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Howard Street Tunnel Project

Phase IA Archaeological Assessment Technical Report

City of Baltimore, Maryland; Wilmington, Delaware; Delaware County, Pennsylvania; and Philadelphia County, Pennsylvania

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EXECUTIVE SUMMARY

The Howard Street Tunnel Project (HST) Project proposes improvements to address multiple vertical clearance restrictions along CSX Transportation's (CSX) Interstate 95 (I-95) Rail Corridor between Baltimore, Maryland, and Philadelphia, Pennsylvania. This is the last major intermodal rail-freight corridor on the CSX network unable to provide modern double-stack service due to various height-clearance obstructions located in Maryland, Delaware, and Pennsylvania.

This Phase IA Archaeological Assessment was prepared to fulfill compliance and document requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800), and the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq). The US Department of Transportation, Federal Railroad Administration (FRA) is the lead federal agency, considering the effects of the HST Project on historic properties. CSX owns and operates the rail corridor, and the Maryland Department of Transportation (MDOT) Maryland Port Administration (MPA) and Pennsylvania Department of Transportation (PennDOT) are the project sponsors. FRA is consulting with the Maryland, Pennsylvania, and Delaware State Historic Preservation Officers, namely the Maryland Historical Trust (MHT), Pennsylvania Historical and Museum Commission (PHMC), and Delaware Division of Historical and Cultural Affairs (DHCA), as well as additional consulting parties. FRA is also seeking and considering the views of the public as part of the Section 106 review process. FRA originally submitted this report to consulting parties on November 6, 2020. Non-tribal additional consulting parties only received the historic architectural report in order to protect potentially sensitive information about archaeological resources. The report has since been revised to incorporate edits for Maryland archaeological site records search results, in response to comments from MHT received on December 2, 2020, and to address comments from DHCA received on January 6, 2021. The revised report also includes updated design information at Boone Tunnel, where a non-conventional construction method is no longer being considered.

At the time of this report, two project alternatives were under consideration, namely a No-Build and a Build Alternative, which proposes improvements to address vertical clearance restrictions at the Howard Street Tunnel in Baltimore City as well as other obstruction locations along the existing I-95 Rail Corridor between Baltimore and Philadelphia. The purpose of the Phase IA Archaeological Assessment is to 1) develop a historic background and archaeological context for the HST Project's archaeological Area of Potential Effects (APE); 2) develop and apply a qualitative archaeological probability model to assess the archaeological potential within the APE; 3) make recommendations to FRA regarding additional archaeological investigations that may be required; and 4) summarize the results in a technical report that will assist FRA, MDOT MPA, and CSX in project planning and decision-making.

All background research, probability modeling, and technical reporting meet the standards specified in the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (Federal Register 48:190:44716–44742), MHT's *Standards and Guidelines for Archaeological Investigations in Maryland* (Shaffer and Cole 1994), DHCA's *Archaeological Survey in Delaware* (2015), and the *Pennsylvania State Historic Preservation Office's Guidelines for Archaeological Investigations in Pennsylvania* (2017). FRA has applied exemptions from Section 106 review for other project activities at locations in Maryland, Pennsylvania, and Delaware, under the activities-based approach of the *Program Comment to Exempt Consideration of Effects to Rail Properties Within Rail Rights-of-Way* issued by the

Advisory Council on Historic Preservation on August 17, 2018 (83 FR 42920, August 24, 2018, and amended 84 FR 31075, June 28, 2019) (Program Comment).

The archaeological APE for the HST Project consists of thirteen non-contiguous survey areas, four of which are located in Maryland, two in Delaware, and seven in Pennsylvania. Survey Areas 1 through 5 are located in Maryland and Pennsylvania and are the locations where tunnel enlargement or bridge modification/replacement will be necessary to meet the desired height clearance requirements of the project. Survey Areas 6 through 12 are located in Delaware and Pennsylvania and are the locations where it will be necessary to lower the existing track and, for some, remove an existing interlocking or construct retaining walls within the existing CSX ROW. Survey Area 13 in Pennsylvania is the location of a new interlocking within the existing CSX ROW.

No previously identified archaeological sites are located within the thirteen survey areas that comprise the APE. All survey areas, with the exception of a portion of Survey Area 4, were determined to have low probability for intact significant pre-contact or historic archaeological sites. These areas were either significantly disturbed by the construction of the existing CSX railroad line or modern (post-1950) urban development, or were located in settings where the proposed project activities have no or minimal potential to encounter intact significant archaeological sites. A portion of Survey Area 4 was determined to have moderate probability for intact significant pre-contact and historic archaeological sites. In this area, however, the proposed construction activities have no potential to affect any archaeological sites that may be present. Therefore, in conclusion, no additional archaeological investigations are recommended for any of the thirteen survey areas that comprise the APE for the HST Project.

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1. INTRODUCTION

The Howard Street Tunnel Project (HST) Project consists of improvements to address multiple vertical clearance restrictions along CSX Transportation's (CSX) Interstate 95 (I-95) Rail Corridor between Baltimore, Maryland, and Philadelphia, Pennsylvania. This is the last major intermodal rail-freight corridor on the CSX network unable to provide modern double-stack service due to various height-clearance obstructions located in Maryland, Delaware, and Pennsylvania.

This Phase IA Archaeological Assessment was prepared to fulfill compliance and document requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800), and the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq). The US Department of Transportation, Federal Railroad Administration (FRA) is the lead federal agency, considering the effects of the HST Project on historic properties. CSX owns and operates the rail corridor, and the Maryland Department of Transportation (MDOT) Maryland Port Administration (MPA) and Pennsylvania Department of Transportation (PennDOT) are the project sponsors. FRA is consulting with the Maryland, Pennsylvania, and Delaware State Historic Preservation Officers, namely the Maryland Historical Trust (MHT), Pennsylvania Historical and Museum Commission (PHMC), and Delaware Division of Historical and Cultural Affairs (DHCA), as well as additional consulting parties. FRA is also seeking and considering the views of the public as part of the Section 106 review process.

At the time of this report, two project alternatives were under consideration, namely a No-Build and a Build Alternative, which proposes improvements to address vertical clearance restrictions at the Howard Street Tunnel in Baltimore City as well as other obstruction locations along the existing I-95 Rail Corridor between Baltimore and Philadelphia. The purpose of the Phase IA Archaeological Assessment is to 1) develop a historic background and archaeological context for the HST Project's archaeological Area of Potential Effects (APE); 2) develop and apply a qualitative archaeological probability model to assess the archaeological potential within the APE; 3) make recommendations to FRA regarding additional archaeological investigations that may be required to satisfy FRA's Section 106 compliance obligations; and 4) summarize the results in a technical report that will assist FRA, MDOT MPA, and CSX in project planning and decision-making.

All background research, probability modeling, and technical reporting meet the standards specified in the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (Federal Register 48:190:44716–44742), MHT's *Standards and Guidelines for Archaeological Investigations in Maryland* (Shaffer and Cole 1994), DHCA's *Archaeological Survey in Delaware* (2015), and the *Pennsylvania State Historic Preservation Office's Guidelines for Archaeological Investigations in Pennsylvania* (2017). FRA has applied exemptions from Section 106 review for other project activities at locations in Maryland, Pennsylvania, and Delaware, under the activities-based approach of the *Program Comment to Exempt Consideration of Effects to Rail Properties Within Rail Rights-of-Way* issued by the Advisory Council on Historic Preservation (ACHP) on August 17, 2018 (83 FR 42920, August 24, 2018, and amended 84 FR 31075, June 28, 2019) (Program Comment). The Phase IA Archaeological Assessment addresses potential effects of HST Project activities on archaeological resources that are not exempt from Section 106 under the Program Comment.

This report is subdivided into the following sections:

- **Section 1** provides an overview of the project and defines the APE.
- **Section 2** outlines the methods used to assess potential effects to archaeological sites in the APE.
- **Section 3** provides an overview of the environmental setting within the APE.
- **Section 4** provides an overview of the pre-contact and historic regional cultural context.
- **Section 5** outlines the previously documented cultural resources and cultural resources surveys within and in proximity to the APE.
- **Section 6** assesses potential effects to archaeological sites within the APE and recommends areas that may require additional archaeological investigation.

1.1 Project Description

The HST Project consists of improvements to address vertical clearance restrictions along CSX's I-95 Rail Corridor between Baltimore, Maryland and Philadelphia, Pennsylvania. The primary obstacle to double-stack service along this corridor has been the Howard Street Tunnel, a 1.7-mile-long railroad passage under the heart of Baltimore, originally constructed in 1895. With current vertical clearances less than the 21 feet necessary to achieve double-stack clearance, the Howard Street Tunnel and other clearance locations currently restrict the ability to move railcars with double-stacked containers between Baltimore and Philadelphia on the I-95 Rail Corridor.

Recent State Freight Plans in Maryland[1], Delaware[2] and Pennsylvania[3] all point to increased freight tonnage of at least 58 percent between 2012 and 2040. Without comprehensive, cost-effective solutions across freight modes, the national transportation network is at risk of delays and inefficiencies that will impact mobility for both passengers and cargo. The HST Project is specifically designed to address these concerns.

The HST Project would remove the numerous vertical clearance obstructions along CSX's I-95 Rail Corridor, thereby providing double-stack connectivity and adding efficiency and resiliency to an important corridor in CSX's intermodal rail network. CSX, in cooperation with MDOT MPA and FRA and to comply with NEPA obligations applicable to the HST Project, is preparing an Environmental Assessment (EA) to evaluate and assess the potential environmental impacts of the HST Project.

[1] Maryland Department of Transportation, *Maryland Strategic Goods Movement Plan*, 2017. http://www.mdot.maryland.gov/newMDOT/Freight/Documents/2018/Strategic_Goods_Movement_Plan_2017.pdf

[2] Whitman, Requardt & Associates, LLP, Delmarva Freight Plan Final Report, May 2015. https://deldot.gov/Publications/reports/freight_plan/pdfs/2015/Delmarva_Freight_Plan_Final_Report.pdf?cache=1588727368738

[3] Pennsylvania Department of Transportation, *Pennsylvania's Long Range Transportation & Comprehensive Freight Movement Plan*, 2016 https://www.penndot.gov/ProjectAndPrograms/Planning/Documents/PennDOT-CFMP%20-%20FINAL%20August%202016.pdf

1.2 Purpose and Need

The purpose of the HST Project is to complete vertical clearance improvements to allow for double-stack train service on CSX's I-95 Rail Corridor between Baltimore, Maryland and Philadelphia, Pennsylvania. The primary needs of the HST Project are described in the following sections, and include:

- Double-Stack Connectivity; and
- Freight Operation Efficiency and System Resiliency.

The HST Project is needed to address these issues and to ensure this portion of the I-95 Rail Corridor continues to serve as a critical link connecting the local, regional, and national transportation network. The sections below provide more information on the need for the HST Project.

1.2.1 **Double-Stack Connectivity**

The CSX I-95 Rail Corridor currently contains insufficient clearances needed to accommodate double-stack freight in multiple locations including the Howard Street Tunnel. Currently, this Corridor serves as a bottleneck to efficient freight movement, limiting the use of double-stack trains between two critical cities in the Mid-Atlantic. This prevents the optimization of land-freight transportation between the Port of Baltimore, other American ports, and destinations throughout the eastern United States.

The double-stack limitation of the Howard Street Tunnel and related locations along the CSX I-95 Rail Corridor has been widely recognized for decades and has been the focus of multiple studies and congressional investigations targeted at reducing congestion on some of the country's most-heavily traveled highways. It was the principal focus of the I-95 Rail Corridor Coalition's Mid-Atlantic Rail Operations (MAROps) studies in 2002[4], and 2009[5], which advocated for a series of investments to improve regional transportation systems in the I-95 Rail Corridor including the removal of impediments to double-stack clearance. The two biggest impediments to double-stack connectivity identified in MAROps studies were the Virginia Avenue Tunnel in Washington, DC, which was recently replaced, and the Howard Street Tunnel in Baltimore.

CSX offers single-stack intermodal service on the freight corridor paralleling I-95 today and runs double-stack trains on some portions via more circuitous routes. Because of the vertical clearance constraints at the Howard Street Tunnel and north to Philadelphia, CSX cannot supply the most competitive, direct double-stack service to connect the markets of the North, South, and Midwest United States. While previous CSX efforts have raised clearances at a number of locations south and west of Baltimore, and north of Philadelphia, this Project is the last obstacle remaining to double-stack intermodal service along CSX's key intermodal network as shown in **Figure 1-1.**

[4] Cambridge Systematics, Inc. and Parsons Brinckerhoff Quade and Douglas, Inc., *Mid-Atlantic Rail Operations* Study Summary *Report*, April 2002.
http://www.mdot.maryland.gov/newMDOT/Freight/Documents/Mid_Atlantic_Rail.pdf

[5] Cambridge Systematics, Inc. *Mid-Atlantic Rail Operations Phase II Study Final Report*, December 2009.
https://i95coalition.org/wp-content/uploads/2015/02/MAROps_Phase_II_Final_Report.pdf?x70560

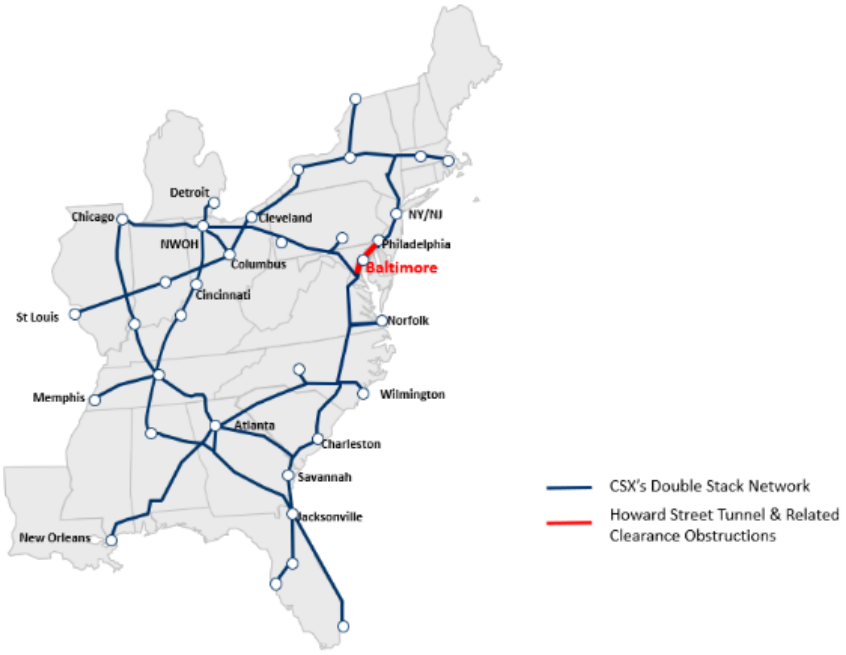

Figure 1-1. CSX Key Intermodal Network

1.2.2 Freight Operation Efficiency and System Resiliency

The lack of double-stack clearance on the CSX I-95 Rail Corridor prevents CSX from running double-stack intermodal traffic through Baltimore on the most direct, lowest mileage rail route across its rail network. This constraint also prevents CSX from offering competitive double-stack service to current rail customers along this route. The lack of double-stack service along the CSX I-95 Rail Corridor results in less efficient and more costly freight movement, since more trains are needed to move the same amount of goods. This increases the cost of existing rail service for origin and destination cities, impedes existing rail traffic moving on domestic coastal routes, creates inefficiencies at the Port of Baltimore, and increases truck traffic on I-95 by encouraging long-distance container moves to occur via truck as opposed to rail.

The 2011 Baltimore's Railroad Network: Analysis and Recommendations report[6], published by FRA and MDOT, concluded that a double-stack-cleared route through Baltimore would "have beneficial multi-state impacts by diverting traffic off the I-95 Rail Corridor with the resultant reduction in energy use, air pollution, highway wear and tear and congestion." The 2017 "Maryland Strategic Goods Movement Plan" continued to highlight the need for double-stack capacity in the region, specifically calling for improvements to the Howard Street Tunnel[1]. Since double-stack trains can carry more containers than single-stack trains, completion of the HST Project would create additional freight capacity without increasing the frequency of train service.

Currently, containers moving in the I-95 Rail Corridor and west from the Port of Baltimore do not have a direct double-stack rail service option. CSX offers double-stack services to many other cities in the

[6] US Department of Transportation, Federal Railroad Administration (FRA), Maryland Department of Transportation (MDOT), *Baltimore's Railroad Network: Analysis and Recommendations*. 2011. https://railroads.dot.gov/elibrary/baltimores-railroad-network-analysis-and-recommendations

corridor, but these routings are indirect and less competitive with trucking than a direct north-south double-stack rail service. Truck travel is a less efficient and more costly method of freight transport over long distances, which can cause issues such as greater traffic congestion, greater pavement damage, and increased emissions compared to rail transport. The lack of double-stack clearance along the CSX I-95 Rail Corridor prevents potential truck-to-rail diversion.

The CSX I-95 Rail Corridor through Baltimore also provides a critical connection from the Port of Baltimore's Seagirt Marine Terminal Intermodal Container Transfer Facility (ICTF) to consumer markets in the Midwest. The lack of double-stack connectivity through the Howard Street Tunnel and I-95 Rail Corridor prevents the Port of Baltimore from capitalizing on its strategic geographic location as the furthest inland location of all the Mid-Atlantic ports. This affects the competitiveness of the Port of Baltimore compared to other nearby ports which can offer ocean shippers the option of double-stack rail to reach critical inland markets.

Resiliency of a rail network is the ability to provide operational flexibility and reliability for train services during normal operations, as well as during periods of higher demand and/or unexpected operating conditions. The lack of a double-stack connection through the I-95 Rail Corridor reduces the overall resiliency of the national freight network, leaving more circuitous routes for transporting double stack freight. The lack of double stack connection also reduces network redundancy and provides fewer opportunities for alternate routes to maintain operations in the case of high demand or unexpected conditions. The proposed improvements would improve the long-term reliability of the national multimodal freight network.

The CSX I-95 Rail Corridor is a critical link in the regional multimodal freight network and, as such, the maintenance of freight traffic during construction would also be a key consideration. Major interruptions to freight mobility along the corridor could potentially result in costly and disruptive delays. Operational flexibility during construction is therefore an important component of the need for freight operation efficiency and system resiliency.

1.3 Alternatives

Two alternatives are being considered in the HST Project EA: 1) the No Build Alternative; and 2) the Build Alternative. The proposed Build Alternative is the preferred alternative, as it satisfies the HST Project Purpose and Need. The No Build Alternative does not meet the Purpose and Need of the Project but is considered as a baseline for comparison to the Build Alternative.

1.3.1 **No Build Alternative**

The No Build Alternative would involve no action to create a double-stack rail network to and from the Port of Baltimore and north along CSX's I-95 Rail Corridor. The existing single-stack capable railway section would remain operational without improving the double-stack connectivity constraint in the national freight rail network.

The No Build Alternative does not meet the HST Project's Purpose and Need for double-stack intermodal service along CSX's I-95 intermodal corridor. The No Build Alternative prevents CSX from running double-stack intermodal traffic through Baltimore on the most direct, lowest mileage rail route across its rail network, and prevents CSX from offering competitive double-stack service to current rail customers along this route.

1.3.2 **Build Alternative**

The Build Alternative consists of improvements that would remove all obstructions restricting passage of modern double-stack intermodal trains, allowing for a 21-foot clearance along the noted stretch of the rail corridor between Baltimore, Maryland and Philadelphia, Pennsylvania. In general, the physical obstructions consist of a bridge or tunnel along the corridor, for which a tailored approach to achieving clearance has been developed. At bridge obstructions, four conventional methods, or a combination thereof, were considered for increasing the vertical clearance: (1) lower tracks beneath the bridge; (2) modify the bridge; (3) raise the existing bridge; or (4) remove and replace the bridge. For tunnel obstructions, three conventional methods, or a combination thereof, will be used to increase vertical clearance: (1) lower tracks within the tunnel; (2) modify the arch and/or invert within the tunnel, or (3) open cutting and reconstructing the tunnel.

The methods for addressing the obstructions will be implemented according to the following rubric:

- **Track Lowering –** Where no utilities or other obstacles are present for both tunnel and bridge locations.
- **Bridge Modification** – Bridge (arch/invert) modification where an obstacle is present and track lowering is not feasible. Bridge modification will not require removal of the existing bridge structure.
- **Bridge Replacement** – Removal and replacement of bridge structure where obstacle or utilities are present and track lowering is not feasible.
- **Track Lowering and Tunnel Arch and/or Invert Modification** – For tunnel locations where utilities or other obstacles are present.

Based on these criteria, the proposed HST Project consists of 18 track lowering locations; one bridge modification without track lowering; two bridge replacements with track lowering; two tunnel locations with track lowering, and arch and/or invert modification; and one relocation of an existing interlocking to facilitate the track lowering proposed at the Woodland Avenue site in Philadelphia, Pennsylvania. In addition, staging and storage activities are proposed at CSX's Bayview Rail Yard in Baltimore, Maryland to support the project. The conventional option would be used at the Boone Tunnel location, which would involve a combination of track lowering and arch modification.

At the Howard Street Tunnel location, an alternate non-conventional option is also being considered. The non-conventional alternative involves the use of a tunnel enlargement system (TES) to gain clearance along approximately 75 percent of the tunnel's approximate 8,700-foot length. The advantage of the TES over the conventional options previously described is that it would enable train traffic to flow through the work zone during active construction while resulting in a new tunnel structure along its length upon completion.

<u>Track-Lowering Locations</u>

There are 18 locations where track-lowering activities under existing bridges and tunnels along the CSX I-95 Rail Corridor are proposed to provide double-stack clearance, summarized below in **Table 1-1**.

Table 1-1. Description of Track-Lowering Locations

Name	Location	Project Activity Description
Mount Royal Avenue	Baltimore, MD	Track/tunnel underpinning and track lowering.
MTA Bridge	Baltimore, MD	Track lowering.
Sisson Street	Baltimore, MD	Track lowering and footer extension work north of Sisson Street.
Huntington Avenue	Baltimore, MD	Track lowering and footer extension work north of Huntington Avenue.
Charles Street	Baltimore, MD	Track lowering and track/tunnel underpinning and footer extension; new retaining wall between Charles Street and St. Paul Street.
St. Paul /Calvert Street	Baltimore, MD	Track lowering and track/tunnel underpinning and footer extension work; new retaining wall between Charles Street and St. Paul Street.
Barclay Street	Baltimore, MD	Track lowering and track/bridge underpinning.
Greenmount Avenue	Baltimore, MD	Track lowering and track/bridge underpinning and footer extension.
Lancaster Avenue	Wilmington, DE	Track lowering and new retaining wall.
W. 4th Street	Wilmington, DE	Track lowering.
Chichester Avenue	Boothwyn, PA	Track lowering.
Crum Lynne Road	Ridley Park, PA	Track lowering.
Clifton Avenue	Sharon Hill, PA	Track lowering.
68th Street	Philadelphia, PA	Track lowering.
65th Street	Philadelphia, PA	Track lowering.
Cemetery Avenue	Philadelphia, PA	Track lowering.
61st Street	Philadelphia, PA	Track lowering.
Woodland Avenue	Philadelphia, PA	Track lowering.

Bridge Modification

North Avenue

At North Avenue in Baltimore, Maryland the existing CSX tracks are bounded below by the Amtrak Baltimore and Potomac (B&P) Railroad Tunnel and a 98-inch-diameter stone and brick culvert, and above by the North Avenue bridge, which carries vehicular traffic and four large municipal water lines (three 36-inch diameter and one 48-inch diameter). The tracks are essentially “sandwiched” between these constraints and cannot practically be lowered. Therefore, clearance at this location would be gained by replacing a portion of the bridge arch structure with a single-span, shallow steel girder, with no resulting change to the North Avenue roadway profile.

Bridge Replacements

Guilford Avenue

The existing arch bridge at Guilford Avenue in Baltimore, Maryland, is proposed to be replaced with a single-span, shallow girder bridge. The tracks at this location cannot practically be lowered due to the presence of two gravity sewer lines that are located directly beneath the track. These sewer lines are very shallow and lowering them would result in considerable impacts to adjacent properties for several blocks to maintain gravity flow within the lines. The stone walls are to remain as retaining walls for the new structure.

Harford Road

At Harford Road in Baltimore, Maryland, track lowering is not feasible due to the presence of an existing 84-inch-diameter water line set in a concrete protection slab located directly below the railroad tracks. Relocation of this utility is not practically feasible and would result in significant impacts to the surrounding public. Therefore, the Build Alternative at this location would consist of replacing the existing arch structure of the bridge with a single-span, shallow girder structure. This work would include the removal and replacement of Harford Road across the bridge at a new finish elevation that is approximately three to five feet higher than its existing elevation.

Tunnel Modifications and Replacements

Howard Street Tunnel

The Howard Street Tunnel generally runs from Camden Station to Mount Royal Station in Baltimore, Maryland, and is approximately 8,700 feet in length. It has a current height clearance of 19 feet, 6 inches and was constructed in three sections: 1) mined section; 2) cut-and-cover section, and 3) concrete box section.

Option One

Option one, or the conventional construction approach to achieving the necessary clearance under the Build Alternative, includes a combination of track lowering and modification to the tunnel arch and/or invert.

Throughout the box culvert section of the tunnel, which extends approximately 1,360 feet from just north of Martin Luther King Jr. Boulevard to just south of W. Camden Street, there is sufficient ballast depth present to allow for clearance to be gained by track lowering alone. In the adjacent cut and cover section of the tunnel, extending approximately 1,140 feet from just south of W. Camden Street to just north of W. Lombard Street, there is insufficient space between the existing track and invert to achieve clearance via track lowering alone. In addition, arch modification in this section is not possible due to the presence of fewer than 5 feet of cover between the tunnel's arch and the major roadway (i.e., Howard Street) and the MDOT Light Rail Line operation. Therefore, the clearance thorough this section of the tunnel under this conventional approach would consist of a combination of invert modification and track lowering.

The mined section of the tunnel extends for approximately 6,200 feet from just north of W. Lombard Street to just north of Dolphin Street. Through the mined section, the conventional option would consist primarily of arch modification and track lowering, with some invert modifications also needed in a short transition zone coming out of the cut-and-cover section. This combination of methods is proposed for this

section of the tunnel because there is insufficient depth beneath the tracks and the tunnel invert to achieve the necessary clearance height through track lowering alone, but there are no obstacles present that would restrict alteration of the tunnel's arch. Therefore, it is more cost effective and less disruptive to use a combination of notching the arch and lowering the track elevation to achieve the necessary clearance. Through the majority of this section, the new track structure would consist of steel ties, ballast, and ballast mat.

Option Two

Option two, the non-conventional construction approach, involves the use of a TES in the 6,200-foot mined section of the tunnel extending from just north of W. Lombard Street to just north of Dolphin Street. The TES would remove the interior tunnel lining and construct an enlarged tunnel in its place. A feasibility study evaluating the use of the TES at the Howard Street Tunnel is currently in progress by CSX. This approach would allow train operations to continue during active construction, and upon completion, would result in a new tunnel structure along the length of its use. Since there is not sufficient clearance between the top of the tunnel and the overlying Howard Street along the cut-and-cover section of the tunnel, the use of the TES cannot extend through the tunnel's existing cut-and-cover section. Therefore, to maintain the benefit of continued train traffic during construction offered by the TES, the clearance in the existing cut-and-cover section would be achieved by removing the top of this section of the tunnel and reconstructing it. For the box section of the Howard Street Tunnel using this non-conventional approach, the clearance methodology would remain the same and be achieved via track lowering only. Because the non-conventional construction option at the Howard Street Tunnel is anticipated to be the more impactful method of construction, this method is assumed in the discussion of environmental impacts.

Boone Tunnel

The Boone Tunnel is located under US 13 (Chester Pike) in Sharon Hill, Pennsylvania and currently has a height clearance of 19 feet, 4 inches. Generally speaking, unlike the Howard Street Tunnel structure which includes an invert structure, the Boone Tunnel does not include an invert and is essentially a long arch structure supported by footings that are resting on bedrock. Modification of the Boone Tunnel's arch to gain clearance is not a feasible option given the very limited cover above it. Due to past track-lowering activities, the existing tunnel (arch) footings are very shallow, and further lowering alone to gain clearance would expose and/or compromise the integrity of the footings. Lastly, depth to bedrock in this area is very shallow relative to the existing track elevation and further track lowering would require the bedrock surface to be lowered. Therefore, the method for achieving clearance at the Boone Tunnel would be track lowering that would generally consist of underpinning of the existing arch structure, notching of the existing portals to increase clearance height, hammering and removal of the underlying rock, and replacing the ballast and track structure.

Additional Project Components

58th Street Interlocking Relocation

The relocation of an existing interlocking at Woodland Avenue and 58th Street is proposed to facilitate track-lowering activities planned at Woodland Avenue and better rail traffic flow during construction. The interlocking would be moved from the current location at 58th street approximately 0.2 miles east to the Eastwick location, between Lindbergh Avenue and the Schuylkill River crossing in Philadelphia,

Pennsylvania. No ground disturbance is proposed with respect to the relocation activities at either the existing or new interlocking locations.

Bayview Rail Yard

The Bayview Rail Yard in Baltimore, Maryland is proposed for temporary staging and storage of materials for the HST Project. No improvements to the rail yard are proposed for the project.

1.4 Archaeological APE and Survey Areas

The archaeological APE, hereafter APE, is defined as the geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (36 CFR 800.16(d)). The APE coincides with the HST Project limits of disturbance (LOD) in areas not exempt from Section 106 review under the Program Comment. The APE was established based on the nature, size and scale of the undertaking, and includes consideration for different kinds of effects caused by the undertaking. Effects may include physical destruction, damage, or alteration to the historic property as a result of Project construction, as well as visual, atmospheric, or auditory effects; the effects may occur later in time, be farther removed by distance, or be cumulative.

The APE consists of thirteen non-contiguous survey areas, four of which are located in Maryland, two in Delaware, and seven in Pennsylvania (**Figure 1-2**). Survey Areas 1 through 5 will all require tunnel enlargement or bridge modifications/replacement to meet the clearance requirements of the project. Survey Areas 6 through 12 will require lowering of the existing track and, for some, removal of an existing interlocking or construction of retaining walls within the existing CSX ROW. One existing interlocking will be removed, and one new interlocking will be installed at a new location within the existing CSX ROW. The survey areas that comprise the APE are described individually below.

1.4.1 Survey Area 1 – Howard Street Tunnel Enlargement, Baltimore, Maryland

Survey Area 1 is located in Baltimore, Maryland, and consists of the Howard Street Tunnel, which runs underneath Howard Street from W. Hill Street to W. Mount Royal Avenue, and associated areas north and south of the tunnel (**Figure 1-3**). The survey area is located entirely within existing CSX ROW. The total area of Survey Area 1 is 4.8 acres (1.9 hectares). The Howard Street Tunnel generally runs from Camden Station to Mount Royal Station and is approximately 8,700-feet (2,652-meters) long. The Howard Street Tunnel was constructed between 1890 and 1895 in three sections: a mined section, a cut-and-cover section, and a concrete box section. Two construction method options are being considered for improvements to the Howard Street Tunnel: 1) a conventional approach and 2) a non-conventional approach.

Under the conventional construction method, proposed improvements include a combination of track geometry optimization, track lowering, tunnel arch modification, invert modification, and improvements to the existing drainage system. Within the 6,200-foot mined section of the tunnel, extending from just north of W. Lombard Street to just north of Dolphin Street, a combination of arch modification, invert modification, and track lowering is proposed to achieve the necessary clearance. This combination of methods was selected because there is insufficient depth beneath the tracks and the tunnel invert to achieve the necessary clearance height by solely lowering the track. Since there are no obstacles

restricting alteration of the tunnel's arch, it is therefore more cost effective and less disruptive to gain the clearance height through a combination of notching the arch and lowering the track elevation.

Within the 1,140-foot long cut and cover section, which extends from just south of W. Camden Street to just north of W. Lombard Street (**Figure 1-3**), there is not sufficient space to achieve clearance by lowering the track within the existing tunnel. Above this section of the tunnel, fewer than five feet of fill material exists between the tunnel and Howard Street, and the MDOT Maryland Transit Administration (MTA) Light RailLink operation adjacent to or above the tunnel. These conditions prohibit modification to the tunnel's arch in this section. Therefore, clearance in this section will be achieved by lowering the tunnel invert and rebuilding the track using wood ties and ballast to achieve the necessary clearance.

Track lowering is proposed along the 1,360-foot long concrete box section of Howard Street Tunnel extending from just north of Martin Luther King Jr. Boulevard to just south of W. Camden Street. Within this section, there is sufficient ballast depth to lower the track profile to achieve the necessary clearance.

The non-conventional construction method entails the use of a tunnel enlargement system (TES) to gain clearance along 75 percent of the tunnel's length within the 6,200-foot mined section of the tunnel. A feasibility study evaluating the use of the TES at Howard Street Tunnel is currently in progress by CSX. This approach would allow train operations to continue during active construction and, upon completion, would result in a new tunnel structure along the length of its use. Since there is not sufficient clearance between the top of the tunnel and the overlying Howard Street along the cut-and-cover section of the tunnel, the use of the TES cannot extend through the tunnel's existing cut-and-cover section. Therefore, to maintain the benefit of continued train traffic during construction offered by the TES, the clearance in the existing cut-and-cover section would be achieved by removing the top of this section of the tunnel and reconstructing it. For the concrete box section of the Howard Street Tunnel, the clearance methodology would remain the same as the conventional approach and be achieved through track lowering only.

1.4.2 Survey Area 2 – North Avenue Bridge Modification, Baltimore, Maryland

Survey Area 2 is located in Baltimore, Maryland, along North Avenue as it intersects the existing CSX ROW and includes all areas that may be affected by the modification of the North Avenue Bridge (Bridge No. BC 1208) (**Figure 1-4**). The survey area measures 0.3 acres (0.1 hectares) and is located partially within the existing CSX ROW and entirely within the existing MDOT ROW. Track lowering is not being proposed at this location in order to avoid any impact to the Amtrak B&P Tunnel. The project proposes to replace a portion of the North Avenue arch bridge with a single span, shallow girder bridge, with no change to the superstructure, including the roadway profile of North Avenue.

1.4.3 Survey Area 3 – Guilford Avenue Bridge Replacement, Baltimore, Maryland

Survey Area 3 is located in Baltimore, Maryland, at the intersection of Guilford Avenue and the existing CSX ROW and E. 26th Street (**Figure 1-5**). The survey area measures 0.4 acres (0.2 hectares) and is located both within and outside of the existing CSX ROW. The portion outside of the CSX ROW includes MDOT Harford Road ROW, Baltimore city property, and private property (2528 Guilford Avenue; 2530 Guilford Avenue; 2531 Guilford Avenue; and 2532 Guilford Avenue). An existing 12-inch sanitary sewer main under the tracks at the bridge location prevents track lowering at this location, as any modification would require track lowering for several blocks south in order to maintain the gravitational functionality of the sewer line. The project proposes to replace the existing arch bridge at Guilford Avenue (Bridge No. BC8029) with a single span, shallow girder bridge. The stone retaining walls are to remain for the new structure.

1.4.4 **Survey Area 4 – Harford Road Bridge Replacement, Baltimore, Maryland**

Survey Area 4 is located in Baltimore, Maryland, at the intersection of Harford Road and the existing CSX ROW, and extends to the north and south of the intersection (**Figure 1-6**). The survey area measures 2.1 acres (0.9 hectares) and is located both within and outside of the existing CSX ROW. The portion outside the CSX ROW includes MDOT Harford Road ROW, Baltimore city property, and private property (2504 Harford Road). An existing water main line beneath CSX's tracks at Harford Road limits the potential track lowering to depths that would not be sufficient to achieve the desired vertical clearance. As such, the project proposes replacing the Harford Road Bridge (Bridge No. BC8026) with a single-span, shallow girder bridge. In conjunction with the new bridge, minor track lowering that avoids the existing water main is proposed. This work will result in an increase of the roadway elevation across the bridge of approximately three to five feet.

In the undeveloped landscaped area east of Harford Road and north of the existing CSX ROW, fill material will be added to raise the area's elevation. As Harford Road and adjacent sidewalk grades will be raised, the project proposes to bring the grade of the landscaped area up to the same level. This proposed activity will entail stripping of existing grass, introduction of topsoil, grading, and planting grass.

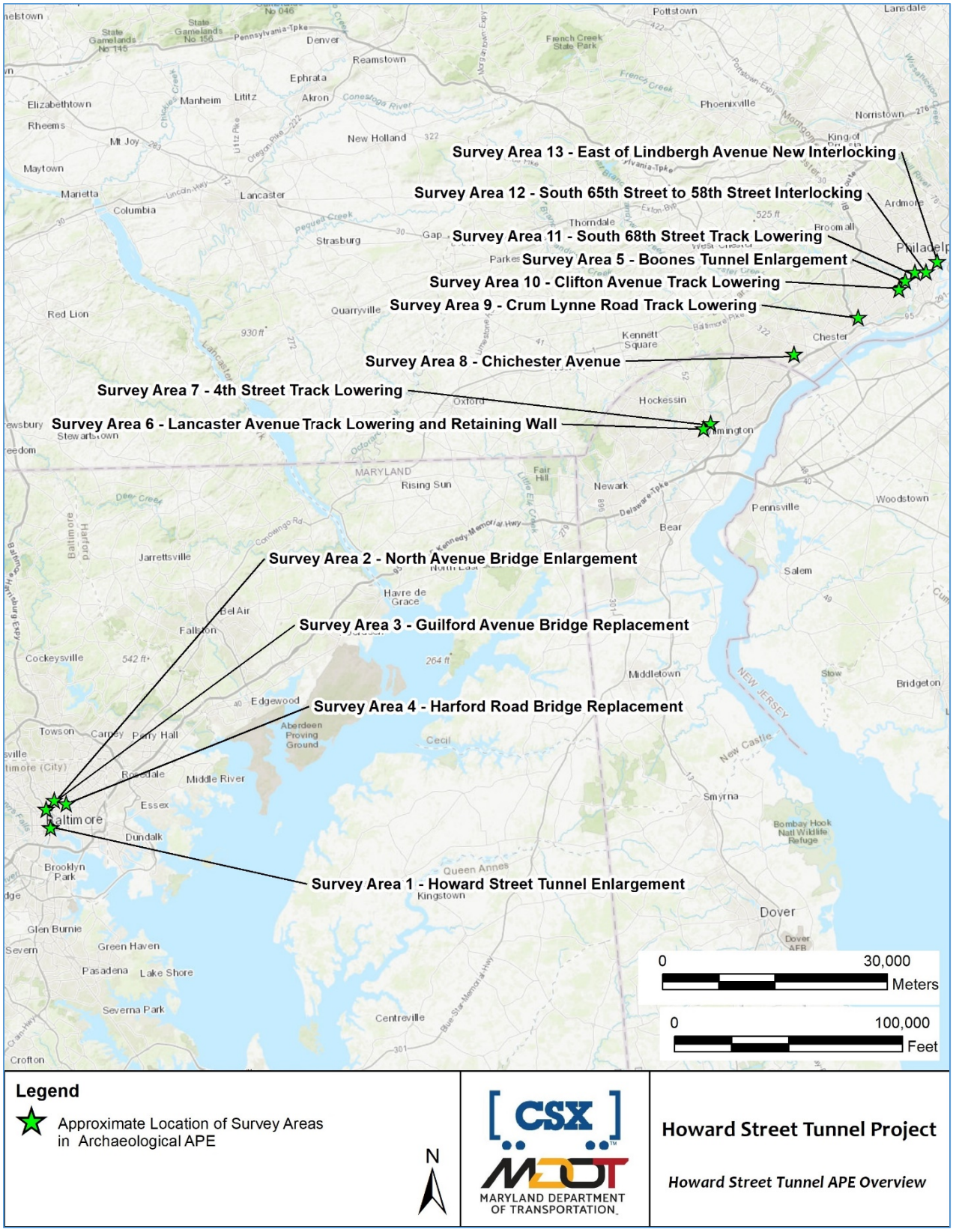

Figure 1-2. Howard Street Tunnel Project archaeological APE survey area locations in Maryland, Delaware, and Pennsylvania.

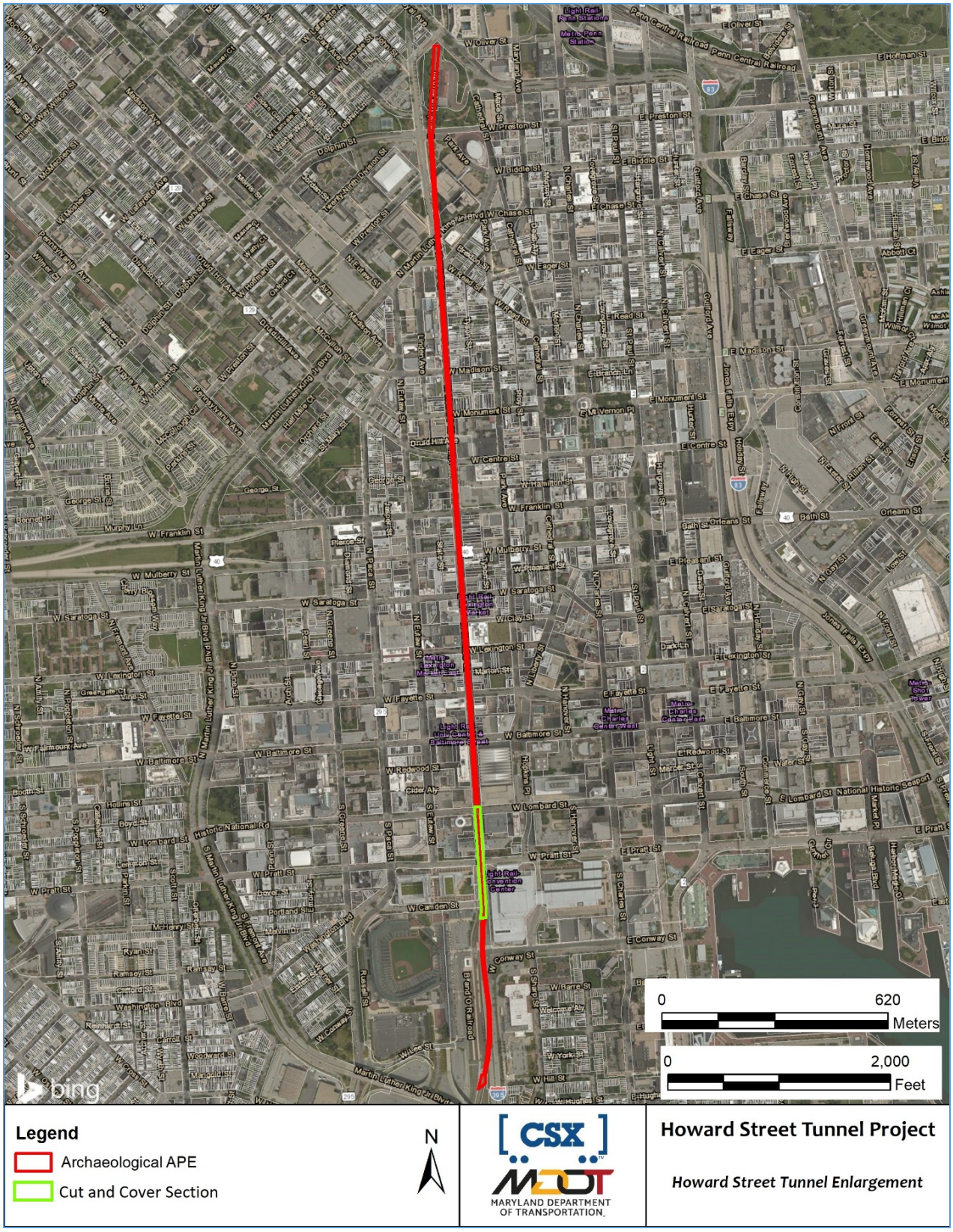

Figure 1-3. Survey Area 1, Baltimore, Maryland.

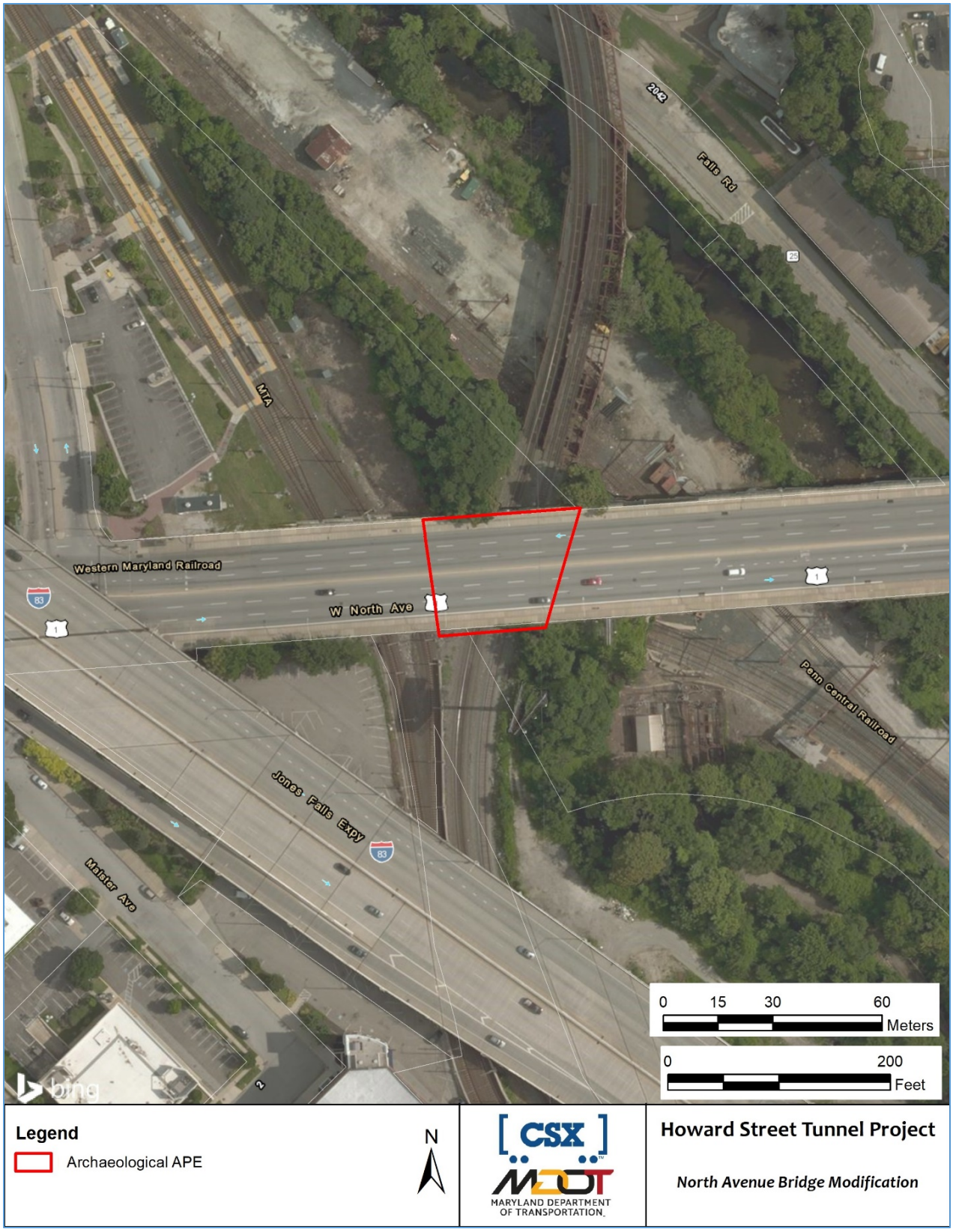

Figure 1-4. Survey Area 2, Baltimore, Maryland.

