

BALTIMORE & OHIO RAILROAD, GUILFORD AVENUE TUNNEL
(Guilford Avenue Bridge)
Carrying CSX Transportation Railroad under Guilford Avenue
Baltimore City
Maryland

HAER No. MD-203-B

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
Interior Region 1, North Atlantic - Appalachian
1234 Market Street, 20th Floor
Philadelphia, PA 19107

HISTORIC AMERICAN ENGINEERING RECORD
BALTIMORE & OHIO RAILROAD, BALTIMORE BELT LINE, GUILFORD AVENUE
TUNNEL
(Guilford Avenue Bridge)

HAER No. MD-203-B

Location: Spanning CSX Transportation railroad tracks, south of East 26th Street, Baltimore, Baltimore City, Maryland.

The Baltimore & Ohio (B&O) Railroad Guilford Avenue Tunnel is located at latitude: 39.31935, longitude: -76.61295. The coordinate represents the structure's northwest corner. This coordinate was obtained November 29, 2021, by plotting its location on the National Geodetic Survey website's Conversion and Transformation Tool. The coordinate's datum is North American Datum 1983. The B&O Railroad Guilford Avenue Tunnel's location has no restriction on its release to the public.

**Present Owner/
Occupant:** Considered unowned by CSX and the City of Baltimore.

Present Use: Vehicular and pedestrian bridge and railroad tunnel.

Significance: The ca.-1894-95 B&O Railroad Guilford Avenue Tunnel is a representative example of a tunnel constructed as part of the Baltimore and Ohio (B&O) Railroad's Baltimore Belt Line, a railroad segment built between 1890 and 1895 in Baltimore, Maryland. The Belt Line was a major infrastructure improvement that was part of a larger effort by the B&O to provide through service between Washington, DC, and New York City. The Belt Line allowed the B&O to connect its yards in Mount Clare on the west side of Baltimore to Bay View Junction on the east. The Belt Line was the first electrified railroad in the United States. The B&O Railroad Guilford Avenue Tunnel is also a good example of a late nineteenth-century stone arch tunnel.

Historian(s): Meghan P. White and Nicole A. Diehlmann, Rummel, Klepper, & Kahl (RK&K), LLP, 2022.

**Project
Information:** The B&O Railroad Guilford Avenue Tunnel was recorded between November 2021 and March 2022 by RK&K, LLP, Baltimore, Maryland, for CSX Transportation (CSX). The recordation was undertaken pursuant to a stipulation of the *Memorandum of Agreement Among the Federal Railroad Administration, the Maryland State Historic Preservation Officer, the Pennsylvania State Historic Preservation Officer, the Maryland Department of Transportation Port Administration, and CSX*

Transportation Regarding the Howard Street Tunnel Project Baltimore City, Maryland and Delaware County, Pennsylvania. Project personnel included RK&K historians Meghan P. White, Laura E. van Opstal, and Nicole A. Diehlmann and photographer Jet Lowe. The sponsor for the recordation is CSX. Cooperating agencies include the Federal Railroad Administration; the Maryland State Historic Preservation Officer; and the Maryland Department of Transportation (MDOT) Maryland Port Administration (MPA).

Part I. Historical Information

A. Physical History:

- 1. Date(s) of construction:** Ca. 1894-95, as indicated on a plan sheet "B&O RR Plan, Sections, &c. Guilford Ave. Tunnel," 1905 and annotated in 1911.
- 2. Architect/Engineer:** W. T. Manning, Chief Engineer, and J. B. Bolt, P.A. Engineer. Manning became assistant chief engineer of the B&O Railroad in 1892 and chief engineer in 1894. He oversaw construction of the Belt Line before retiring from the B&O in 1899. No bibliographic information was found for J. B. Bolt.
- 3. Builder/Contractor/Supplier:** L. B. McCabe and Brother was the contractor hired by the B&O Railroad to build the tunnel.
- 4. Original plans and construction:** The original construction plans have not been located; however, 1905 plans, which were annotated in 1911, and an associated repair and maintenance record show the tunnel's original construction (Figures 1a-1c). The tunnel was designed and constructed as an arched single-span, rusticated limestone, red brick, and concrete structure with 27'-0"-wide openings oriented east-west. The at-grade superstructure, approximately 26'-0" in length, carried Guilford Avenue over the railroad tracks in a north-south direction. The substructure, set within a deep, east-west oriented cut below street level, consisted of a 64'-7" tunnel that carried double railroad tracks under Guilford Avenue. The east and west façades consisted of an arch lined with evenly shaped rusticated limestone voussoirs and a prominent keystone; the remainder of the façade consisted of rectangular coursed rusticated limestone. The arched barrel was comprised of brick resting on a rectangular coursed rusticated limestone base with concrete footings below grade. Stepped rusticated limestone abutments projected at perpendicular angles to the roadway and were topped with a series of larger capstones. West of the tunnel, the stepped rusticated limestone abutments joined tall rectangular coursed rusticated limestone retaining walls that ran along the open cut. Parapets along Guilford Avenue had cast-iron fencing.
- 5. Alterations and additions:** In 1901, the B&O electrified the tracks through Guilford Avenue using an overhead third rail, which was replaced with a rail set at ground level in

1902.

