

SOUTH WILMINGTON CAUSEWAY BRIDGE  
(State Bridge No. 686)  
Spanning Conrail Railroad on Market  
Street (U.S. 13 Br.), 0.5 miles  
north of the intersection of U.S.  
Route 13 and I-495  
South Wilmington vicinity  
New Castle County  
Delaware

HAER No. DE-31

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S. SWILMAN,  
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
Northeast Region  
U.S. Custom House  
200 Chestnut Street  
Philadelphia, PA 19106

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HISTORIC AMERICAN ENGINEERING RECORD

SOUTH WILMINGTON CAUSEWAY BRIDGE

(State Bridge No. 686)

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Location: Spanning Conrail railroad on Market Street (U.S. 13 Br.), 0.5 miles north of the intersection of U.S. Route 13 and I-495. South Wilmington vicinity, New Castle County, Delaware.

USGS Quad: Wilmington South, Del.  
UTM 18.460764.6259010

Date of Construction: 1937-1940

Present Owner: Delaware Department of Transportation  
P.O. Box 778  
Dover, DE 19903

Present Use: Vehicular and Pedestrian Bridge

Significance: The South Wilmington Causeway Bridge (State Bridge No. 686) is a multiple span, embellished example of a encased steel girder bridge. This commonly built type exemplifies the continuing expansion and improvement of the road network under the auspices of the Delaware State Highway Department. The Department had assumed responsibility for construction and maintenance of all local roads in 1935; between 1935 and 1942, efforts focused of the improvement of rural roads and increasing road construction in towns and cities. Over 250 bridges were built during this period statewide; most were simply configured and unembellished. The South Wilmington Causeway Bridge (State Bridge No. 686) is an exceptional example of this type.

Project

Information: This document was undertaken in June, 1991 in accordance with the Memorandum of Agreement by the Federal Highway Administration as a mitigative measure prior to replacement of the bridge.

Michael C. Hahn  
Environmental Planner  
Location & Environmental Studies  
Department of Transportation  
Dover, DE 19903

## SOUTH WILMINGTON CAUSEWAY BRIDGE

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The South Wilmington Causeway Bridge (State Bridge No. 686) was constructed as a grade crossing elimination. The structure carries Market Street over the Pennsylvania Railroad which is presently owned and operated by Conrail Railroad. This multiple span, highly embellished example of a concrete encased steel girder and concrete slab bridge is significant for its multiple spans, architectural treatment and the structural configuration of its slab spans.

Delaware Department of Transportation records states that The South Wilmington Causeway Bridge (State Bridge No. 686) was constructed between 1937 and 1940 under Highway Department Contract Number 474 and was a federally aided project (Federal Aid Project WPGH 41). Drawings on file at the Delaware Department of Transportation document the details of design, materials, and construction for this structure. These drawings were approved and dated on March 30, 1937. The designed structure carried Market Street over the Shellpot Branch of the Pennsylvania Railroad; the drawings note plans were approved by the Pennsylvania Railroad Office of Engineering for Bridges and Buildings on March 25, 1937. The structure was designed in accordance with American Association of State Highway Officials (AASHO) specifications of 1935 for H-20 loading, (AAHO was predecessor of today's AASTO) with some modifications of the flat slab portions. Bids were received on June 9, 1937, and the contract was awarded to J.A. Bader & Co. of Wilmington, Delaware, for the bid price of \$205,685.00. Contract correspondence indicates that the Reading Railroad, a subsidiary user at that time, was initially reluctant to participate in a grade crossing elimination at this location, but finally agreed to relocate its tracks. Problems with securing the necessary access for the contractor further delayed the project.

Repair work accomplished by 1978 under Contract 70-10-021 involved a major construction maintenance and rehabilitation project. The basic propose was to restore the viaduct as nearly as practical to its original condition while at the same time making some essential improvements to its original design. Most of the work involved scarfing, patching, curb and sidewalk replacement, and resurfacing.

The present appearance of the bridge shows signs of deterioration. The entire deck, parapet, and substructure area display evidence of severe deterioration.

The South Wilmington Causeway Bridge (State Bridge No. 686), also known as Conrail Bridge Number 0.55 on the Delaware River Extension, is a composite structure thirty-one spans long. The 39'-0" main span comprises of 12 concrete encased steel girders. The other spans are concrete slabs 26'-2" and 27" in

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length. The deck is 59'-0" wide and carries four lanes of traffic. The overall length of the structure is 852 feet. The concrete parapet has a geometric design with encased rectangles and diamond shaped openings. Geometric blocks divide the parapet wall at the span divisions. The main span is accentuated by an enlarged parapet with a corbelled cap. The substructure consists of concrete abutments and U-shaped wing walls. The main span, the steel girder portions is supported by concrete piers, while the slab spans are supported by individual concrete columns with mushroom capitals grouped in threes at each end.

The bridge features geometrical embellishment reflecting the influence of the Art Moderne movement of the period. The portals are marked by a large concrete pylons with vertical striations and a chevron motif on their outer faces; these pylons formerly supported light standards and serve as wend blocks for a metal railing which runs above the wing walls. The wing walls feature a pattern of incised horizontal lines. Each approach span is defined by large concrete blocks at either end, above the piers; a concrete parapet wall unites the blocks, with rectangular panels punctuated with diamond-shaped openings. Where the approaches meet the main span, the parapet steps up in a series of sloping setbacks to join pylons similar to those at the portals. The parapet of the main span, is higher than that of the approach spans; its upper section is decorated with incised horizontal lines. On the main span, diamond-shaped insets of glazed tile replace the openings found on the approach parapets. A steel rail continues the parapet above the wing walls.

The bridge is significant as a highly embellished multiple span example of a concrete bridge; most concrete bridges surveyed in Delaware were single spans with little ornamentation. Steel girder and concrete slab bridges, like the small Delaware bridges inventoried, have been widely built in the U.S. for highway use throughout the twentieth century. As a class, by the 1930s those commonly built bridge types represented an economical and expedient engineering solution which found broad application across the nation. In general, their treatment was handled in a formulaic manner presenting a standardized and uninspired impression, rather than as aesthetic statement. Embellishment, when presented at all, was limited to simple geometric designs breaking up the visual mass of solid concrete parapets. The ubiquitousness of steel girder and concrete slab bridges, and their non-innovative technological and aesthetic character, prompt engineering historian Carl Condit to observe the great number of these "commonplace structures" with "design and appearance so nearly uniform" made it difficult to select noteworthy examples. The results of the historic bridge survey in Delaware confirm the widely built numbers of simple small expansion and improvement of the road network under the auspices

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of the Delaware State Highway Department. The Department had assumed responsibility for construction and maintenance of all local roads in 1935; between 1935 and 1942, efforts focused on the towns and cities. Over 250 bridges were built during this period statewide; most were simply configured and unembellished. The South Wilmington Causeway Bridge (State Bridge No. 686) is an exceptional example among those surveyed.

In addition to these characteristics, the bridge's slab spans are late applications of an early twentieth century technological innovation more commonly used in building construction, the concrete slab on mushroom columns. The reinforced slab carried on round columns with flared capitals was first developed for building design by C.A.P. Turner in 1905.

Application of the mushroom column and concrete slab to bridge construction occurred shortly after that. As the scientific understanding of reinforcement increased in the twentieth century, the form evolved to include a beam which connected cylindrical columns and to the commonly used pier form more typically seen in mid-twentieth century bridge design.

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Plans on file at Delaware DOT: Contract # 474, 70-10-021