Figure 1-5. Survey Area 3, Baltimore, Maryland.

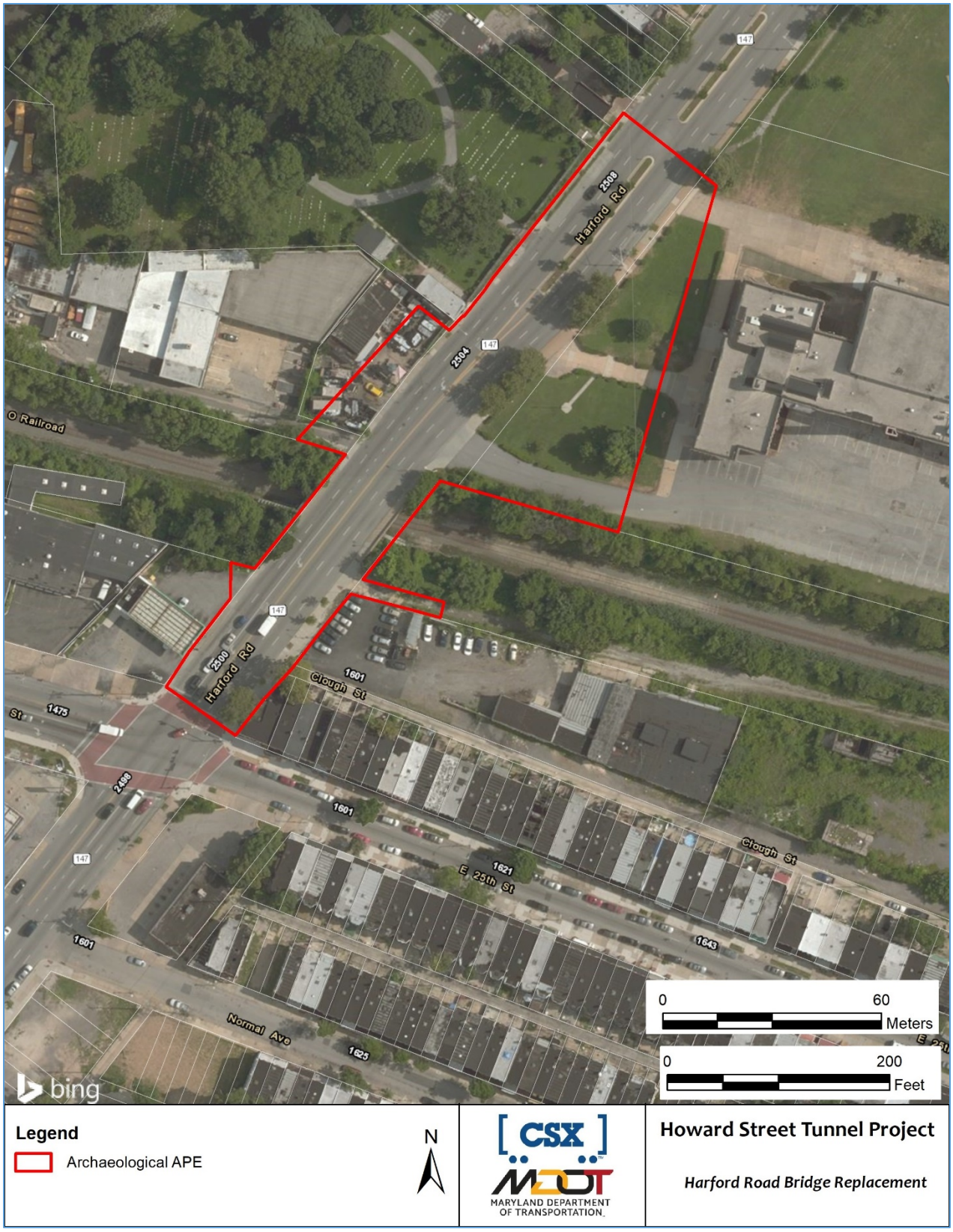

Figure 1-6. Survey Area 4, Baltimore, Maryland.

1.4.5 Survey Area 5 – Boone Tunnel Enlargement, Delaware County, Pennsylvania

Survey Area 5 is located at the intersection of the Collingdale, Sharon Hill, and Darby Boroughs of Philadelphia, Delaware County, Pennsylvania. The survey area consists of Boone Tunnel, which runs underneath the intersection of Chester Pike and Cherry Street, and the associated CSX ROW approximately 500 feet (152 meters) on either side of the tunnel (**Figure 1-7**). The survey area measures 1.7 acres (0.7 hectares) and is located entirely within the existing CSX ROW. The proposed improvements will require a combination of track lowering and arch modification of the tunnel. Due to past track lowering activities, the existing tunnel footings are very shallow, and further lowering alone to gain clearance would compromise the integrity of the footings. Therefore, the proposed improvements will include the addition of footing support, notching of the portals, and underpinning to support the tunnel structure in order to facilitate track lowering. To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet (152 meters) on either side of the bridge.

1.4.6 Survey Area 6 – Lancaster Avenue Track Lowering and Retaining Wall, Wilmington, Delaware

Survey Area 6 is located in Wilmington, Delaware, at the intersection of Lancaster Avenue and the existing CSX ROW (**Figure 1-8**). The survey area measures 1.3 acres (0.6 hectares). All proposed work will occur exclusively within the CSX ROW and includes track lowering underneath the Lancaster Avenue Bridge (Bridge No. 609) to increase the clearance from its current height of 19.5 feet to 21 feet (5.9 to 6.4 meters). To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet (152 meters) on either side of the bridge. The grade will be gradually lowered over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure at this location. A retaining wall is proposed within some sections of the survey area to accommodate track lowering. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal, as needed; erosion control of earthen embankments; constructing a new retaining wall north of Lancaster Avenue on the east side of the tracks to support earthen embankments; and laying gravel atop existing access/egress roads, as needed.

1.4.7 Survey Area 7 – W. 4th Street Track Lowering, Wilmington, Delaware

Survey Area 7 is located in Wilmington, Delaware, at the intersection of W. 4th Street and the existing CSX ROW (**Figure 1-8**). The survey area measures 1.1 acres (0.4 hectares). All proposed work will occur exclusively within the CSX ROW. Proposed work includes track lowering underneath the W. 4th Street Bridge (Bridge No. 609A) to increase the clearance from its current height of 19.5 feet to 21 feet (5.9 to 6.4 meters). To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet (152 meters) on either side of the bridge. The grade will be gradually lowered over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure at this location. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal, as needed; and laying gravel atop existing access/egress roads, as needed.

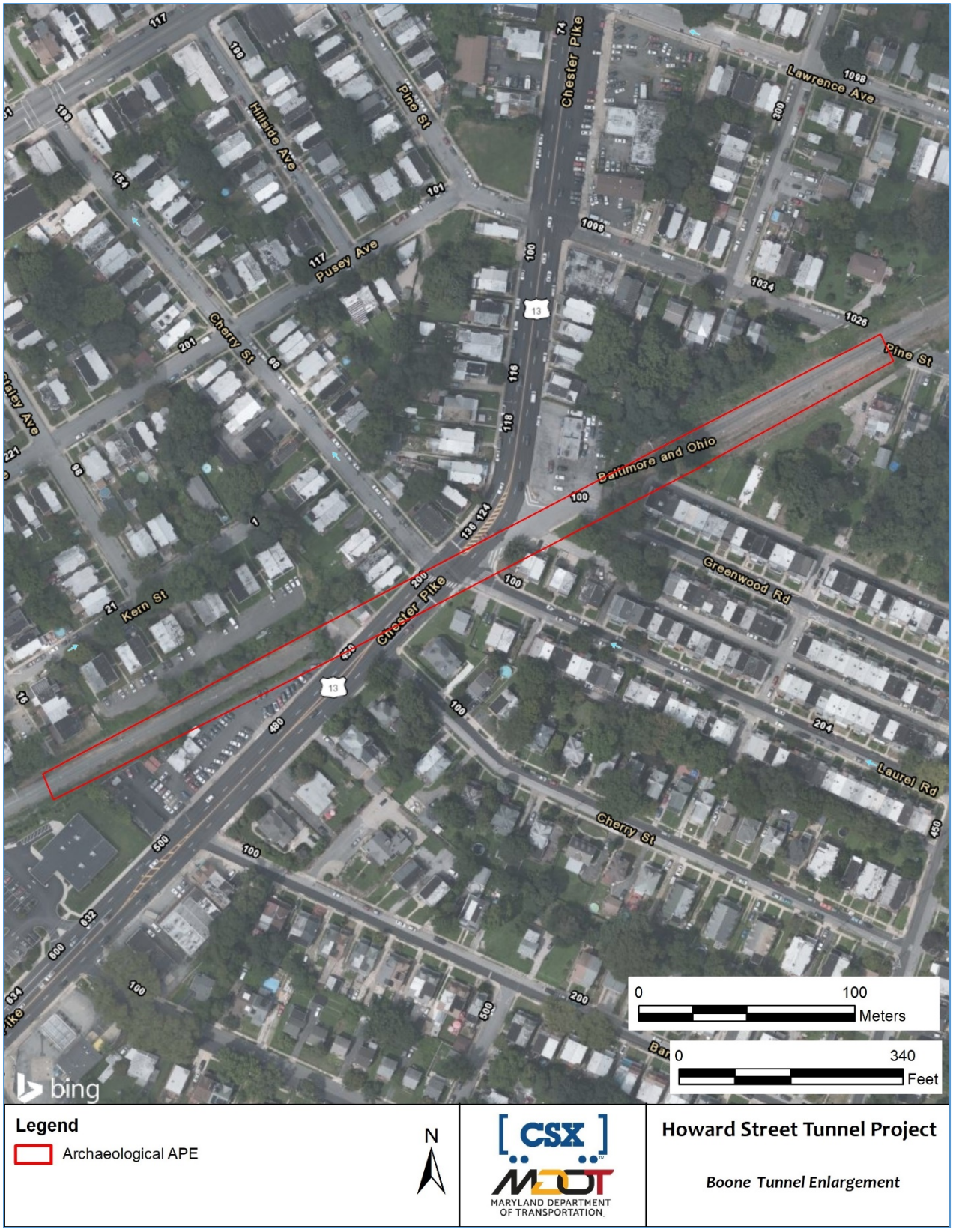

Figure 1-7. Survey Area 5, Delaware County, Pennsylvania.

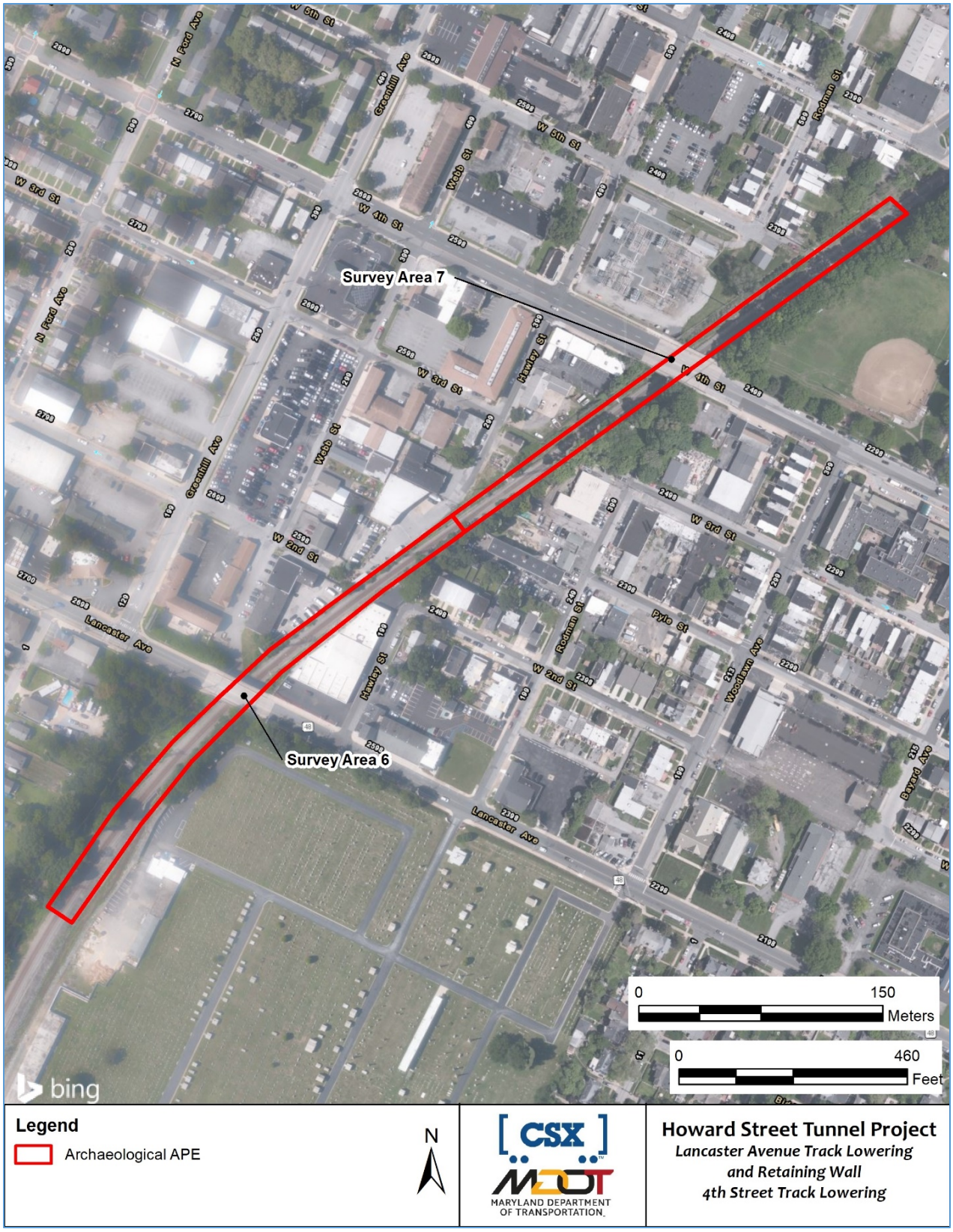

Figure 1-8. Survey Areas 6 and 7, Wilmington, Delaware.

1.4.8 Survey Area 8 – Chichester Avenue Track Lowering, Delaware County, Pennsylvania

Survey Area 8 is located in the Upper Chichester Township of Delaware County, Pennsylvania, at the intersection of Chichester Avenue and the existing CSX ROW (**Figure 1-9**). The survey area measures 1.4 acres (0.6 hectares). All proposed work will occur exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the Chichester Avenue Bridge (Bridge No. 75-A) to allow for double-stack train passage. To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal; and laying gravel atop existing access/egress roads.

1.4.9 Survey Area 9 – Crum Lynne Road Track Lowering, Delaware County, Pennsylvania

Survey Area 9 is located in the Ridley Township of Delaware County, Pennsylvania, at the intersection of Crum Lynne Road and the existing CSX ROW (**Figure 1-10**). The survey area measures 1.5 acres (0.6 hectares). All proposed work will occur exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the Crum Lynne Road Bridge (Bridge No. 81-A) to allow for double-stack train passage. To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal; and laying gravel atop existing access/egress roads.

1.4.10 Survey Area 10 – Clifton Avenue Track Lowering, Delaware County, Pennsylvania

Survey Area 10 is located in the Collingdale Borough of Delaware County, Pennsylvania, at the intersection of Clifton Avenue and the existing CSX ROW (**Figure 1-11**). The survey area measures 1.0 acres (0.4 hectares) and is located exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the Clifton Avenue Bridge (Bridge No. 85-B) to allow for double-stack train passage. To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the ROW; and laying gravel atop existing access/egress roads.

1.4.11 Survey Area 11 – S. 68th Street Track Lowering, Philadelphia County, Pennsylvania

Survey Area 11 is located in Philadelphia, Philadelphia County, Pennsylvania, at the intersection of S. 68th Street and the existing CSX ROW (**Figure 1-12**). The survey area measures 1.6 acres (0.7 hectares) and is located exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the S. 68th Street Bridge to allow for double-stack train passage. To accomplish track lowering at the bridge, a gradual grade change will extend along the existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the right-of-way; and laying gravel atop existing access/egress roads.

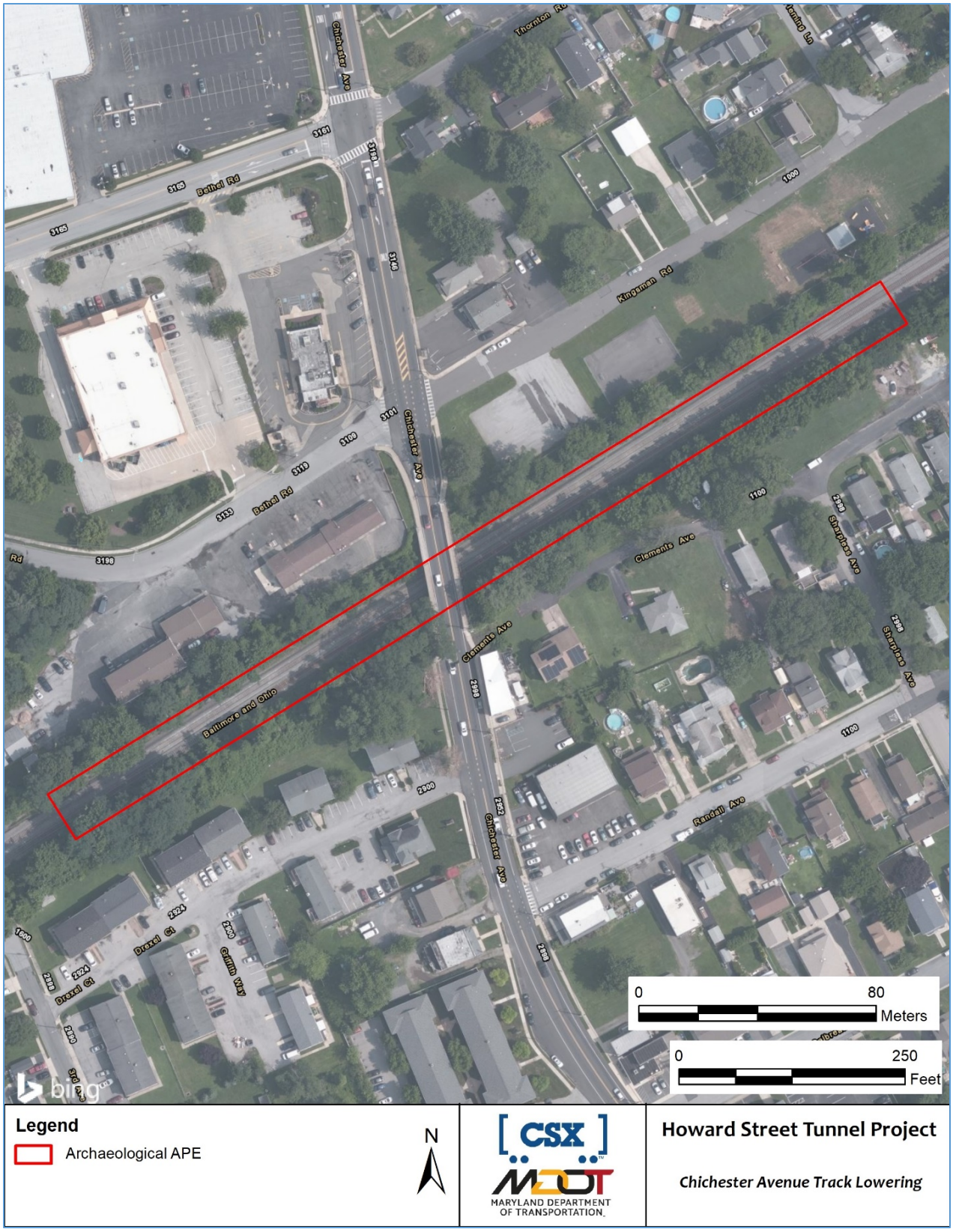

Figure 1-9. Survey Area 8, Delaware County, Pennsylvania.

Figure 1-10. Survey Area 9, Delaware County, Pennsylvania.

Figure 1-11. Survey Area 10, Delaware County, Pennsylvania.

Figure 1-12. Survey Area 11, Philadelphia, Pennsylvania.

1.4.12 Survey Area 12 – S. 65th Street to S. 58th Street Track Lowering, Retaining Wall, and Interlocking Removal, Philadelphia County, Pennsylvania

Survey Area 12 is located in Philadelphia, Philadelphia County, Pennsylvania, at the intersections of S. 65th Street, Cemetery Avenue, S. 61st Street, Woodland Avenue, S. 58th Street and the existing CSX ROW (**Figure 1-13**). The survey area measures 7.0 acres (2.8 hectares) and is located exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the S. 65th Street (Bridge No. 38915), Cemetery Avenue (No Bridge No.), 61st Street (No Bridge No.), and Woodland Avenue (Bridge No. 39196) bridges to allow for double-stack train passage. In addition, an existing interlocking near Woodland Avenue and S. 58th Street will be removed. Since the bridge lowering and interlocking locations are in close proximity to each other along the railroad line, they are all being treated as a single survey area. To accomplish lowering at the bridges, the APE will extend along the existing track approximately 500 feet (152 meters) on either side of each bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstructions. No work is anticipated to the bridge superstructures. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the right-of-way, as needed; and laying gravel atop existing access/egress roads, as needed. Erosion control of earthen embankments walls is also proposed along Cemetery Avenue, consisting of a concrete block wall to occur exclusively within the deeply cut portion of the existing CSX ROW.

1.4.13 Survey Area 13 –Lindbergh Boulevard New Interlocking, Philadelphia County, Pennsylvania

Survey Area 13 is located in Philadelphia, Philadelphia County, Pennsylvania, east of the intersection of Grays Avenue and the existing CSX ROW and west of the Schuylkill River (**Figure 1-14**). The survey area measures 8.3 acres (3.4 hectares) and is located exclusively within the CSX ROW. This is the proposed location of a new interlocking to replace an existing interlocking at Woodland Avenue and S. 58th Street. This is proposed to facilitate track lowering activities planned at Woodland Avenue and better railroad traffic flow during construction. The new interlocking will introduce additional ballast, railroad ties, and tracks adjacent with and parallel to the existing tracks. All proposed work will occur within the existing CSX ROW. Minor impacts within the existing CSX ROW due to minimal ground disturbance are anticipated.

Figure 1-13. Survey Area 12, Philadelphia, Pennsylvania.

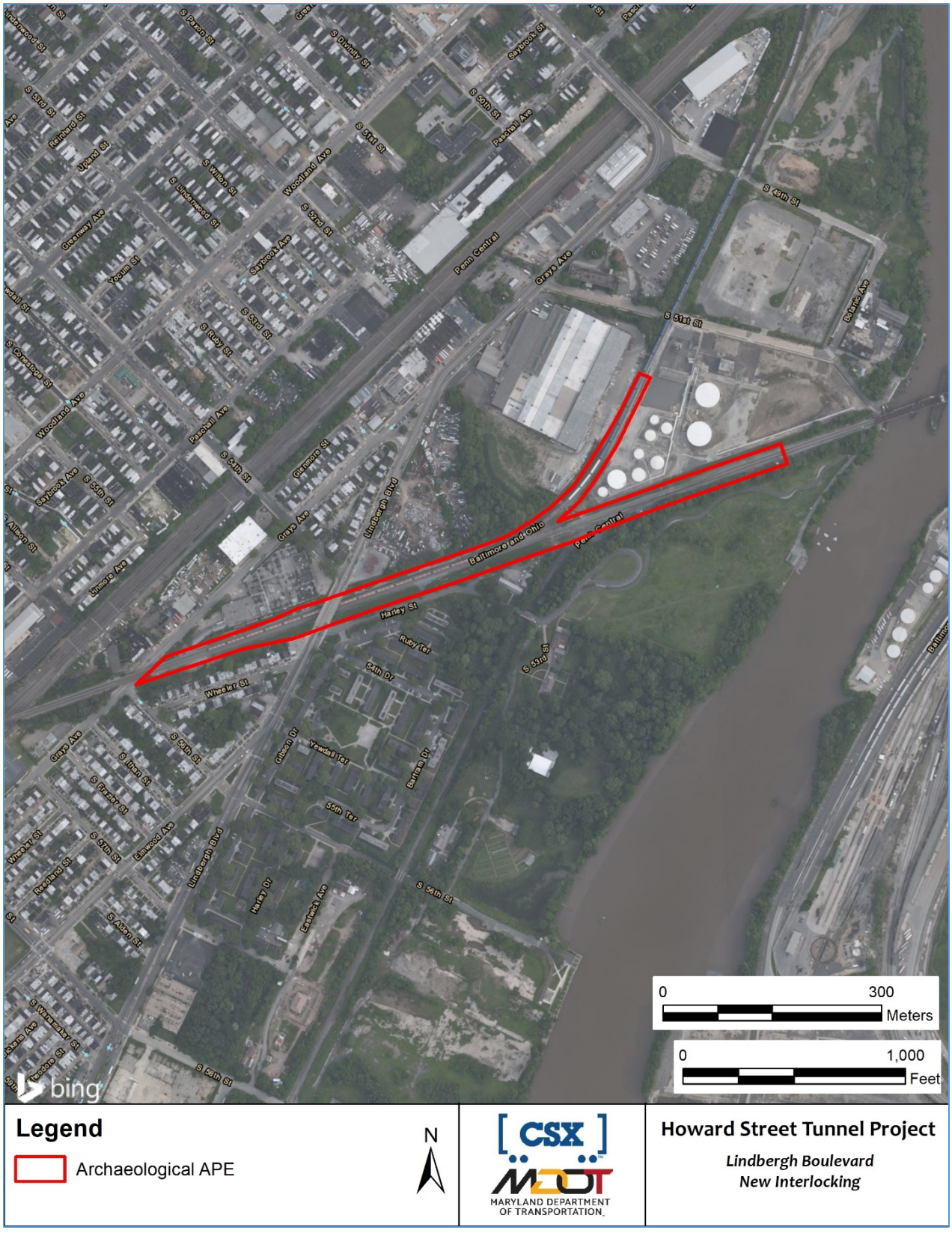

Figure 1-14. Survey Area 13, Philadelphia, Pennsylvania.

2. METHODOLOGY

2.1 Background Research

Rummel, Klepper & Kahl, LLP (RK&K) conducted background research to identify previously recorded cultural resources and previously conducted cultural resource investigations within and surrounding each survey area, and to construct a historic context for the project. This included a detailed narrative of pre-contact and historic land use to help determine the probability of encountering intact significant archaeological sites, and to serve as a framework for analyzing and making recommendations for additional archaeological investigations.

RK&K collected data on archaeological sites, historic architectural resources, and previous archaeological investigations from MHT's Medusa Cultural Resource Information System (Medusa), DHCA's Cultural and Historical Resources Information System (CHRIS), and the PHMC's Cultural Resources Geographic Information System (CRGIS). Information on previously identified archaeological sites and previously conducted archaeological surveys was compiled within a one-block search radius of the APE. Information of previously identified architectural resources, historic resources, NRHP properties, and state-inventoried properties were limited to within or adjacent to the APE. The exception to this method was for the architectural resources in Delaware, as locational information for these resources was limited to a single point. The search radius for these resources was increased to a one-block radius to ensure that no architectural resources within or adjacent to the APE were overlooked. Desktop documentary sources, such as historic and modern aerial photographs, regional histories, land records and plats, historic maps and atlases from the Library of Congress, and the United Stated Geological Survey (USGS) Historical Topographic Map Collection, were used to build a narrative of historic land use for each survey area. Environmental data including soil and physiographic data were also consulted.

2.2 Assessment of Archaeological Potential

To guide the Phase IA Archaeological Assessment, RK&K constructed a GIS-based qualitative archaeological probability model to identify areas of high, moderate, and low potential for intact significant pre-contact or historic archaeological sites within each survey area of the APE. Factors used to build the probability model included soil type; degree of slope; topographic features; proximity to water; level of previous disturbance; proximity and relationship to known historic properties (both archaeological sites and historic architectural resources); local and regional settlement patterns and land use; and the nature of the proposed improvements. This probability model was developed to comply with the guidelines for probability models specified in MHT's *Standards and Guidelines for Archaeological Investigations in Maryland* (Shaffer and Cole 1994), DHCA's *Archaeological Survey in Delaware* (2015), and the *Pennsylvania State Historic Preservation Office's Guidelines for Archaeological Investigations in Pennsylvania* (2017).

Current conditions within each of the five survey areas were assessed using aerial photography, Light Detection and Ranging (LiDAR) imagery provided by the National Map 3D Elevation Program (if available), and United States Department of Agriculture – Natural Resource Conservation Service (USDA NRCS) soil map overlays to identify areas that may retain physical integrity and the potential for intact soils or deeply buried deposits. RK&K reviewed the inventory of known archaeological sites, historic properties, and previous archaeological or historic architectural surveys within and nearby each survey area. Historic maps, aerial photographs, and land records were used to assess the historic archaeological potential of the archaeological APE. Regional sources, documenting the environmental setting, pre-contact settlement

patterns, and historic land use patterns within the Coastal Plain and fall line regions in Maryland, Delaware, and Pennsylvania, were also reviewed for the analysis. RK&K staff performed a series of field visits to each survey area during June and July 2020. Each survey area was visually assessed and photographed to document current conditions.

A survey area is considered to have high pre-contact archaeological potential if it satisfies all of the following criteria: 1) is within 1,000 feet (305 meters) of a water source; 2) is on a slope of less than 15 percent; and 3) is on mostly undisturbed or deeply buried, well-drained soils or otherwise presents heightened archaeological potential as assessed through background research or field assessment.

An area is considered to have high historic archaeological potential if it satisfies all of the following criteria: 1) it was undisturbed or minimally disturbed by the original construction of the Baltimore and Ohio (B&O) Railroad; 2) it remains undisturbed or minimally disturbed by modern (post-1950) urban development; 3) is located within 1,000 feet (305 meters) of known historic period occupations represented by previously documented archaeological sites, standing or documented historic structures or buildings or otherwise presents heightened archaeological potential, as assessed through background research or field assessment.

Survey areas that satisfy some of the criteria for high archaeological potential and are undeveloped or do not appear to be disturbed are designated as having moderate archaeological potential.

Survey areas that do not satisfy any of the criteria for high or moderate archaeological potential are considered to have low potential to contain intact pre-contact or historic archaeological sites.

In addition to this independent assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within the survey areas located in Pennsylvania. The Pennsylvania Statewide Pre-Contact Probability Model was developed by PennDOT and the PA SHPO to assist in project planning. The probability model uses physiographic region, watershed data, previously recorded pre-contact site locations, and other relevant environmental factors to identify areas of High and Moderate potential for pre-contact archaeological sites. This model, however, does not take into account disturbance that may impact archaeological potential. As such, aerial photography, LiDAR, historic topographic maps, and soils information were consulted to supplement the Pennsylvania Statewide Pre-Contact Probability Model. Delaware does have archaeological predictive modeling for the Coastal Plain, but the survey areas in Delaware are within the Piedmont Plateau, so the predictive model was not consulted for this project. Maryland does not provide similar pre-contact archaeological probability models.

The results of the probability models, in conjunction with ground disturbing activities proposed for each survey area, were used to provide recommendations for additional archaeological investigations as necessary. These recommendations may include geomorphological testing, shovel test survey, remote sensing, archaeological monitoring, test unit excavation, pedestrian survey, or additional historic research. No additional archaeological investigations were recommended for locations determined to possess low archaeological potential. In areas determined to have moderate or high archaeological potential, RK&K provides specific recommendations for additional archaeological investigations or, alternatively, an assessment of why additional archaeological investigations are not warranted.

2.3 Consulting Parties and Public Involvement

FRA initiated the Section 106 process for the HST Project with MHT, PHMC, and DHCA by letters dated April 24, 2020. The initiation included a preliminary APE and potential consulting parties. MHT concurred with the preliminary APE and potential consulting parties by letter dated June 3, 2020. PHMC concurred with the preliminary APE and potential consulting parties, with an additional suggested invitee, by letter dated May 14, 2020. A Section 106 kickoff meeting was held virtually via Microsoft Teams with representatives from FRA, MHT, PHMC, CSX, MDOT MPA, and RK&K on May 14, 2020. The goal of the meeting was to present overall project information and preliminary information regarding historic properties, and to solicit input from the respective SHPO representatives regarding methodology. Additional consulting party coordination documents can be found as an appendix in the *Architectural Historic Properties Identification and Effects Assessment Technical Report* (Bray 2021).

FRA has invited parties entitled to be consulting parties, including federally recognized Indian tribes and local governments, to participate in the Section 106 compliance process for the HST Project (36 CFR Part 800.2(c) and 800.3(f)). Five respondents have agreed to participate as additional consulting parties: Delaware Nation; Delaware Tribe of Indians; Baltimore Heritage; Delaware County Planning Department, Heritage Commission; and Preservation Maryland. The Catawba Indian Nation responded to the invitation and expressed no immediate concerns with the project, but wishes to be notified if Native American artifacts or human remains are recovered. Consulting parties will receive HST Project documents and correspondence for their review and comment, including those identifying historic properties, assessing effects, and discussing measures to resolve adverse effects made in accordance with 36 CFR Part 800.4 to 800.6.

FRA continued consultation with the consulting parties on November 6, 2020 by submitting the *Phase IA Archaeological Assessment* and *Architectural Historic Properties Identification and Effects Assessment* reports. Non-tribal additional consulting parties only received the historic architectural report in order to protect potentially sensitive information about archaeological resources. MHT responded on December 2, 2020, and concurred with most of the findings of both reports. Exceptions include the NRHP evaluation findings of three newly identified architectural resources, which MHT believes to be eligible for NRHP listing: Clifton Park Junior High School (B-5329), Darley Park (B-5330), and Cannon Shoe Company (B-5332). MHT noted the group of rowhouses at 2518-2526 Harford Road, 2508-2510 Harford Road, and 2514-2516 Harford Road cannot be evaluated in isolation from the larger neighborhood of which they are a part, and that they believe this as-yet-undefined historic district would be eligible. MHT also noted edits needed for Maryland archaeological site records search results.

The PHMC responded on December 7, 2020, and concurred with the findings of both reports. The agency noted its preference for the conventional construction method of track lowering within the Boone Tunnel. On December 7, 2020, the Delaware Nation indicated the proposed project location does not endanger cultural or religious sites of interest to the Tribe, and also noted the steps for any unanticipated discoveries during construction.

The DHCA responded on January 6, 2021, stating no objection to the finding that the one architectural resource evaluated in Delaware is not eligible for NRHP listing. The agency concurred that there is little potential for intact archaeological resources and no further archaeological work is needed in Delaware if construction, staging, stockpiling, and access to the project locations in the state will be confined to the existing railroad right-of-way. The DHCA also provided additional comments on the reports, project information, the area of potential effects, and consulting parties.

The architectural report has been revised to address MHT comments and includes a new DOE Form for one newly identified residential historic district, which includes the three originally identified groups of rowhouses: the Lower Coldstream Homestead Montebello Historic District (B-5331). This archaeological report has also been revised to address MHT comments. In addition, some revisions requested in the DHCA response have been addressed in this report and the architecture report. Both reports have also been updated to document recent consultation and that the non-conventional construction method is no longer under consideration at Boone Tunnel in Pennsylvania.

Pursuant to 36 CFR Part 800.2(d), "the agency official may use the agency's procedures for public involvement under NEPA or other program requirements in lieu of public involvement requirements in subpart B of this part, if they provide adequate opportunities for public involvement consistent with this subpart." In accordance with the coordinated Section 106 and NEPA public involvement plan developed by CSX and MDOT MPA for the HST Project, a virtual public hearing is planned for early 2021. Comments from the public and other potential stakeholders have been and will continue to be solicited regarding the identification of historic properties and potential effects in accordance with Section 106 and NEPA. Comments from the public and other potential stakeholders have been and will continue to be solicited regarding the identification of historic properties and potential effects, in accordance with Section 106 and NEPA.

3. ENVIRONMENTAL SETTING

Survey Areas 1 through 4, located in the City of Baltimore, are in an urban, heavily developed setting. Survey Areas 5, 8, 9, 10, 11, 12, and 13 are located southeast of Philadelphia, Pennsylvania in heavily developed suburban and urban settings. Survey Areas 6 and 7 are located in an urban, developed setting in the northeast section of Wilmington, Delaware. A brief synopsis of the environmental setting for each survey area—including physiographic province, geology, hydrology, and soils—is provided below.

3.1 Physiography and Geology

Survey Area 1 is within both the Maryland Atlantic Coastal Plain and the Piedmont Plateau physiographic provinces. The portion of Survey Area 1 within the Atlantic Coastal Plain is located within the Western Shore Lowlands Region in the Aberdeen Estuaries and Lowlands District. Landforms within the district consist of lowlands with few topographic features and an elevation of less than 50 feet (15 meters) on the northwestern shore of the Chesapeake Bay. The Aberdeen Estuaries and Lowlands District is a stretch of irregular coastline indented by the Bush, Bird, Middle, Back, and Patapsco River mouths (Reger and Cleaves 2008). Survey Area 1 is located within the Patapsco-Back-Middle Archaeological Research Unit, as defined by the Council for Maryland Archaeology (Shaffer and Cole 1994).

The northern portion of Survey Area 1 and the remaining survey areas in Baltimore are located in the Piedmont Plateau within the fall line region. Survey Areas 2, 3, and 4 are situated within the Perry Hall Upland District where the unconsolidated underlying geology of the Coastal Plain transitions to the crystalline hilltops of the Piedmont. In the Perry Hall Upland District, Cretaceous gravels and sediments begin to thicken in the southeast and rivers have incised steep-walled valleys into the crystalline rock. Survey Areas 2, 3, and 4 are located within the Patapsco-Back-Middle Archaeological Research Unit as defined by the Council for Maryland Archaeology (Shaffer and Cole 1994).

Survey Areas 5, 8, 9, 10, 11, 12, and 13 are located within the Lowland and Intermediate Upland sections of the Atlantic Coastal Plain Province, which consists of unconsolidated to poorly consolidated sand and gravel underlain by schist, gneiss, and other metamorphic rocks. These areas are part of the Pensauken and Bridgeton geologic formations (Pennsylvania Department of Conservation and Natural Resources [PA DCNR] 2020). The Bridgeton Formation is overlain by the Pensauken Formation and consists of yellow to dark reddish-brown feldspathic quartz sand that is cemented and extensively crossbedded, and is interbedded with coarse gravels and boulders (PA DCNR 2020).

Survey Areas 6 and 7 are located within Delaware's Piedmont Plateau physiographic province just north of the fall line. The survey areas are situated on Paleozoic era metamorphic rock of the Wilmington Complex (Spoljaric and Jordan 1966).

3.2 Soils

As the APE survey areas are geographically distinct, soils within each survey area are addressed individually below. **Table 3-1** shows the collective acreage and percentage of each soil type within the overall APE.

Table 3-1. Soil Series within the combined survey areas.

Map Unit Symbol	Map Unit Name	Acres	Percentage of APE	Survey Areas
31UB	Urban land-Sassafras complex, 0-8 slope	0.6	1.8	1
33UB	Urban land-Sunnyside complex, 0 to 8 percent slopes	0.3	0.9	4
34UB	Urban land-Sunnyside Christiana complex, 0 to 8 percent slopes	0.5	1.5	4
40E	Udorthents, loamy, very deep, 15 to 60 percent slopes	0.8	2.4	4
42E	Udorthents, smoothed, 0 to 35 percent slopes	0.7	2.1	2, 3
44UC	Urban land, 0 to 15 percent slopes	4.7	14.4	1, 3, 4
BeB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	<0.1	0.3	10
Ma	Made land, gravelly materials	2.9	8.9	8,9,10
Mc	Made land, silt and clay materials	2.7	8.3	5
Me	Made land, schist and gneiss materials	<0.1	0.3	5
NxB	Neshaminy-Urban land complex, 0 to 8 percent slopes	2.4	7.3	6,7
Ub	Urban land	8.2	25.1	1, 12, 13
Uh	Urban land-Howell complex	8.7	26.6	11, 12, 13
TOTAL		**32.7**	**100**	

3.2.1 Survey Area 1 – Howard Street Tunnel Enlargement, Baltimore, Maryland

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 1 – Urban land (44UC) and Urban land-Sassafras complex (31UB) (**Figure 3-1, Figure 3-2, Figure 3-3**). The Urban land unit has been classified as 100 percent Urban land with slopes between 0 and 15 percent. The Urban land-Sassafras complex unit was classified at 75 percent Urban land, and 25 percent Sassafras and minor component soils with 0 to 8 percent slope. These soils are located almost entirely underneath Howard Street in areas that coincide with previous disturbances. The Sassafras and minor components are well-drained, deep gravelly loam soils that formed on fluviomarine terraces and flats. A vicinity search surrounding the survey area identified similar soils.

3.2.2 Survey Area 2 – North Avenue Bridge Modification, Baltimore, Maryland

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 2—Udorthents, smoothed (42E) soils with slopes between 0 and 35 percent. The soil is composed of well-drained, gravelly silt loam and consists of areas that have been excavated in preparation for development (**Figure 3-4**). A vicinity search of the area identified similar soils along with mixed soil complexes where the major soil component is Urban land.

Figure 3-1. Soil Series within Survey Area 1 (Map 1 of 3), Baltimore, Maryland.

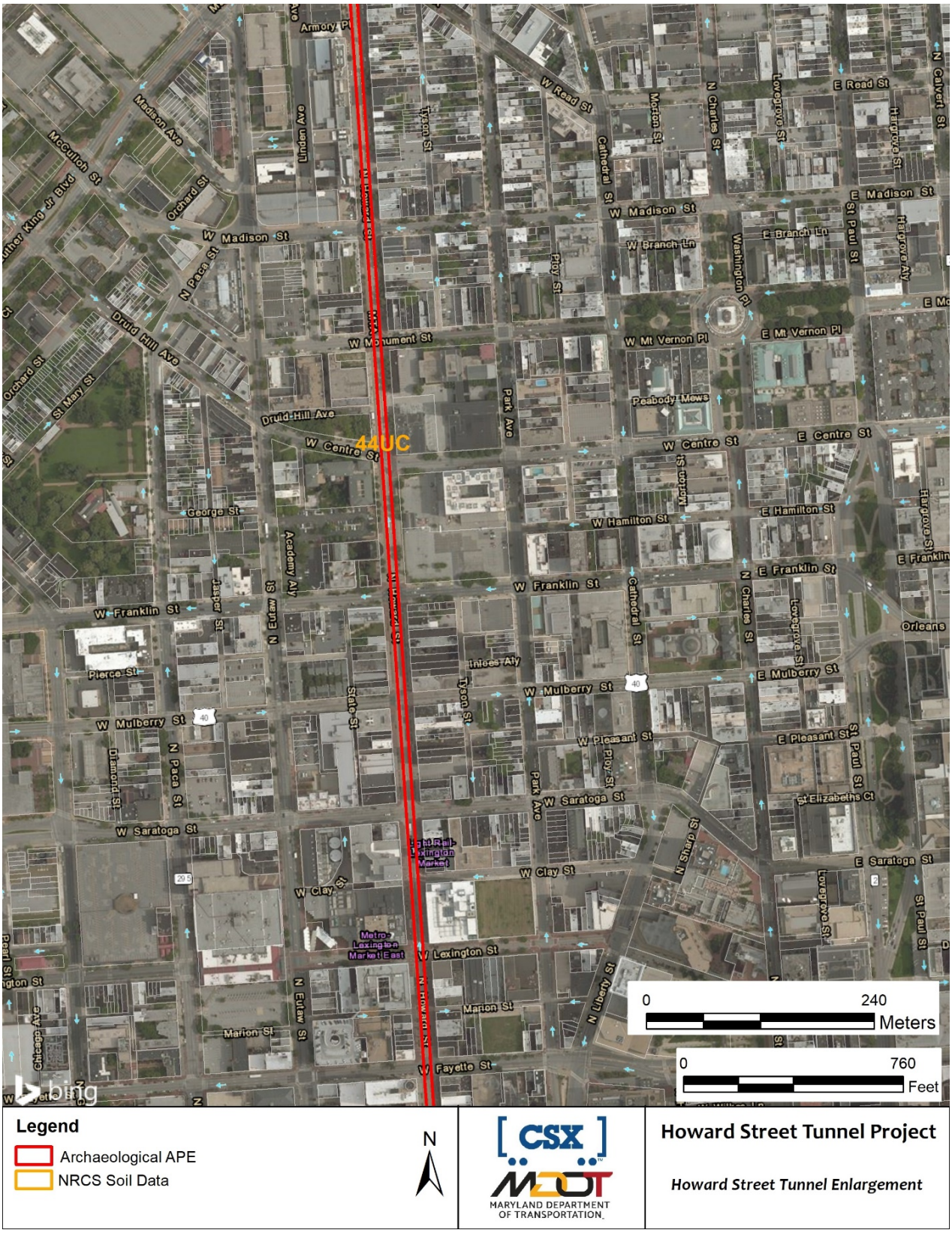

Figure 3-2. Soil Series within Survey Area 1 (Map 2 of 3), Baltimore, Maryland.

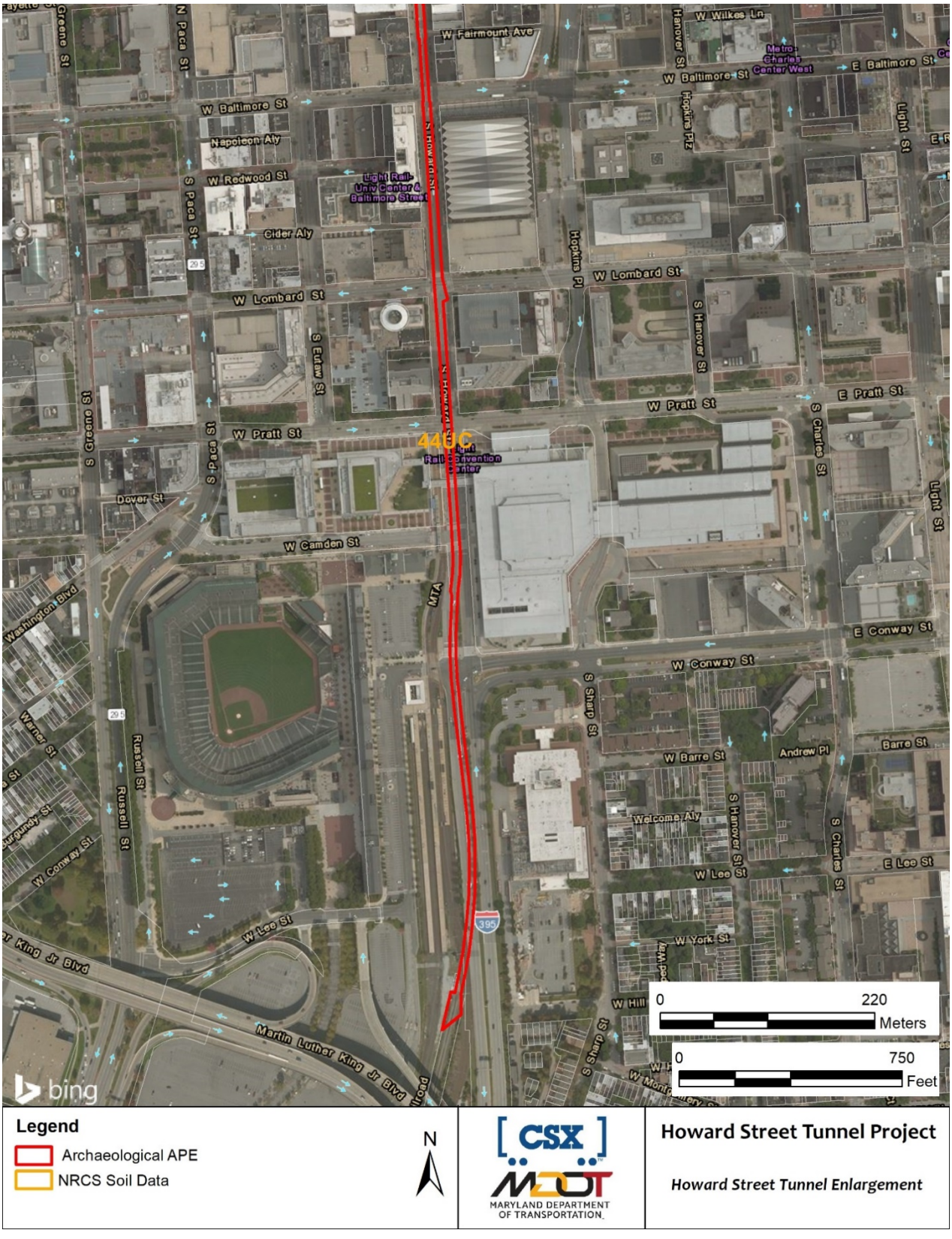

Figure 3-3. Soil Series within Survey Area 1 (Map 3 of 3), Baltimore, Maryland.

