HISTORIC BRIDGE ALTERNATIVE ANALYSIS REPORT

REPLACEMENT OF MERCER COUNTY BRIDGE NO. 230.3 (STRUCTURE #1100-0072) CARRYING MINE ROAD OVER STONY BROOK,

Township of Hopewell, Mercer County, New Jersey

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Executive Summary

IH Engineers, P.C., consultants to the Mercer County Department of Transportation and Infrastructure-Engineering Division, with the assistance of RGA, Inc. (RGA), completed an Historic Bridge Alternatives Analysis for the proposed replacement of Mercer County Bridge No. 230.3 (Structure #1100-072) which carries Mine Road over Stony Brook in the Township of Hopewell, Mercer County, New Jersey. Bridge No. 230.3 is located approximately 40 feet east of the intersection of Mine Road and Stony Brook Road. The proposed project will require a Freshwater Wetlands Permit (N.J.A.C. 7:7A). According to Freshwater Wetlands Protection Act Rules, archaeological, historical and architectural resources listed or eligible for listing on the National Register of Historic Places (NRHP) must be identified in order to determine if the project will affect such resources. The Historic Bridge Alternatives Analysis Report is intended to address specific impacts of proposed work on the NRHP-eligible Mercer County Bridge No. 230.3.

The preferred project alternative calls for the replacement of the current bridge with a new pony truss bridge, which will have an adverse effect on the NRHP-eligible Mercer County Bridge No. 230.3. Replacement of the bridge is needed to improve public safety and the structural integrity of the crossing, improve road deck geometry, and increase the live load capacity of the bridge. Mitigation measures should include historic and photographic documentation of the historic bridge to the standards of the Historic American Engineering Record and the completion of a historical context document. Consultation with the New Jersey Historic Preservation Office regarding additional or alternative mitigation options is recommended.

1. Introduction

This report presents the results of a Historic Bridge Alternatives Analysis for the proposed replacement of Mercer County Bridge No. 230.3 (Structure #1100-072) which carries Mine Road over Stony Brook in the Township of Hopewell, Mercer County, New Jersey. The project will require a Freshwater Wetlands (FW) permit from the New Jersey Department of Environmental Protection (NJDEP) under the Division of Land Use Regulation. In accordance with the FW rules, the potential for this project to impact historic, archaeological and architectural resources must be considered under New Jersey Administrative Code (N.J.A.C.) 7:7A. A Phase I archaeological survey and an Intensive-level historic architectural survey have been completed under separate covers to address the FW requirements. The Historic Bridge Alternatives Analysis Report is intended to address specific impacts of proposed work on the National Register of Historic Places (NRHP)-eligible Mercer County Bridge No. 230.3.

2. Location

Mercer County Bridge No. 230.3 carries Mine Road over Stony Brook in Hopewell Township, Mercer County, New Jersey (see USGS map). The project location includes Bridge No. 230.3, sections of Mine Road which form approach roadways to the bridge, portions of Stony Brook Road just north and south of its intersection with Mine Road, and off-road areas extending north and south from Mine Road and east

and west from Stony Brook Road. The project location extends roughly 160 feet west and 90 feet east along Mine Road from the center of Bridge No. 230.3, and 90 feet north and 80 feet south along Stony Brook Road from the center of its intersection with Mine Road.

Mine Road is a two-lane roadway that generally runs on a southeast-northwest axis. Bridge No. 230.3 is located approximately 40 feet east of the intersection of Mine Road and Stony Brook Road. Stony Brook is a minor stream, and its banks are open on both sides of the structure. The surrounding area is generally agricultural in nature with open fields and limited residential development.

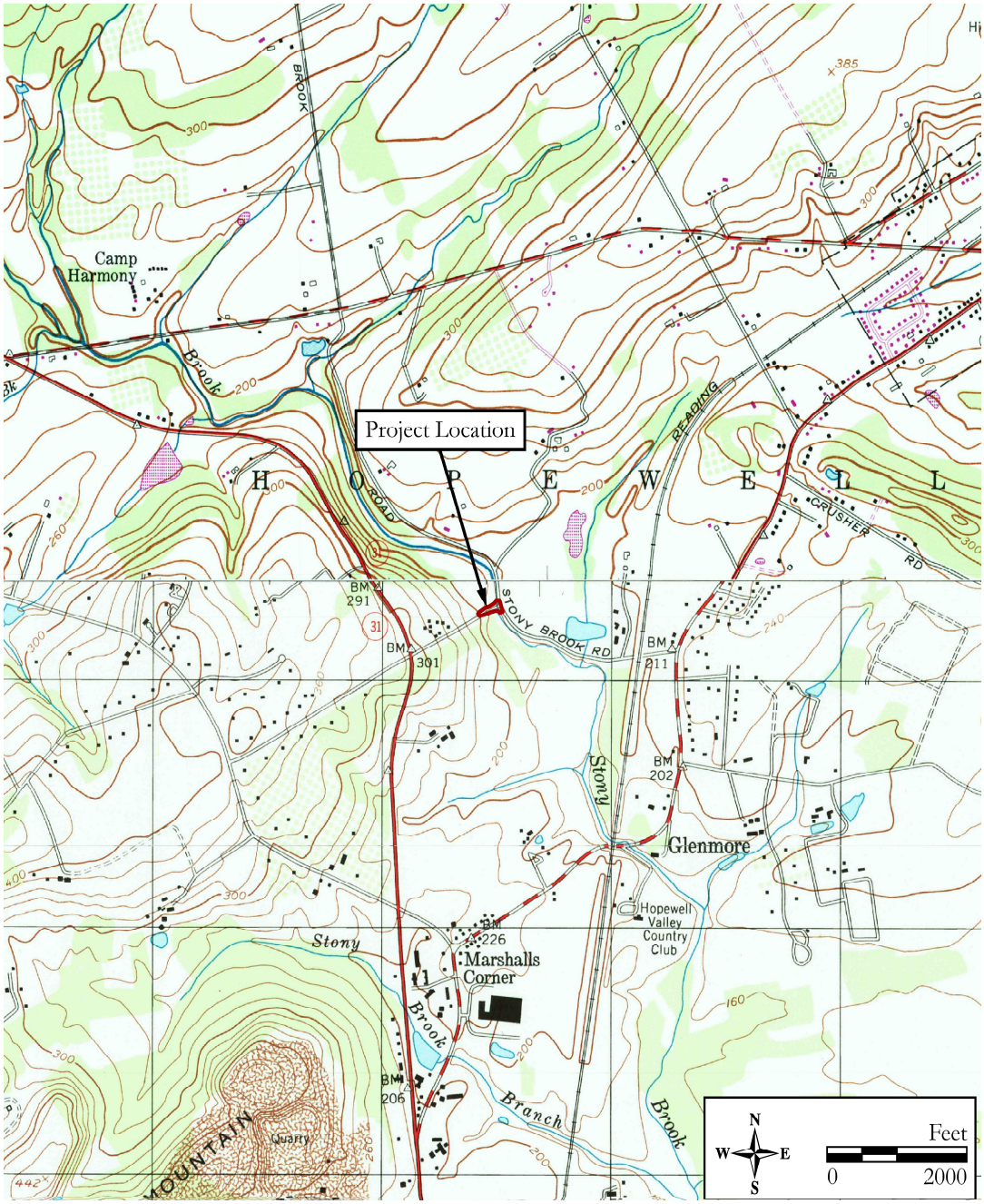
3. The Structure

A. Technical Information

Mercer County Bridge No. 230.3 is a single-span, pin-connected Pratt through truss structure constructed in 1885. Both bridge approaches consists of a two-lane asphalt-paved roadway, with modern W-beam guiderails located along either side of the roadway. The guiderails continue across the bridge, along the inside face of the truss. The bridge superstructure measures seven panels long and has shallow channeled upper chords, inclined end posts, and laced vertical members. A square plaque mounted on the northeast facing end post is inscribed with the names of the bridge committee members. Situated between the upper chords are struts with laced bracing and latticed braced portal struts. A plaque at each end of the portal struts reads “1885 King Iron Bridge Co., Cleveland, O.” The top lateral bracing on the structure attaches to a crimped bracket that connects at the upper panel point pins. Diagonals consist of bar stock with looped-forged eyes, while the counters are round rods fitted with turnbuckles for adjustments. The lower chords are die-forged eye bars.

At the end panels of the structure, true hangers (tension verticals) twist 90 degrees out of phase and pick up the end floor beams. In the New Jersey Historic Bridge Survey, A.G. Lichtenstein & Associates, Inc. stated that the “originality of the rolled I beam floor beams is not known, but it is believed that they are not original” (A.G. Lichtenstein & Associates, Inc. 1994). The floor beams are cut back in section but are fitted with the original brackets for the bottom lateral bracing. The floor beams support five galvanized steel stringers and an open steel grid deck installed in 2011 (Johnson, Mirmiran & Thompson [JMT] 2015: 16-50).

The substructure consists of ashlar stone abutments and wing walls. Concrete caps the top of the northwest and southwest wing walls.


Project Location
Camp Harmony
Brook
HOPEWELL
ROAD
STONY BROOK RD
CRUSHER RD
BEARING
BM 291
BM 301
BM 211
BM 202
Stony
Glenmore
Hopewell Valley Country Club
BM 226
Marshalls Corner
Stony Brook
Branch
Brook
BM 206
MOUNTAIN
Quarry
N
W
E
S
Feet
0
2000

B. History and Significance

Mercer County Bridge No. 230.3 is a notable example of a late nineteenth-century, pin-connected Pratt through truss structure in Mercer County, a bridge type commonly built in New Jersey during the 1880s and 1890s. The King Iron Bridge and Manufacturing Company (KIBMC) of Cleveland Ohio, known as the King Bridge Company after 1892, constructed the subject bridge in 1885. The KIBMC was one of many bridge fabrication companies that emerged during the second half of the nineteenth century, as advances in engineering, metallurgy and fabrication led to uniformity and standardization within the field of metal truss bridge construction. The KIBMC became a prominent bridge manufacturer throughout the United States due to the company's efficient design and operation, which made its bridges an economical option for potential clients. Prior to the regular employment of professional engineers by county and local governments, which began in the early twentieth century, bridge fabrication companies served as both builder and engineer and would widely distribute catalogs advertising their products. These illustrated catalogues, along with a network of regional bridge agents, enabled distant manufactures, like KIBMC, to compete with local contractors on county-awarded bridge contracts. Built in 1885, Mercer County Bridge No. 230.3 dates to a period in the company's history when it had begun to diversify its product line beyond bowstring trusses to include the then-popular Pratt pony and through truss structures. Today, the bridge is the last remaining known KIBMC-built structure in Mercer County.

Mercer County Bridge No. 230.3 is recommended individually eligible for listing on the NRHP under Criteria A and C as an intact example of a pin-connected, Pratt through truss bridge fabricated by the KIBMC. The structure is an increasingly rare example of a once common bridge type in New Jersey, and a rare extant example of the work of the KIBMC. The KIBMC was a prominent bridge building company that attained a degree of success in the late nineteenth century, as truss bridge construction proliferated throughout the country. The subject bridge dates to a distinct phase in the company's development. According to the New Jersey Historic Bridge Survey, the subject bridge was one of two known remaining KIBMC trusses in Mercer County (A.G. Lichtenstein & Associates, Inc. 1994). The other KIBMC truss, known as the Bear Tavern Road Bridge, was removed from its original location in 2014 and replaced with a concrete slab structure. Since its removal, this truss has been held in storage for future reassembly at the Mercer County Park Commission's Howell Living History Farm (Hopewell Valley News 2015).

