

Maryland Historical Trust

Maryland Inventory of Historic Properties number: BA-2557

Name: US 40 OVER PATAPSCO RIVER

The bridge referenced herein was inventoried by the Maryland State Highway Administration as part of the Historic Bridge Inventory, and SHA provided the Trust with eligibility determinations in February 2001. The Trust accepted the Historic Bridge Inventory on April 3, 2001. The bridge received the following determination of eligibility.

MARYLAND HISTORICAL TRUST	
Eligibility Recommended <input checked="" type="checkbox"/>	Eligibility Not Recommended <input type="checkbox"/>
Criteria: <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Considerations: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G <input type="checkbox"/> None
Comments: _____	
Reviewer, OPS: <u>Anne E. Bruder</u>	Date: <u>3 April 2001</u>
Reviewer, NR Program: <u>Peter E. Kurtze</u>	Date: <u>3 April 2001</u>

MARYLAND INVENTORY OF HISTORIC BRIDGES  
HISTORIC BRIDGE INVENTORY  
MARYLAND STATE HIGHWAY ADMINISTRATION/  
MARYLAND HISTORICAL TRUST

MHT No. BA-2557

SHA Bridge No. 3109 Bridge name US 40 over Patapsco River (Patapsco River Bridge)

**LOCATION:**

Street/Road name and number US 40 (National Pike, Edmondson Avenue Extended)

City/town Catonsville Vicinity \_\_\_\_\_

County Baltimore

This bridge projects over: Road \_\_\_ Railway \_\_\_ Water X Land \_\_\_

Ownership: State X County \_\_\_\_\_ Municipal \_\_\_\_\_ Other \_\_\_\_\_

**HISTORIC STATUS:**

Is the bridge located within a designated historic district? Yes \_\_\_\_\_ No X

National Register-listed district \_\_\_\_\_ National Register-determined-eligible district \_\_\_\_\_

Locally-designated district \_\_\_\_\_ Other \_\_\_\_\_

Name of district \_\_\_\_\_

**BRIDGE TYPE:**

Timber Bridge \_\_\_\_\_:

Beam Bridge \_\_\_\_\_ Truss -Covered \_\_\_\_\_ Trestle \_\_\_\_\_ Timber-And-Concrete \_\_\_\_\_

Stone Arch Bridge \_\_\_\_\_

Metal Truss Bridge \_\_\_\_\_

Movable Bridge :

Swing \_\_\_\_\_

Vertical Lift \_\_\_\_\_

Bascule Single Leaf \_\_\_\_\_

Retractable \_\_\_\_\_

Bascule Multiple Leaf \_\_\_\_\_

Pontoon \_\_\_\_\_

Metal Girder \_\_\_\_\_:

Rolled Girder \_\_\_\_\_

Plate Girder \_\_\_\_\_

Rolled Girder Concrete Encased \_\_\_\_\_

Plate Girder Concrete Encased \_\_\_\_\_

Metal Suspension \_\_\_\_\_

Metal Arch \_\_\_\_\_

Metal Cantilever \_\_\_\_\_

Concrete X \_\_\_\_\_:

Concrete Arch X \_\_\_\_\_ Concrete Slab \_\_\_\_\_ Concrete Beam \_\_\_\_\_ Rigid Frame \_\_\_\_\_

Other \_\_\_\_\_ Type Name \_\_\_\_\_

**DESCRIPTION:**

Setting: Urban \_\_\_\_\_ Small town X Rural \_\_\_\_\_

**Describe Setting:**

Bridge No. 3109 carries US 40, the National Pike or Edmondson Avenue Extended, over the Patapsco River in Baltimore County in Patapsco River State Park. US 40 runs in a generally southeast-northwest direction over the western flowing Patapsco River. The bridge is located in an undeveloped park area and is on a 3 percent grade. The structure carries 2 lanes of traffic in each direction, and is located adjacent to the Union Dam.

**Describe Superstructure and Substructure:**

Bridge No. 3109 is a single-span, open spandrel concrete arch bridge with open abutments. The concrete arch is 334 feet long, and has a clear arch span of 180 feet. The arch rises 48 feet 5 inches from the springline to the crown. The bridge carries a 50-foot clear roadway section, 2 sidewalks each measuring 3 feet, and a 10-inch balustrade. The road section has a bituminous wearing surface supported by a reinforced concrete deck. There are 4 longitudinal reinforced, composite concrete interior beams which support the deck. There is also an exterior composite concrete beam on each side which supports the balustrades and reinforced concrete sidewalks.

The exterior beams are supported by 28 curved exterior cantilever overhangs of which 21 bear directly over a spandrel column, which in turn bear on the arch or abutment footing. Those on the arch diminish in height from end to center. Those on the abutment increase in size from end of abutment to beginning of arch. The bridge has 3 arch ribs that are supported by a series of rib struts. The arch ribs support the spandrel columns. The columns are surmounted with simple geometric capitals and are adjoined by dentils.

The bridge has taken the open spandrel concept one step further than most arches. Instead of having massive closed abutments, the Patapsco River Bridge has an opened abutment with spandrel columns protruding through a 2 foot 6 inch concrete slope protection to a thick spread footing that also support the thrust block of the arch.

The balustrades are 3 feet 3 inches high with coping. They are divided into 27 section of 10 and 11 posts by short, solid, intermittent posts that are aligned above the curved corbelled cantilevered sections. The posts are adjoined by dentils. Above the thrust block and at each end of the bridge are incised 2-panel end posts.

The bridge carries a 24-inch water main on its north interior side.

The bridge is not posted, and has a sufficiency rating of 62. According to the 1997 inspection report, this structure was in poor condition with a heavily worn, spalled and patched road surface. The sidewalks have light map cracking and heavy erosion. The median barrier has fine vertical cracks and random spalls. The balustrades have surface erosion with vertical cracking, exposed aggregate, rusted reinforcement bars, and loose concrete. The underside of the deck has heavy map cracking, efflorescence, and patch popouts. The arch has open cracks, scaling and spalling.

