steel, tool, and die industry continued to expand, as did other industries. However, with the onset of the Great Depression at the end of 1929, both industrial production and growth in Cleveland slowed. Unemployment in Cleveland mushroomed during the 1930s, with 41,000 unemployed in 1930 and 100,000 by January 1931 (Poh and Wheeler 1995:42). Only with the entrance of the United States into World War II at the end of 1941 did the demand increase for industrial goods, and at that time the city's factories were brought back up to full capacity.

The wealthy had fought streetcar development along Euclid Avenue for decades, but tracks were finally built in 1910. Streetcars plus dense automobile traffic on Euclid diminished its popularity as an upscale residential area, and a decades-long transformation of the street began. Railroad traffic and its attendant industry encroached from the east and retail development approached from downtown (Chapman 1964:112). As the wealthy began to move away, single-family homes were converted to apartments or taken over by hospitals, nursing homes, or civic groups by the 1920s and 1930s. Other homes were demolished in favor of commercial buildings (Gray & Pape 2000:14). By the 1920s and 1930s, the growth of the area's automobile dealerships led to the rise of numerous shops offering tires and other car-related products (Hopkins 1932).

The area below Euclid Avenue (the Woodland Avenue, Central Avenue, and Orange Avenue corridor) changed demographically during from this period from an Italian settlement known

as Big Italy to a predominantly African American conclave. Tremont and the Clark-Fulton neighborhood experienced an influx of Poles, Greeks, and Syrians, changing the demographic of the area from its original Irish and German mix (ECH 1997j).

Transportation

During the first decades of the twentieth century, Cleveland used almost every mode of transportation that had ever been present in the city. Industry still relied on railroad and lake shipping. An airport opened in 1925. Individuals continued to rely on streetcars and increasingly on the automobile. Road conditions improved throughout the latter half of the nineteenth century and most major roads were paved by the turn of the century (Chapman 1964:112). The names of Cleveland streets were changed in 1906 to a series of numbered avenues and streets. A complete list of street names and their corresponding numbers is provided in the 1906–1907 edition of the Cleveland City Directory.

The Ohio & Erie Canal was still in use during this period, and the canal was refurbished during the years 1905–1909. It did not, however, ever have the importance it attained shortly after its completion. The canal was officially abandoned after the flood of 1913 destroyed large sections of it, which the state refused to repair (ECH 2002).

Railroad grade elimination was another major undertaking during the initial decades of the twentieth century in Cleveland. The Nickel Plate Railroad installed bridges and overpasses in exchange for right-of-way concessions. Cleveland had approximately 240 grade crossings in 1900; 59 were eliminated by 1914, mostly on the east side (Watson and Wolfs 1981:90).

Perhaps the biggest changes in Cleveland were caused by the construction of the Terminal Tower and the railroad lines that converged upon it. Through leveraged buyouts and holding companies, the Van Swearingen brothers amassed 23 railroads and a total of 231 companies. While their actual net worth was only $500,000, they held four billion dollars in stocks in their companies (Stakes 1995:31). In 1916, the Van Swearingen brothers purchased the New York Central Railroad merely to gain the right-of-way from E. 34th to Public Square for their Shaker Heights transit line. The Federal government was pleased because they wanted the New York Central divested from the Vanderbilt holdings in accordance with the Clayton Anti-Trust Act of 1914 (Grant 1997). The Van Swearingen brothers received their right-of-way to bolster their suburban development in Shaker Heights, and in the 1920s they won government and voter approval for a new central rail terminal downtown, Terminal Tower (ECH 1998d). Downtown Cleveland was radically altered by the construction of Terminal Tower and its railroad approaches. The residents of the Haymarket neighborhood were evicted, and the area was razed. The first train entered the Terminal Tower on October 23, 1929, and the stock market crashed six days later on October 29. The Van Swearingens managed to hold everything together until 1935, when they were forced to default on a 48 million dollar loan. Terminal Tower, however, remains the focal point of downtown Cleveland.

Cleveland Municipal Airport opened in 1925 in order to accommodate airmail service flights that ran from coast to coast. The airport became home to the world's first control tower in 1927 (ECH 1997c).

Industry

The presence of many machine tool manufacturers, the chemical industry, and electrical equipment manufacturing set the stage for Cleveland's growth in the automotive industry. By 1900, the automobile industry was emerging as a major economic force in Cleveland. Although Detroit surpassed Cleveland in terms of automobile assembly as early as 1910 and became the center of auto production in the United States, Cleveland remained a major center of automobile assembly and parts manufacturing through the mid-twentieth century (Stapleton 1997).

Industry in Cleveland became increasingly vertically integrated. While steel and ore refining continued to be a major industry, more than half the pig iron produced in Cleveland during the 1920s was turned into finished products in Cleveland (Lawrence and Schattinger 1979:98).

Cleveland was the headquarters of the world's largest shoddy mill during the beginning of this period. Shoddy material is cloth made from recycled woolen cloth (1911 Encyclopedia). Other major industries included lumber and grain.

By 1940, Cleveland was first in the nation in lighting and second in the production of machinery tools. Cleveland was also a leader in the production of paints, motor fuels, trucks, buses, and electrical goods (Lawrence and Schattinger 1979:103).

Commerce

Commerce in Cleveland during the first portion of the twentieth century remained focused on selling manufacturing goods such as automobiles, steel, machinery, lighting products, paint and chemicals. Commercial activity continued to be concentrated in the central business district. Republic Steel moved its headquarters to Cleveland from Youngstown in 1935, reversing the trend of large corporate headquarters that were leaving Cleveland. Shopping and entertainment thrived in the newly constructed Playhouse Square area. The opening of the Terminal Tower marked the largest merchandising area associated with rail service in the country. (Poh Miller 1990:130)

3.1.9 Peak and Decline of Industry and Post-Industrial Development, 1946-Present

Manufacturing continued to be important after the World War II, but service industries began to gain in importance and in the numbers of workers employed. Companies in Cleveland included auto parts warehouses, machine shops, material handling equipment warehouses, furnace supplies, printing, metal-cleaning services, and several commercial warehouses.

The population of Cleveland fell after the war, declining 45 percent between 1950 and 1990 (Bier 1995:251). One factor in this decline was expanded public transportation and greater availability of the automobile, which enabled residents to relocate to newer suburban developments. Another factor was the tax code, which encouraged people to purchase successively expensive homes to avoid capital gains taxes. Houses in Cleveland proper cost

approximately half of what houses cost in the suburbs, so anyone choosing to move into the city of Cleveland would have to pay a substantial tax penalty (Bier 1995:253). Federal loan programs fueled home purchases in the suburbs by people who otherwise may not have been able to afford them (Bier 1995:252). In addition, some housing was demolished to facilitate the expansion of industrial plants; a substantial additional amount of housing stock was torn down during construction of the Cleveland's interstate highways in the late 1950s and early 1960s; and more housing was destroyed during the urban renewal programs. Racial unrest and forced busing also contributed to white flight during the 1960s and 1970s.

Transportation patterns were altered radically with the advent of the interstate highway system. The Shoreway opened in Cleveland in 1960; part of it became I-77. The interstate system opened the east and west sides of Cleveland to suburban development (Bier 1995:252). Subsequent interstate highway development enabled suburban development to the south and west of the city of Cleveland. The interstate highway system also enabled industry to leave the city. While some heavy industry did move abroad or to the Sunbelt of the United States, other concerns merely moved across the city limits. Between 1958 and 1970, the City of Cleveland lost 120, 000 heavy industry jobs while the suburbs gained 210,000 jobs (Poh and Wheeler 1995: 44).

The Cleveland area supports a number of corporate research laboratories for companies such as Sohio, Durkee Foods, and Union Carbide. The Lewis Research Center, part of NASA, also performs research on rocket and jet technology and fuel efficiency. Continuing the trend begun early in the twentieth century, patents and inventions increasingly come from corporate researchers. However, some inventions from Cleveland continue to emanate from individuals; the invention of Day-Glo fluorescent paint in the 1940s is a notable example.

By the 1980s, the industrial era was beginning to wane in Cleveland, as it was in many other American cities in the Midwest. The decline in Cleveland of manufacturing can be attributed to a variety of factors. Many factories had not been modernized, changes in corporate ownership brought new priorities, and foreign steel and auto producers began taking market share. Some studies also indicate that neglect of higher education and research opportunities have taken their toll (Fogarty et al. 2002:58). States with higher patent rates have higher income growth, and higher patent rates are linked to higher education rates (Federal Reserve Bank of Cleveland 2005:16). Unfortunately, the patent rate for Ohio has been falling steadily since 1930 (Federal Reserve Bank of Cleveland 2005). In addition it has been noted that many of the innovators in Cleveland industry have been immigrants, which has been curtailed. (Fogarty et al. 2002:39–40).

However, many heavy industry concerns, including both General Motors and Ford Motor Company, still have large operations in the city. Some have modernized their operations, such as the Brook Park Engine Plant, and continue to provide middle-class jobs to many Clevelanders.

The decline or collapse of companies decimated Cleveland's tax base. For example, the 1970 bankruptcy of Penn Central (formed by the merger of the New York Central and

Pennsylvania Railroads) cost Cleveland millions of dollars in back taxes owed predominately to various school systems. (ECH 1997i)

Transportation

Transportation in Cleveland changed radically during the post-WWII period. Of course, widespread automobile usage changed Cleveland irrevocably, but other changes were also taking place in shipping, air travel, and public transportation. Cleveland Municipal Airport was renamed Cleveland-Hopkins International Airport in 1951. New terminals, concourses, and gates were added in 1956, 1968, and 1978 (ECH 1997c). The smaller Cleveland Burke Lakefront Airport opened in 1947, and was renovated to handle charter and airline services in 1993. It is now the fourth busiest airport in Ohio.

The Port of Cleveland has always been important for the economy of Cleveland. After World War II, the port experienced a frenzy of activity as new construction increased the demand for stone, sand, and ore (Economic Development Program 1997:5). These continue to be the major products entering the port of Cleveland. While the sand is often used in construction applications and some stone is utilized as aggregate, the bulk of the imported stone and ore is used in the steel industry, making the port dependent on the fortunes and vagaries of the steel industry. Recently imported items include Russian plate glass, scotch, rope and twine, fluorspar, autos, marble, and coal tar (Economic Development Program 1997:9). The only major export through the port is salt. Minor exports include complete steel mills, off-highway mining trucks, and industrial rubber processing equipment.

Federal monies enabled Cleveland to improve its port facilities in 1955 in anticipation of the opening of the St. Lawrence Seaway in 1959 (Poh Miller and Wheeler 1995:159). The improvements to the port led to a larger number of foreign ships and increased bulk shipments (Lawrence and Schattinger 1979:107). The Seaway did not initially result in the passage of increased tonnage through the port because a myriad of regulations affecting international shippers caused them to avoid Cleveland. The Cleveland–Cuyahoga Port Authority was created in 1968 to mitigate regulatory issues and increase international trade (Economic Development Program 1997:8).

The City of Cleveland purchased the Cleveland Railway Company in 1942, thereby making streetcars publicly owned (Young 1998). Buses began to be used in the 1920s and gradually replaced the streetcar; the last streetcar ran in 1954 (Young 1998). In 1975, the Cleveland Transit System, which operated the public transportation systems, was sold to the Greater Cleveland Regional Transit Authority to cover city operating expenses (Poh Miller and Wheeler 1995:178).

The Federal Highway Act of 1956 affected Cleveland as much as the construction of the Ohio & Erie Canal and the railroads. However, while the canal and the railroads brought people to Cleveland, the interstate highway system depleted the population of the city. The first interstate, the Cleveland Shoreway, opened in 1960.

Industry

Cleveland maintains a manufacturing base. Machinery is Ohio's largest export and exports of machinery are increasing (Ohio Department of Development 2006b:4). In terms of revenue, Eaton Corp, Lincoln Electric Holdings, and NACCO, all of which manufacture machinery, are leading Cleveland companies (Ohio Department of Development 2006a:2–3).

Garment manufacturing continued until the mid-1950s at Cleveland Worsted Mill. Although the factory on Broadway installed updated machinery in the 1950s, the company suffered from competition based in the South. The company closed its plant on Broadway and others in the U.S. to spite the garment union after the workers voted to unionize the Cleveland shop (ECH 1997d).

The steel industry has steadily consolidated in Cleveland, mirroring recent corporate steel activity the world over. LTV purchased Jones and Laughlin in 1968 and Republic Steel in 1984. LTV sold its Cleveland plant to International Steel Group (ISG) in 2001 after filing for bankruptcy. ISG merged with Ispat in 2004 to form Mittal Steel (ECH 2005a). Recently Cleveland Works was temporarily shuttered in response to a steel glut caused by imports in the light rolled steel market (Krouse 2006).

Chemicals and paints are also predominant industries; Glidden, Ferro, and Sherwin-Williams count among the industry leaders (Ohio Department of Development 2006:2–4).

The salt industry continues as well. In 1945, Ohio was the third largest salt producer in the country and provided 18 percent of the country's table salt (Nordahl 2003).

Commerce

Commercial activity, like industrial activity, began to move outside the confines of the Cleveland city limits. In 1947, the Van Aken-Warrensville center was opened in Shaker Heights, and malls and shopping centers throughout the metropolitan area quickly followed (Poh Miller and Wheeler 1995:159).

Commercial activities and the service industry have replaced manufacturing as the largest employers in the city of Cleveland. The Cleveland Clinic is now the largest employer in Cleveland.

Commercial banking is a leading industry in terms of both revenue and number of people employed; KeyCorp and National City Bank are the leaders in this field based on these factors (Ohio Department of Development 2006a:2–3).

3.2 Other Identified Cultural Resources

The literature review and background research for this project included an examination of the Ohio Archaeological Inventory (OAI), Ohio Historical Inventory (OHI), NRHP, and National Historical Landmark (NHL) files via the OHPO online GIS mapping program. The literature review included NRHP-listed and NHL properties located within 1 mile (1.6 km) of

the Lake Erie coast, and OAI and OHI properties within 0.5 mile (0.8 km of the Lake Erie coast) (Figure 3-1). This study area is larger than the proposed APE to ensure that any adjacent significant properties are identified and the APE could be altered, if appropriate. This is especially important in instances where existing properties might be incorporated into new historic districts, or existing historic districts might warrant expansion into the proposed APE. Gathering data on properties outside of the proposed APE also provides context within which properties can be evaluated.

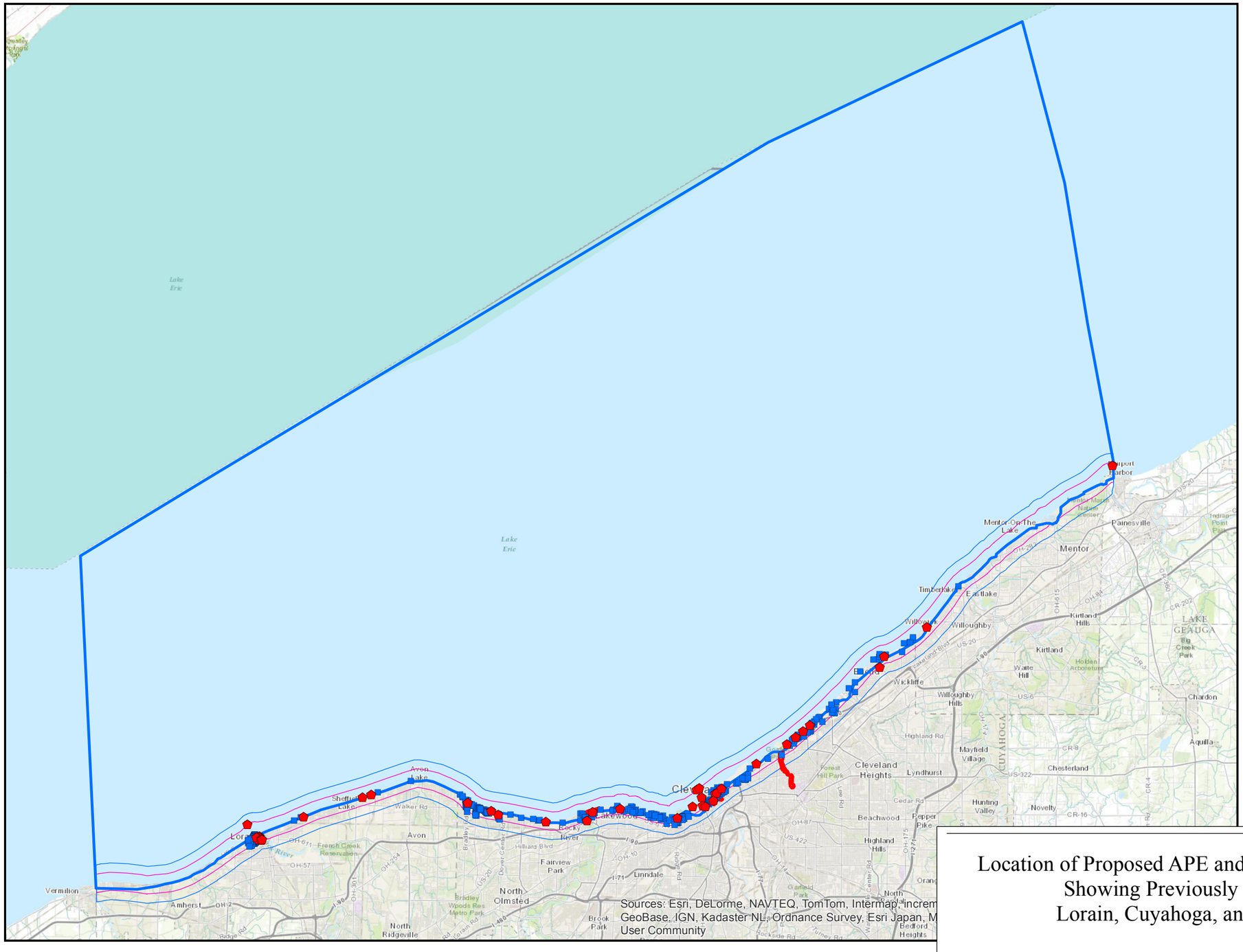
Table 3-1 presents all NRHP-listed historic districts within the literature review area (Figures 3-2 to 3-10). Of these, the Cleveland Mall, the Old River Road Historic District, Rockefeller Park and Cleveland Cultural Gardens Historic District, and Rockefeller Park Bridges District fall outside of the proposed APE. Table 3-2 lists NRHP-listed properties within the study area (Figures 3-2 to 3-10). Of the 46 NRHP-listed properties in the study area, 23 fall within the proposed APE. This includes the one NHL property: The USS Cod, a submarine docked at the USS Cod Submarine Memorial in Cleveland. Table 3-3 lists all of the OHI-documented properties with the study area. The distributions of these properties are provided in Figures 3-11 to 3-30.

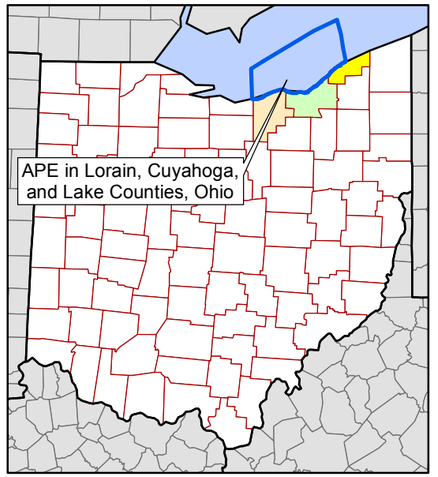
Table 3-4 lists OAI properties in the study area. Although there are several shipwrecks in the study area (see Section 3.4.2), only one, the Sarah Sheldon, is recorded in the OAI. She was a 184 ft (56m) long, 32 ft (9.8- m) wide, with a depth of 14 ft (4.3m) wooden hulled, steam propeller built in 1872 by E. M. Peck in what is now Lorain, Ohio. Built in the lake freighter style of the famous R. J. Hackett, with its pilot house forward and machinery aft the midsection was used for cargo, she was typical of late nineteenth century lake freighters. Although her main propulsion came from a compound steam engine she also was rigged with three masts. She sailed the lakes for thirty-three years transporting typical Great Lakes commodities like coal, grain, ore, and timber, as well as acting as a tow vessel for schooner barges. Throughout her long career she had several incidents such as collisions, engine problems, fire damage, and groundings, however she survived them all. As a result of some of these accidents the Sheldon was repaired and rebuilt numerous times, which changed some of her original profile (Ohio Shipwrecks 2013; MHGL 2013).

Her final voyage began on a stormy night, Thursday October 19, 1905. The thirty-three year old, wooden hulled Sheldon, weighed down by a load of coal, began to leak as the winds and waves on Lake Erie increased. Having left Cleveland up-bound to Sarnia, the captain realized there was a problem and ordered the helmsman to steer the Sheldon toward a lee shore. Before daybreak, the Sheldon was leaking so bad that the captain ordered a new course for Lorain, Ohio. Conditions only got worse, water rose to a level where it dampened the fires in the boilers. With the danger of losing motive power to the vessel, the Captain directed the vessel toward the nearest shore. Soon the Sheldon was grounded and safe from sinking, but she was pounded by the wind and waves and became a wreck. Friday morning most of the crew were saved by rescue vessels from Lorain or Cleveland. However two men were lost that day. Today the remains of the Sheldon lie scattered on the rocky bottom of Lake Erie in approximately 20 feet (6 m) of water off Sheffield, Ohio. The geographic coordinates of the site are 41° 29.737’ N 82° 06.676’ W. The remains consist of the bottom of the hull to the

turn of the bilge, some machinery, two capstans, and propeller. Due to the shallow location of the site some ship materials have been scrambled by annual ice flows or surge (Ohio Shipwrecks 2013; Lake Erie Shipwrecks 2013).

Neither the Sheldon, nor any of the other OAI properties have the potential to be affected by the proposed project.





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- OHI Properties (n=478)
- NRHP Districts (n=7)

0 5 10 Kilometers

0 5 10 Miles

N W E S

Location of Proposed APE and Literature Review Study Areas
Showing Previously Recorded Resources,
Lorain, Cuyahoga, and Lake Counties, Ohio

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ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-1

Table 3-1. Historic Districts Included in the National Register of Historic Places Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

National Register Reference Number	Present Name	Address	Architectural Style	Historical Use	Date
5000031	Gould Block	608-630 Broadway Ave	Renaissance	Commerce/Trade - Department Store	1935
5000382	Rockefeller Park and Cleveland Cultural Gardens Historic District	Roughly bounded by Mt Sinai Rd, East Blvd, Conrail Tracks, & Ansel Rd	Classical Revival; Art Deco; Victorian Picturesque/Romant	Landscape – Park; Recreation And Culture - Monument/Marker; Landscape – Park; Transportation - Road-Related; Landscape - Garden	1894, 1902, 1939
5001574	Old River Road Historic District	1220-1330 Old River Rd	Late Victorian; Italianate; Nineteenth and Twentieth Century Vernacular	Commerce/Trade – All; Transportation - Water-Related	N/A
7000070	Cleveland Warehouse District (+Boundary Increase)	Roughly bounded by Front & Superior Aves, Railroad, Summit, 3rd, & 10th Sts	Italianate Early Commercial	Commerce/Trade: Business; Restaurant; Warehouse	1850, 1921
74001459	Clifton Park Lakefront District	Roughly bounded by Clifton Blvd, Rocky River, Lake Erie, and Webb Rd	Shingle Style; Classical Revival; Jacobean Revival	Domestic – Single Dwelling	N/A
75001360	Cleveland Mall	Roughly T-shaped mall area between E 9th and W 3rd Streets	Beaux Arts	Government - City Hall, Government Office, Post Office, Courthouse; Education - Library; Landscape – Park, Street Furniture/Object	N/A
77001051	Rockefeller Park Bridges	Rockefeller Park	Richardsonian Bridge	Transportation - Road-Related	1897, 1907
86001573	Taylor Mansion - Lakehurst	193 Bratenahl Rd	Colonial Revival; Georgian Revival	Domestic - Single Dwelling	1918

Table 3-2. National Register of Historic Places-Listed Properties Located within 1 mile (1.6 km) of the Lake Erie Coastline along the Study Area

National Register Reference Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing	NRHP Eligibility Status
97	Shore High School	291 E 222nd St	Classical Revival	Education - School	1913	456140	4606060	Listed
422	Henn, Albert W, Mansion	23131 Lake Shore Blvd	Tudor Revival; Bungalow/Craftsman	Domestic -Single Dwelling	1923	456540	4607000	Listed
4000611	Foster, Claud, House	30333 Lake Shore Blvd	Late 19th and Early 20th Century American Movements; Bungalow/Craftsman	Domestic -Single Dwelling	1916	460280	4609600	Listed
73001415	Perry-Payne Building	740 Superior Ave	--	Commerce/Trade - Business	1888	441700	4594980	Listed
74001428	Bay View Hospital	23200 Lake Rd	Shingle Style Romanesque	Domestic -Single Dwelling	1898	426820	4592460	Listed
74001430	Gwinn Estate	12407 Lake Shore Blvd	Late Nineteenth and Twentieth Century Revivals; Second Renaissance Revival	Domestic - Single Dwelling; Landscape - Forest	1908	450011	4600966	Listed
74001431	Hanna, Howard M., Jr., House	11505 Lake Shore Blvd	Tudor Revival; Jacobethan Revival	Domestic -Single Dwelling	1910	449406	4600414	Listed
74001459	Clifton Park Lakefront District	Roughly bounded by Clifton Blvd, Rocky River, Lake Erie, & Webb Rd	Shingle Style; Classical Revival; Jacobean Revival	Domestic -Single Dwelling	--	430937	4593309	Listed
76001390	Cleveland Harbor Station, U.S. Coast Guard	New West Pier	Art Décor; Modernistic	Transportation - Water-Related	1940	440500	4594630	Listed
76001405	Union Terminal Group	50 Public Square	Art Deco	Transportation – Trains	1930	2189039	668402	Listed

Table 3-2. National Register of Historic Places-Listed Properties Located within 1 mile (1.6 km) of the Lake Erie Coastline along the Study Area

National Register Reference Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing	NRHP Eligibility Status
77001054	Honam, John, House	14710 Lake Ave	--	Domestic -Single Dwelling; Commerce/Trade – Business; Commerce/Trade - Professional	1838	433340	4593610	Listed
78002033	Aldrich, Aaron, House	30663 Lake Rd	Federal	Domestic -Single Dwelling	1829	419970	4594170	Listed
78002106	Miller, Peter, House	33740 Lake Rd	Greek Revival	Domestic -Single Dwelling	1830	411500	4594830	Listed
78002108	Lorain Lighthouse	Lorain Harbor	--	Transportation - Water-Related	1909	400600	4592230	Listed
78002109	Palace Theatre Building	Broadway & 6th St	--	Recreation and Culture - Theater	1928	401900	4590900	Listed
78002110	Root, William H, House	3535 E Erie Ave	Greek Revival	Domestic -Single Dwelling	1845	405560	4592930	Listed
79001798	Huntington, John, Pumping Tower	28600 Lake Rd	--	Industry/Processing/Extraction - Water Works	--	422050	4593420	Listed
78002115	103rd Ohio Volunteer Infantry Association Barracks	5501 E Lake Rd	--	Domestic- Camp	1910	410740	4594640	Listed
79001799	Pickands, Jay M., House	9619 Lake Shore Blvd	Late Nineteenth and Twentieth Century Revivals; Renaissance Revival	Domestic -Single Dwelling	1907	448021	4599281	Listed
80002978	Root and McBride-Bradley Building	1220-1230 W 6th St	--	Commerce/Trade - Specialty Store	1884	441560	4594370	Listed
82001470	Antlers Hotel	SWC Erie & Washington Aves	Renaissance	Domestic - Hotel	1922	401405	4591115	Listed

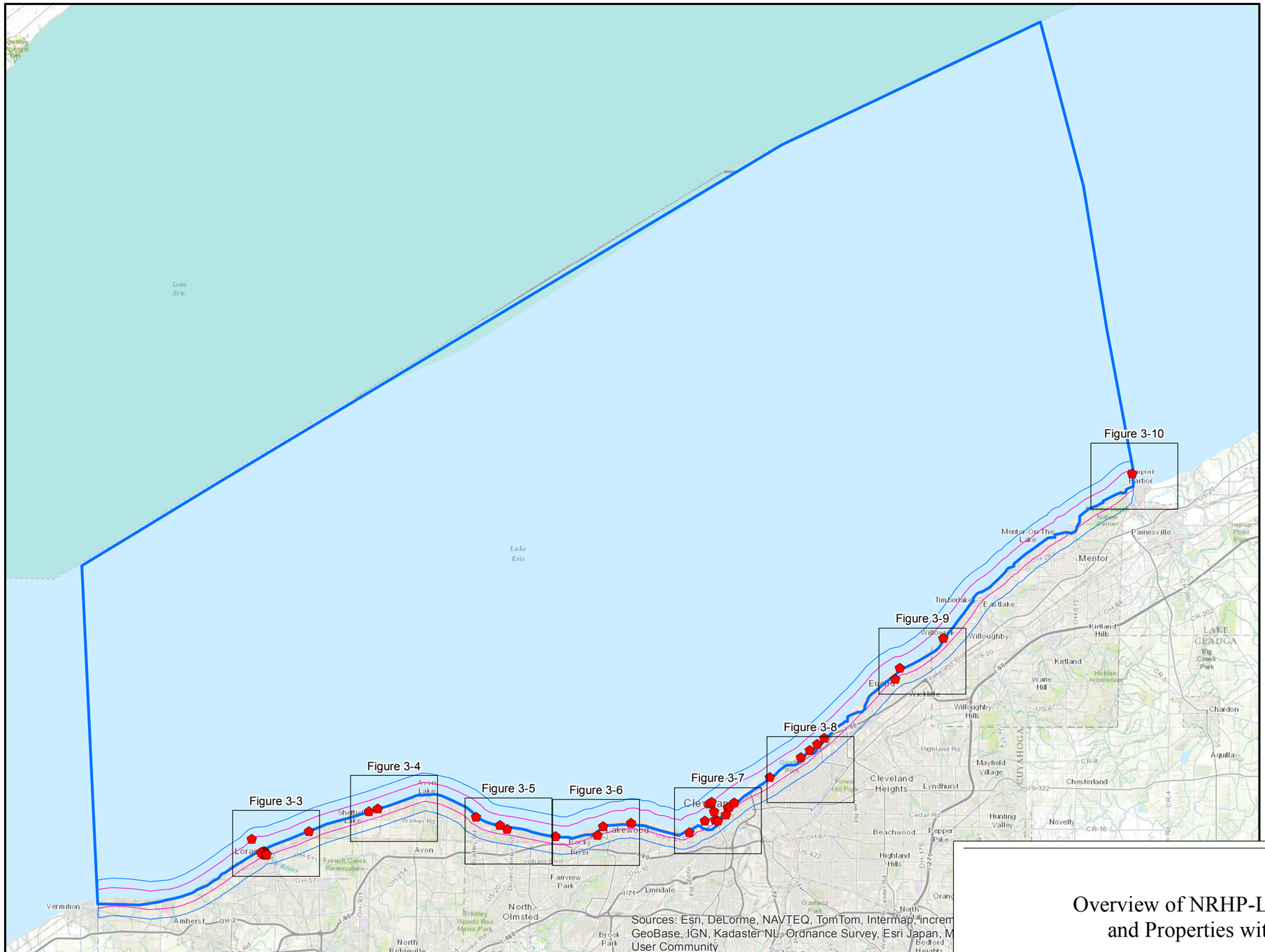
Table 3-2. National Register of Historic Places-Listed Properties Located within 1 mile (1.6 km) of the Lake Erie Coastline along the Study Area

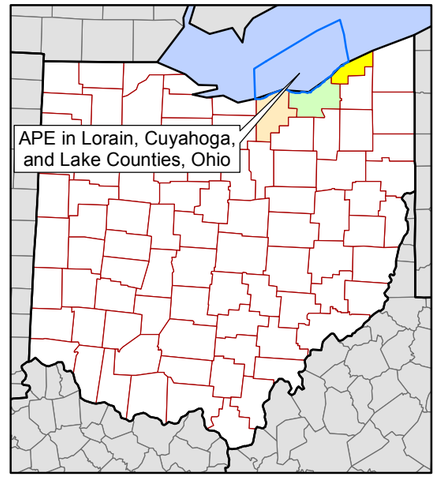
National Register Reference Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing	NRHP Eligibility Status
83001950	Cleveland West Pierhead Light	Cleveland Harbor on Lake Erie	--	Domestic – Single Dwelling; Defense – Military Facility; Transportation – Water-related	1909	440100	4595300	Listed
83001954	Universal Terminal Company Dock and Warehouse	5451 N Marginal Rd	--	Commerce/Trade - Warehouse	1929	445320	4597580	Listed
83004278	Westlake Hotel	19000 Lake Rd	Spanish Colonial Revival	Domestic -Multiple Dwelling	1925	430447	4592590	Listed
85002833	Broadway Building	SE corner of W Erie Ave & Broadway	--	Commerce/Trade – Professional, Specialty Store	1926	401670	4591200	Listed
84003614	Erie Railroad Cleveland Powerhouse	1246 River Rd	--	Industry/Processing/Extraction – Energy Facility	1906	440590	4593900	Listed
86001573	Taylor Mansion--Lakehurst	193 Bratenahl Rd	Colonial Revival; Georgian Revival	Domestic - Single Dwelling	1918	448777	4599892	Listed
86000088*	USS COD (submarine)	N Marginal Dr	Gato class submarine	Defense - Naval Facility; Transportation - Water-Related	1943	442255	4595395	Listed
86000850	Eagles Building	575 Broadway	Classical Revival	Commerce/Trade - Specialty Store; Social - Clubhouse	1918	401845	4590940	Listed
87001248	Duane Block	387-401 Broadway	--	Domestic - Multiple Dwelling; Commerce/Trade - Specialty Store	1906	401725	4591100	Listed
87001374	Lorain Fire Station No 1	605 W 4th St	Colonial Revival	Government - fire station	1912	401460	4591100	Listed
87002287	Cleveland Municipal Stadium (DELISTED)	Erieview Dr	--	Recreation and Culture - Sports Facility	1930	441808	4595041	Delisted (Demolished)