C. Character-defining Features

Character-defining features include the bridge's iron truss system, comprised of riveted laced vertical and overhead members and diagonal eye cables, original pin connections, true floor beam hangers and maker's plaques. Additional character-defining features of the historic bridge are the bridge

deck and stringers, and the coursed ashlar abutments and wingwalls of the substructure.

D. Integrity

The structure retains several character-defining features that are distinctive of its type. The majority of extant character-defining features are elements of the original iron truss system, including extant riveted laced vertical and overhead members and diagonal eye cables, original pin connections, true floor beam hangers, and original maker's plaques. Though an exact construction date for the coursed ashlar abutments is not known, stylistically the abutments date to the mid- to late nineteenth century and were likely constructed around the same time as the superstructure. The original bridge deck and stringers are not extant and therefore no longer contribute to the integrity of the bridge.

E. Condition

1. Existing Conditions

   The information provided below is based on the most current bridge inspection report entitled, "Bridge Re-Evaluation Survey Report - Structure No. 1100-072, Mercer County Structure No. 230.3, Mine Road Over Stony Brook, Hopewell Township, Mercer County, Cycle No. 16, May 1, 2015," prepared by Johnson, Mirmiran & Thompson (JMT 2015; Referred to as "2015 Inspection Report" hereafter).

   The bridge is a single-span riveted wrought iron Pratt through truss structure, and is pinned at the panel points. The bridge's floorbeams are spaced at 14'-6." Non-continuous stringers connect the floorbeams, making these elements fracture critical.

   The bridge has been characterized as Structurally Deficient due to the poor condition of the superstructure and its low load carrying capacity. The bridge is also characterized Functionally Obsolete due to the substandard deck geometry.

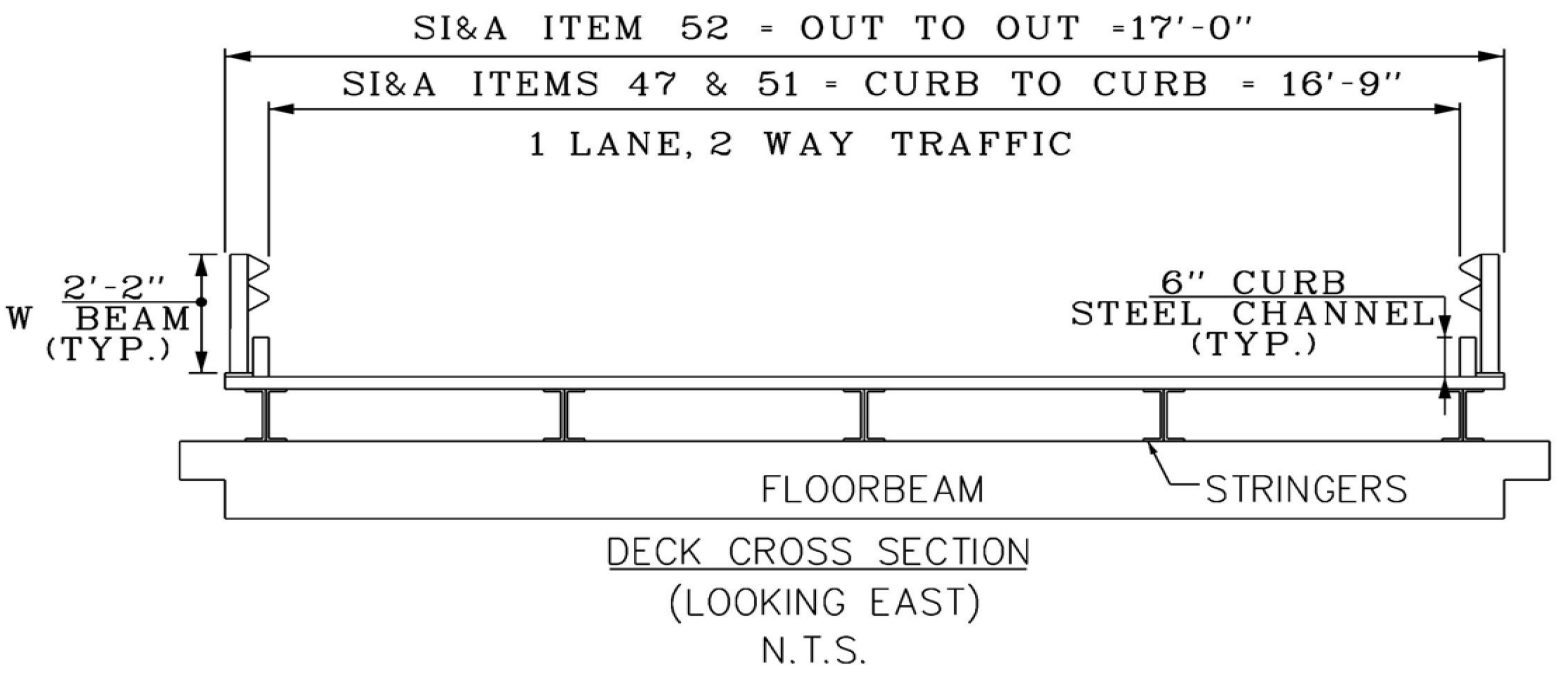
   The bridge is located 25 feet from the intersection of Stony Brook Road and Mine Road, which meet at a Tee intersection. The bridge is on an approximate 8% longitudinal slope. The deck has a curb-to-curb width of 16.7 feet, but carries two lanes of traffic, one in each direction, and has no shoulders. The bridge has a vertical clearance of only 12'-3" below the end portals of the truss at the curb line at all four corners. The bridge railing is substandard at 2'-2" high. The railing is characterized as a W-beam guiderail with steel posts spaced 10 feet apart, and no spacer blocks are attached to the truss. The transition from the bridge to the bridge railing is a single element W-beam, with un-stiffened, steel spacers and continues from the bridge. This transition is typical at all four corners. The approach guiderails are W-beam and spaced with steel spacer blocks; the southwest corner does not have guiderail end terminals.

The structure is posted for 4 Tons Gross load at the bridge and on Stony Brook Road. The structure is posted for 12'-0" vertical under-clearance at both corners of the bridge and at west approach roadway near the intersection of NJ 31 and Mine Road, and at both approach roadways of Stony Brook Road. There is a "Road subject to Flooding" advisory sign at the west approach.

Since 2015, the structure has further deteriorated to a degree that it was determined unsafe for use by the County. For the safety of public, the bridge has been closed to traffic.

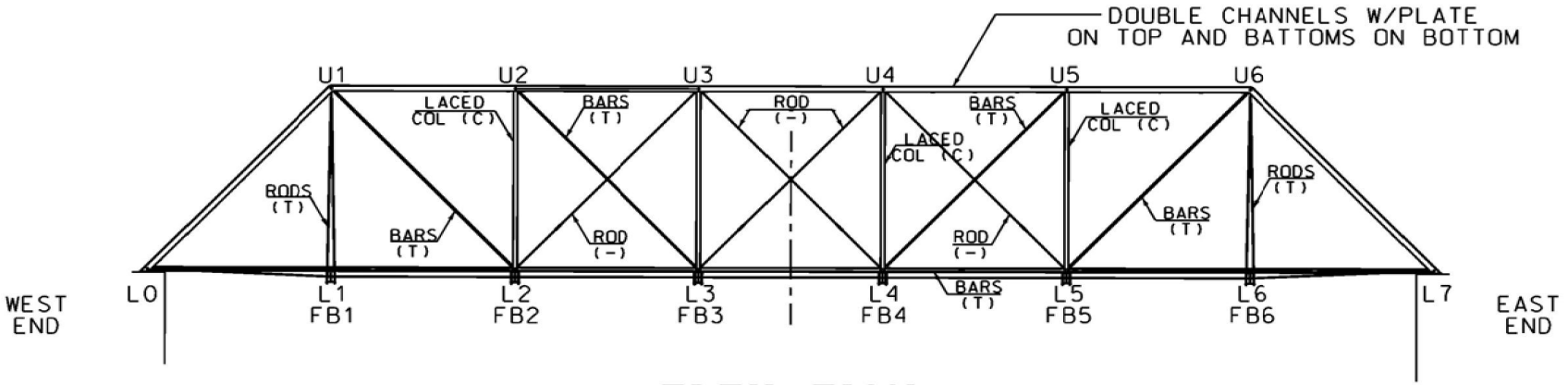
2. Photographs of Existing Conditions
   The photos provided are from the 2015 Inspection Report (JMT 2015).

3. The order of the following bridge components reflects the descending urgency of any deterioration.
   a. Superstructure- Poor condition
   b. substructure/abutments- Satisfactory condition



DECK CROSS SECTION
(LOOKING EAST)
N.T.S.

MERCER COUNTY DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE, DIVISION OF ENGINEERING	
STRUCTURE NO. 1100072 MERCER COUNTY STRUCTURE NO. 230.3 MINE ROAD OVER STONY BROOK HOPEWELL TOWNSHIP MERCER COUNTY	
JOHNSON, MIRMIRAN & THOMPSON	CYCLE NO. 16
	DATE: 5/1/2015



ELEVATION

N.T.S.

T= TENSION
C= COMPRESSION

NOTE:
1. FRACTURE CRITICAL MEMBERS:
BOTTOM TRUSS CHORD, TRUSS VERTICALS,
DIAGONALS LABELED (T), & FLOORBEAMS

MERCER COUNTY DEPARTMENT OF TRANSPORTATION
& INFRASTRUCTURE, DIVISION OF ENGINEERING

STRUCTURE NO. 1100072
MERCER COUNTY STRUCTURE NO. 230.3
MINE ROAD OVER STONY BROOK
HOPEWELL TOWNSHIP
MERCER COUNTY

Location:	Vertical clearance warning sign of the west approach, looking east.
Description:	Broken post of sign 850 feet from bridge.

Location:	Bottom chord of the north truss connection to floorbeam FB1, looking southwest.
Description:	The inner bar has an area of section loss behind the guide block due to pack rust (yellow arrow). The outer guide block is cracked and bent due to pack rust (red arrow).

Location:	Bottom chord pin at L5 of north truss connection to floorbeam FB5, looking east.
Description:	The pin has an area of section loss due to pack rust below the protective sleeve. The counter-action rod has heavy section loss (white arrow). Note the severe pack rust and section loss of the shim plates on the top flange of FB5 (red arrow).

Location:	Bottom chord pin at L3 of south truss, looking west.
Description:	The pin has section loss due to pack rust which was previously below the protective sleeve (bent down to reveal the pin).

Location:	East portal member near the south truss, looking south.
Description:	Moderate collision damage.

Location:	Floorbeam FB2 east face, looking west.
Description:	Heavy corrosion has caused section loss to the top flange with knife edging and a pin hole (red arrow).