According to the annotated 1905 plans (Figures 1a and 1b), in 1907, the B&O repaired and repointed the portal and arch.

In 1912, the B&O constructed retaining walls along the north side of the tracks, north of the original ca. 1895 retaining walls and abutments, to support 26th Street.¹

The annotated 1905 plans note that in 1937 the sidewalls were incised to accommodate ties for a new third rail, likely to accommodate a gauntlet track that allowed for higher train clearances. The retaining wall was repaired that same year.

Gunite or shotcrete was applied to the interior of the arch at an unknown date but possibly in the 1930s when other tunnels along the Belt Line were also gunited.

Ca. 1952, when diesel engines were put in service, the B&O removed the electrified ground rail.

Between 1958, when the B&O eliminated passenger service between Baltimore and New York City, and 1960, the rail line was reduced from double tracks to a single track.²

According to the repair and maintenance record for the structure (Figure 1c), in 1964, the portals, arch, and retaining wall were repointed.

In 1994, the retaining walls along the south side of East 26th Street between North Calvert Street and Guilford Avenue began to fail. Several years later, the failure required replacement of the eastern portion of the original ca. 1895 rusticated limestone retaining wall with poured concrete and metal posts and the 1912 retaining wall was replaced with a poured-concrete retaining wall.³

In November 2018, a section of the ca. 1996, poured-concrete retaining wall along the south side of East 26th Street between North Calvert Street and Guilford Avenue failed and was replaced by the Baltimore City Department of Transportation (DOT). At that time, DOT installed a new metal railing along East 26th Street.

As of 2022, the tunnel was proposed for demolition and replacement as part of the Howard Street Tunnel Project to allow double stacking of freight trains along CSX's route between Baltimore and Philadelphia. Demolition is expected to occur later in the year.

¹ "Scene in Vicinity of Baltimore and Ohio Tracks," *The Sun* (Baltimore, MD), September 28, 1912.

² Herbert H. Harwood Jr., *Royal Blue Line* (Baltimore and London: Johns Hopkins University Press, 1990; repr. 2002), 170-71.

³ "CSX, City Tangle over Cost of Repairing Cave-in as Residents Worry About Safety," *The Sun* (Baltimore, MD), January 15, 1994; "Public Notice," *The Sun* (Baltimore, MD), June 17, 1996.

B. Historical Context:

The ca. 1894-95 B&O Railroad Guilford Avenue Tunnel was constructed as part of the B&O Railroad's Baltimore Belt Line, a railroad segment built between 1890 and 1895 in Baltimore, Maryland. The Belt Line was a major infrastructure improvement that was part of a larger effort by the B&O to provide through service between Washington, DC, and New York City. The historical context for the Baltimore Belt Line can be found in the HAER Historical Report No. MD-203. The Belt Line was the most complicated part of the overall objective to providing service between Washington, DC, and New York. All other segments of the overall B&O project lacked the significant obstacles posed by the construction of the tunnel and the route through Baltimore City. As it compares to projects by competitors, it is unique because the primary competitor of the B&O was the Pennsylvania Railroad, which grew by acquisitions rather than new capital construction. The Pennsylvania Railroad acquired existing lines and associated infrastructure while the B&O undertook this massive-scale construction project.

History of Guilford Avenue Tunnel Area

The B&O Railroad Guilford Avenue Tunnel is within an area annexed into the City of Baltimore in 1888. According to the eighteenth-century *Conveyancer's Map of Baltimore*, the land was once part of the original land patent called Huntingdon, which was divided into smaller estates beginning in 1790. The area remained rural farmland owned by the estates of Samuel Brady and P. B. Sattler until the last quarter of the nineteenth century. The area had a rural road running diagonally from northwest to southeast, dividing the Brady and Sattler lands, but was otherwise undeveloped.⁴ According to the 1890 Sanborn map, the area had been divided into a rectilinear street plan, following the existing north-south running streets, but the diagonally running street remained (Figure 2). East 26th Street was called "Seventh or Walnut Street" on the map.⁵

Six years later, the B&O Railroad Guilford Avenue Tunnel was depicted in the 1896 *Atlas of the City of Baltimore, Maryland* by G. W. Bromley (Figure 3). Guilford Avenue was planned, but not constructed, north of East 24th Street, and East 26th Street was laid out west of St. Paul Street but not to the east. Shortly after the Baltimore Belt Line was constructed, the surrounding area was developed by Francis E. Yewell with an eclectic variety of row house designs featuring small yards and front porches.⁶

Many property owners along the proposed route in the area were displeased with the B&O's plans. A. S. Niles, quoted in the *Sun*, expressed his unhappiness that the difference in grade

⁴ Matt Bray, Nicole A. Diehlmann, Laura van Opstal, and Meghan P. White, "Howard Street Tunnel Project Architectural Historic Properties Identification and Effects Assessment Technical Report," (Baltimore, MD: RK&K, 2021), 31-32.