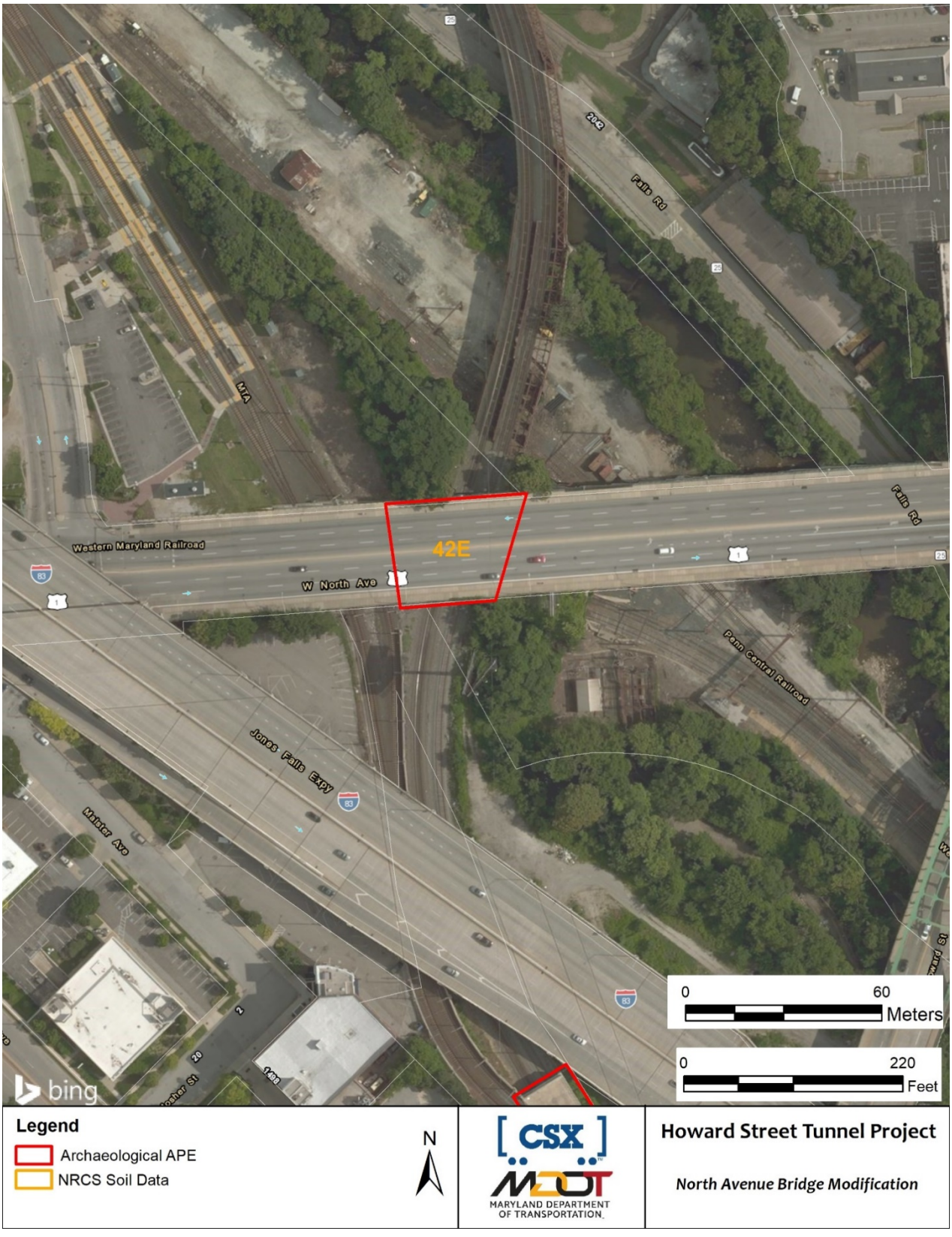

Figure 3-4. Soil Series within Survey Area 2, Baltimore, Maryland.

3.2.3 Survey Area 3 – Guilford Avenue Bridge Replacement, Baltimore, Maryland

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 3—Udorthents, smoothed (42E) and Urban land (44UC) **(Figure 3-5**). The Udorthents, smoothed soil has documented slopes between 0 and 35 percent. The soil is composed of well-drained, gravelly silt loam and consists of areas that have been excavated in preparation for development. The Urban land unit has been classified as 100 percent Urban land with slopes between 0 and 15 percent. A vicinity search identified similar soils within the area.

3.2.4 Survey Area 4 – Harford Road Bridge Replacement, Baltimore, Maryland

The USDA NRCS Web Soil Survey identified four soil types within Survey Area 4 (**Figure 3-6**). Udorthents, loamy (40E) is deep and well-drained sandy loam and has recorded slopes of 15 to 60 percent. Urban land (44UC) has been classified as 100 percent Urban land with slopes between 0 and 15 percent and is mapped below Harford Road. Urban land-Sunnyside complex (33UB) soils are mapped below Harford Road. The Urban land component comprises 75 percent of the soil, and Sunnyside and similar soils are 25 percent of the unit. Sunnyside soils are described as well-drained, fine sandy loams formed in fluvial sediments. Sunnyside soils have a documented E horizon layer below the A horizon. Urban land-Sunnyside-Christiana complex (34UB) soils are situated underneath Harford Road and a commercial property entrance. Urban land and Sunnyside soil descriptions, as described above, make up the majority of the soil in this complex. Christiana soils are moderately well to well-drained silt loams that are formed from clayey fluviomarine deposits on flat, knolls, and hillocks. Christiana soils, like the Sunnyside soils, have an E horizon below the A horizon. A vicinity search identified similar soils in the surrounding area.

3.2.5 Survey Area 5 – Boone Tunnel Enlargement, Delaware County, Pennsylvania

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 5—Made land, silt and clay materials (Mc) and Made land, schist and gneiss materials (Me) (**Figure 3-7**). Made land, silt and clay materials is mapped as Udorthents, unstable acidic, loamy fill that was transported into the survey area derived from interbedded sedimentary rock. Made land, schist and gneiss materials is mapped as Udorthents, Schist and Gneiss that has been graded. The depth to restrictive features ranges from 72 to 80 inches (182 to 203 centimeters). A vicinity search surrounding the survey area identified similar soils.

3.2.6 Survey Area 6 – Lancaster Avenue Track Lowering and Retaining Wall, Wilmington, Delaware

The USDA NRCS Web Soil Survey identified one soil type with Survey Area 6—Neshaminy-Urban land complex, 0 to 8 percent slopes (NxB) (**Figure 3-8**). Neshaminy silt loam comprises 55 percent of the soil complex and is moderate well-drained forms on hillslopes from residuum weathered from gabbro. Urban land comprises 35 percent of the soil complex and minor components comprise the remainder.

3.2.7 Survey Area 7 – W. 4th Street Track Lowering, Wilmington, Delaware

The USDA NRCS Web Soil Survey identified one soil type with Survey Area 7—Neshaminy-Urban land complex, 0 to 8 percent slopes (NxB) (**Figure 3-8**). Neshaminy silt loam comprises 55 percent of the soil complex and is moderate well-drained forms on hillslopes from residuum weathered from gabbro. Urban land comprises 35 percent of the soil complex and minor components comprise the remainder.

Figure 3-5. Soil Series within Survey Area 3, Baltimore, Maryland.

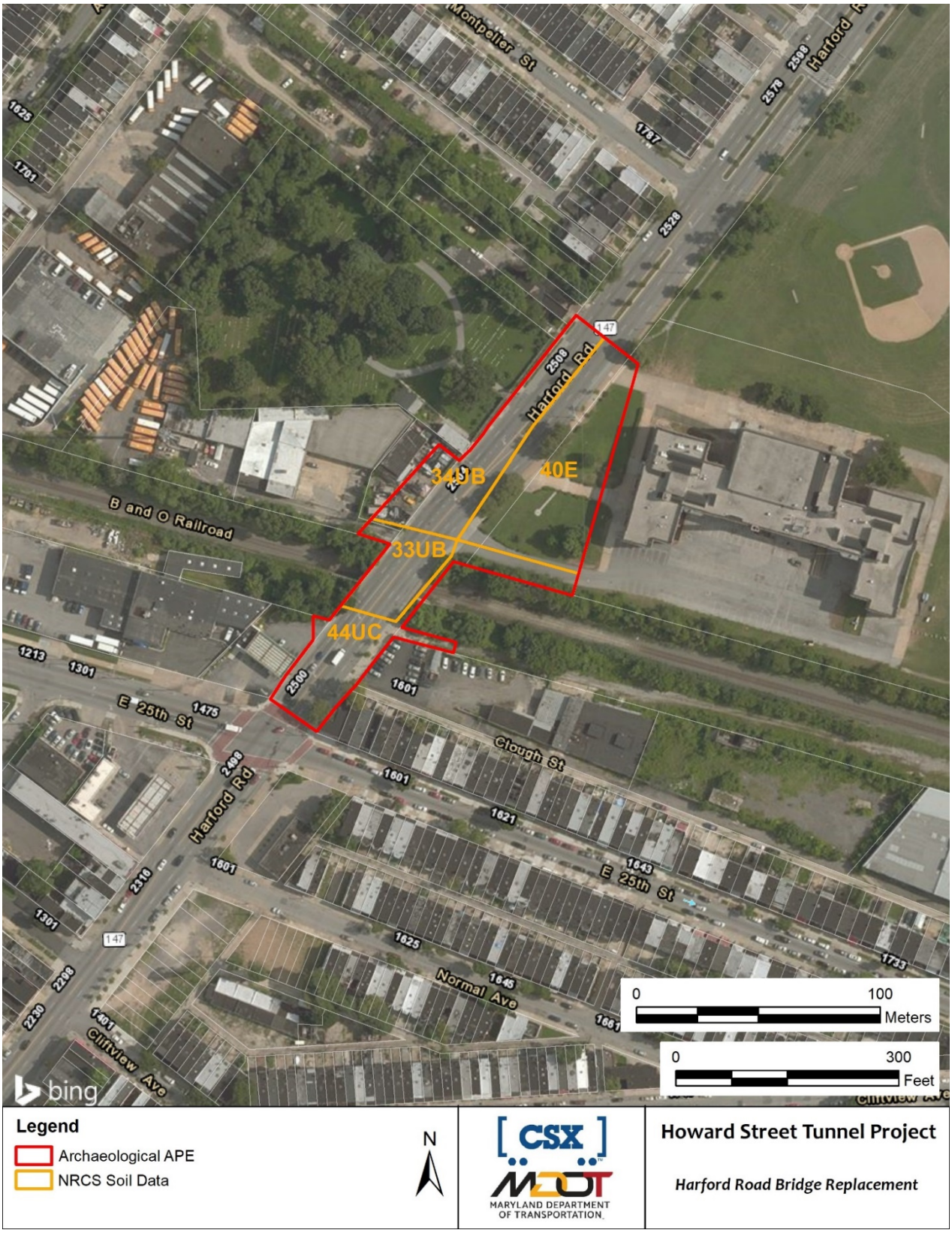

Figure 3-6. Soil Series within Survey Area 4, Baltimore, Maryland.

Figure 3-7. Soil Series within Survey Area 5, Delaware County, Pennsylvania.

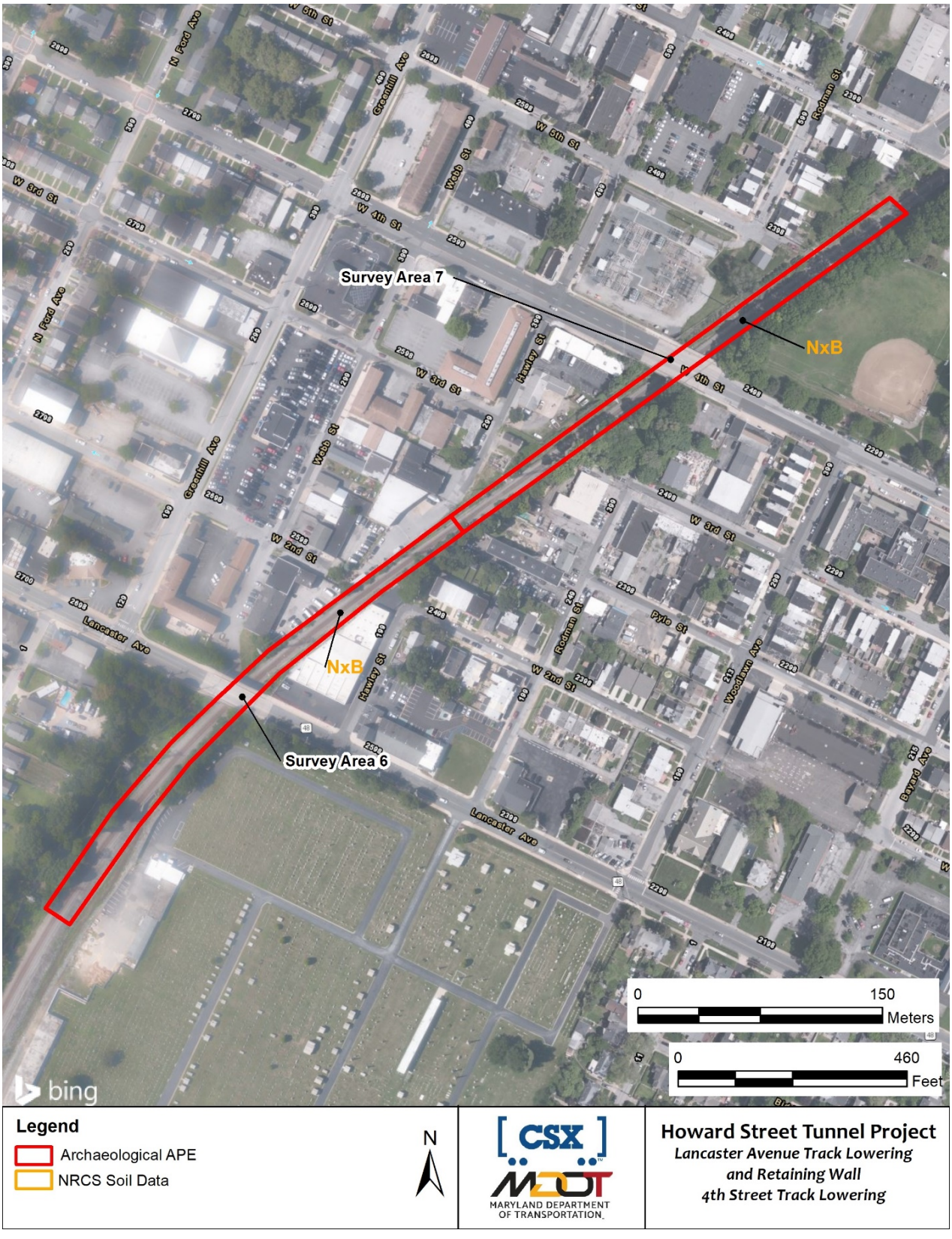

Figure 3-8. Soil Series within Survey Areas 6 and 7, Wilmington, Delaware.

3.2.8 Survey Area 8 – Chichester Avenue Track Lowering, Delaware County, Pennsylvania

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 8—Made land, gravelly materials (Ma) (**Figure 3-9**). The soil is mapped as Udorthents, Shale and Sandstone fill that was transported into the survey area. The parent material is graded sandstone and shale with bedrock located from 20 to 99 inches below the surface.

3.2.9 Survey Area 9 – Crum Lynne Road Track Lowering, Delaware County, Pennsylvania

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 9—Made land, gravelly materials (Ma) (**Figure 3-10**). The soil is mapped as Udorthents, Shale and Sandstone fill that was transported into the survey area. The parent material is graded sandstone and shale with bedrock located from 20 to 99 inches below the surface.

3.2.10 Survey Area 10 – Clifton Avenue Track Lowering, Delaware County, Pennsylvania

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 10—Made land, gravelly materials (Ma) and Beltsville silt loam, 3 to 8 percent slopes, moderately eroded (BeB2) (**Figure 3-11**). The Ma soil is mapped as Udorthents, Shale and Sandstone fill that was transported into the survey area. The parent material is graded sandstone and shale with bedrock located from 20 to 99 inches below the surface. The BeB2 soils consist of 85 percent Beltsville soils and 15 percent minor components. The BeB2 soils make up less than 1 percent of the Survey Area 10 soils.

3.2.11 Survey Area 11 – S. 68th Street Track Lowering, Philadelphia County, Pennsylvania

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 11—Urban land, Howell complex (Uh) (**Figure 3-12**). Urban land, Howell complex is mapped as 50 percent Urban land, 30 percent Howell and similar soils, and 5 percent minor components. The parent material is pavement, buildings, and other artificially covered areas.

3.2.12 Survey Area 12 – S. 65th Street to S. 58th Street Track Lowering, Retaining Wall, and Interlocking Removal, Philadelphia County, Pennsylvania

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 12—Urban land, Howell complex (Uh) and Urban land (Ub) (**Figure 3-13**). Urban land, Howell complex soil is mapped as 50 percent Urban land, 30 percent Howell and similar soils, and 5 percent minor components. The Ub soils are mapped as 90 percent Urban land and 10 percent minor components. The parent material for both soil types is pavement, buildings, and other artificially covered areas.

3.2.13 Survey Area 13 – Lindbergh Boulevard New Interlocking, Philadelphia County, Pennsylvania

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 13—Urban land, Howell complex (Uh) and Urban land (Ub) (**Figure 3-14**). Urban land, Howell complex soil is mapped as 50 percent Urban land, 30 percent Howell and similar soils, and 5 percent minor components. The Ub soils are mapped as 90 percent Urban land and 10 percent minor components. The parent material for both soil types is pavement, buildings, and other artificially covered areas.

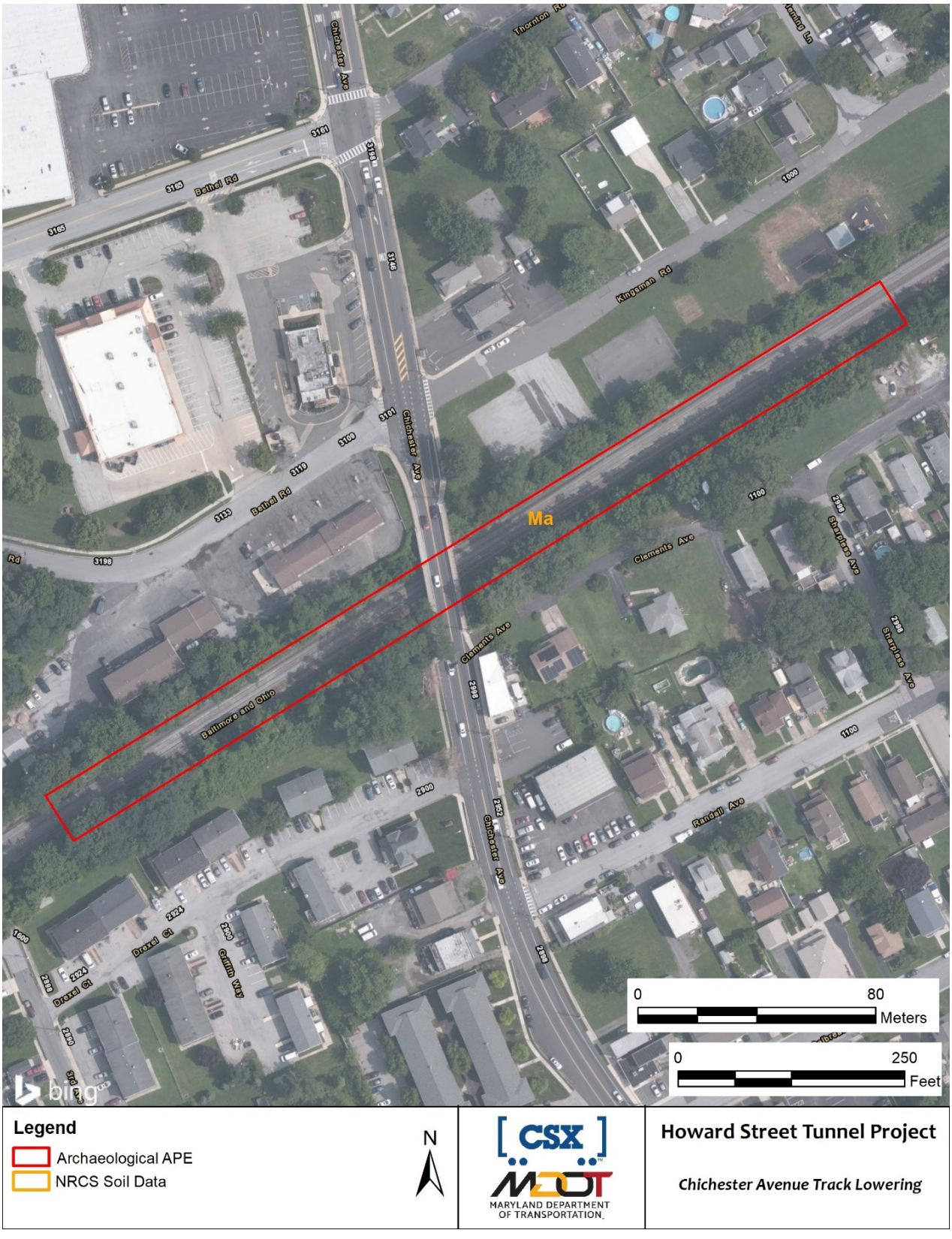

Figure 3-9. Soil Series within Survey Area 8, Delaware County, Pennsylvania.

Figure 3-10. Soil Series within Survey Area 9, Delaware County, Pennsylvania.

Figure 3-11. Soil Series within Survey Area 10, Delaware County, Pennsylvania.

Figure 3-12. Soil Series within Survey Area 11, Philadelphia, Pennsylvania.

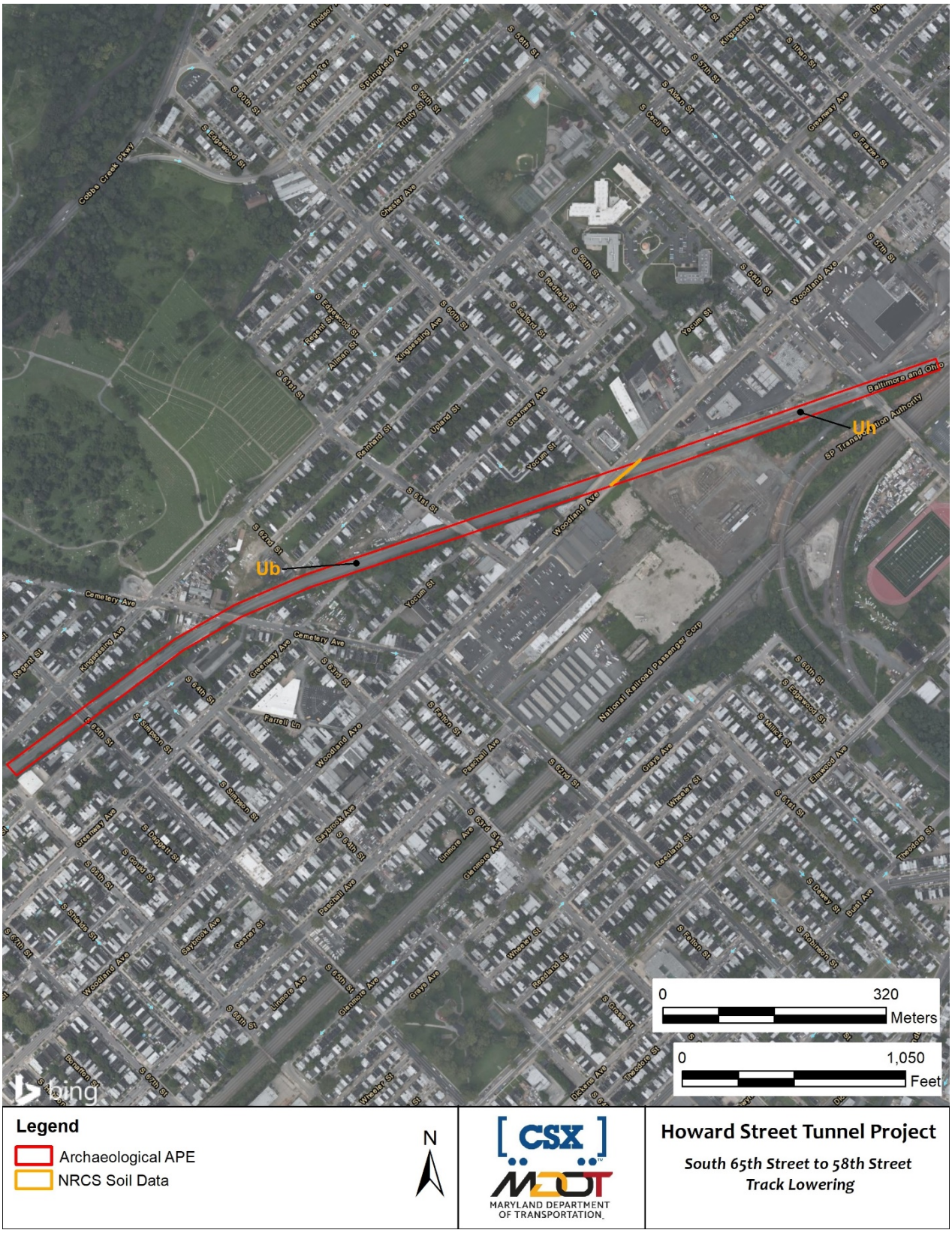

Figure 3-13. Soil Series within Survey Area 12, Philadelphia, Pennsylvania.

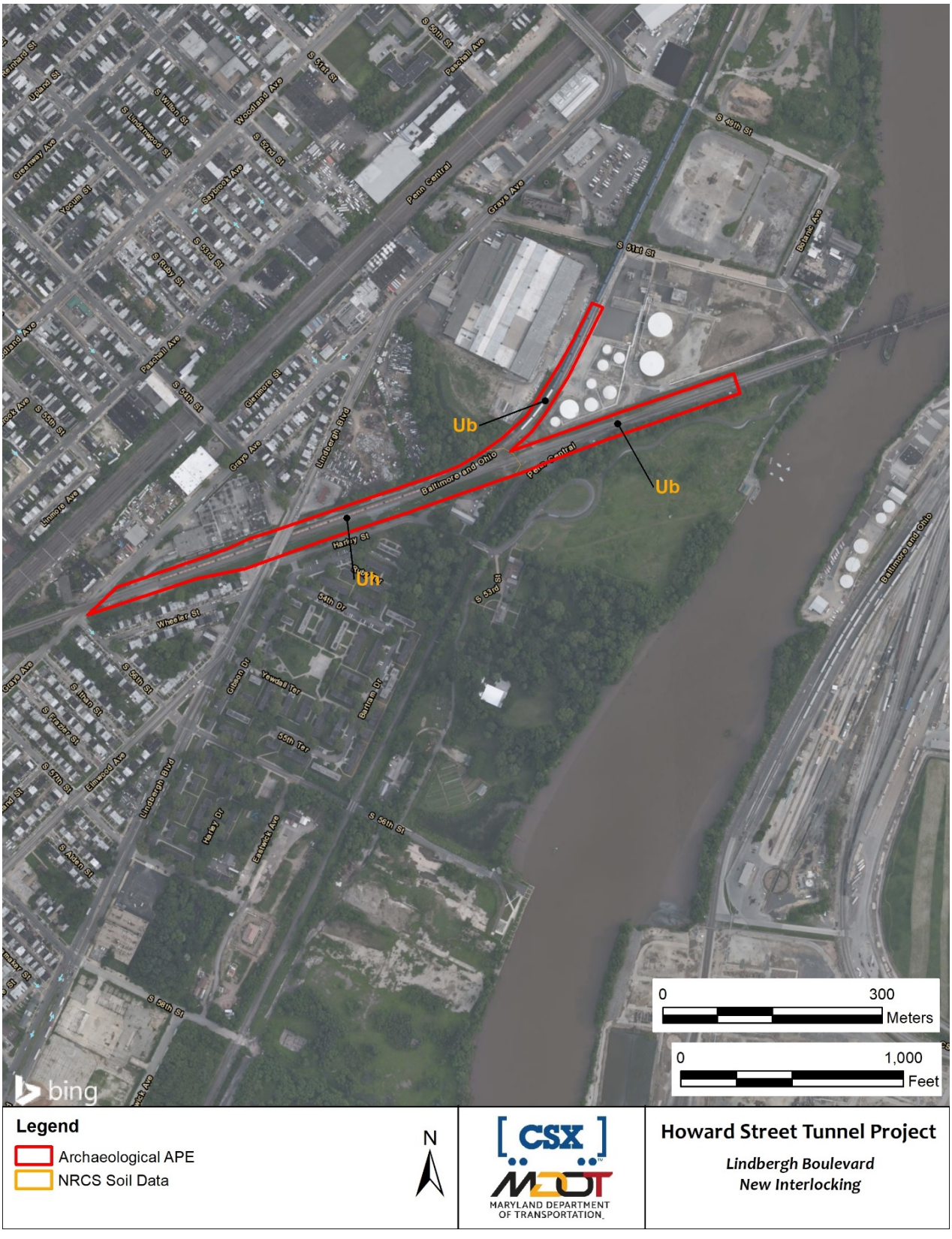

Figure 3-14. Soil Series within Survey Area 13, Philadelphia, Pennsylvania.

3.3 Hydrology

Within the Maryland portion of the APE, the southern portion of Survey Area 1 is located approximately 2,060 feet (628 meters) west of Baltimore's Inner Harbor, which connects the city to the Chesapeake Bay. The Jones Falls is located approximately 620 feet (189 meters) to the northwest from the northern extent of Survey Area 1. Survey Area 2 is located approximately 215 feet (66 meters) southwest of the Jones Falls, which flows into Baltimore's Inner Harbor. Survey Area 3 is located approximately 4,000 feet (1,219 meters) east of the confluence of the Jones Falls and Stony Run. Survey Area 4 is located approximately 4,230 feet (1,289 meters) southwest of Lake Montebello, a man-made reservoir designed and excavated in the nineteenth century. The nearest naturally occurring waterway is Herring Run, which is located approximately 7,500 feet (2,286 meters) northeast of Survey Area 4. However, historic maps from the mid-to-late nineteenth century indicate an unnamed tributary of Herring Run was once located approximately 2,500 feet (762 meters) northeast of Survey Area 4. The spring and a portion of the unnamed tributary were buried as a result of development that occurred in the area during the late nineteenth and early twentieth centuries (Shellenhamer and Hutchins-Keim 2019).

Within the Delaware portion of the APE, Survey Areas 6 and 7 are located 6,000 feet (1,828 meters) east of Chestnut Run and 6,000 feet (1,828 meters) north of Mill Creek, tributaries that drain into the Christina River, which itself is located 7,800 feet (2,377 meters) southeast of the survey areas. However, historic maps from 1849 (Rea and Price *Map of New Castle County*, *Delaware)* and 1881 (Hopkins *Map of New Castle County, Delaware)* depict an unnamed tributary once extending southward towards Little Mill Creek, a tributary of the Christina River, through Survey Area 6 and 7. This tributary is not depicted on later USGS topographic maps and is thought to have been diverted due to urban development.

Within the Pennsylvania section of the APE, Survey Area 5 is located approximately 1,550 feet (472 meters) west of Darby Creek, which drains into the Delaware River. Survey Area 8 is located approximately 1,880 feet (573 meters) southwest of Marcus Hook Creek, which flows south towards the Delaware River. Survey Area 9 is located approximately 1,300 feet (396 meters) southwest of Crum Creek, which flows southeast into the Delaware River. Survey Area 10 is located approximately 5,200 feet (1,585 meters) southwest of Darby Creek, which flows south towards the Delaware River. Survey Area 11 is located approximately 1,330 feet (405 meters) east of Cobbs Creek, which flows southwest into Darby Creek, which empties into the Delaware River. The westernmost extent of Survey Area 12 is located approximately 2,210 feet (638 meters) east of Cobbs Creek, which flows southwest into Darby Creek, which empties into the Delaware River. The easternmost extent of Survey Area 12 is located approximately 3,900 feet (1,189 meters) west of the Schuylkill River. Survey Area 13 is located approximately 340 feet (104 meters) west of the Schuylkill River.

4. REGIONAL CULTURAL CONTEXT

4.1 Pre-contact Context

The following is a brief overview of the pre-contact history of eastern Maryland, Delaware, and Pennsylvania. The pre-contact context is divided into three temporal periods: Paleoindian, Archaic, and Woodland. The Archaic and Woodland Periods are further subdivided into Early, Middle, and Late.[7] These summaries are intended to establish expectations regarding the types of archaeological sites that may be present within the APE and provide an archaeological context for assessing potential site significance.

4.1.1 Paleoindian Period (prior to 11,000 B.C. to 9,500 B.C.)

Archaeological, genetic, and paleoenvironmental evidence suggests that human occupation of the Americas began at least 13,000 years B.C. Initial human entry into the eastern Maryland, Delaware, and Pennsylvania region may have occurred before 11,000 years B.C. during the Paleoindian period. Paleoindian groups were seasonally mobile hunter-gatherers, exploiting new and different resources as they shifted locales. Gardner (1974, 1977, and 1979) has identified several types of Paleoindian sites using data from the Flint Run culture Paleoindian complex in Virginia. The largest sites have been classified as base camps and are identified by the variety of artifacts in the assemblage, the non-random distribution of stone tools and debitage (suggesting discrete activity areas), and pits and post molds. Aggregate bands may have occupied base camps at different times throughout the year. Examples of base camps include the Thunderbird Site of the Flint Run culture complex and the Shoop Site in Pennsylvania (Gardner 1974; Witthoft 1952). Smaller sites are identified as special purpose areas, which were occupied for brief periods by smaller groups than those at base camps. These smaller sites include quarries, lithic workshops, base camp maintenance sites, and outlying hunting sites (Dent 1995).

Paleoindians in North America have traditionally been characterized as highly mobile big game hunters who, after migrating from northern Asia, followed and preyed upon Pleistocene mammals as they migrated across the continent. Archaeological evidence from the Mid-Atlantic and northeastern United States regions— Meadowcroft Rock Shelter in southwestern Pennsylvania, Shawnee-Minisink Site on the upper Delaware River in Northeastern Pennsylvania, Cactus Hill Site in Virginia, Hiscock Site in western New York, and Higgins Site in Anne Arundel County, Maryland—suggests the Paleoindian lifeways were based on broad spectrum foraging and not on big game hunting. Evidence recovered at archaeological sites in the eastern United States over the last half century indicate that the subsistence base also included smaller mammals such as hare, mink and arctic fox, and such plant foods as black walnut, blackberry, goosefoot and wild grape (Dent 1995; Funk and Steadman 1994; Ritchie 1957). There is also evidence of fishing from the Shawnee-Minisink Site on the Delaware River (Kaufman and Dent 1982).

The Paleoindian lithic tool kit from all regions of North America is specialized for hunting. It comprises scrapers, gravers, burins, denticulate flakes, utilized flakes, hammerstones, knives, bifaces, and fluted points (Custer 1984; Funk 1972; Gardner 1974, 1977; Kinsey 1972). Tools are characteristically made of high-quality cryptocrystalline material such as chert and jasper, or of macrocrystalline material such as quartz or quartzite (Dent 1995). In addition, stone tools in these artifact assemblages show evidence of

[7] In Delaware, the prehistoric periods are defined slightly differently than in Maryland and Pennsylvania: Paleoindian Period (12,000 – 6,500 B.C.); Archaic Period (6,500 – 3,000 B.C.); Woodland I Period (3,000 B.C. – A.D. 1000); Woodland II Period (A.D. 100 – 1600); and Contact Period (A.D. 1600 – 1750). A full description of these differences can be found at https://history.delaware.gov/start/prehist/.

great care in stone tool maintenance and resharpening. One of the most distinctive artifacts associated with the Paleoindian period is the fluted point, characterized by a channel flake removed from the center of the base to the center of the point.

4.1.2 The Archaic Period (9,500 B.C. to 1,250 B.C.)

The Archaic period began as a general continuation of settlement and subsistence patterns established during the Paleoindian period. The warming climate and a diversifying environment, however, led to increased variation in settlement patterns, and diversified exploitation of game, fish and forest resources during the Early and Middle Archaic periods (Dent 1995; Funk 1978).

Populations increased during the Early Archaic period (9,500 B.C. to 7,000 B.C.) and groups may have become somewhat less mobile, more localized, and more seasonally organized (MAC Lab 2012). One major difference between the Paleoindian and Early Archaic periods was the tool kit. Fluted points were replaced by a variety of smaller, notched points. Projectile points in the Middle Atlantic are characterized by two artifact traditions: the Corner-Notched Tradition (circa 7,500 to circa 6,800 B.C.) and the Bifurcate Tradition (circa 6,800 B.C. to circa 6,000 B.C.). Rhyolite from the Piedmont Province replaces cryptocrystalline stone as the material of choice. Point types from the Corner-Notched Tradition include assorted Amos, Charleston, Kirk and Palmer notched variants. Those associated with the Bifurcate Tradition include LeCroy, St. Albans, and Kanawha points (Dent 1995). The artifact assemblages of both major traditions are similar to those of the Paleoindian period, but there is greater regional variation. Early Archaic peoples exploited a wider variety of game, fish, and forest resources (including fruit and nuts) (Dent 1995; Funk 1978). However, the people associated with both the Corner-Notched and Bifurcate Traditions probably continued to follow a seasonal hunting schedule, as suggested by their specialized tool kits and their settlement patterns. These patterns were based on large macroband base camps that were surrounded by numerous smaller microband base camps, and special use sites that included activities such as hunting, fishing, gathering, and quarrying (Gardner 1974, 1977, 1979).

The Middle Archaic period (7,000 B.C. to 3,750 B.C.) began about the time that the still dominant oak-hickory forest completely replaced the boreal forest associated with the last glaciation in the northern portions of the eastern United States (LeeDecker and Koldenhoff 1991; Whitehead 1972). The climate, which had begun to warm gradually during the Early Archaic Period, reached an average temperature level nearly the same as, if not slightly warmer than, the present era, with a rise in precipitation as well. Morrow Mountain and Stanley points are the diagnostic tools of the Middle Archaic period (Coe 1964; Custer 1989). Tool kits generally resemble those of the previous period, with the addition of such ground-stone tools as mortars and atlatl weights or bannerstones. The latter were used to balance atlatl spear throwers. A substantial bone tool industry also developed during this period. Artifacts associated with this industry include atlatl hooks and projectile points (Dent 1995). Settlement patterns appear to continue in the tradition of the Early Archaic (Dent 1995). Site locations include interior wetlands, areas near stream confluences, and floodplains.

Gardner (1978, 1980) and Custer (1984) have identified three types of sites associated with the Middle Archaic Period, which they indicate reflect the period's social organization. These sites include macro- and microband camps, and procurement sites. In the fall, when food resources were abundant, same groups of people or bands fused together into macro- or corporate bands. These gathered at macroband base camps that tended to be located at the fall line. Artifact assemblages recovered at these sites indicate fairly long-term occupation with a wide variety of activities. The microbands were comprised of family

groups who tended to live in a single river valley. They moved between the valley floor and adjacent upland areas throughout the year, living in microband base camps and utilizing procurement sites. Microband base camps tended to be located in environmental settings that could not support the larger populations associated with macroband base camps. Procurement sites yield fewer tool types and tend to be related to a limited number of activities. The location of these sites was dependent on the type of resource being utilized (i.e., quarry sites and interior hunting sites). Sites of this period do show evidence of distinct activity areas associated with processing foodstuffs, tool production, and maintenance (Dent 1995).

Late Archaic period (3,750 B.C. to 1,250 B.C.) indigenous groups continued to exploit plant resources, particularly tree mast, for food and other needs. Wetland resources were also commonly exploited during this period. Settlements continued to expand into new settings. The initial portion of the Late Archaic period (3,000 to 1,500 B.C.) is marked by a suite of narrow-bladed projectile points (Bare Island/Lackawaxen, Clagett, Dry Brook, Holmes, Orient, Vernon, and possibly Piscataway types) that accompanied adaptations for exploiting hardwood trees and sylvan resources. Assemblages include a high frequency of grooved axes, adzes, celts, gouges, and grinding stones. A cultural manifestation, associated with broad-bladed projectile points, appeared during the latter portion of the Late Archaic period (2,200 to 1,200 B.C). The broad-bladed point types include Savannah River and Susquehanna types. A major change in settlement pattern is associated with the appearance of these points, with sites focusing on the floodplains of higher-order streams (Mouer 1991). These large, broad stemmed points are typically made of quartzite or rhyolite. It is not certain if they were used as projectile points, or as specialized knives for fish-processing or some other task (McLearen 1991). Although broadspear points are sometimes found in ritual mortuary contexts, they were apparently utilitarian objects, as shown by occasional breakage and edge attrition (Custer 1991). Soapstone (steatite), which was quarried from the Piedmont of Virginia, Maryland, and Pennsylvania, and which emerged during the latter portion of the Late Archaic period, was used for carved bowls (Dent 1995). Soapstone pots were clearly used for cooking, but it is not yet known what foods they were used to process, possibly fish, meat, seeds, tubers, or nuts.

4.1.3 **Woodland Period (1,250 B.C to A.D. 1600)**

Early Woodland period settlement focused on riverine areas, with smaller seasonal camps found in the interior. Early Woodland groups appear to have become more sedentary, although there is no evidence of villages established during this period (Gardner 1982; Mouer 1991; Waselkov 1982). There is some evidence of greater use of seed plants during the Early Woodland, early evidence of a practice that would give rise to cultivated crops (MAC Lab 2012). Settlement and site occupation remain focused on the larger rivers. Stabilization of estuarine areas increased the range for oyster beds and anadromous fish. By the end of the Early Woodland, oysters had become a major food source and large oyster shell middens are a common find on coastal sites (Dent 1995). Anadromous fish, such as American shad, red drum, herring, perch, and striped bass (rock fish), began to make spring runs from the Chesapeake Bay up into the freshwater portions of rivers to spawn. To take advantage of these spring runs, fish weirs, constructed from stone, cane, or wood, directed fish into traps. Early Woodland settlement and subsistence patterns show strong continuity with Late Archaic lifestyles and a continuation of what Dent (1995) calls the “Intensification Process.” Early Woodland chipped-stone tool types include drills, small bifaces, perforators, scrapers, and utilized flakes. Antler and bone tools have also been recovered (Dent 1995).

The introduction of pottery around 1,250 B.C. marks the beginning of the Woodland period in the eastern Maryland/Delaware/Pennsylvania region. Many of the early ceramic wares in the Middle Atlantic developed in the Piedmont Region and the technology spread rapidly through the rest of the regions. While some ceramic types may have originated outside of the region, other types were probably local innovations and are unique to the Chesapeake region. Included in this latter group are Selden Island (Slattery 1946), Bushnell, and Croaker Landing wares (Custer 1989). These ceramic wares were restricted to the Piedmont and sometimes the outer Coastal Plain (Dent 1995). Other ceramic types associated with the Early Woodland include Marcey Creek, Selden Island, and Accokeek. Accokeek wares eventually replaced Marcey Creek in the Coastal Plain and the Piedmont.

Increasing sedentism, the development of ceramics, and cultivation of wild plants continued into the Middle Woodland (A.D. 50 to A.D. 950) and long-distance trade expanded. The pattern of seasonal movement between larger multi-band base camps and smaller summer camps continued (MAC Lab 2012). Very large midden sites begin to appear after A.D. 550, and increase in number between A.D. 700 and 900. Groups are larger and, while many groups continue to rotate from base camp to seasonal camp, some members of the group remain at the base camp/village year-round (Dent 1995). McLearen and Mouer (1994) argue, between A.D. 200 and 800, Middle Woodland peoples gradually changed their subsistence and settlement patterns and began staying in one place for much longer periods of time until they began to live in more permanent settlements. Mobility decreased as groups increased their focus on collecting specific resources. Middle Woodland peoples exploited a wide range of aquatic and upland environments for food and other resources, and collected seed plants such as amaranth and goosefoot (MAC Lab 2012).

Changes in pottery styles also characterize the phases of the Middle Woodland. During the early part of the Middle Woodland, Popes Creek ceramics were the predominate ware on the Coastal Plain of Maryland, as well as in parts of Delaware, Pennsylvania, and Virginia. The core area for this ceramic was the tidal drainage of the Potomac River. Distribution extends to the fall line but is rare in the Piedmont proper. Popes Creek ceramics are replaced by Mockley ceramics around A.D. 200. Mockley ceramics are found in the archaeological record until circa A.D. 900. Mockley is distributed across both the Western and Eastern Shores of the Coastal Plain in Maryland and Delaware, and as far south as the James River in Virginia. It is also found in the fall line region but is rare west of there. Small amounts have been reported from rock shelter sites in the Piedmont and Great Valley Regions of Maryland (MAC Lab 2002).

The pattern of increased sedentism and political nucleation continued in the Late Woodland (A.D. 950-A.D. 1600), although there was still some seasonal movement. Late Woodland settlements were situated near large streams, often in areas suitable for agriculture (MAC Lab 2012). Semi-sedentary villages appear throughout the region, which were associated with small seasonal hunting, fishing, and gathering camps (Potter 1982). Smaller villages appeared between A.D. 800 and 1300, while larger villages tend to appear after A.D. 1300. Between A.D. 800 and 1600, fortified villages appeared along river valleys. A number of villages were fortified with substantial stockades that surrounded a central building, while others surrounded the whole settlement. The former may have marked precinct bounds, while the latter were defensive (Clark 1980; Dent 1995). Population increased and social organization throughout the Middle Atlantic exhibited a greater range of social complexity, increased social stratification, and corresponding social inequality (Potter 1993).

Cultivation of maize, squash, and beans became widespread during the Late Woodland period. Circa A.D. 800, maize began to dominate fields and diets in the southeast. Maize production spread rapidly through eastern North America and, by A.D. 900, it extended from Florida up the North American east coast into Ontario, Canada. The transition coincided with emerging Mississippian Chiefdoms in the Midwest and the beginnings of chiefdoms in the Middle Atlantic. In the Middle Atlantic, maize was part of a diet that included nuts, starchy tubers, amaranth, and goosefoot (Ameringer 1975; Dent 1995; Kinsey and Custer 1982; Moeller 1975). The diet was also supplemented by wild plants, and faunal and aquatic resources, including freshwater shellfish and anadromous fish.