Table 3-2. National Register of Historic Places-Listed Properties Located within 1 mile (1.6 km) of the Lake Erie Coastline along the Study Area

National Register Reference Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing	NRHP Eligibility Status
91001855	Cleveland East Pierhead Light	E breakwater pierhead, entrance to Cleveland harbor	Light station	Defense - Coast Guard Facility; Transportation - Water-Related	1909	440300	4595430	Listed
92000242	Fairport Harbor West Breakwater Light	W breakwater pierhead, harbor entrance	Light Station	Transportation - Water-Related	1920	476600	4623760	Listed
93001439	Moore, Leonard M., House	309 5th St	Classical Revival	Domestic -Single Dwelling	1916	401614	4590915	Listed
94000245	Globe Iron Works Building	2320 Center St	Late Nineteenth and Early Twentieth Century American Movements; Functional Industrial	Industry/Processing/Extraction - Manufacturing Facility	1890	440840	4593830	Listed
94000413	Rose Hill and Community House	Jct of Cahoon & Lake Rds	Colonial Revival	Domestic - Single Dwelling; Social - Meeting Hall; Government - Fire Station; Education - Library	--	422650	4593120	Listed
95000492	Pennsylvania Railway Ore Dock (DELISTED)	On Lake Erie at Whiskey Island	--	Transportation - Rail-Related, Water-Related	1911	439730	4593810	Delisted (Demolished)
12001180	Globe Machine and Stamping Company	1250 W 76th St	---	--	--	438377	4592833	Listed

* Also a National Historic Landmark





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)

0 5 10 Kilometers

0 5 10 Miles

N W E S

Overview of NRHP-Listed Historic Districts and Properties within the Study Area

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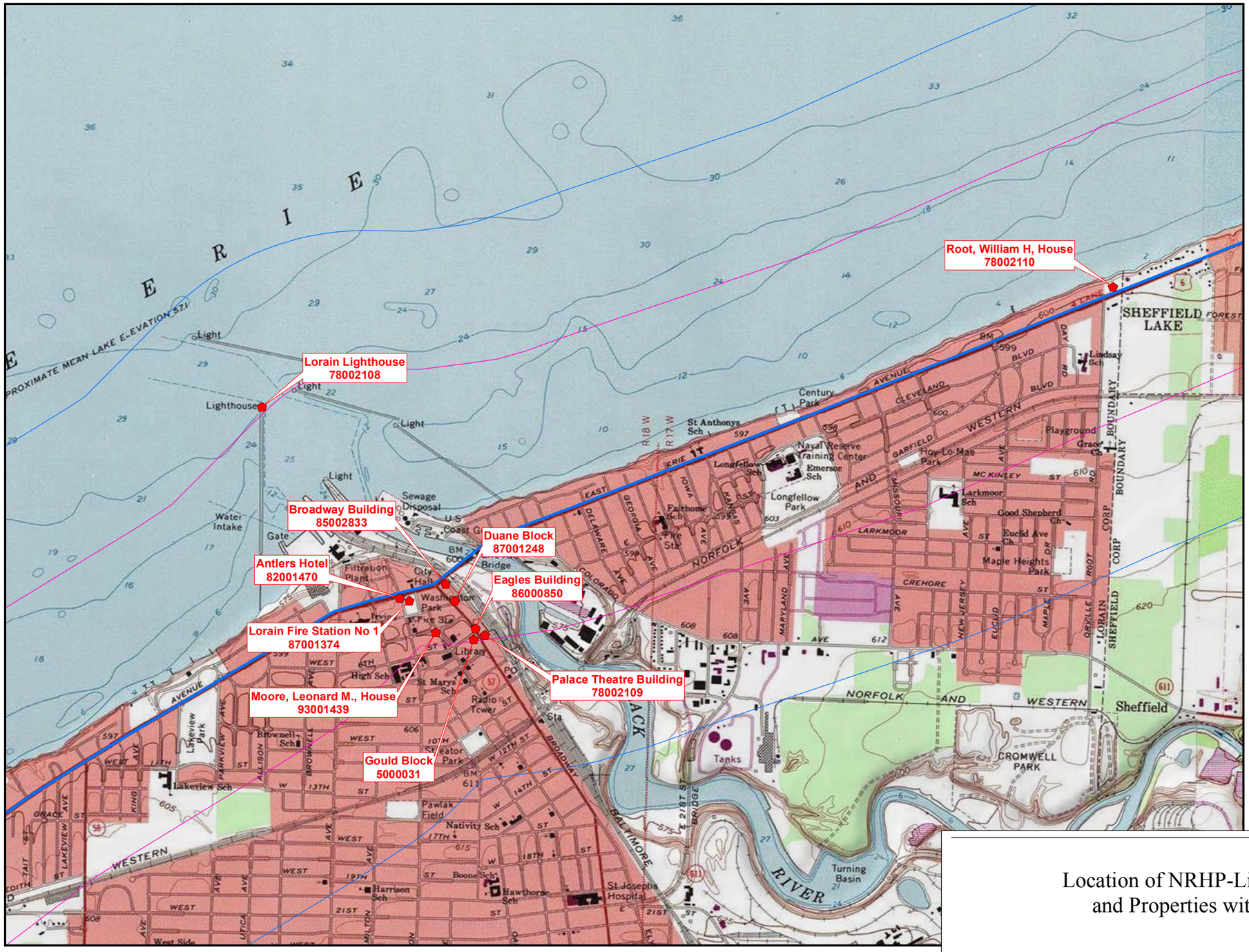
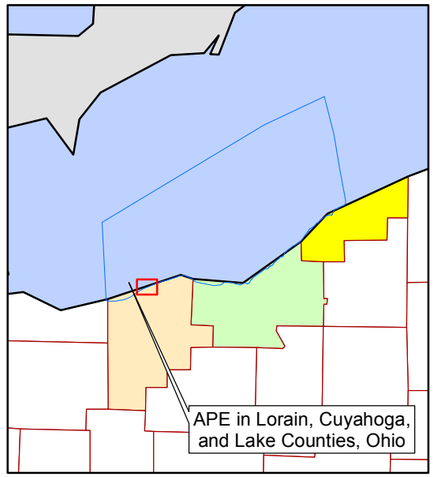
Figure 3-2





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

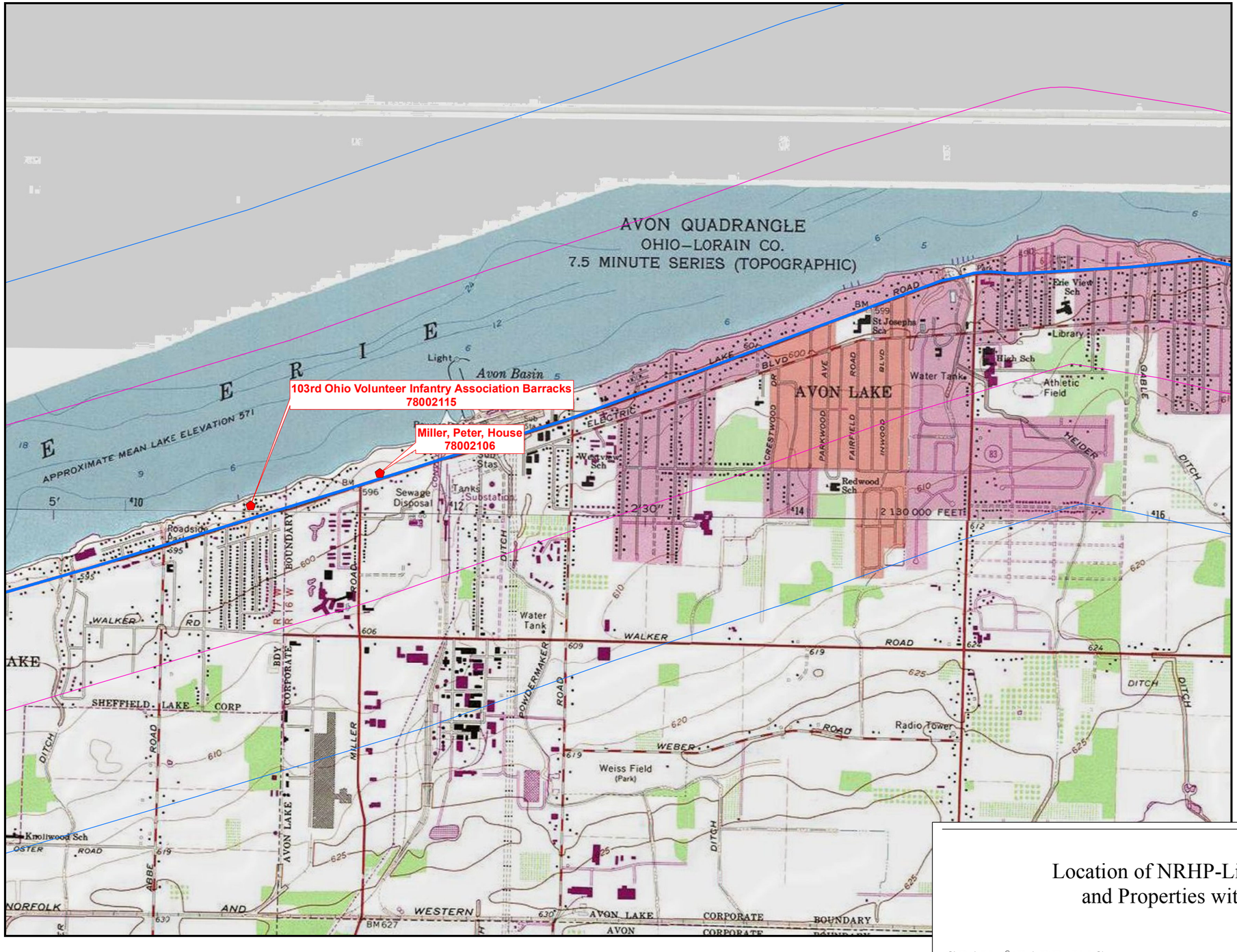
0 0.25 0.5 Miles

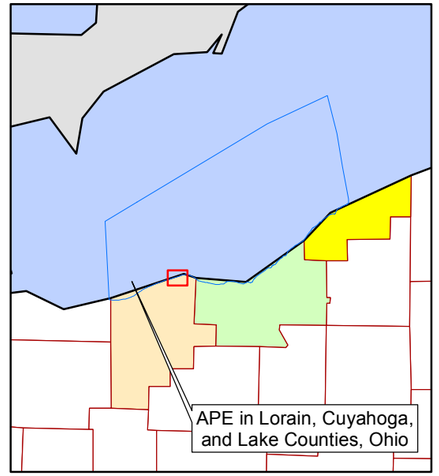
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-3





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

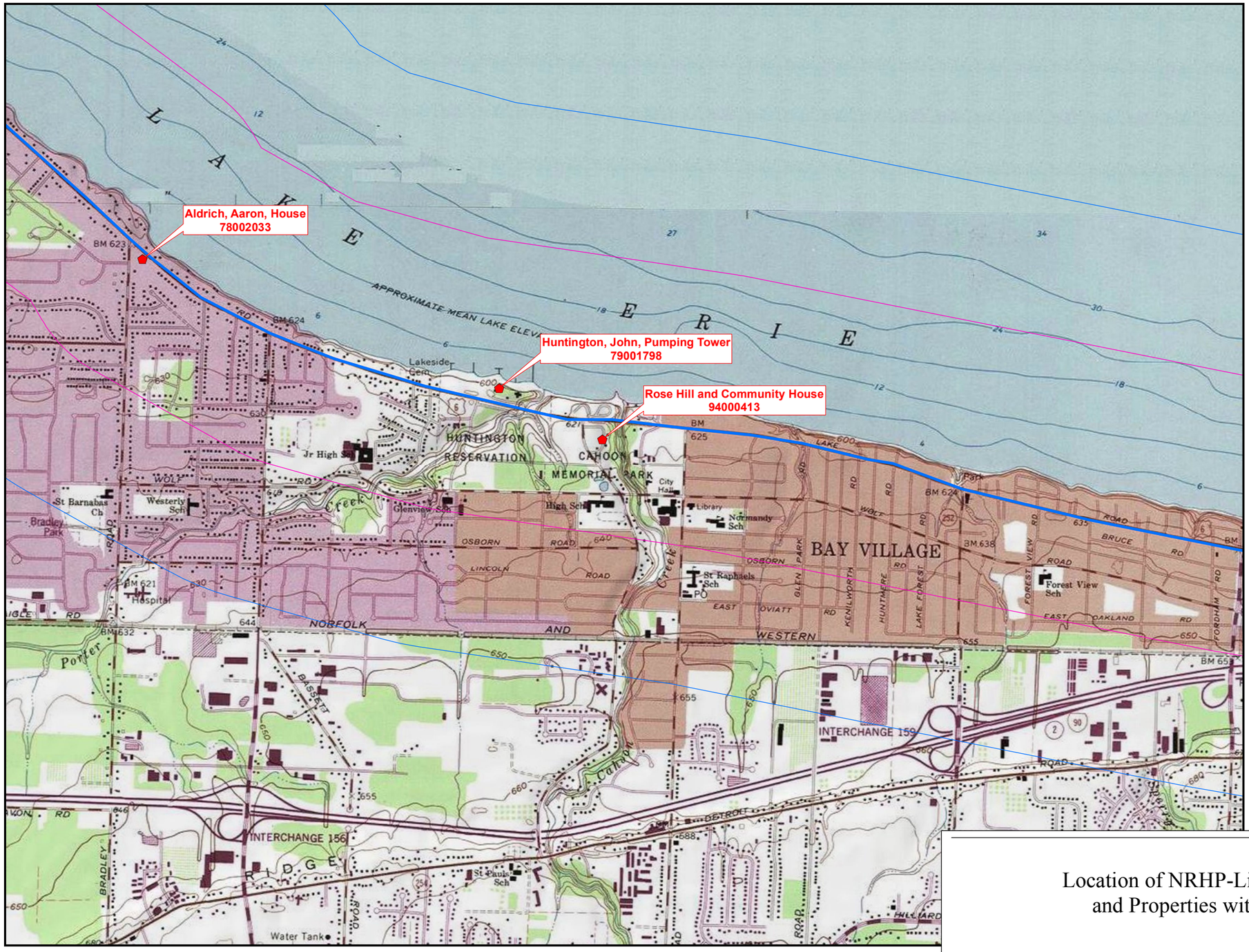
0 0.25 0.5 Miles

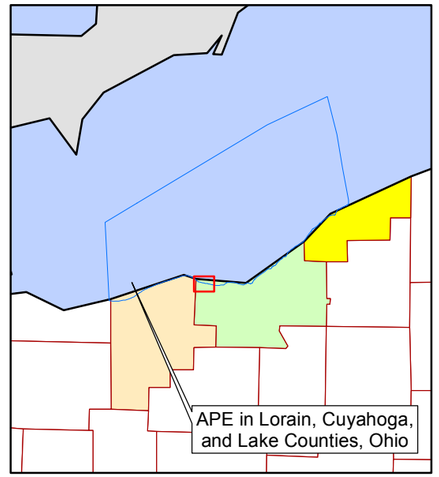
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-4





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

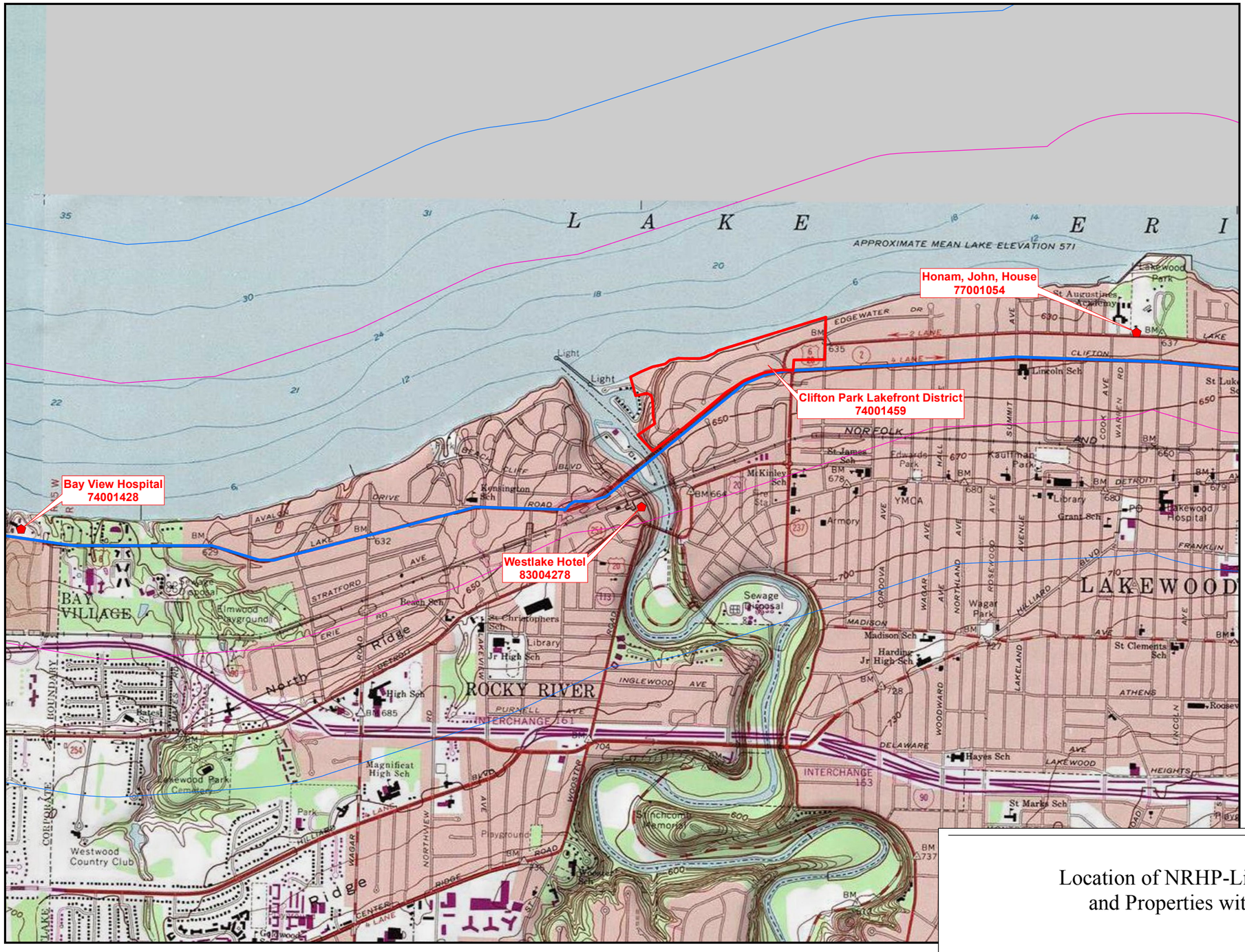
0 0.25 0.5 Miles

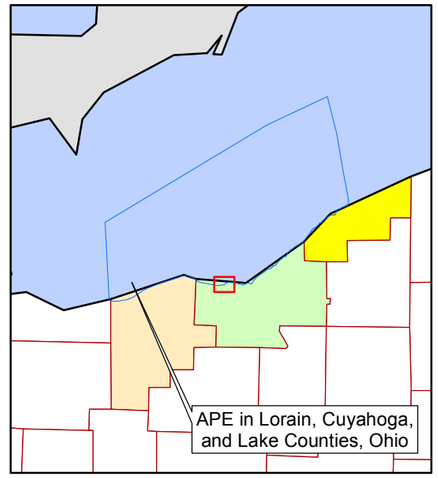
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-5





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

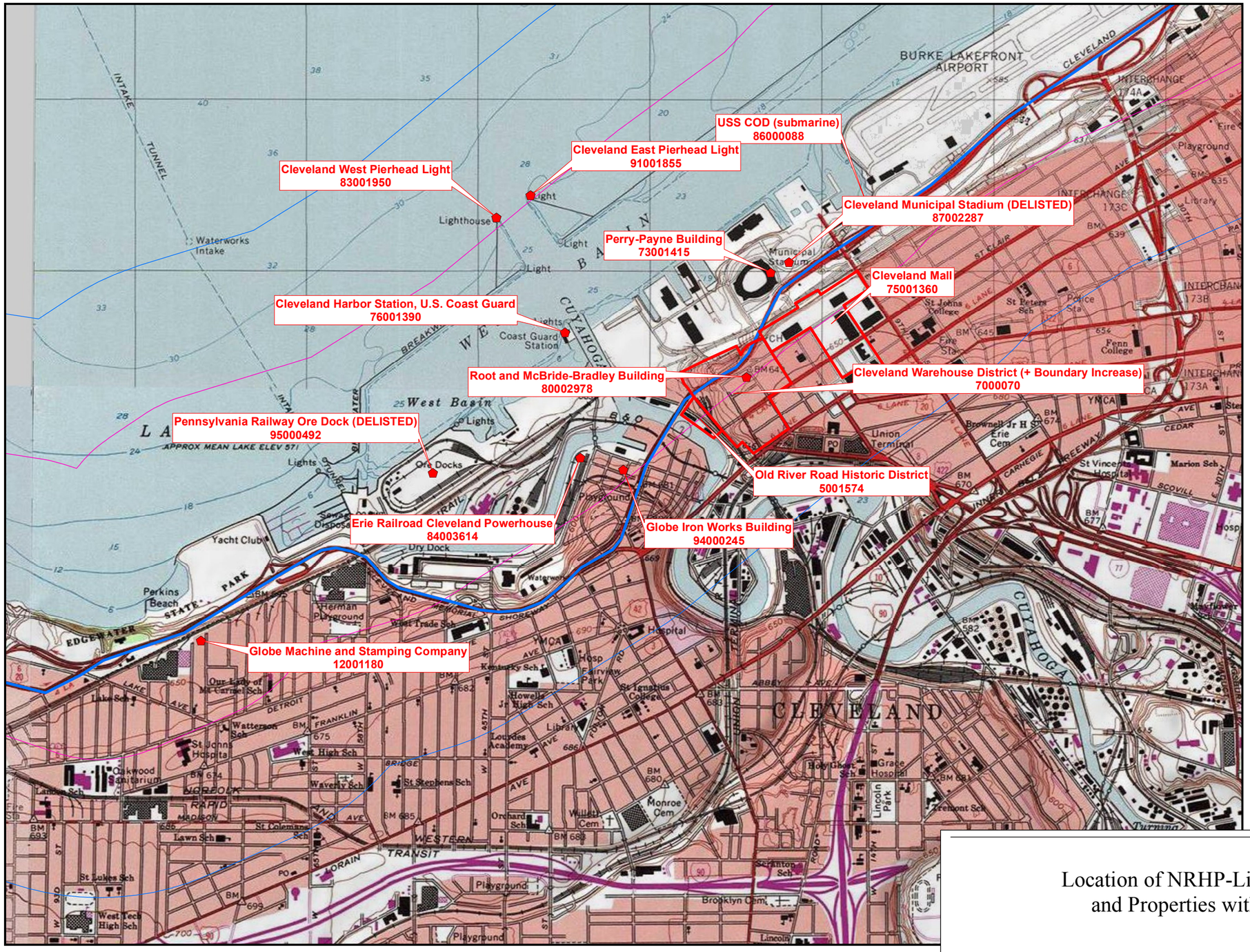
0 0.25 0.5 Miles

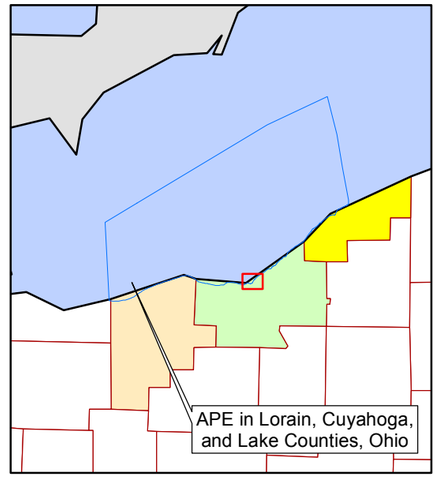
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-6





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

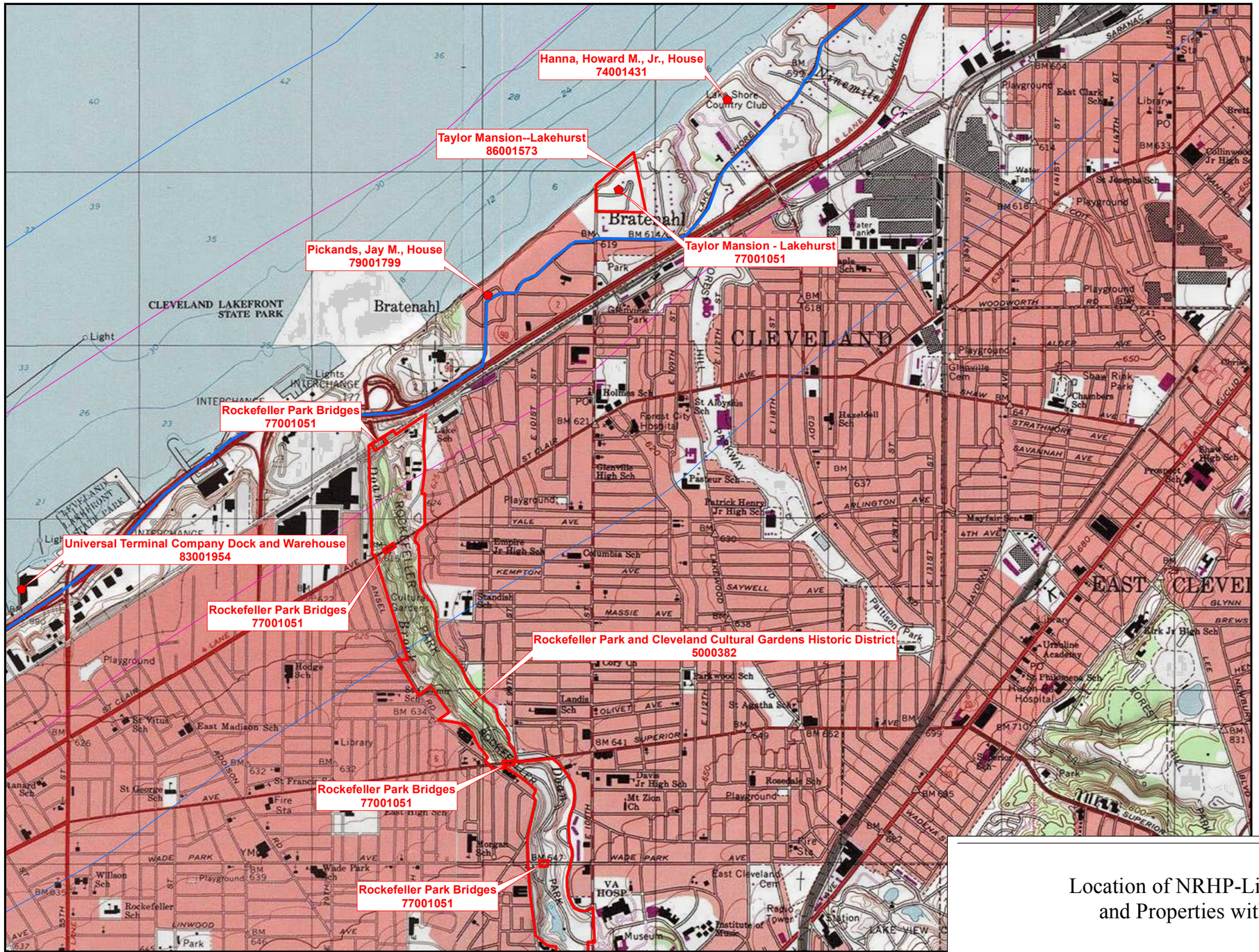
0 0.25 0.5 Miles

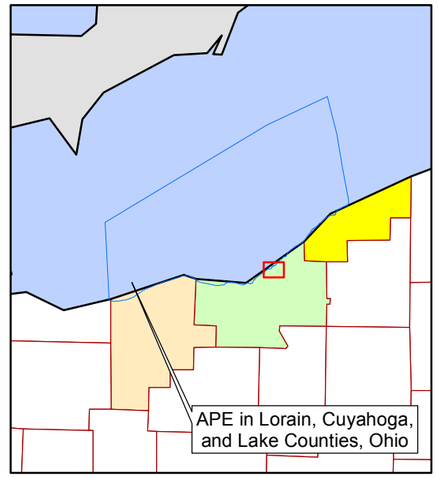
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-7





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

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0 0.5 1 Kilometers

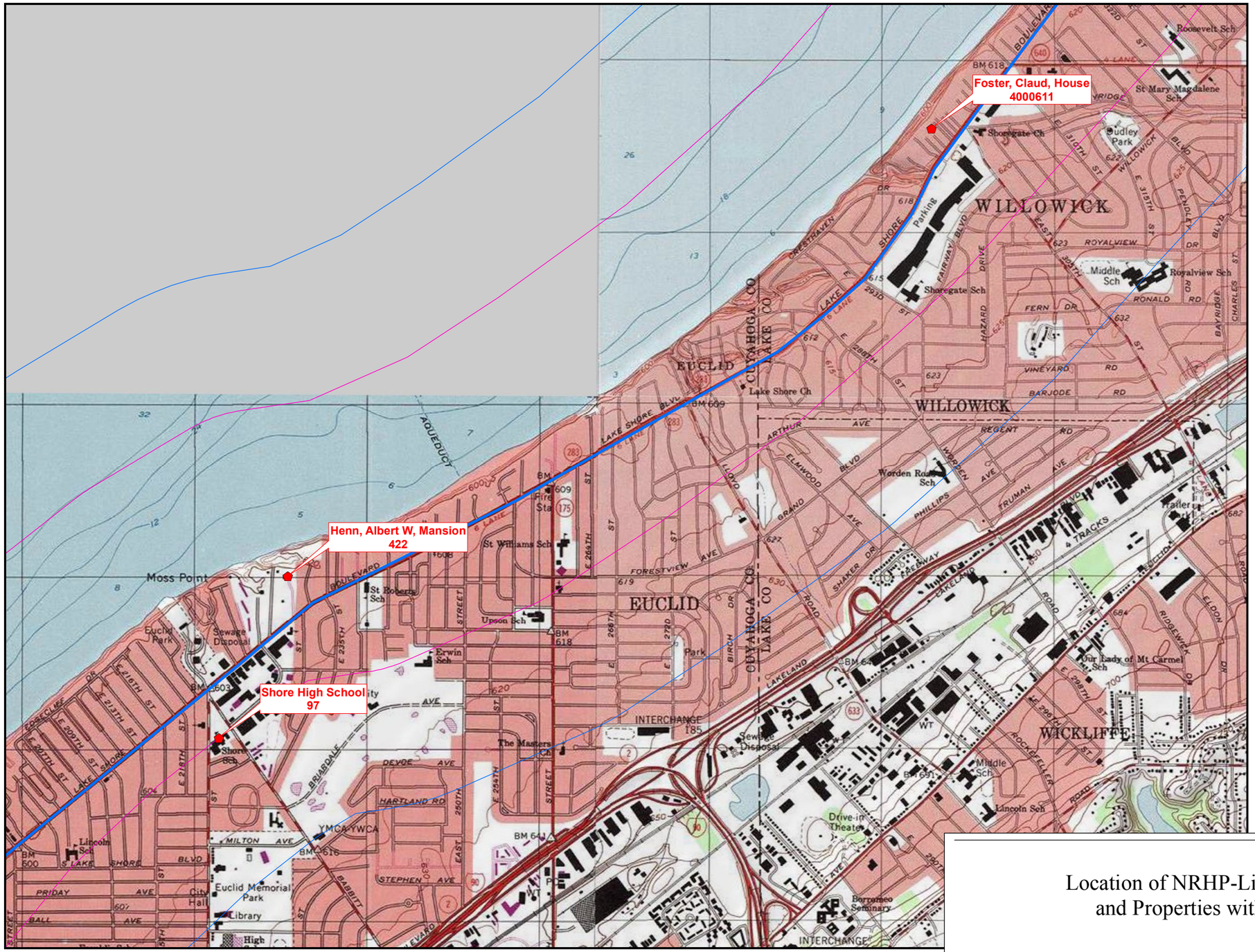
0 0.25 0.5 Miles

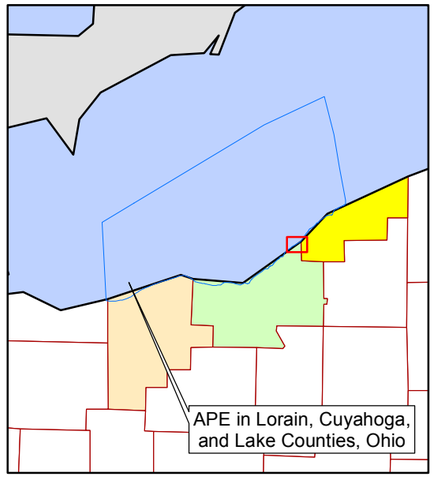
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-8