⁵ *Sanborn Fire Insurance Map from Baltimore, Baltimore County, Maryland*, vol. 2 (New York: Sanborn Map Company, 1890) http://hdl.loc.gov/loc.gmd/g3844bm.g3844bm_g03573189002.

⁶ Bray et al., "Howard Street Tunnel Project," 31-32.

between Guilford Avenue and the planned railroad tracks would be 20'-0".⁷ Open cuts in general worried the citizens of Baltimore, who wished the B&O to enact "every safeguard" to protect residents from being "mutilated and disfigured."⁸ However, the planned rail route crossing under Guilford Avenue proceeded, and the tunnel opened in 1895. A 1912 image of the tunnel is shown in Figure 4, and a 1925 image is shown in Figure 5.

Part II. Structural/Design Information

A. General Statement:

- 1. Character:** The B&O Railroad Guilford Avenue Tunnel is a good example of an arched single-span rusticated limestone, red brick, and concrete structure built as part of the Belt Line. Its siting and design illustrate the B&O's grade-separated approach to weaving the new line through north Baltimore in the 1890s. Like all original Belt Line tunnels, the Guilford Avenue Tunnel features elements of a unified design strategy, including portals and retaining walls along open cuts constructed with rectangular coursed rusticated limestone. The tunnel barrels, like most others along the Belt Line, feature brick construction.⁹
- 2. Condition of fabric:** The B&O Railroad Guilford Avenue Tunnel is in good condition. The original structural brick tunnel barrels are covered with spalling gunite. Parapets along Guilford Avenue retain original cast-iron fencing in fair condition.

- B. Description:** The B&O Railroad Guilford Avenue Tunnel carries Guilford Avenue over the CSX Transportation railroad tracks in northern Baltimore City, just south of East 26th Street. Guilford Avenue runs in a north-south direction, while the railroad tracks run east to west. The tunnel is an arched, single-span, rusticated limestone, red brick, and concrete structure. The approximately 26'-long superstructure, which carries Guilford Avenue, is at street level, while the substructure, with a 64'-7" tunnel for the railroad tracks, is set within a deep, east-west oriented cut below street level. The east and west façades consist of an arch lined with evenly shaped limestone voussoirs and a prominent keystone; the remainder of the façade consists of rectangular coursed limestone. The arch barrel is comprised of brick resting on a rectangular coursed limestone base with concrete footings below grade. Gunite is over portions of the original brick interior. Applied utility piping runs horizontally across the south side of the interior. Stepped limestone abutments are set at perpendicular angles to the roadway and are topped with a series of larger capstones. West of the tunnel, the abutments join tall retaining walls that run along the open cut. The southern retaining wall is rectangular coursed limestone. The east side of the northern wall is poured concrete with metal posts; the west side is rectangular coursed limestone. North of the north wall is a poured-concrete

⁷ "Belt Line Questions," *The Sun* (Baltimore, MD), April 14, 1890, 4.

⁸ "The Citizens and the Belt Line," *The Sun* (Baltimore, MD), April 25, 1890, 5.

⁹ Lawrence Lee, "Baltimore's Unseen Artery: A Brief History of the Baltimore Belt Railroad and its Howard Street Tunnel," in *Baltimore Civil Engineering History*, ed. Bernard G. Dennis Jr. and Matthew C. Fenton IV, P.E. (Reston, VA: American Society of Civil Engineers, 2004), 163-91.

retaining wall. East of the tunnel, the north abutment joins a full-height, poured-concrete retaining wall; there is no retaining wall on the southeast side of the tunnel. The single railroad track has metal rails and wood ties with metal tie plates set on gravel ballast. The roadway is paved with asphalt and accommodates two-way traffic and a parking lane in both directions. Concrete sidewalks with curbs are on both sides of the road. Parapets along Guilford Avenue are topped with cast-iron fencing. Along the abutments and the railroad cut is metal replacement fencing.¹⁰

C. Mechanicals/Operation: Not applicable.

D. Site Information: The B&O Railroad Guilford Avenue Tunnel is within a primarily residential area with row houses in a variety of eclectic late nineteenth and early twentieth-century styles. The superstructure is at street level, while the substructure carries railroad tracks through a tunnel set within a deep, east-west oriented cut below street level.

Part III. Sources of Information

A. Secondary Sources:

Baltimore City Department of Transportation. "26th Street Wall Collapse." PowerPoint presentation accessed October 26, 2021.
https://transportation.baltimorecity.gov/sites/default/files/26th%20Street%20Wall%20Presentation_Final.pdf.

Baltimore and Ohio Railroad Company. "131st Annual Report." 1957. Baltimore & Ohio Railroad Museum Collection, Baltimore, Maryland.

Bray, Matt, Nicole A. Diehlmann, Laura van Opstal, and Meghan P. White. "Howard Street Tunnel Project Architectural Historic Properties Identification and Effects Assessment Technical Report." Baltimore, MD: RK&K, 2021.

Crampton, Alice, and Julie Abell. "Guilford Avenue Bridge (BC8029)." Maryland Inventory of Historic Properties Form B-4526. Crownsville, MD: Maryland Historical Trust, 1994.