4. Statement of Project Need

A. Bridge Condition

As per the Conclusions and Recommendations on Page 16-2 in the 2015 Inspection Report, the overall condition of the structure is critical due to the low load ratings. The bridge has been given an overall rating of 4, i.e., poor condition, due to advanced section loss to the primary structural elements. Since 2015, the structure has further deteriorated to a degree that it was determined unsafe for use by the county.

The bridge is a single-span riveted wrought iron Pratt through truss structure, and is pinned at the panel points. The bridge's floorbeams are spaced at 14'-6." Non-continuous stringers connect the floorbeams making these elements fracture critical. The trusses are fracture critical as well as internally redundant. The superstructure condition rating is poor due to the following issues: the bottom chord bars have areas of section loss behind the guide block due to pack rust; there is section loss to the lower pins; there is heavy section loss of approximately 50% on the diagonal counter-action round bar "eyes" on the lower pins; there is a missing lateral floorbeam bracing round bar in the west floorbeam bay; and finally, heavy corrosion exists with section loss of 50% at the NW and NE lateral floorbeam bracing round bar at the bearing attachments. The substructure condition rating is characterized as satisfactory due to loss of joint mortar on the breast-walls and wing-walls.

Additionally, JMT determined that the bridge was classified as "structurally deficient due to the poor condition of the superstructure and the low load carrying capacity" and the bridge was classified as "functionally obsolete due to the inadequate deck geometry." The bridge carries a two lane road, with two-way traffic, and the bridge has a curb-to-curb width of only 16.7 feet. As per AASHTO Bridge Rating Code for ADT of 101-400, the bridge has to be 32 feet wide to accommodate two lane, two-way traffic. These conditions have been rated intolerable. Therefore, JMT recommended replacing the structure (JMT 2015).

As per the Conclusions and Recommendations on Page 16-2 in the 2015 Inspection Report, the bridge is currently posted for 4 Tons Gross load on both ends of the bridge and at the beginning of Mine Road near Route NJ 31; however, there is no advance load posting signs on NJ 31 northbound or southbound to prevent large trucks from making the turn onto Mine Road. The bridge is also posted for a vertical clearance of 12'-0" at both approaches on Mine Road, at the intersection of Mine Road and NJ 31, and in advance on Stony Brook Road northbound and southbound. However, there is no advance clearance posting signs on NJ 31 northbound or southbound to prevent large trucks from making the turn onto Mine Road. This implies that the bridge is being subjected to heavier and higher loads than its designed capacity.

If the structure were to remain in the deteriorated condition as documented in the 2015 Inspection Report, it could not be used. Since 2015, the structure has further deteriorated to a degree that it was determined unsafe for use by the county, and in the interest of public safety, the bridge has been closed to traffic.

The proposed project seeks to improve the road deck geometry to achieve minimum design standards and enhance vehicular and pedestrian safety along Mine Road, prevent continued deterioration of the bridge superstructure and improve the physical condition of the bridge, and increase the live load capacity of the bridge. The details of these project needs are outlined further below. The proposed project also seeks to retain character-defining features of the NRHP-eligible through truss bridge to the fullest extent possible, in consideration of the other project needs.

B. Traffic Volume

As per the SI and A Sheet on Page 16-12 in the 2015 Inspection Report, the current ADT for year 2015 is 330 and the future ADT projected for year 2035 is 396.

As per the Conclusions and Recommendations on Page 16-2 in the 2015 Inspection Report, the bridge is currently posted for 4 Tons Gross load on both ends of the bridge and at the beginning of Mine Road near NJ 31; however, there is no advance load posting signs on NJ 31 northbound or southbound to prevent large trucks from making the turn onto Mine Road.

C. Geometrics

The bridge is located 25 feet from the intersection of Stony Brook Road and Mine Road, which meet at a Tee intersection. The bridge is on an approximate 8% longitudinal slope. Therefore, the vertical geometry is substandard (not even good for 10 mph) and there is almost no scope for improvement.

The bridge is also posted for a vertical clearance of 12’-0” at both approaches on Mine Road, at the intersection of Mine Road and NJ 31, and in advance on Stony Brook Road northbound and southbound. However, there is no advance clearance posting signs on NJ 31 northbound or southbound to prevent large trucks from making the turn onto Mine Road.

D. Accident History

As per verbal communication with Hopewell Police Department, there is no accident history for this bridge.

E. Safety Features

The bridge railing is substandard at 2’-2” high. The railing is characterized as a W-beam guiderail with steel posts spaced 10 feet apart, and no spacer blocks are attached to the truss. Since the guiderail is attached to the truss

any impact to the guiderail will damage the truss as well. Also, this guiderail is to be designed for a minimum crash load of TL-2, implying the beam guiderail attachment A with minimum height of 2'-7" is to be used. Hence the current guiderail is substandard due to its attachment to the truss, its substandard height, the post spacing, the lack of nesting, and the spacer blocks.

The railing is a 2'-2" tall, continuous rail attached to the deck with 6' post spacing, with steel spaces and is not nested; this is a substandard railing system. The transition from the bridge to the bridge railing is a single element W-beam, with un-stiffened, steel spacers and continues from the bridge. This transition is typical at all four corners. The approach guiderails are W-beam and spaced with steel spacer blocks; the southwest corner does not have guiderail end terminals. This is substandard due to the single element W-beam, un-stiffened, the steel spacers, and the lack of nesting. There are no sidewalks on the structure.

Substandard approach guide rails with substandard approach guide rail end terminals currently exist on the bridge. The approach guiderails are W-beam and spaced with steel spacer blocks and do not have guiderail end terminals at the southwest corner. This is substandard due to steel spacer blocks and missing guiderail end terminals at the southwest corner.

5. Explanation of Alternatives

The various alternatives discussed below were designed to provide an acceptable replacement of Mercer County Bridge No. 230.3 (Structure #1100-072) which carries Mine Road over Stony Brook while considering cost, safety, hydraulic capacity, deck geometry, drainage and environmental/historic impacts. Alternate 1-Pony Truss bridge was selected as the Preferred Alternative for several reasons as outlined below.

A. No Build

Alternative 1 is a no build scenario. This alternative includes performing standard maintenance procedures on the existing bridge. In its present condition, the 2015 Inspection Report determined that the overall condition of the bridge was critical due to the low inventory ratings. As per the 2015 Inspection Report the sufficiency rating is only 24.6 out of 100. Additionally, JMT determined that the bridge was classified as "structurally deficient due to the condition of the superstructure and the low inventory ratings" and "functionally obsolete due to the inadequate deck geometry" (JMT 2015). The deck has a curb-to-curb width of 16.7 feet and carries two lanes of traffic, one in each direction. This has been rated intolerable. Therefore, JMT recommended replacing the structure. Since 2015, the structure has further deteriorated to a degree that it was determined unsafe for public use by the county. For the safety of the public, the bridge has been closed to traffic.

By implementing the "no build" alternative, the structure would remain in its deteriorated condition. As per AASHTO Bridge Rating Code for ADT of 101-400, the bridge has to be 32 feet wide to accommodate two lane-two way traffic. Hence, the geometry would remain inadequate if the “no build” alternative is adopted. While the no build alternative would keep the historic structure in its present location, the bridge would remain unsafe and unusable by the public and would continue to deteriorate. The "no build" alternative is not a reasonable consideration since the bridge does not meet the current minimum deck geometry.

This alternative will incur minor cost to the county but is not desirable as the bridge is already closed to traffic. Considering all the above factors, the “no build” alternative does not address any of the Project Needs.

B. Other means of addressing the project needs

1. Demand dampening
   No development or traffic projection study has been undertaken at this location. The bridge replacement and widening to 32’ is to meet the AASHTO Bridge Rating Code for ADT of 101-400.

2. Alternate crossings
   As stated in geometrics, supplying an alternate crossing will require roadway and intersection re-alignment. Although an alternate crossing could meet the project needs in terms of improved geometrics and meeting AASHTO standards, this option will have more negative environmental impact to the area.

3. Traffic management
   The intersection of Mine Road and Stony Brook Road is STOP controlled. No additional traffic management measures would be appropriate for this location or help to meet the project needs.

C. Rehabilitation according to Secretary of Interior's Standards

According to the National Park Service’s website, the Secretary of the Interior’s (SOI’s) Standards for Rehabilitation are guidelines aimed to assist the long-term preservation of a property's significance through the preservation of historic materials and features. Relevant SOI Standards for this project include the following:

- The removal of historic materials or alteration of features that characterize a property shall be avoided.
- Changes that create a false sense of historical development shall not be undertaken.
- Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
- Deteriorated historic features shall be repaired rather than replaced.

· New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

This alternative proposes to rehabilitate the deteriorated structural members. The existing truss bridge would attempt to be rehabilitated for continued vehicular use, in accordance with the treatment approaches consistent with the *Secretary of the Interior's Standards* (SOI) for the Treatment of Historic Properties, Standards for Rehabilitation. Based on the 2015 Inspection Report, 40% of the truss members are heavily deteriorated, 100% of the floorbeams are structurally deficient and there is heavy section loss of approximately 50% on the diagonal counter-action round bar eyes on the lower pins and heavy corrosion with section loss of 50% at the NW and NE lateral floorbeam bracing round bar at the bearing attachments. The diagonal truss members are about 150% overstressed (members require substantial strengthening), vertical truss members are about 450% overstressed (member strengthening becomes almost impractical), and the bottom chord truss members are about 190% overstressed (member strengthening becomes less practical). A missing lateral floorbeam bracing round bar in the west floorbeam bay will be installed. Other existing floorbeams will be replaced. Existing bridge roadway width would remain unchanged. The joint mortar in the breastwalls and wingwalls of the substructure shall be repaired. Due to the original design of the members, the extent of deterioration and addition of numerous repairs, approximately 55-60% of the members are overstressed and would require extensive and intricate strengthening and select component replacement of main and secondary members. The level of strengthening required would make complying with the SOI nearly infeasible.

As per the 2015 Inspection Report, the bridge is structurally deficient due to the condition of the superstructure and the low inventory ratings (JMT 2015). Also it was found to be functionally obsolete due to the inadequate deck geometry. The bridge has two lane-two way traffic with a curb-to-curb width of only 16.7 feet. This has been rated intolerable and has been recommended for replacement in the 2015 Inspection Report.

The bridge is currently posted for 4 Tons Gross load on both ends of the bridge and at the beginning of Mine Road near NJ 31; however, there is no advance load posting signs on NJ 31 northbound or southbound to prevent large trucks from making the turn onto Mine Road. This implies the bridge is being subjected to higher loads than its load capacity as well.

The overall costs for this rehabilitation alternative will be more expensive than the “no build” alternative but less expensive than replacing the bridge. This rehabilitation alternative would also preserve the historic structure. However, since the existing bridge cannot be widened, it would continue to have inadequate deck geometry, bear loads exceeding its design capacity, and thus would not address the essential project needs.

