CONRAIL VIADUCT, STATE RTE. 139
(Route 1 Extension, Structure No. 0904-151)
Lincoln Highway Between JFK Boulevard and Collard Street
Jersey City
Hudson County
New Jersey

HAER NJ-143
HAER NJ-143

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
NORTHEAST REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
U.S. Custom House, 3rd Floor
200 Chestnut Street
Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD

CONRAIL VIADUCT , STATE RTE. 139 **HAER NO. NJ-143**
(Route 1 Extension, Structure No. 0904-151)

Location: Between Collard Street and JFK Boulevard
Jersey City
Hudson County, New Jersey

USGS Jersey City Quadrangle, Universal Transverse Mercator Coordinates: 18.579230.4510190

Date of Construction: 1924-1932

Engineer: New Jersey State Highway Department

Present Owner: State of New Jersey Department of Transportation

Present Use: Vehicular highway

Significance: The 485'-long Conrail Viaduct is one in a series of structures that carry the approach road to the 1927 Holland Tunnel. Known historically as the Route 1 Extension, the approach road is considered America's first limited-access superhighway. Recognizing that the tunnel was going to introduce a tremendous volume of traffic into an already congested area, the Route 1 Extension was conceived of and designed to service through transportation. It marked the first time that the economic theories of railway location were applied to a vehicular road.

Built between 1924 and 1932, the highway retains its original design at its eastern end, which traverses a fully developed section of Jersey City on a series of viaducts including the Conrail Viaduct. The easternmost five miles of the original 13.1-mile-long extension is a National Register-listed historic district.

Project Information: This documentation fulfills stipulations in the Memorandum of Agreement between the New Jersey State Historic Preservation Office and New Jersey Division, Federal Highway Administration for Structure No. 0904-151. The documentation was undertaken as part of the mitigation of adverse effects as a result of a rehabilitation project that removed original fabric from the Conrail Viaduct including removal of concrete encasement and replacement of the concrete deck and balustrades.

Mary Elizabeth McCahon
Lichtenstein Consulting Engineers, Inc.
One Oxford Valley Mall #818
Langhorne, PA 19047

Historic Context/Background

The Conrail Viaduct is one in a series of structures that make up the 13.1-mile long, approach road to the Holland Tunnel, originally known as Route 1 Extension, that is considered America's first superhighway. The highway was planned, designed, and constructed by the New Jersey State Highway Commission between 1924 and 1932 to alleviate the tremendous volume of traffic that the 1927 Holland Tunnel under the Hudson River introduced into an already congested region of metropolitan northern New Jersey. This superhighway between the state's main north-south route (US Route 1 south of Elizabeth) and the tunnel integrated a high-volume, through road with no grade crossings into fully developed urban settings in Essex and Hudson counties. It was the first time in this country that economic theories of location and operation were applied to the planning and design of an unrestricted-use, vehicular highway, a concept that was not successfully repeated until the Pennsylvania Turnpike in the mid 1930s. The Route 1 Extension represented the transfer from railroads to highways of design ideas based on safety, traffic service, and economic theory (Lavis, pp. 1020-1040), and it reflected the thinking of the New Jersey State Highway Commission under the leadership of William G. Sloan, Chief Engineer, who more than any other individual was responsible for the design (New Jersey State Highway Commission, np). New Jersey's highway became the precedent and set the standard for the planning and design of subsequent high-speed, limited-access highways.

The 485'-long Conrail Viaduct is but one section of the five-mile-long, eastern portion of Route 1 Extension that is composed of a series of structures that are sequential or linked by short sections of at-grade roadway. The eastern portion of the highway traverses a highly industrialized and populated portion of Jersey City dominated by residential development and crisscrossed by a myriad of 19th-century passenger and freight railroads and yards servicing the Port of New York. The highway eliminates all at-grade crossings with local streets and railroads, thus Route 1 Extension is carried on or under structure.

The highway was built at a time when there were no vehicular precedents or models to emulate. The planning, design, and execution of Route 1 Extension was very much the product of a progressive governor (George S. Silzer); a state highway commission committed to solving New Jersey's already legion and looming traffic-congestion problems; and William G. Sloan, the state highway engineer appointed by the commission. New Jersey's approach road to the Holland Tunnel marked the first time that the economic theory of railway location, and its resultant free, uninterrupted flow of through traffic without interference with local uses, was applied to a highway design. The state used the proven theories of the economics of railroad location to justify the

unprecedented cost and complicated design of the highway, and the road represented the transference to highways of design based on economic theory, safety, and traffic service. It was the genius of William Sloan and his staff of seasoned railroad men that made the seemingly obvious link between trunk or main railroad lines and the new "through trunk highway." They used Arthur M. Wellington's classic treatise, The Economic Theory of the Location of Railways (1877), to justify the unprecedented cost and the design of the Holland Tunnel approach road (Lavis, p. 1020-22). A 1930 article in Engineering News-Record stated that "the whole enterprise [Route 1 Extension] is superhighway in the fullest meaning of the term," and "it is a credit to the state highway engineers and commissioners of New Jersey that in meeting the problem which confronted them they considered no solution less than the best" ("A True Superhighway," p. 961). In 1932, Thomas MacDonald, chief of the federal Bureau of Public Roads (predecessor of the Federal Highway Administration) referred to the Route 1 Extension as "the greatest highway project in the United States today" (Reddan, p. 83), and truly it was.