Harwood, Herbert H., Jr. *Royal Blue Line*. Baltimore and London: Johns Hopkins University Press, 1990. Reprinted in 2002.

Lee, Lawrence J. "Baltimore's Unseen Artery: A Brief History of the Baltimore Belt Railroad and its Howard Street Tunnel." In *Baltimore Civil Engineering History*, edited by Bernard G. Dennis Jr. and Matthew C. Fenton IV, P. E., 163-91. Reston,

¹⁰Alice Crampton and Julie Abell, "Guilford Avenue Bridge (BC8029)" (Crownsville, MD: Maryland Historical Trust, 1994), IV-128.

VA: American Society of Civil Engineers, 2004. doi:10.1061/40759(152)11.

White, Meghan P., and Nicole A. Diehlmann. "Baltimore & Ohio Railroad, Baltimore Belt Line." HAER No. MD-203. Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, 2022.

B. Likely Sources Not Yet Investigated: Interstate Commerce Commission (ICC) valuation map records may exist for this structure. These records are held by the National Archives and Records Administration.

Part IV. Figures

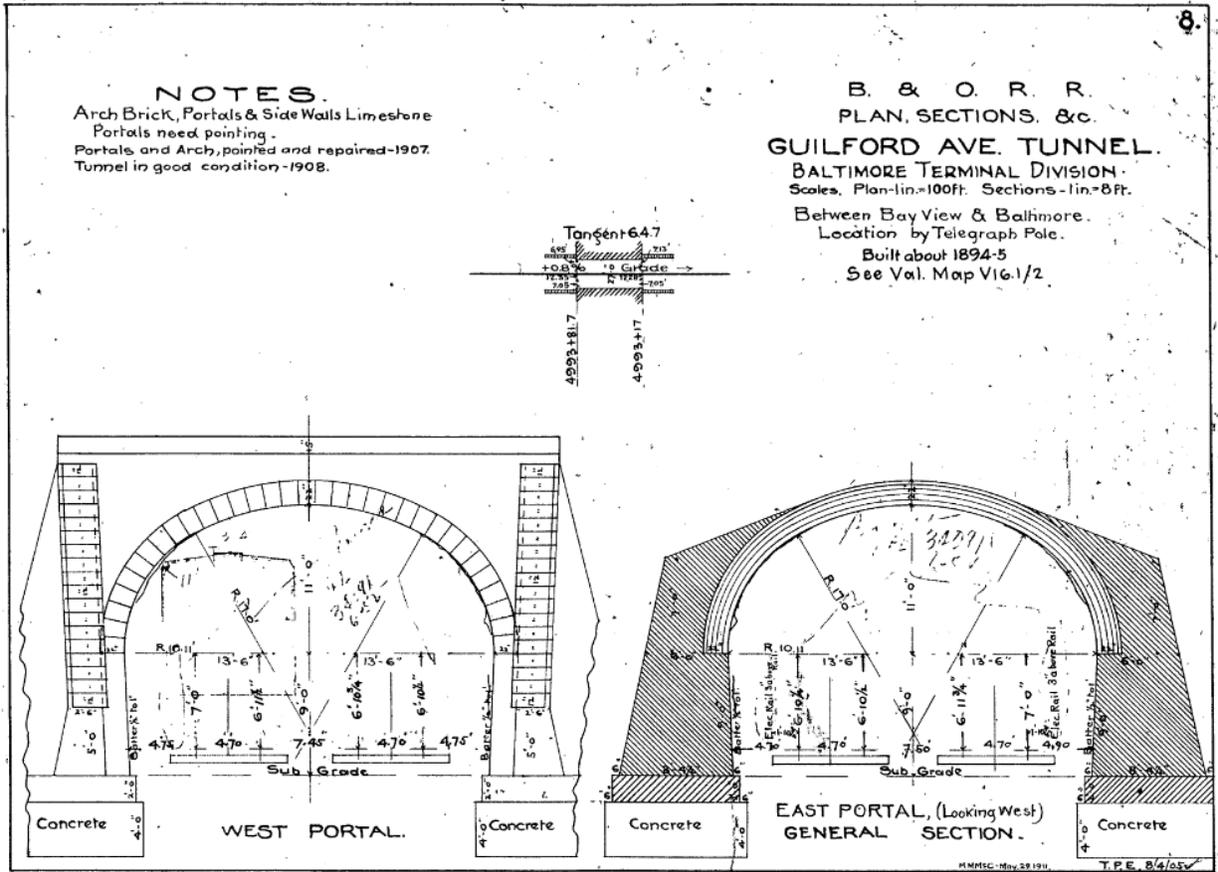


Figure 1a: Section drawings from "B&O RR Plan, Sections, &c. Guilford Ave. Tunnel," 1905 (annotated 1911). (Section Drawings courtesy of CSX Transportation.)

