

SHAW BRIDGE
Claverack, New York

INITIAL SITE VISIT

&

REPORT

December 13, 2012
Revised December 28, 2013



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SITE MAP

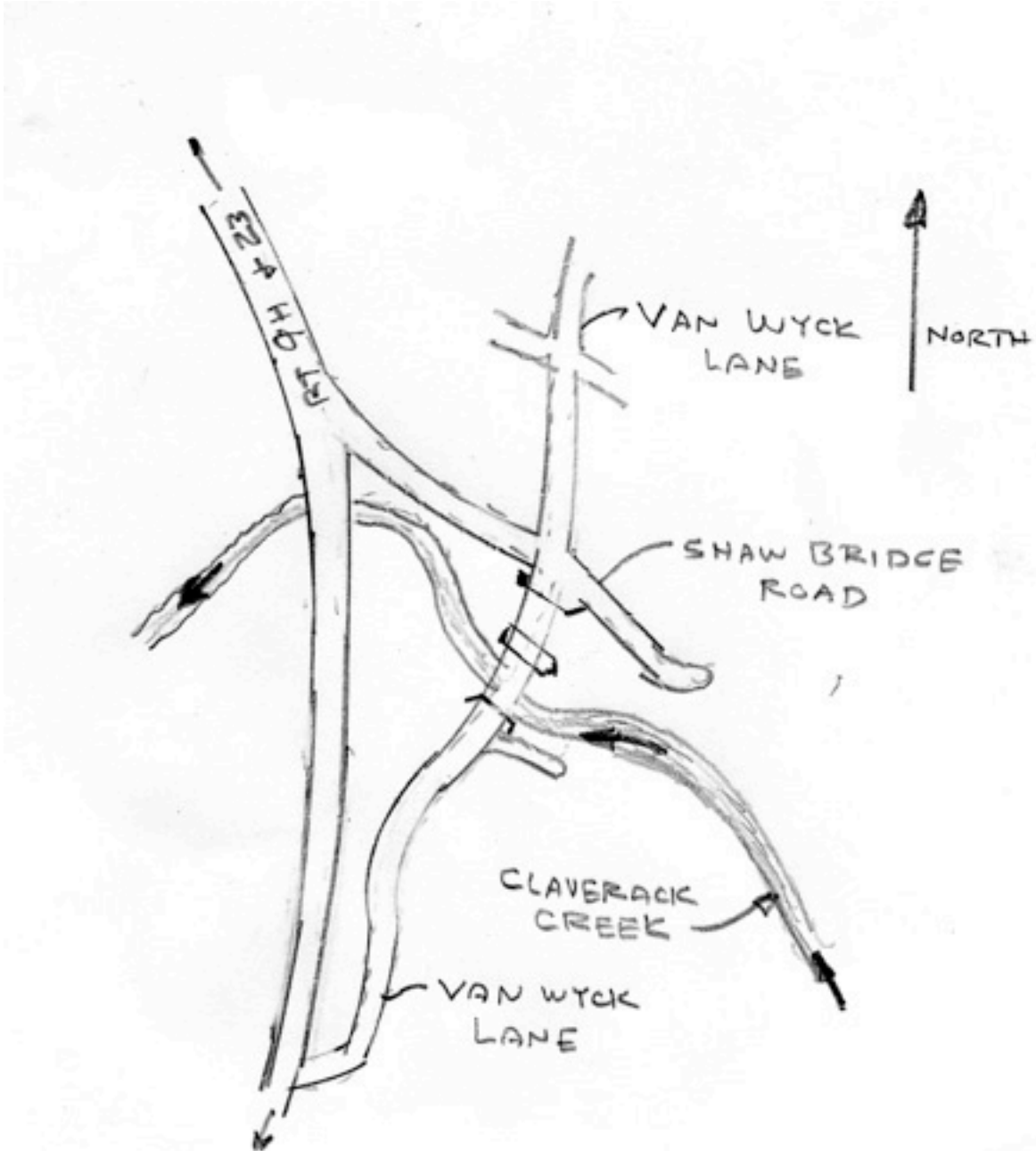


Figure 1

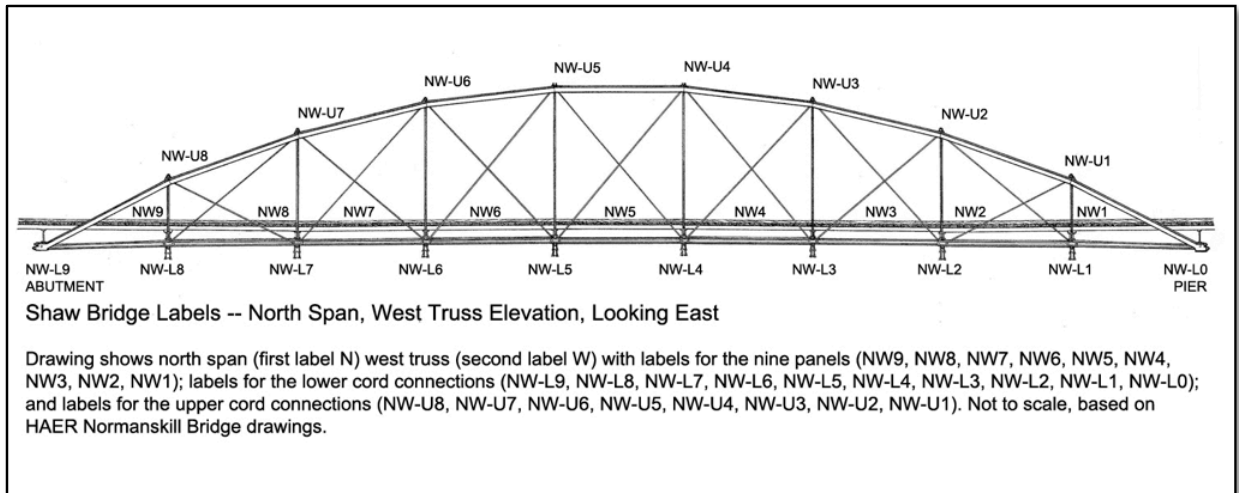


Figure 2

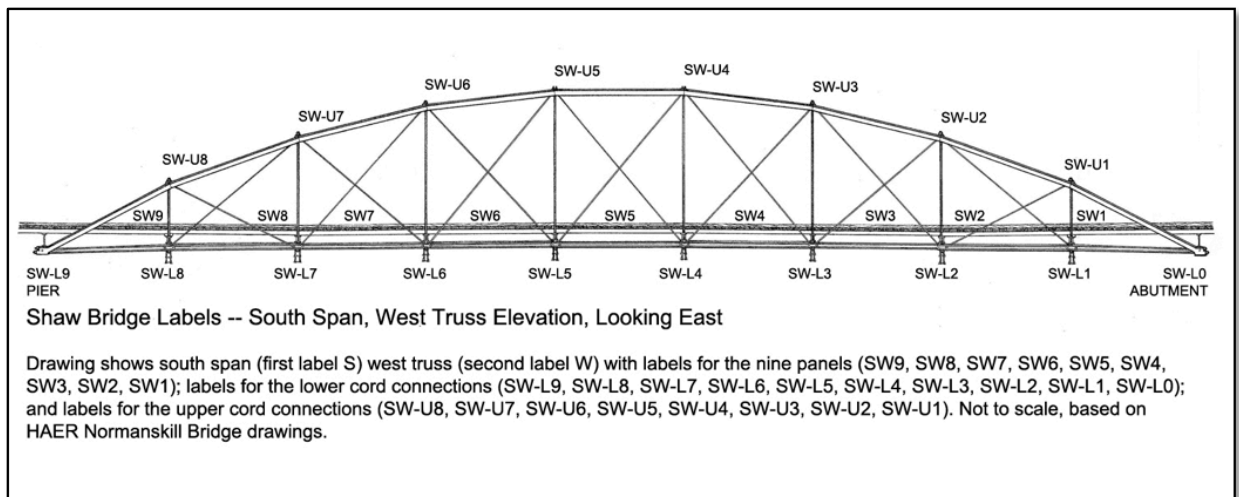


Figure 3

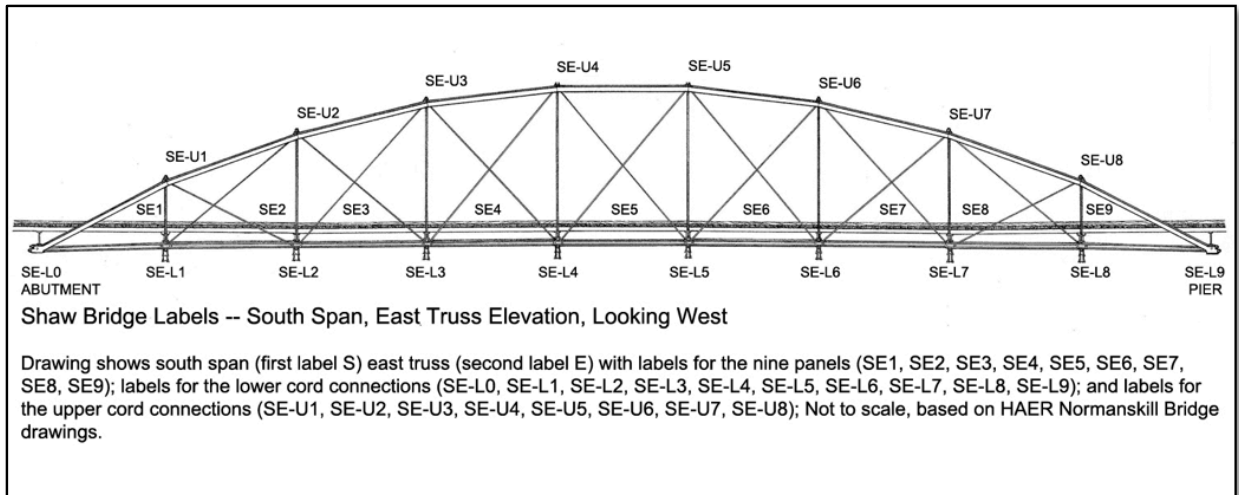


Figure 4

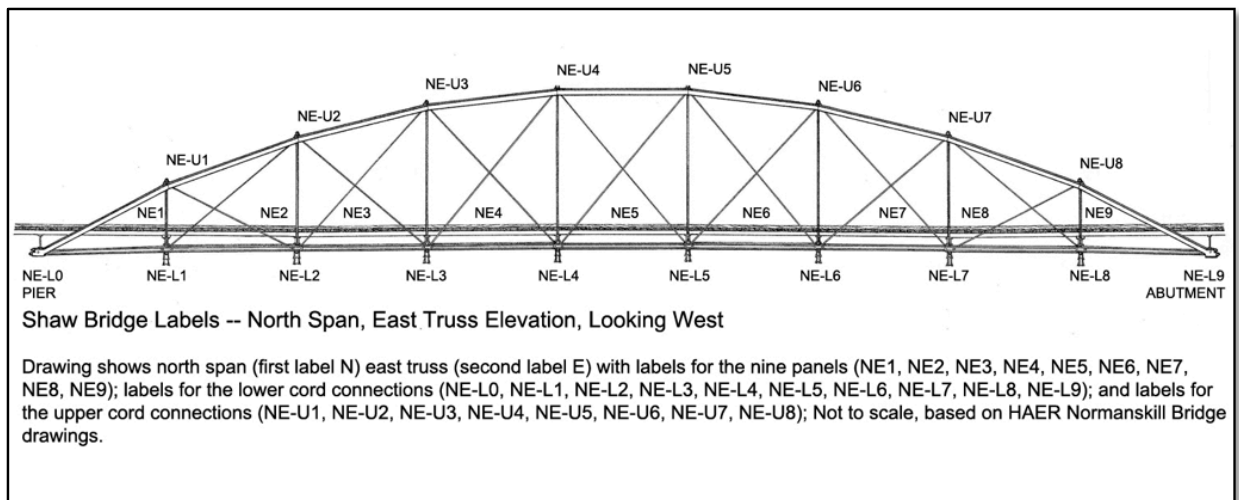


Figure 5

Evaluation of cast and wrought iron elements of the bowstring trusses

Top Chords, Cast Iron

The chords are in excellent condition. The joints between segments are generally full bearing. Evidently in the past someone from the town thought the segments were shifting with respect to one another and added the retainer plates as shown in the connection images (SE-U5, SW-U4, NW-U4). [See Appendix for digital images of truss connections and members.] There was no