Lithic technology does not change appreciably during this period, although the appearance in the archaeological record of triangular stone points probably indicates the manufacture and use of bows and arrows. Other tools include stone celts and hoes, and other lithic, bone and antler tools. Angular pipes have been recovered, as well as native copper beads and pendants, although the latter are rare (Dent 1995).

The cultural boundary demarcated by the fall line, evident in settlement patterns and material culture before the Late Woodland, persisted between the Piedmont and the Coastal Plain Provinces. As Potter (1993) notes, the "fall line had been a dynamic place since at least 2,000 B.C., but it became particularly so during the Late Woodland." In Virginia, this was particularly true in the century or so preceding the settlement of Jamestown. The fall line became a cultural buffer zone between the Monacans of the Piedmont and the Powhatans of the Coastal Plain. This cultural buffer is also noted in the distribution of ceramic types throughout the area.

In Maryland, Late Woodland Period ceramics include Shenks Ferry, Shepard, Page, and Keyser wares. All of these wares have distribution patterns that are located to the west of the fall line. Townsend series ceramics were distributed throughout the Coastal Plain to the fall line. This series of ceramics includes several defined types: Rappahannock Fabric-Impressed, Rappahannock Incised, Rappahannock Plain, Townsend Herringbone, and Townsend Corded-Horizontal. Moyoane and Potomac Creek ceramics also have a limited distribution in the Piedmont west of the fall line (MAC Lab 2002). Distribution of all of these ceramic types appears to match the locations of two distinct linguistic groups—the Algonquians and the Iroquoians. Areas that were predominately inhabited by Algonquian speakers are associated with the distribution of Townsend series ceramics, Potomac Creek ceramics, and Shepard ceramics, while areas with Iroquoian/Eastern Siouan affiliations are associated with the distribution of Shenks Ferry ceramics (Custer 1996; Dent 1995; Griffith and Custer 1985; Potter 1993). By the late 1400s to early 1500s, there was increasing social and political centralization in the Chesapeake region. Potter (1993) believes that complex societies began to emerge at this time in the form of chiefdoms. The earliest of these chiefdoms likely emerged from the Potomac Creek Complex, a series of Late Woodland fortified villages and smaller hamlets and resource procurement sites along the Potomac River and Chesapeake Bay (Blanton et al. 1999), and was comprised of the Piscataway of Maryland and associated groups such as the Nacotchtanks, Pamunkeys, Nangemoys and Potapocos, and the Patawomekes of Virginia and associated groups. This chiefdom continued until the end of the 1500s when the Patawomekes broke away under their own chief (Potter 1993). This early chiefdom arose just to the east of the fall line on the inner Coastal Plain along the Potomac River. This is also the same setting where the Powhatan Chiefdom arose along the James River in Virginia.

4.2 Historic Context

The following is a brief overview of the history of eastern Maryland, Delaware, and Pennsylvania. The historic context is divided into three sections, one each for Baltimore, Maryland; Philadelphia, Pennsylvania; and Wilmington, Delaware. These summaries are intended to provide a historic context for developing expectations regarding the types of archaeological sites that may be present within the APE and for assessing potential site significance.

4.2.1 **Baltimore, Maryland**

Historical Development (1634 – Present)

Rural Agrarian Intensification (1634–1815)

European settlement in Maryland did not officially begin until 1634. At this time, the Baltimore area was relatively devoid of Native American settlements. The area was, however, used periodically by Native American groups—primarily the Susquehannocks—as a resource procurement area or hunting ground. Early English settler John Smith did not indicate any Native American presence in the Baltimore area in his 1608 *Map of Virginia*.

Settlement in the northern Chesapeake region lagged behind that of Southern Maryland. Baltimore County was the sixth county established in Maryland. Formed around 1658, it included parts of present-day Anne Arundel, Howard, Carroll, and Kent Counties, and all of Harford and Cecil Counties and Baltimore City (Brooks and Rockel 1979). The establishment of Baltimore County created a flurry of interest in the unsettled land surrounding the northwest branch of the Patapsco River (Power 1992). The land that became Baltimore's Inner Harbor and downtown was part of the land originally patented by Thomas Cole in 1668.

Baltimore Town was established by charter in 1730 with sixty lots, one-acre each, on the north side of the Inner Basin of the Patapsco River (City of Baltimore 2006: 26). While Baltimore was in its formative years, Maryland's economic base underwent a profound shift. Wheat began to emerge as the cash crop of the Eastern Shore and the new western Piedmont settlements. Local wheat production resulted in the development of mills for grinding flour. Flour proved a lucrative export to markets in England and other colonies (McGrain 1985).

By 1750, Baltimore had approximately 200 residents. John Moale drew a sketch of Baltimore Town in 1752. The sketch shows a small hamlet with 25 houses, St. Paul's Church, Payne's and Kaminsky's taverns, and a small wharf at the current base of Calvert Street (Greene 1980; Moale 1752). Twenty-five years later, the number of houses in Baltimore had increased from 25 to 564 (Olson 1980). Fells Point was patented, surveyed and settled between 1761 and 1770, contributing to the area's increase in population.

The population increase was fueled by the growth of Baltimore's economy. Flour and iron production meant the development of commercial outlets and warehouses on the town wharves, an increase in maritime exports, and the formation of ancillary businesses connected to maritime trade. After 1745, the economy expanded, in large part due to the Seven-Years War (or "French and Indian War"). The Baltimore Inner Harbor was large enough to accommodate numerous vessels and wharfs. In addition, Baltimore had numerous waterways, along which to build the mills associated with the growing grain economy (Brooks and Rockel 1979). In 1768, Baltimore Town became the Baltimore County seat.

Between 1745 and 1783, Baltimore Town made 12 separate annexations of adjacent county lands. The first annexation in 1745 was of the 10 acres that comprised Jones Town. The other 11 annexations, with the exception of Fells Point, were all of undeveloped land. These annexations each averaged approximately 65 acres in size. The owner of the tract was responsible for laying out the lots and streets in the new subdivisions within the town. The landowner would typically request that their track be annexed and then lay it out into town lots, streets, and alleys (Arnold 1978). By the late-eighteenth century, Baltimore was a major port. Lombard and Water Streets, between Charles Street and the Jones Falls, were along the City's original waterfront, and were populated with shops, counting houses, banks, warehouses, shipping offices and their associated wharves. Ships lined the wharves and rode at anchor in the harbor (Greene 1980; Norman 1987; Olson 1980). The waterfront along what is now Lombard Street was fully developed by 1781.

After the Revolutionary War, Baltimore's rival, Annapolis, went into a slow and steady economic decline. By the late-eighteenth century, Annapolis had become primarily a center of government. Baltimore continued to grow, linked to the world through trade networks (Ward et al. 2006). By 1792, Baltimore had spread from the original core around the Inner Harbor and east along the shoreline to Fells Point. In addition, the town had spread north, inland and away from the harbor. Development within the harbor area had spread as far north as what is now Saratoga Street. In East Baltimore, streets had been laid out as far north as the current location of Fayette Street (then Pitt Street) (Folie 1792; Olson 1980). In 1793, a group of Baltimore merchants was able to successfully lobby the General Assembly for a charter of incorporation as a city; which was granted in 1796 (Greene 1980).

Between 1776 and 1816, the population of Baltimore had expanded outside of the city limits into an area of the county known as "the Precincts," or all area south of present-day North Avenue. This area surrounded the city on the west, north, and east sides and covered an area of over 13 square miles. Its population stood at approximately 12,000 people, or one- third of Baltimore County's population. In 1816, Baltimore City was able to annex this area to the city (Arnold 1978).

Agricultural – Industrial Transition Period (1815–1870)

The improvement of old colonial roads into turnpikes assisted in the economic development of the city and surrounding area. Such turnpikes include the National Road, York Road, and Harford Road (Holcomb 2005). The completion of the Erie Canal in 1825 threatened the economic viability of Baltimore reliance on the National Road and other roadways to transport economic goods. In response, Baltimore merchants established the B&O Railroad in 1827. Other railroads such as the Baltimore and Port Deposit Railroad (B&PD Railroad), completed by 1838, and the Philadelphia, Wilmington and Baltimore Railroad (PW&B Railroad), a conglomerate of four separate railroads established in 1831, provided a successful answer to the canal that would influence the city's economics for years to come and lead to numerous technological and engineering advancements (City of Baltimore 2006: 30-31; Harwood 2005; Brooks and Rockel 1979; Olson 1980).

Baltimore had been the county seat of Baltimore County since 1768. As early as 1835, parts of the county population outside the city began to lobby for complete separation of the city and the county. The main argument for separation was discontent with the combined functions of city and county government, which non-city residents saw as heavily biased in favor of city residents. The first referendum for separation was held in October 1837. Separation lost in a vote of 2,270 to 388. The towns near the City of Baltimore, where many of the city's leading merchants had homes, returned the highest percentage of no separation votes. Over the next decade, non-city residents mounted a campaign in favor of separation. In

1851, the State of Maryland called a constitutional convention. The convention's outcome included separating the City of Baltimore and the county (Brooks and Rockel 1979; Greene 1980; Olson 1980).

Prior to the outbreak of the Civil War, Baltimore was distinct from other large American cities for the size of the African American community. In 1820 it had the largest enslaved and free African American population of all cities in the nation. By the time the Civil War erupted, Baltimore was home to 26,000 free blacks and approximately 2,000 enslaved people. However, the free African Americans in Baltimore found it difficult to benefit equally with European Americans for their share of economic prosperity. Racial bias and inequality put free African Americans at a distinct disadvantage when competing with European Americans for skilled and unskilled jobs in the port economy, with white working-class men oftentimes resorted to violence to prevent the loss of their jobs to African Americans (City of Baltimore 2006: 32-33).

During the 1850s, Maryland's economy entered a period of depression. Industry suffered a decline in output and profit. The textile mills were especially hard hit in the early part of the decade. However, despite the slowdown in growth, European immigrants continued to pour into the city. By 1860, "Baltimore [had] doubled its population, its work force, the number of houses, its built-up area, and its street mileage" (Olson 1980:103). The rapid growth of Baltimore during the mid-nineteenth century pushed the city inland from its original core along the harbor. Between 1820 and 1870, Baltimore's population increased from 63,000 to almost 269,000. Immigration was fairly heavy throughout this period. The new arrivals were primarily German or Irish (Browne 1980). This population growth was slowed to some extent by the Civil War.

During the Civil War, Maryland was considered a border state separating the free North from the slave state South. Though it remained with the Union, there were strong factions of secessionists throughout the State, including Baltimore. At the outset of the war in April 1861, these factions battled in downtown Baltimore along the harbor waterfront, an event known afterwards as the Baltimore Civil War Riots. The 6th Massachusetts Infantry arrived at Baltimore's President Street Station on its way to defend Washington. Southern sympathizers and agitators from local gangs began throwing rocks, bricks, and bottles at the troops, which escalated to the point where the troops were ordered to return fire. Four soldiers and at least a dozen civilians were killed (Toomey 2011). No other Civil War skirmishes or battles were fought in Baltimore during the war.

Industrial/Urban Dominance (1870–1930)

The Civil War served as a boon the city's industrial production, which was centered around milling, textile manufacturing, shipping, transportation, and shipbuilding (City of Baltimore2006: 30-31). After the Civil War, Baltimore's industry and manufacturing continued to increase in prominence. The city became a leader in industrial fishing, canning, fertilizer manufacturing, steel production, and ready-made garments manufacturing. By 1900, the city's population was 508,957 and Baltimore was second only to New York City as an immigrant port of entry (City of Baltimore 2006: 33). In 1888, the city annexed portions of Baltimore County beyond North Avenue to what is now 40th Street (City of Baltimore 2006: 34). The growth in railroads during the second half of the nineteenth century increased Baltimore's ties with the global economy. Numerous railroad lines connected Baltimore to cities up and down the Eastern Seaboard and to markets to the west. The B&O Railroad connected the city to the west; the PW&B Railroad connected Baltimore to Philadelphia; and the Baltimore and Potomac (B&P) Railroad, part of the Pennsylvania Railroad, connected Baltimore to the south (City of Baltimore 2006:32-34).

The B&O Railroad was created largely out of the need for Baltimore to compete with the Erie Canal and the City of Philadelphia for shipping superiority. A collection of Baltimore's industrial leaders formed the B&O Railroad in 1827 and immediately began construction in Baltimore with intentions to head west towards Wheeling, West Virginia. Within the city, construction of the B&O Railroad's Baltimore Belt Line, a 7.3-mile-long nearly continuous succession of engineering challenges and feats, began in 1890 and included the 1.4-mile-long Howard Street tunnel, six short tunnels in North Baltimore, a viaduct over the Jones Falls Valley, several other overpasses, and considerable cut-and-fill work (Harwood 2002: 85). The Belt Line was completed in 1895 (Harwood 2002: 97). However, the cost of constructing the Howard Street Tunnel forced the B&O Railroad to file for bankruptcy in 1896.

At the beginning of the twentieth century, Baltimore was a rapidly growing and thriving economic engine in Maryland. The city had a population over half a million, five railroad stations, booming manufacturing industries, and a vibrant port. World War I imposed hardships on the city, but also brought economic opportunity. Unemployed southern farmers moved in great numbers to Baltimore between 1910 and 1920, and the population grew to over 700,000 during that period. Despite the influx of workers, labor shortages were still common, creating a worker-friendly environment that brought about the eight-hour workday, employment for women, and more skilled jobs for African Americans. In 1918, the city annexed additional portions of the county increasing its size from 30 to 90 square miles. And unlike earlier residential development that favored rowhouses, new residential housing took the form of bungalows and other suburban-style houses (City of Baltimore 2006: 37-38).

Modern Period (1930 to present)

Although segments of the American economy were already in a slow downturn before the 1929 stock market crash and beginning of the Great Depression, the region's economy was affected only to a minor degree. After the crash, the region's diversified economy resulted, at least temporarily, in a city unemployment rate which was slightly lower than the national average. Nevertheless, by 1931 there were 42,000 unemployed Baltimoreans, roughly one-eighth of the city's work force (Olson 1980). The region's high unemployment rate continued into the late 1930s. By 1937, increasing tensions in Europe were translating into a build-up of the defense industry in Baltimore. Companies like Glen L. Martin and Bethlehem Steel began to expand production as orders arrived from Europe. During World War II, workers moved into Baltimore from the rural south and West Virginia. Many of these laborers found jobs in the defense plants in eastern Baltimore County. Others worked for the rail yards in Baltimore, settling in the area around Carroll Park known as "Pig Town."

By August 1941, 50,000 Baltimoreans were employed by the defense industry. Approximately half of these jobs were in aircraft manufacture at the Martin Company. However, this build-up in wartime industry did not come without risks to the region's economy. With the end of the war in 1945, 45,000 defense workers lost their jobs at the same time that 35,000 veterans were returning home. With approximately 80,000 people looking for work simultaneously, the region's economy needed to turn quickly from a wartime to peace-time economy. Companies such as Bethlehem Steel, Westinghouse, and Western Electric successfully converted their production to peace-time commodities by the early 1950s. Baltimore's post-war economy continued to grow into the 1970s (Olson 1980).

The B&O Railroad was acquired by the Pennsylvania Railroad in 1901. The railroad struggled during the first half of the twentieth century and was purchased by the C&O in 1963. It was later to be integrated into the larger Chessie System, which also included the C&O and Western Maryland Railway. In 1987, the

former B&O Railroad was included in a large merger of five major rail lines that became the CSX Corporation (Stover 1987).

4.2.2 Survey Area 1 – Howard Street Tunnel Enlargement, Baltimore, Maryland

Survey Area 1 is located in Baltimore, Maryland and runs north through downtown Baltimore along Howard Street from E. Hill Street to W. North Avenue. By 1792, much of the city's street grid from Warren Street (now Avenue) north to Saratoga Street and west to Eutaw Street was laid out and the blocks adjacent to Howard Street from Conway Street to Saratoga Street were developed, as depicted in the 1792 *Plan of the Town of Baltimore and It's Environs* by A. P. Folie (**Figure 4-1**). South of Conway Street, however, Howard Street was laid out, but the adjacent blocks remained mostly undeveloped.

By the mid-nineteenth century, Baltimore's boundaries had expanded south, west and north, and the majority of the city blocks adjacent to Survey Area 1 had been developed, as shown in the 1857 *Map of the City and County of Baltimore, Maryland* by James C. Sydney (**Figure 4-2**). The Baltimore and Susquehanna Railroad Company (later the Northern Central Railway) built Bolton Station in 1832 near the intersection of Bolton and N. Howard Streets near the northern extent of Survey Area 1 (Harwood 2002: 88). By the last quarter of the nineteenth century, several regional railroad companies had constructed railroad lines through Baltimore. The B&O Railroad had constructed Camden Station, west of Howard Street between Lee and Camden Streets, at the southern end of Survey Area 1 and an extension of the B&O Railroad ran along Pratt Street, bisecting Survey Area 1 just north of Camden Station. The 1896 Bromley *Atlas of the City of Baltimore, Maryland* shows the newly created section of the B&O Railroad through the area (**Figure 4-3**). The B&O Railroad constructed the NRHP-listed Mount Royal Station (B-26) in 1896 as part of its new Baltimore Belt Line (Harwood 2002: 88). The station was constructed entirely below grade within an open cut between the Howard Street Tunnel and the Mount Royal Tunnel (NRHP 1970).

4.2.3 Survey Area 2 – North Avenue Bridge Modification, Baltimore, Maryland

Survey Area 2 is located in Baltimore, Maryland along W. North Avenue at what was the northern extent of the city from 1816 until 1888. During the eighteenth and early-nineteenth centuries, Survey Area 2 consisted of undeveloped woodland owned by the Rutter family (Warner and Hanna 1947 [1801]). The railroad lines for the Baltimore and Susquehanna Railroad were constructed within the survey area by the mid-nineteenth century (**Figure 4-2**). North Avenue had been laid out and constructed by 1876 and a bridge along North Avenue crossed several railroad lines associated with the B&P Railroad and the freight yard at Bolton Station. By the turn of the twentieth century, numerous railroad lines, including the B&O Railroad's Baltimore Belt Line (now owned by CSX), crossed beneath North Avenue in the vicinity of Survey Area 2 (**Figure 4-3**).

Figure 4-1. 1792 Folie map showing approximate location of Survey Area 1, Baltimore, Maryland.

Figure 4-2. Section of 1857 Sydney map showing approximate locations of Survey Areas 1 – 4, Baltimore, Maryland.

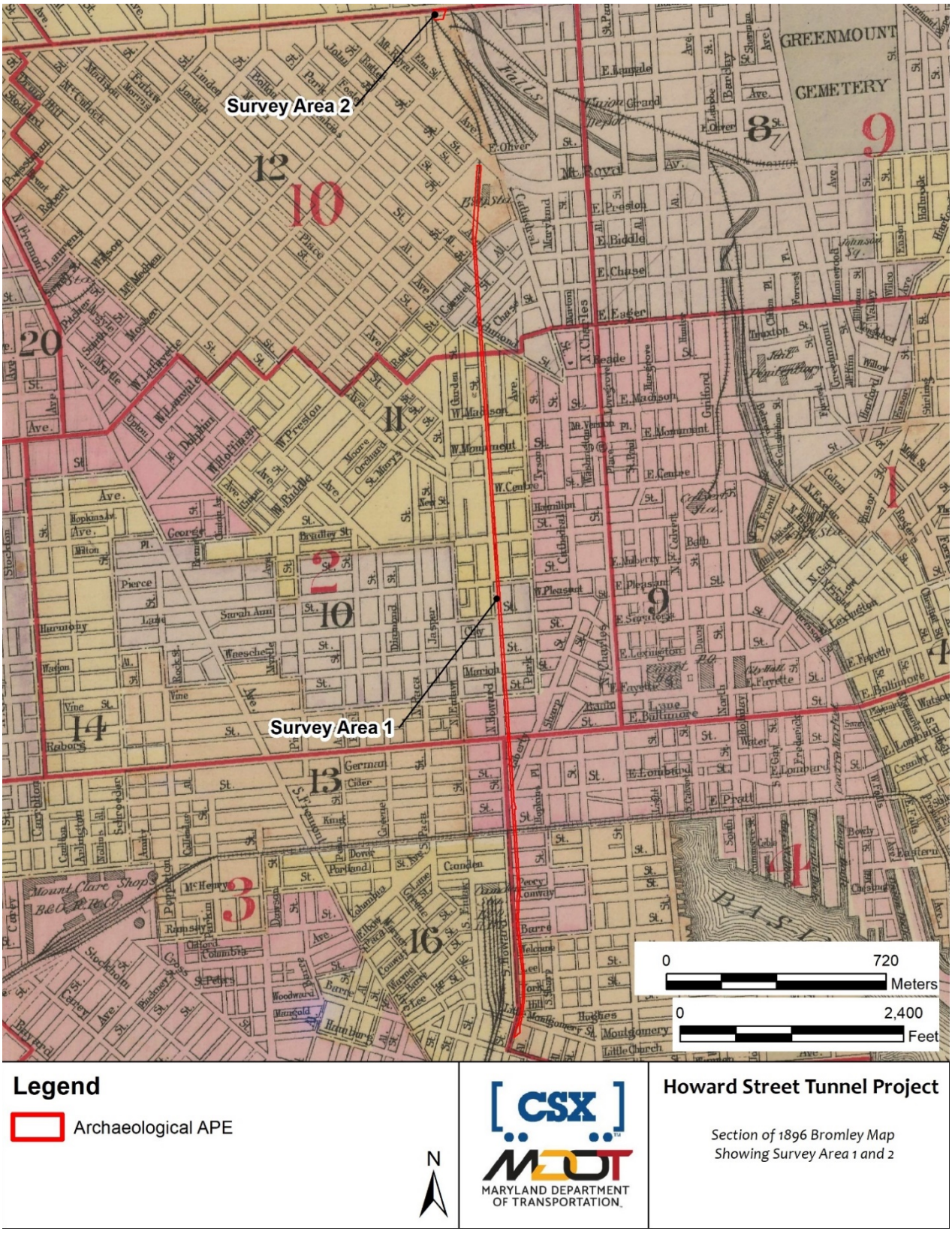

Figure 4-3. Section of 1896 Bromley map showing approximate locations of Survey Areas 1 and 2, Baltimore, Maryland.

4.2.4 Survey Area 3 – Guilford Avenue Bridge Replacement, Baltimore, Maryland

Survey Area 3 is located in Baltimore, Maryland at the intersection of Guilford Avenue and E. 26th Street in part of the 1888 annexation to the City of Baltimore. According to the eighteenth-century *Conveyancer's Map of Baltimore*, the land comprising Survey Area 3 was once part of the original land patent called Huntingdon, which was divided into smaller estates beginning in 1790 (Enoch Pratt Free Library n.d.; NRHP 1983). The survey area remained rural farmland owned by the estates of Samuel Brady and P. B. Sattler until the last quarter of the nineteenth century, as shown on the 1857 *Map of the City and County of Baltimore, Maryland* by James C. Sydney and the 1876 Hopkins *City Atlas of Baltimore, Maryland* (**Figure 4-2** and **Figure 4-4**). At the time, the survey area had a rural road running diagonally from northwest-southeast, dividing the Brady and Sattler lands, but was otherwise undeveloped. Guilford Avenue (known then as North Street) was planned, but not constructed, in the vicinity of the survey area and E. 26th Street (known then as Walnut Street) was laid out to the west of the survey area, but not to the east.

By the end of the nineteenth century, Guilford Avenue had yet to be constructed north of E. 24th Street (**Figure 4-5**). However, E. 26th Street had been constructed to St. Paul Street, two blocks to west of the survey area, and the tunnel for the Baltimore Belt Line, adjacent to E. 26th Street, had also been built. The Baltimore Belt Line was constructed in the early 1890s. A bridge crossing the railroad tracks along what would become Guilford Avenue is depicted in the 1896 G.W. Bromley *Atlas of the City of Baltimore, Maryland* (**Figure 4-5**).

4.2.5 Survey Area 4 – Harford Road Bridge Replacement, Baltimore, Maryland

Survey Area 4 is located in Baltimore, Maryland along Harford Road, just north of E. 25th Street, and was part of the 1888 annexation to the City of Baltimore. According to the eighteenth-century *Conveyancer's Map of Baltimore*, the land along Harford Road comprising Survey Area 4 was once part of Darley Hall, a tobacco plantation patented in the late-seventeenth century by John Oldton (Enoch Pratt Free Library n.d.). Harford Road likely started out as "Darley Path" and later in the colonial period became a turnpike that connected the city with Baltimore and Harford counties (Saylor n.d).

Adjacent to Survey Area 4 is the Friends Burial Ground (B-5086), an NRHP-listed cemetery established in 1713 on Darley Hall next to the Friendship Meetinghouse, a log structure built by the Baltimore Quaker community (Baltimore Heritage n.d.). The meetinghouse was abandoned in 1781 and is no longer standing. No evidence of it has survived. The cemetery, used exclusively by the Quaker community, has been in continuous use ever since. While the earliest marker in the cemetery dates to 1802, it is believed many unmarked graves date to the eighteenth century.

Survey Area 4 is also adjacent to Clifton Park (B-4608), an NRHP-listed historic property associated with Johns Hopkins. Hopkins purchased a large tract of land in 1841 to build his country estate, Clifton Mansion, on what is today Clifton Park. Prior to his purchase, the land had been a farm owned by Henry Thompson, beginning in the late-eighteenth century (Shellenhamer and Hutchins-Keim 2019: 38-40). Following Hopkins' death in 1873, the land was granted to the trustees of Johns Hopkins University who later sold the property to the City of Baltimore in 1894 to be used as a municipal park (Shellenhamer and Hutchins-Keim 2019: 39-43).

Between 1857 and 1876, a number of residences and commercial establishments were constructed along Harford Road to the south and west of Hopkins' estate (**Figure 4-2**). South and adjacent to Survey Area 4 is a parcel of land called Darley Park on which the 1876 G. M. Hopkins *City Atlas of Baltimore, Maryland* indicates stood a brewery, hotel, and depot (**Figure 4-6**). These are not located within or adjacent to the survey area. The Hopkins map also shows across Harford Road from Darley Park a number of small residential parcels and the Friends Burial Ground.

Figure 4-4. Section of 1876 Hopkins map showing approximate location of Survey Area 3, Baltimore, Maryland.

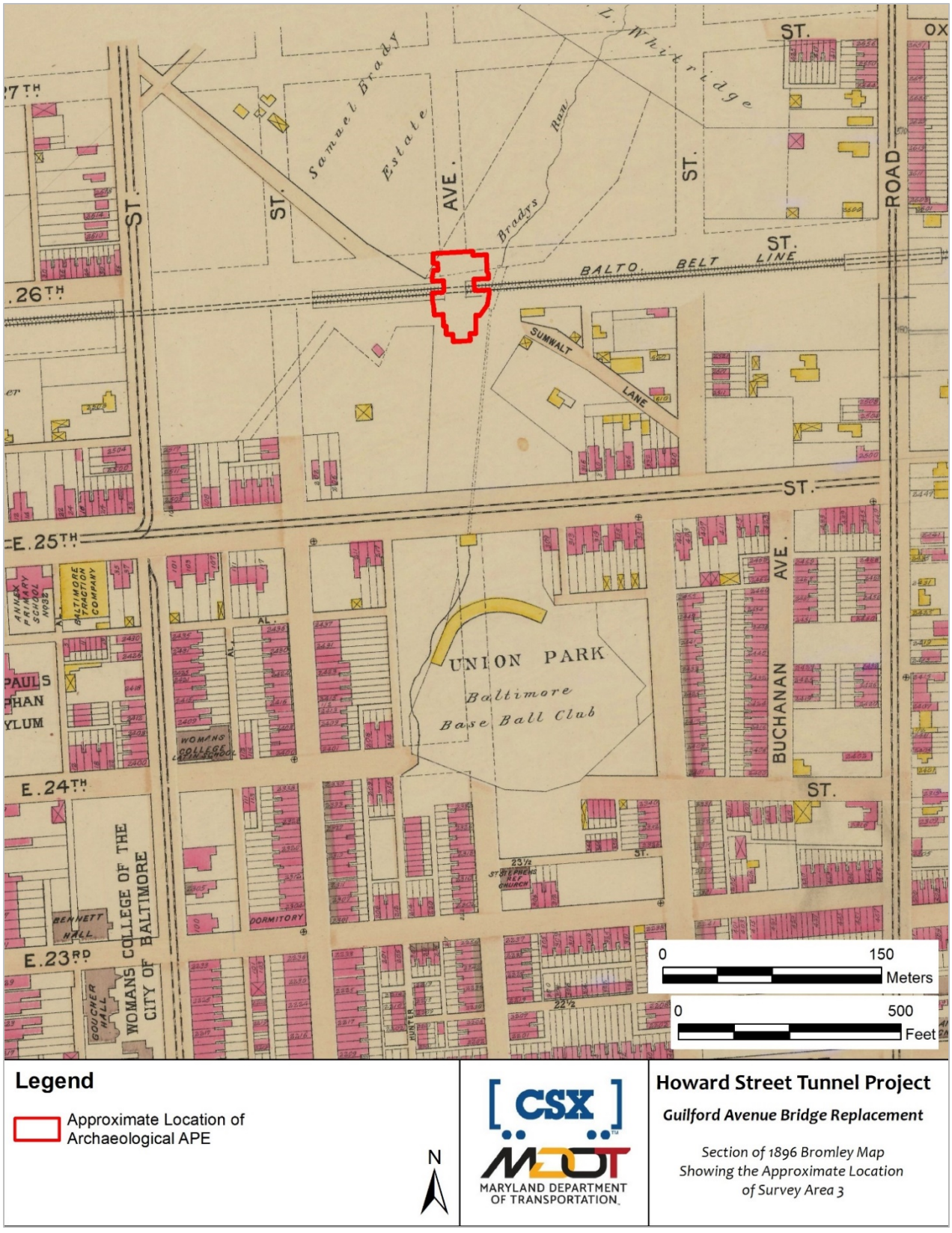

Figure 4-5. Section of 1896 Bromley map showing approximate location of Survey Area 3, Baltimore, Maryland.

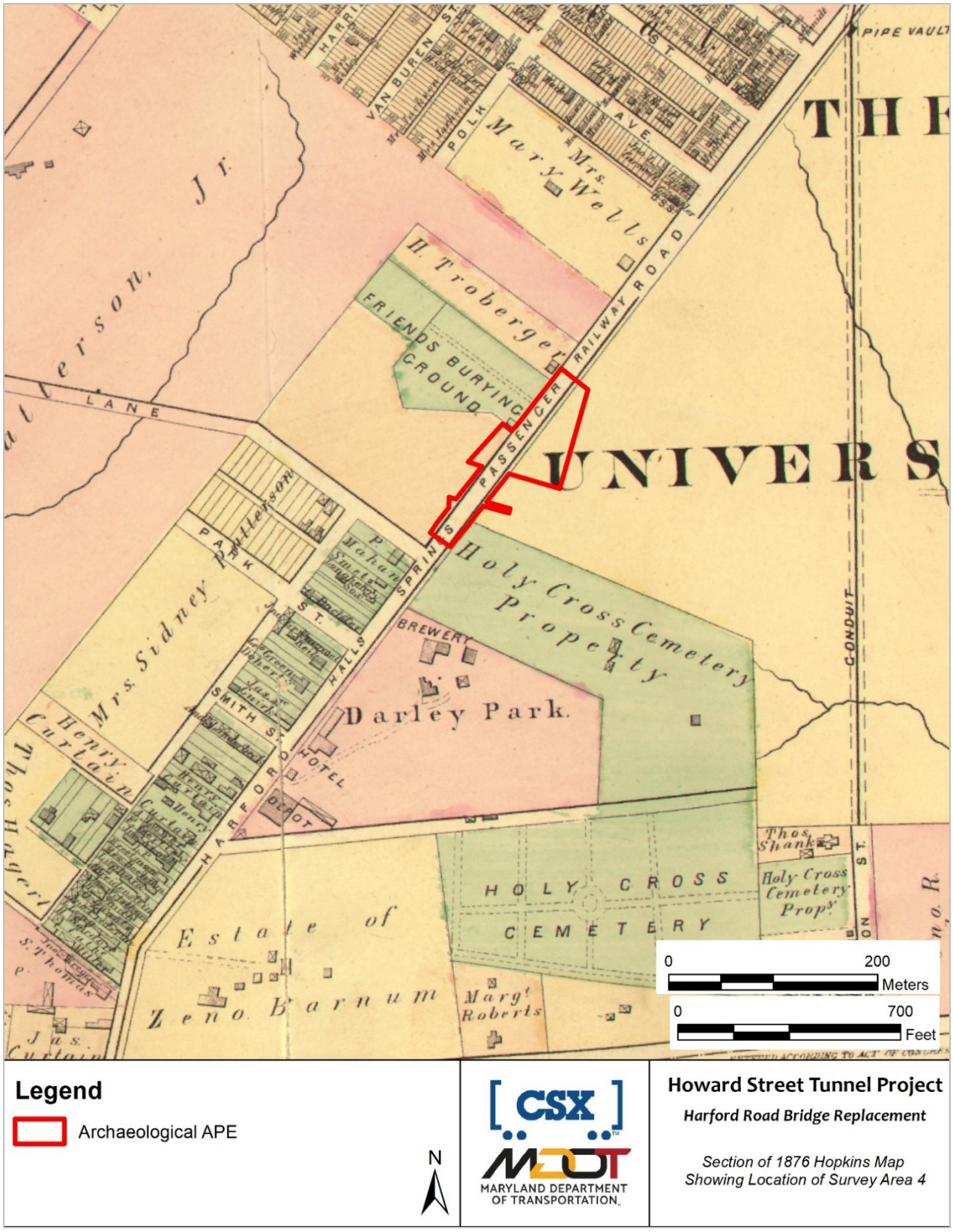

Figure 4-6. Section of the 1876 Hopkins map showing approximate location of Survey Area 4, Baltimore, Maryland.

4.2.6 **Delaware County and Philadelphia, Pennsylvania**

The Dutch initially settled the Philadelphia area and lower Delaware Valley in the early-seventeenth century. At the time, several distinct Native American groups populated what is now eastern Pennsylvania and Delaware. European explorers and settlers began to encounter the Native Americans living in the area. At the time of European contact, moderate-sized, semi-permanent Indian towns and villages dotted the landscape. The aboriginal occupants of eastern Pennsylvania that were encountered by the Dutch in the early 1600s called themselves the Lenni Lenape, meaning the "real" or "original" people, but Europeans labeled them "Delawares" for their proximity to the Delaware River where they lived. Inhabiting the area between northern Delaware and New York State, the Lenni Lenape were not a single, unified nation, but rather a set of loosely organized villages and local bands. Traditionally, the Lenni Lenape were divided into the Munsee (Wolf tribe), Unami (Turtle tribe), and Unalactigo (Turkey tribe) groupings (Klein and Hoogenboom 1973; Licht et al. 2020).

In 1638, a group of Dutch and Swedish investors formed the New South Company, which purchased a tract of land from the Lenni Lenape near present-day Wilmington, Delaware. The Company then established a settlement on Tinicum Island in South Philadelphia. Swedish and Finnish fur traders established a presence along the west bank of the Delaware River. The first Swedish settlement—New Sweden at Fort Christina—was established in 1638 on the Delaware River between Wilmington and Philadelphia. Their presence expanded along both sides of the river within ten years of the initial settlement (Garber 1917). In 1640, Dutch investors purchased the New South Company outright and established new trading posts along the Delaware River. When the Dutch lost all of their North American land claims to the English, the Swedes remained and established a community in West Philadelphia in the area west of the Schuylkill River, which carried the Lenape name Chinssessing, "a place where there is a meadow" (which would become the district of Kingsessing) (Licht et al. 2020).

In 1681, Englishman William Penn was granted proprietary rights and charter from King Charles II to establish a colony in what is now Pennsylvania. The colony was initially named New Wales, but that title was rejected in favor of Sylvania, which was subsequently changed to Pennsylvania to honor its founder. Pennsylvania, measuring approximately 40,000 square miles, was confirmed in 1681 and settlement was encouraged with the alluring offer of 40 shillings per hundred acres or shares of 5,000 acres for 100 pounds (Walther n.d.). Penn arrived in the colony in 1682, immediately establishing the city grid for Philadelphia. The eastern portion of the city along the river was the first area to see significant development.

The actions of Penn, and the Quakers in general, towards the Native Americans they encountered were largely influenced by the principles of goodwill and friendship. When Penn took ownership rights of the Lenape lands, he recognized lands where Lenape villages were located and reserved them from the purchase agreement. After Penn’s death in 1718, peaceful relations between the European settlers and the Lenape did not last. The Lenape lost all claims to the lands they had inhabited for centuries in the "Walking Purchase" of 1737. The Lenape had moved outward from the European settlements under the guidance of Penn, but these lands would later be claimed by growing numbers of European settlers in the countryside as Philadelphia’s European population grew, and land claims expanded (Licht et al. 2020).

The early growth of Philadelphia in the late-seventeenth and early-eighteenth centuries was encouraged by the increasing strength of manufacturing, agriculture, and trade, as the city became one of the most significant ports along the eastern coast. This period of growth was marked by the massive influx of European immigrants—mostly English, Dutch, Irish, Welsh, Swedes, Finns, and Germans. By the mid-eighteenth century, the majority of immigrants were of Irish and German descent (Weigley 1982). By

virtue of its central location in the colonies, its industrial and commercial strength, and its growing population, Philadelphia served a pivotal role during the American Revolutionary period. The First and Second Continental Congress were held in Philadelphia, and the Declaration of Independence was drafted and signed there.

At the turn of the nineteenth century, Philadelphia was becoming a major industrial and population center. It was officially the country's largest city and remained one of its major ports. As a major port city, its industrial strength revolved around trans-oceanic shipping. As industrial manufacturing became the dominant source of income through the nineteenth century and into the twentieth century, industrial, commercial, and residential districts began to emerge throughout the city that largely followed patterns of socio-economic means and ethnic background (Webster 1976). European immigration into Philadelphia was slowed by World War I and immigration quotas imposed in 1924, but the demand for industrial labor for the city's factories and at the new US military shipyard at Hog Island remained. To fulfill this need, many southern African Americans moved north to industrial centers such as Philadelphia during this period and throughout the early twentieth century, a nationwide movement known as the Great Migration. The conditions in the rural, Jim Crow south were difficult for many African Americans, and the economic opportunities and cultural attitudes towards African Americans were a strong pull (US Census Bureau 2012).

During the late-nineteenth and twentieth centuries, major advances in transportation—namely railroads, but also new roads and canals—led to immense growth in the city and its suburbs. Many areas along waterways developed as centers of industrial manufacturing and became working-class suburbs. Water power and transportation encouraged development in places such as Upper Darby, Pennsylvania, where the many creeks and streams allowed for the development of mill towns (Dayanim 2017). As industry grew in the city, many middle- and upper-class residents began moving to suburban communities outside of the city center during the early twentieth century, a trend which was facilitated by the establishment of railroad and trolley lines extending outward from the city (Weigley 1982). Local industrial production included a wide range of wares, "from locomotives and ships to silk hosiery, wool carpets, machine tools, hand tools, lighting fixtures, steel, soup, and men's and women's apparel" (Elesh 2017).

After World War II, migration out of the city center flowed mainly to the inner suburbs that grew to be almost equal to the population of Philadelphia by 1970 (Dayanim 2017). Many of the city-center's factories and jobs moved outward as well, with the peak occurring around 1950. Many of the industries saw a decline during the later half of the twentieth century that exceeded that of other industrial centers (Elesh 2017). In the late-twentieth century, Philadelphia's manufacturing industries—namely textiles and shipbuilding—were impacted by decreased global demand and the movement of manufacturing centers overseas. By the end of the twentieth century, most of the factories and shipyards in Philadelphia were vacant. The greater Philadelphia area's major employers shifted to health care, pharmaceuticals, business services, education, and government. These trends can be seen in each of the survey areas in Pennsylvania. However, as the survey areas in Pennsylvania are geographically separate and have substantially different historical backgrounds, each is addressed individually below.

4.2.7 Survey Area 5 – Boone Tunnel Enlargement, Delaware County, Pennsylvania

Survey Area 5 is located at the intersection of Chester Pike and the CSX railroad corridor at the intersection of the Collingdale, Sharon Hill, and Darby Boroughs of Delaware County, Pennsylvania. The survey area is located along the northern margin of the Sharon Hill neighborhood. Sharon Hill remained largely undeveloped until the late-nineteenth century, when the PW&B Railroad was constructed through the area. Prior to the railroad's construction, several residences and farms were located in the area. The 1753

Scull *Map of Philadelphia and Parts Adjacent* shows Survey Area 5 as a sparsely developed, rural setting southwest of the town of "Derby" (Darby) (**Figure 4-7**). The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows minor development in the town of Darby and additional roads leading into the area. The map indicates that Marth B. Andrews, J. Chs. Andrews, and Henry Sloan all owned property in the vicinity of the survey area (**Figure 4-8**). The main thoroughfare through the area was the "Queen's Highway," which follows the path of present-day Chester Pike (Clarke and Shiber 2009).

In the late-nineteenth century, the Philadelphia Branch of the B&O Railroad was constructed from the City of Baltimore to the eastern side of the Schuylkill River in Philadelphia. Construction of the line began in 1883, but the first regular Baltimore-Philadelphia passenger trains did not begin operating until September 1886. With the introduction of the B&O Railroad, the Sharon Hill neighborhood was officially platted out and many wealthy Philadelphians began constructing homes in the area. The borough of Sharon Hill officially established itself as separate from the Town of Darby in 1890. The 1898 Chester, PA quadrangle USGS topographic map shows the railroad and the beginnings of the development that surrounded the railroad and Survey Area 5 (**Figure 4-9**). As one of many "railroad suburbs" outside of the city proper, the Sharon Hill and Darby areas saw substantial growth in the first half of the twentieth century. The mass availability of the automobile and major improvements in transportation infrastructure—roads, trolley lines, and railroad lines—spurred the growth of suburban areas outside of Philadelphia. The 1942 Lansdowne, PA quadrangle USGS topographic map shows the level of urban development that occurred in Survey Area 5 during the first half of the twentieth century (**Figure 4-10**).

4.2.8 **Survey Area 8 – Chichester Avenue Track Lowering, Delaware County, Pennsylvania**

Survey Area 8 is located in the Upper Chichester Township of Delaware County, Pennsylvania, at the intersection of Chichester Avenue and the existing CSX ROW. At the time of its inception in 1759 from Chichester Township, Upper Chichester Township was heavily centered around agriculture. The 1753 Scull *Map of Philadelphia and Parts Adjacent* depicts Survey Area 8 as a sparsely developed, rural setting (**Figure 4-11**). During the early- and mid-nineteenth century, much of the surrounding areas, particularly those closer to the Delaware River, were becoming industrialized. Upper Chichester Township, however, remained primarily agrarian.

Upper Chichester remained largely rural until the late-nineteenth century, when it experienced immediate growth due to the construction of the Philadelphia Branch of the B&O Railroad from the City of Baltimore to the eastern side of the Schuylkill River in Philadelphia. The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows virtually no development in the area, though it indicates that John Todd and Andrew Osborne were owners of the property in the vicinity of the survey area (**Figure 4-12**). The Philadelphia Branch of the B&O Railroad extended into the Upper Chichester Township in 1889. Towards the end of the nineteenth century, several residential areas were established in the vicinity of the survey area (**Figure 4-13**). **Figure 4-14** shows the state of development of the area in 1942.

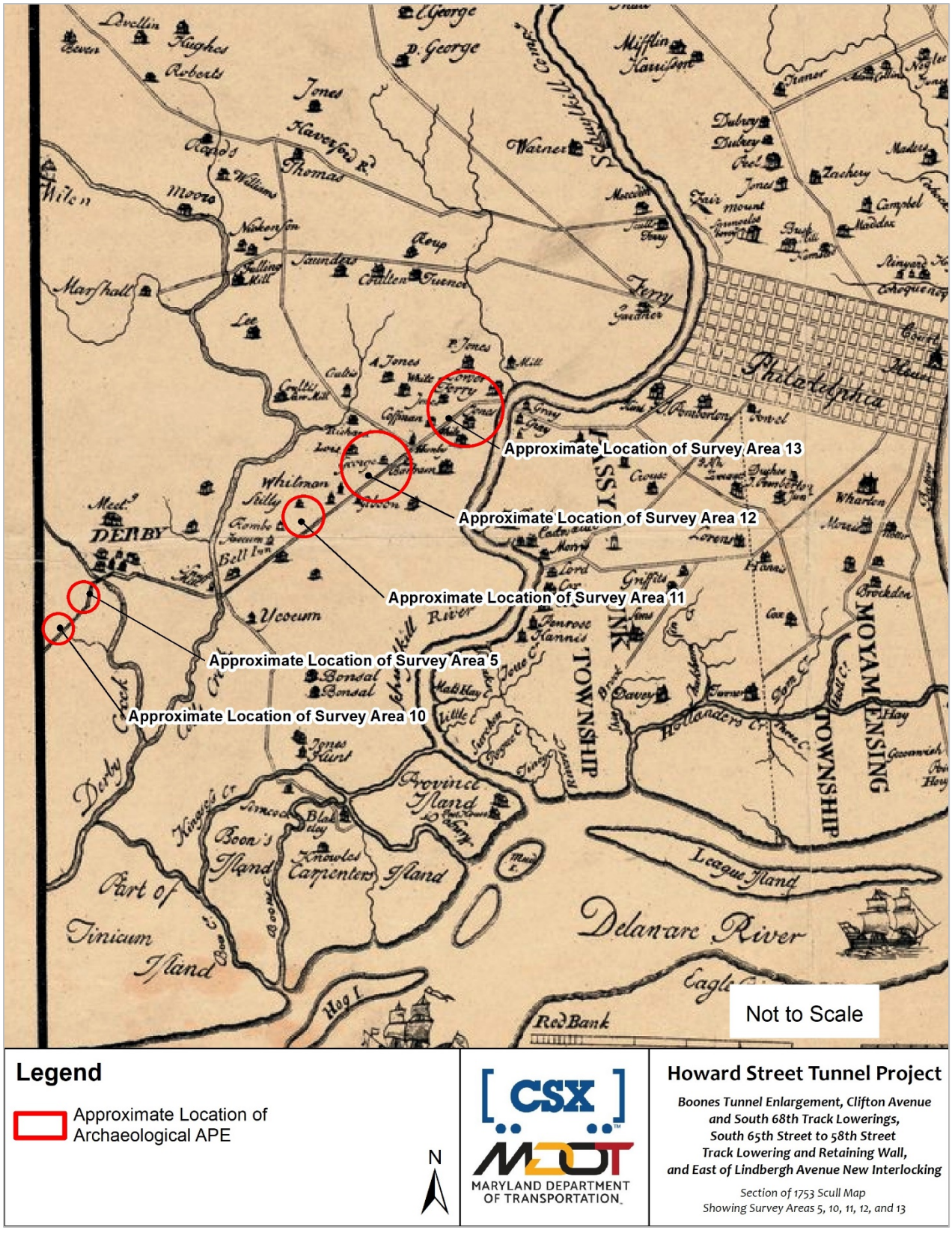

Figure 4-7. Section of the 1753 Scull map showing approximate locations of Survey Areas 5, 10, 11, 12, and 13, Delaware and Philadelphia Counties, Pennsylvania.

Figure 4-8. Section of 1870 Hopkins map showing approximate locations of Survey Areas 5 and 10, Delaware County, Pennsylvania.