**Discuss Major Alterations:**

A precast, double-faced median jersey barrier was added to this structure for safety reasons. It is also evident that the bridge has been patched and repaired many times, and some of these repairs are beginning to fail.

**HISTORY:**

WHEN was the bridge built: 1936  
This date is: Actual \_\_\_\_\_ X \_\_\_\_\_ Estimated \_\_\_\_\_  
Source of date: Plaque \_\_\_ Design plans X County bridge files/inspection form \_\_\_ Other (specify): \_

WHY was the bridge built? To span the Patapsco River, and provide a link between Baltimore and the western counties on US 40.

WHO was the designer? State Roads Commission

WHO was the builder? State Roads Commission

**WHY was the bridge altered?**

The bridge was altered to correct functional or structural deficiencies and for safety reasons.

**Was this bridge built as part of an organized bridge-building campaign?**

There is no evidence that this bridge was built as part of a campaign.

**SURVEYOR/HISTORIAN ANALYSIS:**

This bridge may have National Register significance for its association with:

A - Events \_\_\_\_\_ B- Person \_\_\_\_\_  
C- Engineering/architectural character  X

The bridge was determined eligible by the Interagency Review Committee in September 1996.

**Was the bridge constructed in response to significant events in Maryland or local history?**

The advent of modern concrete technology fostered a renaissance of arch bridge construction in the United States. Reinforced concrete allowed the arch bridge to be constructed with much more ease than ever before and maintained the load-bearing capabilities of the form. As the structural advantages of reinforced concrete became apparent, the heavy, filled barrel of the arch was lightened into ribs. Spandrel walls were opened, to give a lighter appearance and to decrease dead load. This enabled the concrete arch to become flatter and multi-centered, with longer spans possible. Designers were no longer limited to the semicircular or segmental arch form of the stone arch bridge. The versatility of reinforced concrete permitted development of a variety of economical bridges for use on roads crossing small streams and rivers.

Maryland's roads and bridge improvement programs mirrored economic cycles. The first road improvement of the State Roads Commission was a 7-year program, starting with the Commission's establishment in 1908 and ending in 1915. Due to World War I, the period from 1916-1920 was one of relative inactivity; only roads of first priority were built. Truck traffic resulting from war related factories and military installations generated new, heavy traffic unanticipated by the builders of the early road system. From 1920-1929, numerous highway improvements occurred in response to the increase in Maryland motor vehicles from 103,000 in 1920 to 320,000 in 1929, with emphasis on the secondary system of feeder roads which moved traffic from the primary roads built before World War I. After World War I, Maryland's bridge system also was appraised as too narrow and structurally inadequate for the increasing traffic, with plans for an expanded bridge program to be handled by the Bridge Division, set up in 1920. In 1920 under Chapter 508 of the Acts of 1920 the State issued a bond of \$3,000,000.00 for road construction; the primary purpose of these monies was to meet the state obligations involving the construction of rural post roads. The secondary purpose of these monies was to fund (with an equal sum from the counties) the building of lateral roads. The number of hard surfaced roads on the state system grew from 2000 in 1920 to 3200 in 1930. By 1930, Maryland's primary system had been inadequate to the huge freight trucks and volume of passenger cars in use, with major improvements occurring in the late 1930's. Most improvements to local roads waited until the years after World War I.

As the nation's automotive traffic increased in the early twentieth century, local road networks were consolidated, and state highway departments were formed to supervise the construction and improvement of state roads. With a diverse topographical domain encompassing numerous small and large crossings, Maryland engineers quickly recognized the need for expedient design and construction through the standardization of bridge designs.

The concept and practice of standardization was one of the most important developments in engineering of the twentieth century. In Maryland, as in the rest of the nation, the standardized concrete types became the predominant bridge types built. In the period 1911 to 1920 (the decade in which standardized plans were introduced), beams and slabs constituted 65 percent and arches 35 percent of the extant 29 bridges built in Maryland. In the following decade, 1921-1930, the beam (now the T-beam) and slab increased to 73 percent and the arch had declined to 27 percent of the 129 extant bridges; in the next decade (1931-1940), the beam and slab achieved 82 percent and arches had further declined, constituting only 18 percent of the total of extant bridges built on state-owned roads between 1931 and 1946.

Although beam and slab bridges became the utilitarian choice, it appears that the arch was selected when aesthetic as well as other site conditions were considered. The architectural treatment of extant arch bridges supports this assessment. Many of these bridges were multiple span structures with open spandrels or masonry facing. Another

decorative feature of the concrete arch bridge was an open, balustrade-style parapet. Despite the popularity of ornamental arches and the increase in use of beam and slab bridges, examples of simpler, single and multiple span closed concrete arch bridges with solid parapets continued to be constructed throughout the early twentieth century.

The Patapsco River bridge was constructed because of the need of a direct link between Baltimore and the western counties along the US 40 corridor.

**When the bridge was built and/or given a major alteration, did it have a significant impact on the growth and development of the area?**

Yes, until the construction of the interstate system, US 40 was a major transportation artery into Baltimore City and was the primary trucking route between the west and the east. The Patapsco River Bridge crossed a natural barrier that had been limiting the commerce and growth of the greater Baltimore area.

**Is the bridge located in an area that may be eligible for historic designation and would the bridge add to or detract from the historic/visual character of the potential district?**

This bridge is located in an area that may be eligible for historic designation. The structure, which is a good example of a concrete arch bridge, would contribute to the character of the potential district.

**Is the bridge a significant example of its type?**

The bridge is a potentially significant example of a concrete arch bridge, possessing distinctive ornamentation and design.

**Does the bridge retain integrity of important elements described in Context Addendum?**

The bridge retains the character-defining elements of its type, as defined by the Statewide Historic Bridge Context, including arch ribs, spandrel columns and arch, pierced concrete parapets, and open concrete abutments, however some deterioration is evident.

**Is the bridge a significant example of the work of a manufacturer, designer, and/or engineer?**

This bridge is a significant example of the work of the State Roads Commission in the 1930s.