The significance of the New Jersey State Highway Commission's accomplishment is enhanced when considered within the financial context of building urban highways in the 1920s. The use of federal aid for roads in cities with a population of more than 5,000 was not permitted. Even though the Route 1 Extension was this country's most expensive roadway project of the first third of the 20th century, the $40 million cost of its ambitious design and construction was borne entirely by New Jersey's state government. The state assumed responsibility for relieving its own urban traffic congestion, something that nearly all other cities and states avoided until a change in the federal funding laws in the late 1930s.

Although the highway and its component structures were designed largely for through traffic, the engineers of the New Jersey State Highway Commission recognized the need to provide local access to important points along the route. Where connections between the highway on structure and surface streets were made, the highway divided into two separate roadways to admit a central, inclined approach that was generally 24' wide to accommodate two-way traffic. Where local conditions did not permit this arrangement, the highway was carried through the center, and the structure was widened on both sides to accommodate outside ramps flanking the highway and connecting to the surface streets. Since there were hardly any precedents for highway access ramps, the ramp system is one of the most significant design aspects of the highway and its viaducts.

Amazingly, despite the fact that the Route 1 Extension continues to serve a high volume of traffic, the east end survives largely as originally designed because there is

simply no room to accommodate widening or upgrading of the highway through the tightly packed urban environment. The eastern section of the Route 1 Extension that maintains the aspects of integrity as specified in the National Register of Historic Places criteria for evaluation was nominated to the National Register in 2004.

Physical Description of the Conrail Viaduct

Route 1 Extension crosses a 50'-wide, open railroad cut on an eight-span, 485'- long structure now known as the Conrail Viaduct. The hard-rock cut was excavated by the Erie Railroad in 1907-10, and it is one in a series of alternating cuts and tunnels through the Bergen Ridge known as the Bergen Archways (photograph NJ-143-1). The east approach is composed of five, low rise, 28'-long, steel stringer spans set on 2'-high concrete pedestals. The main span is three lines of 130'-long and 25'-deep, riveted, Pratt deck trusses supported on massive concrete piers (photographs NJ-143-1 and NJ-143-2). The approach spans (one on each side of the truss span) consist of three lines of built-up, steel deck girder-floorbeam spans, 40' long to the west of the truss and 51' long to the east. The outside ends of both girder-floorbeam spans are framed into the concrete walls at the respective tops of the cut. The inside end of the west girders bear on the upper chords of the trusses while the inside ends of the east girders are supported on a steel column expansion bent that is founded on the concrete pier that also supports the trusses. The viaduct's structural steel is fully encased in concrete, a measure originally taken to protect the steel from weather and locomotive exhaust. Standard-design concrete balustrades, similar to those originally used all along the Route 1 Extension, enclose the roadway (photograph NJ-143-4).

Sources of Information

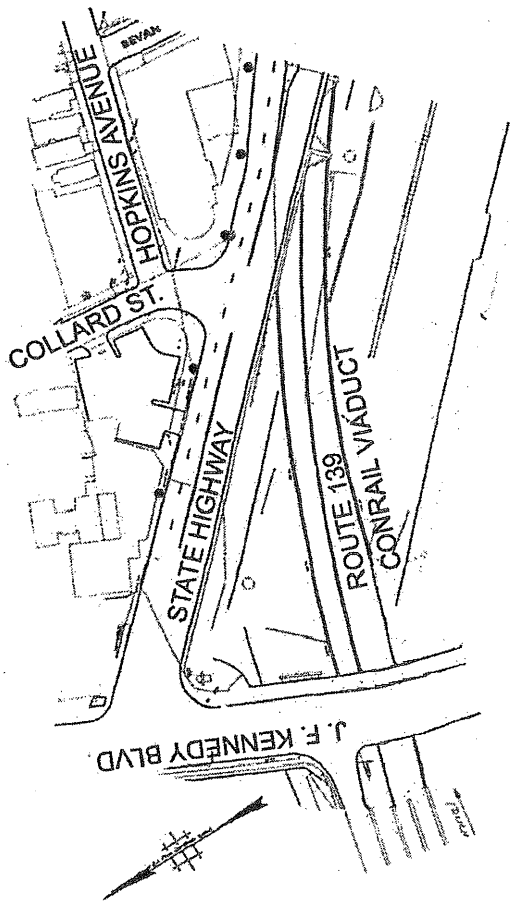
"A True Superhighway." Engineering News-Record. Vol. 104 (June 12, 1930), p. 961.

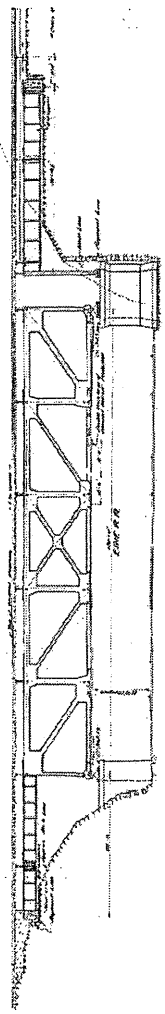
Lavis, Fred. "Highways as Elements of Transportation," American Society of Civil Engineers Transactions, Vol. 95 (1931), pp. 1020-1040.

New Jersey State Highway Commission. "Route 1 Extension." Annual Report of 1925. np.

_____. Annual Reports, 1923-1933.

Reddan, Frank. "A Super-Highway System Being Supplemented by A SUPER VIADUCT." Scientific American. August, 1932. pp. 83-85.





SCALE APPROX. 1"=330'

Existing General Plan and Elevation
Conrail Viaduct
Hudson County, NJ
By Lichtenstein Consulting Engineers
for New Jersey Department
of Transportation, 2004