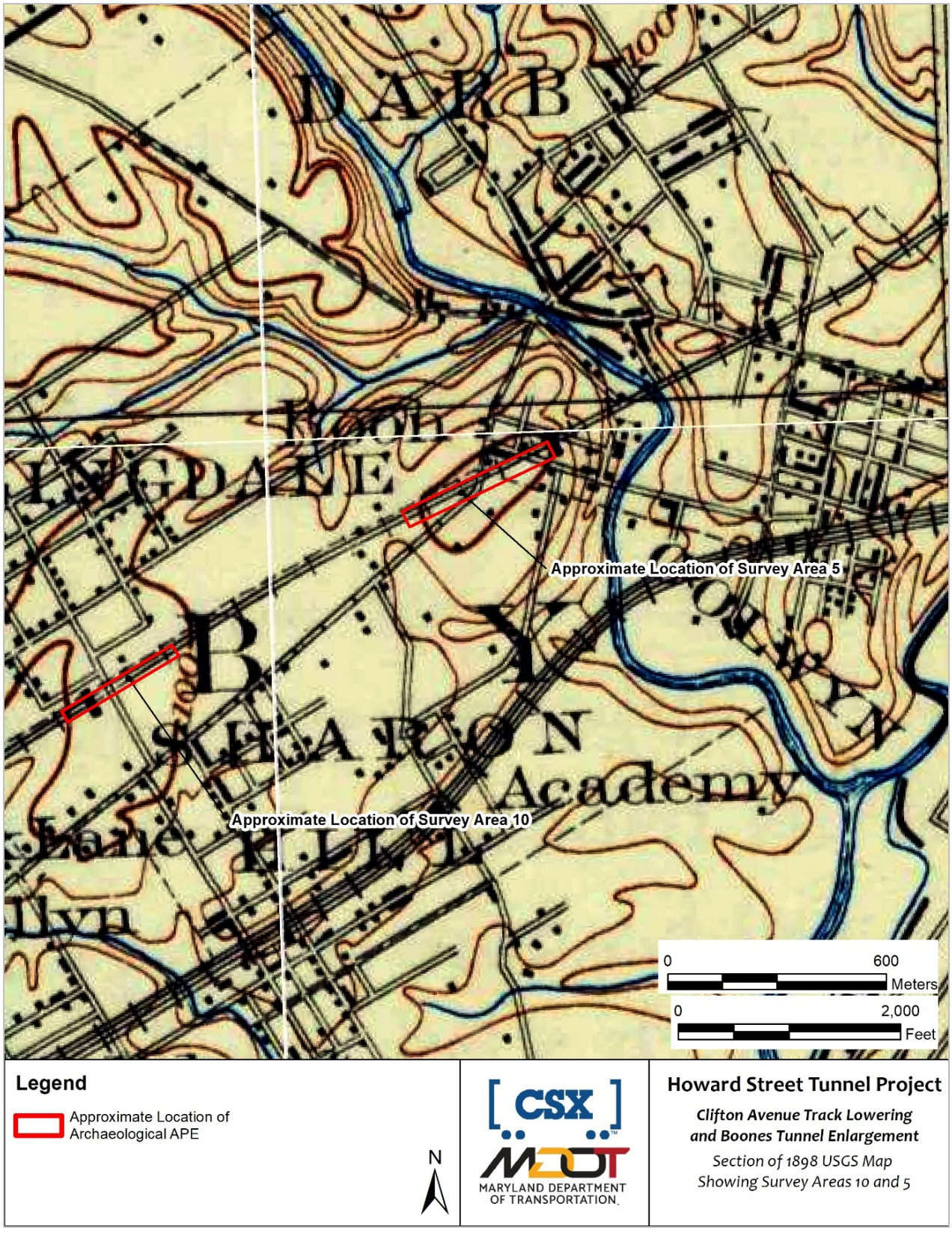

Figure 4-9. Section of 1898 USGS – Chester, PA quadrangle topographic map showing approximate locations of Survey Areas 5 and 10, Delaware County, Pennsylvania.

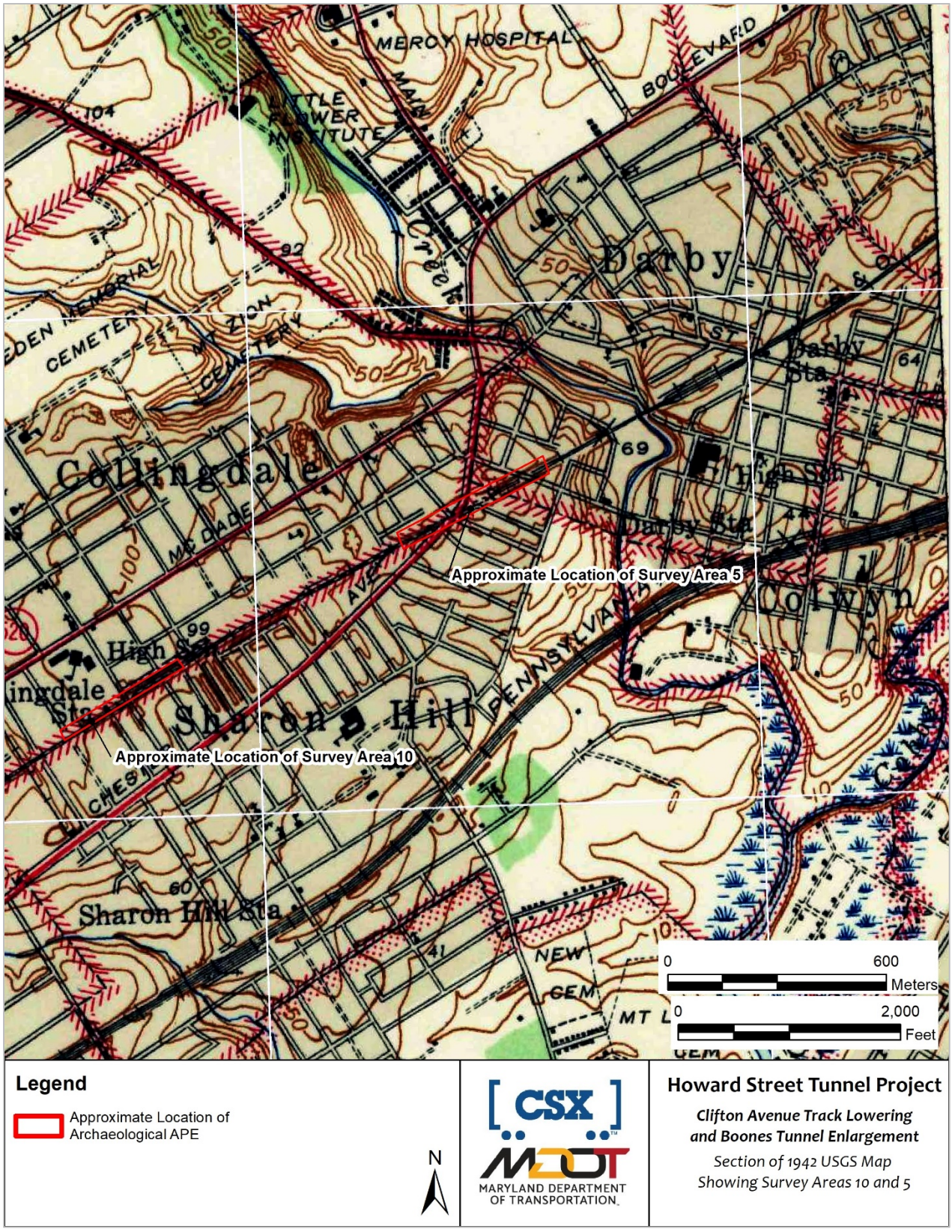

Figure 4-10. Section of 1942 Lansdowne, PA quadrangle topographic map showing approximate locations of Survey Areas 5 and 10, Delaware County, Pennsylvania.

Figure 4-11. Section of the 1753 Scull map showing approximate locations of Survey Areas 8 and 9, Delaware County, Pennsylvania.

Figure 4-12. Section of 1870 Hopkins map showing approximate location of Survey Area 8, Delaware County, Pennsylvania.

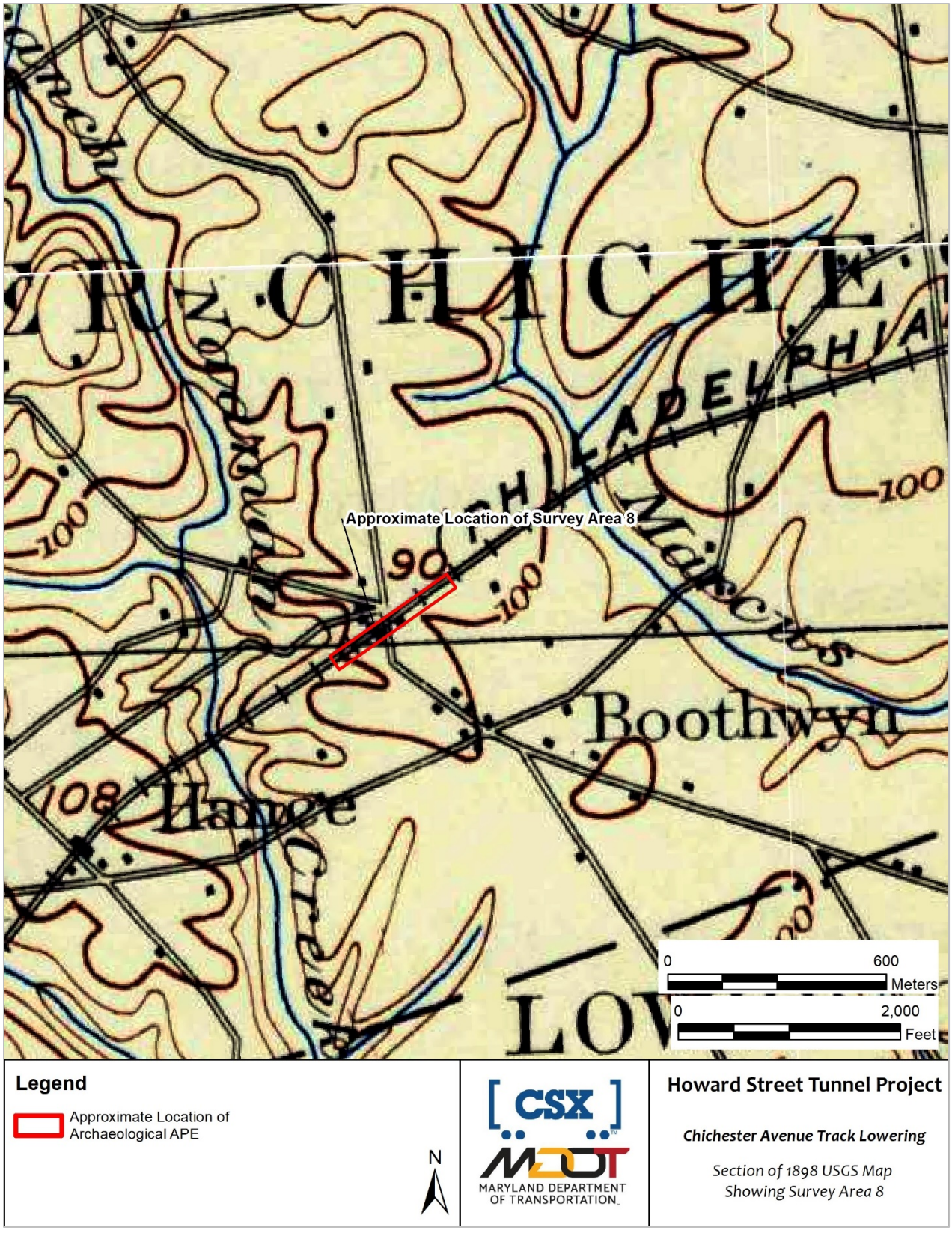

Figure 4-13. Section of USGS – 1898 Chester, PA quadrangle topographic map showing approximate location of Survey Area 8, Delaware County, Pennsylvania.

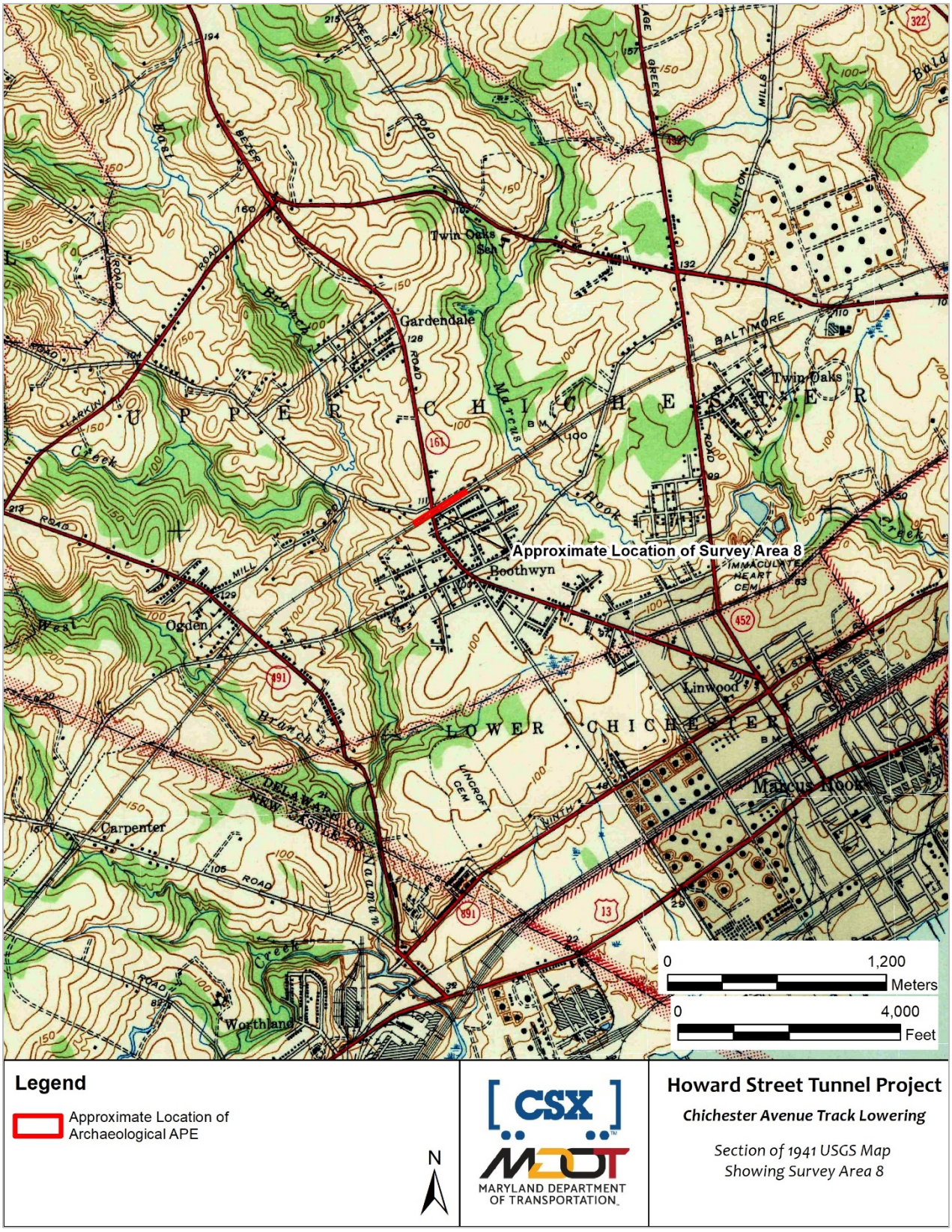

Figure 4-14. Section of 1941 Marcus Hook, PA quadrangle topographic map showing approximate location of Survey Area 8, Delaware County, Pennsylvania.

4.2.9 **Survey Area 9 – Crum Lynne Road Track Lowering, Delaware County, Pennsylvania**

Survey Area 9 is located in the Ridley Park Borough, Ridley Township of Delaware County, Pennsylvania, at the intersection of Crum Lynne Road and the existing CSX ROW. Ridley Township was established in 1687 as part of what was then Chester County. Chester Pike, located south of the survey area, served as the main thoroughfare through the county. The area remained relatively rural through the mid-nineteenth century (**Figure 4-11).** The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows some infrastructure development in the area, though no buildings are shown within or surrounding the survey area. The map indicates that the land in the vicinity of the survey area was owned at this time by J. Hewes and the Ridley family (**Figure 4-15**). The introduction of the "Darby Improvement" section of the PW&B Railroad in the 1870s led to a change from rural to an urban character of the Ridley Park and adjacent areas (NRHP 1991). In 1872, Darby Station was constructed along the PW&B Railroad on Pine Street east of Darby Creek on the north side of the tracks (Delaware County 2020).

Construction of the Philadelphia Branch of the B&O Railroad between 1883 and 1886 further changed the area. The new railroad line generated real estate speculation and the development of new suburban communities such as Sharon Hill, Prospect Park, Norwood, and Glenolden. Ridley Park was one of the earliest and largest of these suburban park developments, with planning underway as early as 1870 (**Figure 4-15**). By 1887, approximately 1,000 people were living in Ridley Park and the area was officially incorporated as a borough, growing steadily through the turn of the century (NRHP 1991) (**Figure 4-16**). The population of the community continued to increase during the 1900s, as remaining acreage was divided and developed. By 1940, most of the borough had been developed, but demographic growth continued for another thirty years (**Figure 4-17**).

4.2.10 **Survey Area 10 – Clifton Avenue Track Lowering, Delaware County, Pennsylvania**

Survey Area 10 is located in the Collingdale Borough of Delaware County, Pennsylvania, at the intersection of Clifton Avenue and the existing CSX ROW. From its initial settlement until the late-nineteenth century, the Collingdale area was largely agrarian, with several residences and farms located in the area. The 1753 Scull *Map of Philadelphia and parts adjacent* shows Survey Area 10 as a sparsely developed, rural setting southwest of the town of "Derby" (Darby) (**Figure 4-7**). The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows virtually no development in the area, though the property in the vicinity of the survey area is shown as owned by E. L. Marshall and S. L. Bunting (**Figure 4-8**). The town experienced immediate growth in the late-nineteenth century following the introduction of the Philadelphia Branch of the B&O Railroad in the 1880s. The 1898 Chester, PA quadrangle USGS topographic map shows the railroad and the beginnings of the development that surrounded the railroad and Survey Area 10 (**Figure 4-9**). Upon learning of the plans to build the railroad line in the area, developers bought the available land surrounding the railroad's path. In Collingdale, the Collingdale Land Improvement Company was established, purchasing land that extended from Clifton Avenue on the west to Springfield Road in the east, Bartram Avenue to the north and the area of the present-day CSX railroad tracks. The community's population continued to increase during the 1900s, as development continued and filled in much of the remaining farmland. By 1940, most of the borough had been developed, appearing much as it does today (**Figure 4-10**).

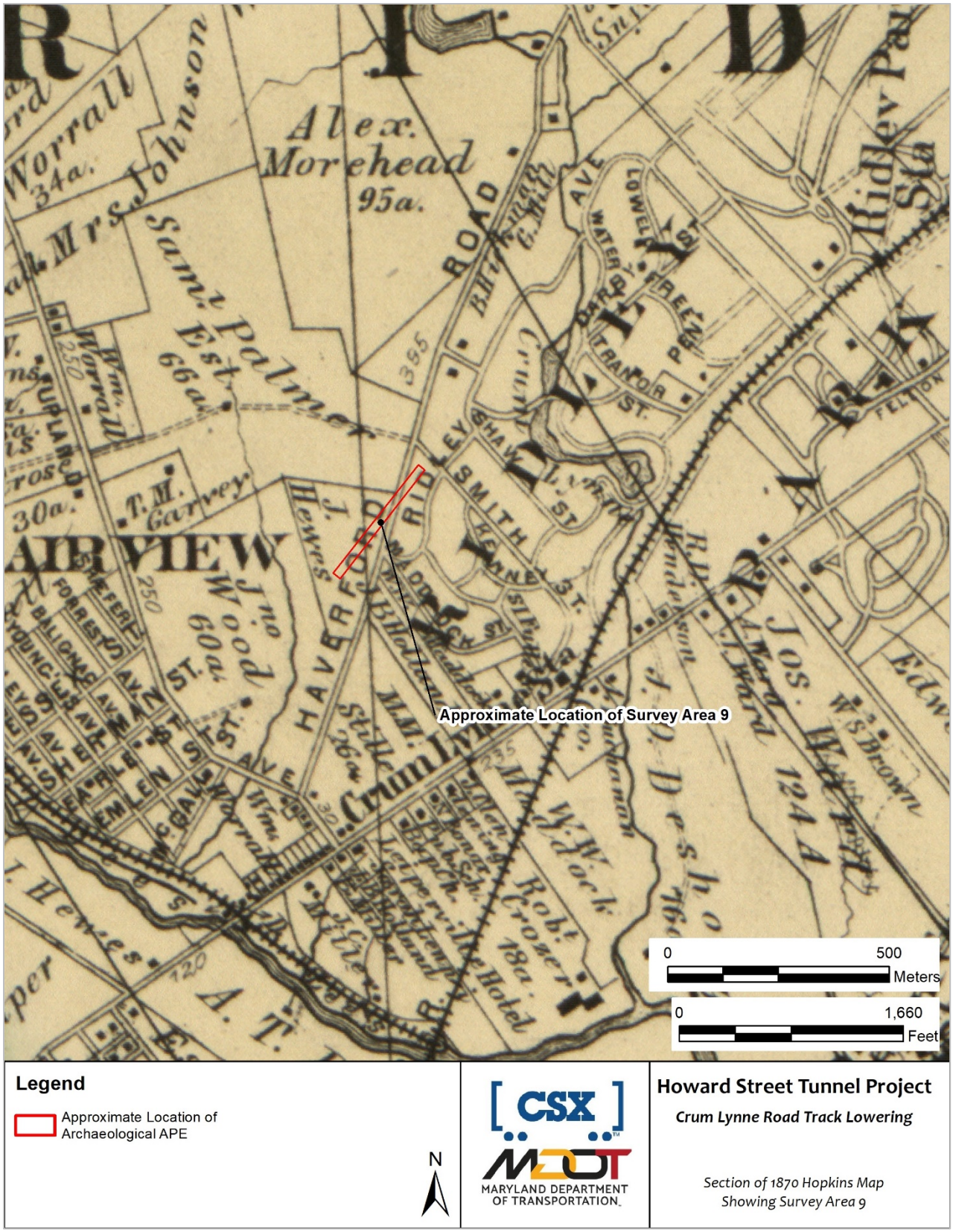

Figure 4-15. Section of 1870 Hopkins map showing approximate location of Survey Area 9, Delaware County, Pennsylvania.

Figure 4-16. Section of 1898 Chester, PA quadrangle topographic map showing approximate location of Survey Area 9, Delaware County, Pennsylvania.

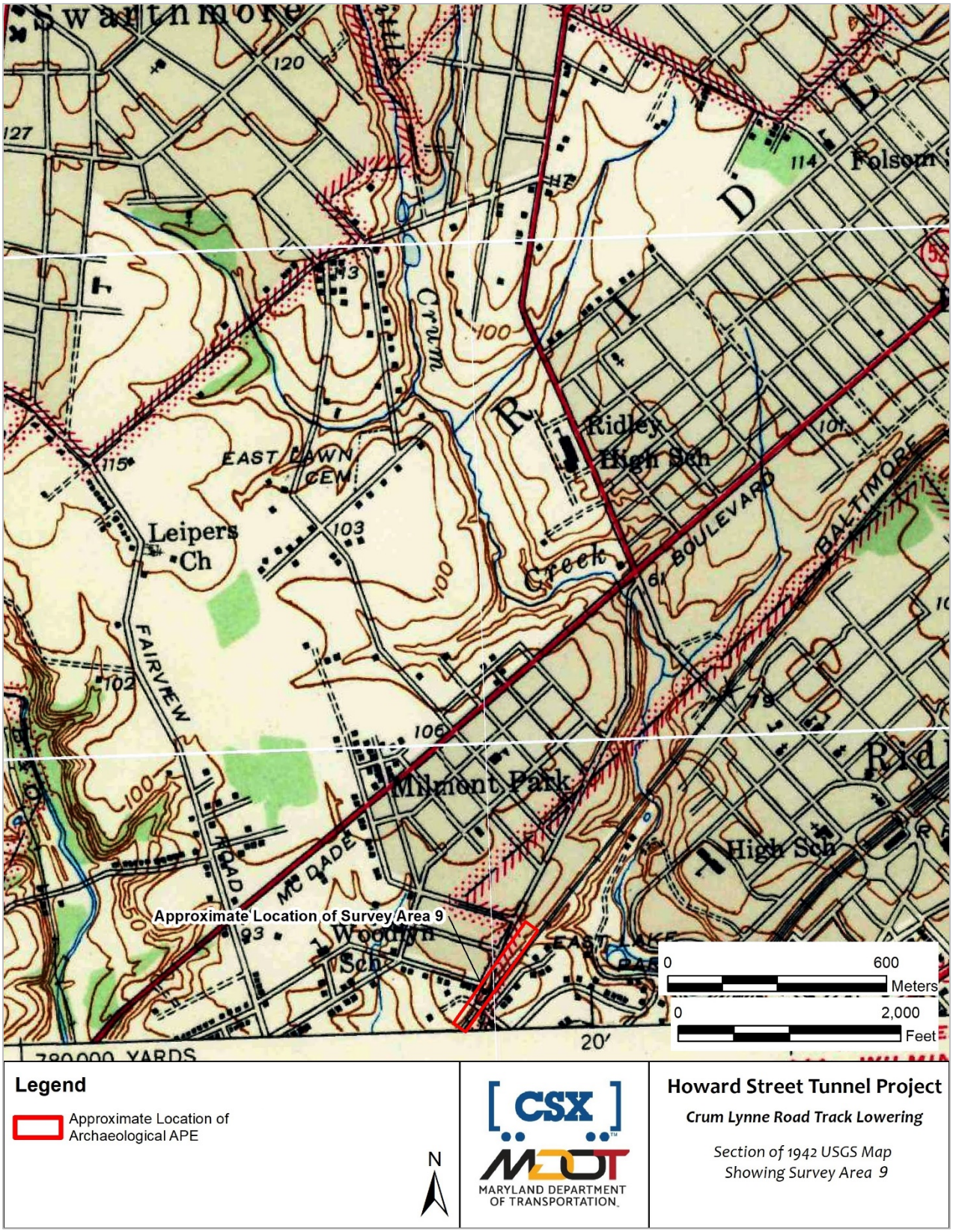

Figure 4-17. Section of 1942 Lansdowne, PA quadrangle topographic map showing approximate location of Survey Area 9, Delaware County, Pennsylvania.

4.2.11 Survey Area 11 – S. 68th Street Track Lowering, Philadelphia County, Pennsylvania

Survey Area 11 is located in the City of Philadelphia, Philadelphia County, Pennsylvania, at the intersection of S. 68th Street and the existing CSX ROW. The survey area was part of the larger Kingsessing area, one of the earliest parts of Philadelphia to be settled by Europeans. The name Kingsessing is often attributed to Delaware Indian word translated as "a place where there is a bog meadow." The area became the hub of Swedish occupation in 1643 when Governor Johann Printz centered the Swedish settlement there. In 1696, the "King's Highway" was built westward from Gray's Ferry, becoming the main thoroughfare connecting Philadelphia to Baltimore (Krulikowski 2014). The Kingsessing Township was established no earlier that 1712 (Daly and Weinberg 1966). The 1753 Scull *Map of Philadelphia and Parts Adjacent* shows Survey Area 11 as a sparsely developed, rural setting along the "King's Highway" (Darby Road) between Philadelphia and "Derby" (Darby). Ownership of the land in the vicinity of the survey area is attributed to the Whitman and Stilly families (**Figure 4-7**). The area remained largely rural until the early-nineteenth century, and development was limited to the areas surrounding roadways and Cobbs Creek to the west. Kingsessing Township was subsumed by Philadelphia County under the Consolidation Act of 1854, though the area was still referred to as "Kingsessing" (Daly and Weinberg 1966).

Kingsessing remained the slowest-developing section of greater Philadelphia through the mid-nineteenth century. By mid-century, the entire township contained only about 1,800 residents (Krulikowski 2014). The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows virtually no development in the area (**Figure 4-18**). The area experienced immediate growth in the late-nineteenth century, when the Philadelphia Branch of the B&O Railroad was constructed from the City of Baltimore to the eastern side of the Schuylkill River in Philadelphia. The railroad and associated development can be seen in the 1898 Philadelphia, PA quadrangle USGS topographic map (**Figure 4-19**).

Southwest Philadelphia saw sustained residential, commercial, and industrial development during the late-nineteenth and early-twentieth centuries, and immigrant and native-born workers followed the opportunities for industrial employment. Irish, German, Lithuanian, Polish, Italian, and Jewish immigrants established communities in the area. During World War I, the federal government authorized the American International Shipping Corporation to establish a shipyard at Hog Island on the river in Southwest Philadelphia. Almost 15,000 male workers arrived into the area, filling in the surrounding neighborhoods. By 1940, most of the area had been developed, appearing much as it does today (**Figure 4-20**) (Krulikowski 2014).

4.2.12 Survey Area 12 – S. 65th Street to S. 58th Street Track Lowering, Retaining Wall, and Interlocking Removal, Philadelphia County, Pennsylvania

Survey Area 12 is located in the City of Philadelphia, Philadelphia County, Pennsylvania, at the intersections of S. 65th Street, Cemetery Avenue, 61st Street, Woodland Avenue, S. 58th Street and the existing CSX ROW. The survey area is on the northern margin of the Elmwood Park neighborhood in Southwest Philadelphia. The area was part of the larger Kingsessing area, one of the earliest parts of Philadelphia to be settled by Europeans. The name Kingsessing is often attributed to Delaware Indian word translated as "a place where there is a bog meadow." The area became the hub of Swedish occupation in 1643 when Governor Johann Printz centered the Swedish settlement there. In 1696, the "King's Highway" was built westward from Gray's Ferry, becoming the main thoroughfare connecting Philadelphia to Baltimore (Krulikowski 2014). The Kingsessing Township was established no earlier that 1712 (Daly and Weinberg 1966). The 1753 Scull *Map of Philadelphia and Parts Adjacent* shows Survey Area 12 as a sparsely developed, rural setting along the King's Highway (Darby Road) between Philadelphia

and “Derby” (Darby). Ownership of the land in the vicinity of the survey area at this time is attributed to the Bois and Yeocum families (**Figure 4-7**). The area remained largely rural until the early-nineteenth century, and development was limited to the areas surrounding roadways and Cobbs Creek to the west. Kingsessing Township was subsumed by Philadelphia County under the Consolidation Act of 1854, though the area was still referred to as “Kingsessing” (Daly and Weinberg 1966).

Kingsessing remained largely rural as the slowest-developing section of greater Philadelphia through the mid-nineteenth century. By mid-century, the entire township contained only about 1,800 residents (Krulikowski 2014). The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows virtually no development in the area (**Figure 4-18**). The area experienced immediate growth in the late-nineteenth century with the introduction of the Philadelphia Branch of the B&O Railroad. The railroad and associated development can be seen in the 1898 Philadelphia, PA quadrangle USGS topographic map (**Figure 4-19**).

Southwest Philadelphia saw sustained residential, commercial, and industrial development during the late-nineteenth and early-twentieth centuries, and immigrant and native-born workers followed the opportunities for industrial employment. Irish, German, Lithuanian, Polish, Italian, and Jewish immigrants established communities in the area. During World War I, the federal government authorized the American International Shipping Corporation to establish a shipyard at Hog Island south of the survey area. Almost 15,000 workers arrived into the area, filling in the surrounding neighborhoods. By 1940, the area was dominated by urban development, appearing much as it does today (**Figure 4-20**) (Krulikowski 2014).

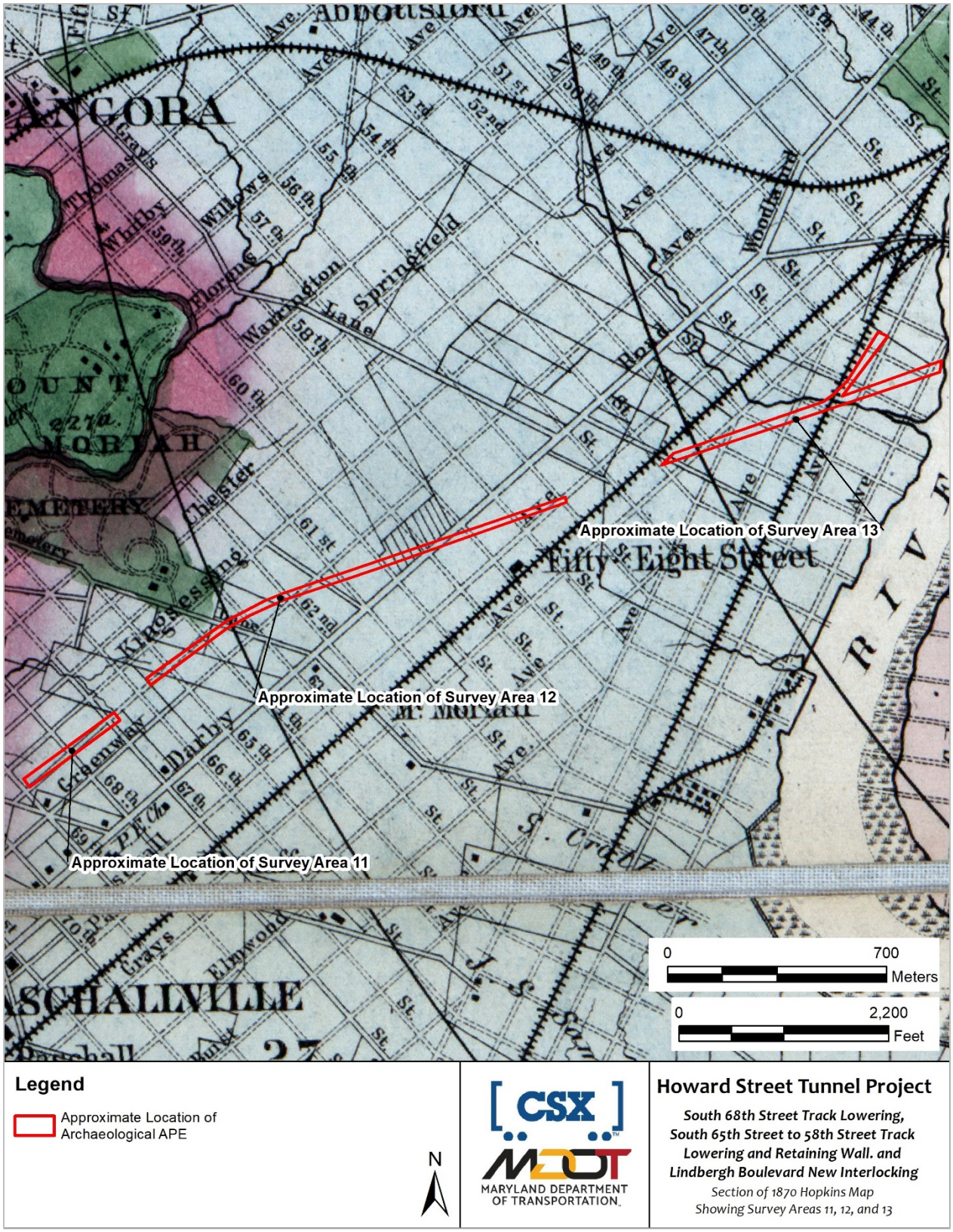

Figure 4-18. Section of 1870 Hopkins map showing approximate locations of Survey Areas 11, 12, and 13, Philadelphia County, Pennsylvania.

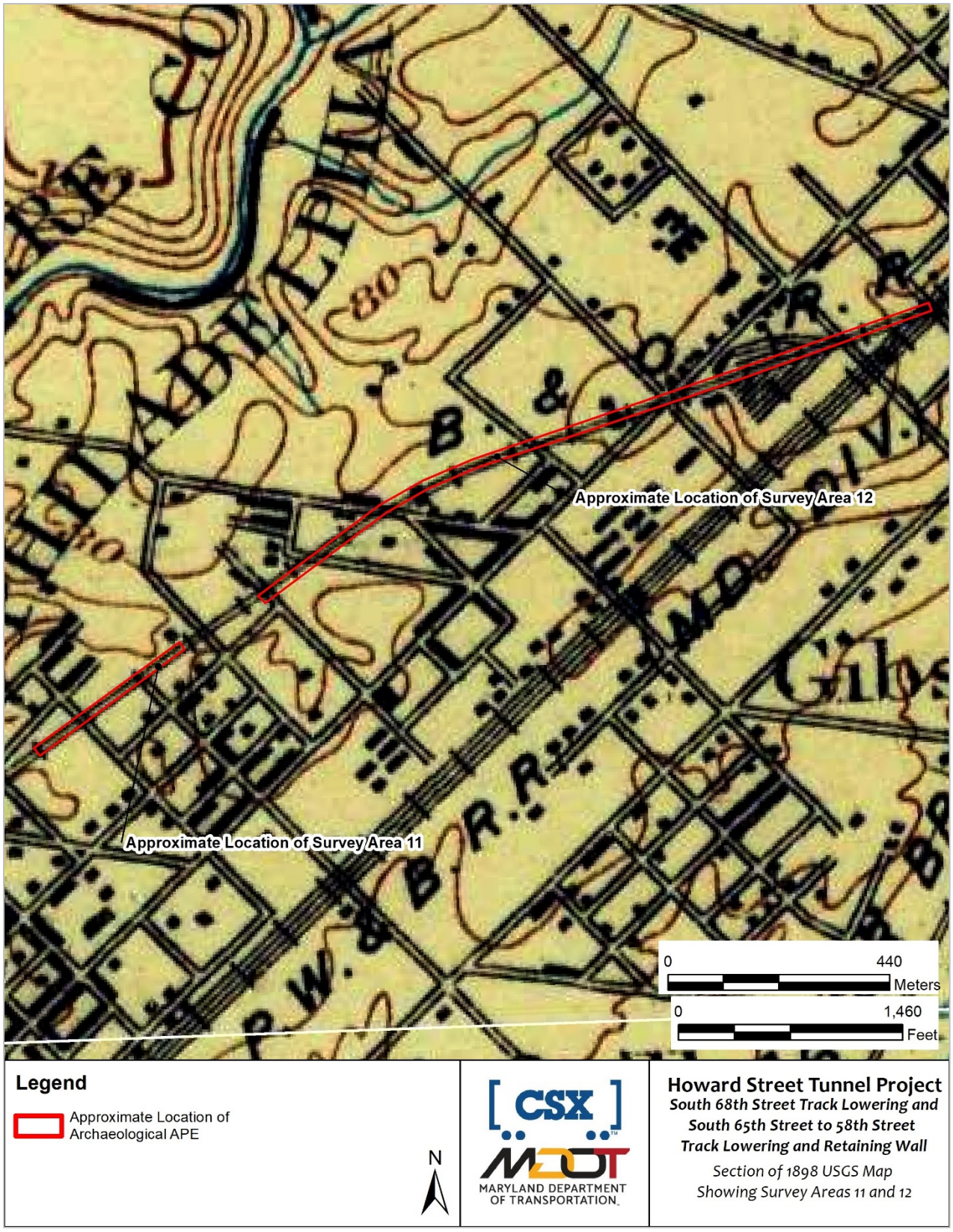

Figure 4-19. Section of 1898 USGS Philadelphia, PA map showing approximate locations of Survey Areas 11 and 12, Philadelphia County, Pennsylvania.

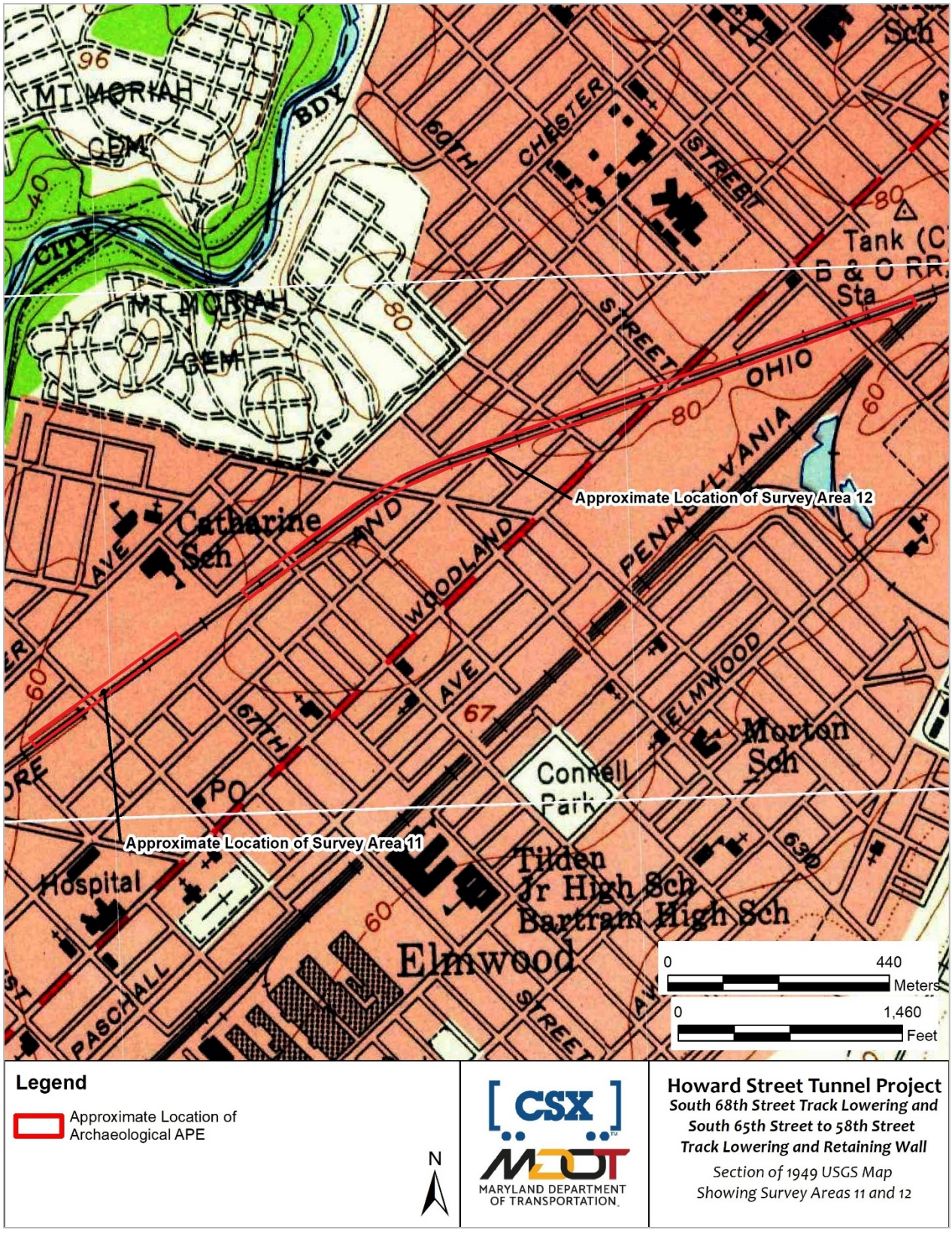

Figure 4-20. Section of 1949 USGS Philadelphia, PA map showing approximate locations of Survey Areas 11 and 12, Philadelphia County, Pennsylvania.

4.2.13 **Survey Area 13 – Lindbergh Boulevard New Interlocking, Philadelphia County, Pennsylvania**

Survey Area 13 is located in the City of Philadelphia, Philadelphia County, Pennsylvania, east of the intersection of Grays Avenue and the existing CSX ROW, and west of the Schuylkill River. The survey area is on the northern margin of the Elmwood Park neighborhood in Southwest Philadelphia and the southern margin of the Kingsessing neighborhood. The area was part of the larger Kingsessing area, one of the earliest parts of Philadelphia to be settled by Europeans. The name Kingsessing is often attributed to Delaware Indian word translated as "a place where there is a bog meadow." The area became the hub of Swedish occupation in 1643 when Governor Johann Printz centered the Swedish settlement there. In 1696, the "King's Highway" was built westward from Gray's Ferry, becoming the main thoroughfare connecting Philadelphia to Baltimore (Krulikowski 2014). The Kingsessing Township was established no earlier that 1712 (Daly and Weinberg 1966). The 1753 Scull *Map of Philadelphia and Parts Adjacent* shows Survey Area 13 as a sparsely developed, rural setting along King's Highway" (Darby Road) between Philadelphia and "Derby" (Darby). Ownership of the land in the vicinity of the survey area at this time is attributed to the Jones family (**Figure 4-7**). Kingsessing Township was subsumed by Philadelphia County under the Consolidation Act of 1854, though the area was still referred to as "Kingsessing" (Daly and Weinberg 1966).

Kingsessing remained largely rural, as the slowest-developing section of greater Philadelphia through the mid-nineteenth century. By mid-century, the entire township contained only about 1,800 residents (Krulikowski 2014). The 1870 G. M. Hopkins and Company *Map of Delaware County and the City of Philadelphia* shows very sparse development in the area (**Figure 4-18**). The area experienced immediate growth in the late-nineteenth century with the introduction of the Philadelphia Branch of the B&O Railroad. The railroad and associated development can be seen in the 1898 Philadelphia, PA quadrangle USGS topographic map (**Figure 4-19**).

Southwest Philadelphia saw sustained residential, commercial, and industrial development during the late-nineteenth and early-twentieth centuries, and immigrant and native-born workers followed the opportunities for industrial employment. Irish, German, Lithuanian, Polish, Italian, and Jewish immigrants established communities in the area. During World War I, the federal government authorized the American International Shipping Corporation to establish a shipyard at Hog Island south of the survey area. Almost 15,000 workers arrived into the area, filling in the surrounding neighborhoods. By 1940, the area was dominated by urban development, appearing much as it does today (**Figure 4-20**) (Krulikowski 2014).

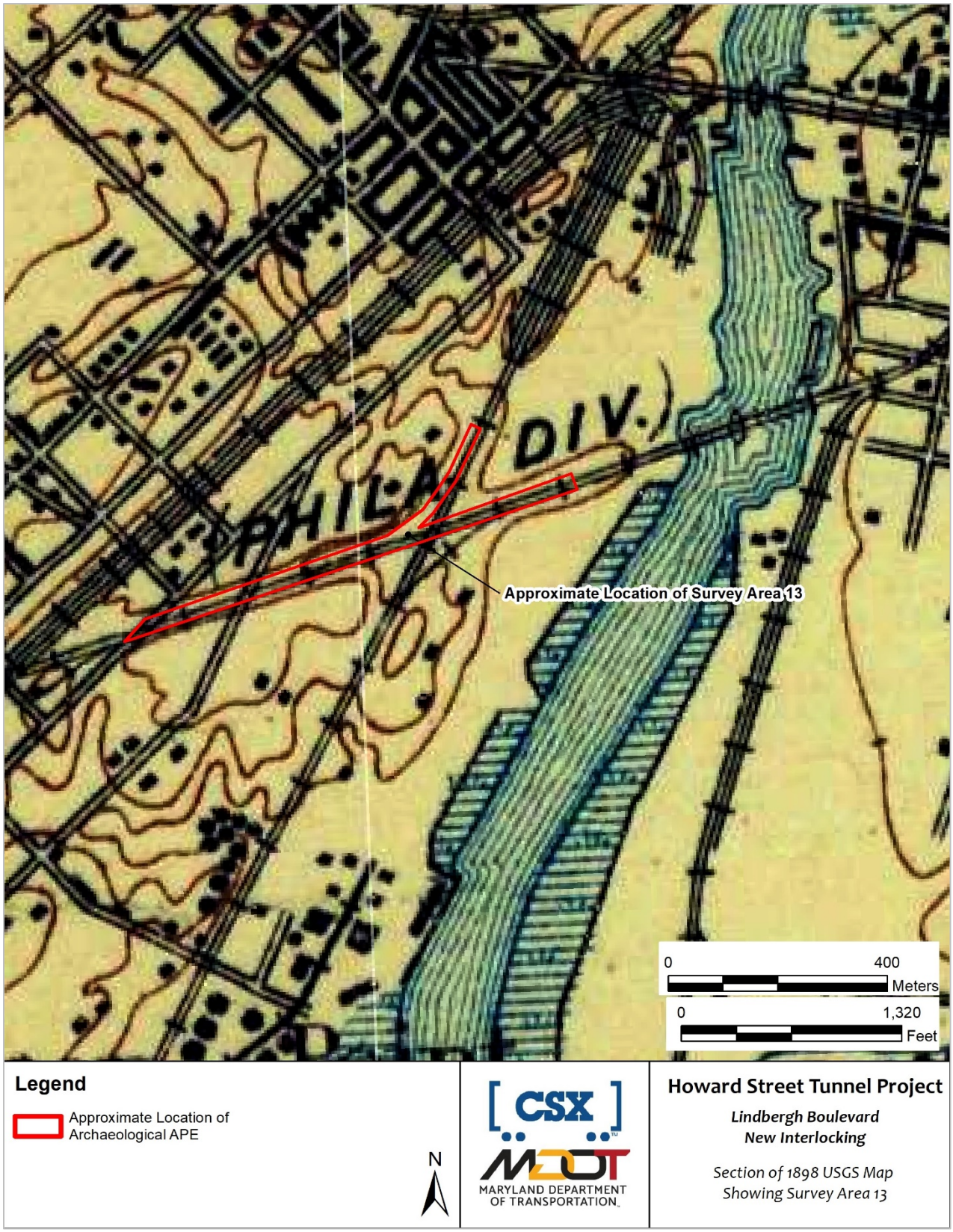

Figure 4-21. Section of 1898 USGS Philadelphia, PA map showing approximate location of Survey Area 13, Philadelphia County, Pennsylvania.