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

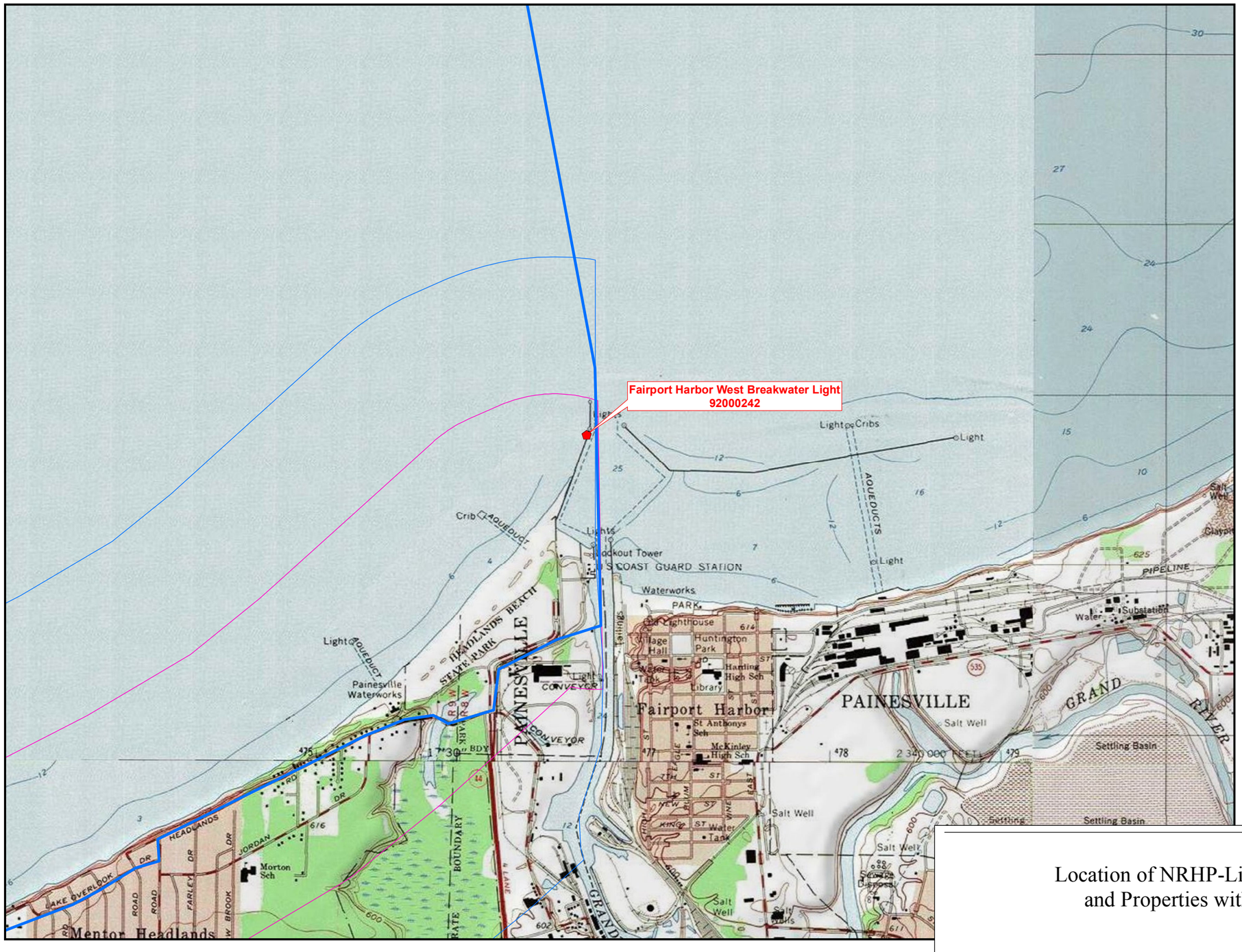
0 0.25 0.5 Miles

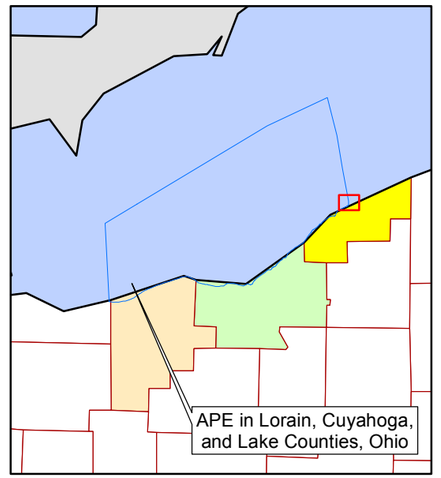
N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-9





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)

Previously Recorded Resources

- NRHP Properties (n=39)
- NRHP Districts (n=7)

0 0.5 1 Kilometers

0 0.25 0.5 Miles

N W E S

Location of NRHP-Listed Historic Districts and Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-10

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0000811	Euclid Beach Park Gateway	Lake Shore Blvd & E 156th	Exotic Revivals	N/A	1901	452331	4602960
CUY0002611	Roediger House	12401 Coit Rd	Neo-Classical Revival	Single Dwelling	1916	450123	4600429
CUY0002711	John B Dempsey House	12611 Lake Shore Blvd	High Victorian Gothic	Single Dwelling	1911	450157	4601076
CUY0002811	Raymond V Feldman	13003 Lake Shore Blvd	Georgian Revival	Single Dwelling	1913	450421	4601303
CUY0002911	Richard J Hamilton House	13303 Lake Shore Blvd	French Colonial/Norman	Single Dwelling	1922	450575	4601455
CUY0003011	Donald B Cameron House	12717 Lake Shore Blvd	Colonial Revival	Single Dwelling	1910	450212	4601123
CUY0003212	Norfolk & Western Freight	Depot St	Stick	Rail Related	1880	430313	4592588
CUY0004401	Stone Block	425 Lakeside Ave NW	Commercial/Chicago Style	Commercial	1905	441617	4594428
CUY0005701	Root McBride/Bradley	1220-1230 W 6th St	Commercial/Chicago Style	Commercial	1884	441569	4594370
CUY0006201	Hausheer Building	1220-1240 Old River Rd	Italianate	Retail Store/Shop	1868	441249	4594127
CUY0008605	N/A	1176 E 38th St (at King)	Vernacular	Industrial/Engineering	1901	444110	4596290
CUY0010803	Cleve Window Glass &	2406-2408 Center St	Romanesque Revival	Mill/Processing/Manufacturi	1890	440842	4593830
CUY0015105	Reserve Terminals Co	1300 E 45th St	Commercial/Chicago Style	Mill/Processing/Manufacturi	1905	444610	4596286
CUY0033803	WestingHouse Electric	W 58th St near Shoreway	Romanesque Revival	Mill/Processing/Manufacturi	1883	439280	4593200
CUY0034703	Cleve Police Patrolmen's	1301-1303 W 58th St	Second Renaissance	Meeting Hall	1917	439390	4592910
CUY0039601	Monarch Leasing	1100 W 9th St	Richardsonian	Commercial	N/A	441315	4594431
CUY0042313	Rose Hill Museum	27715 Lake Rd	Vernacular	Single Dwelling	1818	422672	4593145
CUY0042501	N/A	1211-1225 W 9th St	Commercial/Chicago Style	Commercial	1910	441476	4594298
CUY0042601	National Terminals	1210-1220 W 9th St	Commercial/Chicago Style	Commercial	1916	441403	4594300

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0042701	WareHouse	1200 W 9th St	Commercial/Chicago Style	Warehouse	1900	441385	4594328
CUY0043501	LN Gross Company	1220 W 3rd St	Vernacular	Industrial/Engineering	1917	441689	4594470
CUY0043601	Crown Building	310 Lakeside Ave NW	Jacobethian	Mill/Processing/Manufacturing	1915	441670	4594522
CUY0073405	Cleve Municipal Light Plant	Marginal Rd at E 53rd St	Vernacular	Energy Facility	1938	444750	4597150
CUY0077703	Dom's LightHouse Inn	8905 Lake Ave	Exotic Revivals	Restaurant/Bar	1929	437718	4592599
CUY0078511	Henry W Longfellow School	650 E 140th St	Jacobethian	School	1924	451115	4601238
CUY0078711	N/A	14713 Lake Shore Blvd	Georgian Revival	Church/Religious Structure	1929	451684	4602358
CUY0078811	St Jerome Roman Catholic	15100 Lake Shore Blvd	Second Renaissance	Church School	1923	451961	4602311
CUY0078911	Immanuel Presbyterian	326 E 156th St	Late Gothic Revival	Church/Religious Structure	1906	452270	4602394
CUY0079003	Cleve Hermetic & Supply	7724 Detroit Ave	Vernacular	Warehouse	1913	438366	4592338
CUY0079111	Slovenian Workingmens	15335 Waterloo Rd	Vernacular	Meeting Hall	1926	452187	4602007
CUY0079211	Memorial School	410 E 152nd St	Renaissance Revival	School	1910	451964	4602066
CUY0079511	Commodore Roller Rink	343 E 152nd St	Vernacular	Multiple Dwelling	1927	452061	4602325
CUY0079611	Charles E Squires House	15025-15031 Shore Acres	Exotic Revivals	Single Dwelling	1927	451923	4602746
CUY0079711	N/A	9718 Lake Shore Blvd	Tudor/English Revival	Single Dwelling	1897	448047	4599241
CUY0082103	Edgewater Bldg	7424-7440 Detroit Ave	Jacobethian	CommercialL	1909	438462	4592372
CUY0082303	St Luke's Episcopal Church	1349 W 78th St	Gothic Revival	Church/Religious Structure	1895	438347	4592424
CUY0085803	Otis Elevator Baker Plant	8000 Baker Ave	Vernacular	Mill/Processing/Manufacturing	1900	438120	4592640
CUY0085903	American Greetings Studio	1300 W 78th St	Commercial/Chicago Style	Mill/Processing/Manufacturing	1916	438309	4592529
CUY0086003	Union Carbide-Edgewtr	1251 W 76th St	Vernacular	Industrial/Engineering	1908	438520	4592799
CUY0086301	Cuyahoga County	1 Lakeside Ave NE	Beaux-Arts	Courthouse	1906	441824	4594642
CUY0086503	McKinley Terrace	1406-1426 W 81st St	Queen Anne	Apartment House	1906	438124	4592201

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0087203	5th Church of Christ	11623 Lake Ave	Beaux-Arts	Church/Religious Structure	1926	435851	4593042
CUY0087303	N/A	11435 Edgewater Dr	Tudor/English Revival	Single Dwelling	1941	436139	4593109
CUY0087403	N/A	11202 Edgewater Dr	Jacobethian	N/A	1921	436352	4593139
CUY0087503	N/A	10912 Edgewater Dr	Mediterranean	Single Dwelling	1922	436544	4593092
CUY0087603	N/A	10407 Edgewater Dr	Tudor/English Revival	Single Dwelling	1915	436826	4592954
CUY0087703	N/A	10314 Lake Ave	Colonial Revival	Single Dwelling	1928	436969	4592836
CUY0087803	N/A	10416 Lake Ave	Tudor/English Revival	Single Dwelling	1922	436843	4592869
CUY0087903	N/A	10411 Lake Ave	Neo-Classical Revival	Single Dwelling	1912	436809	4592806
CUY0088003	N/A	11018 Lake Ave	Mission	Single Dwelling	1911	436429	4592976
CUY0088103	Cities Service Station	11521 Cliffton Blvd	Neo-Classical Revival	Road/Vehicle Related	1929	436042	4592854
CUY0088203	N/A	11111-11127 Cliffton Blvd	Neo-Classical Revival	Hotel/Inn/Motel	1912	436299	4592792
CUY0088303	N/A	10228-10302 Cliffton Blvd	Colonial Revival	Single Dwelling	1905	436952	4592685
CUY0088903	The Breakers	9823-9829 Lake Ave	Late Gothic Revival	Apartment House	1928	437314	4592673
CUY0089003	N/A	1342-1352 W 95th St	Queen Anne	Residential Domestic	1880	437474	4592286
CUY0089103	N/A	11460 Edgewater Dr	Georgian Revival	Single Dwelling	1925	436089	4593179
CUY0089203	Apartments	9907 Lake Ave	Late Gothic Revival	Apartment House	1928	437122	4592725
CUY0089303	N/A	10107 Cliff Dr	Mediterranean	Single Dwelling	1928	437116	4593006
CUY0089403	Edgewater Park Pavilion	Edgewater Park	Craftsman/Arts and Crafts	Park	1925	437920	4592830
CUY0089501	Cleveland Municipal	1085 W 3rd St	Art Deco	Sport Facility	1931	441600	4594940
CUY0089611	N/A	15020 Shore Acres Dr	Mission	Single Dwelling	1923	451911	4602679
CUY0089711	N/A	17404 Schenely Rd	Tudor/English Revival	Single Dwelling	1931	453446	4604176
CUY0089811	St Joseph Christian Life	18485 Lake Shore Blvd	Georgian Revival	Orphanage	1943	453970	4604720
CUY0089911	Oliver Hazard Perry School	18400 Schenely Rd	Neo-Classical Revival	School	1927	453987	4603877

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0120311	N/A	13625 Lake Shore Blvd	Prairie	Single Dwelling	1912	450871	4601681
CUY0120411	Charles Morgan House	13405 Lake Shore Blvd	Mission	Single Dwelling	1909	450784	4601618
CUY0120511	N/A	12814 Lake Shore Blvd	Colonial Revival	Single Dwelling	1921	450395	4601006
CUY0120611	Jay C Horse House	12725 Lake Shore Blvd	Tudor/English Revival	Single Dwelling	1905	450260	4601160
CUY0120711	N/A	12204 Coit Rd	Queen Anne	Single Dwelling	1905	450019	4600385
CUY0120811	CH Gale House	12016 Lake Shore Blvd	Exotic Revivals	Single Dwelling	1901	449897	4600482
CUY0120911	N/A	11811 Lake Shore Blvd	Tudor/English Revival	Single Dwelling	1898	449691	4600347
CUY0121011	N/A	11808 Lake Shore Blvd	Tudor/English Revival	Single Dwelling	1903	449820	4600301
CUY0121111	N/A	11239-11341 Lake Shore	Queen Anne	Single Dwelling	1895	449372	4600079
CUY0121211	Bratenahl High School	11404 Lake Shore Blvd	Italianate	Single Dwelling	1870	449480	4599920
CUY0121311	N/A	304 Corning Dr	Colonial Revival	Single Dwelling	1926	448993	4599895
CUY0121411	N/A	298 Corning Dr	Tudor/English Revival	Single Dwelling	1920	448988	4599932
CUY0121511	N/A	280 Corning Dr	Colonial Revival	Single Dwelling	1926	448936	4599971
CUY0121611	N/A	282 Corning Dr	Mission	Single Dwelling	1926	448956	4600096
CUY0121711	N/A	293 Corning Dr	Jacobethian	Single Dwelling	1918	449030	4600122
CUY0121811	N/A	277 Bratenahl Rd	French Colonial/Norman	Single Dwelling	1928	448695	4599734
CUY0121911	N/A	10491 Lake Shore Blvd	Jacobethian	Single Dwelling	1912	448619	4599568
CUY0122011	N/A	10401 Lake Shore Blvd	Colonial Revival	Single Dwelling	1930	448518	4599710
CUY0122111	N/A	9920 Foster Ave	Vernacular	Unknown Use	1870	448255	4599156
CUY0122211	N/A	414 E 105th St	Queen Anne	Single Dwelling	1899	448620	4599315
CUY0122311	Pickands House	9619 Lake Shore Blvd	Not Discernible from OHI	Single Dwelling	1907	448026	4599286
CUY0122411	Martin Marks	10311 Lake Shore Blvd	Not Discernible from OHI	Single Dwelling	1911	448430	4599620

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0129312	Edgewater Cove Apts	12065 Edgewater Dr	Tudor/English Revival	Apartment House	1930	435330	4593390
CUY0129412	N/A	12541 Lake Ave	Neo-Classical Revival	Single Dwelling	1910	435173	4593264
CUY0129512	N/A	12547 Lake Ave	Tudor/English Revival	Single Dwelling	1900	435120	4593284
CUY0129612	Byron Harris House	12984 Lake Ave	Queen Anne	Single Dwelling	1890	434730	4593500
CUY0129712	N/A	13405 Lake Ave	Georgian Revival	Single Dwelling	1911	434621	4593425
CUY0129812	N/A	13474 Edgewater Dr	Not Discernible from OHI	Single Dwelling	1915	434435	4593754
CUY0129912	N/A	1032 Homewood Dr	Tudor/English Revival	Single Dwelling	1925	434318	4593811
CUY0130012	N/A	13823 Edgewater Dr	French Colonial/Norman	Single Dwelling	1925	434200	4593617
CUY0130112	N/A	13834-13840 Lake Ave	Georgian Revival	Single Dwelling	1925	434084	4593562
CUY0130212	Taft School	13601 Lake Ave	Second Renaissance	School	1927	434262	4593425
CUY0130312	Emerson Junior High	13439 Clifton Blvd	Second Renaissance	School	1920	434487	4593281
CUY0130412	St Augustine Academy &	14808 Lake Ave	Jacobethian	Church School	1925	433230	4593680
CUY0130512	Edgecliff Apts	14901 Lake Ave	Modern Movements	Apartment House	1925	433155	4593569
CUY0130612	Wingate Apts	15115-15119 Lake Ave	Art Moderne	Apartment House	1930	433042	4593572
CUY0130712	N/A	15100 Edgewater Dr	Mission	Single Dwelling	1920	433101	4593830
CUY0130812	N/A	17411 Lake Ave	Colonial Revival	Single Dwelling	1900	431646	4593507
CUY0130912	The Pearlerman	15518-15524 Clifton Blvd	Dutch Colonial Revival	Apartment House	1915	432738	4593496
CUY0131012	Lincoln School	15615 Clifton Blvd	Colonial Revival	School	1913	432672	4593405
CUY0131112	N/A	13979-13983 Clifton Blvd	Colonial Revival	Single Dwelling	1915	433715	4593371
CUY0131212	N/A	12973 Clifton Blvd	Mission	Single Dwelling	1915	434711	4593259
CUY0133812	N/A	18181 Clifton Rd	Tudor/English Revival	Single Dwelling	1905	430888	4592855
CUY0133912	N/A	18151 Clifton Rd	Craftsman/Arts and Crafts	Single Dwelling	1910	431041	4593069

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0134012	McKinstry House	18121 Clifton Rd	Neo-Classical Revival	Single Dwelling	1904	431121	4593246
CUY0148812	N/A	19732 Lake Rd	Federal	Single Dwelling	1830	429860	4592606
CUY0149112	N/A	19715 Frazier Dr	Queen Anne	Single Dwelling	1897	429862	4593169
CUY0149412	Lee Wilson House	19520 Frazier Dr	Mission	Single Dwelling	1912	430032	4593205
CUY0149612	Robert E Ferry House	19420 Frazier Dr	Georgian Revival	Single Dwelling	1900	430128	4593030
CUY0151113	Bay United Methodist	29931 Lake Rd	Georgian Revival	Church/Religious Structure	1909	420670	4593721
CUY0151213	Bay Middle School	27725 Wolf Rd	Neo-Classical Revival	School	1922	422680	4592744
CUY0151313	N/A	30663 Lake Rd	Greek Revival	Single Dwelling	1829	419966	4594184
CUY0151413	John D Twaddle House	31564 Lake Rd	Shingle	Single Dwelling	1900	419300	4594883
CUY0151513	Bay Village Bd of Ed	502 Cahoon Rd	Vernacular	Single Dwelling	1875	422773	4592669
CUY0151613	N/A	29059 Lake Rd	Greek Revival	Single Dwelling	1832	421442	4593449
CUY0151713	N/A	29202 Lake Rd	Not Discernible from OHI	Single Dwelling	1814	421374	4593544
CUY0151813	David Foote House	30906 Lake Rd	Federal	Single Dwelling	1828	419835	4594387
CUY0151913	Mounting Block Huntington	Huntington Metro Park	N/A	Street Furniture/Object	1885	421990	4593430
CUY0152013	Metro Park Pump House	Huntington Metro Park	Italianate	Food	1870	422056	4593425
CUY0152113	Richard C Gash House	29560 Lake Rd	Greek Revival	Single Dwelling	1858	421025	4593645
CUY0152213	N/A	23924 Lake Rd	Italianate	Single Dwelling	1874	426146	4592558
CUY0152313	Thomas Britton House	30165 Lake Rd	Italianate	Single Dwelling	1876	420412	4593842
CUY0152413	SE Perzy House	26565 Lake Rd	Vernacular	Single Dwelling	1872	423713	4593073
CUY0152513	Castle Garden	28838 Lake Rd	Greek Revival	Single Dwelling	1853	421688	4593429
CUY0152613	N/A	25547 Lake Rd	Greek Revival	Single Dwelling	1845	424659	4592808
CUY0152713	Baycrafters Gallery	28795 Lake Rd	Bungalow	Single Dwelling	1920	421719	4593193
CUY0155513	N/A	24326 Lake Rd	Georgian Revival	Single Dwelling	1925	425740	4592698

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0157313	N/A	427 Bassett Rd	Not Discernible from OHI	Single Dwelling	1900	420715	4593022
CUY0158613	Marybell S Cooney House	23724 Cliff Dr	International	Single Dwelling	1940	426291	4592621
CUY0158713	Baycrafters Arts & Crafts	28795 Lake Rd	Stick	Rail Related	1883	421829	4593199
CUY0161612	Rolf & Susie Klippert House	21565 Aberdeen Rd	Vernacular	Single Dwelling	1885	428314	4592368
CUY0164122	Wickliffe-on-the-Lake No 1	1 Lloyd Rd	Swiss Chalet	Single Dwelling	1899	458804	4608239
CUY0164222	N/A	75 E 280th St	Jacobethian	Single Dwelling	1935	459065	4608453
CUY0165322	Euclid Park ClubHouse	off Lake Shore Blvd near E	Vernacular	Social/Civic	1930	455934	4606705
CUY0165522	Shore Junior High School	291 E 222nd St	Jacobethian	School	1915	456134	4606040
CUY0274505	Lake Shore Generating	6800 S Marginal Dr	Vernacular	Energy Facility	1940	446320	4598010
CUY0282312	Terrace Apts	301 Riverdale Dr	Vernacular	Multiple Dwelling	1909	430237	4592827
CUY0282412	N/A	323 Riverdale Dr	Vernacular	Single Dwelling	1922	430316	4592804
CUY0282512	N/A	335 Riverdale Dr	Vernacular	Single Dwelling	1920	430293	4592822
CUY0282612	N/A	321 S Island Dr	Bungalow	Single Dwelling	1912	430307	4592858
CUY0283413	Strake House	196 Bradley Rd	Vernacular	Single Dwelling	1874	419845	4594096
CUY0283513	Fred Schluembach House	351 Bradley Rd	Queen Anne	Single Dwelling	1896	419910	4593364
CUY0284013	David & Adelaide Davies	31263 Lake Rd	Vernacular	Single Dwelling	1878	419497	4594595
CUY0292203	Hadco Corp	2320 Center St	Vernacular	Mill/Processing/Manufacturing	1890	440893	4593811
CUY0292303	Cleve Window Glass &	2428 Center St	Vernacular	Industrial/Engineering	1890	440798	4593845
CUY0292403	Boom Fabricating &	2505 Center St	Vernacular	Mill/Processing/Manufacturing	1916	440714	4593824
CUY0292503	Boom Fabricating &	2514 Center St	Vernacular	Mill/Processing/Manufacturing	1916	440729	4593874
CUY0296301	N/A	1450-1460 Davenport Ave	Gothic Revival	Commercial	1890	442643	4595185
CUY0297303	Ro-Mon Corp	2313 Elm St	Vernacular	Mill/Processing/Manufacturing	1900	440935	4593844

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0297403	N/A	2325 Elm St	Romanesque Revival	Mill/Processing/Manufacturing	1880	440905	4593853
CUY0297502	Huron Cement Terminal	2500 Elm St	Vernacular	Storage	1928	440835	4593941
CUY0297603	Rsv Terminals Co Whse 23	2501 Elm St	Vernacular	Mill/Processing/Manufacturing	1890	440790	4593890
CUY0302701	Cleveland Playdium Club	1065 Front St	Vernacular	Warehouse	1920	441039	4594327
CUY0305702	US Coast Guard Station	1 Lake Erie	Modern Movements	Office	1940	440503	4594620
CUY0305901	Mall "C" Park	Lakeside NE btwn	N/A	Park	1903	441968	4594747
CUY0306101	Yates Bldg	400 Lakeside Ave NW	Commercial/Chicago Style	Warehouse	1910	441619	4594494
CUY0306301	Cleveland City Hall	601 Lakeside Ave NE	Beaux-Arts	Village/Twp/City Hall	1912	442099	4594830
CUY0308001	Kindler's Restaurant	1016-1024 Main Ave	Vernacular	Commercial	1912	441212	4594283
CUY0308101	N/A	1026-1028 Main Ave	Vernacular	Office	1923	441199	4594269
CUY0308202	Brilliant Sign Co	1151 Main Ave	Vernacular	Industrial/Engineering	1950	441146	4594022
CUY0310403	Dubro Oil Corp	2400 Mulberry St	Vernacular	Industrial/Engineering	1916	440806	4593738
CUY0310503	N/A	2410 Mulberry St	Vernacular	Residential Domestic	1860	440788	4593744
CUY0310601	Fagans	998 Old River Rd	Vernacular	Restaurant/Bar	1920	440938	4594260
CUY0310701	N/A	1001 Old River Rd	Vernacular	Commercial	1913	440974	4594298
CUY0310801	Saber's River Front Deli	1009-1011 Old River Rd	Vernacular	Warehouse	1910	440986	4594294
CUY0310901	The Circus	1035 Old River Rd	Neo-Classical Revival	Commercial	1930	440997	4594291
CUY0311001	Silky Sullivan's	1045 Old River Rd	Vernacular	Warehouse	1920	441009	4594288
CUY0311101	Peabody's Down Under	1055 Old River Rd	Commercial/Chicago Style	Warehouse	1860	441021	4594284
CUY0311201	Stone Bros Rag	1061 Old River Rd	Italianate	Warehouse	1875	441033	4594281
CUY0311301	Cleveland Beach Club	1064 Old River Rd	Vernacular	Warehouse	1920	441020	4594231
CUY0311401	N/A	1065 Old River Rd	Vernacular	Warehouse	1945	441122	4594253

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0311501	JJ Shepard Bldg	1068-1074 Old River Rd	Queen Anne	Warehouse	1891	441040	4594225
CUY0311601	Noisemaker's/Tangerine	1087 Old River Rd	Commercial/Chicago Style	Customs House	1910	441076	4594269
CUY0311701	Rose Iron Works	1100 Old River Rd	Modern Movements	Industrial/Engineering	1949	441067	4594218
CUY0311801	Rum Runners	1124 Old River Rd	Vernacular	Retail Store/Shop	1945	441098	4594209
CUY0311901	N/A	1125-1147 Old River Rd	Art Moderne	Industrial/Engineering	1950	441162	4594240
CUY0312001	Bridges & Docks Office	1170 Old River Rd	Vernacular	Office	1952	441160	4594190
CUY0312101	Rivers Edge	1198 Old River Rd	Vernacular	Warehouse	1918	441206	4594157
CUY0312201	Samsel Supply Co	1235 Old River Rd	Commercial/Chicago Style	N/A	1916	441267	4594176
CUY0312301	Parking Garage	1271-1281 Old River Rd	Vernacular	Industrial/Engineering	1954	441313	4594137
CUY0312401	Samsel Supply Company	1285 Old River Rd	Vernacular	Industrial/Engineering	1895	441297	4594152
CUY0321903	Industrial Bldg	1252 Spruce St	Vernacular	Industrial/Engineering	1941	440799	4593793
CUY0328901	Willard Park	E 9th & Lakeside Ave NE	N/A	Park	1936	442190	4594892
CUY0331701	Fort Huntington Park	W 3rd and Lakeside NE	N/A	Park	1937	441730	4594588
CUY0333001	Automatic Fasteners	1138-1160 W 9th St	Commercial/Chicago Style	Commercial	1912	441341	4594389
CUY0334001	N/A	1059-1115 W 11th Place	Vernacular	Industrial/Engineering	1890	441150	4594325
CUY0336701	HWH Building	1150 W 3rd St	Vernacular	Industrial/Engineering	1919	441652	4594549
CUY0336801	Jimell Building	1221 W 6th St	Commercial/Chicago Style	Office	1883	441618	4594398
CUY0337301	Bardons & Oliver Building	1133 W 9th St	Vernacular	Commercial	1899	441412	4594432
CUY0337401	Keller Block Marshall Drug	1201-1221 W 9th St	Commercial/Chicago Style	Commercial	1899	441455	4594328
CUY0338203	Lakeview Terrace D26 Apts	1255-1263 W 25th St	Vernacular	Residential Domestic	1936	440750	4593710
CUY0361801	Burke Lakefront Service Co	Lakefront	Vernacular	Air Related	1945	442749	4595747

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0363601	N/A	2601 Lakeside Ave NE	Vernacular	Service Station	1942	443572	4595791
CUY0363701	USS Cod	N Marginal Rd	N/A	Defense	1943	442250	4595400
CUY0363801	Army Corps of Engineers	1035 E 9th St	Vernacular	Federal Government Office	1920	442016	4595370
CUY0363901	E 9th St Pier	9th St Pier	Vernacular	Water Related	1920	441892	4595481
CUY0365401	Donald Gray Gardens	Erieside Dr	N/A	Garden	1936	441543	4595073
CUY0381701	Cleveland E Pierhead Light	Pierhead Harbor's Main	Vernacular	Water Related	1910	440293	4595430
CUY0381801	Cleveland W Pierhead Light	Main Entrance of Harbor	Vernacular	Water Related	1910	440102	4595296
CUY0415403	N/A	6609 Herman Ave	Vernacular	Commercial	1892	438953	4592767
CUY0415503	Nature's Way Starter	6810 Herman Ave	Vernacular	Financial Institution	1915	438897	4592799
CUY0416103	Apartments	1327 W 67th St	Vernacular	Single Dwelling	1900	438956	4592718
CUY0416303	Apartments	1245 W 69th St	Italianate	Double	1917	438889	4592949
CUY0416403	N/A	1248 W 69th St	Colonial Revival	Residential Domestic	1900	438842	4592934
CUY0416503	Deleva House	1249 W 69th St	Bungalow	Single Dwelling	1927	438889	4592937
CUY0416603	Deleva House	1251 W 69th St	Bungalow	Residential Domestic	1900	438889	4592925
CUY0416703	N/A	1255 W 69th St	Vernacular	Retail Store/Shop	1900	438888	4592913
CUY0416803	N/A	1258 W 69th St	Vernacular	Retail Store/Shop	1900	438843	4592902
CUY0416903	Ezzo House	1308 W 69th St	Vernacular	Residential Domestic	1910	438837	4592750
CUY0417003	Holy Virgin Russian	1350 W 69th St	Vernacular	Church/Religious Structure	1900	438835	4592632
CUY0480905	The Lakeside Building	1192 E 49th St	Italianate	Industrial/Engineering	1880	444310	4596360
CUY0481105	Buildings 6-8 General	3829 Hamilton Ave (and	Vernacular	Industrial/Engineering	1900	444300	4596120
CUY0481305	Buildings 3-5 Gallo	3865 Hamilton Ave	Vernacular	Industrial/Engineering	1900	444360	4596160
CUY0481405	Buildings 1-2	3901 Hamilton Ave	Vernacular	Industrial/Engineering	1900	444400	4596180
CUY0481705	Industrial Lift-Truck Service	Lakeside Ave & E 40th St	Vernacular	Road/Vehicle Related	1900	444370	4596320

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0481805	Buildings 1-2 Sidari's Italian	3950 Lakeside Ave	Vernacular	Industrial/Engineering	1900	444380	4596260
CUY0481905	Building 3	Lakeside Ave	Vernacular	Warehouse	1900	444280	4596200
CUY0482005	Building 4	SEC Lakeside Ave & E	Vernacular	Industrial/Engineering	1900	444260	4596180
CUY0482105	North Coast Machining Inc	4501 Lakeside Ave	Vernacular	Industrial/Engineering	1880	444604	4596589
CUY0585813	S Nase House	390 Basset Rd	Vernacular	Single Dwelling	1900	420650	4593185
CUY0585913	Edward WSchaefer House	366 Bassett Rd	Italianate	Single Dwelling	1862	420654	4593297
CUY0586013	Bradley Svenson House	353 Basset Rd	Tudor/English Revival	Single Dwelling	1930	420722	4593351
CUY0586113	LA Durr House	357 Bassett Rd	Colonial Revival	Single Dwelling	1900	420722	4593332
CUY0586213	Brian Forsgren House	367 Bassett Rd	Colonial Revival	Single Dwelling	1900	420722	4593283
CUY0586313	Martin's Deli	328-330 Bassett Rd	Vernacular	Retail Store/Shop	1920	420670	4593448
CUY0586413	Jerry A Jare House	317 Bassett Rd	Colonial Revival	Single Dwelling	1900	420732	4593516
CUY0586513	George A Kourcklas House	308 Basset Rd	Tudor/English Revival	Single Dwelling	1930	420667	4593547
CUY0586613	James W Glauner House	301 Bassett Rd	Vernacular	Single Dwelling	1890	420733	4593588
CUY0586713	Douglas M Hawkins House	29357 Lake Rd	Italianate	Single Dwelling	1870	421235	4593480
CUY0586813	AB & Helen Holton House	29219 Lake Rd	Dutch Colonial Revival	Single Dwelling	1900	421355	4593460
CUY0586913	Todd Veverka House	29146 Lake Rd	Shingle	Single Dwelling	1900	421400	4593545
CUY0587113	Russell J Cooley House	29127 Lake Rd	Colonial Revival	Single Dwelling	1920	421450	4593440
CUY0587213	DJ Ackerman House	29139 Lake Rd	Bungalow	Single Dwelling	1900	421235	4593480
CUY0587313	James P Daniels House	29005 Lake Rd	Tudor/English Revival	Single Dwelling	1930	421530	4593420
CUY0587413	RM Yargo House	29014 Lake Rd	Dutch Colonial Revival	Single Dwelling	1900	421515	4593480
CUY0587513	Jack & Karen Norton House	28944 Lake Rd	Colonial Revival	Single Dwelling	1900	421540	4593470
CUY0587713	Richard M Allen House	28803 Lake Rd	Colonial Revival	Single Dwelling	1930	421685	4593380