D. Modified Rehabilitation

A multi-girder steel bridge with an approximately 102-foot span and a 32-foot width was considered and assessed. The two existing truss panels are placed as fascia onto the rehabilitated deck with no structural loads being put onto the existing truss panels. The substructure will be repaired; widened and new wing-walls will be constructed to accommodate the new superstructure. The depth of the considered structure was calculated approximately as L/25, thus the depth would be around 49". The existing structure depth is about 13.5" from hydraulic point of view. Thus, the difference between existing and proposed would be about 3'. Also, as per the existing flood elevation for a 100 year+25%, there would be 12" of freeboard. Hence, if the adopted structure depth were 49" then an approximate area of 102ft x 2ft (24") would be blocked for the hydraulic opening. This will create a significant hydraulic impact. The profile of the bridge cannot be changed as it is at a Tee intersection and if the profile is maintained, the blockage of hydraulic opening increases. To compensate, if the span length is increased, then the structure depth automatically increases further resulting in an endless loop.

Considering a decrease to the blockage of the existing hydraulic opening, the result would be the need to change the profile of entire Tee intersection. The intersection would have to be tentatively raised by almost 2'. Thus, the embankment limits will also increase; ultimately causing an enormous environmental impact on the surrounding area. The bridge lies in a floodplain and the Flood Hazard permit will not allow any changes of this nature. If the existing truss is placed as a fascia onto the rehabilitated deck with no structural loads being put onto the existing truss (i.e., use the existing truss only for aesthetic purposes), this system would still not work due to the deficiency of the conventional longitudinal member system. Hence, this alternative does not meet the project needs due to hydraulic limitations.

The cost of this rehabilitation alternative would be similar to a replacement alternative as the work involved is equivalent to the replacement of the bridge. Although this alternative would strive to meet project needs of preserving character-defining features of the historic structure, increasing live load capacity, and improving public safety and geometrics, it would cause serious hydraulic and environmental impacts in the area. Hence, this alternative will not be adopted for this project.

E. Replacement

1. Alternate alignment
   As stated in geometrics, any alternate alignment will have more negative environmental impact to the area and will not resolve the profile deficiency.

2. Alternative replacement structure types
   For the replacement, a bridge structure with a curb-to-curb width of 32 feet plus two 4-bar railings, and one 5-foot sidewalk is proposed to satisfy the current AASHTO requirements.

   The possible alternatives that may be used for replacement are Alternate 1-Pony Truss Bridge, Alternate 2-Through Truss Bridge or Alternate 3-Conventional Longitudinal member system.

   ALTERNATE 1 & 2: Truss bridge:
   A Truss bridge with a span of approximately 105 feet and a curb-curb width of 32 feet is proposed. A 4-bar beam guiderail will be provided along the roadway length to meet the current standards. Truss panels and 4-bar beam guiderail will maintain a distance such that truss panels remain unaffected in the event of a crash.

   Two types of stringer-floorbeam configurations were considered: floorbeam flushed with bottom chord of truss and floorbeam not flushed with bottom chord of truss. When the stringer connects to the face of the floorbeam, the floorbeam would be flush with the bottom chord and when the stringer sits on top of floorbeam, the floorbeam would not be flush with bottom chord. When the stringer connects to the face of the floorbeam, the entire structure depth blocks hydraulic flow whereas in the other case, only the face of floorbeam blocks water flow. The structure depth is about 23" when the stringer sits on top of the floorbeam from the hydraulic point of view and it is approximately 44" when the stringer connects to the face of the floorbeam. Since the existing freeboard is 12", the alternative with the stringer on top of the floorbeam provides about 3" of freeboard as only the front face of the floorbeam blocks water flow. On the other hand, the alternative with the stringer connecting to the face of the floorbeam blocks water for an area of about 102ft x 18.5". This implies that the entire bottom chord of the truss will be completely submerged, thus blocking the hydraulic opening for the entire span length, similar to the conventional longitudinal member system. Hence, the choice would be to consider the stringer placed on top of the floorbeam as the preferred option for a truss system. The cost of both the types of truss bridge would be about the same. Since the bridge is closed for traffic, replacement is the most feasible and economical alternative that would provide a longer sustainable life for the bridge.

   ALTERNATE 1: Pony Truss bridge:
   A Pony Truss as shown on the plan (Appendix E) has only vertical truss panels, implying there would not be any vertical under-clearance issues. Although this alternative would result in the loss of the historic structure, a Pony Truss bridge would increase the live load capacity,

would improve public safety and geometrics, and would avoid the negative environmental impacts that could occur under other alternatives.

ALTERNATE 2: Through Truss bridge:

Although a Through Truss is similar to the existing bridge in configuration it would need to be wider than the existing bridge and be designed for HL-93 and Permit truck loads. The resultant bridge would be robust in appearance. The possibility that the bridge would sustain vehicular impacts is higher due to the vertical under-clearance issues which occur due to the presence of horizontal bracing at the top. Hence, this alternative would not be preferred due to the vertical under-clearance issues.

ALTERNATE 3: Conventional Longitudinal member system:

A multi-girder steel bridge was assessed with a span of about 102ft. Six (6) stringers at a spacing of 6.5 feet were considered. The depth of the considered structure was calculated approximately as L/25, thus the depth would be around 49". The existing structure depth is about 13.5" from hydraulic point of view. Thus, the difference between existing and proposed would be about 3ft. Also, as per the existing flood elevation for 100 year+25%, there would be 12" freeboard. Hence, if the adopted structure depth were 49" then an approximate area of 102ft x 2ft (24") would be blocked for the hydraulic opening. This will create a significant hydraulic impact. The profile of the bridge cannot be changed as it is at a Tee intersection and if the profile is maintained, the blockage of hydraulic opening increases. To compensate, if the span length is increased, then the structure depth automatically increases further resulting in an endless loop.

Considering a decrease to the blockage of the existing hydraulic opening, the result would be the need to change the profile of entire Tee intersection. The intersection would have to be tentatively raised by almost 2'. Thus, the embankment limits will also increase; ultimately causing an enormous environmental impact on the surrounding area. The bridge lies in a floodplain and the Flood Hazard permit will not allow any changes of this nature.

The cost of this alternative is relatively similar as the Truss alternative; however, it doesn't meet the project need due to the hydraulic issues posed. Considering all these factors, a conventional longitudinal member system will not be selected for this site.

6. Preferred Alternative

Considering the geometrics, historical significance, hydraulic impact to the site, effective costs and sustainability of the bridge, Alternative 1-Pony Truss

system was selected as the Preferred Alternative for this project. Although this alternative will result in the loss of the NRHP-eligible Mercer County Bridge No. 230.3, it is the best option to address other project needs. The pony truss alternative will improve the road deck geometry to achieve minimum design standards and enhance vehicular and pedestrian safety along Mine Road, prevent continued deterioration of the bridge superstructure and improve the physical condition of the bridge, and increase the live load capacity of the bridge, while avoiding negative hydraulic and environmental impacts inherent in the rehabilitation and other replacement alternatives.

A detailed matrix comparing the alternatives presented in this report is included in Appendix E.

7.0 Conclusion

The preferred alternative will have an adverse effect on the NRHP-eligible Mercer County Bridge No. 230.3. Project plans call for the removal and replacement of the bridge. The bridge is significant for its design and as the last remaining work of the prolific KIBMC in the county (A.G. Lichtenstein & Associates, Inc. 1994). Replacement of the bridge is needed to improve public safety and the structural integrity of the crossing. A new, wider bridge will allow traffic to safely travel across Stony Brook and will support the larger loads carried by the trucks that regularly utilize the bridge despite current load restrictions. As such, the replacement of the bridge cannot be avoided and the adverse effect cannot be minimized.

Mitigation measures should include historic and photographic documentation of the historic bridge to the standards of the Historic American Engineering Record (HAER). Copies of the documentation should be distributed to the Hopewell Branch of the Mercer County Library, the Hopewell Public Library, the Pennington Public Library, and other repositories identified in consultation with the New Jersey Historic Preservation Office (NJHPO). Additionally, the completion of a historical context document is recommended. As the replacement of this structure marks the complete loss of KIBMC-constructed bridges in Mercer County, the context could focus on the company's practice as it related to bridges in New Jersey, or other relevant topics as identified in consultation with the NJHPO. Recipients of the historical context document should include, but not be limited to, those repositories identified to receive a copy of the HAER documentation. Consultation with the NJHPO regarding additional or alternative mitigation options is recommended.

Appendices

A. Project Schedule

B. 2015 Bridge Re-evaluation Report

C. Community Input

D. Police Accident Reports

E. General Plan & Elevation Sheets for the Three Alternatives and HBAA Comparison Matrix

F. Vitae of persons involved in writing report

Bibliography:

A.G. Lichtenstein & Associates, Inc.
1994 New Jersey Historic Bridge Survey. Prepared for the New Jersey Department of Transportation, Bureau of Environmental Analysis, Trenton, New Jersey. On file, the State Historic Preservation Office, Trenton, New Jersey.

Hopewell Valley News
2015 Hopewell Township: Local bridge project earns state, national awards. Electronic document, http://www.centraljersey.com/news/hopewell_valley_news/hopewell-township-local-bridge-project-earns-state-national-awards/article_06cc49b4-c21e-5459-8402-36d893944505.html. Accessed July 13, 2018.

Johnson, Mirmiran & Thompson (JMT)
2015 Bridge Re-Evaluation Survey Report, Structure No. 1100072, Mercer County # 230.3, Mine Road over Stony Brook, Hopewell Township. On file, Mercer County Office of the County Engineer, Trenton, New Jersey.

Appendix A

Schedule for completion of preferred alternative:
Probable Completion by October 2020

2018		2019								2020
Sep Oct	Nov Dec	Jan	Feb Mar Apr May			Jun Jul Aug		Sep Oct	Nov Dec	Jan - Oct
SHPO Review & Comment Resolution	Preliminary Design Phase		Submission of Permits/ Approval of Permits			Final Design Phase		Agency Review & Comment Resolution	Bidding phase	Construction Phase

Appendix B

COUNTY OF MERCER

OFFICE OF THE COUNTY ENGINEER

640 South Broad Street
TRENTON, NEW JERSEY 08650-0068

BRIDGE RE-EVALUATION SURVEY REPORT

STRUCTURE NO. 1100072
Mercer County # 230.3
MINE ROAD
over
STONY BROOK
HOPEWELL TOWNSHIP

16TH CYCLE

May 1, 2015

NOTE: This Bridge Re-evaluation Report shall be filed immediately after the 15TH Cycle Inspection Report.

Prepared By:

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future

1200 Lenox Drive, Suite 101
Trenton, NJ 08648-2329

TABLE OF CONTENTS

MERCER COUNTY
RE-EVALUATION BRIDGE SURVEY REPORT

CYCLE NO. 16

STRUCTURAL DATA:

Bridge No.:	1100072	Year Built:	1885	Widened/Rehab:	1976 & 2011
Route No.:	9011	Length:	102.0′	Width:	17.0′
Mile Point:	NA	Date of this Evaluation:		5/1/2015	
Name:	Mine Road over Stony Brook (MC# 230.3)	By:	Johnson, Mirmiran & Thompson, Inc.		
		Date of Previous Evaluation:		6/18/2013	
		By:	IH Engineers, P.C.		
		Date of Underwater Inspection		Not required	
		Scour Critical:	No		
		Special Equipment:		Large ladder (Photo 16-22)	

Structure Type: Single span riveted wrought iron pin connected Pratt through trusses with wrought iron floorbeams and steel stringers.