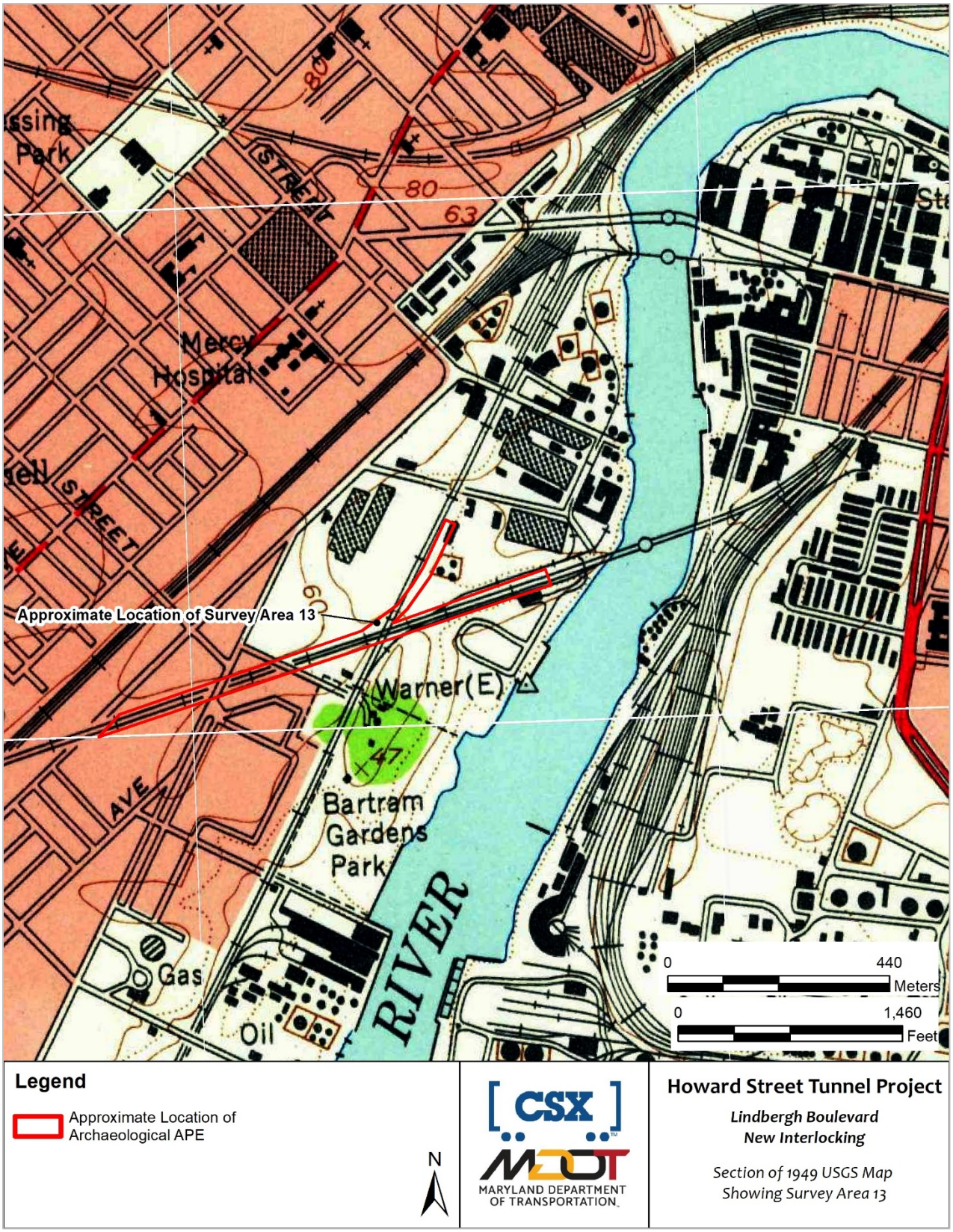

Figure 4-22. Section of 1949 USGS Philadelphia, PA map showing approximate location of Survey Area 13, Philadelphia County, Pennsylvania.

4.2.14 **Wilmington, Delaware**

When the Dutch initially settled what would become the City of Wilmington in the early-seventeenth century, they found that semi-permanent Indian towns and villages dotted the landscape. The aboriginal occupants that were encountered by the Dutch called themselves the Lenni Lenape, meaning the "real" or "original" people, but Europeans labeled them "Delawares" for their proximity to the Delaware River where they lived. Inhabiting the area between northern Delaware and New York State, the Lenni Lenape were not a single, unified nation, but rather a set of loosely organized villages and local bands. Traditionally, the Lenni Lenape were divided into the Munsee (Wolf tribe), Unami (Turtle tribe), and Unalactigo (Turkey tribe) groupings. There are currently two state-recognized tribes in Delaware: the Lenape Indian Tribe of Delaware and the Nanticoke Indian Tribe (Klein and Hoogenboom 1973; Licht et al. 2020).

In 1638, a group of Dutch and Swedish investors formed the New South Company, which purchased a tract of land from the Lenni Lenape near present-day Wilmington, Delaware. The first Swedish settlement—Fort Christina—was established on the narrow piece of land between the Brandywine and Christina Rivers in 1638. European presence expanded along both sides of the river within ten years of the initial settlement (Garber 1917). In 1640, Dutch investors purchased the New South Company outright and established new trading posts along the Delaware River. The Dutch seized New Sweden (including present-day Wilmington) from the Swedish in 1655. When the Dutch lost all of their North American land claims to the English, the Swedes remained and established a community in West Philadelphia in the area west of the Schuylkill River, which carried the Lenape name Chinssessing, "a place where there is a meadow" (which would become the district of Kingsessing) (Licht et al. 2020).

The British colonization period began in 1664 and the region stabilized under British rule. In 1682, the area was divided into five separate “hundreds”, which were geographic division similar of Pennsylvania’s townships. The portion of Wilmington addressed in this report was originally part of Christiana Hundred. A royal borough charter for Wilmington was granted in 1739, at which point the borough’s name was changed from Willington, after Thomas Willing who established the area’s town’s street grid pattern, to Wilmington, after Spencer Compton, the Earl of Wilmington and a favorite of the King of England. The town steadily developed into a prospering business and residential center in the years between its charter and the Revolutionary War. Wilmington’s easy river access to the interior and the Atlantic Ocean attracted craftsmen, merchants, millers, and artisans who transformed the small borough into a production center (City of Wilmington 2019; Nepa 2019).

During the Revolutionary War, the town’s milling industries, geographic location, political leaders, and resources proved of strategic value. Wilmington provided shelter for American troops during the British occupation of Philadelphia, and colonial regiments from Maryland and Delaware remained in the borough to protect supply lines along the Delaware and Elk Rivers (City of Wilmington 2019; Nepa 2019).

Wilmington’s population reached over 5,000 by the early 1800s. Its papermaking and grain and flour milling industries were augmented with new endeavors. French chemist E. I. du Pont established a gunpowder mill along the Brandywine River, upstream from the borough. Other prominent families developed timber businesses, shipping companies, banks, and textile mills. The Town of Wilmington became the City of Wilmington in 1832 through state charter. The completion of the PW&B Railroad in 1837 made the city accessible by water, road, and railroad along the major north-south transportation route on the Eastern Seaboard and, as a result the city’s economy, flourished in the years leading up to the start Civil War. As the city’s industrial base increased, so did its population of immigrant workers, most arriving in the 1840s and 1850s from Ireland and Germany (City of Wilmington 2019; Nepa 2019).

Since the 1700s, the population of New Castle County included numerous enslaved people, most of whom lived in the rural southern portion of the county. Beginning in the early 1800s, Wilmington had a thriving free African American community whose residents owned homes, businesses, and established schools and churches. Wilmington also maintained a strong abolitionist sentiment and served as the northeastern terminus of the Underground Railroad, less than 10 miles from the Pennsylvania line. Delaware would remain a "slave state" until 1860 and, although it remained in the Union throughout the Civil War, Delaware and Wilmington's citizens were deeply divided by Union and Confederate sympathies (Nepa 2019).

The Civil War had a profound and expanding effect of the city's economy. Wilmington's strong industrial base and centralized location along major transportation routes allowed the city to meet the great economic needs of the war. Wilmington's industries built ships and railroad cars, produced gunpowder, and manufactured shoes, tents, uniforms, blankets and other war-related goods for the Union Army (City of Wilmington 2019; Nepa 2019).

The city emerged from the war with a diversified economy. Wilmington served as a key element in the greater Philadelphia industrial network. By 1868, Wilmington produced more iron ships than the rest of the country combined and ranked first in gunpowder production. The city also produced carriages and railcars. The population grew from 21,258 in 1860 to 77,000 by 1900. Newly arrived immigrants from Italy, Hungary, and Poland accounted for much of the population growth; they settled in the outskirts of downtown Wilmington and in low-lying areas along the Christina River, and found work in the textile mills or B&O Railroad construction (City of Wilmington 2019; Nepa 2019). Post-war prosperity was reflected in the building of elaborate new homes and the residential developments west of the existing city center. Wealthy industrialists and businessmen built the first suburban area of the city along Delaware Avenue, which was established in 1864 and facilitated by the first horsecar line (City of Wilmington 2019; Nepa 2019).

By the second decade of the twentieth century, the population of Wilmington had grown from 21,250 in 1900 to 110,168, and industrial production continued to increase and diversify throughout the twentieth century. Both World Wars stimulated the city's industries and manufacturing. Shipyards, steel foundries, and machinery and chemical producers operated on a 24-hour basis. After World War II, Wilmington prospered and its larger single employer, DuPont, increased its workforce by ten thousand in the 1950s, pioneering technical, chemical, and manufacturing advances in plastics, nylon, rayon, Kevlar, Tyvek, and other chemicals that transformed postwar consumption. Automobile production increased and became the state's largest industry after DuPont (Nepa 2019).

4.2.15 Survey Areas 6 and 7 – Lancaster Avenue Track Lowering and Retaining Wall and W. 4th Street Track Lowering, Wilmington, Delaware

Survey Areas 6 and 7 are located in Wilmington, Delaware east of Greenhill Avenue and extend from just south of Lancaster Avenue north to W. 5th Street. These survey areas were not incorporated into the city's boundaries until the late nineteenth century. Originally, they were part of Christiana Hundred, created in 1682 and one of the original five hundreds, which were geographic division similar of Pennsylvania's townships. The survey areas straddle what was known historically as the Wilmington Turnpike (present-day Lancaster Avenue), which connected Wilmington and Lancaster, Pennsylvania. The turnpike was constructed in the first decades of the nineteenth century (Mill Creek Hundred History 2010). The land on either side of the turnpike in the vicinity of the survey areas remained rural land until the last quarter of the nineteenth century, as shown in the 1849 Rea and Price *Map of New Castle County*,

Delaware (**Figure 4-23**). Several dwellings were located along the turnpike on either side of the survey areas, but none were located within the survey areas. Cathedral Cemetery, located east of the survey areas, was established in 1870.

The city's boundaries and suburban development pushed westward in the decades following the Civil War. Although the survey areas were still located outside the official city line in 1881, eighteen urban blocks had been laid out and developed north of Lancaster Avenue and east of Greenhill Avenue. The 1881 Hopkins *Map of New Castle County, Delaware* depicts the survey areas located on or alongside several urban buildings (**Figure 4-24**). Construction of the Philadelphia Branch of the B&O Railroad, connecting Baltimore to Philadelphia, began in 1883 and operation began in 1886. The introduction of the railroad encouraged urban development of the area, which can be seen on the 1906 Wilmington, DE and the 1904 West Chester, PA quadrangles of the USGS topographic maps. These maps depict the railroad, the development of the city blocks immediately west of the B&O Railroad tracks, and the expansion of the city boundary within the survey areas (**Figure 4-25**).

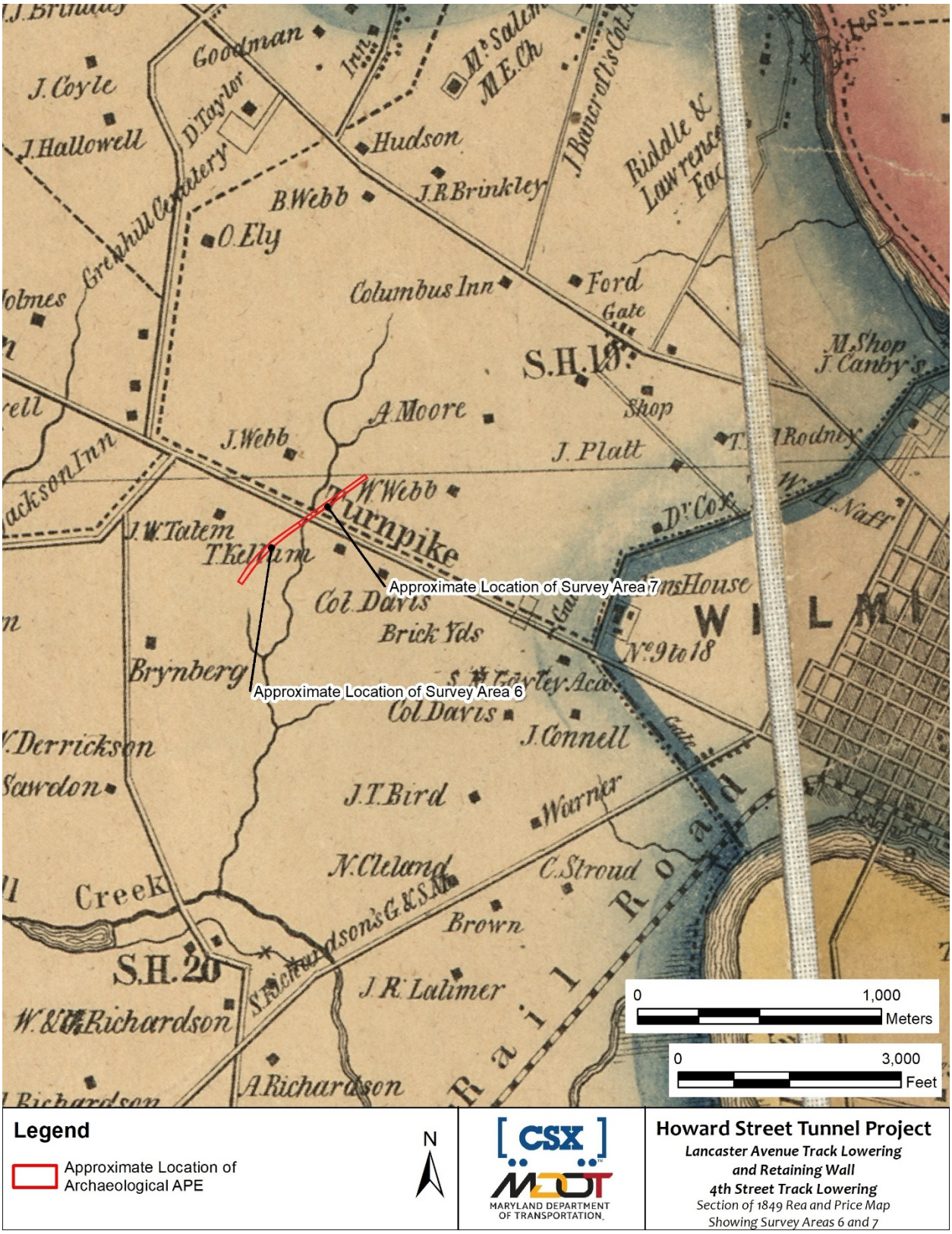

Figure 4-23. Section of 1849 Rea and Price map showing approximate locations of Survey Areas 6 and 7, Wilmington, Delaware.

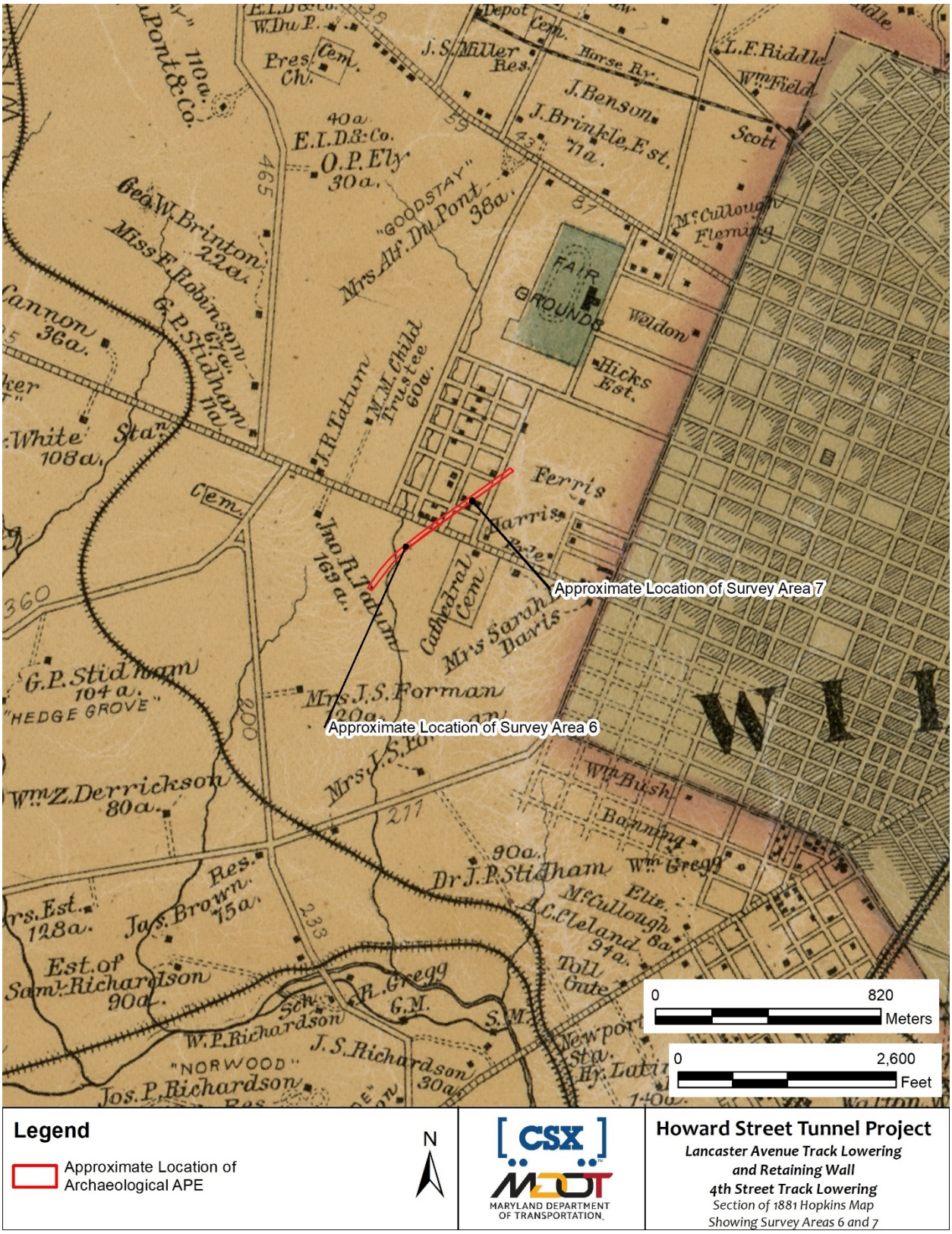

Figure 4-24. Section of 1881 Hopkins map showing Survey Areas 6 and 7, Wilmington, Delaware.

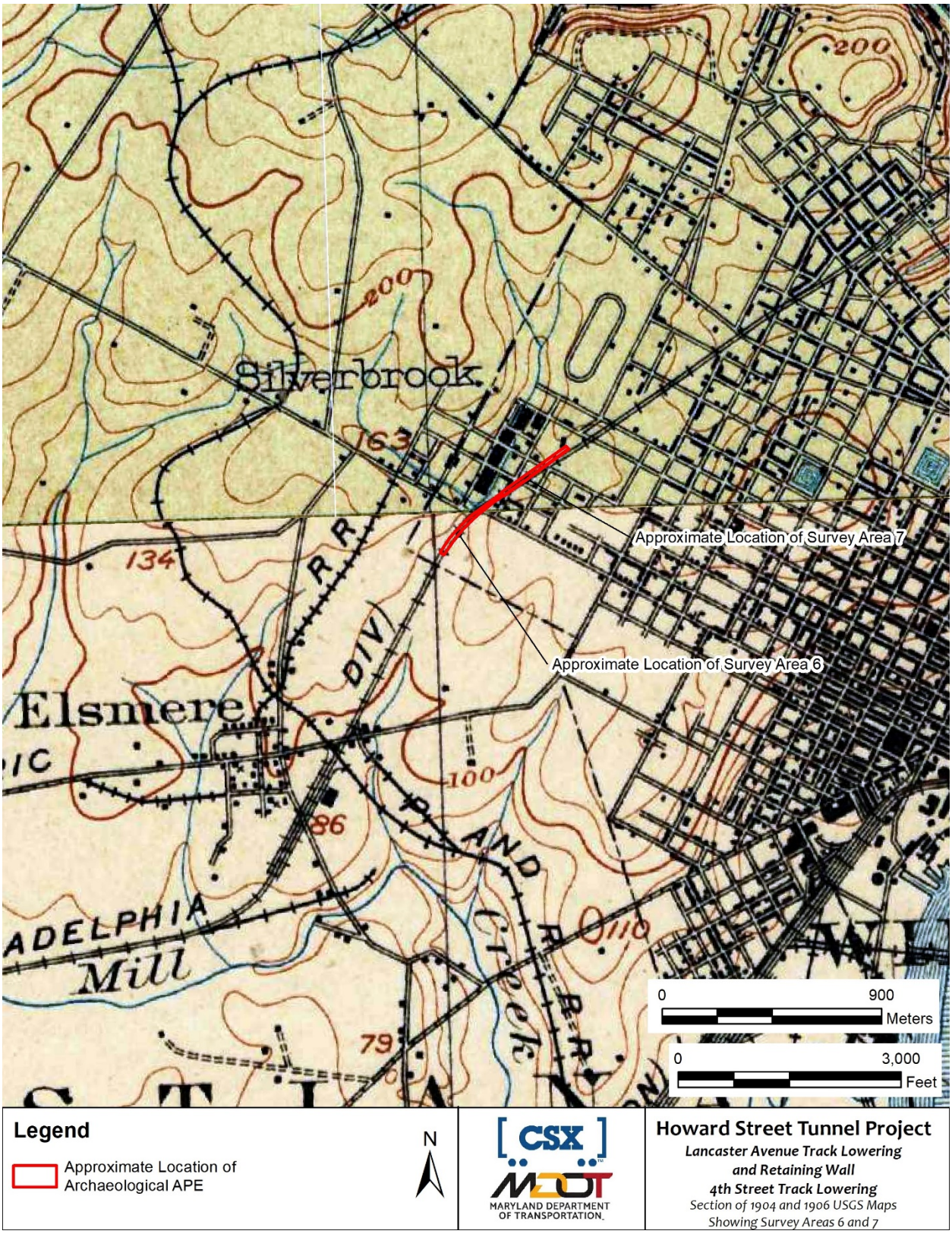

Figure 4-25. Section of 1906 Wilmington, Delaware and 1904 West Chester, Pennsylvania USGS Quadrangle Topographic showing Survey Areas 6 and 7, Wilmington, Delaware.

5. PREVIOUSLY DOCUMENTED CULTURAL RESOURCES

RK&K conducted background research to identify previously recorded cultural resources and previously conducted cultural resource investigations within and surrounding each survey area. Data was collected from MHT's Medusa, DHCA's CHRIS, and PHMC's CRGIS systems. The review included any archaeological sites or archaeological surveys within, adjacent to, or within a one block radius of each survey area. The review also included all architectural resources, historic architectural surveys, NRHP-listed or NRHP-eligible resources, previously surveyed but unevaluated, and non-eligible resources within the boundaries of or directly adjacent to each of the survey areas.

This review provides a framework for determining the potential for and types of archaeological sites that may be located within the survey areas and for evaluating the significance and level of integrity that these resources may possess. It also uses information from the previous cultural resource studies to assist in developing cultural resource investigation recommendations for current and future stages of the project.

5.1 Survey Area 1 – Howard Street Tunnel Enlargement, Baltimore, Maryland

Survey Area 1 runs north through downtown Baltimore, Maryland, along Howard Street from W. Hill Street to south of W. Mount Royal Avenue. Six previously documented historic architectural resources are located within Survey Area 1, all of which are listed in or eligible for listing in the NRHP. One is a National Historic Landmark (NHL) (**Table5-1; Figure 5-1; Figure 5-2; Figure 5-3**).

Six previously identified archaeological sites are within a one-block radius of Survey Area 1, all of which are located towards the southern extent of the Survey Area (**Table 5-2; Figure 5-4**). None of these resources are known to extend into the current survey area. No archaeological surveys have been conducted within Survey Area 1, though two previous archaeological surveys have been conducted within a one-block radius (**Table 5-3; Figure 5-4**).

Table 5-1. Previously identified historic architectural resources within or adjacent to Survey Area 1, Baltimore, Maryland.

MIHP No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
B-26 (NR-179)	Mount Royal Station	Building	1894-1896	NHL: (1976); Listed (1973); C
B-64 (NR-54)	Bolton Hill Historic District	District	ca. 1850-1917	Listed (1971); A, B, C
B-79 (NR-183)	Howard Street Tunnel and Power House	Structure	1890-1895	Listed (1973); C
B-1262 (NR-1230)	Market Center Historic District	District	ca. 1820- 1945	Listed (2000); A, C
B-1393	Mount Vernon Local Historic District	District	ca. 19th century	Eligible (2002); A, B, C
B-5287	Baltimore and Ohio (B&O) Railroad Baltimore Belt Line	Railroad	1891-1895	Eligible (2015); A, C

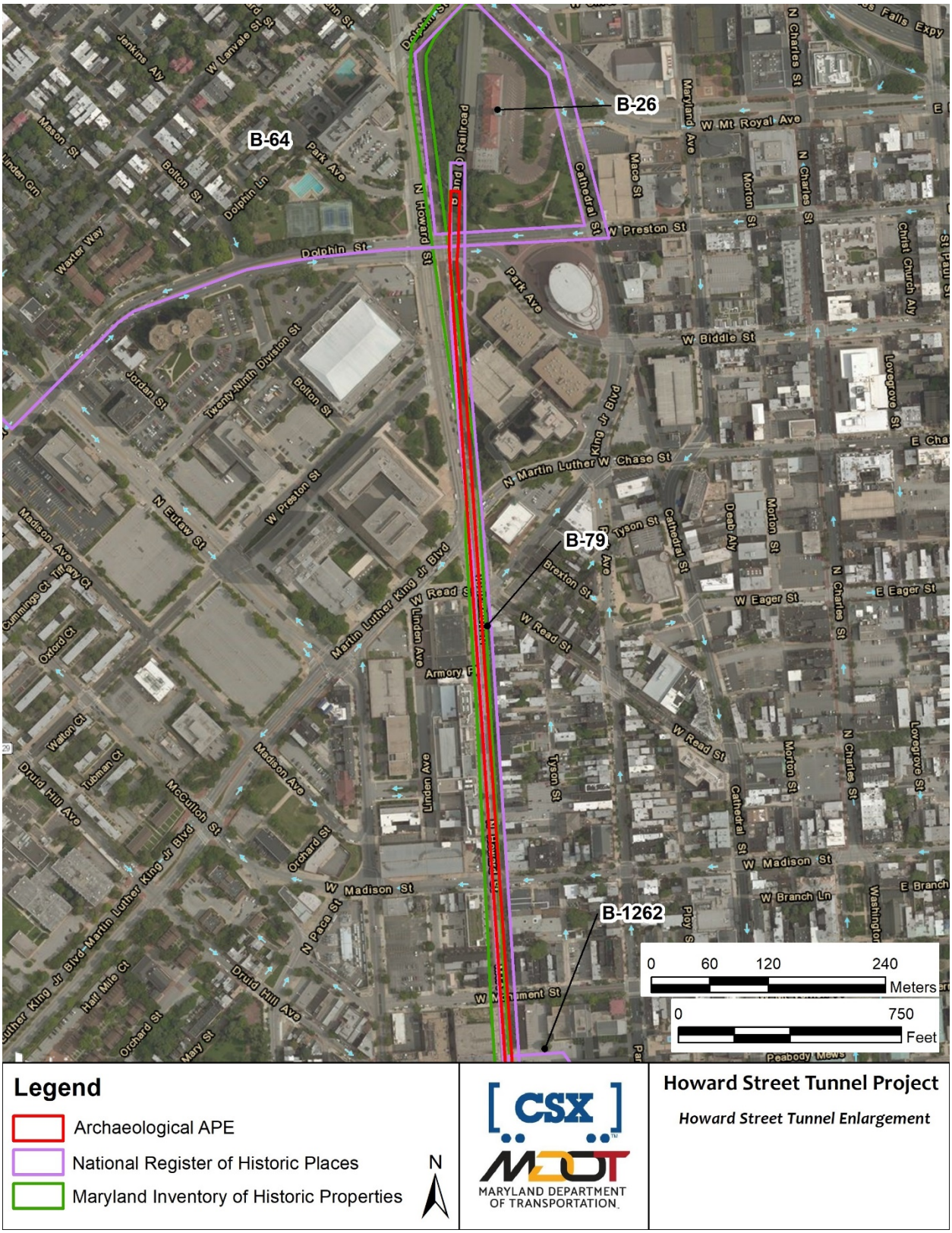

Figure 5-1. Survey Area 1 – Previously identified NRHP and MIHP resources (1 of 3), Baltimore, Maryland.

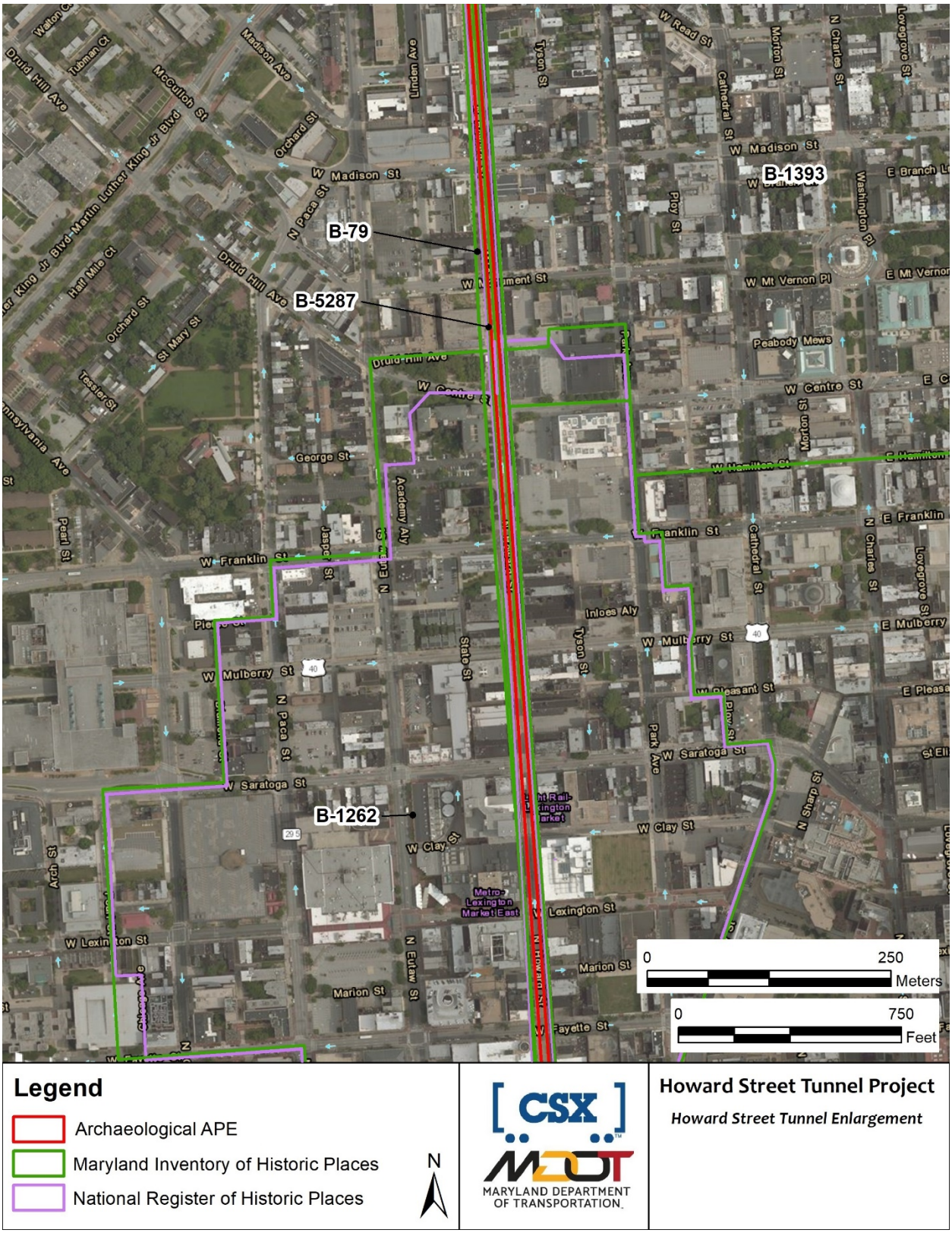

Figure 5-2. Survey Area 1 – Previously identified NRHP and MIHP resources (2 of 3) , Baltimore, Maryland.

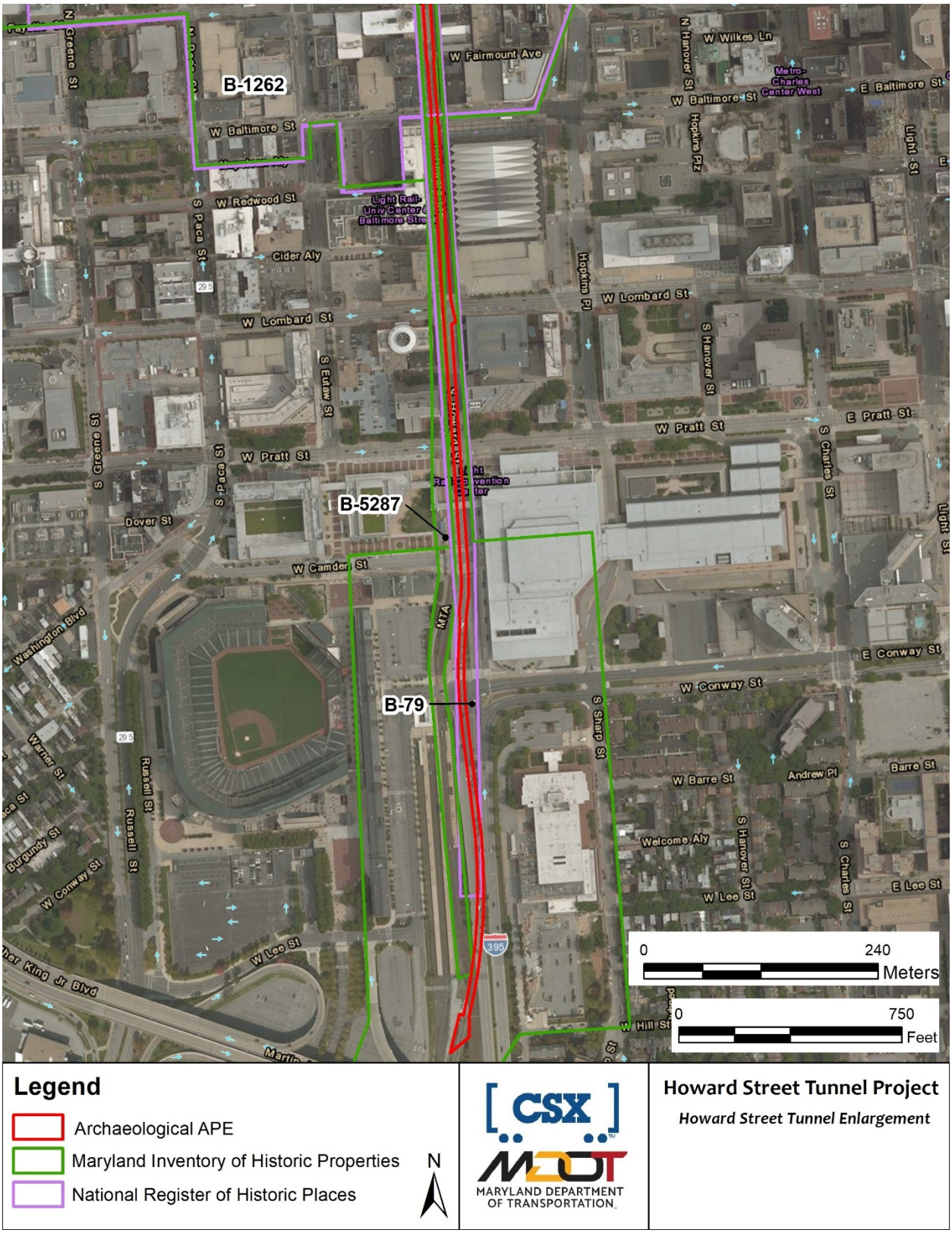

Figure 5-3. Survey Area 1 – Previously identified NRHP and MIHP resources (3 of 3), Baltimore, Maryland.

The Hill Street site (18BC25) is a series of early- to late-nineteenth century outhouses/privies and a well. The site was partially excavated as part of a Phase III data recovery project in 1980, with excavations focused on the portions of the site that were to be disturbed by the construction of the Federal Reserve Bank building. This site has not been evaluated for inclusion in the NRHP. The site is documented as being heavily disturbed by pothunters and is currently underneath an asphalt parking area for the Federal Reserve Bank (McCarthy and Basalik 1980; Basalik and McCarthy 1982).

The Federal Reserve Building site (18BC27) consists of early-nineteenth to late-twentieth century house sites and commercial building sites. The site was partially excavated as part of a Phase III data recovery project in 1980 during construction of the Federal Reserve Bank building. Phase III excavations identified 54 cultural features included privies, wells, drainage features, cellars, and other structural/construction features. Identified features were sampled, profiled, and photographed before and during construction site preparation. According to the Maryland State Site Form, the site has not been formally evaluated for the NRHP determination, though the technical report for the investigation indicates the site does not retain any subsurface integrity (McCarthy and Basalik 1980; Basalik and McCarthy 1982).

Site CC-1 (18BC102) consists of a late-eighteenth to early-nineteenth century possible domestic site and late-nineteenth to early-twentieth century brick rowhouse site. This site represents a former rowhouse located at 318 Sharp Street that was utilized for domestic and light artisan/craft industries from 1870 to 1930. Phase I/II archaeological testing revealed the remains of a brick foundation and brick floor from the late-nineteenth century rowhouse, as well as remnants of an earlier deposit containing domestic kitchen artifacts dating from circa 1800 (Sanders and Williams 1994). 18BC102 has been severely disturbed by various demolition, construction, and filling activities and was determined not eligible for inclusion in the NRHP in 1994 (MHT 1994a).

Site CC-2 (18BC103) consists of the archaeological remains of late-nineteenth to early-twentieth century brick rowhouses/commercial buildings. This site is at the former location of 202-205 Perry Street. Phase I archaeological trenching revealed the remains of three buildings shown on historic maps from approximately 1877 to 1914, though they may have been present as early as 1855. The site has been significantly disturbed by modern construction and filling and is beneath the Baltimore Convention Center (Sanders and Williams 1994). 18BC103 has been severely disturbed by various demolition, construction, and filling activities and was determined not eligible for inclusion in the NRHP in 1994 (MHT 1994b).

Site CC-3 (18BC104) is an early-nineteenth century house site and associated commercial building. A dry-laid stone foundation with builder’s trenches and a single concrete footer were identified, though subsurface integrity has been compromised by subsequent construction. Soil analysis revealed that the upper 12-18 inches (30-46 centimeters) of the natural soil profile was stripped away and replaced through several filling episodes. As a result, only the bottom 15.75 inches (40 centimeters) of the fieldstone foundation, primary deposits, and builder's trench remain. The site has been significantly disturbed by modern construction and filling and is beneath the Baltimore Convention Center (Sanders and Williams 1994). 18BC104 has been severely disturbed by various demolition, construction, and filling activities and was determined not eligible for inclusion in the NRHP in 1994 (MHT 1994c).

Site CC-4 (18BC105) is a mid- to late-nineteenth century stable and bottlery located at the site of the former 216-220 W. Conway Street, just west of the Inner Harbor. The site was identified as part of a Phase I archaeological survey that included four mechanically excavated 1.5-meter by 5-meter (5-foot by 16-foot) trenches. The site has been significantly disturbed by modern construction and filling and is beneath

the Baltimore Convention Center (Sanders and Williams 1994). 18BC105 has been severely disturbed by various demolition, construction, and filling activities and was determined not eligible for inclusion in the NRHP in 1994 (MHT 1994d).

No archaeological surveys have been conducted within Survey Area 1, though two previous archaeological surveys have been conducted within a one-block radius (**Table 5-3; Figure 5-4**). In 1992, R. Christopher Goodwin and Associates conducted archaeological and architectural investigations at Camden Yards, Baltimore, Maryland (BC74). In 1994, R. Christopher Goodwin and Associates conducted Phase I/II Archaeological Investigations for the proposed Baltimore Convention Center Expansion, Baltimore, Maryland (BC95). Neither of these previous surveys occurred within the current survey area.

Table 5-2. Previously identified archaeological sites within a one-block radius of Survey Area 1, Baltimore, Maryland.

MHT No.	Name	Type	Date(s)	Condition/NRHP Status
18BC25	Hill Street	Outhouses/privies and well	19th century	Disturbed; No determination
18BC27	Federal Reserve Building	Domestic and commercial building sites	Early-19th to late-20th century	Disturbed; No determination
18BC102	CC-1	Possible domestic site, brick rowhouse site	Late-18th to early-20th century	Disturbed; Not eligible (MHT 1994a)
18BC103	CC-2	Brick rowhouses/commercial buildings	Late-19th to early-20th century	Disturbed; Not eligible (MHT 1994b)
18BC104	CC-3	Domestic site and associated commercial building	Early-19th century	Disturbed; Not eligible (MHT 1994c)
18BC105	CC-4	Stables and bottlery	Mid- to late-19th century	Disturbed; Not eligible (MHT 1994d)

Table 5-3. Previous archaeological investigations within a one-block radius of Survey Area 1, Baltimore, Maryland.

MHT No.	Report Title	Type	Author(s)	Year
BC74	Archeological and Architectural Investigations at Camden Yards, Baltimore, Maryland, Vol. I.	Phase I Archaeological/ Architectural Survey	Goodwin, R. Christopher, Kathryn Kuranda, Elizabeth S. Pena, Suzanne M. Sanders, and Martha R. Williams; R. Christopher Goodwin and Associates	1992
BC95	Phase I/II Archeological Investigations for the Proposed Baltimore Convention Center Expansion, Baltimore, Maryland	Phase I/II Archaeological	Sanders, Suzanne L. and Martha R. Williams; R. Christopher Goodwin and Associates	1994

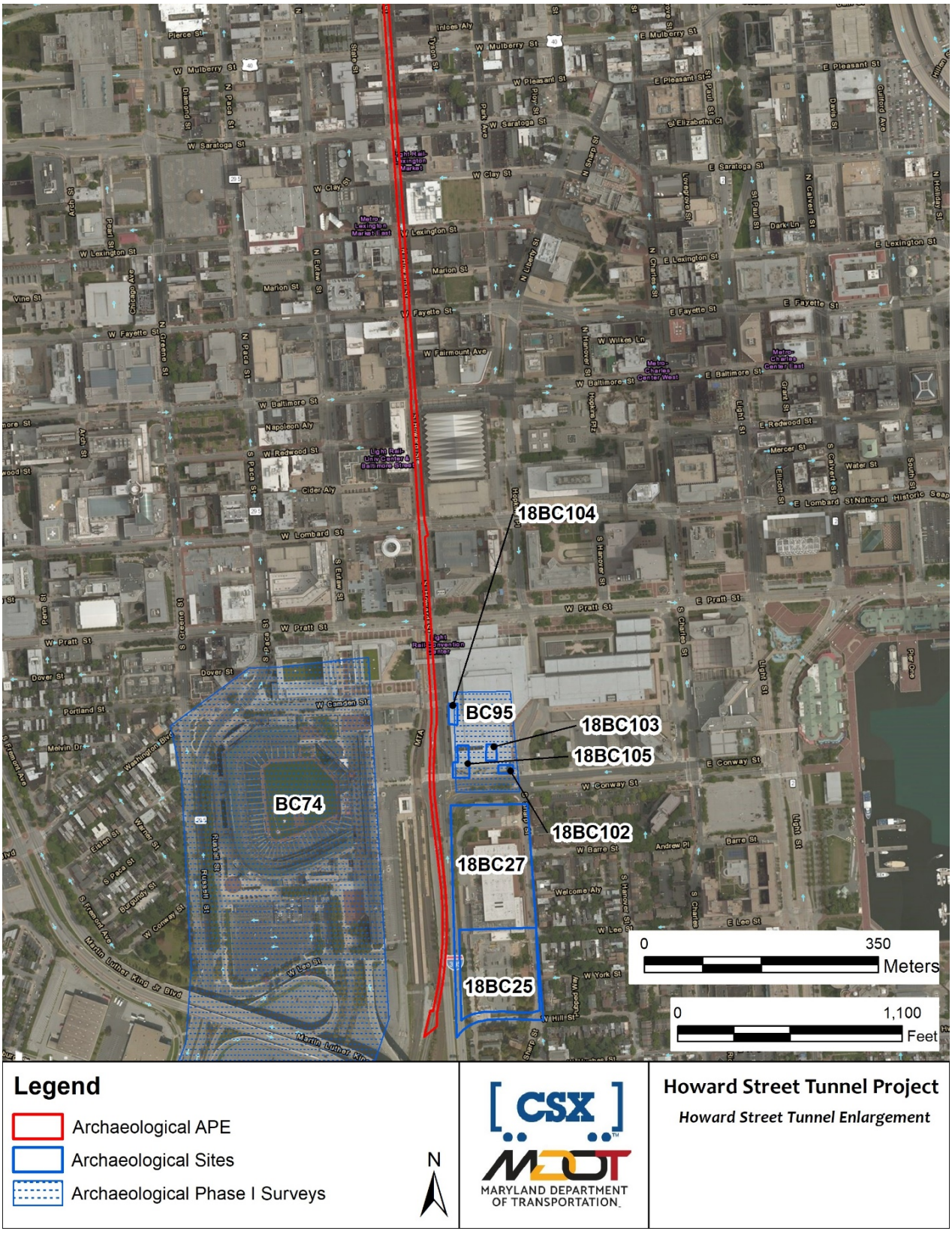

Figure 5-4. Survey Area 1 – Previously identified archaeological sites and previous archaeological surveys, Baltimore, Maryland.

