ET - 20331
Rec'd 9/18/13

Civilstar, Inc

September 13, 2013

Mr. Chad Slider
Office of the Indian State Historic Preservation Officer
402 West Washington Street, W274
Indianapolis, IN 46204

RE: Request for determination of eligibility of Bridge MP 40.19 over the Flatrock River (DHPA # 35523) (DHPA # 11979), STB Docket No. FD-35523, CSX Transportation, Inc.—Joint Use—Louisville & Indiana Railroad Company, Inc.

Dear Mr. Slider:

My name is Garry Shook and I am a Railroad Bridge Engineer who provides consulting services to the Louisville & Indiana Railroad Company, Inc. ("L&I") and other railroads. I am a 1973 graduate in Civil Engineering from North Carolina State University and have spent the past 40 years (35 years as Principal-In-Charge) inspecting, repairing, planning, designing and executing construction for bridge projects in 15 states including a number of railroad bridge projects in Indiana. I am a member of the American Railroad Engineers and Maintenance of Way Association (AREMA) and a member of AREMA Committee 15 (Steel Structures) since 1985. I am licensed to practice engineering in the State of Indiana as well as other states. I have been in charge of the rehabilitation, strengthening or replacement of five major truss railroad bridges in Indiana over the past two years.

As part of the proposed upgrade of the L&I Line as a result of CSX Transportation, Inc.'s acquisition of a permanent easement over the L&I Line, the existing bridge at MP 40.19 crossing the Flatrock River approximately one mile north of Columbus, IN (the "Flatrock River Bridge") will be replaced to allow for modern railroad operations. The existing Flatrock River Bridge restricts operations to speeds of 10 mph and car weights of 263,000 pounds gross weight on rail ("GWOR").

Upgrading the current Flatrock River Bridge is not feasible because of the age, condition and design of the existing structure. The current bridge does not meet the criteria of the Manual for Railway Engineering published by AREMA (the "AREMA Manual") for handling 286,000 pound GWOR at speeds up to 60 mph. I am very familiar with the AREMA Manual and do not see how the current bridge can be upgraded to meet the necessary standards without replacing the entire bridge.

The Flatrock River Bridge consists of two pinned connected Pratt truss spans of 144'-8" length and seven 30'-0" riveted deck plate girder spans on the south approach. The bridge is open deck timber tie construction supporting one mainline track and a single timber and steel grating walkway on the west side of the bridge. Most of the existing truss bridge elements are over 100 years old and are suffering from ware, steel fatigue and corrosion. The Flatrock River Bridge was designed in 1897 for an assumed live load of 5,000 lbs/ft of bridge plus a single concentrated load of 50,000 pounds equaling a total load of 765,000 pounds for each truss span. Current AREMA standards require capacity to support 1,948,000 pounds of live load for a 143' bridge span. The existing truss bridge is over 60% deficient of current capacity requirements.

While the original two truss spans and supporting substructure were built in 1899, numerous repairs to broken and deteriorated parts have been made over the years. Seven riveted steel deck girder spans and supporting stone substructure were built in 1916 to replace timber approach spans at the south end of the truss spans. Structural steel trusses and girder spans are "medium steel" and all rivets are of wrought iron that was in common use at the turn of the 19^{th} century. The piers and abutments were built of stone masonry on spread footings, excepting the two main span support piers (Pier 1 and Pier 2), which are supported on 20' long timber pile foundations. The two main span piers were encased in concrete in about 1970 due to differential settlement and advanced deterioration of the original masonry. In 2012 the upper portal braces were reconfigured and the upper lateral bracing square rods were replaced with new round rods.

The design of the Flatrock River Bridge is known as "Pin-Connected Pratt Trusses". Pin Connected Pratt Trusses were commonly used for railway structures on spans of 125 -200 feet built between 1890 and 1920. The design style is only significant in its simplicity and original low cost. Variations of the Pratt truss are in modern usage in non-railroad applications. However, Pin-Connected Pratt Trusses disappeared due to many problems found with this type of design. While the design provided for efficiency in steel weight, it proved not to be tough enough for modern railway loading over the long-term. Bridges with this design have many non-redundant "fracture-critical" members of a nature that can lead to sudden and complete bridge collapse in the event of failure of a single member or connection. Fatigue failure is a major concern with frequent high loadings common on railroad bridges. Of special concern, is damage to pin connections at truss panel points. The pins are concealed and can only be visually inspected by full disassembly of each truss joint which requires removing the connection pin. Connection pins become worn due to rotation with load deflection of the truss members and might fail without warning.

The eye-bar chords and hangers are subject to hairline cracks at or near the eyes due to material flaws common in the manufacturing processes used at the turn of the 19^{th} century. Bridges like the Flatrock River Bridge with pin connected eye-bar members are of special concern due to their historical susceptibility to failure.