WORK DONE: None

OVERALL PHYSICAL CONDITION: Poor due to the superstructure condition.

OVERALL CONDITION (ITEM 67): Critical due to the low load ratings.

Inspection Team Leader: John Petre, PE **Initials:**

Certifying Engineer: James C. Lane, PE

N.J. P.E. Number: 24 GE 02859100

I certify that this report is an accurate description of the subject structure, to the extent determinable by visual inspection and testing performed.

Signature: James C Lane

Date: 12/18/15

CONCLUSIONS AND RECOMMENDATIONS:

The overall condition of the structure is critical due to the low load ratings

The superstructure condition rating is poor due to the bottom chord bars which have areas of section loss behind the guide block due to pack rust (Photo 16-10), section loss to the lower pins (Photos 16-11 and 16-12), heavy section loss of approximately 50% on the diagonal counter-action round bar "eyes" on the lower pins (Photo 16-11), a missing lateral floorbeam bracing round bar in the west floorbeam bay (Photo 16-18), and heavy corrosion with section loss of 50% at the NW and NE lateral floorbeam bracing round bar at the bearing attachments (Photo 16-19).

The substructure condition rating is satisfactory due to loss of joint mortar (pointing) on the breastwalls and wingwalls (Photos 16-20 and 16-21).

Since the previous inspection, the condition of the structure has generally remained the same. The deck and approaches condition ratings have been downgraded from very good to good due to minor defects observed. The substructure condition rating has been upgraded from fair to satisfactory due to defects observed.

The bridge is currently posted for 4 Tons Gross load at the bridge on both ends and at the beginning of Mine Road near Route NJ 31 (Photo 16-03), however there is no advance load posting signs on NJ 31 northbound and southbound to prevent large trucks from making the turn onto Mine road. The bridge is also posted for a vertical clearance of 12'-0" at both approaches and at the intersections of Route NJ 31 and in advance on Stony Brook Road northbound and southbound. There is, however, no advance clearance posting signs on NJ 31 northbound and southbound to prevent large trucks from making the turn onto Mine road.

The bridge is a single span riveted wrought iron Pratt through truss structure, and is pinned at the panel points. There are floorbeams and stringers. The trusses are fracture critical as well as internally redundant. The floorbeams are spaced at 14'-6", with non-continuous stringers, making them fracture critical.

Based on the Bridge Scour Evaluation Program data provided by NJDOT, dated August 2007, the structure is NOT scour critical. This inspection did not reveal any scour problems and SI&A Item 113 is coded 8.

The bridge is Structurally Deficient due to the poor condition of the superstructure and the low load carrying capacity. The bridge is Functionally Obsolete due to the substandard deck geometry (Item 68 = 2). Therefore we recommend the following remedial action: **Bridge Replacement.**

a.	Demolition: Lump sum	$ 100,000
b.	New Bridge (Includes two 1.75′ parapets):	
	102′ (1.25 Factor) = 128 LF x 31.5′ = ±4032 SF @ $356 (2015)/SF	$1,435,400
c.	Approach Roadway work (including drainage):	
	100 LF x 2 approaches = 200 LF @ $1,000/LF	$ 200,000
d.	MPT (±20% of a, b and c)	$ 347,000
	Subtotal	$2,082,400
e.	Preliminary Engineering (±15%)	$ 312,400
	Total	$2,394,800

Costs are from the NJDOT "Cost Guide for Bridge Repairs 2003" and increased 3% per year. The County may want to consider re-locating the bridge to a park and using it for pedestrian foot traffic.

In the interim, until the bridge is replaced, we recommend that the following Emergency/Priority repairs be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety, and extend its useful life: **Refer to Priority Repair Letter 1100072_20150501cy16_PR1_01, and the letter's recommendation below.**

Repair the broken clearance posting sign post:

1. Replace the damaged post at the west approach and attach the fallen sign to it with safety shear bolts ½ Crew Day

While no maintenance repairs are recommended as set forth by this report, the owner should remedy defects listed in the field notes.

We recommend to have all pins ultrasonically tested (or equal form of testing) next cycle to determine remaining pin section and to determine if there are any defects. In addition, analysis of the findings will be required, and load capacity calculations may be needed. As per discussions with the County Supervising Engineer, we will include these tasks in the next cycle inspection.

The bridge should be inspected on an interim basis of 12 months due to the low load ratings and Item 67 coding of 3.

1 - STRUCTURAL DATA

IDENTIFICATION

8 Structure No.: 1100072 *M82 County Bridge No.:* 230.3 *M83 Municipal Bridge No.:*

(AB) Name: MINE ROAD over STONY BROOK

1 State Code:

(1A) State Code 34 - New Jersey

(1B) Region Code 2 - Region 2 - New York/New Jersey

2 Highway Agency District: DISTRICT 02 (CENTRAL)

4 Place Code: 33180 - Hopewell (Township of)

3 County Code: 021 - MERCER COUNTY

(A) Town: 1106 - Hopewell Township

5A Inventory Route (On/Under): 1: Route carried "on" the structure

9 Location: 0.24 MI EAST of RT NJ 31

5B Inventory Route Signing Prefix: 8 - OTHER (include toll roads not otherwise indicated or identified above)

5C Level of Service: 1 - MAINLINE

11 Mile Point: 0000.000

5D Inventory Route Number: 00000

(AA) Inventory Route: 9011 - Mercer County

5E Directional Suffix: 0 - NOT APPLICABLE

(FV) Inventory Route Milepoint:

6 Features Intersected: STONY BROOK

(AC) Non-Inventory Feature: WW: Roadway and/or railroad over waterway

7 Facility Carried by Structure: MINE ROAD

(AD) Adm. Juris. Non-Inv Feature: 1: State

(AE) Alternate Agency: 9011 - Mercer County
Same owner as Item AA

16 Latitude: 402226.29

(AF) Alternate Structure Number: 230.3

17 Longitude: -744738.40

98 Border Bridge Code:

M84 Latitude (Degrees): 40.37397

(98AA) State Code:

M85 Longitude (Degrees): -74.7940

(98AB) Region Code

(98B) % Resp.:

99 Border Bridge Structure Number:

M142 GPS Location: Southwest Corner

CLASSIFICATION

21 Maintenance Responsibility: 02 - County Highway Agency

26 Func. Class. of Inv. Route: 09 - Rural - Local

M94 Maint. Resp.:

37 Historical Significance: 2 - Eligible for National Register

22 Owner: 02 - County Highway Agency

M91 On/Off System: 0: Off-System Structure

M93 Owner:

M96 Comments Ownership:

M95 Ownership Resolved:

101 Parallel Structure Designation: N - No parallel structure

(BB) Orphan Bridge: N

103 Temporary Struct. Designation:

(BP) Bridge Demolition: N

104 Highway System of Inv. Route: 0 - Structure/Route is NOT on NHS

(CP) Federal Report: _ - Highway carrying NBIS bridges included in reports to FHWA

112 NBIS Bridge Length: Yes

(CR) Off-Route Bridge: N

Agency Admin. Area:

(FX) Federal Error Cannot be Corrected: N

Structure No.: 1100072 Route: 9011 Cycle No.: 16

Name: MINE ROAD over STONY BROOK Insp. Date: 05/01/2015

STRUCTURE TYPE AND MATERIAL

43A Main Span Material: 9 - Aluminum, Wrought Iron or Cast Iron

43B Main Span Design: 10 - Truss - Thru

44A Approach Span Material:

44B Approach Span Design:

45 Number of Main Spans: 1

46 Number of Approach Spans: 0

(AJ) Type of Slope Protection:

(AK) Type of Abutment: 07: Masonry (Brick, Fieldstone, etc.).

(AL) Type of Pier:

(AT) Special Material 1: W: Wrought Iron

(AT) Special Material 2: H: High Strength Steel - 36 ksi < Grade < 70 ksi

(AU) Additional Structure Type 1: A: Eyebar Truss

(AU) Additional Structure Type 2: 4: *Non-redundant Construction (Fracture Critical)

Fracture Critical Details: V - Eye Bar heads or Pin Plates

M143 Structure Type Primary:

M144 Structure Type Secondary:

M97 Struct. Mat. Type Desc:

107 Deck Structure Type: 3 - Open Grating

108A Wearing Surface: 0 - None

108B Membrane: 0 - None

108C Deck Protection: 0 - None

(AV) Widened Structure Type:

1st Widened Material:

1st Widened Design:

2nd Widened Material:

2nd Widened Design:

AGE AND SERVICE

27 Year Built: 1885

28A Lanes On Structure: 01

28B Lanes Under Structure: 00

106 Year Reconstructed: 2011

42A Type of Service On: 1 - Highway

42B Type of Service Under: 5 - Waterway

GEOMETRIC DATA

32 Approach Roadway Width (w/ shoulders): 20.000 ft

33 Bridge Median: 0 - No median

34 Skew: 0 deg

35 Structure Flared: 0 - No flare

M98 Str. is Standalone or Connected:

M99 Length of Portion Included: ft

M101 Total Structure Opening: ft^2

M145 Design Vertical Inside Opening: ft

M146 Available Vertical Inside - South or West End: ft

M147 Available Vertical Inside - North or East End: ft

48 Length of Maximum Span: 101 ft

49 Structure Length: 102 ft

M141 Effective CoMBIS Width: ft

50A Left Curb/Sidewalk Width: 00.0 ft

50B Right Curb/Sidewalk Width: 00.0 ft

51 Bridge Roadway Width, Curb-to-Curb: 16.7 ft

52 Deck Width, Out-to-Out: 17.0 ft

(AM) Depth of Fill over Structure: ft

Total length: 102 ft

Deck Area: 1734 ft^2

NAVIGATION DATA

38 Navigation Control: 0 - No navigation control on waterway (bridge permit not required)

39 Navigation Vertical Clearance: 000 ft

40 Navigation Horizontal Clearance: 0000 ft

111 Pier/Abutment Protection: _ - Not Applicable

116 Min. Nav. Vertical Clearance under Lift Bridge: 000 ft

(AP) Fender System:

UTILITIES AND APPURTENANCES

(HA) Bridge Noise Barrier:

Type of Material 1:

Type of Material 2:

Barrier Height 1: ft

Barrier Height 2: ft

(AO) Utilities:

Utilities 1:

Utilities 2:

Utilities 3:

Utilities 4:

Sign Structures:

(GS) Overhead Sign Structure:

(GT) Cantilever Sign Structure:

(GU) Fascia Mounted Sign Structure:

RAILROAD

(BC) USRA Code:

(BE) Rail Milepost:

(BD1) Rail On:

(BD2) Rail Under:

TEMPORARY STRUCTURES

(GV) Bridge:

(GW) Shoring:

(GZ) Cond. Desc.:

(GY) Measures:

(GX) Repairs:

Structure No.: 1100072 Route: 9011 Cycle No.: 16

Name: MINE ROAD over STONY BROOK Insp. Date: 05/01/2015

2 - LOAD RATING AND POSTING

NBI Load Ratings:

31 Design Load: 0 - Unknown

65 Inventory Rating Method: 2 - Allowable Stress (AS)

66 Inventory Rating: 6 tons

63 Operating Rating Method: 2 - Allowable Stress (AS)

64 Operating Rating: 8 tons

Rating Date 12/23/2011

Type	Inventory		Operating	
H15:	(BQ)	4	(CA)	6
HS20:	(BR)	6	(CB)	8
3:	(BS)	5	(CC)	7
NJ3S2:	(BT)	10	(CD)	13
3-3:	(BU)	10	(CE)	14
Military:	(BV)		(CF)	
HL93:	( )		( )	

Alternate Load Ratings:

Alt. Design Load:

Alt. Inventory Rating Method: -1

Alt. Inventory Rating: tons

Alt. Operating Rating Method: -1

Alt. Operating Rating: tons

Alt. Rating Date

Type	Inventory	Operating
H15:	( )	( )
HS20:	( )	( )
3:	( )	( )
NJ3S2:	( )	( )
3-3:	( )	( )
Military:	( )	( )
HL93:	( )	( )

41 Posting Status: P - Posted for Load

70 Posting: 0 - More than 39.9% below legal loads

(CG1) Posted Load Type: 9 - Gross Load Only

(CG2) Posted Load Limit: 4 tons

(AI) Speed Limit Posting: mph

Load Rating Review Recommended: ☐

(BK) Overstress %: 99

(CH1) Load Rating/Posting Combo: WP: W&P

(CH2) Load Rating/Posting Combo: tons

(AN) Plans Available: Yes, plans are readily available.