5.2 Survey Area 2 – North Avenue Bridge Modification, Baltimore, Maryland

Survey Area 2 is located along W. North Avenue, as it intersects the existing CSX ROW, in Baltimore, Maryland. Three previously documented historic architectural resources are located within or adjacent to Survey Area 2, all constructed from the mid- to late-nineteenth century. All are eligible for the NRHP, though none are formally listed (**Table 5-4; Figure 5-5**).

No previously identified archaeological sites are recorded within a one-block radius of Survey Area 2. The nearest archaeological site, 18BC100 (Curved Dam, Timanus Mill Site), is a late-eighteenth through early-twentieth century mill site located approximately 0.75 miles northeast of the survey area. There have been no previous archaeological surveys within a one-block radius of the survey area.

Table 5-4. Previously identified historic architectural resources within or adjacent to Survey Area 2, Baltimore, Maryland.

MHT No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
B-5164	Philadelphia, Wilmington, and Baltimore Railroad (Baltimore and Potomac Railroad)	Railroad	Circa 1832	Eligible (2010); A, C
B-5287	Baltimore and Ohio (B&O) Railroad Baltimore Belt Line	Railroad	1891 to 1895	Eligible (2015); A, C
B-4521	North Avenue Bridge (BC1208)	Bridge	1891 to 1896	Eligible (1999); A, C

5.3 Survey Area 3 – Guilford Avenue Bridge Replacement

Survey Area 3 is located at the intersection of Guilford Avenue, the existing CSX ROW, and E. 26th Street in Baltimore, Maryland. Three previously documented historic architectural resources are located within or adjacent to Survey Area 3. One of these is listed in the NRHP and two are eligible for the NRHP but are not formally listed (**Table 5-5; Figure 5-6**). These resources date from the late-nineteenth to early-twentieth century.

Table 5-5. Previously identified historic architectural resources within or adjacent to Survey Area 3, Baltimore, Maryland.

MHT No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
NR-775/B-3736	Charles Village/Abell Historic District (Peabody Heights)	District	Circa 1895-1915	Listed (1983); A, B, C
B-4526	Guilford Avenue Bridge (BC8029)	Bridge	1895	Eligible (2001); A, C
B-5287	Baltimore and Ohio (B&O) Railroad Baltimore Belt Line	Railroad	1891 to 1895	Eligible (2015); A, C

No previously identified archaeological sites are recorded within a one-block radius Survey Area 3. The nearest archaeological site, 18BC141 (Carroll's Meadow Site), is located approximately 0.6 miles (1 kilometer) northwest of the survey area. The site is a multi-component culturally unaffiliated pre-contact lithic scatter and a nineteenth century plantation manor house. The site has been destroyed by the construction of the Johns Hopkins University Art Center. There have been no previous archaeological surveys within a one-block radius of the survey area.

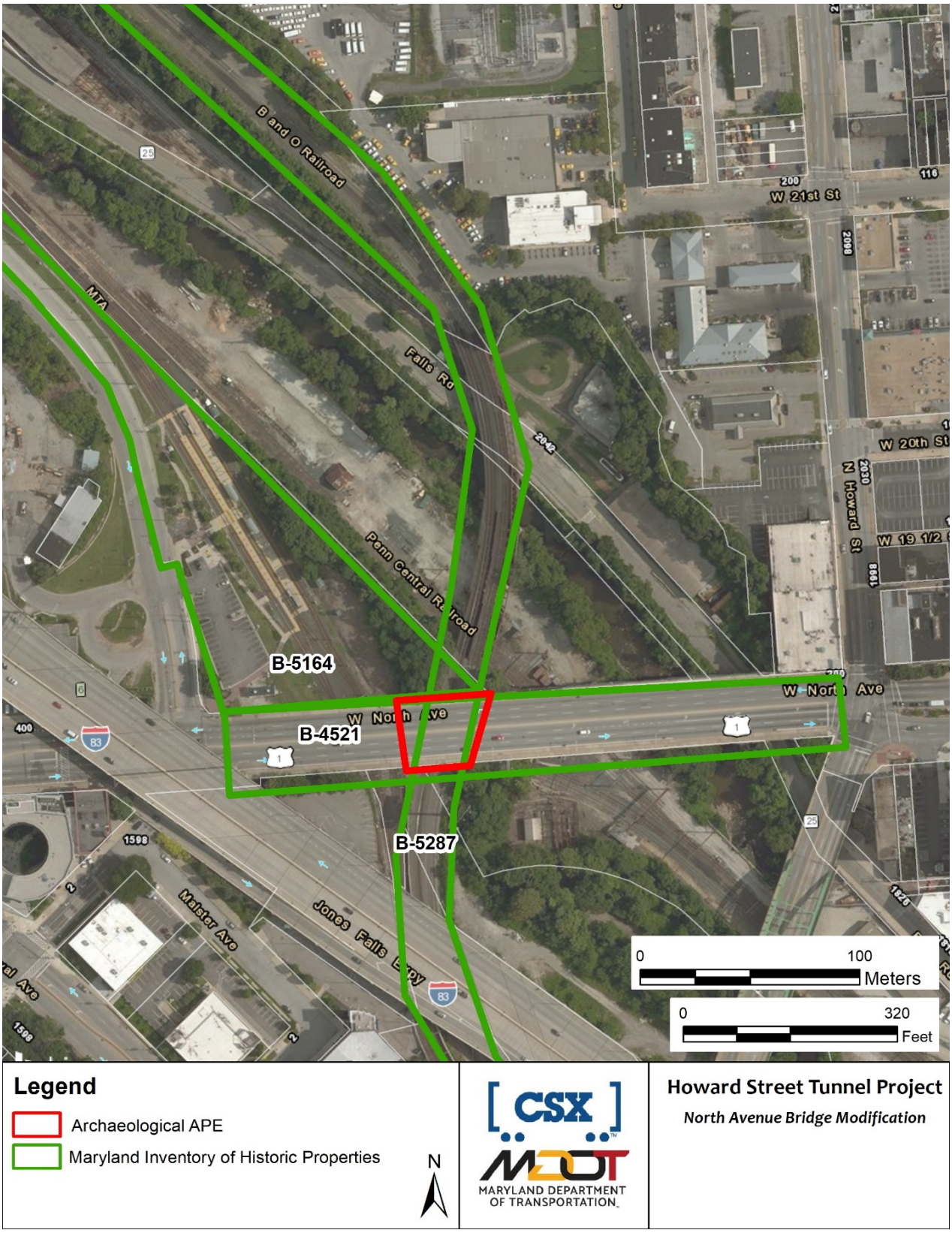

Figure 5-5. Survey Area 2 – Previously identified MIHP resources, Baltimore, Maryland.

Figure 5-6. Survey Area 3 – Previously identified NRHP and MIHP resources, Baltimore, Maryland.

5.4 Survey Area 4 – Harford Road Bridge Replacement

Survey Area 4 is located in Baltimore, Maryland at the intersection of Harford Road and the existing CSX ROW, and extends to the north and south of the intersection. Four previously documented historic architectural resources are located within or adjacent to Survey Area 4. Two resources are formally listed in the NRHP and are located adjacent to the survey area. The remaining two resources are eligible for the NRHP, but are not formally listed (**Table 5-6; Figure 5-7**). The eligible resources are partially located within the survey area. These four resources date from the early-eighteenth century to the early-twentieth century.

No previously identified archaeological sites have been recorded within a one-block radius of Survey Area 4. The nearest archaeological site, 18BC178 (Clifton Mansion), is located approximately 0.4 miles (0.6 kilometers) northwest of the survey area. The site is a late-eighteenth century domestic dwelling with nineteenth century additions. There have been no previous archaeological surveys within a one-block radius of the survey area.

Table 5-6. Previously identified historic architectural resources within or adjacent to Survey Area 4, Baltimore, Maryland.

MHT No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
B-4523	Harford Road Bridge (BC8026)	Bridge	1895	Eligible (2001); C
B-4608 (NR-1444)	Clifton Park	District	Late-18th- to early-20th century	Listed (2007); A, B, C
B-5086 (NR-1399)	Friends Burial Ground	Cemetery	1713 to 1926	Listed (2004); A, C
B-5287	Baltimore and Ohio (B&O) Railroad Baltimore Belt Line	Railroad	1891 to 1895	Eligible (2015); A, C

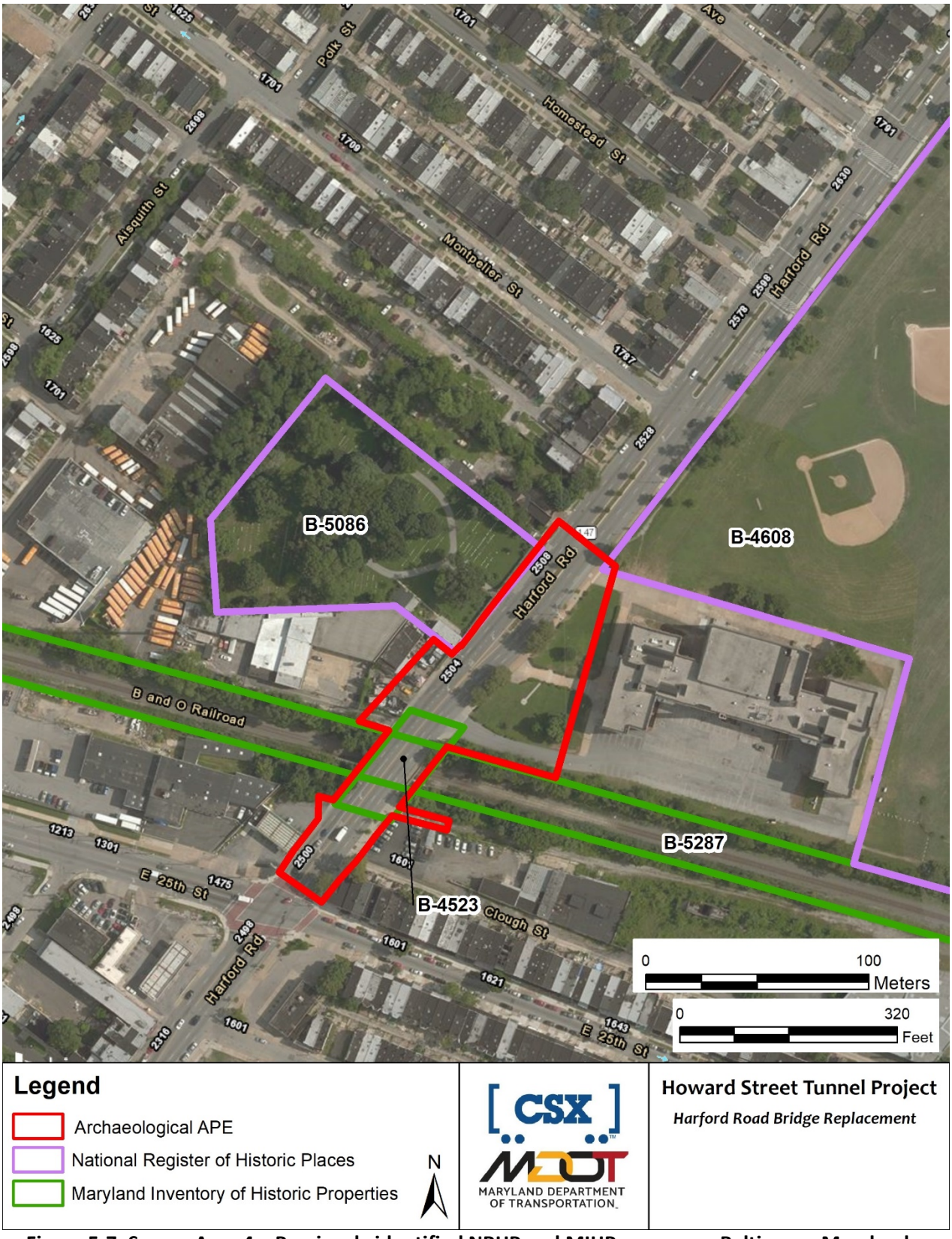

Figure 5-7. Survey Area 4 – Previously identified NRHP and MIHP resources, Baltimore, Maryland.

5.5 Survey Area 5 – Boone Tunnel Enlargement, Delaware County, Pennsylvania

Survey Area 5 is located at Boone Tunnel running underneath the intersection of Chester Pike and Cherry Street at the intersection of the Collingdale, Darby, and Sharon Hill boroughs of Delaware County, Pennsylvania. Five previously documented historic architectural resources are located within or adjacent to Survey Area 5. One is eligible for the NRHP but is not formally listed. Three have been determined not eligible for the NRHP. These four resources date from the late-nineteenth and early-twentieth centuries. One aggregate resource has not been evaluated (**Table 5-7; Figure 5-8**).

No previously identified archaeological sites are located within Survey Area 5 and none have been recorded within a one-block radius. In addition, no previous archaeological investigations have occurred within a one-block radius of Survey Area 5.

Table 5-7. Previously identified historic architectural resources within or adjacent to Survey Area 5, Delaware County, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
106212	Boone Tunnel	Structure	1885	Eligible (1997); C
116397	Sharon Hill Borough	District	Late-19th and early-20th centuries	Not Eligible (2001)
133277	CSX Railroad Bridge	Bridge	ca. 1915	Not eligible (1997)
144062	Baltimore and Ohio Railroad Philadelphia Branch	Railroad	1883-1886	Not Eligible (2007)
210510	Old Swedes Path	Trail	NA	Unevaluated

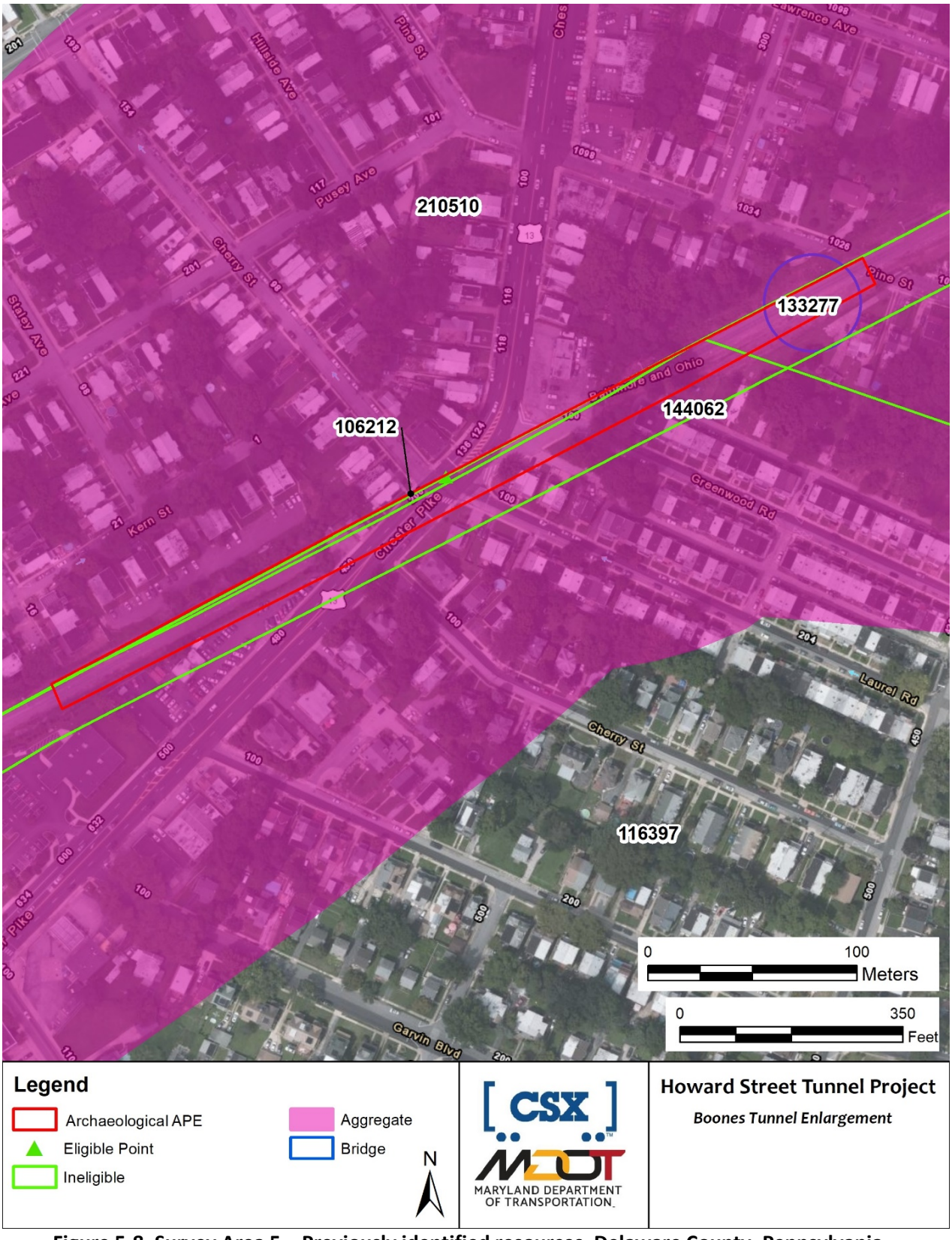

Figure 5-8. Survey Area 5 – Previously identified resources, Delaware County, Pennsylvania.

5.6 Survey Area 6 – Lancaster Avenue Track Lowering and Retaining Wall, Wilmington, Delaware

Survey Area 6 is located at the Lancaster Avenue Bridge and runs from the Wilmington city line northeast to Pyle Street in the City of Wilmington, Delaware. Fourteen previously documented historic architectural resources are located within a one-block radius of Survey Area 6 (**Table 5-8; Figure 5-9**). The Lancaster Avenue Bridge (Bridge 609) was constructed in 1900 and was determined not eligible for the NRHP. Twelve of the resources adjacent to the survey area have photographic inventories and have not been evaluated. The resources consist of three dwellings, two dwellings and garages, one garage, three offices and garages, and three stores, all of unrecorded build date.

One resource—Cathedral Cemetery—was inventoried as part of the New Castle Cemetery Mapping Project and currently has a "proposed" review status. No previously identified archaeological sites or previous archaeological surveys are located within a one-block radius of Survey Area 6. One cemetery, the Mount Zion Cemetery (N14669), has been recorded within a one-block radius.

Table 5-8. Previously identified historic architectural resources within a one-block radius of Survey Area 6, Wilmington, Delaware.

CRS No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
Bridge 609	Lancaster Avenue over B&O Railroad	Bridge	1900	Not Eligible
N10672	201 Rodman St.	Office/garage	Not Recorded	Unevaluated
N10676	2419 W. 2nd St.	Dwelling	Not Recorded	Unevaluated
N10686	103-107 Hawley St	Store	Not Recorded	Unevaluated
N10698	216 Webb St	Store	Not Recorded	Unevaluated
N10692.001	2500 W. 3rd St.	Dwellings	Not Recorded	Unevaluated
N10692.002	2504 W. 3rd St.	Dwellings	Not Recorded	Unevaluated
N10699	212 Webb St.	Store	Not Recorded	Unevaluated
N10700	208 Webb St.	Garage	Not Recorded	Unevaluated
N10701.001	204-204A Webb St.	Dwelling and garage	Not Recorded	Unevaluated
N10701.002	2509 W. 2nd St.	Dwelling and garage	Not Recorded	Unevaluated
N10702	2510-2512 W. 2nd St.	Garage/office	Not Recorded	Unevaluated
N14669	Cathedral Cemetery	Cemetery	Not Recorded	Proposed Review Status
N10672	201 Rodman St.	Office/garage	Not Recorded	Unevaluated

5.7 Survey Area 7 – W. 4th Street Track Lowering, Wilmington, Delaware

Survey Area 7 is located at the W. 4th Street Bridge and runs from Pyle Street northeast to halfway between W. 5th and W. 6th Streets in the City of Wilmington, Delaware. Seventeen previously documented historic architectural resources are located within a one-block radius of Survey Area 6 (**Table 5-9; Figure 5-9**). The W. 4th Street Bridge (Bridge 609A) was constructed in 1900 and was determined not eligible for the NRHP. Sixteen of these resources have photographic inventories though they have not been evaluated. The resources consist of nine dwellings, three garages, two offices, one store and warehouse, and one store and garage all of unrecorded build date.

No previously identified archaeological sites or previous archaeological surveys are located within a one-block radius of Survey Area 7. One cemetery, the Mount Zion Cemetery (N14669), has been recorded within a one-block radius.

Table 5-9. Previously identified historic architectural resources within a one-block radius of Survey Area 7, Wilmington, Delaware.

CRS No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
Bridge 609A	W. 4th St. over B&O Railroad	Bridge	1900	Not eligible
N10570.004	506 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10570.001	500 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10573	516 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10572.001	510 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10570.002	502 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10572.002	512 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10570.005	508 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10570.003	504 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10572.003	514 Rodman St.	Dwelling	Not Recorded	Unevaluated
N10697	300 Hawley St.	Garage	Not Recorded	Unevaluated
N10671	215 Rodman St.	Garage	Not Recorded	Unevaluated
N10571	510 Rodman St.	Garage	Not Recorded	Unevaluated
N10670	217 Rodman St.	Office	Not Recorded	Unevaluated
N10586	2400 W. 4th St.	Office	Not Recorded	Unevaluated
N10669	225 Rodman St.	Store and warehouse	Not Recorded	Unevaluated
N10696	2420 W. 3rd St.	Store/garage	Not Recorded	Unevaluated

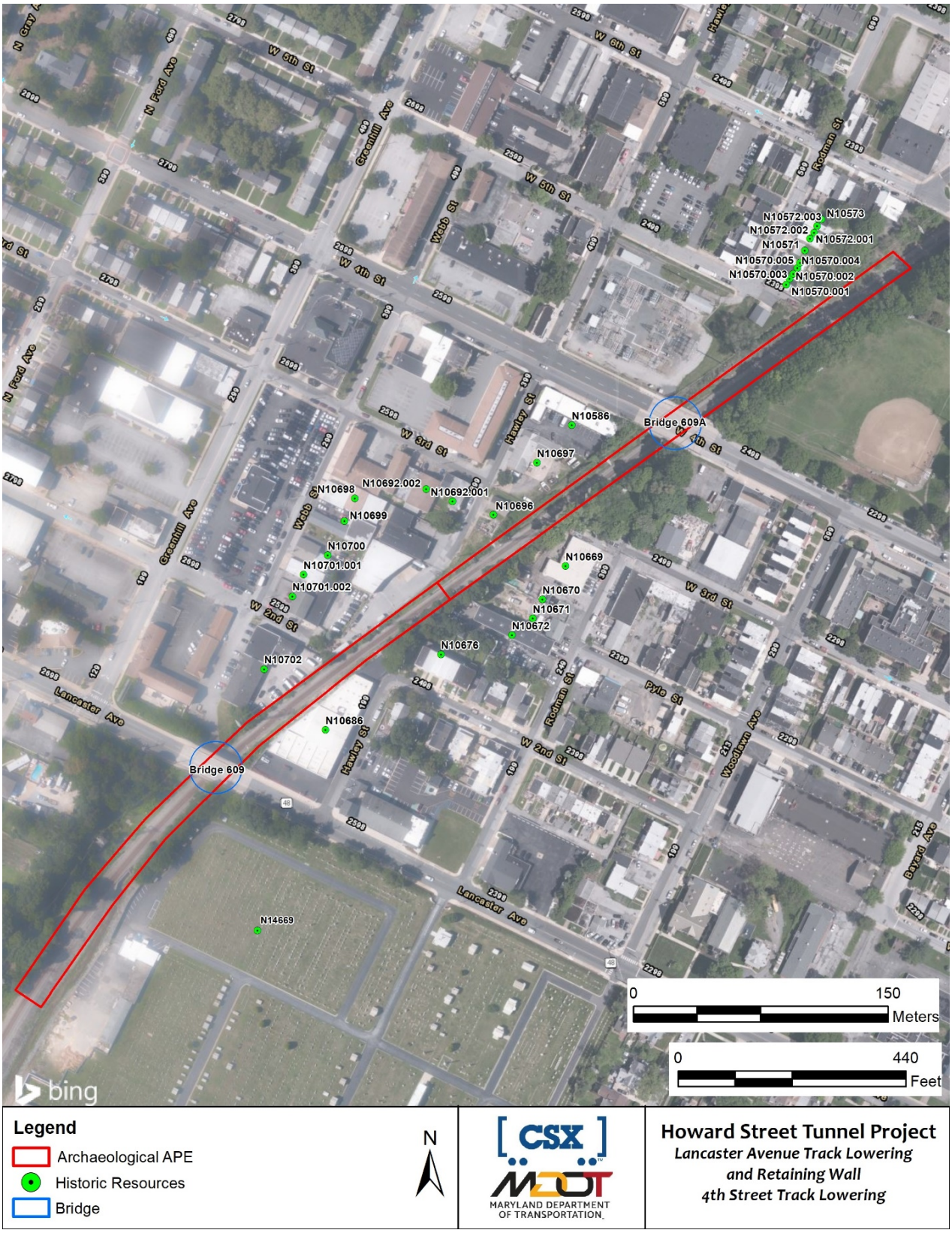

Figure 5-9. Survey Areas 6 and 7 – Previously identified resources, Wilmington, Delaware.

5.8 Survey Area 8 – Chichester Avenue Track Lowering, Delaware County, Pennsylvania

Survey Area 8 is located in the Upper Chichester Township, Delaware County, Pennsylvania at the intersection of Chichester Avenue and the existing CSX ROW. Two previously documented historic architectural resources are located within or adjacent to Survey Area 8. Both resources have been determined not eligible for the NRHP (**Table 5-10; Figure 5-10**). These resources date from the late-nineteenth and mid-twentieth centuries.

One archaeological survey has been conducted partially within Survey Area 8 (**Table 5-11; Figure 5-10**). R. Alan Mounier created the resulting report entitled *An Archaeological Survey of Lutheran Knolls South Boothwyn Vicinity, Upper Chichester Township, Delaware County, Pennsylvania* in 1997. The author indicates that the site and much of the survey area were significantly disturbed. One pre-contact archaeological resource was identified during the archaeological survey. However, it is not registered with the PA SHPO and is not included in their CRGIS system. The site was a small, culturally unaffiliated fire-cracked rock and lithic debitage scatter that was recommended as not eligible for the NRHP

Table 5-10. Previously identified historic architectural resources within or adjacent to Survey Area 8, Delaware County, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
106216	Chichester Avenue Bridge (Bridge No. 75-A)	Bridge	ca. 1941	Not eligible (2007)
144062	B&O Railroad: Philadelphia Branch	Railroad	1883-1886	Not eligible (2007)

Table 5-11. Previous cultural resource investigations within a one-block radius of Survey Area 8, Delaware County, Pennsylvania.

ER No.	Report Title	Type	Author(s)	Year
1995-3133-045-B	An Archaeological Survey of Lutheran Knolls South Boothwyn Vicinity, Upper Chichester Township, Delaware County, Pennsylvania	Phase I Archaeological Survey	R. Alan Mounier	1997

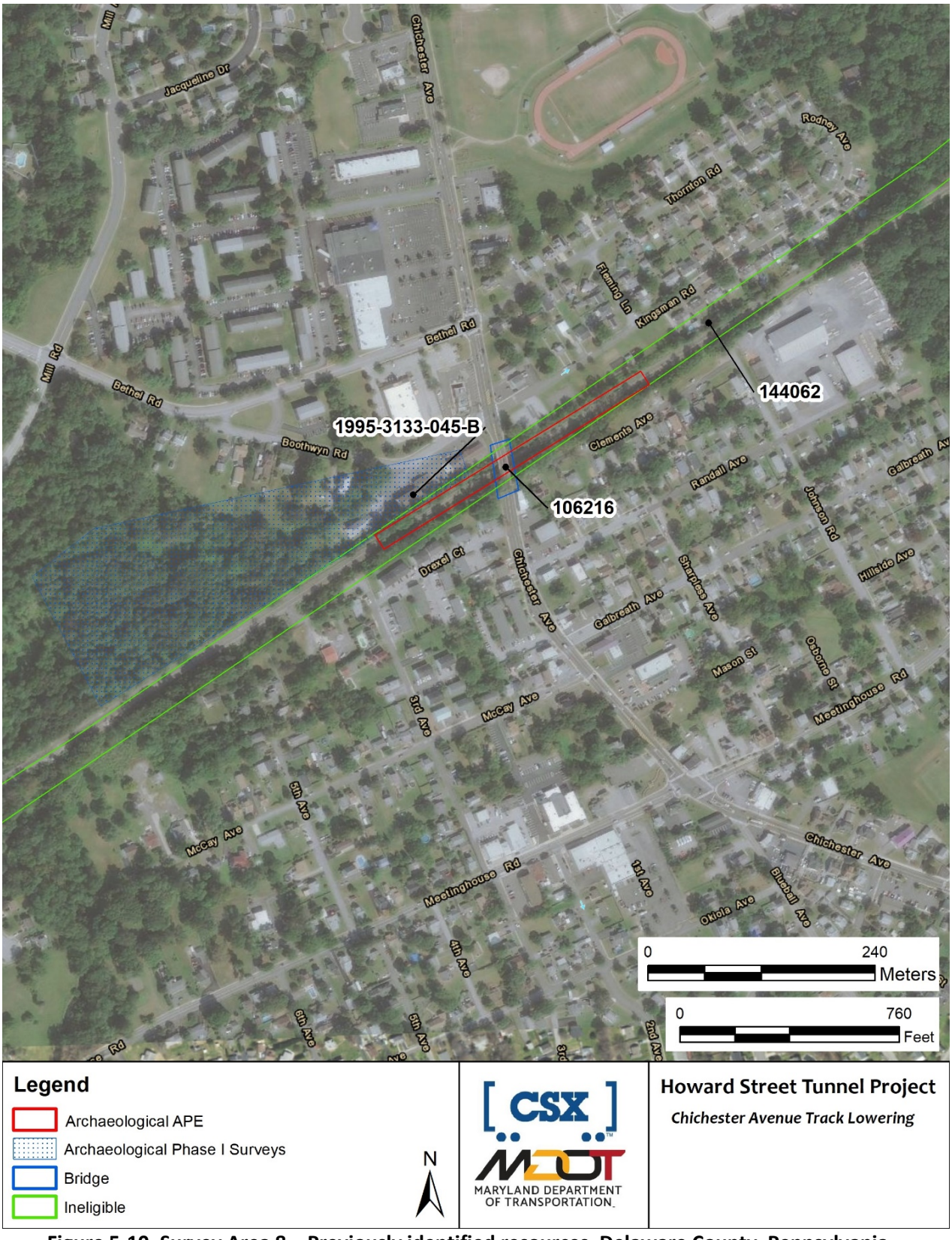

Figure 5-10. Survey Area 8 – Previously identified resources, Delaware County, Pennsylvania.

5.9 Survey Area 9 – Crum Lynne Road Track Lowering, Delaware County, Pennsylvania

Survey Area 9 is located in the Ridley Township of Delaware County, Pennsylvania, at the intersection of Crum Lynne Road and the existing CSX ROW. Two previously documented historic architectural resources are located within Survey Area 9. Both resources have been determined not eligible for the NRHP. These resources date from the late-nineteenth and mid-twentieth centuries (**Table 5-12; Figure 5-11**).

No previously identified archaeological sites or previous archaeological surveys are located within a one-block radius of Survey Area 9.

Table 5-12. Previously identified historic architectural resources within or adjacent to Survey Area 9, Delaware County, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
106218	Crum Lynne Road Bridge (Bridge No. 81-A)	Bridge	1947 (1957)	Not eligible (2007)
144062	B&O Railroad: Philadelphia Branch	Railroad	1883-1886	Not eligible (2007)

5.10 Survey Area 10 – Clifton Avenue Track Lowering, Delaware County, Pennsylvania

Survey Area 10 is located in the Collingdale Borough of Delaware County, Pennsylvania, at the intersection of Clifton Avenue and the existing CSX ROW. Four previously documented historic architectural resources are located within or adjacent to Survey Area 10. Three resources have been determined not eligible for the NRHP. These resources date from the late-nineteenth and early-twentieth centuries. One aggregate resource has not been evaluated and is not attributed with any date of construction (**Table 5-13; Figure 5-12**).

No previously identified archaeological sites or previous archaeological surveys are located within a one-block radius of Survey Area 10.

Table 5-13. Previously identified historic architectural resources within or adjacent to Survey Area 10, Delaware County, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
106210	Clifton Avenue Bridge (Bridge No. 85-B)	Bridge	ca. 1922	Not eligible (1997)
116397	Sharon Hill	Historic District	Late-19th and early-20th centuries	Not eligible (2001)
144062	B&O Railroad: Philadelphia Branch	Railroad	1883-1886	Not eligible (2007)
210510	Old Swedes Path	Trail	NA	Unevaluated

Figure 5-11. Survey Area 9 – Previously identified resources, Delaware County, Pennsylvania.

Figure 5-12. Survey Area 10 – Previously identified resources , Delaware County, Pennsylvania.

5.11 Survey Area 11 – S. 68th Street Track Lowering, Philadelphia County, Pennsylvania

Survey Area 11 is located in the City of Philadelphia, Philadelphia County, Pennsylvania, at the intersection of S. 68th Street and the existing CSX ROW. Two previously documented historic architectural resources are located within or adjacent to Survey Area 11. Both resources have been determined not eligible for the NRHP. These resources date from the late-nineteenth and early-twentieth centuries (**Table 5-14; Figure 5-13**).

No previously identified archaeological sites or previous archaeological surveys are located within a one-block radius of Survey Area 11.

Table 5-14. Previously identified historic architectural resources within or adjacent to Survey Area 11, Philadelphia, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
137510	68th Street Bridge (Bridge No. 39248)	Bridge	1926	Not eligible (2007)
144062	B&O Railroad Philadelphia Branch	Railroad	1883-1886	Not eligible (2007)

5.12 Survey Area 12 – S. 65th Street to S. 58th Street Track Lowering, Retaining Wall, and Interlocking Removal, Philadelphia County, Pennsylvania

Survey Area 12 is located in the City of Philadelphia, Philadelphia County, Pennsylvania, at the intersections of S. 65th Street, Cemetery Avenue, 61st Street, Woodland Avenue, S. 58th Street and the existing CSX ROW. Five previously documented historic architectural resources are located within or adjacent to Survey Area 12. Four of these resources have been determined not eligible for the NRHP. These resources date from the late-nineteenth to late-twentieth centuries. One resource has been determined eligible for the NRHP (**Table 5-15; Figure 5-14**).

No archaeological sites or previous archaeological surveys are located within or adjacent to Survey Area 12.

Table 5-15. Previously identified historic architectural resources within or adjacent to Survey Area 12, Philadelphia, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
137537	Woodland Avenue Bridge (Bridge No. 39196)	Bridge	1994	Not eligible (2007)
137672	S. 65th Street Bridge (Bridge No. 38915)	Bridge	1910	Not eligible (2007)
144062	Baltimore and Ohio Railroad Philadelphia Branch	Railroad	1883-1886	Not eligible (2007)
156956	Green Line (SEPTA Subway Surface Line)	Railroad	1903, 1907 (1932, 1950, 1980 additions)	Not eligible (2007)
111801	Philadelphia, Wilmington & Baltimore Railroad (Marcus Hook to Lower Chichester Township)	Railroad	ca. 1837	Eligible (1999); A

Figure 5-13. Survey Area 11 – Previously identified resources, Philadelphia, Pennsylvania.

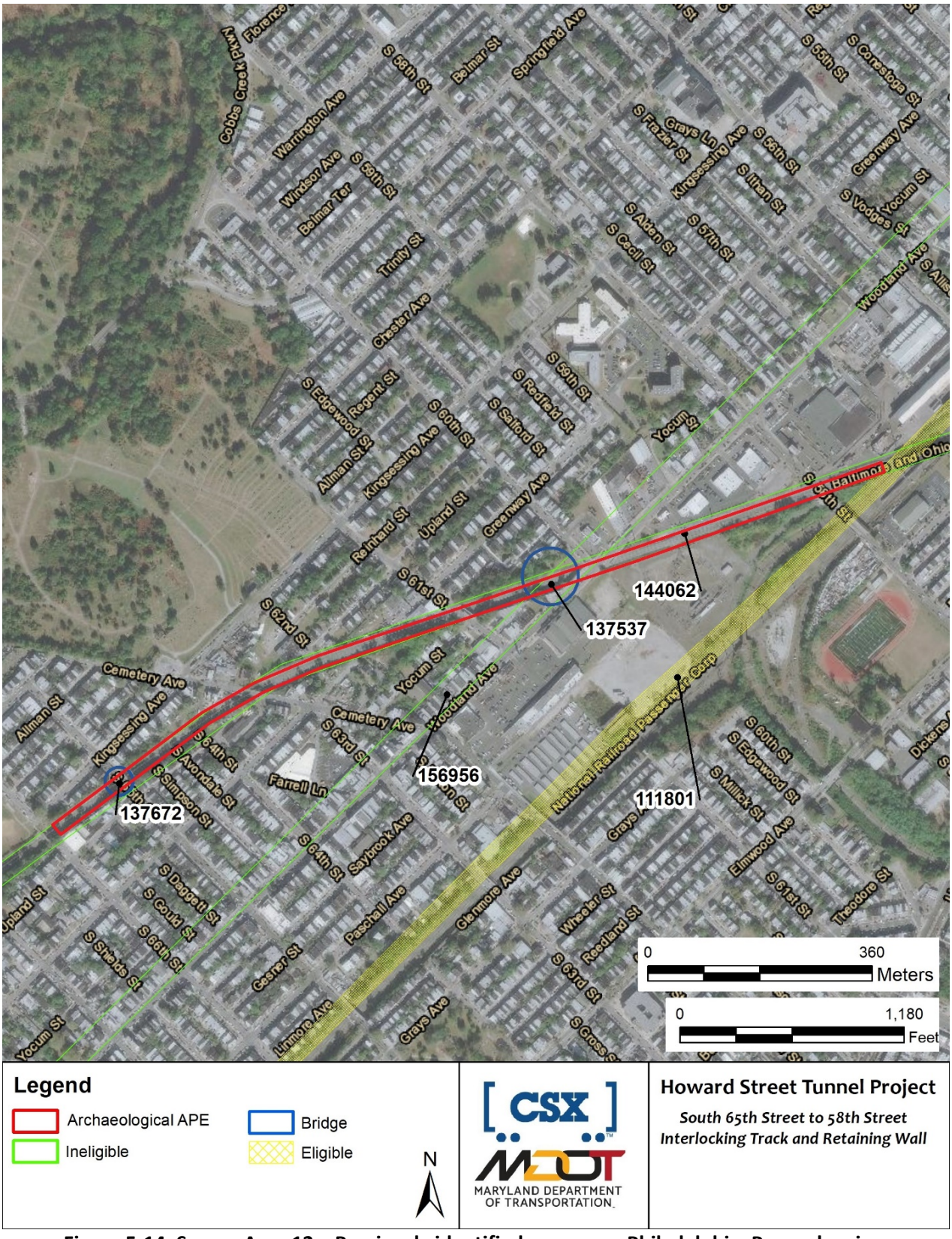

Figure 5-14. Survey Area 12 – Previously identified resources, Philadelphia, Pennsylvania.

5.13 Survey Area 13 – Lindbergh Road New Interlocking, Philadelphia County, Pennsylvania

Survey Area 13 is located in the City of Philadelphia, Philadelphia County, Pennsylvania east of the intersection of Grays Avenue and the existing CSX ROW, and west of the Schuylkill River. The survey area measures 8.3 acres (3.4 hectares) and is located exclusively within the CSX ROW. Four previously documented historic architectural resources are located within or adjacent to Survey Area 13 (**Table 5-16; Figure 5-15**). One—the John Bartram House and Gardens—is an NHL. One—Bartram Village—has been determined to be eligible for the NRHP. Both resources are adjacent to the survey area. One resource has been determined not eligible for the NRHP. One resource has not been evaluated for the NRHP.

No archaeological sites or previous archaeological surveys are located within a one-block radius of Survey Area 13. The nearest archaeological site is the John Bartram House Site (36PH0014) located approximately 175 meters (574 feet) south of the survey area. The site is a multicomponent pre-contact and historic site. The pre-contact site component dates to the Late Archaic and Woodland (Early, Middle, and Late) periods. The historic component of the site dates from the mid-seventeenth through the mid-twentieth century. The site was determined eligible for the NRHP in 2012.

Table 5-16. Previously identified historic architectural resources within or adjacent to Survey Area 13, Philadelphia, Pennsylvania.

PHMC No.	Name	Type	Build Year(s)	NRHP Status (Year); Criteria
001332	John Bartram House and Gardens	Building	1728, 1777	NHL (1974); A, C
103292	Bartram Village	District	1942	Eligible (1995); A, C
144062	Baltimore and Ohio Railroad: Philadelphia Branch	Railroad	1883-1886	Not eligible (2007)
155708	Philadelphia and Reading Railroad	District	1833	Aggregate; Not evaluated

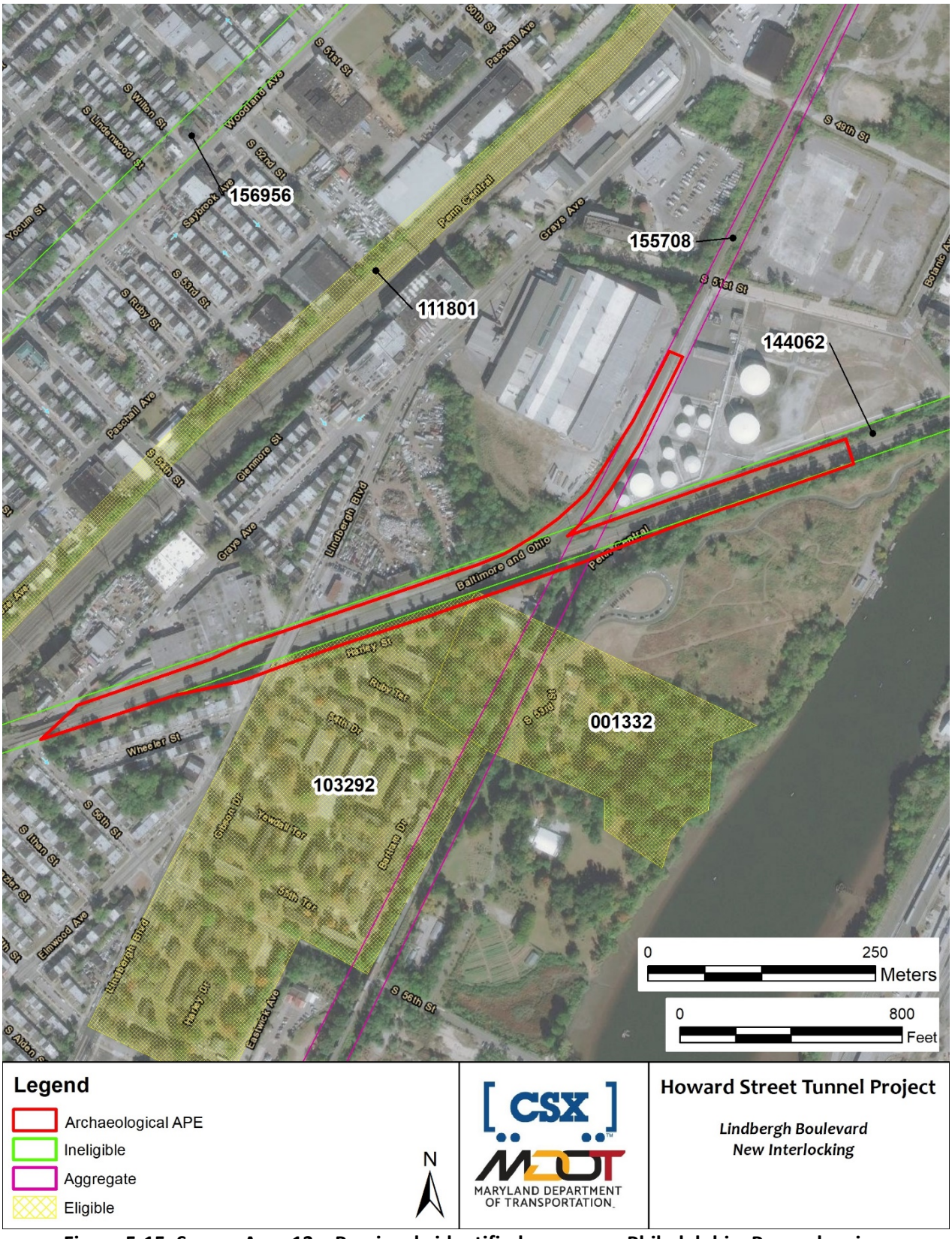

Figure 5-15. Survey Area 13 – Previously identified resources, Philadelphia, Pennsylvania.

6. ASSESSMENT OF ARCHAEOLOGICAL SITE POTENTIAL

To guide the Phase IA Archaeological Assessment, RK&K constructed a GIS-based qualitative archaeological probability model to identify areas of high, moderate, and low potential for intact significant pre-contact or historic archaeological sites within each survey area of the APE. Factors used to build the probability model included soil type; degree of slope; topographic features; proximity to water; level of previous disturbance; proximity and relationship to known archaeological sites, historic architectural resources, or historic sites; local and regional settlement patterns and land use; and the nature of the proposed improvements. An assessment of current conditions within each of the thirteen survey areas was conducted using aerial photography, LiDAR imagery (if available), and USDA NRCS soil map overlays to identify areas that may retain physical integrity and the potential for intact soils or deeply buried deposits. This probability model was developed to comply with the guidelines for models specified in MHT's *Standards and Guidelines for Archaeological Investigations in Maryland* (Shaffer and Cole 1994), DHCA's *Archaeological Survey in Delaware* (2015), and the *Pennsylvania State Historic Preservation Office's Guidelines for Archaeological Investigations in Pennsylvania* (2017).

In addition to RKK's independent assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within the survey area located in Pennsylvania. The probability model uses physiographic region, watershed data, previously recorded pre-contact site locations, and other relevant environmental factors to identify areas of High and Moderate potential for pre-contact archaeological sites. This model, however, does not take into account disturbance that may impact archaeological potential. As such, aerial photography, LiDAR, historic topographic maps, and soils information were consulted to supplement the Pennsylvania Statewide Pre-Contact Probability Model. Maryland and Delaware do not have similar pre-contact archaeological probability models.

The results of RKK's probability model, in conjunction with the results of the Pennsylvania Statewide Pre-Contact Probability Model for the survey areas in Pennsylvania, were used to provide recommendations for additional archaeological investigations as necessary. The results of the archaeological site potential assessment are below.

6.1 Archaeological Site Potential

Each of the thirteen survey areas was addressed individually to determine pre-contact and historic archaeological site potential.