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0587813	Mark L McMahon House	348 Pinewood Dr	Tudor/English Revival	Single Dwelling	1940	421525	4593310
CUY0587913	Armand Niccolai House	363 Pinewood Dr	Colonial Revival	Single Dwelling	1930	421560	4593310
CUY0588013	Richard L Yoo House	358 Longbeach Pkwy	Colonial Revival	Single Dwelling	1930	421615	4593265
CUY0588113	Kenneth A Jensen House	345 Longbeach Pkwy	Colonial Revival	Single Dwelling	1930	421670	4593325
CUY0588213	C & J Pagens House	361 Longbeach Pkwy	Dutch Colonial Revival	Single Dwelling	1930	421670	4593300
CUY0588313	Eric Edlund / Daniel Yuhas	379 Bassett Rd	Dutch Colonial Revival	Single Dwelling	1920	420720	4593234
CUY0588413	John L Yuhas House	389 Bassett Rd	Vernacular	Single Dwelling	1920	420720	4593184
CUY0588613	Richard Feagler House	363 Longbeach Pkwy	Tudor/English Revival	Single Dwelling	1930	421660	4593275
CUY0590813	Donald J Morace, Jr House	270 Bradley Rd	Tudor/English Revival	Single Dwelling	1930	419829	4593751
CUY0590913	Martin Fabian House	262 Bradley Rd	Vernacular	Single Dwelling	1930	419833	4593787
CUY0591013	Eugene F Andrews, Jr	252 Bradley Rd	Craftsman/Arts and Crafts	Single Dwelling	1930	419833	4593807
CUY0591113	Frank P Niuzzo House	250 Bradley Rd	Colonial Revival	Single Dwelling	1940	419834	4593826
CUY0591213	Sean P Allan House	246 Bradley Rd	Colonial Revival	Single Dwelling	1940	419836	4593851
CUY0591313	David S Phillips House	242 Bradley Rd	Queen Anne	Single Dwelling	1890	419836	4593873
CUY0591413	John B Walmsley House	281 Bradley Rd	Greek Revival	Single Dwelling	1840	419910	4593691
CUY0591513	George M Naegle House	226 Bradley Rd	Vernacular	Single Dwelling	1900	419838	4593954
CUY0591613	Mrs Charles W Dugan	216 Bradley Rd	Vernacular	Single Dwelling	1900	419794	4593986
CUY0591713	Karen Adams House	206 Bradley Rd	Colonial Revival	Single Dwelling	1920	419844	4594041
CUY0591813	James Comenski House	420 Bassett Rd	Vernacular	Single Dwelling	1870	420646	4593056
CUY0591913	Brian Cahill House	174 Bradley Rd	Queen Anne	Single Dwelling	1900	419853	4594172
CUY0592013	Michael Suhoza House	170 Bradley Rd	Colonial Revival	Single Dwelling	1920	419855	4594203
CUY0592113	Monroe Snider Jr House	30816 Lake Rd	Colonial Revival	Single Dwelling	1900	419890	4594340
CUY0592213	N/A	30813 Lake Rd	Colonial Revival	Single Dwelling	1930	419810	4594300

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0592313	Joseph V Barna House	30800 Lake Rd	Tudor/English Revival	Single Dwelling	1920	419990	4594325
CUY0592413	David Kozak & Kenneth	30859 Lake Rd	Colonial Revival	Single Dwelling	1920	419790	4594330
CUY0592513	John G School House	30931 Lake Rd	Dutch Colonial Revival	Single Dwelling	1920	419745	4594365
CUY0592613	Richard Lzyznski House	31012 Lake Rd	Dutch Colonial Revival	Single Dwelling	1900	419505	4594690
CUY0592813	Charles K Koster House	30470 Lake Rd	Bungalow	Single Dwelling	1930	420195	4593980
CUY0592913	Frank Minard House	30300 Lake Rd	Bungalow	Single Dwelling	1900	420320	4594000
CUY0593013	Robert C Krohn House	30214 Lake Rd	Tudor/English Revival	Single Dwelling	1930	420520	4593890
CUY0593313	Anthony Yankel, Jr House	29814 Lake Rd	Tudor/English Revival	Single Dwelling	1930	420810	4593750
CUY0593413	P Dailey House	29803 Lake Rd	Shingle	Single Dwelling	1900	420800	4593655
CUY0593513	John Crum House	29737 Lake Rd	Greek Revival	Single Dwelling	1830	420867	4593640
CUY0593613	AD Heck House	29723 Lake Rd	Bungalow	Single Dwelling	1920	420887	4593637
CUY0593713	Carol & Richard Loehr	29644 Lake Rd	Bungalow	Single Dwelling	1910	420961	4593669
CUY0593813	RF Gash House	29622 Lake Rd	Colonial Revival	Single Dwelling	1910	420983	4593661
CUY0593913	H C Miller House	29627 Lake Rd	Bungalow	Single Dwelling	1900	420969	4593590
CUY0594013	Thomas A Crane House	29612 Lake Rd	Vernacular	Single Dwelling	1890	421004	4593653
CUY0594213	Daniel J Mooney III House	29514 Lake Rd	Tudor/English Revival	Single Dwelling	1930	421102	4593628
CUY0594313	Catherine Redinger House	29503 Lake Rd	Vernacular	Single Dwelling	1900	421103	4593551
CUY0676711	Rockefeller Pk GreenHouse	750 E 88th St	Art Deco	Other use	1905, 1937-39	447556	4598312
CUY0806622	Albert W Henn Mansion	23131 Lake Shore Blvd.	N/A	Single Dwelling	1923	456522	4606995
CUY0806722	Lucian B Smith House	180 Lloyd Rd	Queen Anne	Residential	1851	458829	4608258
CUY0807222	Kenneth Bates House	7 E 194th St	Modern Movements	Single Dwelling	Built 1935	454428	4605676
CUY0838201	Burke Lakefront Airport	Lakefront	N/A	Fire Station	1970's	442285	4595526
CUY0838301	North Point Office Building	901 Lakeside Ave, NE	N/A	Office	1985	442289	4594965

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
CUY0838501	Holiday Inn Lakeside	1111 Lakeside Ave	N/A	Hotel/Inn/Motel	1965	442417	4595031
CUY0838601	Public Utilities Building	1201 Lakeside Ave	N/A	Office	1971	442485	4595073
CUY0838801	Central Adult Training	1325 Lakeside Ave	Modern Movements	Office	1959	442525	4595095
CUY0839601	N/A	2701 Lakeside Ave	N/A	N/A	after 1946	443698	4595884
CUY0839701	Justice Center/ Jail Building	42 W Lakeside Ave	N/A	Government/Public	1976	441770	4594505
CUY0839801	Lakeside Parking Garage	701-725 Lakeside Ave NW	Modern Movements	Warehouse	1968	441495	4594350
CUY0840101	Army Corps of Engineers	1120 E 9th St	N/A	Warehouse	after 1942	442018	4595341
CUY0840201	Army Corps facility	E 9th St	N/A	Warehouse	after 1942	442032	4595350
CUY0841001	Biggie's Crooked River	1187 Old River Rd	N/A	Parking Lot	c. 1960	441224	4594200
CUY0841801	Cleveland -Cuyahoga Co -	Port of Cleveland	N/A	Warehouse	1964, 1968	441546	4595253
CUY0841901	Port of Cleveland Cargo	On dock 28, Port of	N/A	Industrial/Engineering	c. 1961-1963	441363	4595016
CUY0865222	Scotese Residence	21660 Edgecliff Dr.	Tudor/English Revival	N/A	c. 1920s	455585	4606733
CUY0865322	McSween Residence	93 E. 225th St.	Dutch Colonial Revival	N/A	1922	456131	4606966
CUY0865522	Monroe Residence	22701 Edgecliff Dr.	International	N/A	1938	456153	4607193
CUY0865622	Name of owners not on	26431 Edgecliff Dr.	Tudor/English Revival	N/A	c. 1920s	458285	4608175
CUY0865722	Ward Residence	85 E. 280th St.	No academic style -	N/A	1928	459076	4608674
CUY0865822	Waters Edge Apartments	23951-24101 Lake Shore	Modern Movements	N/A	late 1950s-1960s	458130	4607368
CUY0865922	St. Robert Church and	23802 Lake Shore Blvd.	No academic style -	N/A	1952	456703	4607160
LAK0008401	Eastlake Generating Plant	10 Erie Rd	Not Discernible from OHI	Energy Facility	1950	463060	4613170
LAK0008704	Fairport Harbor West	W side Harbor Entrance	Other	Water Related	1921	476600	4623793

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OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0010816	Elyria Savings & Trust	605 4th St	Bungalow	Fire Station	1912	401475	4590997
LOR0013716	Masonic Temple	SWC Washington St & 4th	Second Renaissance	Masonic Hall	1926	401412	4590983
LOR0014816	Palace Theater	601-613 Broadway St	Neo-Classical Revival	Office	1920	401868	4590915
LOR0017916	William H Root House	3535 E Erie Ave	Greek Revival	Single Dwelling	1850	405560	4592925
LOR0018416	Antlers Hotel	300 Washington Ave	Renaissance Revival	Hotel/Inn/Motel	1920	401383	4591095
LOR0021716	Jax Store for Men	422-426 Broadway St	Richardsonian	Retail Store/Shop	1909	401707	4591050
LOR0021816	Honecker Block	446-448 Broadway St	Neo-Classical Revival	Commercial	1910	401738	4591018
LOR0024416	Myer's House	3363 E Erie Ave	Neo-Classical Revival	Single Dwelling	1910	405300	4592820
LOR0024616	1st Congregational Church	433 Washington Ave	Georgian Revival	Church/Religious Structure	1926	401455	4590988
LOR0034916	Lorain Lighthouse	In Lake Erie at W	Other	Government/Public	1909	400600	4592230
LOR0037616	Lee Furniture	425-437 Broadway St	Richardsonian	Retail Store/Shop	1892	401750	4591068
LOR0037716	Good Time Charlie's & R-	436-440 Broadway St	Vernacular	Retail Store/Shop	1892	401727	4591028
LOR0039316	Electric Building	203-205 5th St	Vernacular	Retail Store/Shop	1911	401710	4590952
LOR0045302	Avon Lake Water Works	Lake Rd at Route 83	Renaissance Revival	Water Works	1926	414970	4596030
LOR0045402	Avon Lake Generating	33570 Lake Rd	Neo-Classical Revival	Public Works	1926	412063	4595057
LOR0052016	MF Koury Real Estate	430 Broadway St	Vernacular	Retail Store/Shop	1894	401717	4591040
LOR0052116	The Findings / Coastal	502 Broadway St	Vernacular	Retail Store/Shop	1906	401765	4590992
LOR0052216	Rakich & Rakich Clothing	506 Broadway St	Vernacular	Retail Store/Shop	1892	401773	4590982
LOR0052316	Jones Block	534 Broadway St	Richardsonian	Retail Store/Shop	1895	401800	4590940
LOR0052416	First Nationwide Bank	559 Broadway St	Neo-Classical Revival	Financial Institution	1950	401838	4590953
LOR0052516	Janasko Insurance	562 Broadway St	Italianate	Financial Institution	1882	401815	4590920
LOR0052616	Herman Kircner Furniture	608-616 Broadway St	Beaux-Arts	Retail Store/Shop	1928	401838	4590877
LOR0052716	Knight Bldg	629-633 1/2 Broadway St	Richardsonian	Retail Store/Shop	1900	401893	4590880

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0052916	Disciples of Christ Temple	940 W 5th St	Late Gothic Revival	N/A	1930	401485	4590929
LOR0053116	N/A	747 Brownell Ave	Colonial Revival	Single Dwelling	1912	400878	4590637
LOR0053216	N/A	759 Brownell Ave	Vernacular	Single Dwelling	1850	400878	4590622
LOR0054816	N/A	1156 W 8th St	Colonial Revival	Single Dwelling	1912	401210	4590517
LOR0055016	N/A	1208 W 8th St	Vernacular	Single Dwelling	1912	400985	4590485
LOR0055716	N/A	309 5th St	Colonial Revival	Single Dwelling	1908	401615	4590912
LOR0055816	N/A	405 5th St	Eastlake	Single Dwelling	1885	401598	4590907
LOR0055916	N/A	1018-1020 5th St	Neo-Classical Revival	Apartment House	1928	401375	4590890
LOR0056016	N/A	1027-1029 5th St	Colonial Revival	Double	1909	401345	4590840
LOR0056116	N/A	1028 5th St	Vernacular	Single Dwelling	1885	401352	4590885
LOR0056216	N/A	1034 5th St	Vernacular	Single Dwelling	1870	401328	4590878
LOR0056316	N/A	1108 5th St	Bungalow	Single Dwelling	1905	401255	4590868
LOR0056416	N/A	1110 5th St	Bungalow	Single Dwelling	1897	401227	4590895
LOR0056516	N/A	1119 5th St	Vernacular	Single Dwelling	1897	401235	4590807
LOR0056616	N/A	1124 5th St	Queen Anne	Single Dwelling	1903	401183	4590847
LOR0056716	N/A	1125 5th St	Prairie	Single Dwelling	1917	401215	4590803
LOR0056816	N/A	1128 5th St	Prairie	Single Dwelling	1910	401165	4590843
LOR0056916	N/A	1139 5th St	Bungalow	Single Dwelling	1903	401145	4590785
LOR0057016	N/A	1141 5th St	Vernacular	Single Dwelling	1905	401130	4590780
LOR0057116	Franklin Terrace	1143-1159 5th St	Colonial Revival	Apartment House	1913	401102	4590773
LOR0057216	Moore Apartments	1150-1156 5th St	Colonial Revival	Apartment House	1910	401102	4590825
LOR0057316	N/A	1216-1218 5th St	Colonial Revival	Double	1911	400968	4590850
LOR0057416	N/A	1217 5th St	Vernacular	Single Dwelling	1910	400985	4590800

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0057516	N/A	1219 5th St	Eastlake	Single Dwelling	1890	400967	4590800
LOR0057616	Apartments	1239-1241 5th St	Colonial Revival	Apartment House	1925	400880	4590800
LOR0057716	N/A	1313-1315 5th St	Colonial Revival	Single Dwelling	1912	400793	4590805
LOR0057816	N/A	1335 5th St	Bungalow	Single Dwelling	1915	400717	4590805
LOR0057916	N/A	1337 5th St	Colonial Revival	Single Dwelling	1915	400702	4590805
LOR0058016	N/A	1017 1st St	Vernacular	Single Dwelling	1900	401252	4591320
LOR0058116	N/A	1020 4th St	Colonial Revival	Single Dwelling	1905	401337	4591008
LOR0058216	N/A	1021 4th St	Bungalow	Single Dwelling	1920	401365	4590965
LOR0058316	First Edition	1025 4th St	Craftsman/Arts and Crafts	Single Dwelling	1912	401340	4590957
LOR0058416	N/A	1026 4th St	Queen Anne	Single Dwelling	1900	401310	4591000
LOR0058516	N/A	1032 4th St	Colonial Revival	Single Dwelling	1900	401297	4590995
LOR0058616	N/A	1034 4th St	Colonial Revival	Single Dwelling	1925	401285	4590990
LOR0058716	N/A	1037 4th St	Bungalow	Single Dwelling	1905	401298	4590945
LOR0058816	Irving Junior High School	1124 4th St	Neo-Classical Revival	School	1922	401160	4590970
LOR0058916	N/A	1125 4th St	Vernacular	Single Dwelling	1925	401182	4590908
LOR0059016	Deeping Gate	1127 4th St	Tudor/English Revival	Single Dwelling	1929	401163	4590915
LOR0059116	N/A	1131 4th St	Tudor/English Revival	Single Dwelling	1929	401148	4590910
LOR0059216	N/A	1137 4th St	Colonial Revival	Single Dwelling	1915	401120	4590902
LOR0059316	Captain's Walk	1139 4th St	Colonial Revival	Single Dwelling	1923	401103	4590898
LOR0059416	N/A	1143 4th St	Craftsman/Arts and Crafts	Single Dwelling	1921	401088	4590895
LOR0059516	Admiral King House	113 Hamilton Ave	Vernacular	Single Dwelling	1905	401210	4591300
LOR0059616	N/A	123 Hamilton Ave	Craftsman/Arts and Crafts	Single Dwelling	1924	401212	4591285

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0059716	N/A	159 Hamilton Ave	Vernacular	Single Dwelling	1905	401225	4591235
LOR0059816	N/A	207 Hamilton Ave	Vernacular	Single Dwelling	1850	401237	4591195
LOR0059916	N/A	220 Hamilton Ave	Colonial Revival	Single Dwelling	1915	401195	4591170
LOR0060016	N/A	225-227 Hamilton Ave	Vernacular	Single Dwelling	1860	401245	4591165
LOR0060116	N/A	425 Hamilton Ave	Colonial Revival	Single Dwelling	1915	401307	4590920
LOR0060216	N/A	440 Hamilton Ave	Queen Anne	Single Dwelling	1908	401273	4590872
LOR0060316	N/A	648 Hamilton Ave	Prairie	Single Dwelling	1909	401332	4590660
LOR0060416	N/A	658 Hamilton Ave	Colonial Revival	Single Dwelling	1900	401335	4590640
LOR0063116	N/A	1214 9th St	Vernacular	Single Dwelling	1908	400970	4590360
LOR0063216	N/A	1227 9th St	Colonial Revival	Single Dwelling	1930	400938	4590320
LOR0063316	N/A	403 Oberlin Ave	Colonial Revival	Single Dwelling	1895	401060	4590890
LOR0063416	N/A	404 Oberlin Ave	Queen Anne	Single Dwelling	1912	401017	4590895
LOR0063516	N/A	442 Oberlin Ave	Colonial Revival	Single Dwelling	1911	401020	4590847
LOR0063616	N/A	500 Oberlin Ave	Queen Anne	Single Dwelling	1910	401017	4590803
LOR0063716	N/A	505 Oberlin Ave	Queen Anne	Single Dwelling	1909	401060	4590768
LOR0063816	N/A	539 Oberlin Ave	Vernacular	Single Dwelling	1880	401060	4590710
LOR0063916	N/A	542 Oberlin Ave	Colonial Revival	Single Dwelling	1908	401017	4590762
LOR0064016	N/A	606 Oberlin Ave	Colonial Revival	Single Dwelling	1890	401015	4590685
LOR0064116	N/A	624 Oberlin Ave	Italianate	Single Dwelling	1880	401015	4590669
LOR0064216	N/A	660 Oberlin Ave	Colonial Revival	Single Dwelling	1908	401015	4590603
LOR0064316	N/A	840 Oberlin Ave	Queen Anne	Single Dwelling	1900	401005	4590388
LOR0064616	N/A	1010 2nd St	Vernacular	Single Dwelling	1905	401290	4591250
LOR0064716	N/A	1018 2nd St	Italianate	Single Dwelling	1915	401277	4591247

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0064816	N/A	1024 2nd St	Craftsman/Arts and Crafts	Single Dwelling	1924	401240	4591238
LOR0064916	N/A	1100 2nd St	Vernacular	Single Dwelling	1900	401183	4591224
LOR0065016	N/A	1103 2nd St	Dutch Colonial Revival	Single Dwelling	1907	401193	4591185
LOR0065116	N/A	1115 2nd St	Vernacular	Single Dwelling	1860	401155	4591175
LOR0065216	N/A	1117-1119 2nd St	Vernacular	Single Dwelling	1902	401137	4591165
LOR0066116	N/A	1131 7th St	Tudor/English Revival	Single Dwelling	1929	401252	4590562
LOR0066216	N/A	1136 7th St	Craftsman/Arts and Crafts	Single Dwelling	1912	401223	4590612
LOR0066316	N/A	1155 7th St	Prairie	Single Dwelling	1924	401140	4590560
LOR0066416	N/A	1158 7th St	Tudor/English Revival	Single Dwelling	1924	401115	4590610
LOR0066516	N/A	1163 7th St	Craftsman/Arts and Crafts	Single Dwelling	1919	401120	4590560
LOR0066616	N/A	1166 7th St	Tudor/English Revival	Single Dwelling	1939	401073	4590610
LOR0066716	N/A	1172 7th St	Tudor/English Revival	Single Dwelling	1921	401050	4590610
LOR0066816	N/A	1175 7th St	Colonial Revival	Single Dwelling	1926	401055	4590558
LOR0066916	N/A	1235 7th St	Greek Revival	Single Dwelling	1850	400900	4590565
LOR0067016	N/A	1318-1320 7th St	Vernacular	Double	1924	400737	4590615
LOR0067116	N/A	1329 7th St	Dutch Colonial Revival	Single Dwelling	1900	400705	4590570
LOR0067616	Emmanuel United	400-410 6th St	Neo-Classical Revival	Church/Religious Structure	1925	401660	4590838
LOR0068016	N/A	1111 6th St	N/A	Single Dwelling	N/A	401290	4590702
LOR0068116	N/A	1115 6th St	Colonial Revival	Single Dwelling	1900	401275	4590698
LOR0068216	Bratten-Oldham House	1118 6th St	Craftsman/Arts and Crafts	Single Dwelling	1910	401235	4590735
LOR0068316	Thomas B Williams House	1127 6th St	Queen Anne	Single Dwelling	1910	401235	4590688

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0068416	N/A	1128-1132 6th St	Craftsman/Arts and Crafts	Double	1918	401190	4590725
LOR0068516	The Charleston Cemetery	6th St	N/A	N/A	1880	401190	4590645
LOR0068616	N/A	1149 6th St	Tudor/English Revival	Single Dwelling	1928	401155	4590668
LOR0068716	N/A	1152 6th St	Colonial Revival	Single Dwelling	1921	401118	4590708
LOR0068816	N/A	1153 6th St	Queen Anne	Single Dwelling	1900	401128	4590660
LOR0068916	N/A	1155 6th St	Tudor/English Revival	Single Dwelling	1926	401103	4590655
LOR0069016	Resek Manor	1160 6th St	Tudor/English Revival	Single Dwelling	1950	401087	4590700
LOR0069116	N/A	1161 6th St	Colonial Revival	Single Dwelling	1924	401080	4590650
LOR0069216	N/A	1168 6th St	Tudor/English Revival	Single Dwelling	1924	401070	4590695
LOR0069316	N/A	1169 6th St	Neo-Classical Revival	Single Dwelling	1915	401057	4590645
LOR0069416	N/A	1172 6th St	Tudor/English Revival	Single Dwelling	1924	401055	4590691
LOR0069516	N/A	1225 6th St	Vernacular	Single Dwelling	1895	400950	4590685
LOR0069616	N/A	1227-1229 6th St	Vernacular	Double	1910	400912	4590685
LOR0069716	N/A	1235 6th St	Vernacular	Single Dwelling	1900	400895	4590685
LOR0069816	N/A	1317 6th St	Vernacular	Single Dwelling	1870	400710	4590690
LOR0072016	N/A	106 Washington Ave	Vernacular	Single Dwelling	N/A	401297	4591332
LOR0072116	N/A	136-138 Washington Ave	Vernacular	Single Dwelling	1861	401310	4591295
LOR0072216	N/A	201 Washington Ave	Craftsman/Arts and Crafts	Single Dwelling	1906	401375	4591252
LOR0072316	N/A	205 Washington Ave	Colonial Revival	Single Dwelling	1907	401383	4591233
LOR0072416	N/A	206 Washington Ave	Vernacular	Single Dwelling	1893	401337	4591218
LOR0072516	N/A	240 Washington Ave	Vernacular	Single Dwelling	1880	401353	4591175
LOR0072616	Frederick W Colson House	416 Washington Ave	Colonial Revival	Single Dwelling	1905	401417	4590968

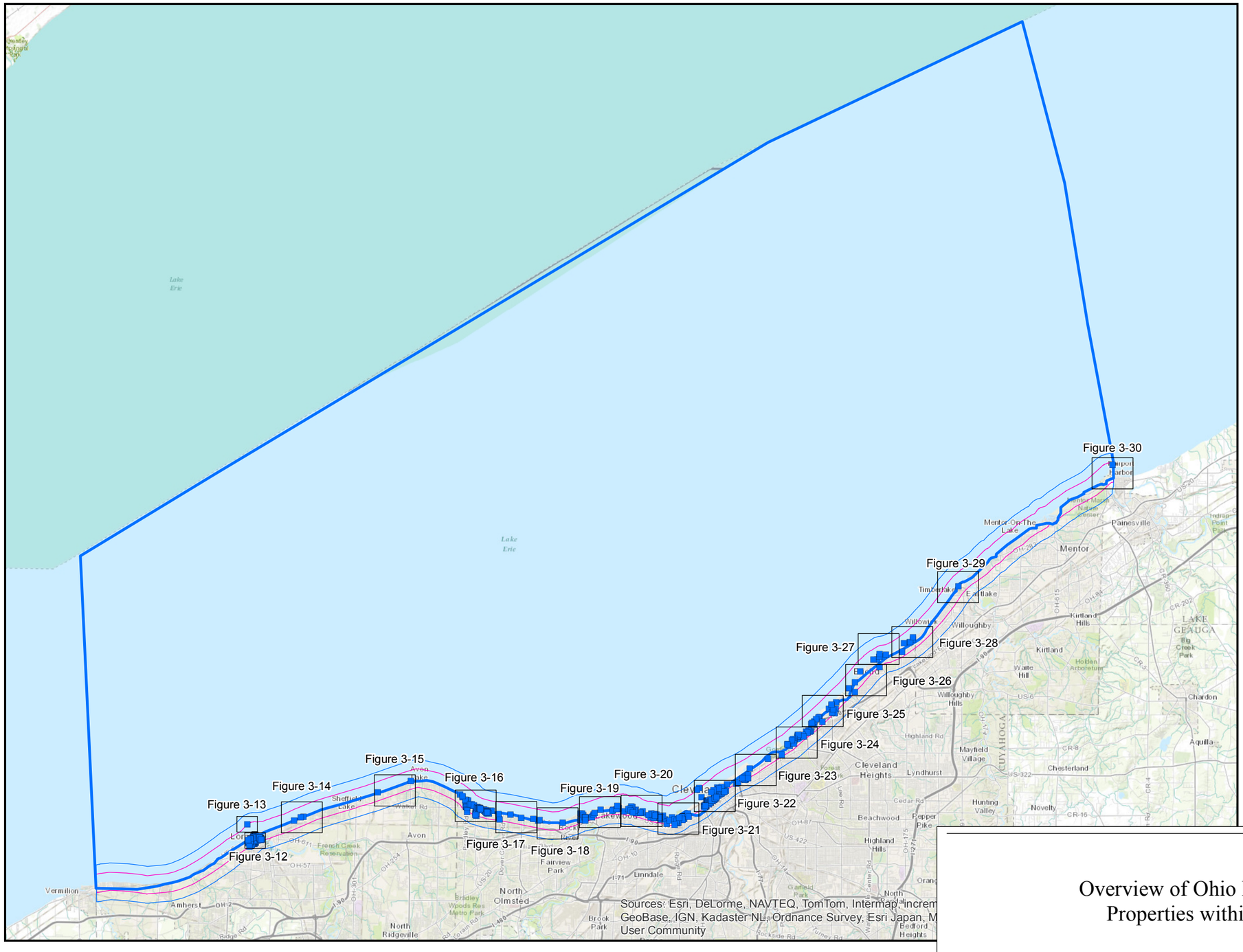
Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

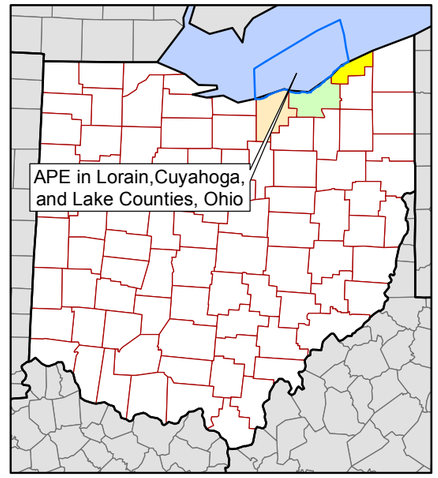
OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0072716	Edward & Myrth Herald	436 Washington Ave	Craftsman/Arts and Crafts	Single Dwelling	1910	401423	4590953
LOR0072816	N/A	517-519 Washington Ave	Vernacular	Single Dwelling	1900	401490	4590865
LOR0072916	N/A	525 Washington Ave	Queen Anne	Single Dwelling	1900	401493	4590855
LOR0073016	N/A	527 Washington Ave	Vernacular	Single Dwelling	1880	401497	4590843
LOR0073116	N/A	538 Washington Ave	Queen Anne	Single Dwelling	1900	401455	4590835
LOR0073216	N/A	545 Washington Ave	N/A	Single Dwelling	1890	401505	4590817
LOR0073316	N/A	556-558 Washington Ave	Colonial Revival	Double	1890	401463	4590798
LOR0074216	N/A	1022 1/2 A-B W Erie Ave	Vernacular	Single Dwelling	1910	401260	4591153
LOR0074316	N/A	1038 W Erie Ave	Vernacular	Single Dwelling	1905	401255	4591118
LOR0074416	N/A	1103-1105 W Erie Ave	Colonial Revival	Double	1900	401223	4591057
LOR0074516	N/A	1111 W Erie Ave	Queen Anne	Single Dwelling	1890	401208	4591052
LOR0074616	N/A	1113 W Erie Ave	Vernacular	Single Dwelling	1890	401193	4591048
LOR0074716	N/A	1123 W Erie Ave	Italianate	Single Dwelling	1880	401163	4591040
LOR0074816	N/A	1129-1129 1/2 W Erie Ave	Vernacular	Double	1929	401120	4591029
LOR0074916	N/A	1130 W Erie Ave	Vernacular	Single Dwelling	1910	401105	4591082
LOR0075016	N/A	1139 W Erie Ave	Queen Anne	Double	1895	401087	4591021
LOR0075116	N/A	1233-1233 1/2 W Erie Ave	Colonial Revival	Single Dwelling	1900	400958	4590957
LOR0075216	N/A	1239 W Erie Ave	Vernacular	Single Dwelling	1900	400924	4590937
LOR0075316	N/A	1336 W Erie Ave	Queen Anne	Single Dwelling	1910	400912	4590990
LOR0075416	N/A	1338 W Erie Ave	Queen Anne	Single Dwelling	1910	400900	4590982
LOR0075516	N/A	1346 W Erie Ave	Neo-Classical Revival	Single Dwelling	1900	400875	4590967
LOR0075616	N/A	1348-1348 B W Erie Ave	Federal	Single Dwelling	1860	400680	4590862

Table 3-3. Ohio Historic Inventory Architectural Properties Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area

OHI Number	Present Name	Address	Architectural Style	Historical Use	Date	Easting	Northing
LOR0126816	Lorain National Bank	457 Broadway St	Neo-Classical Revival	Financial Institution	1911	401785	4591033
LOR0126916	FOE Building	575 Broadway St	Neo-Classical Revival	Fraternal/Patriotic Org	1918	401847	4590942
LOR0127116	Brownell School	10th & Brownell Ave	Romanesque Revival	School	1904	400810	4590268
LOR0127216	Broadway Bldg	301-309 Broadway St	Neo-Classical Revival	Commercial	1926	401645	4591180
LOR0127316	First Lorain Trust Bank Bldg	383 Broadway St	Neo-Classical Revival	Financial Institution	1926	401717	4591100
LOR0127416	Duane Bldg	387-401 Broadway St	Renaissance Revival	Retail Store/Shop	1906	401733	4591085
LOR0127516	First Methodist Church	559 Reid Ave	Late Gothic Revival	Church/Religious Structure	1926	401710	4590882
LOR0127616	Grunda & Grunda Bldg	522 Broadway St	Vernacular	Retail Store/Shop	1931	401787	4590960
LOR0127716	Oehlke Bldg	530 Broadway St	Late Gothic Revival	Retail Store/Shop	1928	401795	4590950
LOR0127816	Smith Block	538-542 Broadway St	Not Determined	Retail Store/Shop	1892	401808	4590930
LOR0129016	Arkinetics Inc	201 5th St	Vernacular	Retail Store/Shop	1902	401720	4590960
LOR0129216	Ted Jacobs Bldg	209 4th St	N/A	Commercial	1950	401673	4591050
LOR0129616	Elks Lodge	203 6th St	Queen Anne	Single Dwelling	1890	401785	4590855
LOR0134516	Thompson House	2919 E Erie St	Georgian Revival	Single Dwelling	1916	404725	4592595
LOR0136516	Old Lorain Nat'l Bank Bldg	600 Broadway St	Romanesque Revival	Residential Domestic	1901	401835	4590893

Table 3-4. Archaeological Resources Located within 0.5 miles (0.8 km) of the Lake Erie Coastline along the Study Area							
OAI Number	**Site Name**	**Prehistoric Affiliation**	**Historic Affiliation**	**Setting**	**Site Type**	**Easting**	**Northing**
CU0074		Unassigned Woodland	N/A	Open Site	Unknown	[redacted]	[redacted]
CU0131		Unassigned Archaic	N/A	Open Site	Unknown	[redacted]	[redacted]
CU0152		Middle Woodland	N/A	Open Site	Unknown	[redacted]	[redacted]
CU0153	Dead Man's Island	Historic	Aboriginal	Open Site	--	[redacted]	[redacted]
CU0406		Unassigned Prehistoric	N/A	Open Site	Unknown	[redacted]	[redacted]
CU0510		Historic	Non-Aboriginal	Open Site	--	[redacted]	[redacted]
LA0004	Chagrin River Campsite/Village (Reeves Site ?)	Unassigned Woodland	N/A	Open Site	Village	[redacted]	[redacted]
LA0058		Early Woodland	N/A	Open Site	Unknown	[redacted]	[redacted]
LA0133	Ahlstrom Site	Unassigned Woodland	N/A	Open Site	Habitation	[redacted]	[redacted]
LA0135		Unassigned Prehistoric	N/A	Open Site	Unknown	[redacted]	[redacted]
LA0186	Pedrick Fort (Reeves Site ?)	Late Woodland, Late Prehistoric	N/A	Open Site	Village	[redacted]	[redacted]
LN0082	Avon Lake Recreational Area	Unassigned Woodland	N/A	Open Site	Unknown	[redacted]	[redacted]
LN0214		Historic	Non-Aboriginal	Open Site	--	[redacted]	[redacted]
LN0269	Sarah E. Sheldon Shipwreck Site	Historic	Non-Aboriginal	Submerged	--	[redacted]	[redacted]