DIVISION - BALTIMORE E. E.		CHARACTER - Stone portals
NAME - GUILFORD AVE.		and side walls. 5 Ring Brick
LOCATION - BALTIMORE, MD.		Arch
		LENGTH - 64.7 FT.
REPAIRS		
COMPLETED :	FOREMAN :	WORK DONE
1-23-37	WJHealy	Cut out side walls for 3rd rail ties Install drain pipe AFE 22909
12-28-37	WJHealy	Repair retaining wall
7-1964-7-1964 R.R. Riddle : Painted 2720 SF Portals. " 2665 SF Arch. " 1170 SF Wall.		

Figure 1c: B&O Railroad Guilford Avenue Tunnel Repair and Maintenance Record, 1937 (annotated in 1937 and 1964). (Image courtesy of CSX Transportation.)



Figure 2: East 26th Street, or “Seventh or Walnut,” as it was called in 1890. (Image from Library of Congress.)

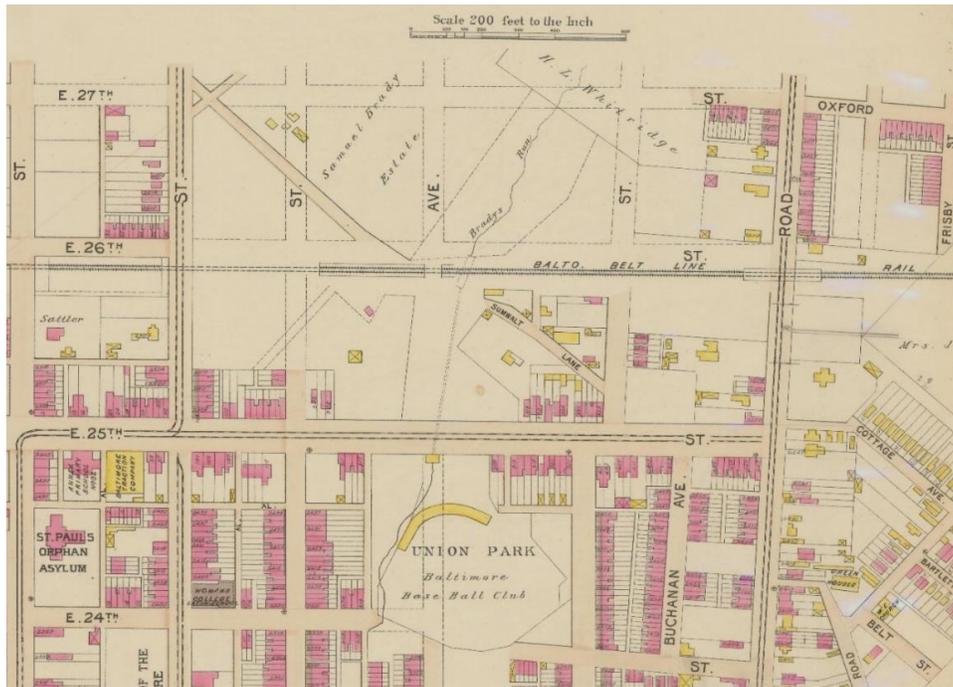


Figure 3: The newly constructed B&O Railroad Guilford Avenue Tunnel and retaining walls, 1896. (Image from the *Bromley Atlas of the City of Baltimore, Maryland.*)

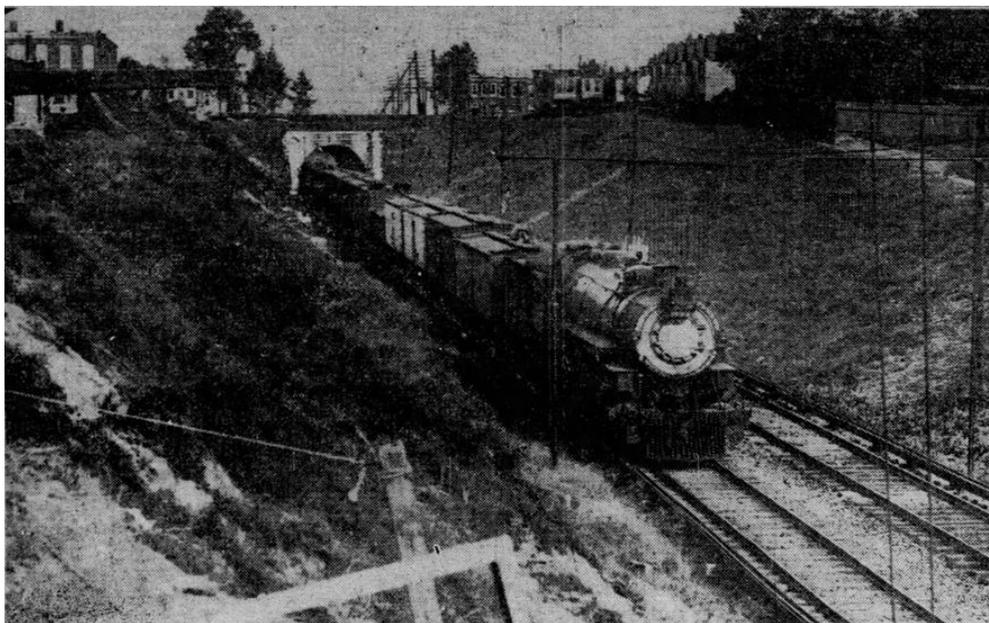


Figure 4: Eastbound train exiting the east portal of the Guilford Avenue Tunnel, looking northwest, in 1912. (Image from *The Sun* [Baltimore, MD], September 28, 1912.)