Load Rating Engineer: Mahmud Rahman

Posting

	Inventory	Operating
Truck 1:		
Truck 2:		
Truck 3:		

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: MINE ROAD over STONY BROOK Insp. Date: 05/01/2015

3A - INSPECTION INFORMATION

APPRAISAL ITEMS

Structurally Deficient/Functionally Obsolete: SD

Sufficiency Rating: 24.6

67 Structural Evaluation: 2 - Intolerable - high priority of replacement

68 Deck Geometry: 2 - Intolerable - high priority of replacement

69 Underclearances, Vertical & Horizontal: N - Not applicable

70 Bridge Posting: 0 - More than 39.9% below legal loads

71 Waterway Adequacy: 6 - Occasional Overtopping of Approaches

72 Approach Roadway Alignment: 6 - Equal to present minimum criteria

EXISTING BRIDGE CONDITION

58 Deck: 7 - Good Condition (some minor problems)

(BA) Approach Roadway Condition: 7: Good Condition - minor defects such as cracking of approach roadway, small spalls in approach roadway, minor settlements (less than 1") or minor collision damage to guide rails.

59 Superstructure: 4 - Poor Condition (advanced deterioration)

60 Substructure: 6 - Satisfactory Condition (minor deterioration)

61 Channel/Channel Protection: 7 - Bank protection needs minor repairs

62 Culvert: N - Not Applicable

113 Scour Critical Bridge: 8 - Stable for scour conditions

63 Operating Rating Method: 2 - Allowable Stress (AS)

64 Operating Rating: 8 tons

65 Inventory Rating Method: 2 - Allowable Stress (AS)

66 Inventory Rating: 6 tons

CONDITION REMARKS

Deck Distress/Unrepaired Spalls: ft²

(BF) Deck:

1.
2
3
4.
5.

(BG) Superstructure:

1. C: Loss of section
2 3: Spot rusting
3 B: Collision damage
4. Z: Other
5.

(BH) Substructure:

1. R: Deteriorated pointing
2 C: Medium/wide cracks
3 Z: Other
4.
5.

(BI) Channel:

1.
2

(BJ) Culvert:

1.
2

HIGHWAY SAFETY/FENCING

36A Bridge Rail: 0 - Does not meet acceptable standards/safety

36B Transition: 0 - Does not meet acceptable standards/safety

36C Approach Rail: 0 - Does not meet acceptable standards/safety

36D End Treatments: 0 - Does not meet acceptable standards/safety

(AG) Type of Bridge Rail: 18: None of the types above

(AH) Height of Bridge Rail: 2.17 ft

(AQ) Chain Link Fence Height: ft

(FN) Fencing Warranted: NO - Conditions DO NOT warrant chain link

(FO) Pedestrian Traffic Fencing Status: N: Not applicable or fencing is not

(FP) Fencing Improvement Cost: $ 0

SCOUR EVALUATION

*113 Scour Critical Bridge: 8 - Stable for scour conditions

(FB) Date of Stage 1 Scour Eval.: 11/1/1992

(FC) Stage 1 Scour Eval. Consultant:
L10 - Lichtenstein

(FD) Stage 1 Scour Eval. Prioritization Category:
3 - Relatively low potential for scour damage

(FE) Stage 1 Scour Eval. Sufficiency Rating: 47.5

(FA) FHWA Scour Category: 02: Screened (Low risk)

(FF) Date of Stage 2 Scour Eval.:

(FG) Stage 2 Scour Eval. Consultant: _ - Not Applicable

(FH) Scour Critical Elements:

SCOUR COUNTERMEASURES

(FJ) Scour Countermeasures Cost: $

(FK) Scour Countermeasures Installed/Type:

(FL) Scour Monitoring Required/Type:

1.
2.
3.

(FI) Recommended Scour Countermeasures:

PROPOSED IMPROVEMENTS

75A Type of Work: 31 - Replacement - Load/Geometry

75B Work To Be Done By: 1 - Work to be done by contract

76 Length of Structure Improvement:	128 ft	95 Roadway Improvement Cost:	$ 200000
(BO) Owner's Maintenance Cost:	$ 0	96 Total Project Cost:	$ 2394800
94 Bridge Improvement Cost:	$ 1435400	97 Year of Improvement Cost Estimate:	2015

3B - INSPECTION INFORMATION

INSPECTION DATES

Inspection Report Author: Petre, John
Primary Type of Inspection: Regular Inspection
Previous Cycle Inspection Date: 06/18/2013
90 Inspection Date: 05/01/2015
91 Inspection Frequency (in months): 24
Next Inspection Date: 05/01/2017
Pontis Element Inspection Date: 05/01/2015
Pontis Element Frequency (in months): 24
Next Pontis Element Inspection Due: 05/01/2017
(AW) Date of Mechanical/Electrical inspection: 1/1/1901
(AW1) Mechanical Insp. Type:
(AW2) Electrical Insp. Type:
(AW3) Traffic Safety Insp. Type:
(AW4) Mechanical Insp. Date:
(AW5) Electrical Insp. Date:
(AW6) Traffic Safety Insp. Date:
(AW7) Movable Bridge Type:
(AX) Date of Deck Condition Survey:
M132 Confined Space Entry: No
M105 Description of Inspection Type:

93A FC Inspection Date: 05/01/2015
92A FC Inspection Frequency (in months): 024
Next FC Inspection Date: 05/01/2017
93B UW Inspection Date:
92B UW Inspection Frequency (in months): 000
Next UW Inspection Date:
UW Inspected By:
93C SI Date: 05/01/2013
92C SI Frequency (in months): 012
Next SI Date: 05/01/2014
(AR) Special Equipment: L: Large Ladder (over 24' long)
(AR) Special Equipment:
(AR) Special Equipment:
Special Inspection By:
(AS) Special Testing Type:
U: Non-destructive Testing of Steel (ultrasonic, radiographic, magnetic particle, dye penetrant, etc.)
(AS) Special Testing Type:

(AS) Special Testing Type:

(AY) Date of Special Testing:
7/24/2007

PAINT CONDITIONS AND DATE

(GD) Fascia Beam: 10: 0-0.03% Rust
(GE) Fascia Bottom Flange: 10: 0-0.03% Rust
(GF) Interior Beam: 10: 0-0.03% Rust
(GH) Interior Bottom Flange: 10: 0-0.03% Rust
(GI) Beam Ends: 06: 1 - 3% Rust
(GJ) Connections: 00: 100% Rust
(GK) Bracings: 00: 100% Rust
(GL) Bearings: 04: 10 - 16% Rust
(GM) Substructure: 10: 0-0.03% Rust
(GN) Above Deck Superstructure: 06: 1 - 3% Rust
(GO) Railings/Fence: 10: 0-0.03% Rust

(GA) Is Painting Required? Yes: Parts of the structure require painting
(GB) Environment: 01: Rural or Industrial, Mild Exposure
(GC) Date of Current Paint Inspection: 05/01/2015
(GR) Date of Last Painting: 1/1/2011
(GP) Remarks 1:

(GQ) Remarks 2:

(AZ) FATIGUE DETAIL

Location 1: 12 - Coped flange
02 - Floorbeam
Location 2: 03 - Other E detail
20 - Other location

Location 3:

IN-DEPTH FRACTURE CRITICAL/PIN-HANGER

(FY) Special FCM Insp. Required: ☐

(FZ) Special P/H Insp. Required: ☐

(FQ) Latest In-Depth FC/ Pin-Hanger Inspection Date: 1/1/1901

(FQ1) Special FCM Insp. Date:

(FQ2) Special P/H Insp. Date:

(FS) FCM's Inspected:

(FT) Combo In-Depth Fracture Critical/Pin-Hanger Inspection:

(FR) Consultant: _

(FR1) Special FCM Insp. Consultant:

(FR2) Special P/H Insp. Consultant:

CYCLE DATA

(P1) Group Number: 11E5

(P2) Work Spec Number:

(CI) Cycle Number: 16

(CJ) Inspection Type: R: Regular Inspection

(CM) Current Consultant: J07 - Johnson, Mirm & Thom

(CO) Previous Consultant: I12 - IH Engineers, P.C.

M87 Contract State Agreement No.: 2015BI006H

Agreement Modification Number:

Contract ID: 15-50820

Contract Date: 03/10/2015

(BM) Federal Job Number: BRZ NBIS766

(BN) State Job Number: 2205923

(P3) NTP Date: 03/17/2015

Funding Category: Federal - STP OffSystem

(P4) State Project Manager: Robert Flanegan

(P5) State Assistant PM: Tim Lertch

County Project Manager: Basit Muzaffar

M130 Project Name:

STRUCTURE STATUS

Bridge Status: 3 - Active

Bridge Lifecycle Phase: 1 - Service

Data Last Updated: 05/01/2015

Structure No.: 1100072 Route: 9011 Cycle No.: 16

Name: MINE ROAD over STONY BROOK Insp. Date: 05/01/2015

4A - ROADWAY DATA

ROADWAY IDENTIFICATION

Roadway Name: MINE ROAD

Bridge ID/Structure Number: 1100072

Roadway SRI: 11060000__

NBI Roadway?: Yes

5A Position of Route (On/Under): 1: Route carried "on" the structure

5B Route Signing Prefix: 8 - OTHER (include toll roads not otherwise indicated or identified above)

5C Level of Service: 1 - MAINLINE

5D Route Number: 00000

5E Directional Suffix: 0 - NOT APPLICABLE

HIGHWAY NETWORKS AND SERVICE CLASSIFICATION

11 Milepoint: 0000.000

12 Base Highway Network: Inventory Route is not on the Base Network

13A LRS inventory Route:

13B Subroute Number:

13R Ramp Code:

20 Toll Facility: 3 - On free road. The structure is toll-free and carries a toll-free highway.

26 Functional Classification: 09 - Rural - Local

100 STRAHNET Highway Designation: 0 - Not a STRAHNET route

102 Traffic Direction: 3 - One lane bridge for 2-way traffic

104 NHS System: 0 - Structure/Route is NOT on NHS

105 Federal Lands Highways:

0 - Not Applicable

110 Designated Truck Highway Network: Inventory route not on network

School Bus: ☐ Transit Route: ☐ Emergency Route: ☐

TRAFFIC DATA

28 Number of Lanes: ON 01 UNDER 00

Number of Medians: 0

Roadway Speed Limit: 15 mph

19 Bypass/Detour Length: 2 miles

Detour Speed: 35 mph

(FM) Incidents Reported:

Accident Count: Rate:

ADT Class: ADT Class 2

29 ADT Total: 330

30 Year of ADT: 2015

114 Future ADT: 396

115 Year of Future ADT: 2035

109 Truck ADTT (%): 3

(FW) Estimated ADT: Yes

VERTICAL AND HORIZONTAL CLEARANCES

10 Vertical Clearance: 12.3 ft

53 Minimum Vertical Clearance over Bridge: 12.30 ft

54A Minimum Vertical Underclearance Ref.: N - Feature not a highway or railroad

54B Minimum Vertical Underclearance: 00.00 ft

(DJ) Minimum Vertical Underclearance (including shoulders): 00.00 ft

32 Approach Roadway Width: 20.000 ft

47 Inventory Route, Total Horizontal Clearance: 16.7 ft

51 Bridge Roadway Width, Curb-to-Curb: 16.7 ft

55A Mimimum Lateral Underclearance Ref: N - Feature not a highway or railroad

55B Minimum Lateral Underclearance on Right: 00.0 ft

56 Minimum Lateral Underclearance on Left: 00.0 ft

Element Inspection

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
28 - Steel Deck with Open Grid	3 - Mod.	1734	sq. ft.	1734	0	0	0
515 - Steel Protective Coating		1734	sq. ft.	1734	0	0	0
113 - Steel Stringer	3 - Mod.	510	ft.	510	0	0	0
515 - Steel Protective Coating		1830	sq. ft.	1830	0	0	0
136 - Other Truss	3 - Mod.	204	ft.	190	10	4	0
1000 - Corrosion		6			6	0	0
1020 - Connection		4			0	4	0
1900 - Distortion		2			2	0	0
7000 - Damage		2			2	0	0
157 - Other Floor Beam	3 - Mod.	116	ft.	0	56	60	0
1000 - Corrosion		116			56	60	0
217 - Masonry Abutment	3 - Mod.	55	ft.	0	3	52	0
1610 - Mortar Breakdown (Masonry)		52			0	52	0
1620 - Split/Spall (Masonry)		3			3	0	0
301 - Pourable Joint Seal	3 - Mod.	34	ft.	34	0	0	0
321 - Reinforced Concrete Approach Slab	3 - Mod.	520	sq. ft.	520	0	0	0
520 - Concrete Reinforcing Steel Protective System		520	sq. ft.	520	0	0	0
330 - Metal Bridge Railing	3 - Mod.	204	ft.	204	0	0	0
515 - Steel Protective Coating		408	sq. ft.	408	0	0	0
801 - Steel Curbs/Sidewalks	3 - Mod.	204	ft.	204	0	0	0
844 - Masonry Wingwall	3 - Mod.	78	ft.	0	0	78	0
1610 - Mortar Breakdown (Masonry)		78			0	78	0

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

LOAD RATING SUMMARY SHEET (LRSS)

(Form NJ-BI-101 Created 1/25/2011)

Project Information:

Group: 11E1 Agreement No.: 2011BI818D Contract ID: 11-50816 Agree/Mod No.: 0

Rating Information:

Method: LRFR: No LFR: Yes ASR: Yes Other (Specify):

Rating Date: 12/23/2011 Computer Software Used: LARS Bridge Version: 5.00.06.03

Load Testing: No Cycle Rating Performed: 14 Design Load: Unknown

Structure Information:

Plans Available? Yes Contract Designation: Unknown

Overlay? No Considered in Rating? No Type/Thickness: N/A

Section Losses? Yes Considered in Rating? Yes Item 59: 4

For LRFR Use Only:

Dynamic Load Allowance: Condition Factor: System Factor:

ADTT (one direction): Resistance Factor: FCM: Yes

Load Rating Engineer (LRE):

Name: Mahmud Rahman Firm: IH Engineers, P.C. Initial: NA

Load Rating Reviewer (LRR) certification as per the NBIS Title 23 CFR Section 650.309(c):

Name: Mushtaq A Nasim, P.E. N.J. P.E. No.: 24GE04799000

Firm: IH Engineers, P. C.

I certify that this rating is an accurate representation of the subject structure, considering all deterioration and/or changes to loading conditions, to the extent determinable by research and visual inspection and testing performed. I am charged with the overall responsibility for bridge capacity evaluation for the above mentioned structure.

NA
Sign

NA
Date

Structure No.:	1100072	Route:	9011	Cycle No.:	16
Name:	Mine Road over Stony Brook			Insp. Date:	5/1/2015

LOAD RATING SUMMARY SHEET (LRSS) (*cont.*)

Rating Comments: Load ratings calculated in the 14th Cycle Inspection.
The load ratings considered section loss of up to ¼" (1/2" remaining) to the double U4/L5 rods at the eye at L5 and section loss of up to ¼" along the top and bottom flanges of the floorbeams (3/8" average remaining thickness with ¼" remaining along the edges).
As-built results were not included in the previous cycle load ratings for the truss and floorbeam members.
The following load ratings have been computed in the 14th cycle inspection.

The Working Stress ratings, computed in accordance with the FHWA directive dated November 1993, AASHTO Manual for Bridge Evaluation, 2008, as modified by Section 43 of the NJDOT Design Manual, Bridges and Structures, are as follows:

Material	Compressive Strength f'c	Tensile Strength	Yield	Inventory	Operating
Structural Steel (Floorbeam)	N/A	---	33,000	18,000	24,500
Structural Steel (Stringer)	N/A	---	50,000	20,000	32,500
Wrought Iron*	N/A	---	---	10,000*	14,600

* According to AASHTO Manual for Condition Evaluation of Bridges, Interim 1995, the allowable maximum unit stress in wrought iron inventory is 14,600 psi and operating is 20,000 psi. However, since no coupon test was performed to confirm material properties, the controlling truss member has not been recalculated.

Member	Truck Type (Tons)		Rating (Tons) / Rating Factor							
			Working Stress				LRFR			
			As-Built		As-Insp.		As-Built		As-Insp.	
			Inv.	Op.	Inv.	Op.	Inv.	Op.	Inv.	Op.
Truss Member Bottom Chord (L0L1, L1L2, L5L6, L6L7)	H15	(15T)	---	---	7	14	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	10	19	---	---	---	--
	3	(25T)	---	---	9	19	---	---	---	--
	3S2	(40T)	---	---	11	22	---	---	---	--
	3-3	(40T)	---	---	12	24	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

Member	Truck Type (Tons)		Rating (Tons) / Rating Factor							
			Working Stress				LRFR			
			As-Built		As-Insp.		As-Built		As-Insp.	
			Inv.	Op.	Inv.	Op.	Inv.	Op.	Inv.	Op.
Truss Member Top Chord (U2U3, U3U4, U4U5)	H15	(15T)	---	---	23	31	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	34	46	---	---	---	--
	3	(25T)	---	---	32	45	---	---	---	--
	3S2	(40T)	---	---	38	53	---	---	---	--
	3-3	(40T)	---	---	43	59	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--
Truss Member Vertical (U1L1)	H15	(15T)	---	---	5	9	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	10	16	---	---	---	--
	3	(25T)	---	---	8	13	---	---	---	--
	3S2	(40T)	---	---	12	20	---	---	---	--
	3-3	(40T)	---	---	17	27	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

Member	Truck Type (Tons)		Rating (Tons) / Rating Factor							
			Working Stress				LRFR			
			As-Built		As-Insp.		As-Built		As-Insp.	
			Inv.	Op.	Inv.	Op.	Inv.	Op.	Inv.	Op.
Truss Member Vertical (U2L2, U5L5)	H15	(15T)	---	---	28	37	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	40	53	---	---	---	--
	3	(25T)	---	---	39	51	---	---	---	--
	3S2	(40T)	---	---	50	66	---	---	---	--
	3-3	(40T)	---	---	58	76	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--
Truss Member Vertical (U4L4)	H15	(15T)	---	---	48	60	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	65	81	---	---	---	--
	3	(25T)	---	---	61	77	---	---	---	--
	3S2	(40T)	---	---	91	114	---	---	---	--
	3-3	(40T)	---	---	105	132	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

Member	Truck Type (Tons)		Rating (Tons) / Rating Factor							
			Working Stress				LRFR			
			As-Built		As-Insp.		As-Built		As-Insp.	
			Inv.	Op.	Inv.	Op.	Inv.	Op.	Inv.	Op.
Truss Member Diagonal (U1L2, L5U6)	H15	(15T)	---	---	11	19	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	17	28	---	---	---	--
	3	(25T)	---	---	17	28	---	---	---	--
	3S2	(40T)	---	---	20	34	---	---	---	--
	3-3	(40T)	---	---	23	37	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--
Truss Member Vertical (U4L5*)	H15	(15T)	---	---	**4***	**6***	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	**6***	**8***	---	---	---	--
	3	(25T)	---	---	**5***	**7***	---	---	---	--
	3S2	(40T)	---	---	**10***	**13***	---	---	---	--
	3-3	(40T)	---	---	**10***	**14***	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--