current evidence that these joints had shifted and it is my opinion that the retained plates can be removed in the rehabilitation of the spans. There are some casting depressions but these are not significant and can be left alone unless it is desired to fill them in with an appropriate mixture such as a tinted bondo. A small hairline crack was observed on the east truss of the south span where someone had attached a railing bracket (near SE1) and connected a steel bar across the crack. This is not a serious structural problem but if desired the crack could be grooved out, the casting heated to a red-hot condition and a bead of welding or brazing could be applied and later ground down flush. At one location a lip of the top chord has been chipped off but no action is required to repair it. In locations where railings have been welded or dowelled to the cast iron (NW9, SW1, NE9, etc.) these should be removed and the holes filled in with welding or brazing and the areas ground flush.

The largest unknown is the condition of the ends of the chords that have been encased in concrete at the abutments and pier. It is unlikely that the cast iron has been damaged by the encasing but they should be examined after the concrete is removed.

Lower Chord loops, Wrought iron

Based upon a visual examination these loops appear to be in good condition and in full contact with the cast iron junction blocks as there were no observed loose members. The largest unknown is again at the ends where they have been encased with concrete and where they enter the upper chord casting. In the past there has been some necking down of the bars where they enter the casting. This area should be investigated closely when the concrete is removed and when the structure is cleaned and any cake or pack rust is removed.