6.1.1 Survey Area 1 – Howard Street Tunnel Enlargement, Baltimore, Maryland

Survey Area 1 consists of all areas that may be affected by the proposed enlargement of the Howard Street Tunnel, and associated areas north and south of the tunnel. The Howard Street Tunnel generally runs from Camden Station to Mount Royal Station and is approximately 8,700-feet (2,652-meters) long. The entrances/exits to the tunnel are shown in **Figure 6-1** and **Figure 6-2**. The Howard Street Tunnel was constructed between 1890 and 1895 in three sections: a mined section, a cut-and-cover section, and a concrete box section. Two options are being considered for improvements to the Howard Street Tunnel: 1) a conventional approach and 2) a non-conventional approach. These options are discussed in detail in section 1.4.1 of this report and will be briefly reiterated here to help assess the archaeological potential of the survey area, as each option varies in its potential to encounter archaeological deposits.

Figure 6-1. Survey Area 1 – Northern entrance at Mt. Royal Station, facing south.

Figure 6-2. Survey Area 1 – Southern entrance at Camden Station, facing north.

The soil within Survey Area 1 consists of Urban land (44UC) and Urban land-Sassafras complex (31UB) (USDA NRCS 2020). The Urban land unit has been classified as 100 percent Urban land with slopes between 0 and 15 percent. The Urban land-Sassafras complex unit was classified at 75 percent Urban land and 25 percent Sassafras and minor component soils with 0 to 8 percent slope. These soils are located partially underneath the roadway and partially below a grassy area within the survey area that coincides with previous disturbances. The Sassafras and minor components are well-drained, deep gravelly loam soils that formed on fluviomarine terraces and flats. Survey Area 1 is located approximately 2,060 feet (628 meters) west of Baltimore's Inner Harbor, which connects the city to the Chesapeake Bay. The Jones Falls is located approximately 620 feet (189 meters) to the northwest of Survey Area 1.

Conventional Approach

Proposed improvements under the conventional approach include a combination of track geometry optimization, track lowering, tunnel arch modification, invert modification, and improvements to the existing drainage system. Within the 6,200-foot mined section of the tunnel, a combination of arch modification, invert modification, and track lowering is proposed to achieve the necessary clearance. Track lowering and invert modifications will occur entirely under the existing railroad surface within the tunnel, which is over 25 feet (7.6 meters) below the original grade and has been disturbed by the construction of the tunnel. CSX would also modify the crown of the tunnel arch by means of shallow and deep notching of the bricks as necessary in order to achieve the required clearance. The proposed arch modification will occur within the existing tunnel and will not impact the soils above the tunnel.

Within the 1,140-foot long cut and cover section, there is not sufficient space to achieve clearance by exclusively lowering the track within the existing tunnel. Above this section of the tunnel, fewer than five feet of fill material exists between the tunnel and Howard Street, and the MDOT MTA Light RailLink operation adjacent to or above the tunnel. These conditions prohibit modification to the tunnel's arch in this section. Therefore, clearance in this section will be achieved by lowering the tunnel invert, and rebuilding the track using wood ties and ballast to achieve the necessary clearance.

Track lowering is proposed along the 1,360-foot long concrete box section of Howard Street Tunnel, extending from just north of Martin Luther King Jr. Boulevard to just south of W. Camden Street. Within this section, there is sufficient ballast depth to lower the track profile to achieve the necessary clearance. This work will occur entirely under the existing railroad surface within the tunnel, which is over 25 feet (7.6 meters) below the original grade and has been disturbed by the construction of the tunnel.

The areas within approximately 500 feet (152 meters) of the tunnel entrances/exits are over 25 feet (7.6 meters) below the original grade and have been disturbed by the construction of the original railroad line. To the north of the tunnel, the B&O Railroad constructed the Mount Royal Station and trainshed in 1896 in association with the railroad line (Harwood 2002: 88). The station was constructed entirely below grade within an open cut between the Howard Street Tunnel and the Mount Royal Tunnel (NRHP 1970). Additionally, the USGS LiDAR imagery indicates that the present grade of the CSX ROW at the northern and southern tunnel entrances range from approximately 25 to 30 feet (7.6 to 9.1 meters) below natural grade, as evidenced by visible cuts on either side of the tracks.

Non-conventional Approach

The non-conventional alternative involves different methods to achieve double-stack clearance in the mined section, and the cut and cover section of the tunnel. The methods proposed for the concrete box

section, and the areas to the north and south of the tunnel entrances are the same as the conventional approach. This approach entails use of a TES to gain clearance within the mined section of the tunnel. This approach would allow train operations to continue during active construction and, upon completion, would result in a new tunnel structure.

However, the use of the TES cannot extend through the tunnel's existing cut and cover section because there is not sufficient clearance between the top of the tunnel and the overlying Howard Street. Therefore, to maintain the benefit of continued train traffic during construction offered by the TES, the clearance in the existing cut and cover section would be achieved by removing the top of this section of the tunnel and reconstructing it. This would involve the opening of the tunnel at the street level and replacing the arch portion of the tunnel. In these areas, ground disturbance associated with railroad construction, twentieth-century urban development, and utility placement has likely displaced or disturbed any significant archaeological deposits that may have been present within the survey area.

For the concrete box section of the Howard Street Tunnel, the clearance methodology would remain the same as the conventional approach and be achieved through track lowering only. This work will occur entirely under the existing railroad surface within the tunnel, which is over 25 feet (7.6 meters) below the original grade and has been disturbed by the construction of the tunnel.

Survey Area 1 is considered to have low probability for intact significant pre-contact or historic archaeological sites under both the conventional and non-conventional approaches. The majority of the proposed improvements will occur within or below the existing railroad tunnel, which has been significantly disturbed by the construction of the railroad. The only locations within the survey area with potential for intact historic archaeological sites would be above the mined sections of the tunnel above the tunnel ceiling and, in these areas, ground disturbance associated with railroad construction, twentieth-century urban development, and utility placement has likely displaced or disturbed any significant archaeological deposits that may have been present within the survey area. Due to the low probability for intact significant pre-contact or historic archaeological sites, the nature of the proposed tunnel enlargement in relation to previously disturbed CSX ROW, and the lack of ground disturbing activities outside of the existing CSX ROW, no additional archaeological investigations are recommended for Survey Area 1.

6.1.2 Survey Area 2 – North Avenue Bridge Modification, Baltimore, Maryland

Survey Area 2 includes all areas that may be affected by the proposed modification of the North Avenue Bridge in Baltimore, Maryland. The project proposes to replace a single arch of the North Avenue arch bridge with a single span, shallow girder bridge with no change to the superstructure (**Figure 6-3; Figure 6-4**). Survey Area 2 also contains the existing Amtrak B&P Tunnel running under another arch of the bridge. No track lowering is proposed in order to avoid any impact to this tunnel.

The soils within Survey Area 2 consist entirely of Udorthents, smoothed (42E) soils with slopes between 0 and 35 percent. This soil is composed of well-drained, gravelly silt loam and consists of areas that have been excavated in preparation for development. Survey Area 2 is located approximately 215 feet (66 meters) southwest of the Jones Falls. A review of historic maps and aerial photography indicate that the entire survey area has been subject to cutting, filling, and development associated with the construction of the railroad and roadways.

Figure 6-3. Survey Area 2 – North Avenue Bridge, view from south.

Figure 6-4. Survey Area 2 – North Avenue Bridge, view from south.

The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW in Survey Area 2 is approximately 55 feet (16.8 meters) below natural grade, as evidenced by visible cuts on either side of the tracks. Although the survey area is located approximately 75 meters (246 feet) southwest of the Jones Falls stream on relatively level terrain, construction of the Philadelphia, Wilmington, and Baltimore Railroad, Falls Road, the B&O Railroad, and the B&P Tunnel under the North Avenue Bridge have caused significant disturbance to the original landscape. As designed, the proposed bridge modification will have minimal potential to affect significant pre-contact archaeological sites.

Survey Area 2 is considered to have low probability for containing intact significant historic archaeological sites. A review of historic maps shows several buildings or development within the vicinity of the survey area prior to its use as a railroad corridor, though they all appear to exist outside of the survey area (**Figure 4-2**). The lack of pre-railroad corridor historic resources and the disturbance associated with the construction of the transportation corridors suggest that no historic resources are present within the survey area. Due to the low probability for intact significant pre-contact or historic archaeological sites, no additional archaeological investigations are recommended for Survey Area 2.

6.1.3 **Survey Area 3– Guilford Avenue Bridge Replacement, Baltimore, Maryland**

Survey Area 3 includes all areas that may be affected by the proposed replacement of the Guilford Avenue Bridge in Baltimore, Maryland. The Guilford Avenue Bridge (B-4526/BC8029) is located within Survey Area 3 and crosses the CSX tracks just south of E. 26th Street. The existing arch bridge is to be replaced with a single span, shallow girder bridge. The existing stone walls are to remain as retaining walls for the new structure.

Soils within the survey area include Udorthents, smoothed (42E) and Urban land (44UC). Udorthents, smoothed soils consist of earthen fill and non-soil material that has been placed on poorly drained to somewhat excessively drained soils on uplands, terraces, and floodplains (USDA NRCS 1998). The Urban land soils include areas where more than 80 percent of the surface is covered by impervious surfaces (USDA NRCS 1998). Survey Area 3 is located approximately 4,000 feet (1,219 meters) east of the confluence of the Jones Falls and Stony Run.

The survey area is located in a gently sloping upland setting just west of Brady's Run, a now extinct intermittent stream. However, more favorable environmental settings would be located closer to permanent streams, like now-extinct Jackson's Run, located over 2,000 feet (610 meters) to the east. The majority of the survey area consists of twentieth-century urban development or below-grade cut to construct the B&O Railroad Baltimore Belt Line that runs under the Guilford Avenue Bridge. The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW within Survey Area 3 ranges from approximately 24 to 28 feet (7.3 to 8.5 meters) below natural grade, as evidenced by visible cuts on either side of the tracks. Ground disturbance associated with railroad construction and urban development has likely displaced or disturbed any significant pre-contact archaeological deposits that may have been present. The field visit to Survey Area 3 demonstrated that the area is currently improved with asphalt roadway and paved sidewalks (**Figure 6-5**), and includes the Guilford Avenue Bridge that shows a steep cut up to 15 feet (5 meters) below ground surface (**Figure 6-6** and **Figure 6-7**).

Figure 6-5. Survey Area 3 – Guilford Avenue Bridge facing south from E. 26th Street.

Figure 6-6. Survey Area 3 – General conditions from Guilford Avenue Bridge, facing east.

Figure 6-7. Survey Area 3 – General conditions from Guilford Avenue Bridge, facing west.

Survey Area 3 possesses low probability for intact significant historic archaeological sites. The survey area is located in proximity to documented nineteenth-century development. Survey Area 3 straddled Sumwalt Lane, a road in use into the late-nineteenth century but no longer present today (**Figure 4-4** and **Figure 4-5**). Several nineteenth-century buildings associated with the Sattler estate were located approximately 300 feet (91 meters) to the northwest and southeast of the survey area. Additional development occurred along the southern portion of Sumwalt Lane in the late-nineteenth century. The B&O Baltimore Belt Line was constructed below grade, just south of and parallel to E. 26th Street, in the 1890s. Several bridges were constructed so that the railroad line would not interfere with the existing streets at grade. Guilford Avenue Bridge was constructed in 1895 below the natural grade. According to a review of Sanborn maps, Guilford Avenue was completed between E. 24th Street and E. 26th Street between 1902 and 1915. Twentieth-century utility lines and roadway improvements have likely impacted intact soils beneath the paved surfaces. Due to the low probability for intact significant pre-contact or historic archaeological sites, no additional archaeological investigations are recommended for Survey Area 3.

6.1.4 **Survey Area 4 – Harford Road Bridge Replacement, Baltimore, Maryland**

Survey Area 4 includes all areas that may be affected by the proposed replacement of the Harford Road Bridge in Baltimore, Maryland. The Harford Road arch bridge is to be replaced with a single-span, shallow girder bridge. The bridge modifications are required due to an existing water main line beneath CSX's tracks at Harford Road that limits the potential track lowering to depths that would not be sufficient to achieve the desired vertical clearance. Minor track lowering that avoids the existing water main is also proposed.

Soils within the survey area include Urban land-Sunnyside complex (33UB), Urban land-Sunnyside-Christiana complex (34UB), Udorthents, loamy, very wet (40E), and Urban land (44UC). The Urban land-Sunnyside complex (33UB) and the Urban land-Sunnyside-Christiana complex (34UB) contain approximately five and 25 percent relatively disturbed natural soils, respectively. The remainder of each soil complex includes Urban land that is improved with concrete, asphalt, buildings, or other impervious surfaces (USDA NRCS 1998). Survey Area 4 is located approximately 4,230 feet (1,289 meters) southwest of Lake Montebello, a man-made reservoir designed and excavated in the nineteenth century. The nearest naturally occurring waterway is Herring Run, which is located approximately 7,500 feet (2,286 meters) northeast of Survey Area 4. However, historic maps from the mid-to-late nineteenth century indicate an unnamed tributary of Herring Run was once located approximately 2,500 feet (762 meters) northeast of Survey Area 4. The spring and a portion of the unnamed tributary were buried as a result of the increased development that occurred in the area during the late nineteenth and early twentieth centuries (Shellenhamer and Hutchins-Keim 2019).

The survey area generally consists of twentieth-century urban development—asphalt and concrete roadway, sidewalks, and parking areas—and is located on a slightly elevated ridge, within approximately 2,500 feet (762 meters) of an unnamed stream that has since been destroyed by urban development. The majority of the survey area consist of twentieth-century urban development or the below-grade cut for the construction of the B&O Railroad Baltimore Belt Line (**Figure 6-8**). The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW within Survey Area 4 is approximately 24 feet (7.3 meters) below natural grade, as evidenced by visible cuts on either side of the tracks. In these areas, ground disturbance associated with railroad construction, twentieth-century urban development, and utility placement, has likely displaced or disturbed any significant pre-contact archaeological deposits that may have been present within the survey area.

The portion of the survey area north of the CSX ROW and east of the Harford Road ROW is an undeveloped lawn of the REACH! Partnership School (2555 Harford Road) that appeared to have avoided impacts from the construction of the CSX railroad and remained relatively undisturbed by urban development. As such, this area was initially designated as having a moderate probability for intact significant pre-contact and historic archaeological sites. **Figure 6-9** is a photograph of a portion of this area and **Figure 6-10** provides an aerial image of this area. However, this area was likely previously disturbed by grading and landscaping improvement associated with the renovation of the REACH! Partnership School and grounds in 2018-2019. In addition, the proposed project activities in this area include the removal of grass, introduction of topsoil fill, and leveling of the topsoil. These proposed activities will have minimal potential to affect archaeological sites. No buildings or other improvements along the Harford Road ROW are documented on historic maps reviewed as part of this assessment **(Figure 4-6**). Due to the low probability for intact significant pre-contact or historic archaeological sites in the developed areas and the nature of the proposed construction activities in the undeveloped areas, no additional archaeological investigations are recommended for Survey Area 4.

Figure 6-8. Survey Area 4 – General conditions from Harford Road Bridge, facing south.

Figure 6-9. Survey Area 4 – REACH! Partnership School property northeast of Harford Road Bridge, facing east.

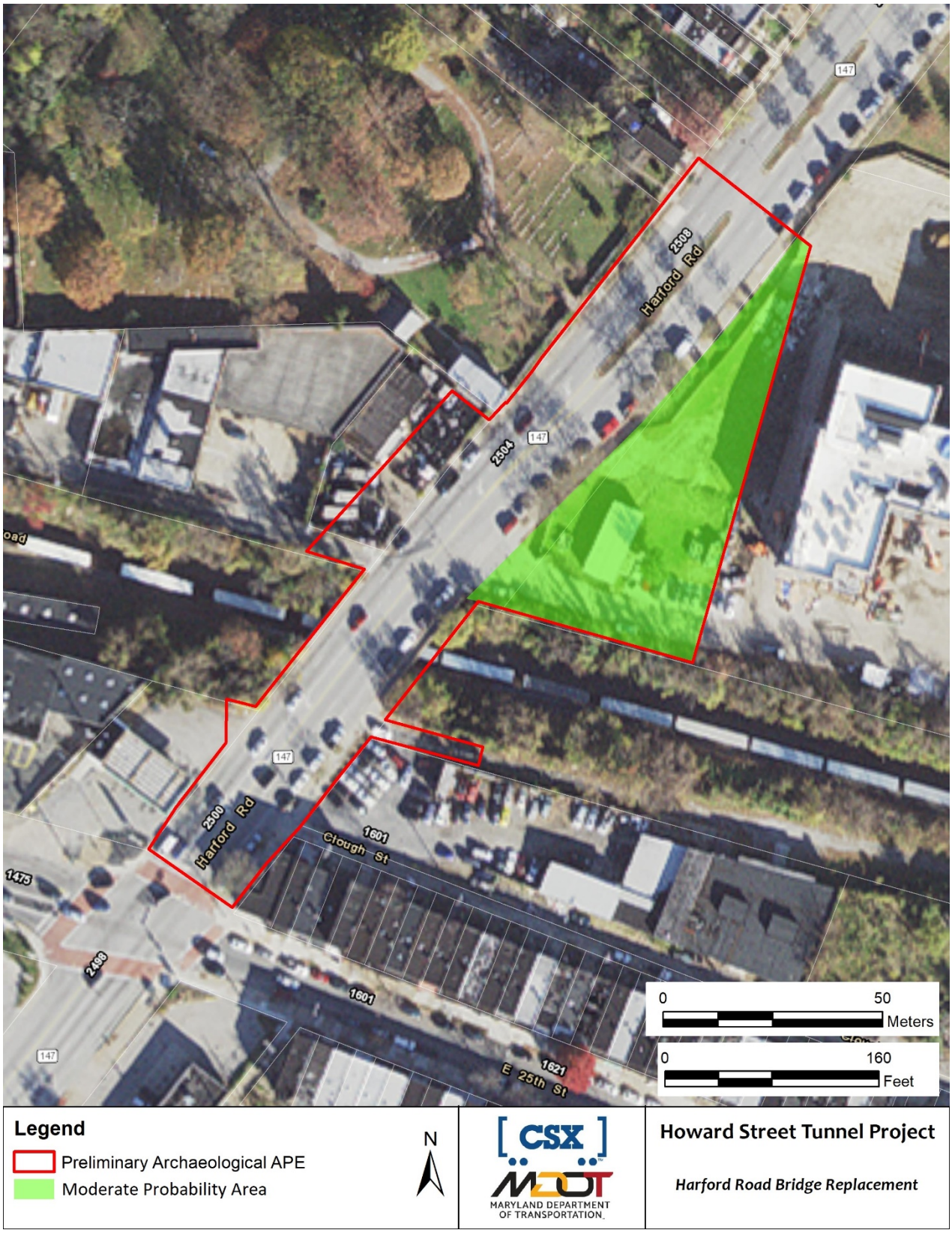

Figure 6-10. Survey Area 4 – Moderate probability area, REACH! Partnership School (2555 Harford Road).

6.1.5 **Survey Area 5 – Boone Tunnel Enlargement, Delaware County, Pennsylvania**

Survey Area 5 includes all areas that may be affected by the proposed enlargement of Boone Tunnel, which carries Chester Pike over the existing CSX ROW in the Sharon Hill borough of Delaware County, Pennsylvania. The proposed improvements consist of a combination of track lowering and arch modification of the tunnel. Due to past track lowering activities, the existing tunnel footings are very shallow, and further lowering alone to gain clearance would compromise the footings' integrity. Therefore, the proposed improvements will include the addition of footing support, notching the portals, and underpinning to support the tunnel structure in order to facilitate track lowering.

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 5, the Made land, silt and clay materials (Mc) **(Figure 3-7**). The soil is mapped as Udorthents, unstable acidic, loamy fill that was transported into the survey area derived from interbedded sedimentary rock. Survey Area 5 is located approximately 1,550 feet (472 meters) west of Darby Creek, which drains into the Delaware River.

Previous railroad construction activities below natural grade would have displaced any potential pre-contact archaeological deposits that may have been present **(Figure 6-11** and **Figure 6-12).** The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW ranges from approximately 18 to 23 feet (5.5 to 7.0 meters) below natural grade, as evidenced by visible cuts on either side of the tracks. Twentieth-century utility lines and roadway improvements have likely impacted intact soils beneath the paved surfaces. Historic maps within the survey area do not show historic resources before construction of the railroad in 1883. The majority of historic development of the surrounding area generally occurred during and after railroad construction.

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 5. Survey Area 5 is not located in an area of high or medium archaeological potential.

Survey Area 5 is considered to have low probability for intact significant pre-contact or historic archaeological sites. Due to the low probability for intact significant pre-contact or historic archaeological sites and the lack of effects outside the existing railroad ROW, no additional archaeological investigations are recommended for Survey Area 5.

Figure 6-11. Survey Area 5 – General conditions at Boone Tunnel, southwestern extent, facing north.

Figure 6-12. Survey Area 5 – General conditions at Boone Tunnel, northeastern extent, facing south.

6.1.6 **Survey Area 6 – Lancaster Avenue Track Lowering and Retaining Wall, Wilmington, Delaware**

Survey Area 6 is located in Wilmington, Delaware, and includes all areas that may be affected by the proposed track lowering underneath the Lancaster Avenue Bridge and the construction of a concrete block retaining wall to accommodate track lowering. All proposed activities are to occur within the existing CSX ROW. Proposed work includes lowering the tracks 1.5 feet at Lancaster Avenue, increasing clearance from its current height of 19.5 feet to 21 feet. To achieve the clearance required at the obstruction, approximately 500 feet of the existing track on either side of the bridge will be lowered gradually over that distance. No work is anticipated to the bridge superstructure at this location.

Soils within the survey area consist of the Neshaminy-Urban land complex (NxB), which contains approximately 55 percent relatively undisturbed Neshaminy silt loam and 35 percent Urban land that is improved with concrete, asphalt, buildings, or other impervious surfaces. Survey Areas 6 is located 6,000 feet (1,828 meters) east of Chestnut Run and 6,000 feet (1,828 meters) north of Mill Creek, tributaries that drain into the Christina River, which itself is located 7,800 feet (2,377 meters) southeast of the survey areas. However, historic maps from 1849 (Rea and Price *Map of New Castle County, Delaware*) and 1881 (Hopkins *Map of New Castle County, Delaware*) depict an unnamed tributary once extending southward towards Little Mill Creek, a tributary of the Christina River, through Survey Area 6. This tributary is not depicted on later USGS topographic maps and is thought to have been diverted by urban development.

The survey area remained undeveloped until the third quarter of the nineteenth century, when 18 blocks of residential and commercial buildings were built nearby as part of Wilmington's suburban expansion, as documented in the 1881 Hopkins *Map of New Castle County, Delaware*. Some of these buildings were located within and adjacent to the portion of Survey Area 6 north of Lancaster Avenue prior to the construction of the B&O Railroad beginning in 1883. Subsequent railroad construction involved cutting below grade north of Lancaster Avenue or adding fill material south of Lancaster Avenue to achieve the appropriate grade for the alignment. The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW south of Lancaster Avenue ranges from approximately 4 to 6 feet (1.2 to 1.8 meters) above natural grade and the tracks north of Lancaster Avenue range from at grade to approximately 15 feet (4.6 meters) below grade, as evidenced by visible cuts on either side of the tracks (**Figure 6-13**).

Survey Area 6 is considered to have low probability for intact significant pre-contact or historic archaeological sites because of ground disturbance caused by the construction of the B&O Railroad and the nature of the proposed track lowering. No additional archaeological investigations are recommended for Survey Area 6.

Figure 6-13. Survey Area 6 – General conditions at Lancaster Avenue Bridge, facing north.

6.1.7 **Survey Area 7 – W. 4th Street Track Lowering, Wilmington, Delaware**

Survey Area 7 is located in Wilmington, Delaware, and includes all areas that may be affected by the proposed track lowering underneath the W. 4th Street Bridge. Proposed work includes lowering the tracks 1.5 feet. The grade will be lowered gradually over approximately 500 feet on either side of the bridge to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the right-of-way, as needed; erosion control of earthen embankments; and laying gravel atop existing access/egress roads, as needed.

Soils within the survey area consist of the Neshaminy-Urban land complex (NxB), which contains approximately 55 percent Neshaminy silt loam and 35 percent Urban land that is improved with concrete, asphalt, buildings, or other impervious surfaces. Survey Area 7 is located 6,000 feet (1,828 meters) east of Chestnut Run and 6,000 feet (1,828 meters) north of Mill Creek, tributaries that drain into the Christina River. However, historic maps from 1849 and 1881 depict an unnamed tributary once extending southward towards Little Mill Creek through Survey Area 7. This tributary is not depicted on later USGS topographic maps and is thought to have been diverted due to urban development. The survey area remained undeveloped until the third quarter of the nineteenth-century when 18 blocks of residential and commercial buildings were built in the vicinity of the survey area as part of Wilmington's suburban expansion, as documented in the 1881 Hopkins map. Some of these buildings were located within and adjacent to the portion of Survey Area 7 north of Lancaster Avenue prior to the construction of the B&O Railroad beginning in 1883. The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW ranges from approximately 10 to 14 feet (3.1 to 4.3 meters) below natural grade, as evidenced by visible cuts on either side of the tracks (**Figure 6-14**).

Survey Area 7 is considered to have low probability for intact significant pre-contact or historic archaeological sites because of ground disturbance caused by the construction of the B&O Railroad and the nature of the proposed track lowering. No additional archaeological investigations are recommended for Survey Area 7.

Figure 6-14. Survey Area 7 – General conditions from W. 4th Street Bridge, facing southwest with Lancaster Avenue Bridge in background.

6.1.8 **Survey Area 8 – Chichester Avenue Track Lowering, Delaware County, Pennsylvania**

Survey Area 8 is located in the Upper Chichester Township of Delaware County, Pennsylvania, at the intersection of Chichester Avenue and the existing CSX ROW. All proposed work will occur exclusively within the CSX ROW. These improvements include lowering the railroad tracks going under the Chichester Avenue Bridge (Bridge No. 75-A) to allow for double-stack train passage. To accommodate this, the survey area extends along existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal, as needed; and laying gravel on existing access roads, as needed.

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 8—Made land, gravelly materials (Ma). The soil is mapped as Udorthents, Shale and Sandstone fill that was transported into the survey area. This soil type generally indicates that the original soils at grade have been displaced or disturbed. Survey Area 8 is located approximately 1,880 feet (573 meters) southwest of Marcus Hook Creek, which flows south towards the Delaware River.

Construction of the existing CSX tracks has significantly altered the landscape within Survey Area 8, as it is entirely below the natural grade (**Figure 6-15**and **Figure 6-16**). The LiDAR imagery indicates that the present grade of the CSX ROW is 13 feet (4.0 meters) below the natural grade within the survey area, as evidenced by visible cuts on either side of the tracks. This construction would have displaced any potential pre-contact archaeological deposits that may have been present. Historic maps within the survey area do not show historic resources before construction of the railroad in 1883. The historical development of the surrounding area generally occurred during and after railroad construction.

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 8. No high probability areas are located within the survey area. A minor portion of the survey area in the vicinity of the existing bridge is listed as a medium probability area in the PA CRGIS system. However, construction of the B&O Railroad substantially below the natural grade would have displaced or destroyed any pre-contact archaeological deposits that may have been present within the survey area.

Survey Area 8 is considered to have low probability for intact significant pre-contact or historic archaeological sites due to the nature of the proposed track lowering and substantial ground disturbance within the entirety of the survey area caused by the construction of the B&O Railroad. No additional archaeological investigations are recommended for Survey Area 8.

Figure 6-15. Survey Area 8 – General conditions, from Chichester Avenue Bridge, facing northeast.

Figure 6-16. Survey Area 8 – General conditions at Chichester Avenue Bridge, facing north.

6.1.9 **Survey Area 9 – Crum Lynne Road Track Lowering, Delaware County, Pennsylvania**

Survey Area 9 is located in the Ridley Township of Delaware County, Pennsylvania, at the intersection of Crum Lynne Road and the existing CSX ROW. All proposed work will occur exclusively within the CSX ROW. These improvements include lowering the railroad tracks going under the Crum Lynne Road Bridge (Bridge No. 81-A) to allow for double-stack train passage. To accommodate this, the survey area extends along existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal, as needed; and laying gravel atop existing access/egress roads, as needed.

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 9, Made land, gravelly materials (Ma). The soil type is mapped as Udorthents, Shale and Sandstone fill that was transported into the survey area. This generally indicates that the original soils at grade have been displaced or disturbed. Survey Area 9 is located approximately 1,300 feet (396 meters) southwest of Crum Creek, which flows southeast into the Delaware River.

Construction of the existing CSX tracks has significantly altered the landscape within Survey Area 9, as the entirety of the survey area is below the natural grade, as evidenced by visible cuts on either side of the tracks (**Figure 6-17** and **Figure 6-18**). The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW is approximately 21 feet (6.4 meters) below the natural grade within the survey area. This construction would have displaced any potential pre-contact archaeological deposits that may have been present. Historic maps within the survey area do not show historic resources before construction of the railroad in 1883 (**Figure 4-8**). The historical development of the surrounding area generally occurred during and after railroad construction.

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 9. No high probability areas are located within the survey area. A small area at the southernmost extent of the survey area is listed as a medium probability area. However, construction of the B&O Railroad substantially below the natural grade would have displaced or destroyed any pre-contact archaeological deposits that may have been present within the survey area.

Survey Area 9 is considered to have low probability for intact significant pre-contact or historic archaeological sites due to the nature of the proposed track lowering and substantial ground disturbance within the entirety of the survey area caused by the construction of the B&O Railroad. No additional archaeological investigations are recommended for Survey Area 9.

Figure 6-17. Survey Area 9 – General conditions, from Crum Lynne Road Bridge, facing southwest.

Figure 6-18. Survey Area 9 – General conditions at Crum Lynne Road Bridge, facing northwest.

6.1.10 **Survey Area 10 – Clifton Avenue Track Lowering, Delaware County, Pennsylvania**

Survey Area 10 is located in the Collingdale Borough of Delaware County, Pennsylvania, at the intersection of Clifton Avenue and the existing CSX ROW. The survey area measures 1.0 acres (0.4 hectares) and is located exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the Clifton Avenue Bridge (Bridge No. 85-B) to allow for double-stack train passage. To achieve this, the survey area extends along existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the right-of-way, as needed; and laying gravel atop existing access/egress roads, as needed.

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 10—Made land, gravelly materials (Ma) and Beltsville silt loam, 3 to 8 percent slopes, moderately eroded (BeB2). The Ma soil is mapped as Udorthents, Shale and Sandstone fill that was transported into the survey area. These soil characteristics generally indicate that the original soils at grade have been displaced or disturbed. Survey Area 10 is located approximately 5,200 feet (1,585 meters) southwest of Darby Creek, which flows south towards the Delaware River.

Construction of the existing CSX tracks has significantly altered the landscape within Survey Area 10, as the entirety of the survey area is below the natural grade, as evidenced by visible cuts on either side of the tracks (**Figure 6-19** and **Figure 6-20**). The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX ROW is between approximately 4 to 8 feet (1.2 to 2.4 meters) below the natural grade within the survey area. This construction would have displaced any potential pre-contact archaeological deposits that may have been present. Historic maps within the survey area do not show historic resources before construction of the railroad in 1883 (Figure 4-8). The historical development of the surrounding area generally occurred during and after railroad construction.

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 10. No high probability areas are located within the survey area. A small area north of the Clifton Avenue Bridge is listed as a medium probability area. However, construction of the B&O Railroad substantially below the natural grade would have displaced or destroyed any pre-contact archaeological deposits that may have been present within the survey area.

Survey Area 10 is considered to have low probability for intact significant pre-contact or historic archaeological sites due to the nature of the proposed track lowering and substantial ground disturbance within the entirety of the survey area caused by the construction of the B&O Railroad. No additional archaeological investigations are recommended for Survey Area 10.

Figure 6-19. Survey Area 10 – General conditions, from Clifton Avenue Bridge, facing southwest.

Figure 6-20. Survey Area 10 – General conditions at Clifton Avenue Bridge, facing east.

6.1.11 **Survey Area 11 – S. 68th Street Track Lowering, Philadelphia County, Pennsylvania**

Survey Area 11 is located in the City of Philadelphia, Philadelphia County, Pennsylvania, at the intersection of S. 68th Street and the existing CSX ROW. The survey area is located exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the S. 68th Street Bridge to allow for double-stack train passage. To accommodate this, the survey area extends along existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. Associated work activities include replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the right-of-way, as needed; and laying gravel atop existing access/egress roads, as needed.

The USDA NRCS Web Soil Survey identified one soil type within Survey Area 11, Urban land, Howell complex (Uh). The soil is mapped as 50 percent Urban land, 30 percent Howell and similar soils, and 5 percent minor components. These soil characteristics generally indicate that the original soils at grade have been displaced or disturbed. Survey Area 11 is located approximately 1,330 feet (405 meters) east of Cobbs Creek, which flows southwest into Darby Creek, which empties into the Delaware River

Construction of the existing CSX tracks has significantly altered the landscape within Survey Area 11, with the entirety of the survey area considerably below the natural grade, as evidenced by visible cuts on either side of the tracks (**Figure 6-21** and **Figure 6-22**). The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX track in Survey Area 11 is between approximately 14 to 18 feet (4.3 to 4.9 meters) below the natural grade. This construction would have displaced any potential pre-contact archaeological deposits that may have been present. Historic maps within the survey area do not show historic resources before construction of the railroad in 1883 (**Figure 4-18** and **Figure 4-19**). The historical development of the surrounding area generally occurred during and after railroad construction.

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 11. No high probability areas are located within the survey area. The majority of the survey area is listed as a medium probability area. However, construction of the B&O Railroad substantially below the natural grade would have displaced or destroyed any pre-contact archaeological deposits within the survey area that may have been present.

Survey Area 11 is considered to have low probability for intact significant pre-contact or historic archaeological sites due to the nature of the proposed track lowering and substantial ground disturbance within the entirety of the survey area caused by the construction of the B&O Railroad. No additional archaeological investigations are recommended for Survey Area 11.

Figure 6-21. Survey Area 11 – General conditions, S. 68th Street Bridge in background, facing southwest.

Figure 6-22. Survey Area 11 – General conditions at S. 68th Street Bridge, facing north.

6.1.12 Survey Area 12 – S. 65th Street to S. 58th Street Track Lowering, Retaining Wall, and Interlocking Removal, Philadelphia County, Pennsylvania

Survey Area 12 is located in Philadelphia, Philadelphia County, Pennsylvania, at the intersections of S. 65th Street, Cemetery Avenue, 61st Street, Woodland Avenue, S. 58th Street, and the existing CSX ROW. The survey area measures 7.0 acres (2.8 hectares) and is located exclusively within the CSX ROW. Proposed improvements include lowering the railroad tracks going under the S. 68th Street Bridge to allow for double-stack train passage. To accomplish this, the survey area extends along existing track approximately 500 feet on either side of the bridge. The grade will be lowered gradually over that distance to accomplish the additional clearance required at the obstruction. No work is anticipated to the bridge superstructure. In addition, the existing interlocking at Woodland Avenue and S. 58th Street will be removed. Associated work activities include track removal; replacing or reusing track, ties, and ballast; altering the grade of trackside drainage ditches; tree trimming and brush removal within the right-of-way, as needed; and laying gravel atop existing access/egress roads, as needed. Erosion control of earthen embankments through the placement of concrete block retaining walls is also proposed along Cemetery Avenue. An example of the retaining walls to be constructed can be seen in **Figure 6-23.**

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 12, Urban land, Howell complex (Uh) and Urban land (Ub). The Uh soil is mapped as 50 percent Urban land, 30 percent Howell and similar soils, and 5 percent minor components. These soil characteristics generally indicate that the original soils at grade have been displaced or disturbed. The westernmost extent of Survey Area 12 is located approximately 2,210 feet (638 meters) east of Cobbs Creek, which flows southwest into Darby Creek, which empties into the Delaware River. The easternmost extent of Survey Area 12 is located approximately 3,900 feet (1,189 meters) west of the Schuylkill River.

Construction of the existing CSX tracks has significantly altered the landscape within Survey Area 12, with the entirety of the survey area considerably below the natural grade, as evidenced by visible cuts on either side of the tracks (**Figure 6-23** through **Figure 6-28**). The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade of the CSX track in Survey Area 12 is between approximately 3 to 21 feet (0.9 to 6.4 meters) below the natural grade. The elevation of the railroad track level relative to the natural grade at the northernmost extent of the survey area is considerably less than at the southernmost extent, though still enough to have disturbed or displaced any natural soils. Railroad construction below natural grade would have displaced any potential pre-contact archaeological deposits that may have been present. Historic maps within the survey area do not show historic resources before construction of the railroad in 1883 (**Figure 4-18** and **Figure 4-19**). The historical development of the surrounding area generally occurred during and after railroad construction.

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 12. No high probability areas are located within the survey area. A small area east of the Woodland Avenue Bridge is listed as a medium probability area. However, construction of the B&O Railroad substantially below the natural grade would have displaced or destroyed any pre-contact archaeological deposits that may have been present.

Survey Area 12 is considered to have low probability for intact significant pre-contact or historic archaeological sites due to the nature of the proposed track lowering and substantial ground disturbance within the entirety of the survey area caused by the construction of the B&O Railroad. No additional archaeological investigations are recommended for Survey Area 12.

Figure 6-23. Survey Area 12 – General conditions from S. 65th Street Bridge, facing southwest.

Figure 6-24. Survey Area 12 – General conditions, from S. 65th Street Bridge, facing northeast. Cemetery Avenue Bridge visible in background.

Figure 6-25. Survey Area 12 – General conditions, from Cemetery Avenue Bridge, facing northeast. S. 61st Street Bridge visible in background.

Figure 6-26. Survey Area 12 – General conditions, from S. 61st Street Bridge, facing northeast. Woodland Avenue Bridge visible in background.

Figure 6-27. Survey Area 12 – General conditions, from intersection of S. 58th Street and CSX ROW, facing southwest showing existing interlocking. Woodland Avenue Bridge visible in background.

Figure 6-28. Survey Area 12 – General conditions, from intersection of S. 58th Street and CSX ROW, facing northeast. Northern extent of survey area visible in background.

6.1.13 **Survey Area 13 – Lindbergh Boulevard New Interlocking, Philadelphia County, Pennsylvania**

Survey Area 13 is located in Philadelphia, Philadelphia County, Pennsylvania, east of the intersection of Grays Avenue and the existing CSX ROW, and west of the Schuylkill River. The survey area measures 8.3 acres (3.4 hectares) and is located exclusively within the CSX ROW. This is the proposed location of a new interlocking to replace an existing interlocking at Woodland Avenue at S. 58th Street, which will facilitate track lowering activities planned at Woodland Avenue and allow for better railroad traffic flow during construction. The new interlocking will introduce additional ballast, railroad ties, and tracks adjacent with and parallel to the existing tracks. All proposed work will occur within the existing CSX ROW. No ground disturbance is proposed with respect to the relocation activities at the new interlocking location.

The USDA NRCS Web Soil Survey identified two soil types within Survey Area 13—Urban land, Howell complex (Uh) and Urban land (Ub). The Uh soil is mapped as 50 percent Urban land, 30 percent Howell and similar soils, and 5 percent minor components. These soil characteristics generally indicate that the original soils at grade have been displaced or disturbed. Survey Area 13 is located approximately 340 feet (104 meters) west of the Schuylkill River.

The elevation of the railroad tracks in Survey Area 13 fluctuated relative to the surrounding terrain. The USGS National Map 3D Elevation Program LiDAR imagery indicates that the present grade ranges from approximately 24 feet (7.3 meters) below the natural grade to 7 feet (2.1 meters) above the natural grade (**Figure 6-29** and **Figure 6-30**). The railroad track at the easternmost extent of the survey area is higher than the surrounding grade while the majority of the remainder is below grade. Railroad construction below natural grade would have displaced any potential pre-contact archaeological deposits that may have been present. Historic maps within the survey area do not show historic resources before or immediately following the construction of the railroad in 1883 (**Figure 4-18** and **Figure 4-21**).

As part of the assessment of archaeological potential, the Pennsylvania Statewide Pre-Contact Probability Model was consulted to assess pre-contact archaeological site potential within Survey Area 13. The majority of the survey area between Lindbergh Boulevard and the Schuylkill River is listed as a high probability for pre-contact archaeological sites. This high-probability designation is likely due to its proximity to the Schuylkill River and the John Bartram House Site (36PH0014), a multicomponent pre-contact and historic site located approximately 175 meters (574 feet) south of the survey area. Additionally, the area at the intersection of Lindbergh Boulevard and the CSX ROW is listed as a medium probability area. Railroad construction below natural grade in the lowered portion of the survey area would have displaced any potential pre-contact archaeological deposits that may have been present. The introduction of fill material in the remaining areas during construction of the B&O Railroad raised the track level above the natural grade and would have avoided any archaeological deposits that may have been present. The limited nature of the proposed activities—addition of ballast, railroad ties, and tracks within the existing CSX ROW—will not impact any undisturbed, natural soils.

Although Survey Area 13 satisfies the criteria to be considered a high probability area for both pre-contact and historic archaeological resources, the proposed activities will involve no ground disturbance and do not have the potential to encounter any archaeological sites. Despite the presence of known historic properties in the vicinity, such as the Bartram House and Gardens, Bartram Village, and the John Bartram House Site (36PH0014), all proposed work will occur within the existing CSX ROW, which has seen either substantial ground disturbance or the introduction of fill material to elevate the rail. No additional archaeological investigations are recommended for Survey Area 13.

Figure 6-29. Survey Area 13 – General conditions, from Lindbergh Boulevard Bridge, facing northeast.

Figure 6-30. Survey Area 13 – General conditions, from eastern extent of survey area, facing southwest.

7. SUMMARY AND RECOMMENDATIONS

RK&K, in coordination with FRA, MDOT MPA, PennDOT, and CSX, conducted a Phase IA Archaeological Assessment for the HST Project. CSX is proposing improvements to address several clearance limitations along the existing I-95 Rail Corridor at the Howard Street Tunnel in Baltimore, Maryland, and other obstruction locations between Baltimore, Maryland and Philadelphia, Pennsylvania. FRA, as the lead federal agency, responsible for compliance with NEPA and Section 106, has determined that the HST Project is a federal undertaking with the potential to cause effects to historic properties (36 CFR Part 800.3(a)) and that an EA will be prepared pursuant to NEPA. FRA intends to coordinate its responsibilities under Section 106 with the NEPA EA.

The CSX's I-95 Rail Corridor between Baltimore, Maryland, and Philadelphia, Pennsylvania is the last major intermodal rail-freight corridor on the CSX network unable to provide modern double-stack service due to height-clearance obstructions located in Maryland, Delaware, and Pennsylvania. This undertaking will remove overhead obstructions that restrict passage of modern double-stack intermodal trains along the corridor due to current height clearance limitations.

The purpose of the Phase IA archaeological assessment was to 1) develop a historical background and archaeological context for the HST Project's archaeological APE; 2) develop and apply a qualitative archaeological probability model to assess the archaeological potential of the APE; 3) make recommendations regarding additional archaeological investigations that may be required; and 4) summarize the results in a technical report that will assist FRA, MDOT MPA, and CSX in project planning.

The APE coincides with the overall project LOD in areas not exempt from Section 106 review under the *Program Comment to Exempt Consideration of Effects to Rail Properties Within Rail Rights-of-Way* (ACHP 2018). The APE was established by FRA based on the nature, size, and scale of the undertaking as informed by the preliminary planning and design information provided by CSX in August 2020. The APE is subject to minor modifications or refinements as the design and construction methods for the HST Project advance, and FRA will coordinate with consulting parties as appropriate.

The APE consists of thirteen (13) non-contiguous survey areas, four of which are located in Maryland, two in Delaware, and seven in Pennsylvania. Survey Areas 1 through 5 are located in Maryland and Pennsylvania and will require tunnel enlargement or bridge modification/replacement to meet the clearance requirements of the project. Survey Areas 6 through 12 are located in Delaware and Pennsylvania and will require lowering of the existing track and, for some, removal of an existing interlocking or construction of retaining walls within the existing CSX ROW. Survey Area 13 in Pennsylvania will be the location of a new interlocking within the existing CSX ROW.

FRA initiated the Section 106 process for the HST Project with MHT, PHMC, and DHCA by letter dated April 24, 2020. The initiation included a preliminary APE and potential consulting parties. MHT concurred with the preliminary APE and potential consulting parties by letter dated June 3, 2020. PHMC concurred with the preliminary APE and potential consulting parties, with an additional suggested invitee, by letter dated May 14, 2020. FRA continued consultation with the consulting parties on November 6, 2020, by submitting the *Phase IA Archaeological Assessment* and *Architectural Historic Properties Identification and Effects Assessment* reports. MHT responded on December 2, 2020, concurring with most of the findings of both reports, but noted edits needed for Maryland archaeological site records search results. The PHMC responded on December 7, 2020, concurring with the findings of both reports. On December 7, 2020, the Delaware Nation indicated the proposed project location does not endanger cultural or religious sites of

interest to the Tribe. The DHCA responded on January 6, 2021, and concurred that there is little potential for intact archaeological resources and no further archaeological work is needed in Delaware if construction, staging, stockpiling, and access to the project locations in the state will be confined to the existing railroad right-of-way.

No previously identified archaeological sites are located within any of the thirteen (13) survey areas that comprise the APE. All survey areas, with the exception of a portion of Survey Area 4, were determined to have low probability for intact significant pre-contact or historic archaeological sites. These areas were either significantly disturbed by the construction of the existing CSX railroad line or modern (post-1950) urban development, or were located in settings where the nature of the proposed Project activities have no or minimal potential to encounter significant archaeological sites. A portion of Survey Area 4 was determined to have moderate probability for intact significant pre-contact and historic archaeological sites. In this area, however, the proposed construction activities have no potential to affect any archaeological sites that may be present. Therefore, in conclusion, no additional archaeological investigations are recommended for any of the thirteen (13) survey areas that comprise the APE. **Table 7-1** summarizes the results of the Phase IA Archaeological Assessment.

Table 7-1. Survey Areas within APE Summary Table

Survey Area	Survey Area Name (State)	Size (acres)	Archaeological Potential (Pre-Contact/Historic)	RKK Recommendation
2	North Avenue Bridge Modification (MD)	0.3	Low/Low	No additional archaeological investigations
3	Guilford Avenue Bridge Replacement (MD)	0.4	Low/Low	No additional archaeological investigations
4	Harford Road Bridge Replacement (MD)	2.1	Low; Moderate/Low; Moderate	No additional archaeological investigations
5	Boone Tunnel Enlargement (PA)	0.8	Low/Low	No additional archaeological investigations
6	Lancaster Avenue Track Lowering and Retaining Wall (DE)	1.3	Low/Low	No additional archaeological investigations
7	W. 4th Street Track Lowering (DE)	1.1	Low/Low	No additional archaeological investigations
8	Chichester Avenue Track Lowering (PA)	1.4	Low/Low	No additional archaeological investigations
9	Crum Lynne Road Track Lowering (PA)	1.5	Low/Low	No additional archaeological investigations
10	Clifton Avenue Track Lowering (PA)	1.1	Low/Low	No additional archaeological investigations
11	S. 68th Street Track Lowering (PA)	1.6	Low/Low	No additional archaeological investigations
12	S. 65th Street to S. 58th Street Interlocking Track Lowering and Retaining Wall (PA)	7.0	Low/Low	No additional archaeological investigations
13	Lindbergh Boulevard New Interlocking (PA)	8.3	Low/Low	No additional archaeological investigations

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