**Should the bridge be given further study before an evaluation of its significance is made?**

No further study of this bridge is required to evaluate its significance.

**BIBLIOGRAPHY:**

County inspection/bridge files \_\_\_\_\_ SHA inspection/bridge files   X    
Other (list):

Johnson, Arthur Newhall  
1899 The Present Condition of Maryland Highways. In *Report on the Highways of Maryland*. Maryland Geological Survey, The Johns Hopkins University Press, Baltimore.

P.A.C. Spero & Company and Louis Berger & Associates  
1995 Historic Highway Bridges in Maryland: 1631-1960: Historic Context Report. Maryland State Highway Administration, Maryland State Department of Transportation, Baltimore, Maryland.

Suffness, Rita  
1992 Patapsco River Bridge, No 3109. Maryland Historical Trust State Historic Sites Inventory Form, BA-2557

BA-2557

Tyrrell, H. Grattan

1909 *Concrete Bridges and Culverts for Both Railroads and Highways*. The Myron C. Clark Publishing Company,  
Chicago and New York.

**SURVEYOR:**

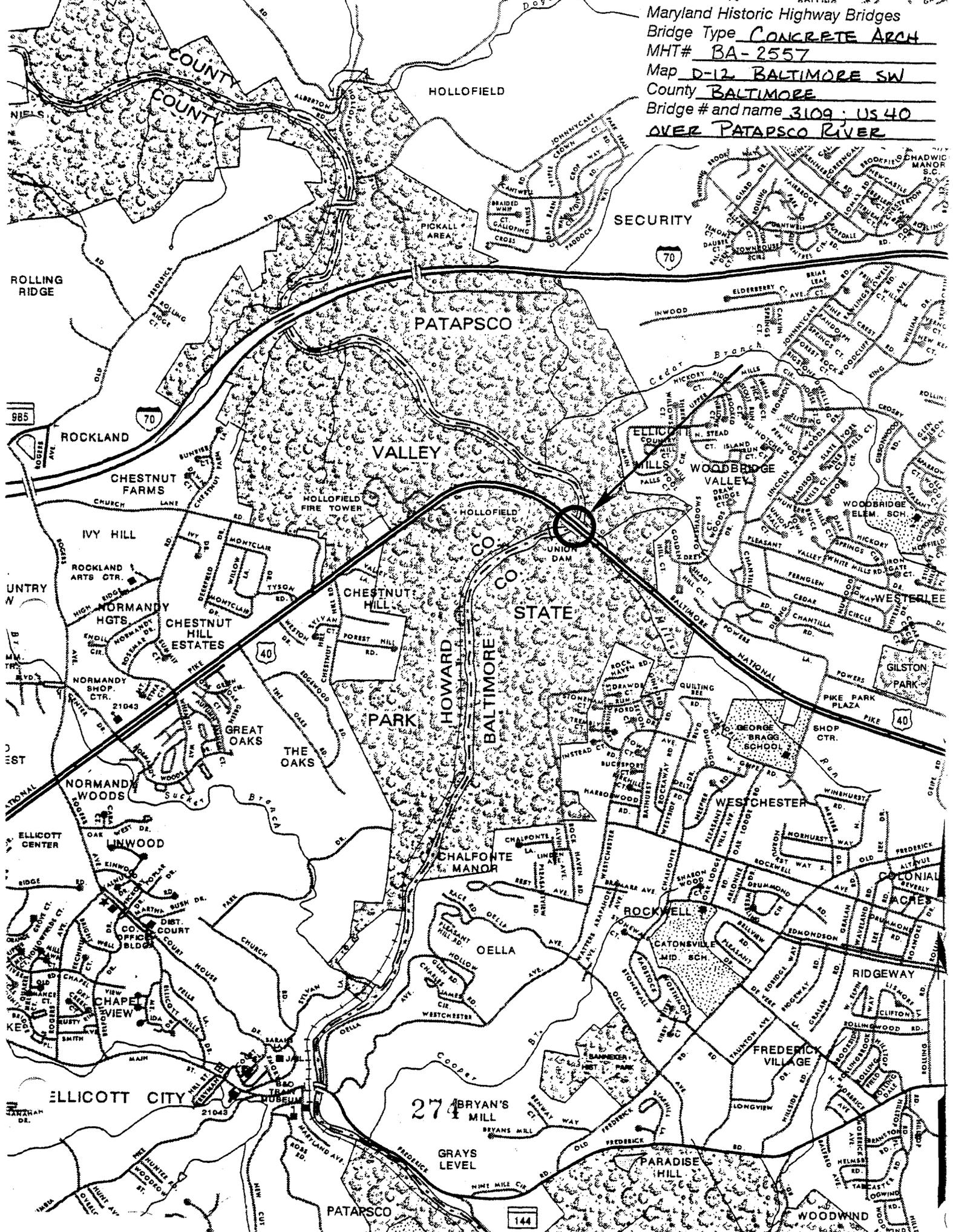
Date bridge recorded December 1997

Name of surveyor Wallace, Montgomery & Associates / P.A.C. Spero & Company

Organization/Address P.A.C. Spero & Co., 40 W. Chesapeake Avenue, Baltimore, MD 21204

Phone number (410) 296-1635 FAX number (410) 296-1670

Maryland Historic Highway Bridges  
Bridge Type CONCRETE ARCH  
MHT# BA-2557  
Map D-12 BALTIMORE SW  
County BALTIMORE  
Bridge # and name 3109 US 40  
OVER PATAPSCO RIVER





