



CATANIA ENGINEERING ASSOCIATES, INC.

Consulting Engineers & Land Surveyors

March 16, 2009
File #80400-OHCD-03-C

Mr. John E. Pickett, AICP Director
Delaware County Office of Housing
And Community Development
600 North Jackson Street, Room 101
Media, Pennsylvania 19063

Re: SEPTA Trolley Bridge Inspection
Springfield Road and MacDade Boulevard
Borough of Darby

Dear Mr. Pickett:

On March 11, 2009, I inspected the abandoned trolley bridge over Darby Creek at your request. The following are my observations and recommendations.

Structure Description:

The existing bridge is a single span steel truss structure that was originally designed to support trolley traffic. The structure spans approximately 80 foot, is skewed and is approximately 20 foot wide. The bridge is supported on stone masonry closed abutments.

The center portion of the bridge has a steel plate deck with guardrails. The surface of the steel deck is diamond scored. This portion is approximately 12 feet wide. A chain link fence has been added to the deck along the guardrails.

Structure Condition:

Overall, the structure is in fair condition. The paint on the bridge is peeling and there is deterioration of the steel at various locations. The stone masonry abutments are in fair condition.

The steel trusses are in good condition. Portions of the paint have peeled, exposing the steel, but deterioration of the truss members is minimal. The worst location of deterioration is at the bearing locations, though the amount of section loss here is not detrimental to the structural adequacy of the bridge.

The steel floor system is in fair condition. The lack of paint is more a problem on the floor system. Approximately 50% of the steel is exposed and deterioration of these members has occurred. Due to the skew of the structure, the floor beams at the ends of the structure do not frame into the trusses, but are supported by the abutment. At these locations, there is approximately 20% section loss of the flanges and web. There is some deterioration of the floor beams at other locations in the span. The top flange of one floor beam has approximately 70% section loss. The remainder of the floor beams exhibit approximately 10% section loss. Most of this deterioration is located at the connection to the truss panel points and the top flange under the steel deck.

The steel deck is in good condition, though there is debris along the edges of the surface that is trapping moisture. There is some deterioration of the steel members under the decking along these edges.

The stone masonry abutments are in fair condition. There are a few locations where mortar has deteriorated and there are cracks in the walls, but these items do not affect the structural integrity of the bridge at this time. If not addressed, over time, the stone will displace possibly causing failure of the abutments and wingwalls.

Recommendations:

It is our understanding that the existing bridge is to be converted to pedestrian use. Overall, the structure is adequate to support the required design loading for pedestrian use. There are a few modifications and repairs that are required to meet current design standards and ensure the long term stability of the structure.

1. The bridge shall be cleaned and painted. **Estimated cost is \$29,000.**
2. The chain link fence will need to be removed and replaced by a 42 inch high pedestrian railing system. This system shall meet the AASHTO design standards for loading and opening size. These requirements are that a 4 inch diameter sphere can not pass through an opening and that the rail system is designed for a 200 pound concentrated load or a 50 pound per foot uniform load acting in any direction. **Estimated cost is \$18,000.**
3. In the few areas that the structural floor beam members have deteriorated, steel plates shall be added to strengthen the sections. **Estimated cost is \$5,000.**
4. On the abutments, there are locations where the mortar has deteriorated. These locations shall be tuckpointed to a minimum depth of 2 inches. **Estimated cost is \$1,000.**
5. The steel deck surface is in fair condition and structurally can remain in place. It should be noted that the surface has a diamond scoring pattern that has been worn, limiting its ability to create a slip resistance surface. Our recommendation is that the steel deck be sandblasted and coated with an epoxy paint treatment that has abrasive material added to provide a slip resistant surface. This surface will require cleaning of debris after flooding and in the fall when the leaves fall to maintain the slip resistance. **Estimated cost is \$4,000.**

The total estimated cost to perform these items is \$57,000.

If you have any questions, please feel free to contact me.

Very truly yours,



Zeyn B. Uzman, PE, F.NSPE
For Catania Engineering Associates Inc.



Photo 1 – Elevation of existing bridge. Note peeling paint on truss.



Photo 2 – Loss of mortar on north abutment.



Photo 3 – Deterioration of steel beam encased in concrete at abutment.



Photo 4 – Looking south at steel deck. Note debris that collects due to flooding and leaves.



Photo 5 – Looking at chain link fence. This fence does not meet current design requirements.



Photo 6 – Looking at top of floor beam at north end of bridge. Note deterioration of top flange.