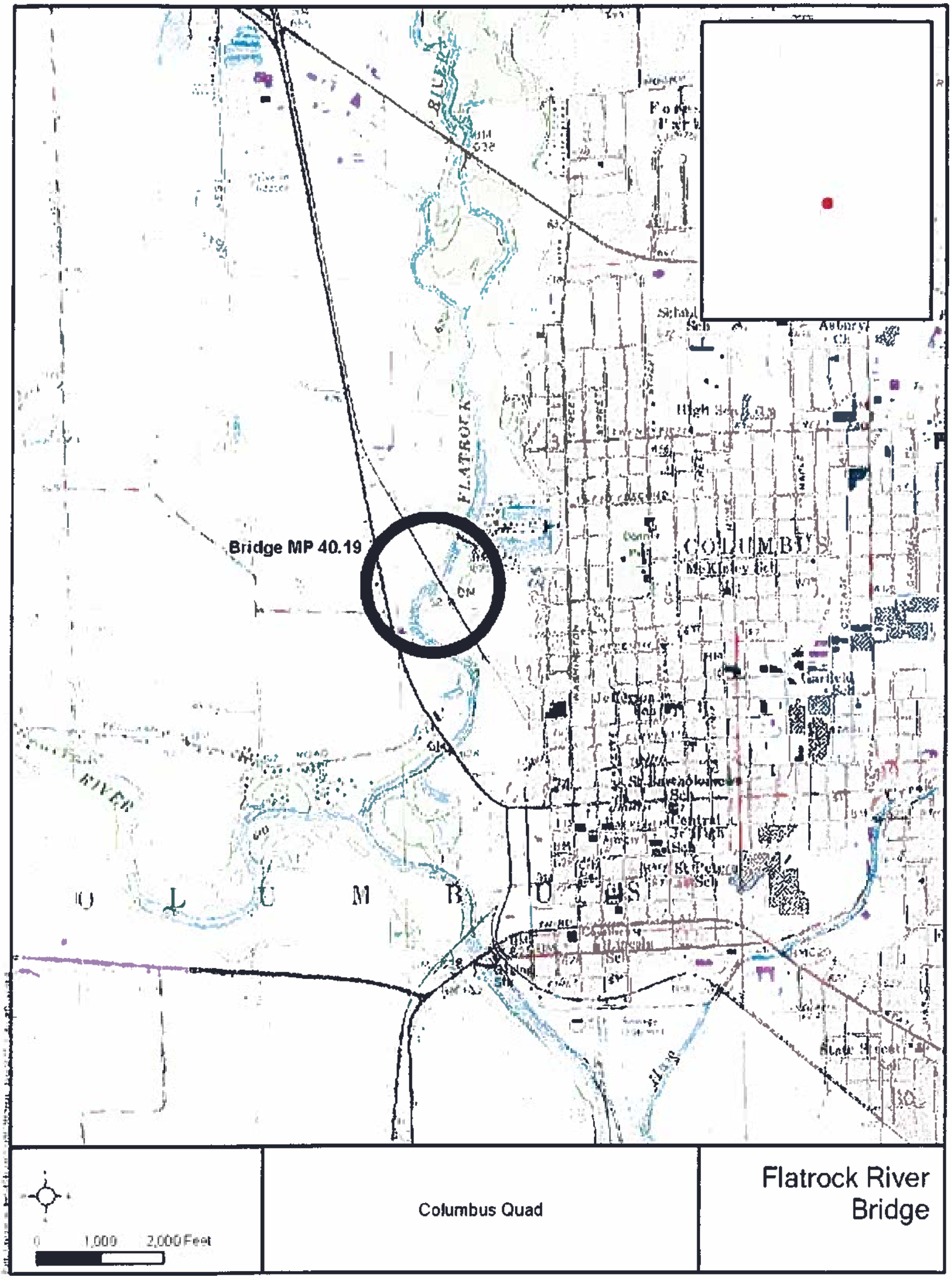
If a rehabilitation of the existing bridge were pursued as an option, numerous temporary supports would be required for staging truss rehabilitation. These temporary supports could clutter up the waterway catching drift and further restricting water flow during any flood event that might occur while rehabilitation was in process. Since the existing waterway opening is deficient at the bridge and there is a history of significant flooding near the site, nearby residents could suffer additional flood damage. Therefore, rehabilitation of the existing trusses is undesirable.

Any major work on Bridge MP 40.19 would also require increasing the existing under-clearance of the bridge by 2.5' to accommodate the 100-year flood elevation. Rehabilitating the Flat Rock River Bridge to make it useable for modern railroad operations would require replacement of stringers, floor beams, all truss bottom chord members, top chord members, all hangers, lateral bracing counters, and Pier #1 (due to inadequate pile support and settlement), thus totally compromising the bridge's historical integrity and in essence creating a new bridge. The cost for such rehabilitation would be greater than $5,000,000. In addition, maintenance cost of a rehabilitated bridge would be more than twice that of a modern steel girder replacement structure due the complexity and additional exposed steel surface area inherent to a truss bridge and lower strength and durability of the existing concrete, masonry and steel bridge materials.

The Flatrock River Bridge should be replaced with new steel thru-girder spans meeting AREMA specifications to provide for modern railroad operations and to ensure a high level of safety for railroad employees and the public. As an additional benefit, the new structure would increase the waterway opening and hydraulic efficiency at the site, potentially decreasing flooding risk in the Columbus area.

Sincerely yours,

Garry T. Shook, PE


Bridge MP 40.19
FLATROCK
RIVER
COLUMBUS
McKinley Sch
0 1,000 2,000 Feet
Columbus Quad
Flatrock River
Bridge