Verticals, Wrought iron

Based upon a visual examination, except in areas where they have been bent, probably from some vehicle crossing the bridge, they appear to be in good condition. In the past there has been some necking down from corrosion where the vertical passes into the cast iron junction block. All of these areas should be reexamined after the structure is cleaned and any cake or pack rust is removed.

Diagonals, Wrought iron

Except where broken (SE-L5, SE-L6, SE-U3, SE-L3) or bent (SE6), as shown in the truss images the diagonals are in good condition. Many of the diagonals are loose and will need to be tightened. As with the verticals necking down of the section can occur where the diagonals enter the cast iron junction blocks. Pack rust is visible in many locations where the diagonals enter the junction block so it is probable that some of the ends of these elements may have to be replaced. All of these areas should be reexamined after the structure is cleaned and any cake or pack rust is removed.

Junction blocks, Cast Iron

All junction blocks appear to be in a solid, uncracked, condition.

Deck structure, beams and cross bracing



Image taken under the north span looking north



Image taken under north span looking north at north abutment

The beams, probably steel and not original, appear to be in fairly good condition. Some rusting on the top flanges is apparent. It is believed that after cleaning they should be reusable.

The diagonal floor bracing also looks okay. The turnbuckles will have to be cleaned and restored to operating condition.

The wooden decking must all be replaced. From a distance it appears that the wooden stringers may be salvageable but prudence would suggest the entire wooden structure be replaced.

Foundations, Abutments, Pier

North Abutment



South face, looking north



South face, edge view



North Abutment west face



North Abutment, east face



Looking northwest

Condition

The rough masonry appears to be stable after over 150 years. No sign of settling or shifting out of plane. Should be usable with only a chipping, prying, out of all loose mortar and re-pointing. The mortar should be forced as far into the masonry as possible using a dry pack mortar. Re-pointing has been attempted in the past. It is not known if the masonry joints were initially mortared but it is likely the stonework was dry laid.

It is not known what the foundation for the masonry consists of. Given the roughness of the masonry it is clear that not much attention was paid to the quality (say when compared with Erie Canal limestone masonry) of the foundation. It is likely an excavation was made a few feet deep and the masonry laid directly on the subsoil. If a foundation was placed at all it may have been of timber similar to Erie Canal masonry.

Central Pier



West face



East face, ice breaker



East and south face

Condition

Same as north abutment

South Abutment



South Abutment, north face

Condition

Same as north abutment and central pier

Conclusions and Recommendations

It is understood that any rehabilitation of the trusses, foundations and decking will take place in a phased fashion. With that understanding I would suggest the following course of action.

Phase I

1. Remove concrete covering ends of the bowstring trusses to enable an inspection of the iron work, top chord end and end loops.
2. Remove existing rotting deck planking, and guide rail, and replace with temporary planking to serve as a working platform.
3. Sandblast all ironwork to remove what is apparently lead paint. Make sure that all pack rust is blown out where diagonals and verticals intersect and pass through the cast iron junction blocks. Use appropriate environmental safeguards.
4. Make a detailed inspection of all ironwork to determine which of the verticals or diagonals may need to be repaired.
5. Remove top chord retainer plates to determine if bearing of top chord elements are uniform across their widths.

Phase II

Prepare plans to:

1. Straighten bent diagonals and verticals. This can be done by heating the iron, placing a stiff angle iron along the member and using some type of clamping device pull the bend back flush with the attached angle iron.
2. On broken diagonals or diagonals with significant section loss where they pass through the junction blocks cut off about 3 feet of bar and weld on new mild steel threaded rod.
3. Remove all traces of railing welded to or bolted to the cast iron top chords.

Phase III

1. Re-point masonry joints.
2. Rehab ironwork.
3. Apply four-coat paint system. I would suggest a black color. The National Park Service recommends (27 Preservation Briefs) a zinc-rich primer, followed by an epoxy base coat, and two urethane finish coats.
4. Replace wooden decking, stringers and planking. I would suggest rough sawn treated planking. I would also suggest a deck width of no more than 10 feet.

5. Select and install a railing system attached to the decking and/or curbing. A railing system from the 1870 time period is suggested.
6. Install approach walkways to bridge on north and south ends. I would suggest some type of pavers rather than asphalt, as it is a walkway not a roadway. If necessary, to keep vehicles off the bridge, some bollards may be necessary.
7. At the ends of the bridge consider some type of park or picnic area with informational kiosks explaining the historical significance of the bridge and the process used in rehabilitating it.

North span, easterly truss



South span, easterly truss, showing creek



Twin spans looking southerly