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 5 10 Kilometers

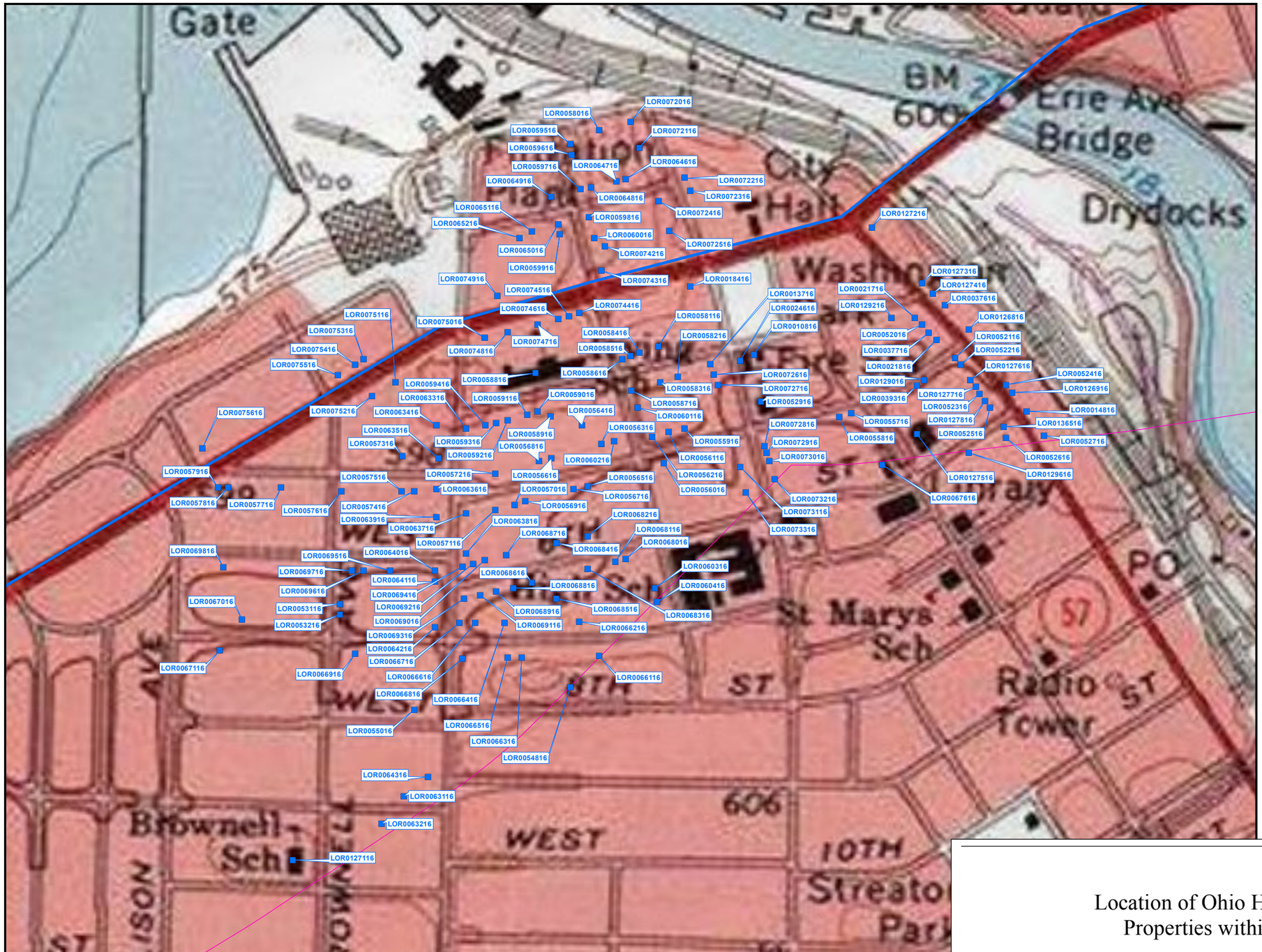
0 5 10 Miles

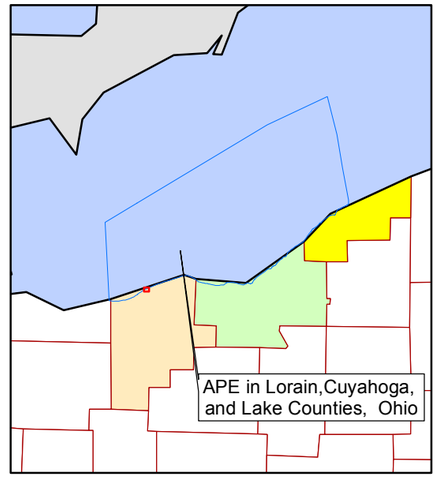
N W E S

Overview of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-11





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

N
W E
S

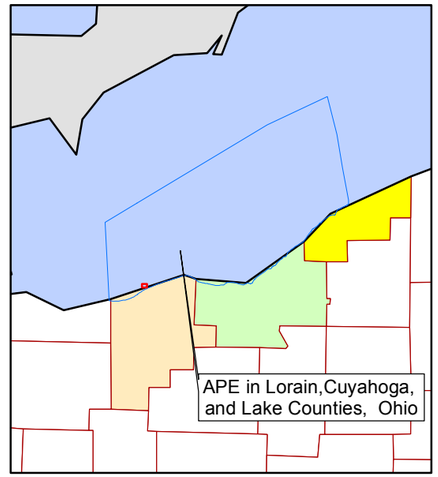
0 0.25 0.5 Kilometers

0 0.1 0.2 Miles

Location of Ohio Historical Inventory
Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-12



LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

N
W E
S

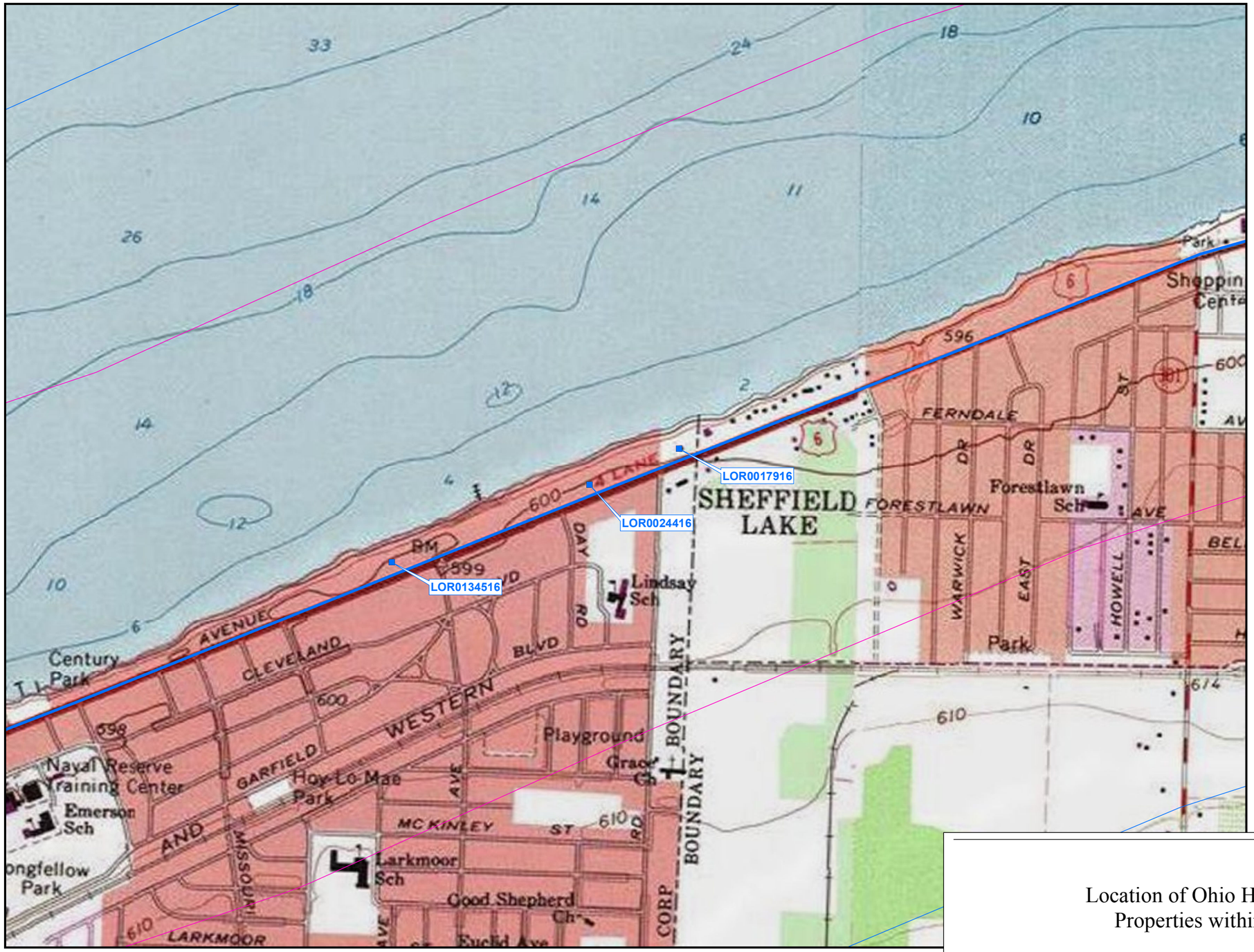
0 0.25 0.5 Kilometers

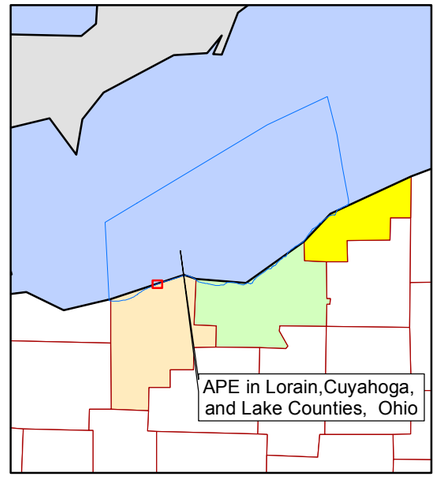
0 0.1 0.2 Miles

Location of Ohio Historical Inventory
Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-13





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

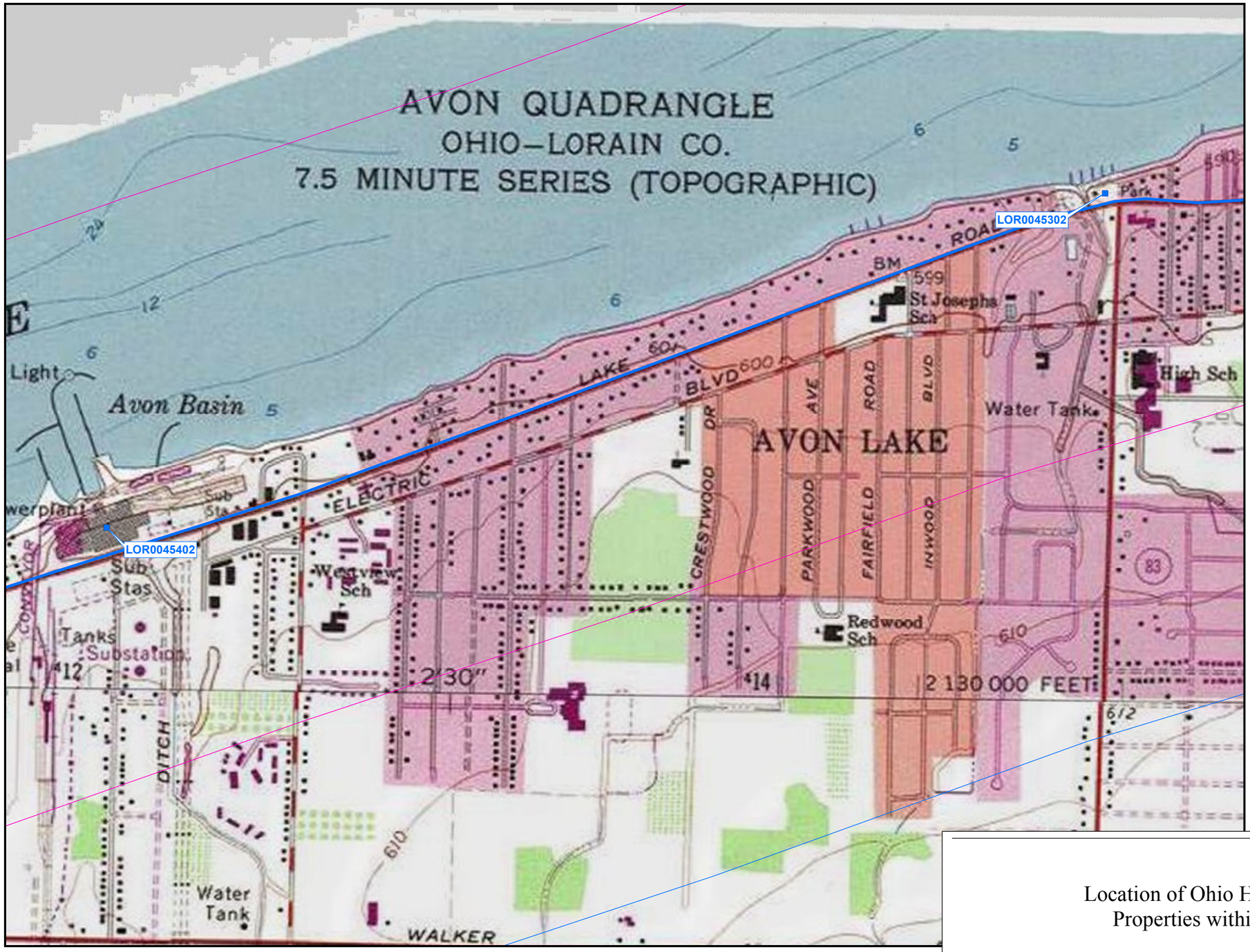
0 0.1 0.2 Miles

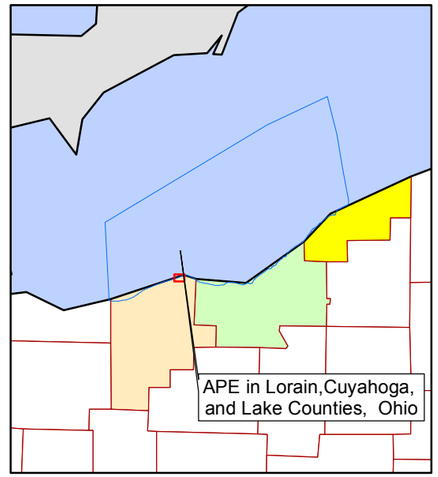
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-14





LEGEND

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- OHI Properties (n=478)

0 0.25 0.5 Kilometers

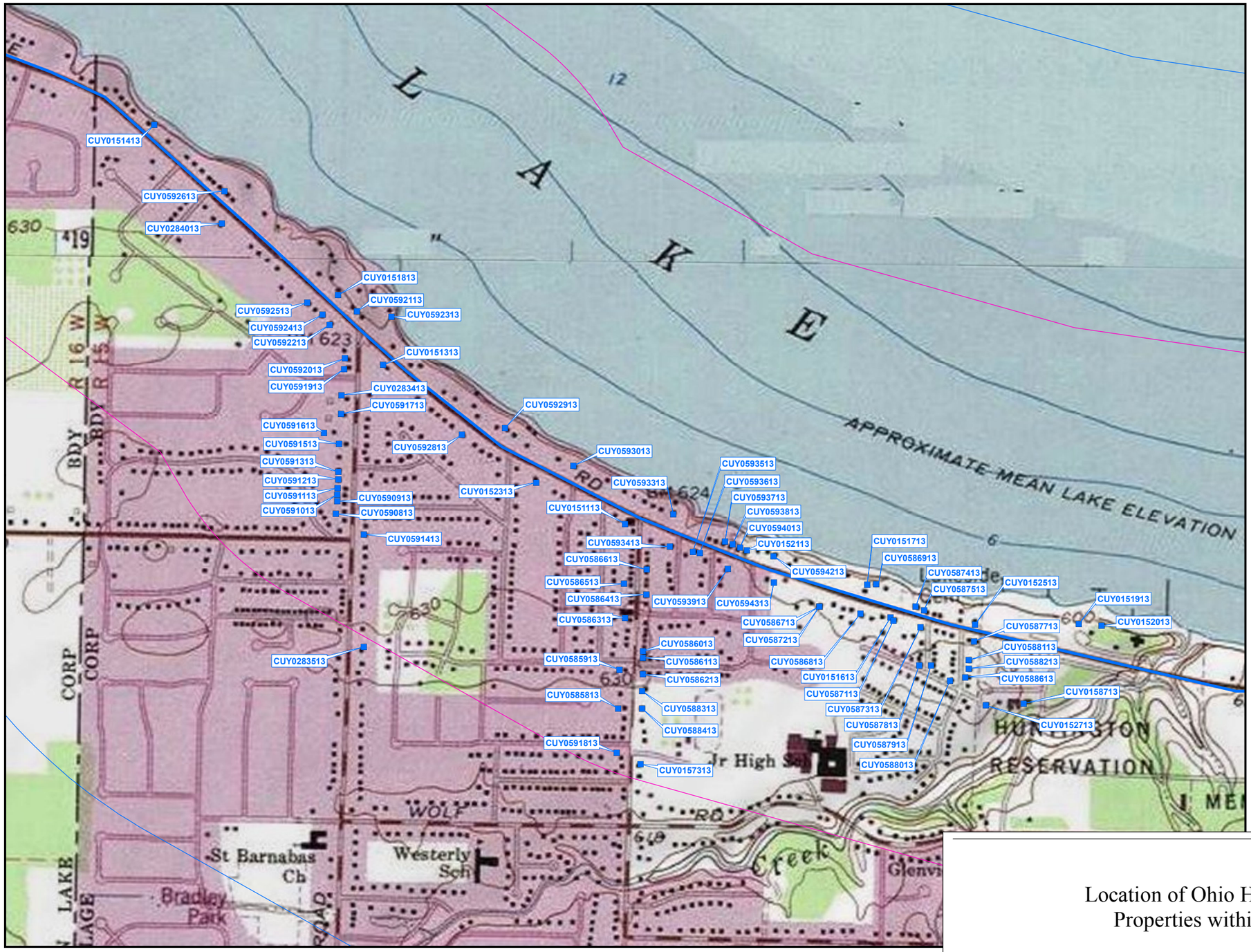
0 0.1 0.2 Miles

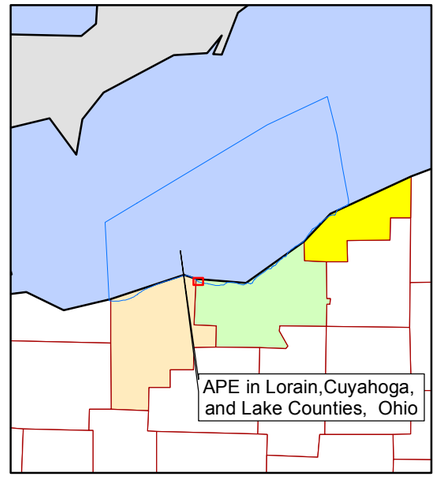
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-15





LEGEND

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- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

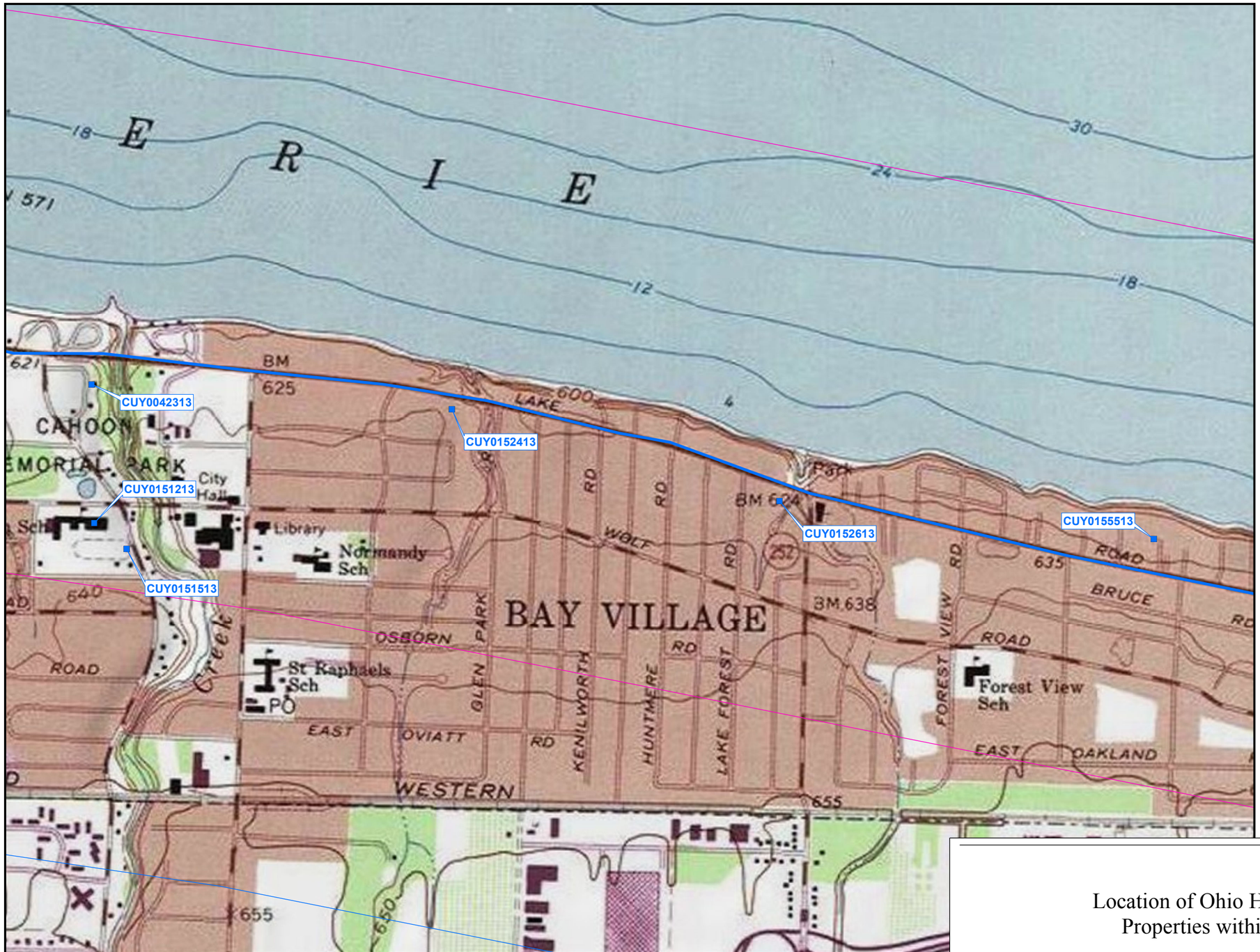
0 0.1 0.2 Miles

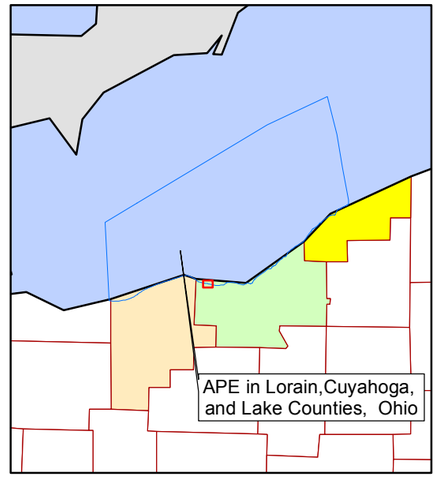
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-16





LEGEND

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- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

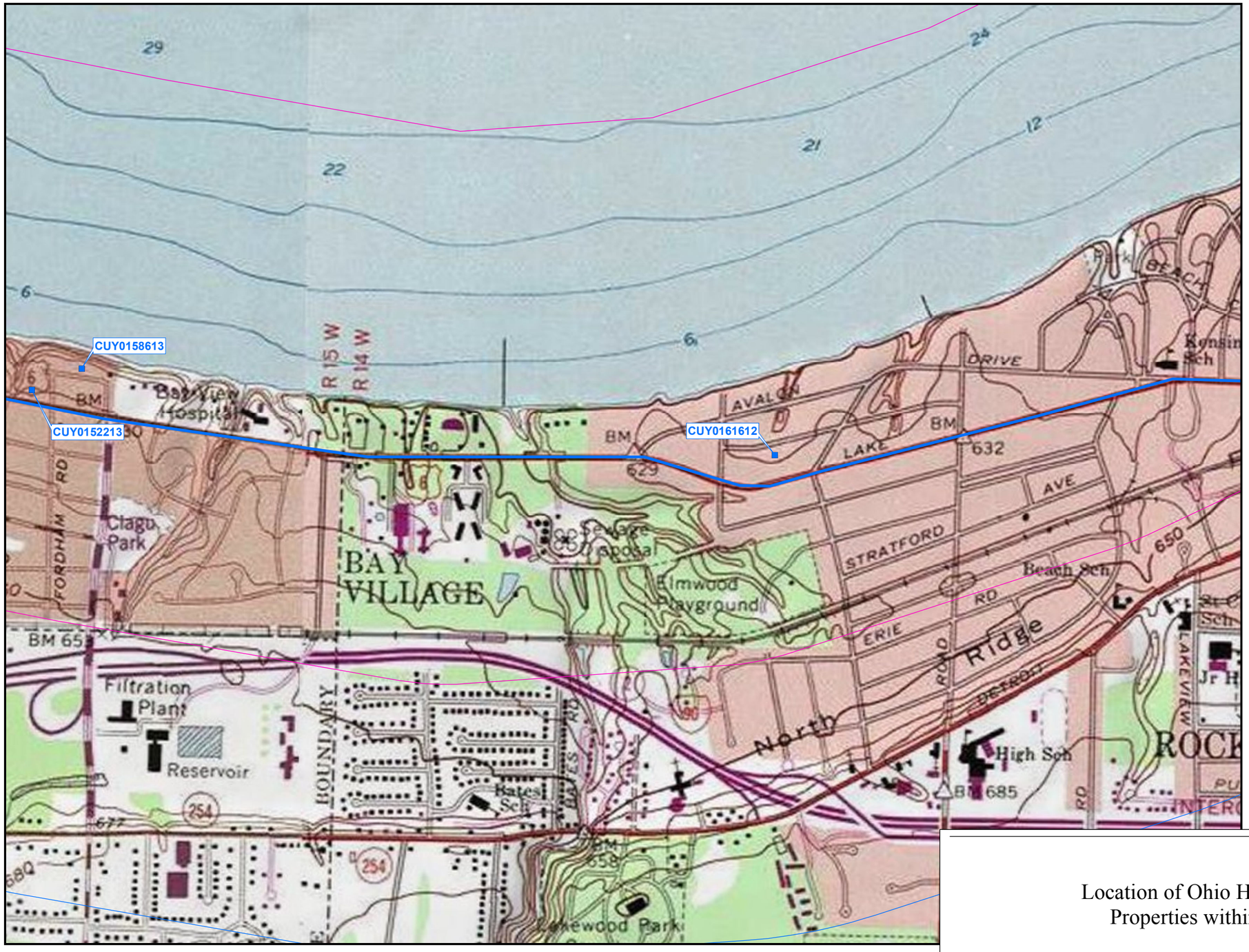
0 0.1 0.2 Miles

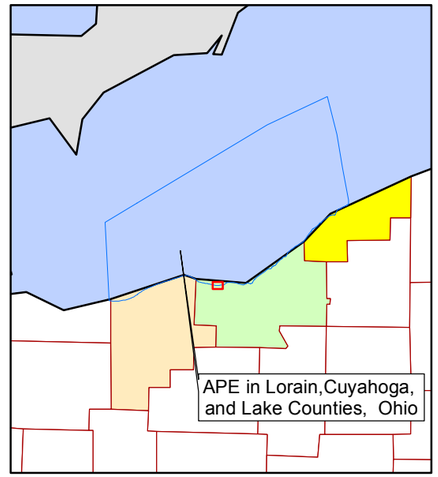
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-17





LEGEND

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- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

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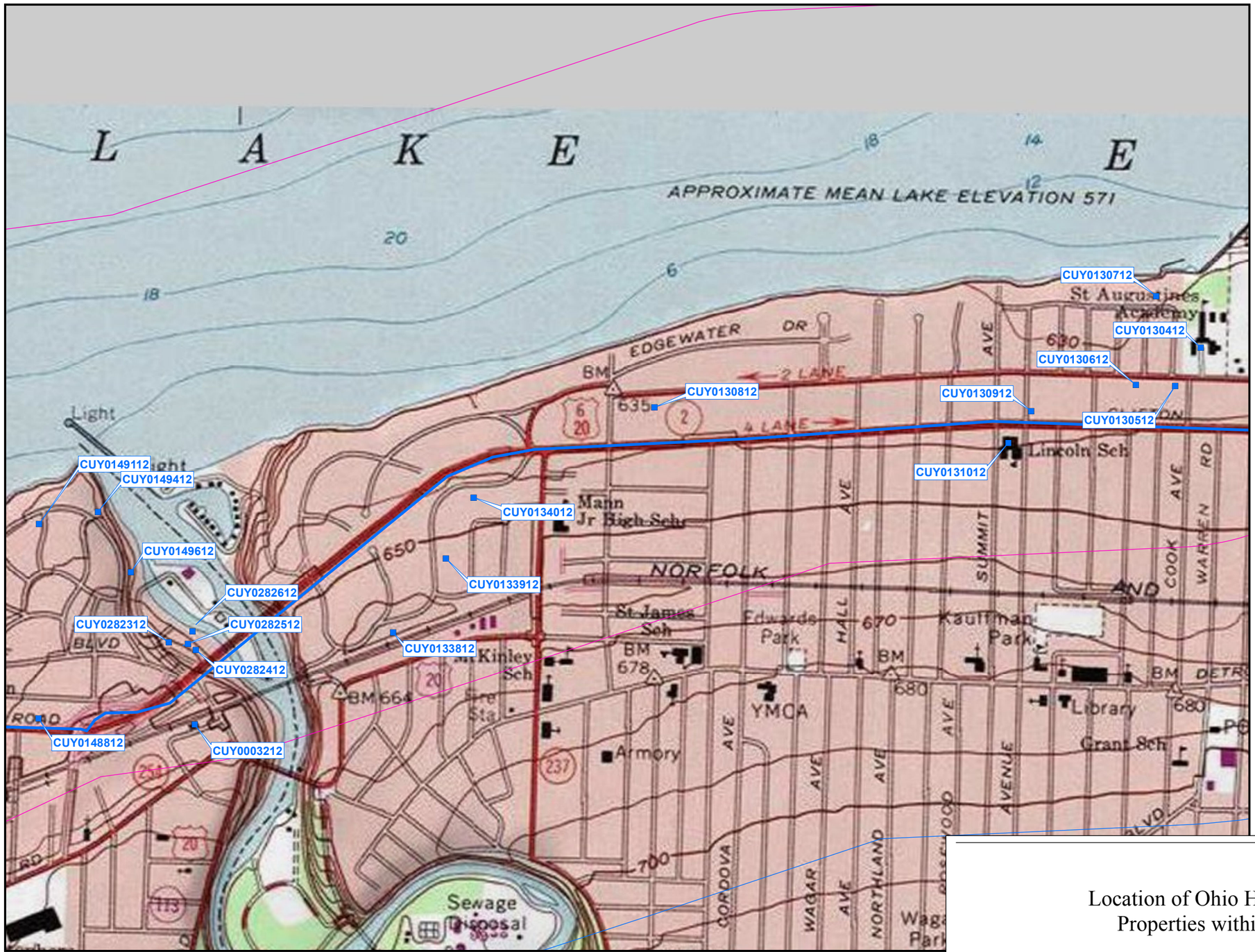
0 0.1 0.2 Miles

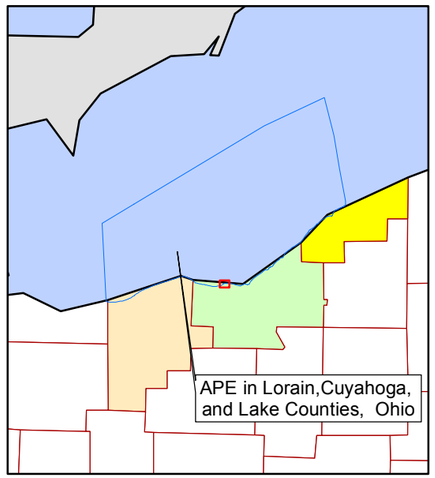
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-18





LEGEND

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- OHI Properties (n=478)