Inventory # BA-2557

Name 3109- US40 OVER PATAPSCO RIVER

County/State BALTIMORE COUNTY/MD

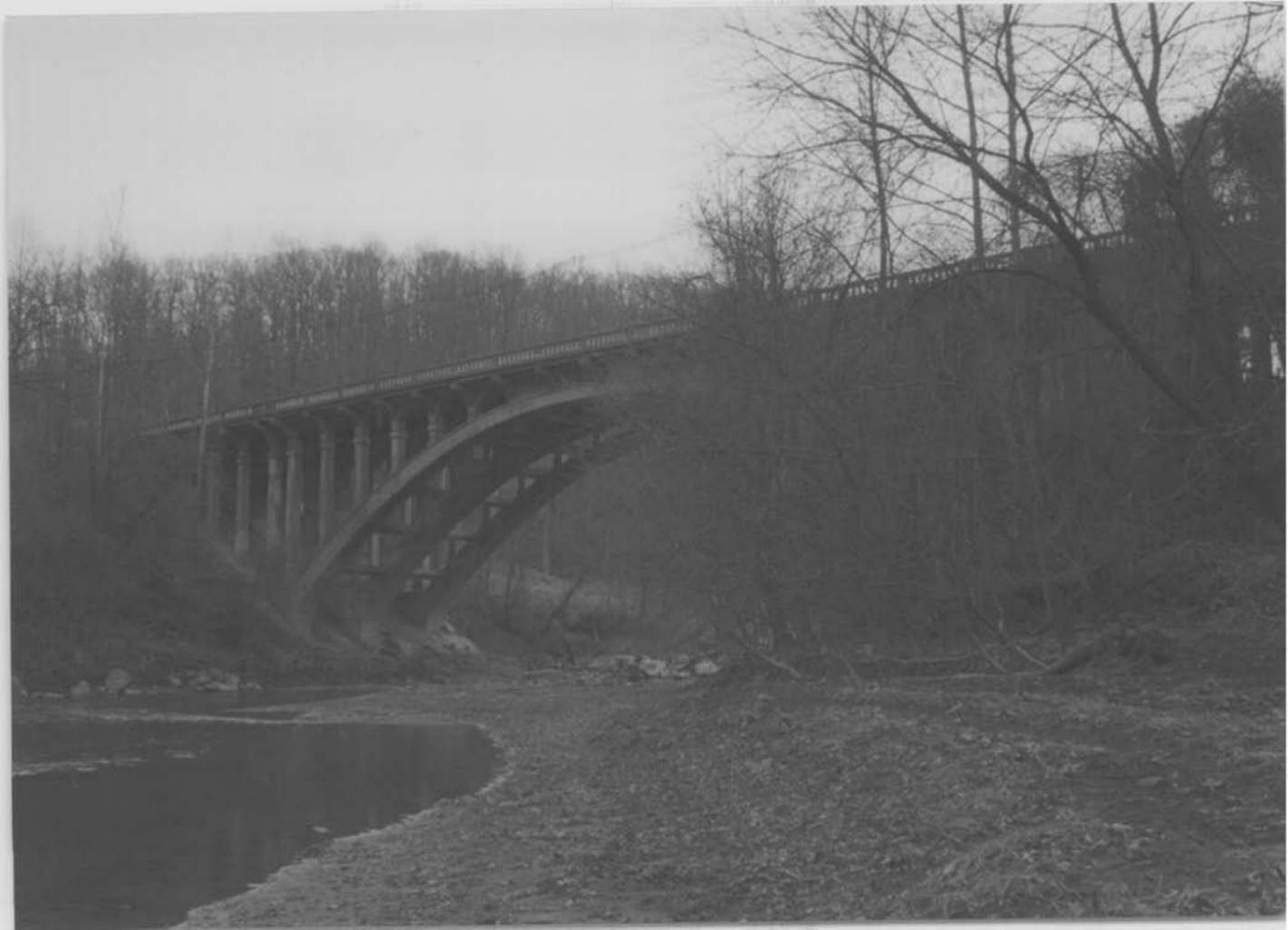
Name of Photographer DAVE DIENL

Date 1/95

Location of Negative SHA

Description WEST APPROACH LOOKING  
SOUTHEAST

Number 1 of 345



Inventory # BA-2557

Name 3109-US40 OVER PATAPSCO RIVER

County/State BALTIMORE COUNTY/MD

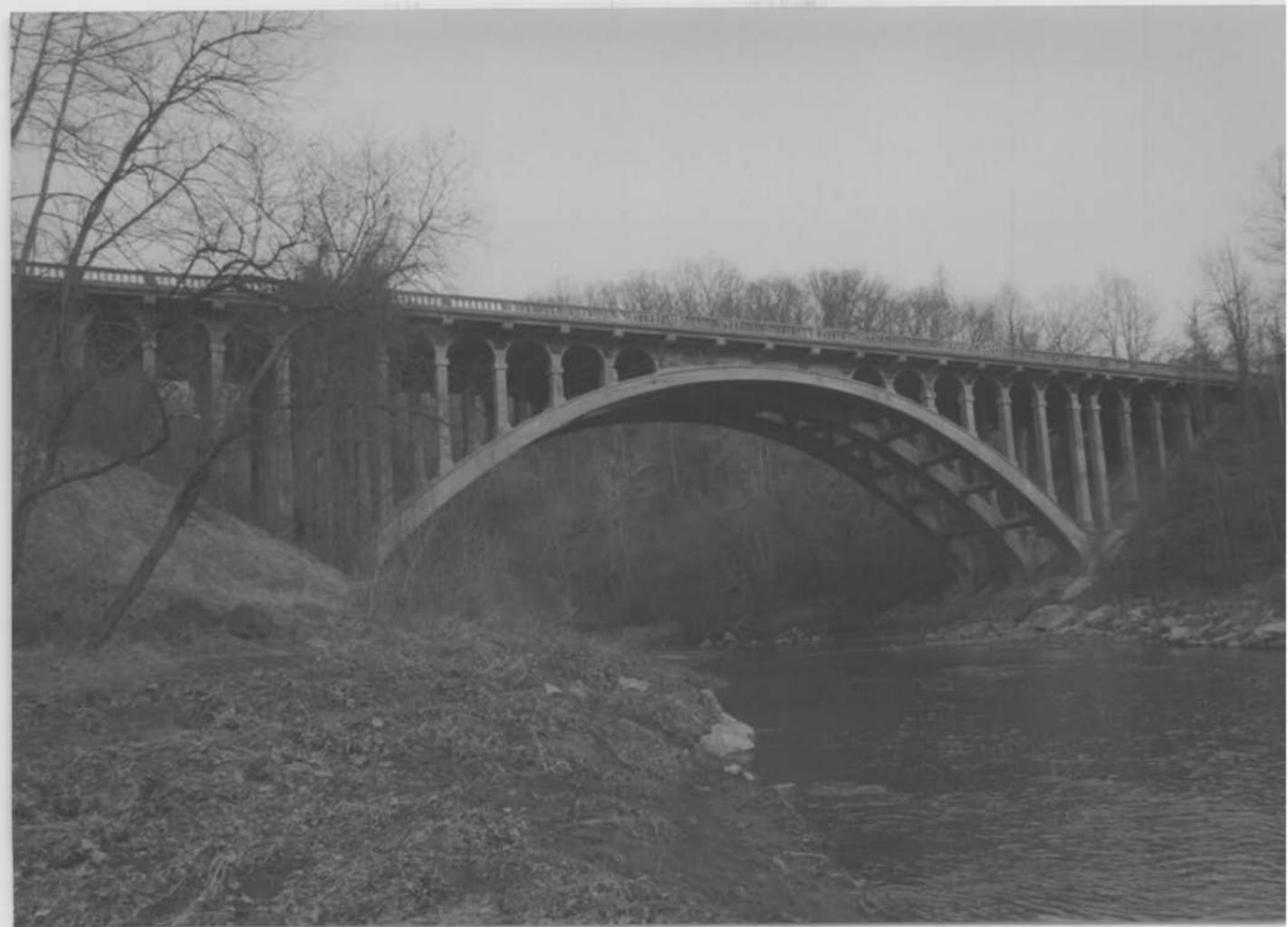
Name of Photographer DAVE PIEHL

Date 11/95

Location of Negative SHA

Description NORTH ELEVATION LOOKING  
SOUTH

Number 2 of 345



Inventory # BA-2557

Name 31091-1440 OVER PATAPSCO RIVER

County/State BALTIMORE COUNTY/MD

Name of Photographer DAVE DIEHL

Date 1/95

Location of Negative SHA

Description SOUTH ELEVATION LOOKING  
NORTHEAST

Number 3 of 345



Inventory # DA-2557

Name 3109-US40 OVER PATAPSCO RIVER

County/State BALTIMORE COUNTY/MD

Name of Photographer DAVE DIEHL

Date 1/95

Location of Negative SHA

Description CLOSE-UP OF EAST ABUTMENT  
AND ADJACENT CULVERT  
OUTLET

Number 4 of 245



Inventory # BA-2557

Name 3109- US40 OVER PATAPSCO RIVER

County/State BALTIMORE COUNTY MD

Name of Photographer DAVE DIEHL

Date 1/95

Location of Negative SHA

Description EAST APPROACH LOOKING  
NORTHWEST

Number 5 of 34

# Maryland Historical Trust State Historic Sites Inventory Form

## MARYLAND INVENTORY OF HISTORIC PROPERTIES

Survey No. BA-2557

Magi No.

DOE  yes  no

### 1. Name (indicate preferred name)

historic

and/or common Patapsco River Bridge, No. 3109

### 2. Location

street & number US 40 over Patapsco River  not for publication

city, town \_\_\_\_\_ vicinity of \_\_\_\_\_ congressional district \_\_\_\_\_

state Baltimore county Baltimore

### 3. Classification

Category	Ownership	Status	Present Use	
<input type="checkbox"/> district	<input checked="" type="checkbox"/> public	<input type="checkbox"/> occupied	<input type="checkbox"/> agriculture	<input type="checkbox"/> museum
<input type="checkbox"/> building(s)	<input type="checkbox"/> private	<input type="checkbox"/> unoccupied	<input type="checkbox"/> commercial	<input type="checkbox"/> park
