PENNSYLVANIA RAILROAD, WHITFORD BRIDGE
Pennsylvania Historic Railroad Bridges Recording Project
Spanning Amtrak tracks at Whitford Rd.
Whitford
Chester County
Pennsylvania

HAER No. PA-522

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
1849 C Street, NW
Washington, DC 20240

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HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

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Jet Lowe, photographer, spring 1999.

PA-522-1 PERSPECTIVE VIEW, LOOKING NE FROM SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY (SEPTA) STATION PARKING LOT.

PA-522-2 OBLIQUE VIEW SHOWING WESTERN ABUTMENT, LOOKING ENE ALONG MAIN LINE. SEPTA COMMUTER TRAIN IN FOREGROUND.

PA-522-3 VIEW OF STRUCTURAL DETAIL AT MID-SPAN, LOOKING SE.

PA-522-4 LONGITUDINAL VIEW OF UNDERSIDE, LOOKING WEST FROM SEPTA STATION.

PA-522-5 EASTERN ABUTMENT, SHOWING WHITFORD BRIDGE ABOVE AND STONE ARCH UNDER MAIN LINE BELOW.

PA-522-6 LONGITUDINAL VIEW AT TRACK LEVEL, LOOKING WEST.

PA-522-7 DETAIL VIEW OF TURNBUCKLE IN DIAGONAL MEMBER, WITH KODACHROME FILM BOX ON RIGHT TURNBUCKLE FOR SCALE.

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HISTORIC AMERICAN ENGINEERING RECORD

PENNSYLVANIA RAILROAD, WHITFORD BRIDGE

HAER No. PA-522

Location:	Spanning Amtrak tracks at Whitford Rd., Whitford, Chester County, Pennsylvania.
USGS Quadrangle:	Downingtown, Pennsylvania (7.5-minute series).
UTM Coordinates:	18/445515/4429395
Dates of Construction:	1904-05.
Basis for Dating:	Interstate Commerce Commission valuation records.
Designer:	H. R. Leonard (Engineer of Bridges & Buildings, Pennsylvania Railroad).
Fabricator / Builder:	Pennsylvania Steel Co. (Steelton, Pa.).
Present Owner:	Norfolk Southern Railroad.
Present Use:	Railroad bridge (out of service).
Structure Type:	Pin-connected Parker through truss.
Significance:	The Whitford Bridge's main span, a pin-connected Parker through truss, is an exceptionally long example of its type at 373'-1". Its length surpasses the practical limit of 300'-0", beyond which a subdivided Pennsylvania truss was commonly used instead. It is also significant in association with the Pennsylvania Railroad's Philadelphia & Thorndale Branch, a low-grade freight line constructed as part of massive improvements during the early twentieth century.
Historian:	Justin M. Spivey, April 2001.
Project Information:	The Historic American Engineering Record (HAER) conducted the Pennsylvania Historic Railroad Bridges Recording Project during 1999 and 2000, under the direction of Eric N. DeLony, Chief. The project was supported by the Consolidated Rail Corporation (Conrail) and a grant from the Pennsylvania Historical and

Museum Commission (PHMC). Justin M. Spivey, HAER engineer, researched and wrote the final reports. Preston M. Thayer, historian, Fredericksburg, Virginia, conducted preliminary research under contract. Jet Lowe, HAER photographer, and Joseph E. B. Elliott, contract photographer, Sellersville, Pennsylvania, produced large-format photographs.