0 0.25 0.5 Kilometers

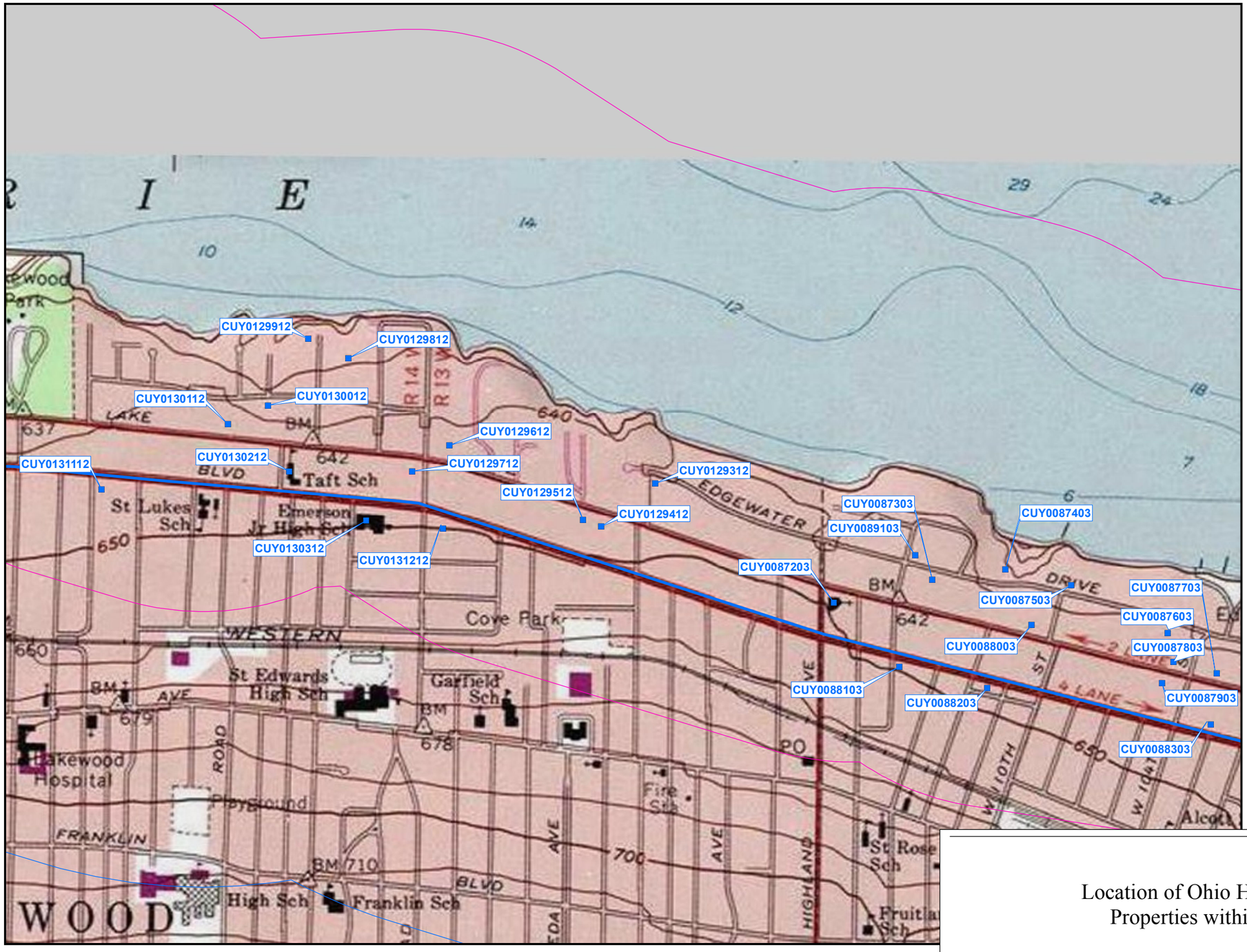
0 0.1 0.2 Miles

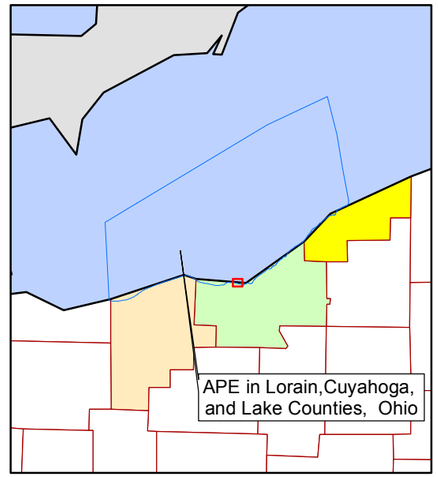
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-19





LEGEND

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- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

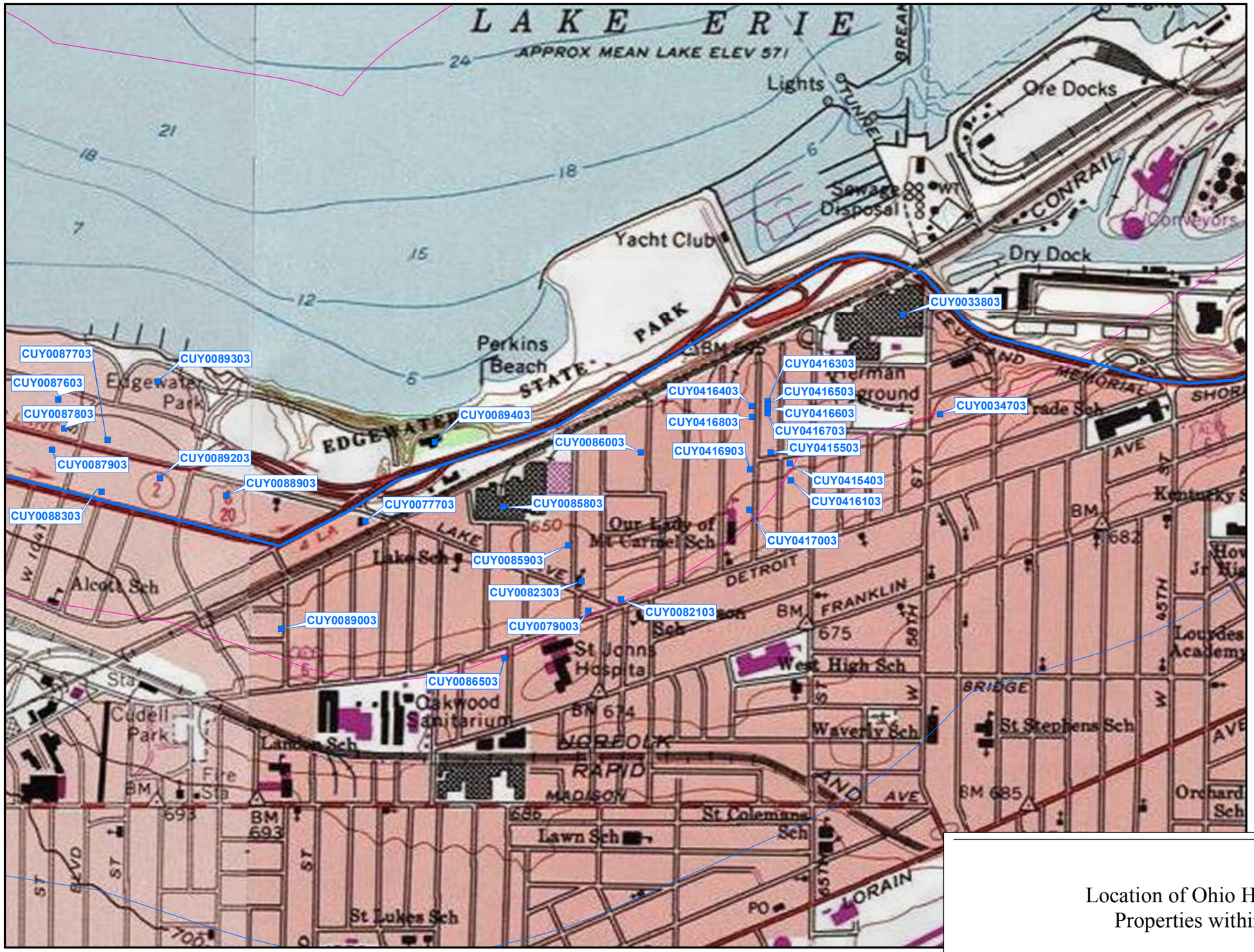
0 0.1 0.2 Miles

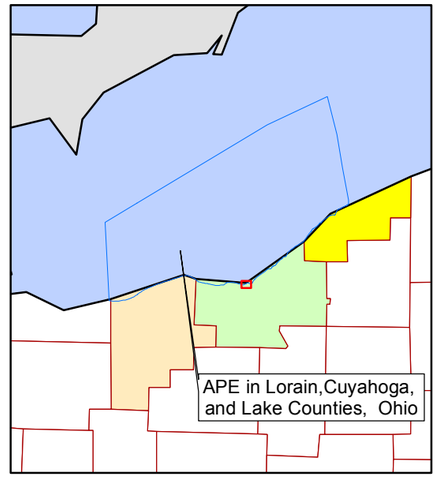
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-20





LEGEND

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- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

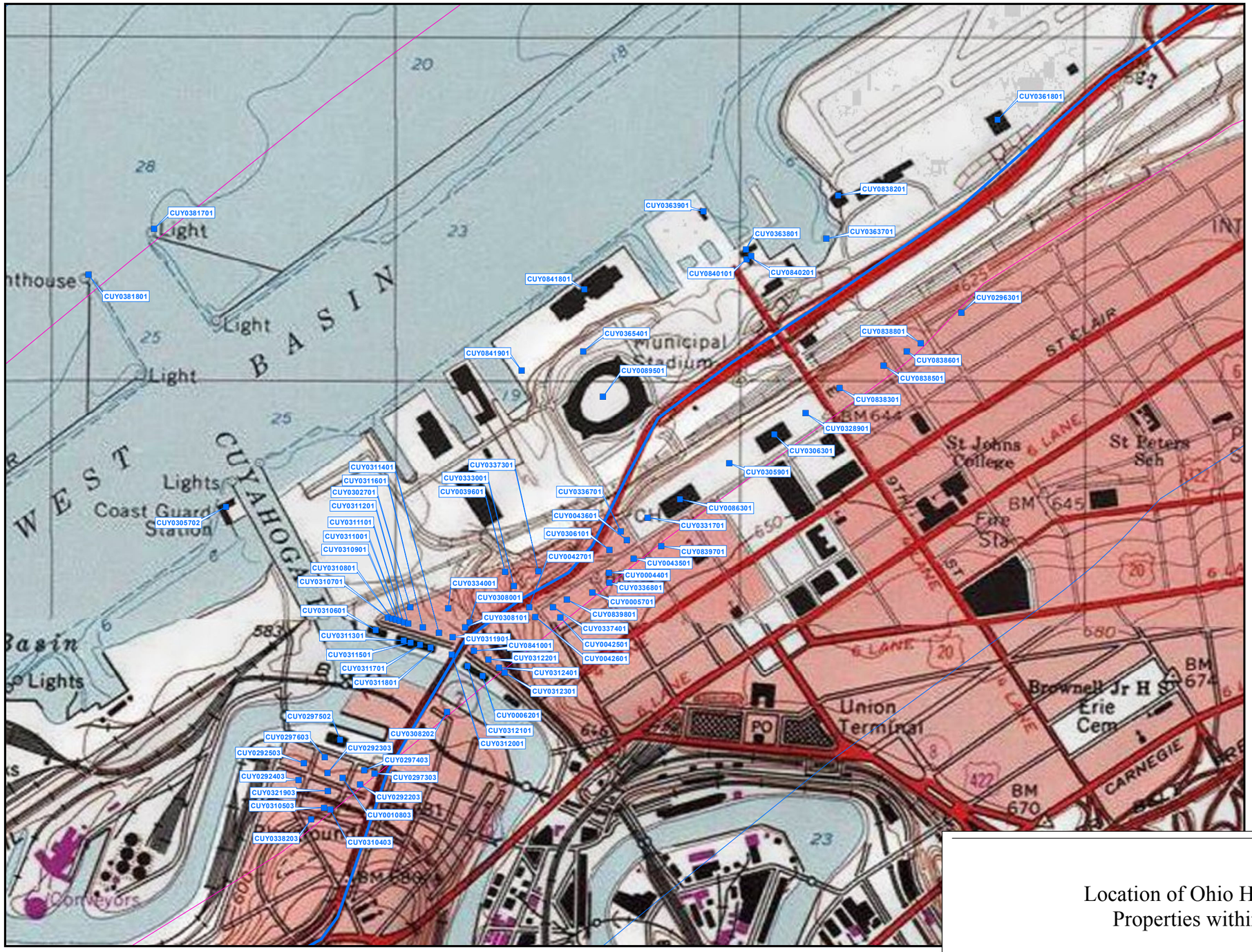
0 0.1 0.2 Miles

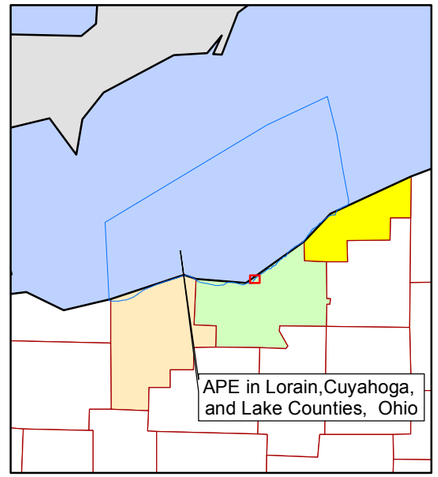
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-21





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

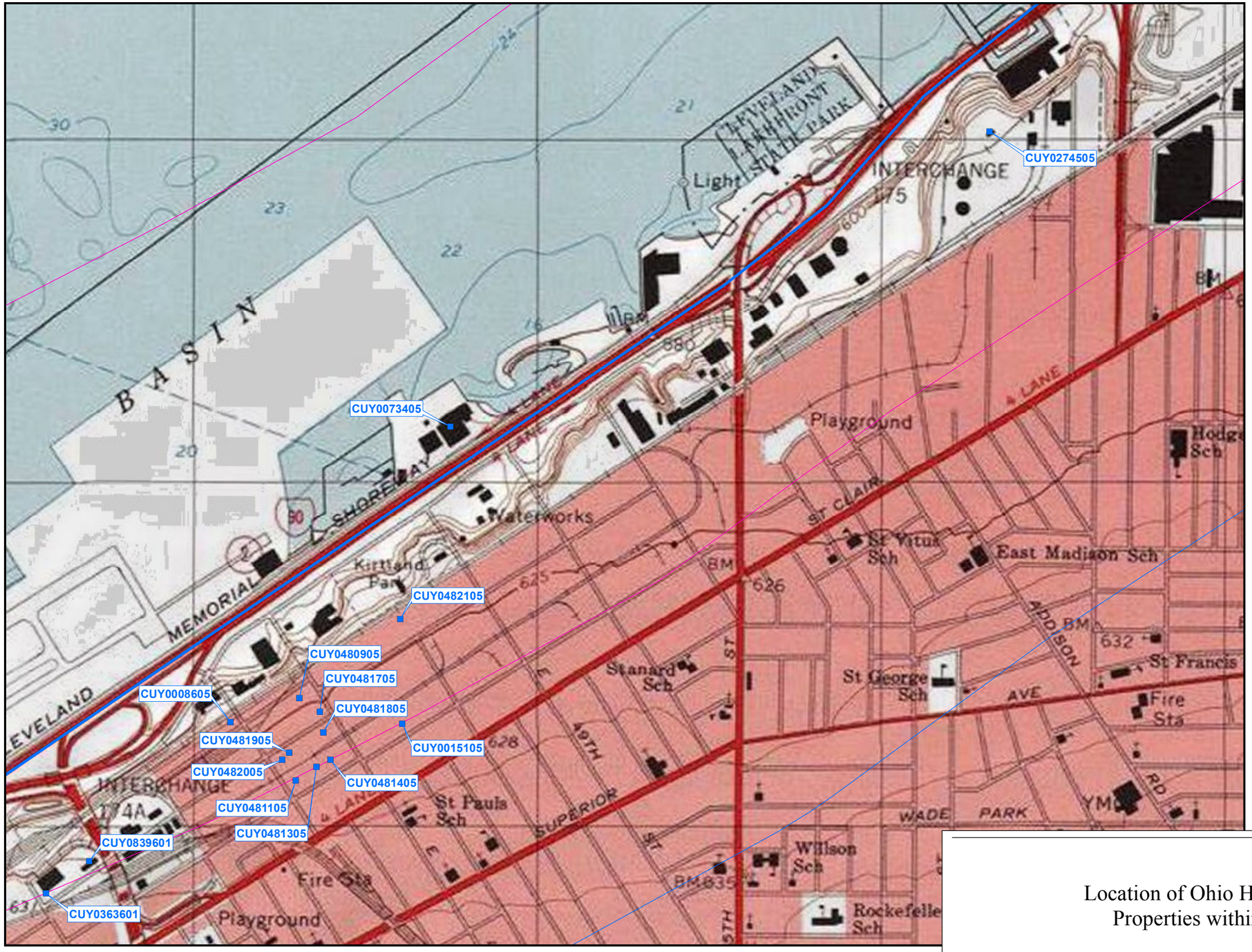
0 0.1 0.2 Miles

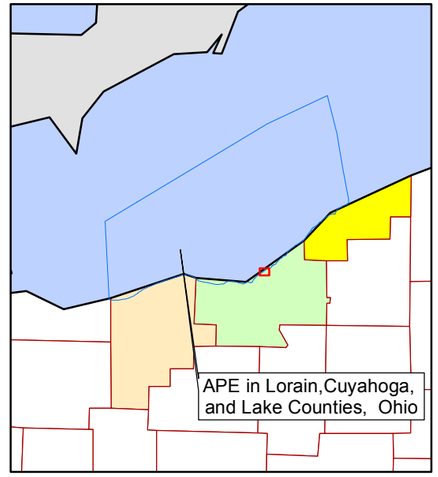
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-22





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

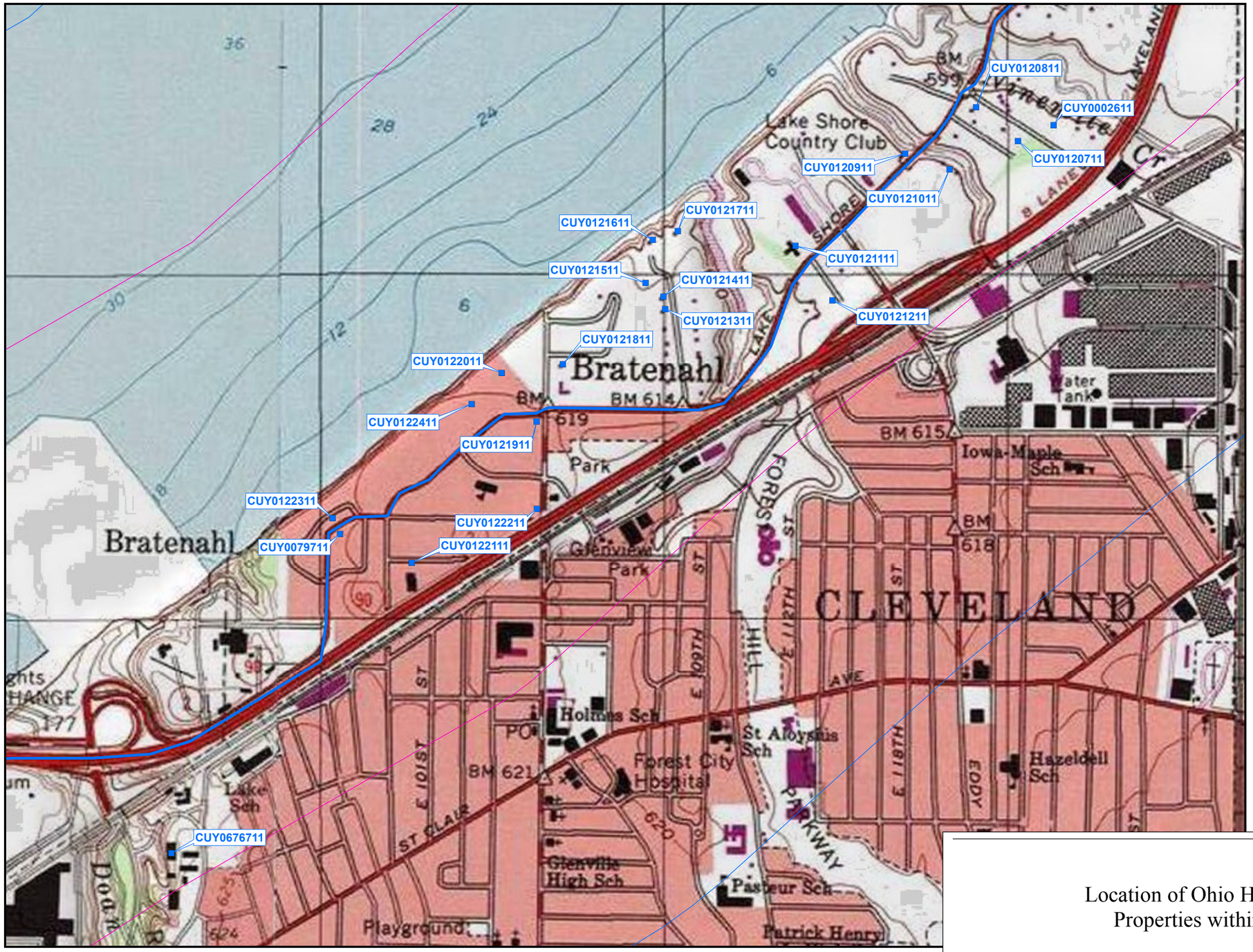
0 0.1 0.2 Miles

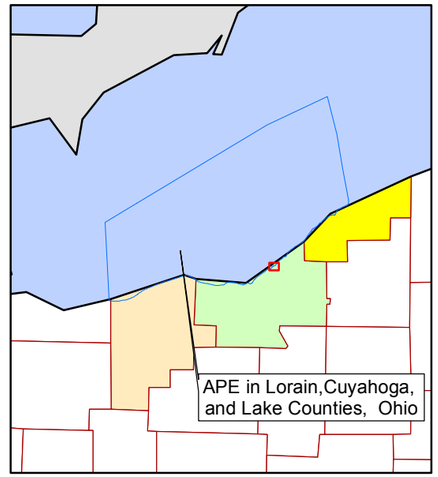
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY · HISTORY · HISTORIC PRESERVATION

Figure 3-23





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

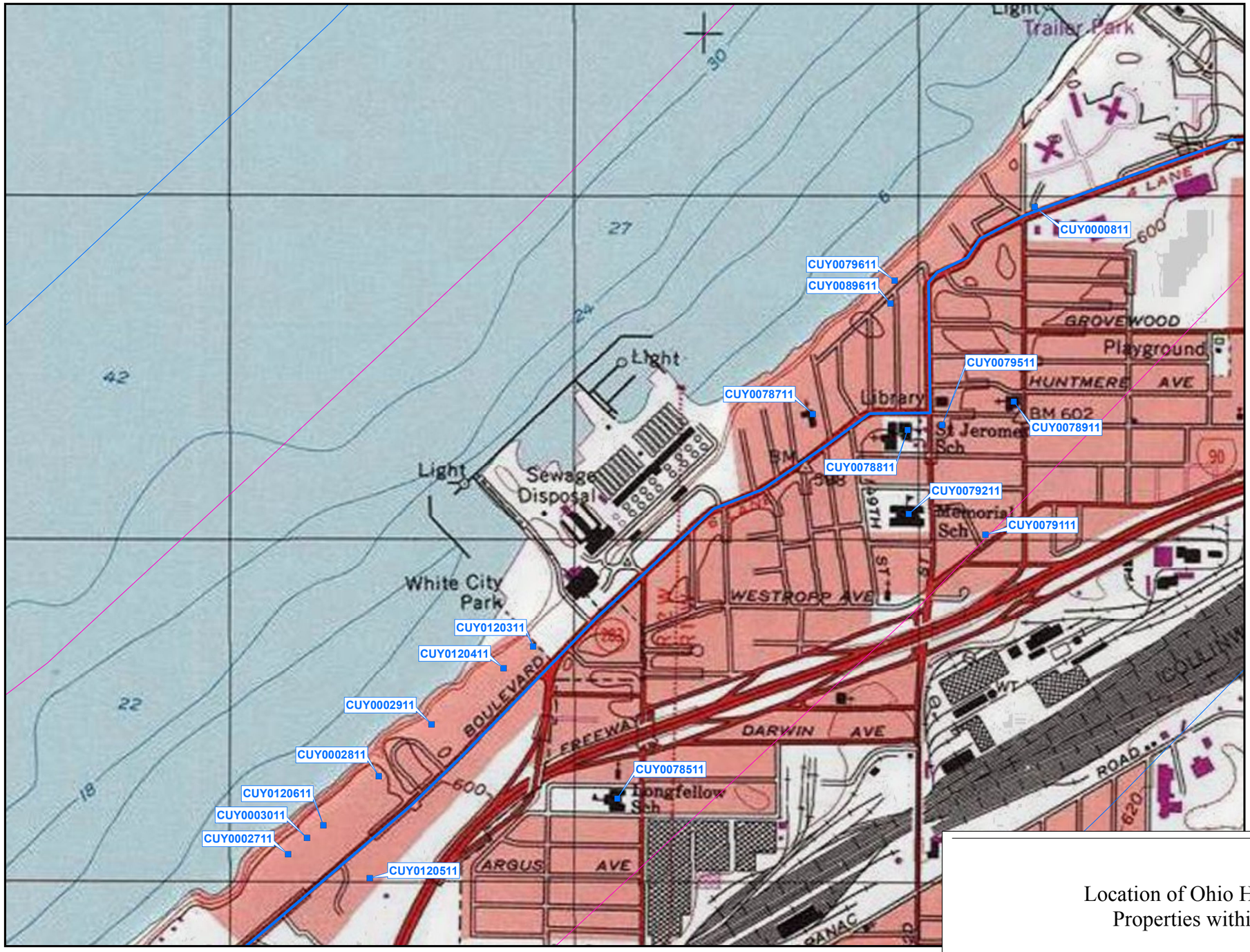
0 0.1 0.2 Miles

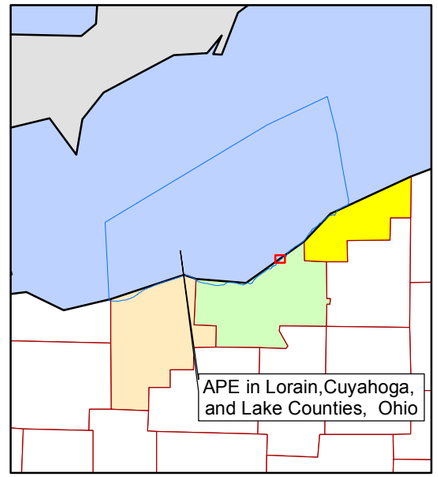
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-24





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

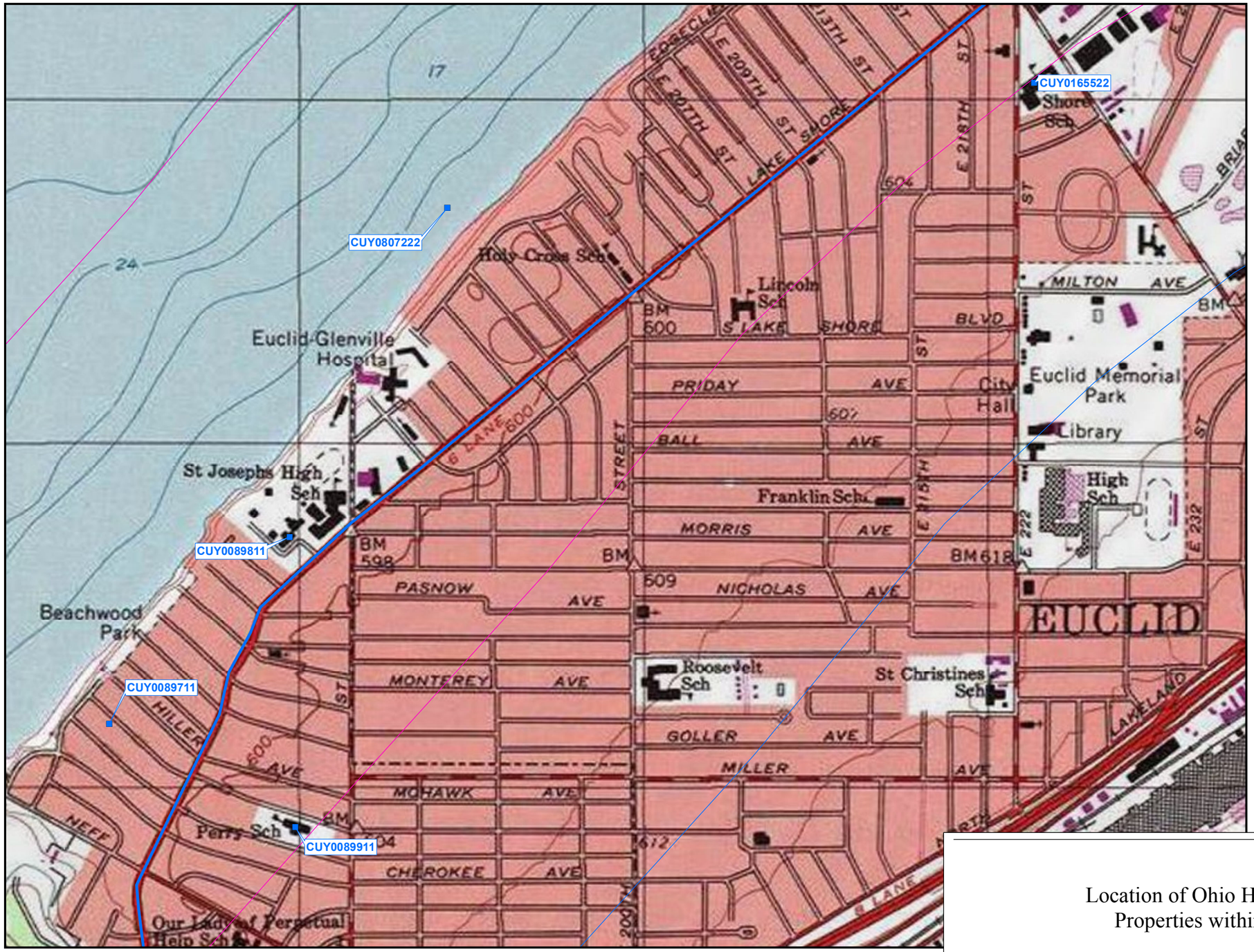
0 0.1 0.2 Miles

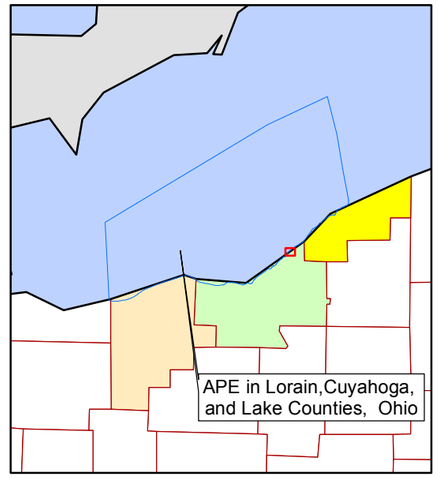
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-25





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

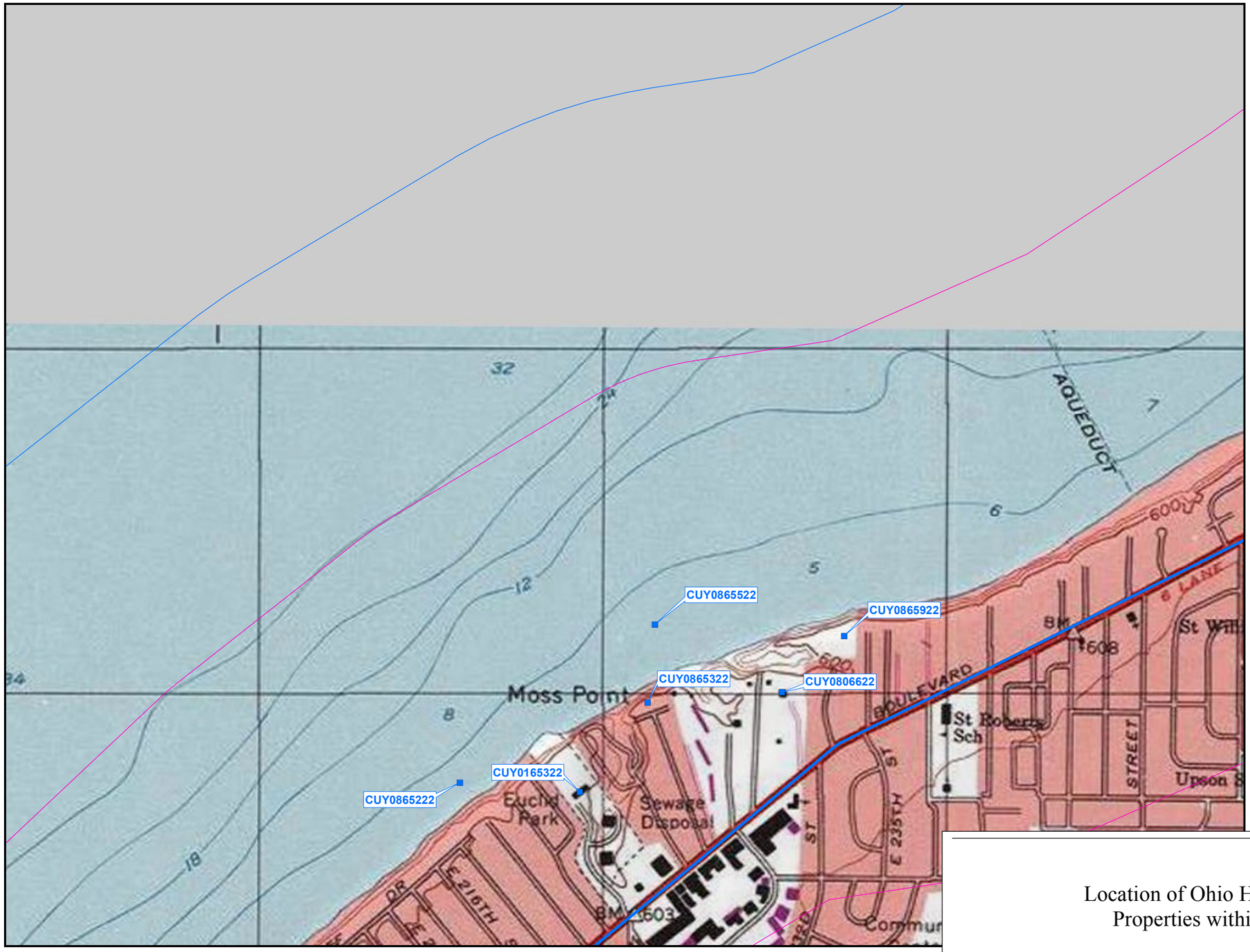
0 0.1 0.2 Miles

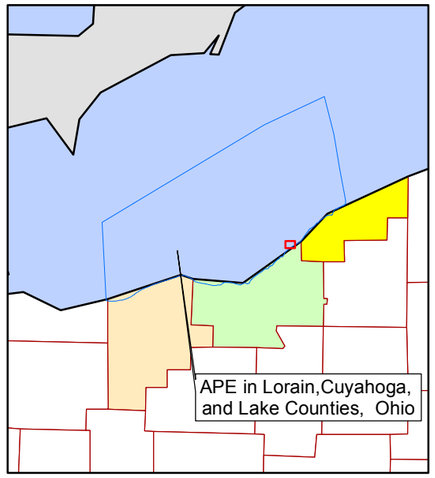
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-26





LEGEND

- APE Boundary
- Study Area (1-mi./1.6-km)
- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