<input checked="" type="checkbox"/> structure	<input type="checkbox"/> both	<input type="checkbox"/> work in progress	<input type="checkbox"/> educational	<input type="checkbox"/> private residence
<input type="checkbox"/> site	<b>Public Acquisition</b>	<b>Accessible</b>	<input type="checkbox"/> entertainment	<input type="checkbox"/> religious
<input type="checkbox"/> object	<input type="checkbox"/> in process	<input checked="" type="checkbox"/> yes: restricted	<input type="checkbox"/> government	<input type="checkbox"/> scientific
	<input type="checkbox"/> being considered	<input type="checkbox"/> yes: unrestricted	<input type="checkbox"/> industrial	<input checked="" type="checkbox"/> transportation
	<input type="checkbox"/> not applicable	<input type="checkbox"/> no	<input type="checkbox"/> military	<input type="checkbox"/> other:

### 4. Owner of Property (give names and mailing addresses of all owners)

name MD SHA

street & number 707 North Calvert telephone no.:

city, town Baltimore state and zip code MD 21202

### 5. Location of Legal Description

courthouse, registry of deeds, etc. Baltimore County Courthouse liber

street & number \_\_\_\_\_ folio \_\_\_\_\_

city, town Towson state MD

### 6. Representation in Existing Historical Surveys

title

date \_\_\_\_\_ federal \_\_\_\_\_ state \_\_\_\_\_ county \_\_\_\_\_ local \_\_\_\_\_

pository for survey records

city, town \_\_\_\_\_ state \_\_\_\_\_

# 7. Description

Survey No. BA-2557

<b>Condition</b>		<b>Check one</b>	<b>Check one</b>	
<input type="checkbox"/> excellent	<input type="checkbox"/> deteriorated	<input checked="" type="checkbox"/> unaltered	<input checked="" type="checkbox"/> original site	
<input checked="" type="checkbox"/> good	<input type="checkbox"/> ruins	<input type="checkbox"/> altered	<input type="checkbox"/> moved	date of move _____
<input type="checkbox"/> fair	<input type="checkbox"/> unexposed			

Prepare both a summary paragraph and a general description of the resource and its various elements as it exists today.