Figure 5: East portal of the B&O Railroad Guilford Avenue Tunnel, looking west from the Barclay Street Tunnel, ca. 1925. (Image courtesy of the B&O Railroad Historical Society.)

HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-1



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

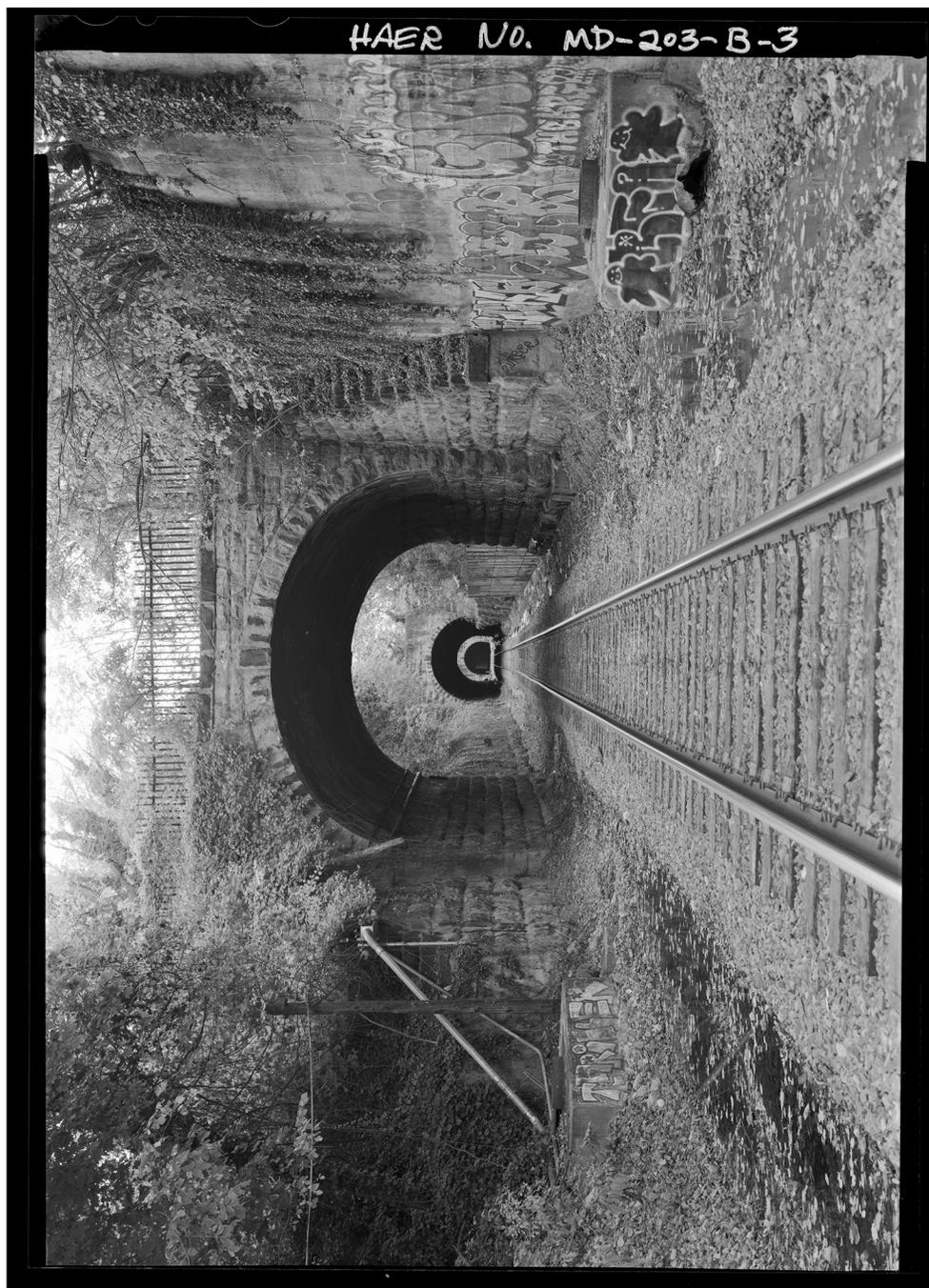
HAER NO. MD-293-B-2



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

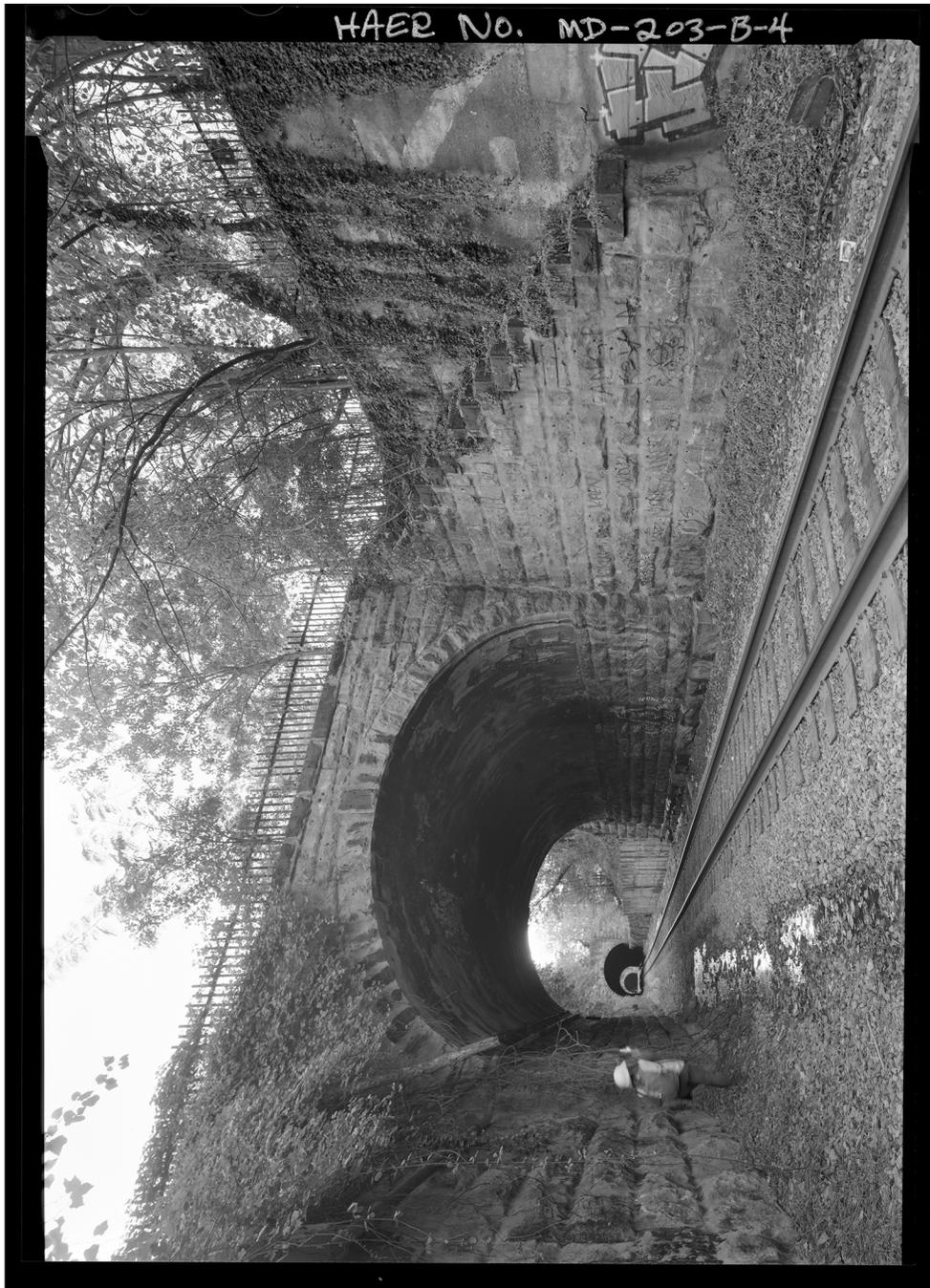
HAER NO. MD-203-B-3



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-4



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-5



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-6



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-7



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-8



HISTORIC AMERICAN ENGINEERING RECORD

SEE INDEX TO PHOTOS FOR CAPTIONS

HAER NO. MD-203-B-9



HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

BALTIMORE & OHIO RAILROAD, GUILFORD AVENUE TUNNEL
(Guilford Avenue Bridge)
Carrying CSX Transportation Railroad under Guilford Avenue
Baltimore City
Maryland