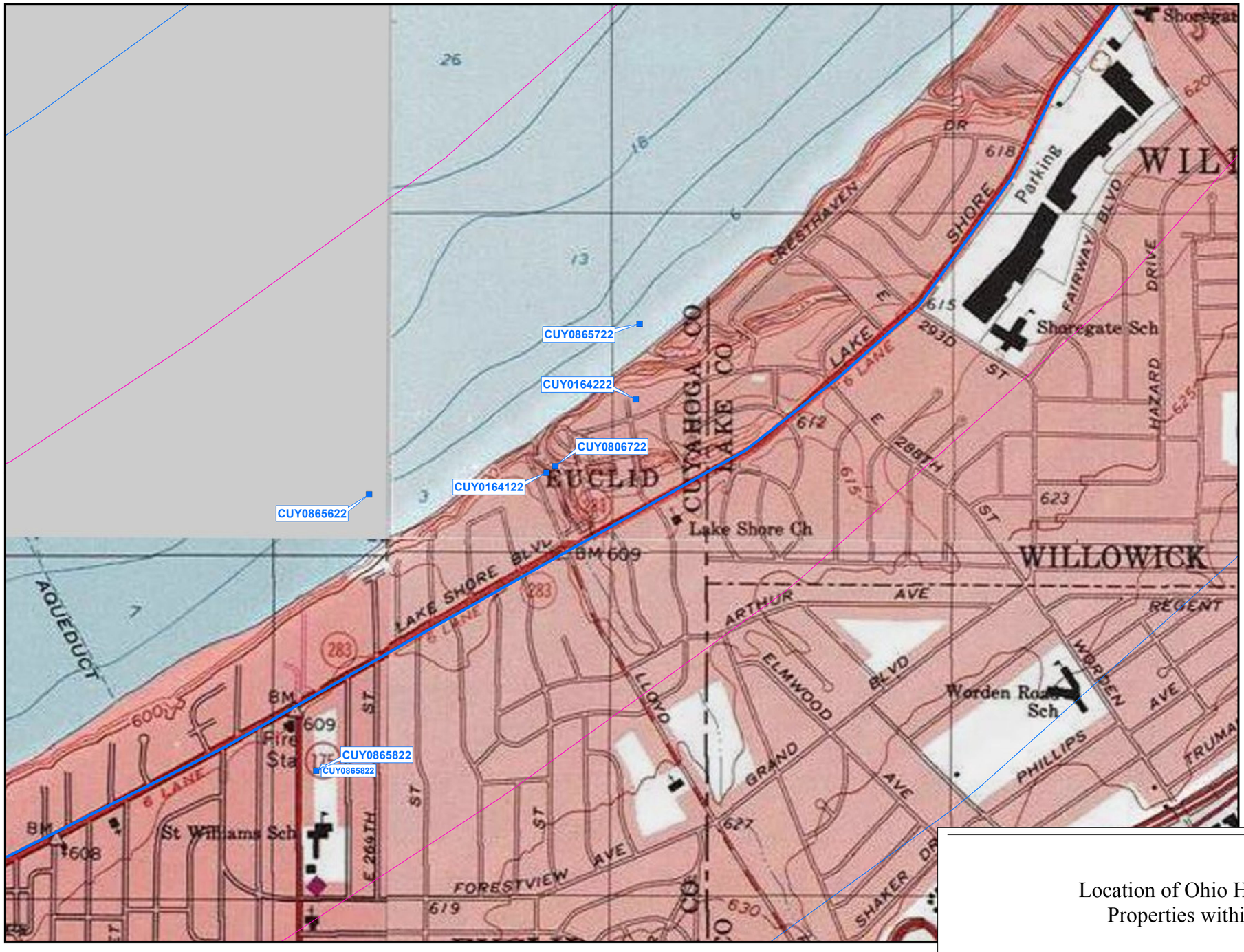
0 0.1 0.2 Miles

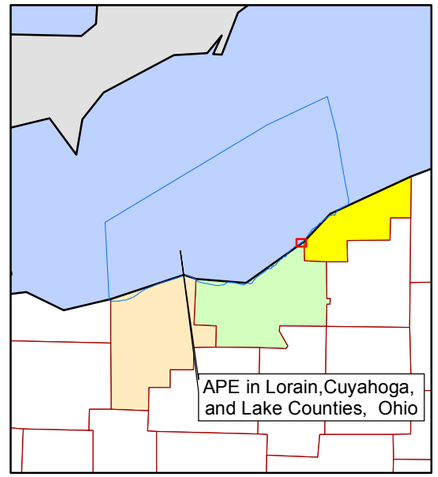
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-27





LEGEND

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- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

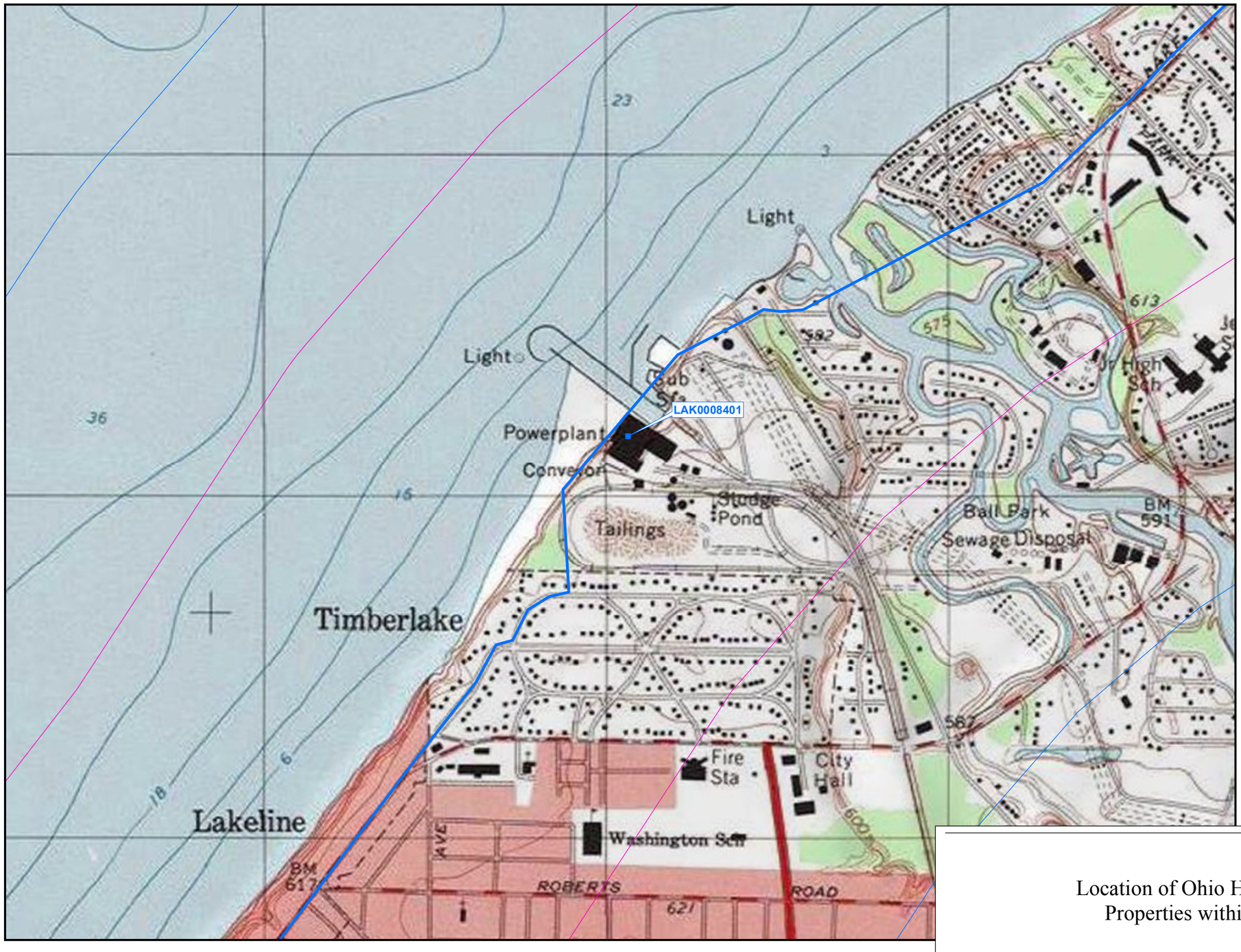
0 0.1 0.2 Miles

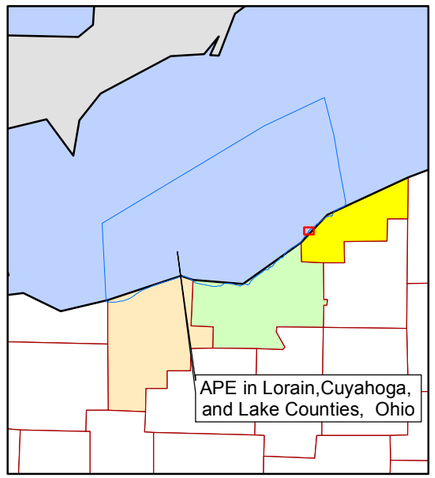
N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-28





LEGEND

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- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

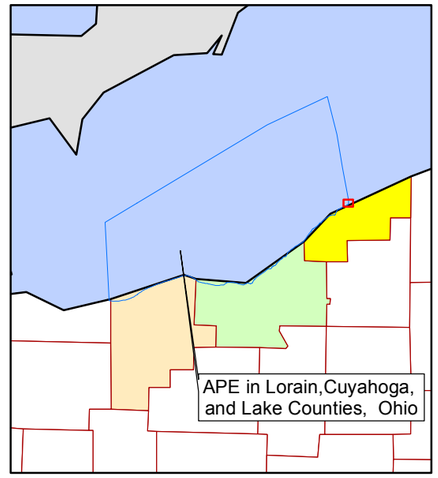
0 0.1 0.2 Miles

N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-29



LEGEND

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- Alternate Study Area (0.5-mi./0.8-km)
- OHI Properties (n=478)

0 0.25 0.5 Kilometers

0 0.1 0.2 Miles

N W E S

Location of Ohio Historical Inventory Properties within the Study Area

GRAY & PAPE, INC.
ARCHAEOLOGY - HISTORY - HISTORIC PRESERVATION

Figure 3-30

3.3 Potential for Submerged Prehistoric Archaeology

Locating prehistoric sites underwater may seem like a theoretical challenge and a practical impossibility. This line of thought would be mistaken. Predictive modeling of sites on land is a common and accepted practice for terrestrial archaeology. The same techniques can be employed offshore with adequate knowledge of the postglacial sea/lake level rises and falls, prehistoric settlement/use patterns on adjacent landforms, and local aquatic conditions.

3.3.1 Previous Research in Submerged Prehistoric Archaeology

Numerous submerged prehistoric sites have been located throughout North America, from New England, to the Great Lakes, to the Gulf of Mexico and the Pacific coast. Over twenty submerged prehistoric sites have been identified in the Southern New England area. Many of the archaeological examples of this region were recovered by fishermen, by dredging, or by other marine resource extraction and construction activities. Although removed from their archeological context at depths from mean sea level to 196.9 feet (60 m) below sea level, these archaeological finds represent cultural periods from Paleoindian through Woodland. One site off of Maine that was originally located by scallop dredgers was later examined by archaeological divers. Numerous artifacts, from 25 feet (7.6 m) below the surface, dated to the Middle Archaic Period, and it was presumed the site environment at that time was located on a small cove near a fresh water spring (Merwin et al. 2003). Numerous other sites from the intertidal region to the continuously submerged region have been recognized or intuited through archaeological investigations. Like southern New England there is a paucity of Early and Middle Archaic sites in northern Ohio. However, many areas of potential habitation, with ready access to water resources have likely been inundated since the retreat of the glaciers at the end of the Pleistocene Epoch (i.e., the Ice Age) and the creation of Lake Erie during the Holocene Epoch. Thus sites that date to this time in the recent geologic past may be submerged and/or disturbed and are not easily identified.

Rather than finds along shore in the intertidal zone or chance finds from fishing nets, some archaeologists have created predictive models and have located submerged prehistoric sites using these models. During the early Holocene Epoch, “It is more than probable that any paleolandscapes exposed during those times were known to, and exploited by, people” (Faught and Gusick 2011). Predictive modeling of sites based on characterizing submerged landscapes to identify high probability areas for cultural occupation has been successfully used in several contexts. For example, select portions of the Gulf coast of Florida were examined using a predictive model for archaeological site patterning that existed on adjacent shores and for environmental factors that would encourage sedimentary preservation (e.g., a low-energy marine environment). Based on this predictive modeling over 310 miles (500 km) of survey lines were examined, which resulted in the detailed investigation of 52 locations of which 36 (70%) provided positive evidence of preserved cultural materials. Additionally Faught and Gusick were able to use simple survey techniques off the island of Espiritu Santo, Bahia Ballena, in the Gulf of California to locate possible paleofeatures with the potential to be prehistoric habitation sites (Faught and Gusick 2011). Although definitive evidence of cultural material has not been positively confirmed in this case, modeling has shown that possible submerged paleofeatures can be identified even when these features are located in areas with turbulent seas. With appropriate knowledge, proper environmental

conditions for preservation, and appropriate modeling techniques, it has been shown that submerged prehistoric sites can be located and identified.

Locating submerged landforms that have high potential for archaeological sites in an oceanic context is similar to methods and techniques that would be required to locate submerged landforms in the Great Lakes. However it must be recognized that the Great Lakes have a relatively complex and dynamic postglacial water level history, caused by the lakes' location near the the margins of the melting glaciers and by the isostatic rebound of the land surface following the final retreat of the glaciers. Locating the right conditions to make informed observations of the data observed is important. A study conducted by O'Shea and Meadows focused on the paleolandscape of the low-water phase of Lake Stanley (11,850-5,500 B.C.) formerly located in the present Lake Huron Basin. Using side-scan sonar, remotely operated vehicles, and diving by archaeologists, two areas were investigated at depths between 39.4 and 492.1 feet (12 and 150 m). Certain landforms along the once exposed and now submerged Alpena-Amberley ridge (near Lake Stanley) were identified as being located in an area of low sedimentation (a proper environment for preservation). Under such conditions landforms such as rock outcrops with the potential for habitation sites and other features indicative of prehistoric structures were potentially identified.

It is theorized that during the Paleoindian Period the Lake Stanley area would have had an environment similar to the high arctic of today. Ethnographic observations in the Arctic region indicate manmade features on the landscape used for herding and hunting reindeer are similar to features located on the once exposed Alpena-Amberley ridge. Several paleofeatures were intuited through the observations including a caribou channeling structure approximately 1,150 feet (350 m) long, a potential hunting blind, dwelling or tent rings, and a prehistoric water course. Under the right conditions (e.g., low or no sedimentation) these features could be observed. More detailed observations were hampered by a cover of mussels and algae. More study is required to confirm the observations and indicate small finds, however many of the sites are located at depths between 65.6 and 131.2 feet (20 - 40 m) and are within reach of archaeologists using diving equipment (O'Shea and Meadows 2009).

3.3.2 History of Lake Erie

Northern Ohio has been modified by the advances and retreat of the glaciers during Pleistocene Epoch (i.e., Ice Age) and by the dynamic growth and contraction of Lake Erie since the end of the Ice Age. Along the south shore of Lake Erie, the nearly flat Lake Erie Plain and Maumee Lake Plains hug the shore from Buffalo in the east to beyond Toledo in the west. The Glaciated Allegheny Plateau, an ice-scoured portion of the western foothills of the Appalachian Mountains starts south and east of Cleveland.

Although (modern) Lake Erie may look like a permanent feature on the landscape, its level (or stage) has fluctuated since its inception approximately 10,000 BC (i.e, early Lake Erie). Today the water datum for navigation on Lake Erie is set at 569 feet (173.5 m) above mean sea level. The annual average fluctuation of the surface of the lake is approximately 1 foot (0.3 m), however extreme events have been recorded where the lake's level has been 1.1 feet (0.34 m) below to 5.1 feet (1.6 m) above datum (NOAA 2005a). During the period of potential human habitation (i.e., the last 12,000 years [or from 10,000 BC to the present]) the

lake has changed its boundaries and configuration in a radical manner. The potential habitation date coincides with the retreat of the last of the Wisconsinan stage glaciers out of the Lake Erie Basin (10,000 BC). All evidence of habitation prior to this period would have been destroyed by glacial action.

The basin for Lake Erie was formed as the Erie Lobe of the Laurentide ice sheets advanced and retreated into the area during the Pleistocene Epoch, eroding the pre-existing bedrock and soil and deepening and widening a pre-existing river valley (ODNR 2009a). Therefore, the present-day topography of the lake bottom is the result of the cumulative effect of the repeated erosion by glacial ice and the repeated deposition of the products of this erosion. This movement of glacial ice left a widespread deposit of till on top of the eroded bedrock in the basin. The existing topography of the lake bed is essentially what was left following the most recent retreat of the ice sheets out of the basin but with significant modifications occurring in postglacial (Holocene) time (Holcombe et al. 2005). According to Holcombe et al. (2005), these postglacial modifications include: (1) shoreline erosion and the deposition of eroded sand and gravel as beaches, bars, and spits; (2) preferential deposition of eroded finer-grained sediment in the deeper parts of the lake; (3) secondary sculpting of the existing deposits by lake water currents; and (4) anthropogenic disturbances (e.g., dredging and dumping of spoils).

Charles Herdendorf (2013) states that the lakes that have occupied Lake Erie Basin since the end of the Pleistocene Epoch can be grouped into three phases. Herdendorf further notes that the oldest phase, from approximately 12,400 to 10,000 BC, had proglacial lakes associated with glaciers retreating from the basin and were higher than present (i.e., modern) Lake Erie. The middle phase, from approximately 10,000 to 2,700 BC, had lake stages (referred to as early and middle Lake Erie) isolated from Upper Great Lakes drainage during a dryer climatic period and were below the present level of Lake Erie (Herdendorf 2013). The last phase (modern Lake Erie), from approximately 2,700 BC to the present, the Lake Erie Basin received drainage from the Upper Great Lakes and the water level rose to a slightly higher stage before establishment of Lake Erie's present stage through the erosion of the Niagara River Outlet (Herdendorf 2013).

During the oldest phase, proglacial lakes (e.g., Lake Maumee) formed in the Lake Erie Basin adjacent to the Erie Lobe as the ice sheet began to withdraw from the basin approximately 14,000 years ago (Fuller 1996). Proglacial lakes occupied the Lake Erie Basin until approximately 12,000 years ago (10,000 B.C.) when the Erie Lobe completely withdrew from the basin (Fuller 1996). Sedimentary deposits associated with the proglacial lakes can be found in the basin. These glaciolacustrine sedimentary deposits include a laminated silt and clay unit deposited near the retreating glacial front and a massive clay unit deposited in the more distal reaches of the proglacial lakes (Fuller 1996). These Pleistocene glaciolacustrine sediments were deposited on the glacial till mantling bedrock or directly on bedrock and are relatively limited in aerial extent.

Lake Erie (i.e., Early Lake Erie, Middle Lake Erie, and Modern Lake Erie) is a relatively young lake formed in Holocene (or recent) time after the final withdrawal of the Erie Lobe from the Lake Erie Basin (approximately 12,000 years ago [10,000 B.C.]). The level of Lake Erie in postglacial time has been controlled primarily by the isostatically rebounding outlet

sills of the Niagara River (Holcombe et al 2003) and by the amount of water entering its basin. The earlier, lower postglacial lake stages began with Early Lake Erie which formed after the lake outlet that drained across the isostatically depressed Niagara Escarpment at Buffalo and into the Lake Ontario Basin had been opened by the final retreat of the glacial ice (Fuller 1996). In general, lake levels have increased as the elevation of the outlet rebounded. In addition, a large rise in lake level occurred in mid-Holocene time (estimated to have occurred 3,600 years ago to 4,600 years ago) when the discharge from the Upper Great Lakes was diverted to Lake Erie. The bottom of Lake Erie is mantled by features indicative of the earlier, lower lake levels (e.g., the Pelee-Lorain Ridge, a drowned spit site deposited on a moranic ridge [Holcombe et al 2003]).

The exact nature of recent lake bottom deposits in the Central Basin of Lake Erie are poorly understood. Recent (i.e., Holocene or postglacial) sedimentation in the basin includes sediment transported into the lake by inflowing streams and rivers and sediment derived from the shoreline erosion of bluff material. This sediment is composed of sand, sand and gravel, mud (i.e., silt, clay, and mud), and sandy mud. This includes approximately 4 million tons of clay, silt, and sand transported annually into the lake from its tributaries and approximately 8 million tons of material delivered annually to the lake from shoreline erosion. This sediment is deposited in the Central Basin of Lake Erie on Devonian-age bedrock (e.g., the Ohio Shale Formation), Pleistocene-age glacial till, and/or the Pleistocene-age glaciolacustrine sediment (where present).

It has been estimated that postglacial muds (i.e., silt, clay, and organic matter) have accumulated in thicknesses exceeding 30 feet (10 m) in the Western Basin and the Sandusky sub-basin, 60 feet (20 m) in the Central Basin, and 120 feet (40 m) or more in the Eastern Basin (Thomas et al. 1976); with the greatest thicknesses concentrated in the deepest parts of the original postglacial topographic surface (Holcombe 2005:14) In his discussion of erosional process on the lake, Sly (1976) states that “The character of the lake basin remains extremely responsive to the modifying processes of sediment erosion-transportation and deposition, and it is estimated that the average maximum rate of mud accumulation, during the last 12,000 yr, has been about 0.03, 0.19, and 0.3 cm/yr.” Additionally, today’s rates are higher than long-term averaged values as portions of the lake basin were exposed and not submerged in the past. Shoreline erosion rates of up to 5 feet per year (1.5 m/yr) were possible during periods of water level stability. At present, only a few coring or geophysical studies of the specific nature of lake bottom deposits in the area represented by the APE are available to the public. These studies are summarized in the report entitled *Environmental Assessment Project Icebreaker*, prepared by ENVIRON International Corporation and dated December 2013.

3.3.3 Potential to Locate Prehistoric Sites in the Lake Erie Study Area

Locating prehistoric submerged sites was once considered like finding ‘Needles in Haystacks’ (Faught and Flemming 2008). However with advancements in geophysical remote sensing equipment as well as advances in theoretical (e.g., predictive modeling) and practical approaches by numerous archaeologists, inundated prehistoric sites and materials have been located from all four of the United States’ coasts; Atlantic, Gulf, Pacific, and Great Lakes. For Icebreaker, there are several sources of information that allow us to infer the

archaeological potential of the offshore sediment and submerged landforms including regional scale studies on the lake floor geomorphology and sedimentation processes within Lake Erie (Herdendorf 1971; Kemp et al. 1977; Holcombe et al. 1997, 2005). For example, the Port of Cleveland is located along a relatively straight portion of Lake Erie shoreline. This area is dominated by the Cuyahoga River which is the largest fluvial source of sediment (mean discharge = 800 cubic feet per second) to the Central Basin of the lake (Herdendorf 1971). Immediately northeast of the mouth of the Cuyahoga River is a submerged feature called the Cleveland Ridge. This submerged feature is described as a broad, lake bottom platform with two large terraces. The feature has been interpreted to represent either a glacial moraine (formed during the last Ice Age) or a deltaic deposit formed during a lower lake stage and attributed to the Cuyahoga River (Holcombe et al., 2003). The Cleveland Ridge is a submerged feature (located in the APE) with the potential to be prehistoric habitation site (occupied during lower lake levels).

As noted above, the potential for locating cultural materials that reside on or in the lakebed of Lake Erie is a function of known habitation characteristics during the Paleoindian and Archaic periods as well as the environmental and climatic variables of the changing lake shoreline and sedimentation rates. The three major periods (i.e., oldest, middle, and last) of expansion and contraction in lake level and size since the retreat of the glaciers likely affected the possibility of human habitation in and around the various lake shorelines. Prior to the retreat of the glaciers the area was uninhabitable. Twelve-thousand years BC, humans were already inhabiting much of North America, and the region of northern Ohio was becoming habitable. Between 10,400 and 10,000 B.C., water levels in the Lake Erie basin changed from approximately 49 feet (15 m) above present lake level to approximately 177 feet (54 m) below present lake level. Due to various climatological and geologic processes (e.g., isostatic rebound of the land surface and erosion of outlets) the level of the water in the Lake Erie basin during the middle phase fluctuated but stayed lower than present levels from approximately 10,000 to 2,700 B.C. For most of the middle phase a large portion of the present APE would have been outside of the boundaries of the lake (i.e., it would be exposed land). Therefore, all or part of the area represented by the APE would have been potentially habitable, assuming appropriate climatic conditions. This date range coincides with the Paleoindian and the Early and Middle phases of the Archaic Period. At the end of the middle phase lake levels rose and have been at or above modern levels and habitation of the area represented by the APE would have been impossible.

Although it may seem that the presently inundated portions of the lake that were exposed during lower lake stages may have been habitable this may not be the case. During a large portion of the middle phase the Lake Erie Basin was closed, with no outflow. Under this condition the lake may have been stagnant and possibly eutrophic, and not able to sustain life. Additionally over time, the mineral content of the water may have risen as the only outlet was atmospheric evaporation. During this time period, native groups may have avoided the lake directly, but not its fresh water tributaries and potential activity or habitation sites may be located along the tributaries to early and middle Lake Erie. Additionally, any settlements along the shores of Lake Erie would be inhibited as the lake level began to rise at the end of the middle phase reaching a high water stage at the beginning of the last phase (modern Lake Erie) approximately 2,700 BC. The suggested stagnation period during the

middle phase and the dynamic and expanding shoreline boundaries during the end of the middle phase and the beginning of the last phase may have inhibited Paleoindian and Early Archaic peoples from establishing campsites along the shores of Lake Erie until the lake reached its postglacial maximum stage (581 feet above msl) approximately 2,700 B.C. However the context of prehistoric shoreline sites may have been disturbed through the dynamic process of lake level changes, shoreline winter ice flows, and wave energy being dispersed along the prehistoric shorelines. "It is apparent that shore erosion in the zone of high wave energy has been effective in altering and shaping the unconsolidated glacial drift and soft shales which characterize the Lake Erie shoreline (Holcombe et al. 2005:11)." Thus any prehistoric site established in presently submerged areas of the lake very likely would have been impacted by erosional forces of a rising lake during the formation of modern Lake Erie at the end of the middle phase and beginning of the last phase.

As noted above, it is possible that camps or other habitation sites may have been established in presently submerged portions of the Lake Erie Basin along the drowned rivers and streams valleys that flowed into basin during the lower lake levels of the middle phase (i.e., into early and middle Lake Erie). However, the configuration of the lower Cuyahoga River valley is problematic for identifying evidence of human activity. One would expect that the extension of the Cuyahoga River channel into the Lake Erie Basin during periods of low water levels would have left some trace. Onshore within 1.25 miles (2 km) of the modern Lake Erie shoreline the lower Cuyahoga River has eroded its channel 130 feet (40 meters) into glacial till in response to the lowered water level of early Lake Erie (Szabo et al. 2003). This paleochannel has subsequently filled with sediment. The paleochannel likely extended into the basin and is likely submerged by modern Lake Erie. However, previous studies of the nearshore area in the vicinity of Cleveland have not detected possible evidence of the paleochannel except near the Cleveland Ridge and, therefore, the precise location of the paleochannel is not yet known with certainty. Erosional and sedimentation processes would likely have affected prehistoric sites located along the tributaries discharging to the low-water lakes occupying the Lake Erie Basin during the lake's middle and last phase. Ultimately, erosion would have mixed and destroyed the context of any site while sediment deposition may have aided in preservation of a site by burying it under a layer of silt and clay.

In deeper portions of the lake, potential habitation sites would have been impacted by other lacustrine processes, including sedimentation. Postglacial modifications to Erie's lake-floor topography would have been consistent with those occurring within any large shallow lake. These modifications include the erosion of the shoreline and the deposition of the eroded sand and gravel (and similar coarse-grained material transported into the lake by its tributaries) as beaches, bars, and spits. The deposition of finer-grained sediments eroded from the shoreline and, brought into the lake by tributaries would cover preexisting deposits and landforms located further offshore. These sediments would undergo secondary sculpting after deposition by lake currents, and in shallower waters by wave action and winter ice flows (Holcombe et al. 2005).

Icebreaker includes the construction of six turbines and the installation of transmission cable. From the shoreward portion of the APE, horizontal directional drilling will be used to initiate

the cable lay. The drilling will take place underneath the modern harbor and past the outer harbor breakwater. Laying cable will proceed from there, where the waters are approximately 30 ft (9m) deep. Along the mouths of the rivers at the modern shoreline in the area represented by the proposed APE (including the Port of Cleveland) there is the potential to affect materials from the Paleoindian and the Early and Middle Archaic periods. However, any materials from those periods, if they existed in the APE, may have been previously disturbed by harbor construction and deepening activities. Therefore no material associated with late Archaic or after should be potentially affected.

Cable-laying by hydroplow will take place in waters approximately 30 feet (9 m) and deeper. Paleoindian sites present a very low archaeological profile across the landscape and are representative of areas where small groups of people would perform specific tasks of short duration. Additionally in northern Ohio, Stothers and Pratt (1980) note that Early and Middle Archaic sites are usually of two types: "those in which a single or a few points are included in a collection of material from other cultural periods, and those in which Early or Middle Archaic materials predominate." The later, mixed sites, would not be represented in the areas examined. The potential for locating Early and Middle Archaic sites beneath Holocene lake sediments with today's remote sensing technologies is a factor of sedimentation depths and relict landscapes. Features such as hidden outcrops that may indicate cultural use areas, have been covered by natural lake sedimentation processes. Therefore, it would be difficult or impossible to locate sites if they existed.

3.4 Potential for Submerged Historical Era Archaeological Sites

Submerged historical era archaeological sites are most commonly shipwrecks. This section provides a summary of the navigational history of Lake Erie, and a list of known obstructions, including shipwrecks, in the immediate vicinity of the ground-disturbing portions of the APE.

3.4.1 History of Navigation of Lake Erie

During the prehistoric period it is easily surmised the Native American populations along the shoreline of the Great Lakes and interior rivers were well familiar with watercraft. The four main type of prehistoric watercraft available for use in the Great Lakes region were rafts (wood or reed), skin boats, bark canoes, and log or dugout canoes (Greenhill 1976, Johnstone 1980). Unfortunately, due to the fragility of many of these objects and the environment in which they were used little direct physical evidence of skin boats, bark canoes, or reed craft is extant.

Ethnographic evidence and early historical accounts indicate that skin, dugout, and bark craft were used by natives of North America. The explorer Verrazzano, sailing for France during the 1520s, voyaged along the east coast of North American and described dugout canoes that the natives build by burning out the interior. To the north, off the coast of Canada, his French compatriot explorer, Cartier noted native watercraft on several occasions. Off the southern coast of Labrador he noted sea going boats made of birch bark, and in Chaleur Bay he encountered natives in forty or fifty canoes. Half a century later, in the 1580s, English

explorers on the outer banks of the Carolinas made contact with natives in dugout canoes, and to the north in the Arctic regions, Eskimos their skin kayaks (Morrison 1971). Some of the earliest exploration of the North American continent recorded three of the four basic types of watercraft used by native populations. Rafts, including reed bundled craft, seem not to be mentioned in the cold northern climates; however the Spanish mention the type in Central and South America. Just because they were not mentioned in these early accounts does not mean they were not used, but evidence of such craft would be fleeting as wet and soggy reeds or bundles of wood would not remain long before deteriorating or be worth mentioning if noticed.

There is however evidence of Native American watercraft that predates European contact. A pre-Columbian model raft, made of gold, was recovered from Lake Guatavita, Columbia (Johnstone 1988). Not only did the indigenous Americans have the technology to build these vessels they had a sophisticated enough level of society to represent them as artistic or cultural items constructed from highly desirable materials. All the evidence, ranging from early historic accounts to votive images and models, indicate that pre-Columbian people of the Americas were conversant with and expert at using the four traditional building blocks of watercraft; rafts, skin boats, bark boats, and dugout logs.

Unfortunately the construction materials of most of these types of craft are difficult if not impossible to recover intact from an archaeological site. Unless conditions are perfect for preservation the direct evidence of most of these type of craft would be lost due to natural deterioration processes. Reed, skin, and bark vessels are by their nature fragile craft created with organic materials that can quickly deteriorate back into the environment leaving little or trace evidence. The dugout log canoe, on the other hand, is made of hardier material that has a chance to be preserved. In the state of Florida over 200 sites that have been located that contained log boats or canoes, the oldest dating to the Middle Archaic Period, ca. 6000-7000 years ago (Florida Department of State 2013). Prehistoric canoes have been found around the country: A dugout from the Cooper River, South Carolina approximately 4100 years old, nineteen canoes from Phelps Lake, North Carolina with date ranges between 2430 B.C. to A.D. 1400 (Boehme 1999, Wilde-Ramsing 1992).

A prehistoric dugout canoe was located in Ohio during the fall of 1976 in Savannah Lake, Ashland County during dredging operations. Known as the Ringler Dugout, and found 3 feet (1 m) below the peat bottom of the lake, it was considered old at the time of discovery. Today the lake in which the canoe was found is part of the Vermilion River system that empties north into Lake Erie. Initially dated to approximately 3550 years ago, the canoe was considered possibility to be associated with the Late Archaic period. Later testing indicated a date for the canoe at approximately 310 years ago. These dates are very different, and a determination of cultural affiliation is very difficult. Examination of the vessel indicated that it may have been built by same charring and scraping methods observed by early explorers and settlers, indicating a continuity of method across the continent over time. An additional two canoes were reported to come from a similar context as the Ringler Dugout, but they have not been examined in detail (Brose and Greber 1982, Gerber et. al. 2012).

Other potential prehistoric evidence of watercraft use in the Great Lakes comes from upstate New York. Investigating currently subaerial sites in Fort Drum, which were posited to be prehistoric coastlines during the late Pleistocene or early Holocene, archaeologist found what might indicate evidence of bark canoe manufacture. Prehistoric occupation in the region is not in doubt and had been documented to approximately 9000 B.C.. A site, FDP 1208, located on a fossil beach strand produced tools identified as potentially used for boat construction from an intuited Paleoindian context. These tools included scrapers, punches, blades, and drills. "Experimental use-wear comparison analysis of the Fort Drum tools bore out the theory that the FDP 1208 assemblage was likely used on materials consistent with the construction of bark boats or canoes (Schulz et al 2011: 33)." In conjunction with other sites located in the area it is suggested that the assemblages are consistent with boat-building activities dating to the Paleoindian period.