The US 40 bridge over the Patapsco River at Union Dam is a 180 foot clear span open-spandrel, rib-type reinforced concrete deck arch which was constructed in 1936 for \$136,503.30. The east approach span is 83 feet and the west approach span is 72 feet for a total length of 335 feet. The elevation of the structure is 60 feet  $\pm$  above the normal water level.

This structure is dramatically sited over one of Maryland's major rivers within the Patapsco Valley State Park. It is composed of twenty-three arched openings with a design widely used in the United States in the 1920's and 1930's. The spandrel columns display curved arch facia curtain walls, concrete railings with small arched openings, and corbelling to support the railing atop capped posts. The regular spacing of the arches interrupted by the closer spacing of the paired posts on either side of the central clear span. Short sections of solid parapets with rectangular incising are located on top of these paired posts, thus interrupting the eleven-arch sections of balustrade and emphasizing the springing of the arch.

# 8. Significance

Survey No. BA-2557

Period	Areas of Significance—Check and justify below			
<input type="checkbox"/> prehistoric	<input type="checkbox"/> archeology-prehistoric	<input type="checkbox"/> community planning	<input type="checkbox"/> landscape architecture	<input type="checkbox"/> religion
<input type="checkbox"/> 1400-1499	<input type="checkbox"/> archeology-historic	<input type="checkbox"/> conservation	<input type="checkbox"/> law	<input type="checkbox"/> science
<input type="checkbox"/> 1500-1599	<input type="checkbox"/> agriculture	<input type="checkbox"/> economics	<input type="checkbox"/> literature	<input type="checkbox"/> sculpture
<input type="checkbox"/> 1600-1699	<input type="checkbox"/> architecture	<input type="checkbox"/> education	<input type="checkbox"/> military	<input type="checkbox"/> social/ humanitarian
<input type="checkbox"/> 1700-1799	<input type="checkbox"/> art	<input type="checkbox"/> engineering	<input type="checkbox"/> music	<input type="checkbox"/> theater
<input type="checkbox"/> 1800-1899	<input type="checkbox"/> commerce	<input type="checkbox"/> exploration/settlement	<input type="checkbox"/> philosophy	<input checked="" type="checkbox"/> transportation
<input checked="" type="checkbox"/> 1900-	<input type="checkbox"/> communications	<input type="checkbox"/> industry	<input type="checkbox"/> politics/government	<input type="checkbox"/> other (specify)
		<input type="checkbox"/> invention		

**Specific dates** 1936 **Builder/Architect** Maryland SHA

check: Applicable Criteria:  A  B  C  D  
and/or

Applicable Exception:  A  B  C  D  E  F  G

Level of Significance:  national  state  local

Prepare both a summary paragraph of significance and a general statement of history and support.

Bridge No. 3019 was constructed over the Patapsco River at Union Dam as part of the extension of Edmondson and Old Frederick Road, from the intersection of Old Frederick Road to the National Pike (US 40) at a point approximately two miles west of Ellicott City. Built during the Depression, the Federal government contributed one-million dollars (less than one-half) toward the road construction through the Public Works Administration.

This bridge is significant as a one of only three open-spandrel arch bridges on the state system of roads in Maryland. Bridge No. 15033 (MD 195 over Sligo Creek) and Bridge No. 21012 (US 40 over Conococheague Creek) are the others. It is also significant for typifying the general design utilized for large open-spandrel bridges of the 1930's. Its high elevation as it crosses the Patapsco Valley State Park results in a particularly dramatic siting, visible from points within the park. It is eligible for the National Register under criterion C for engineering.

As to its place within the historic of reinforced concrete bridges, its design was one which had been utilized by bridge engineers for highway bridges in the 1920's and 1930's for open spandrel bridges. To recapitulate briefly the history of reinforced concrete for bridge use, concrete had been recognized as one of the preferred materials for highway and railroad bridges by the early twentieth century. The first type of concrete arch structure to be constructed was the solid, filled, spandrel arch which was similar to a stone arch wherein a barrel arch carries fill and the solid spandrel wall serves as a retaining wall containing the fill material. Concrete allowed

Continued on attached sheet

## 8. Significance Continued

greater flexibility than masonry for arch construction. Whereas most stone arch bridges had limited span lengths and high rise to span ratio, reinforced concrete arches had a variety of configurations, low rise to span ratio and greater span lengths. Because of the plasticity of concrete, open spandrel arches could be given a variety of shapes and thicknesses.

As the structural advantages of reinforced concrete were explored, the heavy, filled barrels were lightened into ribs. Spandrel walls were pierced and opened, eventually diminishing until columns or posts carried the deck loads to the rib arches. By 1905 the construction of ribbed arch bridges was well established, and experimentation with open spandrel designs begun.



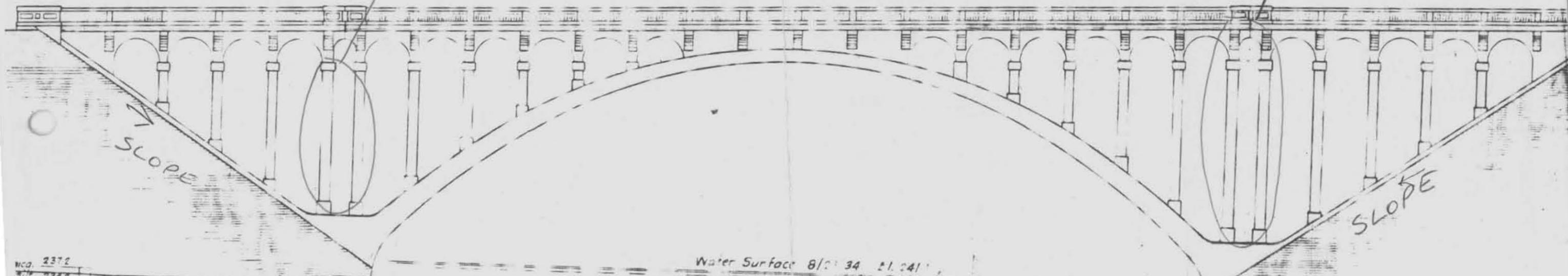
PLAN

Scale: 1" = 20'-0"