HAER No. MD-203-B

INDEX TO BLACK AND WHITE PHOTOGRAPHS

Jet Lowe, photographer, November 2021

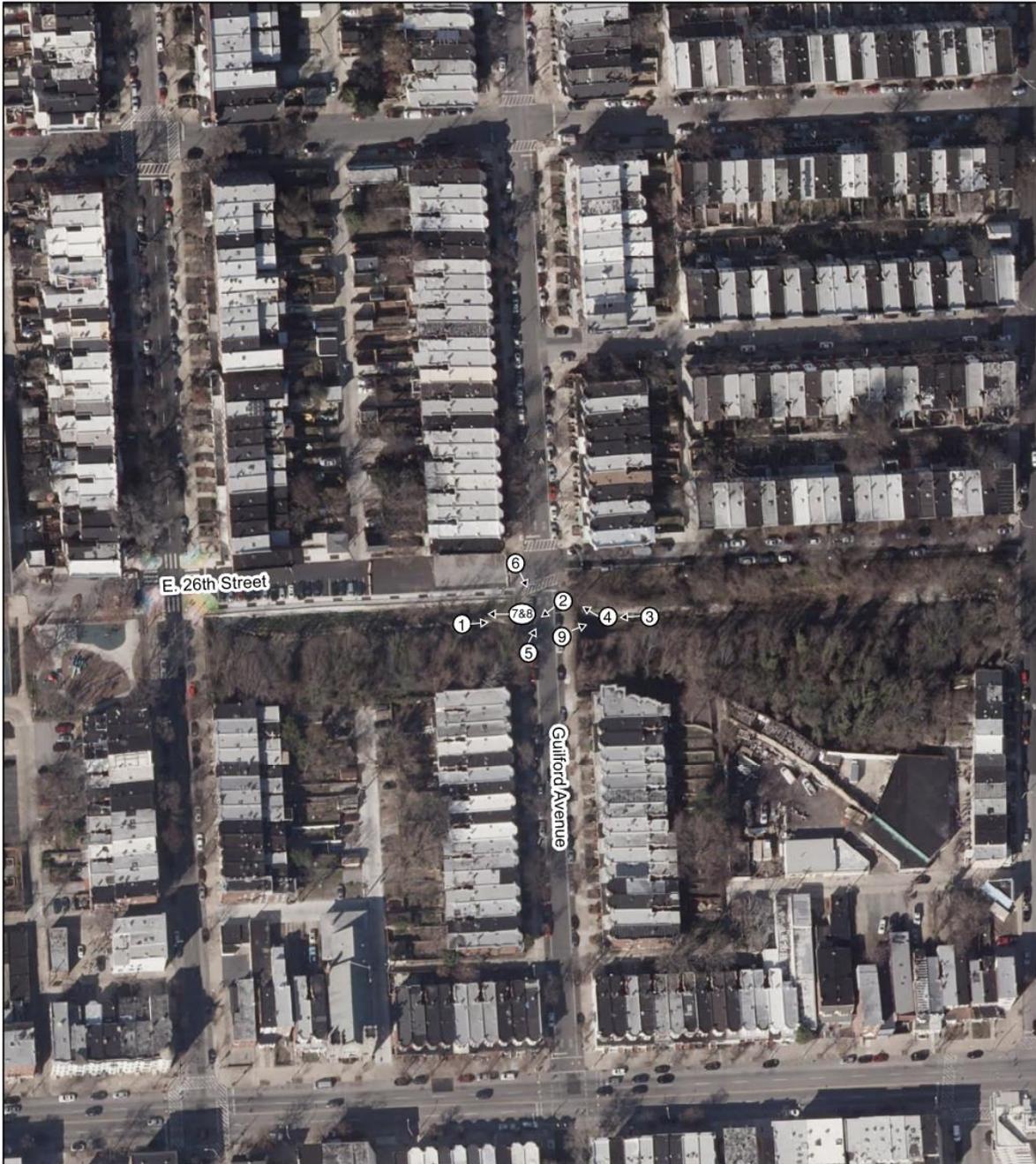
- | | |
|------------|--|
| MD-203-B-1 | West tunnel portal and retaining walls, view looking east along railroad right-of-way. Note the new retaining wall to the left. The Barclay Street Tunnel is visible in the distance. |
| MD-203-B-2 | Interior view of the south tunnel wall, brick tunnel arch, west tunnel portal opening, and southwest abutment, looking southwest. The N. Calvert Street to St. Paul Street Tunnel is visible in the distance. |
| MD-203-B-3 | Exterior view of the east tunnel portal and stepped limestone abutments, looking west. The N. Calvert Street to St. Paul Street and N. Charles Street to N. Howard Street Tunnels are visible in the distance. |
| MD-203-B-4 | Exterior view of the east tunnel portal, stepped limestone abutments and interior brick arch, looking northwest. The N. Calvert Street to St. Paul Street Tunnel is visible in the distance. |
| MD-203-B-5 | Street view along Guilford Avenue bridge deck, looking north-northeast. The tunnel portal walls are indicated by cast-iron fencing. |
| MD-203-B-6 | View along Guilford Avenue toward bridge deck, looking south-southeast. Tunnel portal walls are indicated by cast-iron fencing. The residential setting of the Guilford Avenue Tunnel is visible beyond the bridge deck. |
| MD-203-B-7 | View from atop the Guilford Avenue Tunnel along the railroad right-of-way with a westbound freight train passing through the N. Calvert Street to St. Paul Street Tunnel, looking west. |
| MD-203-B-8 | View looking west from atop the Guilford Avenue Tunnel along the railroad right-of-way toward the N. Calvert Street to St. Paul Street Tunnel. |

BALTIMORE & OHIO RAILROAD, GUILFORD AVENUE TUNNEL
HAER No. MD-203-B
INDEX TO PHOTOGRAPHS
(Page 2)

MD-203-B-9

View from atop the N. Calvert Street to St. Paul Street Tunnel along the railroad right-of-way looking east-northeast toward the Guilford Avenue Tunnel.

BALTIMORE & OHIO RAILROAD, GUILFORD AVENUE TUNNEL
HAER No. MD-203-B
INDEX TO PHOTOGRAPHS
(Page 3)



Key to Photographs

① → Photograph Location and Direction

Imagery Source: State of Maryland (MD iMAP, DoIT)

0 0.0225 0.045 0.09 Miles