Sailing Vessels

On the eve of exploration by Europeans, the natives of the Great Lakes region most assuredly had the societal structure and the technical capabilities to create any of the four types of early watercraft. Europeans quickly adapted to the bark canoe for their exploration and commercial activities in the Great Lakes region. Louis Joliet, a French explorer, is considered the first European to have seen and paddled across the waters of Lake Erie in 1669 while returning from the Great Lakes to Montreal (Fraser 2008). Europeans also adapted craft from their own traditions and created the light, plank-sided, flat-bottomed *bateau*. Leaving from Montreal and heading up river the first vessels of European construction entered Lake Ontario in 1671. The *bateau* became the dominant vessel for transportation from the St Laurence to the Great Lakes for the next century (Gardner 1987).

Historic navigation on the Great Lakes was inaugurated in 1679 by the French explorer LaSalle. He had a vessel built on the shores of the Niagara River, above Niagara Falls, and then sailed it into Lake Erie. By September the Griffin, named in honor of his benefactor Count Frontenac, whose coat of arms contained a pair of griffins, sailed through Lake Erie. At 45-tons and with five cannon she was the first sailing vessel, a bark (barque), ever to pass the future settlement of Detroit into and through Lake Huron and finally to Green Bay. Loaded with furs, the Griffin's captain was ordered to sail back to Lake Erie. The vessel never reached its destination. The first European vessel to sail the Great Lakes also became the first maritime loss (Johnson 2002). Such an inauspicious start did not dissuade the European powers vying for the forest riches of the New World from continuing to build vessels to explore, sail, and trade in the region. The French *coureur du bois* and *voyageurs* rapid spread throughout the Great Lakes and Mississippi Valley regions using water transportation as the main means of commerce and communication. Later, other craft such as Durham boats, developed along the Delaware River in the mid eighteenth century were used for inland transport, and Mackinac boats and other lake specific craft developed in the nineteenth century were used on the Great Lakes for transportation (Chapelle 1951). In the early 1800s Durham boats were constructed at Black Rock [Buffalo] for use on the lakes (MNMQR 1855). *Bateaux,* canoes, Durham boats, Mackinac boats, and other small craft, were used for transportation and trade through northeastern North America by explorers, colonists, and early national Americans. These small open boats were light and unsubstantial relative to the vessels that would soon take over lake trade.

The Great Lakes held wealth in numerous resources such as fish, furs, and forest products. Later both agricultural products and later industrial products, from raw ore to finished goods were added to the commercial mix. In order to move these commodities, larger and larger vessels were developed. From the relatively small canoes, *bateaux* and other boats, sailing vessels began to ply the waters of the Great Lakes. Being on the frontier between two European powers, Britain and France, the region also was considered strategic. By the mid-eighteenth century Britain and France were contesting for primacy throughout the continent of North America. Although much of the action took place on the eastern seaboard of the Canadian Maritimes, and the St. Lawrence and Hudson River/Lake Champlain Valleys, the Great Lakes region was also contested. During the French and Indian Wars, 1754-1763, the British launched two vessels in the Great Lakes, the Huron, a four-gun schooner and the Michigan, a six-gun sloop. The Huron was the first vessel to sail the lakes since the ill-fated voyage of the Griffin, and the Michigan followed the historic pattern of the Griffin, being wrecked off Presque Isle. After the war the British also launched the Boston and Gladwin, both eight-gun schooners and the 10-gun sloop Royal Charlotte. These vessels were used to communicate with the widely dispersed British bases in the Great Lakes, from the mouth of the Niagara River to Detroit, Mackinac, and beyond. These vessels also provided space for moving private trade. The small government fleet was not enough to satiate the demand for the growing population and the first private vessel, the sloop Enterprise was constructed in 1769. Other sloops and schooners were to follow beginning a new era of growth on the lakes (Malcomson 2004).

Unfortunately the peace brought by the elimination of the French from North American did not last. The American colonists were eager to press ever westward, in contradiction to some provisions of the Proclamation of 1763 which basically cut off unregulated trade and settlement in the frontier beyond the Appalachian Mountains. During the American Revolution the British, who forbade any private vessels to be under sail, launched five sloops, three schooners, one brig and one scow, and hired several private vessels to support their needs on the Great Lakes. During the war the British had virtual monopoly on sailing vessels in the region. The Peace of Paris in 1783 ended the war and the Great Lakes became the boundary between two nations. However the area was not de-militarized and both nations launched vessels into the lakes in subsequent years to protect their interests (Malcomson 2004). Americans flooded into the Northwest's 'open' lands and displaced many of the native people there. The first American sailing vessel constructed on Lake Erie was the schooner Washington. It was launched at Four Mile Creek near Erie, Pennsylvania in 1796 (MNMQR 1855). The natives had, in general, supported British over American interests and conflicts turned again ultimately to war.

The War of 1812 was ostensibly fought for, "Free trade and sailors' rights" on the open Atlantic, but there was a large and growing demand for land by Americans in the old Northwest around the Great Lakes, and just as important was a main area of combat between the British and American forces. Lakes Ontario and Erie and the shores surrounding them would be the location of more than a few military actions, some extremely significant. The most significant action was the Battle of Lake Erie. Fought in 1813, the conflict saw an American fleet of nine vessels capture a British fleet of six. As Commodore Perry put it so eloquently after the battle, "We have met the enemy and they are ours: Two Ships, two brigs,

one schooner, and one sloop" (Skaggs and Altoff 1997). The Great Lakes remained an area of conflict but no other major actions on the water occurred through the end of the war (Hickey 2006). When peace came in early 1815 the Great Lakes were about to be the focus for a long period of expansion. The Americans sold several naval vessels to private interests, laid up others and only kept one schooner active on the lakes (Malcomson 2004).

Although the Great Lakes saw many types of sailing vessels cross its waters, starting with La Salle's barque Griffon, and ranging to the mixed British squadron taken by Perry in the Battle of Lake Erie (which consisted of two ships, two brigs, a schooner, and a sloop) the predominant sailing vessel type on the lakes was the schooner. A schooner is a type of sailing vessel with two or more masts on which the sails are rigged fore-and-aft. First mentioned in the historic record in approximately 1717 along the New England coast, the rig became ubiquitous in North America (Chapelle 1935). There were numerous advantages to this rig type in the Great Lakes environment. Fore-and-aft rigged vessels, with smaller crews, could sail a course closer to the apparent wind and would not be as susceptible to being wind bound in port than a square rigged vessel. With the prevailing westerly winds fore-and-aft rigging made tacking to windward, and thus moving to the lakes, much easier than full rigged square-sailed vessels. Finally wind was free, and although steam vessels ultimately triumphed in commercial navigation, low costs aided in keeping sailing vessels viable modes of transportation on the Great Lakes. The sail fleet in the lakes in 1870 was near its peak, numbering 159 brigs, 214 barques, and 1,737 schooners (Lesstrang 1985). Even as steam technology took hold as primary propulsion for lake vessels, many continued to install masts rigged fore and aft for auxiliary power.

The adaption of the schooner rig to the Great Lakes did not stop innovation due to local conditions. To the opening of the Erie Canal, in 1825, the lakes fleet consisted primarily of relatively small sloops, schooners and brigs (Lesstrang 1985). Lakes schooners were relatively shallow draft and by 1851 incorporated the feature of the centerboard, to allow for better sailing abilities and still be able to maneuver in shallow waters. Schooners, like most vessels on the lakes began to grow in size and three and four masted models were constructed. The first five-masted schooner on the lakes was the 275-foot (83.8-m) David Dows, built in 1881 at Toledo, Ohio (Chapelle 1935). Mechanically powered vessels developed as well with new innovations beyond the capabilities of sail and overtook them in most lake applications. Many schooners had their rigs cut down and became towed barges behind tugs or steamers in an attempt to stay competitive. The last schooner to sail the lakes was the Lucia A. Simpson; she was wrecked in 1929 (Lesstrang 1988).

Canals

Another technology that was gaining traction on the American Frontier was canals. The years 1824 and 1825 would usher in legal and physical changes that would aid in the rapid expansion of waterborne commerce and steam navigation around the nation and the Great Lakes in particular. A defeat in the US Supreme Court in 1824 of the monopolistic practices established by Fulton and Livingston in the case of Gibbons v Ogden allowed for real competition and growth. The next year, 1825 the entire Erie Canal opened, it was a 363-mile (584-km) all water route from the Atlantic Ocean to the interior of the American continent. As one terminus of the canal was at Buffalo, at the eastern end of Lake Erie, the lake would see immediate and dramatic growth in both population and shipping. At one point two –

Buffalo and Cleveland – of America's ten largest cities were along its shores. This area would soon fill with millions of immigrants. Assisting the growth and development of this region, the Federal Government for the first time appropriated funds for harbor improvements in the Great Lakes region (Still et al 1993).

If the expansion of trade by the Erie Canal were not enough other outlets were soon to follow that only increased the contact of Lake Erie with the wider commercial world. The Welland Canal, first opened in 1829, allowed direct trade between Lakes Erie and Ontario. This was no small feat as it took 40 locks over approximately 27 miles (44 km) to overcome the major inhibiting factor between direct transportation between the two bodies of water with a 99.5 m (326 ft) difference in their levels, mostly represented by the 51 m (167 ft) falls at Niagara (SLSMC 2003). The entire Great Lakes region was now connected and an additional connection to world trade through the St Lawrence River was added.

Another canal connecting Lake Erie to an internal channel of transportation and commerce was the Ohio and Erie Canal, completed in 1832. Although not a major regional breakthrough like the other two canals it was a huge event locally. There was poverty amid the plenty in Ohio where agricultural products were concerned. Locally a barrel of flour was selling at $1.95 but in New York it could fetch $8.00 (Drago 1972). Transportation costs were the problem and the canal would fix that. The 309-mile (497-km) canal would connect in the north with the Great Lakes and thus the Erie Canal and Eastern markets and in the south with the Ohio River and Pittsburgh to the east and the Mississippi River system the west, which led ultimately to the New Orleans and the Gulf of Mexico. Ohio, a continental landmass, was now connected to the world's main trading centers by three man made features. The northern terminus of this canal was Cleveland via the Cuyahoga River. As Buffalo was to the Erie Canal, Cleveland was to the Ohio and Erie Canal and both cities grew, in part, in tandem with their canals. Railroads came to challenge the dominance of canals and some shipping routes. In several ways railroads could improve upon their inefficiencies (e.g., speed and winter closings) but canals and lake vessels gave specific regions of the Great Lakes, especially Lake Erie, enormous advantages in early growth that would have dramatic legacy effects. With these internal and external improvements Cleveland on the shores of Lake Erie rose to become one of Ohio's and the nation's major cities.

Two other watercourse improvement schemes, not located on or entering directly to Lake Erie, also contributed to the increase in traffic across the lake and into the port of Cleveland. To the northeast of Lake Erie the St Lawrence River canal system was completed by 1848 (Larkin 1998). Vessels could travel seamlessly between the Great Lakes and the Atlantic Ocean. To the northwest the Soo Locks at Sault Ste Marie, Michigan, which created a shipping connection between Lake Superior and the four lower lakes, were opened in 1855. Later, 1895, the Canadian government built the Sault Ste Marie Canal immediately to the north in Ontario to have unimpeded access to Lake Superior. These canals opened up the mineral rich regions on the shore of Lake Superior. Over time these canal and lock systems would grow to allow ever larger vessels to traverse the waters of the Great Lakes.

Steam Vessels

Steamboats were not long to be sailing on the Great Lakes after their first successful commercialization by Robert Fulton on the Hudson River in 1807 and the conclusion of the War of 1812. Only a decade after steam's first commercial success on the Hudson River and two years after the war, in 1817, two steamers, the American Ontario and the Canadian Frontenac, were steaming along the shores of Lake Ontario. These vessels were confined to that lake by their inability to navigate around Niagara Falls to the south or the rapids of the St Laurence River to the north. A year later the Walk-in-the-Water was built at Black Rock, north of Buffalo to navigate on the Great Lakes. The Walk-in-the-Water had a short use life as it was wrecked outside of Buffalo during a late October storm in 1821. The loss of the Walk-in-the-Water did not dampen the desire for speed and regularity for passenger service that steam vessels provided over sail. The Enterprise, competition for the Superior which replaced the wrecked Walk-in-the-Water, was built in Cleveland. The year that the Erie Canal opened there were already eleven steamers on Lake Ontario and five running on the Great Lakes (Still et al 1993). Through the remaining nineteenth century steam vessels on the Great Lakes only got larger, faster, and more efficient.

The nineteenth century saw many, major technical advancements, especially in shipping. From Robert Fulton's successful mastery of the steam engine to propel a vessel, steam power rose to prominence over sail, especially on the Great Lakes. The first steam vessels were rather inefficient and their low pressure engines took up valuable cargo space so steam vessels generally moved passengers while sailing vessels were primary cargo haulers. However steam vessels could leave on schedule, sail against prevailing winds and were relatively dependable. Immigrants pouring into the old Northwest through the Erie Canal would leave from Buffalo and end up along the shores of the other Great Lakes to start new lives and communities. In 1836 the steamer United States, one of 45 steam vessels on the lakes, carried 700 passengers from Buffalo to Detroit (Lesstrang 1985). Passenger service was to be their main commerce until more efficient hulls and engines were developed, and this would not be long (Still et al 1993).

Vessels with single cylinder engines turning two paddlewheels, gave way to vessels like the Great Britain in 1830, which had two low pressure walking beam engines, each controlling their own paddlewheel, and that made for more control and maneuverability. Additionally the hulls of vessels began to change and develop for the lake environment. Early steamboats were built by shipwrights who were used to making deeper draft sailing vessels on an oceanic model. As builders began to perfect their craft, vessels got shallower drafts but hogging, sagging caused by excess weight at the ends of a vessel, had to be accounted for as much support was lost without a deep keel running the length of a vessel. Hogging trusses, longitudinal strengthening features, were invented and expressed themselves in the form of long metal rods or trusses on the upper works of vessels. Guards and sponsons, wide areas on the exterior of a paddlewheel steamboat's hull that protect the paddlewheel and extend the deck space, were developed for safety and efficiency.

Additionally the marine propeller saw some of its first use in the Great Lakes region. The Vidalia, launched in 1841, was the first vessel on the Great Lakes to use a propeller. She also had two high pressure engines which were smaller and lighter than the low pressure engines

used on a typical lakes sidewheeler (Still et al 1993). A typical sidewheel steamer was fine for lake travel but too wide to be effectively managed in canals. However a propulsion system placed in the rear of a vessel did not create width issues with relatively narrow canal locks. By 1846 there were 93 steam powered vessels on the lakes, 26 of which were the new propeller type and the rest were paddlewheelers. A decade later, in 1857, propeller steamships, numbering 135, surpassed the number of old sidewheeled steamers by 18 (Lesstrang 1985). In 1853 the Lake Erie Ports of Buffalo and Cleveland produced numerous sail and steam powered vessels. One brig, nine schooners, and 12 steamers, for a grand total of 22 vessels with a tonnage of 8,619 were launched from Buffalo. Cleveland yards launched four ships or barques, 16 schooners, 14 sloops or canal-boats, and three steamers for a total of 37 vessels but rated at only 7,015 tons (MNMQR 1855). The rise of a particular Great Lakes vessel type was encouraged in part as so much of the construction was being done locally. Just prior to the Civil War, Buffalo and Cleveland ranked first and second in propeller tonnage launched in the US (Still et al 1993). The change in the Great Lakes fleet of steam powered vessels continued and in 1860 consisted of 138 paddle-propelled steamboats as well as 197 propeller-driven vessels. It was also during this period that the first steam barges were constructed with dimensions to specifically fit into canals for commerce between Lake Erie and Lake Ontario (Lesstrang 1985).

Larger and heavier engines creating more vibrations pushed the limits of wooden hull construction to its maximum. Steam engines could literally shake the caulking from between the planks of wooden vessels. Iron had first been used for vessel construction in Europe during 1822 when the Aaron Manby was launched. Built in England of ¼ inch iron plates lapped riveted to angle-iron frames, the Manby was exported to France for service on the River Seine (Greenhill 1993). The vast wooded shores of the Great Lakes, expertise in wooden construction as well as the lack of the proper iron building technology hindered the introduction of this new ship building material on the lakes for two decades. In 1843 the U.S. Navy launched the iron-hulled, paddlewheel steamer USS Michigan from the shores of Erie, Pennsylvania. The Michigan was built in Pittsburgh, transported to its launch site, and assembled (Sweetman 1991). However the first iron hulled commercial vessels in the Great Lakes were imported from Great Britain as well and used on the St Lawrence and Lake Ontario.

The first lakes built iron hulled, propeller driven vessel was the Merchant, built at Buffalo in 1861 (Still et al 1993). The iron hulled Onoko, launched in 1882 by the Globe Iron Works in Cleveland, was the largest, 302 feet (92 m), vessel on the lakes until the introduction of steel hulled freighters a decade later (Minnesota Historical Society 2013). Although steam and iron were new technologies and building materials, these early vessels were still fitted with auxiliary masts and yards for sails. The Onoko, utilizing the new compound engine technology, was fully rigged as a three-masted schooner (Thompson 1994). Additionally wooden sailing vessels and schooner barges were still being built and utilized on the lakes. Although they were fast losing commercial viability due to economy of scale in shipping bulk commodities, their power source, the wind, was free.

With its link to canals, the expanding railroads, access to the iron ore producing areas of the Great Lakes and the coal fields of the Appalachians, Cleveland was centrally located to

became one of the major iron and later steel producing, and shipbuilding areas on the Great Lakes. In 1869 the ship building firm Peck & Masters constructed the R. J. Hackett, a 211-foot (64-m) purpose built ore carrier. Specifically designed for the trade it had its pilot house forward, its machinery aft, and an unobstructed midsection for cargo. Many consider the design the proto-type for the subsequent Great Lakes freighter. This was a radical change in design as sailing vessels and early steam powered craft traditionally had their steering areas at the rear of the vessel (ECH 2013).

By the 1880s steel vessels were, again, being imported from Great Britain for use on the lakes. This again spurred local builders and in 1886 the first steel hulled vessel was constructed on the Great Lakes. Built by Globe Ship Building in Cleveland, the 264-foot (80.5-m) 1,741 ton Spokane was launched in June. Six years later, 1892, this innovative vessel was lengthened by adding a 60-foot (18.3-m) section to her cargo hold, which was completed at Cleveland Ship Building. The lengthening process increased the ships tonnage to 2,356 (Thompson 1994).

Other Great Lakes shipping design innovations during the late nineteenth century were the whaleback freighter for bulk cargos, like grain and iron ore, and the car ferry to transport rail road cars. Both of these designs represented the maturity and specialization of commerce on the Great Lakes. Created by Captain Alexander McDougall, the whaleback vessel had a flat bottom, and typically squared hull for cargo space, but the deck was rounded so that waves would easily wash over it when loaded. Whalebacks also had two turret structures, one forward and one aft, the midsection of the vessel open for cargo, and keel bent up and forward at the bow and terminated in a snout like shape, which gave them a unique profile. The car ferry linked the growing rail roads, ending at one lake shore with rails on the other side (Lesstrang 1985). These vessels sailed all the lakes.

With the new technologies, techniques, and materials steamships kept getting bigger. In during the late 1890s several 475-foot (144.8-m) vessels were built. By the turn of the century the 500 foot (153.4m) mark was broken. By 1906, 600-foot (182.9-m) lake freighters literally set the standard. For the next thirty to forty years on the Great Lakes dozens of vessels were built to the 600-footer standard with little change. Although large the 600-footers were still small enough to navigate, with the aid of tugs, the sinuous Cuyahoga River to reach Cleveland's steel mills (Thompson 1994). During World War II the shipyards of the Great Lakes were mobilized to produce various vessels for the war effort, from submarines to frigates. After the war vessel size, again, expanded. During the 1970s, with the launch of the Stewart J. Cort the 1000-foot (304.8-m) laker was inaugurated on the lakes. The vessel was so large that it could not leave the Great Lakes (Lesstrang 1985).

Concomitant with the ever increasing size of vessels, new and innovative design features were added to vessels. As ships got larger, steering gear was required to assist the human pilots, and auxiliary deck machinery assisted the crews in hoisting ever heavier loads. These innovations were introduced in the 1860s. By the 1870s, electricity was introduced on ships for lighting the darker areas of the boiler room as well as passenger spaces. Electricity was also used for fans to increase ventilation to the ever increasing engine that required more air for combustion in their boilers, and for passenger comfort. Refrigeration was introduced

during the same decade but did not take hold until the 1880 on ocean liners (Griffiths 1993). Size of vessels was not the only innovation. As these vessels were built to larger dimensions more machinery could be placed in them. To the chagrin of stevedores everywhere, self-unloading gear was added to a Wyandotte Transportation Company vessel in 1908 and the successful experiment was followed by others (Lesstrang 1985). With the basics set, materials design and cargoes, lakes freighters grew to enormous proportions.

Vessel Locomotion

The initial engines used aboard early steam vessels were generally low pressure models. Low pressures were used due to the restrictions of boiler design and construction materials. Also, due to the new technology, these early vessels also were rigged for sail, when there were engine troubles, or when sailing downwind to conserve fuel. Riverboats on the Mississippi system soon lost their sails, but in the open expanses of the Great Lakes they were useful. Iron, although strong, had limits relative to being employed in a pressure vessel. Steel, was much stronger, but not cost effective or available in quantities until the later nineteenth century. However by the time new and innovative boilers and engines were employed on vessels they were assuredly employed on land in some capacity.

As boiler production advanced, higher and higher steam pressures could be achieved. As a result engines could be smaller and weigh less, or at least the piston size could decrease. However there was a resultant loss of potential energy when this higher pressure steam was exhausted. The compound engine was an improvement in which steam was introduced into one cylinder at high pressure, and when it had completed its initial work was then exhausted at lower pressure into another cylinder. This process increased power and efficiency with the same input, and was adopted for shipboard use in the mid-1850s (Griffiths 1993).

The piston thump of motive steam evolved from a relatively single cylinder devise working off low pressure, to the huge and complex triple and quadruple expansion engines of the late nineteenth century. Another type of engine that could use the motive forces of steam was also developed at the end of the nineteenth century. The Turbinia was the first steam turbine-powered vessel which made its appearance in 1894. Rather than using reciprocating principles of energy transfer, having steam move a piston up and down, a turbine used rotary principles, a continuous turning to transfer steam into mechanical power. Although adapted early for Atlantic passenger liners after the turn of the century, steam turbines were first employed on the Great lakes in four vessels built for Pittsburgh Steamship during 1937 and 1938. Later, after the war, several vessels with triple or quadruple expansion engines would have them replaced by the more efficient turbines (Thompson 1994; Maclennan 2000).

An alternate source of reciprocal motion propulsion arrived with new fuels. With the rise of petroleum derivatives as a source of motive power for internal combustion engines, which run on the same principle as steam reciprocating engines, gasoline and diesel engines became a source of motive power. Gasoline and kerosene being slightly more volatile was sidelined in favor of the more stable diesel fuel for vessels. The first diesel engine was installed for inland use in Europe in 1904. Being relatively small, and less difficult to maintain than steam engines, diesel engines were rapidly adopted. By the 1920s diesel engines were becoming more common in fleets around the world (Maclennan 2000).

Fuel Source

The motive power for watercraft and vessels moving across the surface of Lake Erie is wide ranging. The natives and early explorers depending on canoes and bateaux used human power, either paddling or rowing to propel their craft. From the initial foray of the Griffin in 1679, and early Mackinac Boats, to later barks, sloops, schooners, ships and other sail powered vessels the wind was the motive force behind vessels. With the advent of steam navigation on the Great Lakes, chemical energy in the form of burning wood used to create steam in boilers transformed in to the mechanical energy of a turning paddlewheel or propeller. As the shores of the Great Lakes were denuded of their trees and the developing coal fields in Appalachia were producing vast amounts of quality coal for rising industries, coal became more and more used until it supplanted wood by mid-nineteenth century. Globally coal held sway until oil fired turbines and diesel engines made their debut in the early twentieth century. On the Great Lakes, where coal was one of the four main commodities moved, its use as a fuel lingered longer before being replaced by liquid fuels. The switch to liquid fuels eliminated a whole class of maritime worker, the coal heaver. Introduced in the early twentieth century, oil as fuel had many advantages. Per weight it contained about 40% higher energy contend, it drastically cut the space needed for coal bunkers, therefore increasing potential cargo space, it also speeded up and made for a cleaner turnaround time in port (Maclennan 2000).

3.4.2 Shipwrecks

For all the design innovation and technical advancement that happened on the Great Lakes since the first European style vessels sailed across their waters accidents were common and vessels were lost. The Griffin, the first European style vessel on the Upper Great Lakes, was lost on its maiden voyage and never located. Sailing vessels, at the mercy of the weather and a lee shore, continued to sink throughout the history of the lakes even in sight of major cities. Weather, mechanical issues, human error, collisions, negligence, or in some cased just plain bad luck caused the loss of a vessel. Numerous authors have recounted the famous stories or listed the losses (Bowen 1952; Boyer 1968; Fraser 2008; Kohl 1998). Heden (1993) lists over 1,700 historic wrecks in the Great Lakes, many in Lake Erie. Cleveland being a major iron and steel center as well as a shipbuilding location historically saw a great amount of traffic and as such the occasional vessel loss.

Today the National Oceanic and Atmospheric Administration (NOAA) maintains a record of vessel losses and obstructions to shipping, the Automated Wreck and Obstruction Information System (AWOIS). A list of wrecks in the Cleveland area is presented in Table 3-6 and Figure 3-33. Additionally NOAA Chart 14839, Cleveland Harbor Including Lower Cuyahoga River, shows two ‘obstructions’ to the lakeside of the Cleveland breakwater about 75 feet (23 m) from the proposed cable route, and an “intake tunnel” that extends into Lake Erie running in a general west-north-westerly direction that roughly parallels the proposed cable lay. This tunnel runs directly toward the City of Cleveland Kirtland Pump Station, which is one block inshore from the harbor. History indicates that numerous wrecks were lost in Lake Erie and modern aids to navigation indicate that several wrecks and obstructions to safe navigation are in proximity to the project APE.

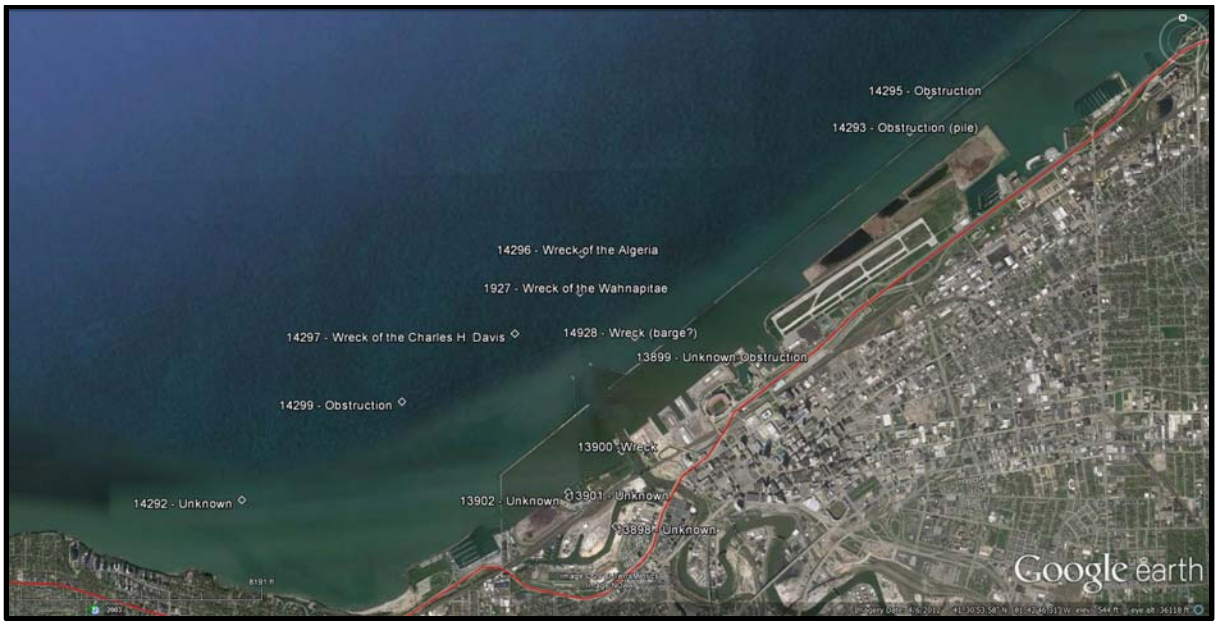

Figure 3-31. NOAA AWOIS Navigational Obstructions near Downtown Cleveland

Table 3-5. NOAA AWOIS listed objects near Cleveland

AWOIS Number	Type	Latitude	Longitude	Comment	Depth (ft.)
1927	Wreck	41.516717	81.716519	Wahnapitae	
13898	Unknown	41.495014	81.712869		
13899	Obstruction	41.510188	81.698692		
13900	Wreck	41.501994	81.712353		
13901	Unknown	41.498308	81.71865		
13902	Unknown	41.497817	81.718547		
14292	Unknown	41.498284	81.759593		26
14293	Obstruction	41.531078	81.674905	Pile	19
14295	Obstruction	41.534527	81.672225		
14296	Wreck	41.520448	81.716076	Algeria	32
14297	Wreck	41.513194	81.725045	Charles H Davis	28
14298	Wreck	41.512713	81.709879	barge?	22
14299	Obstruction	41.507366	81.739151		26

4.0 SUMMARY AND CONCLUSIONS

Gray & Pape recommends an APE for direct effects that is limited to those areas that will be physically affected by the installation and operation of the turbine array. This area includes the footprint of the turbines and any associated construction workspace, the corridor of disturbance from the cables, and any on-shore construction. Due to the limited construction disturbances at the CPP Lake Road Substation and the nature of the material at the site (i.e., fill), only intrusive construction activities (i.e., excavation of the launch pit for the horizontal direction drilling) should be monitored for relevant cultural resources.

Due to the amount of development along the lake shore, views of the lake are fragmentary or non-existent beyond the first road south of the lake shore. Views are obstructed by other buildings or by trees at even short distances. The APE along the shore, therefore, has been limited to the area immediately adjacent to the lake, as bounded by easily identifiable roads. The proposed project includes measures to mitigate viewshed impacts, including the choice of light gray (RAL 7035) paint and downshielding the navigational lights to reduce the visibility of the turbines. Other historical properties within the study area (0.5 and 1.0 miles from the lakeshore) are identified but are not included in the proposed APE.

The period of historic navigation, beginning with LaSalle's Griffin in 1679, introduces materials that can be easily discovered on the bed of Lake Erie. The types of vessels that traversed the lakes range from bateaus, Durham and Mackinac boats, sloops, schooners, ships to steam paddle-wheelers and propellers. There were technical and design innovations which would help to identify any shipwreck located. Cleveland was one of the earliest lake shore settlements and grew to be a major lake port. Shipbuilding and shipping were major components of its nineteenth and early twentieth century economy. Numerous vessels are known to have been lost in Lake Erie and in the vicinity of Cleveland. The NOAA AWOIS lists 13 wrecks and obstructions in the Cleveland Area. AWOIS Targets 14295 and 14293 lay in Lake Erie just beyond the outer breakwater of Cleveland harbor near the CPP landfall for the cable. None of these targets will be physically affected by the installation and operation of the turbine array or the buried transmission cable.

The likelihood of locating submerged prehistoric resources in the APE is very low. Due to lake level changes through the Holocene Period, portions of the APE would only have been habitable between 10,000 B.C. to 2,750 B.C.. These dates coincide with the Paleoindian and Early and Middle Archaic periods. These groups did not leave large assemblages of materials or structures in the northeast Ohio area. Some sites and occasional finds from these periods have been located in northeast Ohio indicating the hypothetical potential for them to exist in a submerged Lake Erie context. However the inundation of Lake Erie since glacial retreat has introduced thick layers of sediment on the lake bed. "Away from the shore zone the three basins are broadly bowl-shaped, with depths extending smoothly from near shore down to the greater depths. The bowl shape suggests postglacial deposition and sediment-smoothing in response to a gyre of water circulation in each basin, or progressive shoreline modifications in the zone of Holocene rising lake levels. This sediment-smoothing has diminished or eliminated surface relief left in place by the last glaciation (NOAA 2013a)." These sediments would have covered any materials deposited thousands of years ago. The state of geophysical

remote sensing cannot, at present, locate buried, non-metallic sites as expressed by the typical Paleoinidan or Archaic assemblages found in Ohio.

An additional geophysical survey of the turbine array and the transmission cable route is scheduled for 2014. Although there are multiple uses for this information, the presence of potentially significant cultural resources in the affected area will be re-evaluated. This survey will include a single-beam echo sounder, side-scan sonar, sub-bottom profiler, and a magnetometer. A series of transect lines at a distance of 100 feet (15 m) will be conducted in the turbine array area. A centerline along the cable route and two parallel transects, off to either side of the center line at a distance of 100 feet (15 m), for a total distance of 200 feet (120 m) from the centerline, will be conducted. This will ensure full coverage and allow enough room for cable rerouting, if a shipwreck or other obstruction is located along the proposed cable route. The use of a sub-bottom profiler along the cable route will examine sediment for potentially significant cultural resources or buried obstructions. The magnetometer will detect the presence of metallic objects along the survey transects. The findings of this survey will be communicated to USACE.

Finally, Federally recognized Indian Tribes and consulting parties should be consulted by the USACE concerning the potential for traditional cultural resources within the APE. It is recommended that additional inquiries are made to representatives of the tribes identified by the Native American Consultation Database (NACD). The NACD, managed under the Native American Grave Protection and Repatriation Act (NAGPRA), lists tribes which have demonstrated historical ties to areas through the Indian Claims Commission.

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