Repairs to columns

Repairs to columns

+00 - Grade



Water Surface 8/23/34 El. 241'

Norm. Water Surface El. 225'

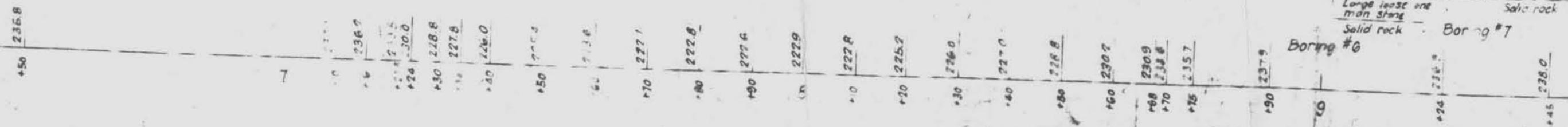
237.2	Clay-sand s	231.7
228.2	Clay soil	230.0
228.2	Dark grey clay	228.2
224.7	Dark grey clay streaked with peat	221.7
224.7	Solid rock (Seam)	

231	Work	228	Water
228	Clay and grey mud	228	Graded stone or box pier
228	Grey mud	228	Solid rock

238.4	Sand, sand clay	238.5	Dry sand sand	227.4
235.4	Loam and mica	235.5	Dry sand & mica	227.4
232.4	Clay sand	232.5	Sand clay	227.4
228.4	Dark brown clay sand and mica	229.5	Dark grey clay	227.4
228.4	Coarse sand, small gravel, grey mud	221.5	Coarse sand & gravel	227.4
220.4	Sand and dark grey mud	218.5	Coarse sand & gravel and grey mud	218.4
219.4	Large loose iron stone	218.5	Solid rock	218.4
219.4	Solid rock			

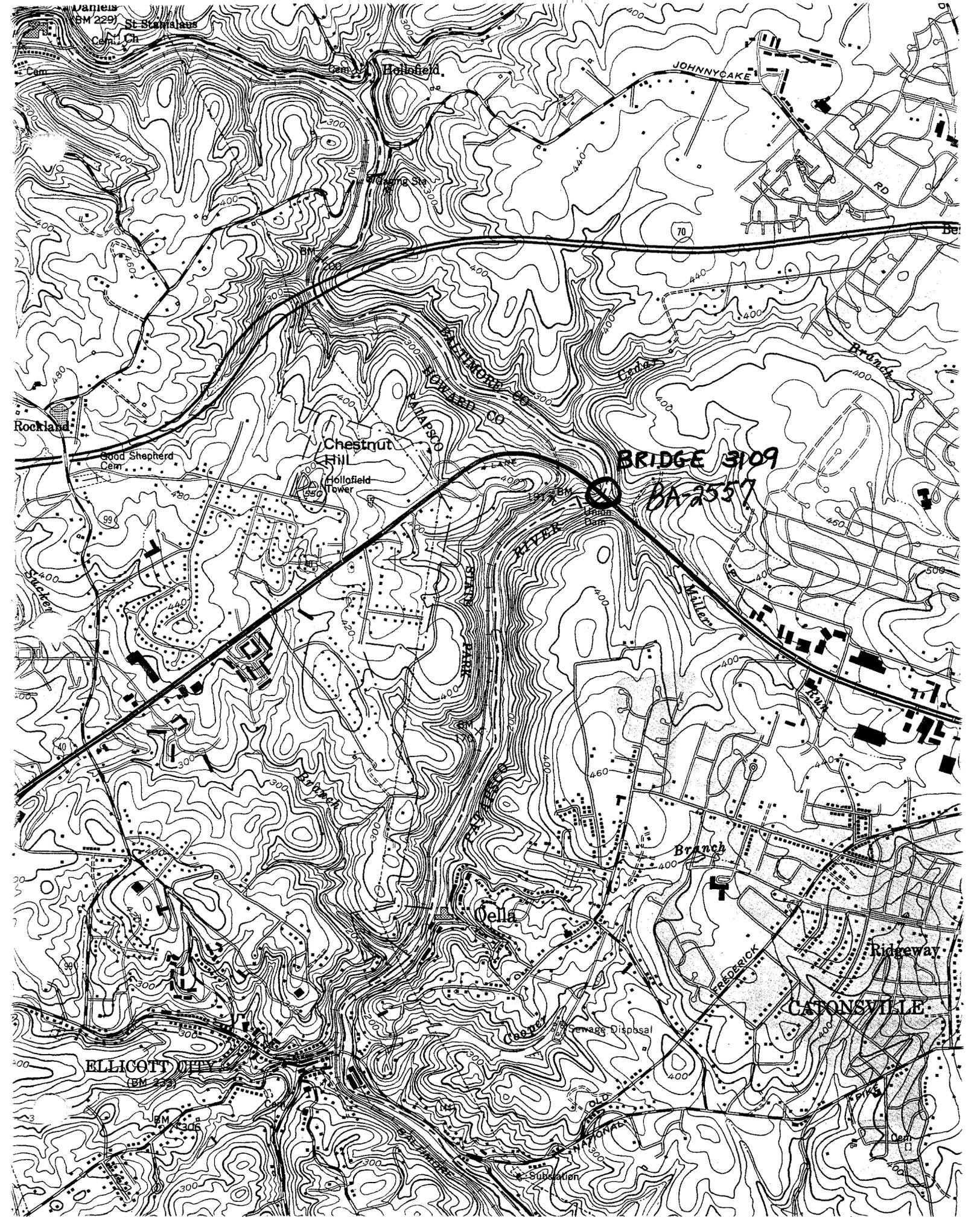
Boring #4 Boring #5 Boring #6

Boring #6 Boring #7 Boring #8



ELEVATION

Scale: 1" = 20'-0"