Description and History

The Pennsylvania Railroad (PRR) made a number of improvements to freight operations in eastern Pennsylvania during the administration of President Alexander J. Cassatt (1899-1906). In addition to reducing grades on the Trenton Cut-Off around Philadelphia, Cassatt's ambitious construction plan of 1902 included two sections of low-grade freight tracks: the Philadelphia & Thorndale Branch parallel to its main line in Chester County, and the Atglen & Susquehanna Branch along a separate alignment in Lancaster County. Except for a ten-mile stretch of shared tracks through Coatesville, these improvements constituted a complete separation of freight and passenger traffic between Trenton and Harrisburg.[1]

At Whitford, the Philadelphia & Thorndale Branch crosses over PRR's former four-track main line on an exceptionally long pin-connected Parker through truss. PRR bridge engineers completed plans for the two-track span in late 1904. Pennsylvania Steel Co. fabricated the structure, delivered parts from its Steelton plant in May 1905, and presumably completed erection that same year.[2] The truss crosses the passenger tracks at an extreme skew, but is framed square on stone abutments, perhaps to simplify design and construction. The Parker truss has diagonals in tension and inclined end posts like the Pratt truss, but uses material more efficiently in a polygonally curved upper chord. The Whitford Bridge's Parker truss is 56'-0" deep at mid-span and measures 373'-1" from center to center of its endmost pins. This exceeds the commonly accepted practical limit of 300'-0" for the Parker type.[3]

The Whitford Bridge is not the only PRR structure to push the Parker truss envelope. It has a slightly longer sibling, a 387'-10" span at 52nd Street in Philadelphia, built earlier in PRR's passenger-freight separation campaign. The 52nd Street Bridge carries only one passenger track, however, and is of somewhat lighter construction. In describing the Whitford Bridge, Conrail Chief Engineer James T. Sullivan noted that "a good many designers would have transferred to Pennsylvania truss construction" for this span length.[4] Because the Whitford Bridge's Parker truss has only eleven equal panels of 33'-11", its stringers must be exceptionally heavy 4'-7-1/2"-deep plate girders to carry loads between panel points.[5] A Pennsylvania truss design would have been more efficient by providing a secondary system of diagonals to support intermediate floor beams.

A 1918 photograph of the Whitford Bridge shows two features, perhaps original, that protected the passenger tracks below. Steel plates about 8'-0" high were bolted to the trusses on either side, and longitudinal wooden planks were laid across the ties to form a solid floor.[6] A few planks can still be found on the bridge, but no steel plates remain. The bridge has been out

of service, with its tracks removed, since about 1990. The former PRR main line below presently carries Amtrak passenger trains between Philadelphia and Harrisburg, and has only two tracks installed.

Notes

1. Howard W. Schotter, *The Growth and Development of the Pennsylvania Railroad Company: A Review of the Charter and Annual Reports of the Pennsylvania Railroad Company 1846 to 1926* (Philadelphia: Press of Allen, Lane, and Scott, 1927), 281-82.

2. Interstate Commerce Commission, Bureau of Valuation, Engineering Field Notes, Pennsylvania Railroad Eastern Division, Notebook No. 40, p. 13 (28 June 1918), in Box 6002, Record Group 134, National Archives, College Park, Md.

3. See T. Allan Comp and Donald Jackson, "Bridge Truss Types: A Guide to Dating and Identifying," *History News* 32, No. 5 (May 1977): Technical Leaflet No. 95.

4. James T. Sullivan, Chief Engineer, Design & Construction, Consolidated Rail Corp., to Diane S. Snyder, 5 June 1984, Milepost 27.76, region/division/branch 101122, correspondence files, Consolidated Rail Corp., Philadelphia, Pa. [transferred to Norfolk Southern Railway Co., Atlanta, Ga.].

5. Pennsylvania Steel Co., Bridge & Construction Department, "Bridge Carrying Low Grade Freight Line over Main Line, P. R. R., at Whitford, Pa." (1904), milepost 27.76, region/division/branch 101122, aperture card files, Consolidated Rail Corp., Philadelphia, Pa. [transferred to Norfolk Southern Railway Co., Atlanta, Ga.].

6. See photograph in Interstate Commerce Commission, op. cit. The plates also appear in an undated postcard image, Pennsylvania Railroad Scrapbook 3:227, Larry Woolsten Collection, Railroad Museum of Pennsylvania, Pennsylvania Historical & Museum Commission, Strasburg, Pa.