ELLICOTT CITY QUADRANGLE

BA-2557

No 3109  
South Side



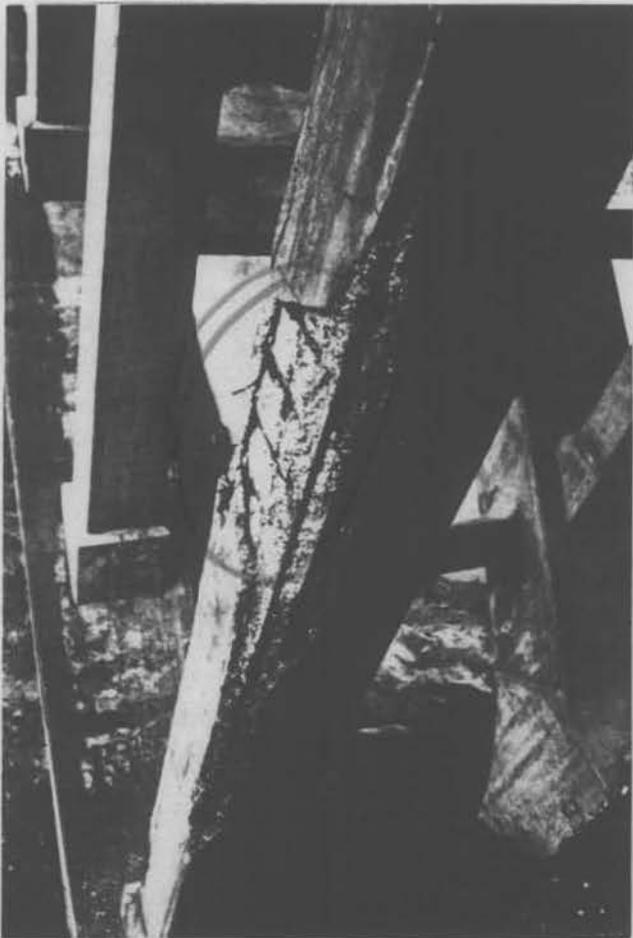
North  
Side



Looking  
East



Bridge 3109



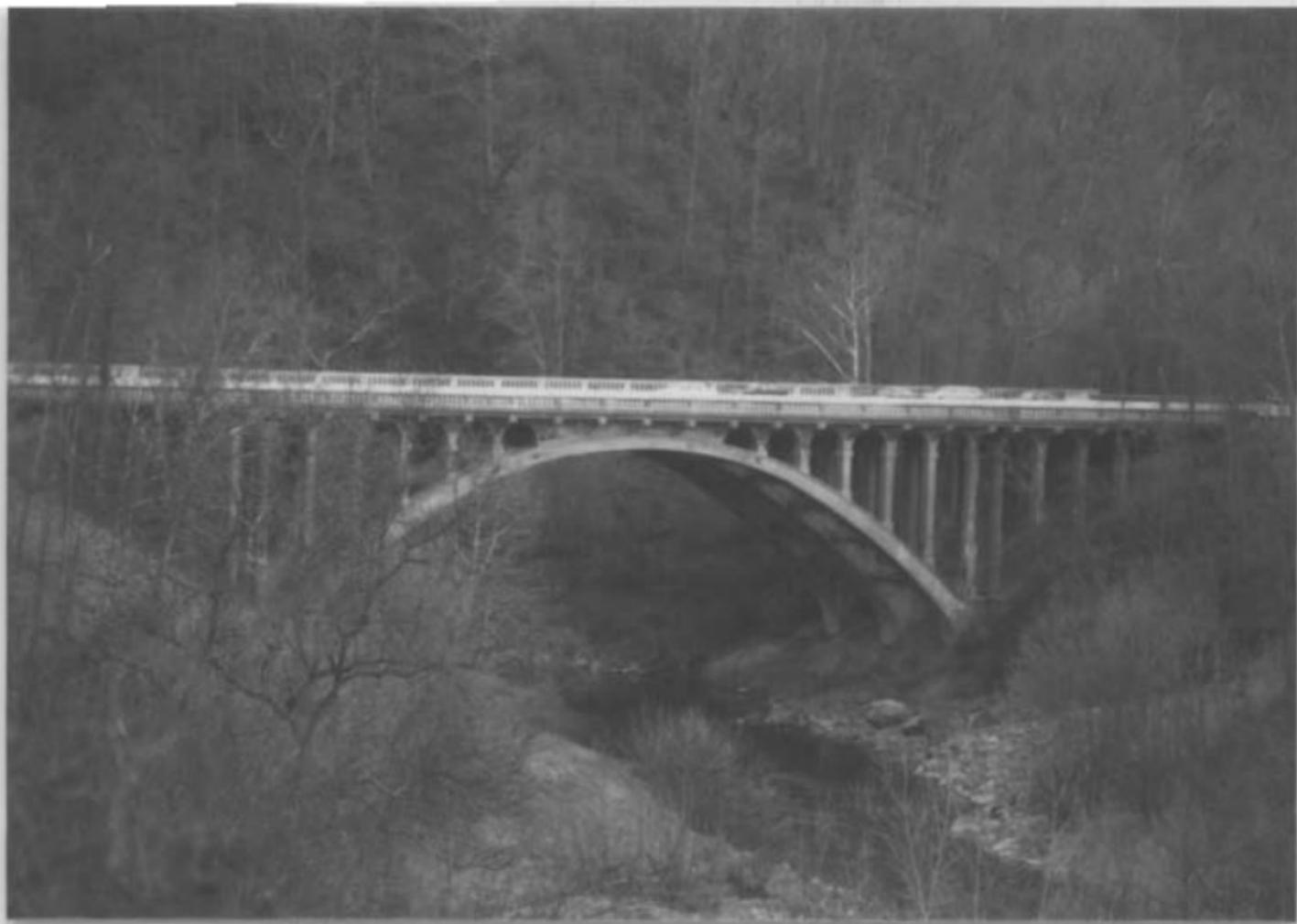
A Column 3, Pier 3  
Rusted Reinforcement  
bars



B Earth Embankment slope



C Earth slope to  
be repaired.



520 24 571

Bridge No. 3193

U.S. 40 over the Patuxent Riv.

South of Elberton

1992

( N )

1992

21