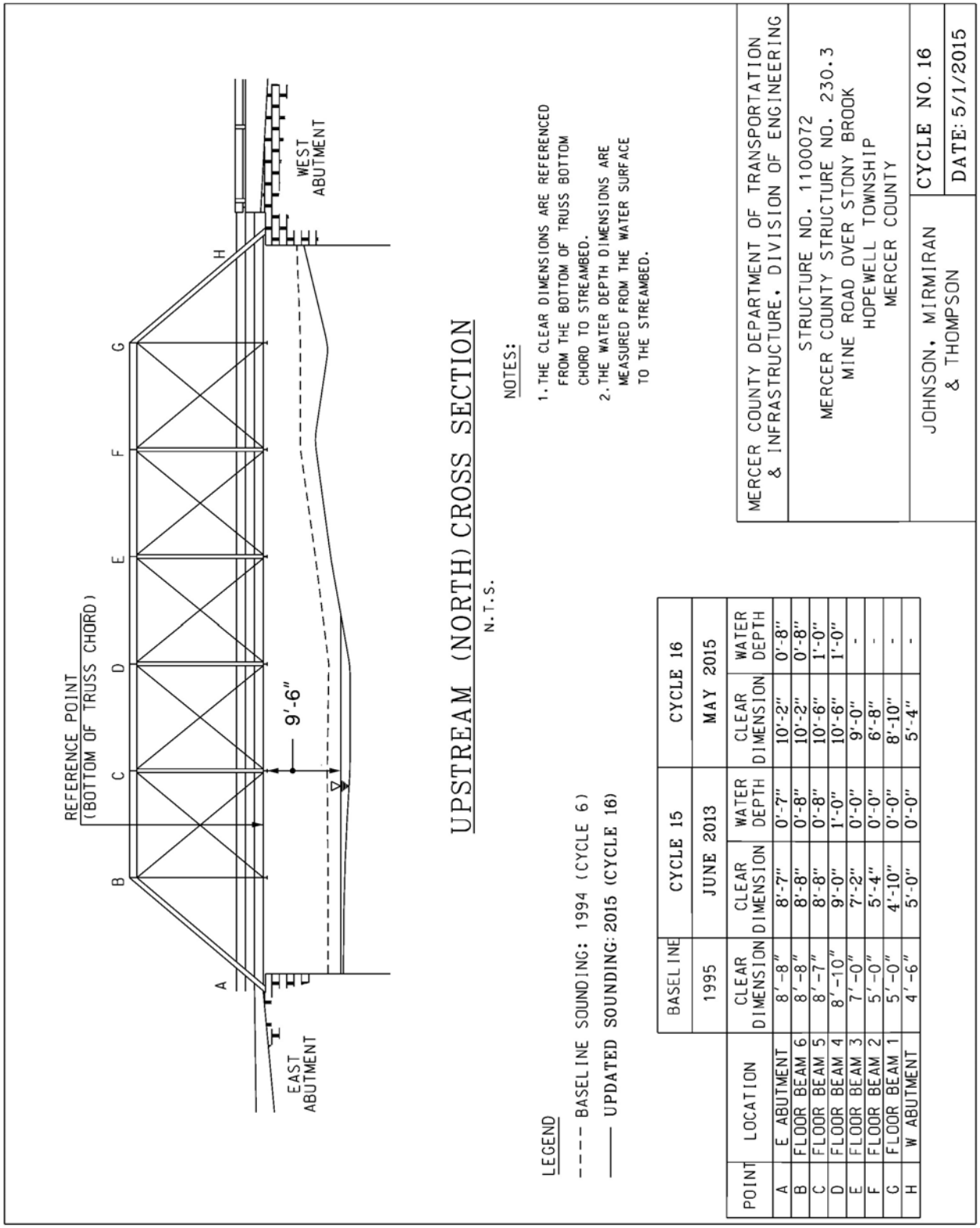
Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

Member	Truck Type (Tons)		Rating (Tons) / Rating Factor							
			Working Stress				LRFR			
			As-Built		As-Insp.		As-Built		As-Insp.	
			Inv.	Op.	Inv.	Op.	Inv.	Op.	Inv.	Op.
Truss Member Diagonal (U2L3, L4U5)	H15	(15T)	---	---	12	18	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	17	26	---	---	---	--
	3	(25T)	---	---	16	25	---	---	---	--
	3S2	(40T)	---	---	21	33	---	---	---	--
	3-3	(40T)	---	---	24	38	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--
Truss Member Diagonal (U3L4, L3U4)	H15	(15T)	---	---	12	16	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	16	22	---	---	---	--
	3	(25T)	---	---	15	21	---	---	---	--
	3S2	(40T)	---	---	22	31	---	---	---	--
	3-3	(40T)	---	---	26	36	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

Member	Truck Type (Tons)		Rating (Tons) / Rating Factor							
			Load Factor				LRFR			
			As-Built		As-Insp.		As-Built		As-Insp.	
			Inv.	Op.	Inv.	Op.	Inv.	Op.	Inv.	Op.
Interior Stringer	H15	(15T)	21	36	21	36	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	39	65	39	65	---	---	---	--
	3	(25T)	34	57	34	57	---	---	---	--
	3S2	(40T)	55	92	55	92	---	---	---	--
	3-3	(40T)	67	112	67	112	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--
Floorbeam	H15	(15T)	---	---	5	8	---	---	---	--
	HL-93	(NL)	---	---	---	--	---	---	---	--
	HS-20	(36T)	---	---	9	15	---	---	---	--
	3	(25T)	---	---	7	12	---	---	---	--
	3S2	(40T)	---	---	10	17	---	---	---	--
	3-3	(40T)	---	---	14	23	---	---	---	--
	SU4	(27T)	---	---	---	--	---	---	---	--
	SU5	(31T)	---	---	---	--	---	---	---	--
	SU6	(35T)	---	---	---	--	---	---	---	--
	SU7	(39T)	---	---	---	--	---	---	---	--

* Controlling Rating
(NL) = Notional Load



UPSTREAM (NORTH) CROSS SECTION

N.T.S.

NOTES:

1. THE CLEAR DIMENSIONS ARE REFERENCED FROM THE BOTTOM OF TRUSS BOTTOM CHORD TO STREAMBED.
2. THE WATER DEPTH DIMENSIONS ARE MEASURED FROM THE WATER SURFACE TO THE STREAMBED.

LEGEND

---- BASELINE SOUNDING: 1994 (CYCLE 6)

—— UPDATED SOUNDING: 2015 (CYCLE 16)

POINT	LOCATION	BASELINE 1995 CLEAR DIMENSION	CYCLE 15 JUNE 2013 CLEAR DIMENSION	CYCLE 15 JUNE 2013 WATER DEPTH	CYCLE 16 MAY 2015 CLEAR DIMENSION	CYCLE 16 MAY 2015 WATER DEPTH
A	E ABUTMENT	8'-8"	8'-7"	0'-7"	10'-2"	0'-8"
B	FLOOR BEAM 6	8'-8"	8'-8"	0'-8"	10'-2"	0'-8"
C	FLOOR BEAM 5	8'-7"	8'-8"	0'-8"	10'-6"	1'-0"
D	FLOOR BEAM 4	8'-10"	9'-0"	1'-0"	10'-6"	1'-0"
E	FLOOR BEAM 3	7'-0"	7'-2"	0'-0"	9'-0"	-
F	FLOOR BEAM 2	5'-0"	5'-4"	0'-0"	6'-8"	-
G	FLOOR BEAM 1	5'-0"	4'-10"	0'-0"	8'-10"	-
H	W ABUTMENT	4'-6"	5'-0"	0'-0"	5'-4"	-

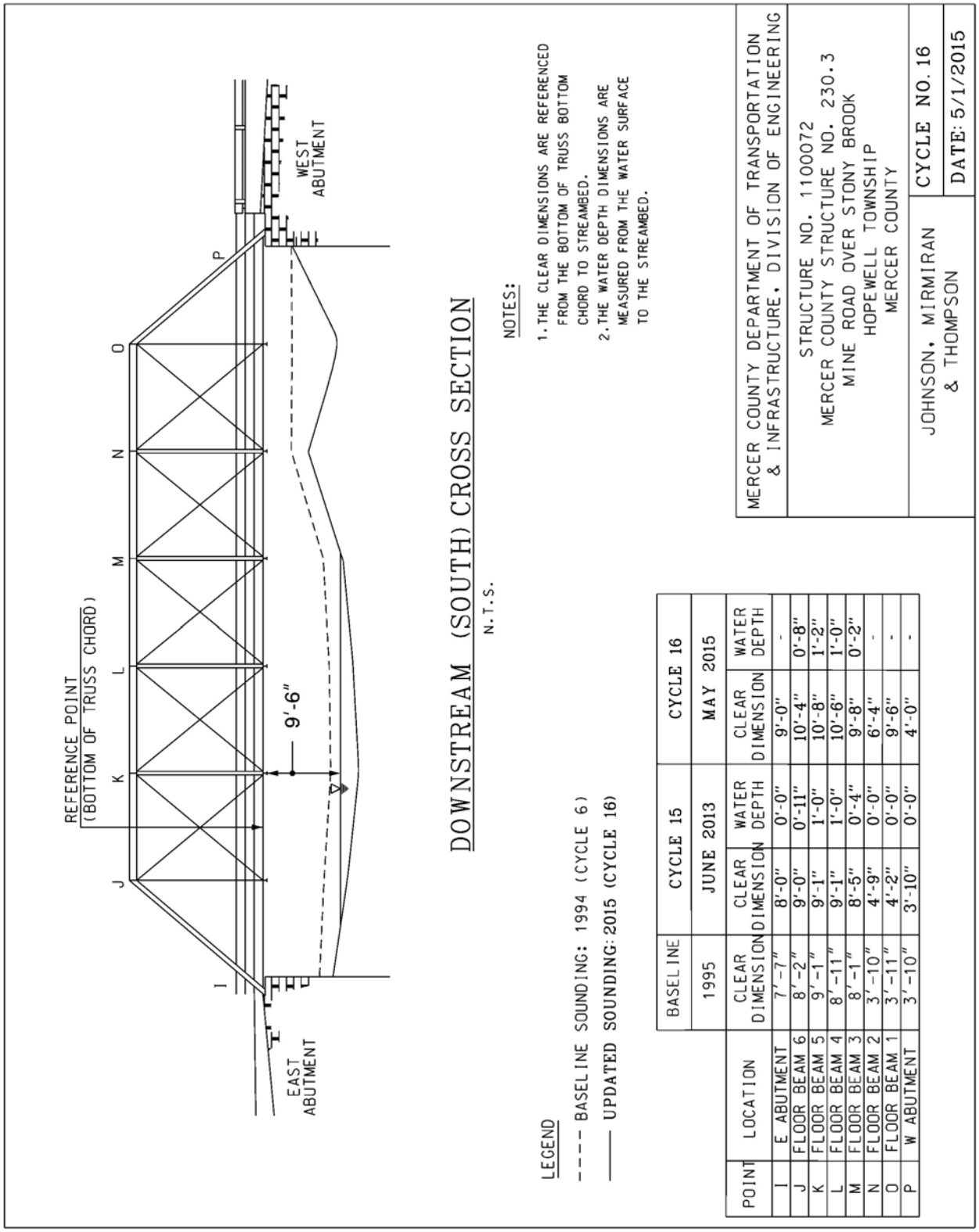
MERCER COUNTY DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE. DIVISION OF ENGINEERING

STRUCTURE NO. 1100072
MERCER COUNTY STRUCTURE NO. 230.3
MINE ROAD OVER STONY BROOK
HOPEWELL TOWNSHIP
MERCER COUNTY

JOHNSON. MIRMIRAN & THOMPSON

CYCLE NO. 16

DATE: 5/1/2015



POINT	LOCATION	BASELINE 1995 CLEAR DIMENSION	CYCLE 15 JUNE 2013 CLEAR DIMENSION	CYCLE 15 JUNE 2013 WATER DEPTH	CYCLE 16 MAY 2015 CLEAR DIMENSION	CYCLE 16 MAY 2015 WATER DEPTH
I	E ABUTMENT	7'-7"	8'-0"	0'-0"	9'-0"	-
J	FLOOR BEAM 6	8'-2"	9'-0"	0'-11"	10'-4"	0'-8"
K	FLOOR BEAM 5	9'-1"	9'-1"	1'-0"	10'-8"	1'-2"
L	FLOOR BEAM 4	8'-11"	9'-1"	1'-0"	10'-6"	1'-0"
M	FLOOR BEAM 3	8'-1"	8'-5"	0'-4"	9'-8"	0'-2"
N	FLOOR BEAM 2	3'-10"	4'-9"	0'-0"	6'-4"	-
O	FLOOR BEAM 1	3'-11"	4'-2"	0'-0"	9'-6"	-
P	W ABUTMENT	3'-10"	3'-10"	0'-0"	4'-0"	-

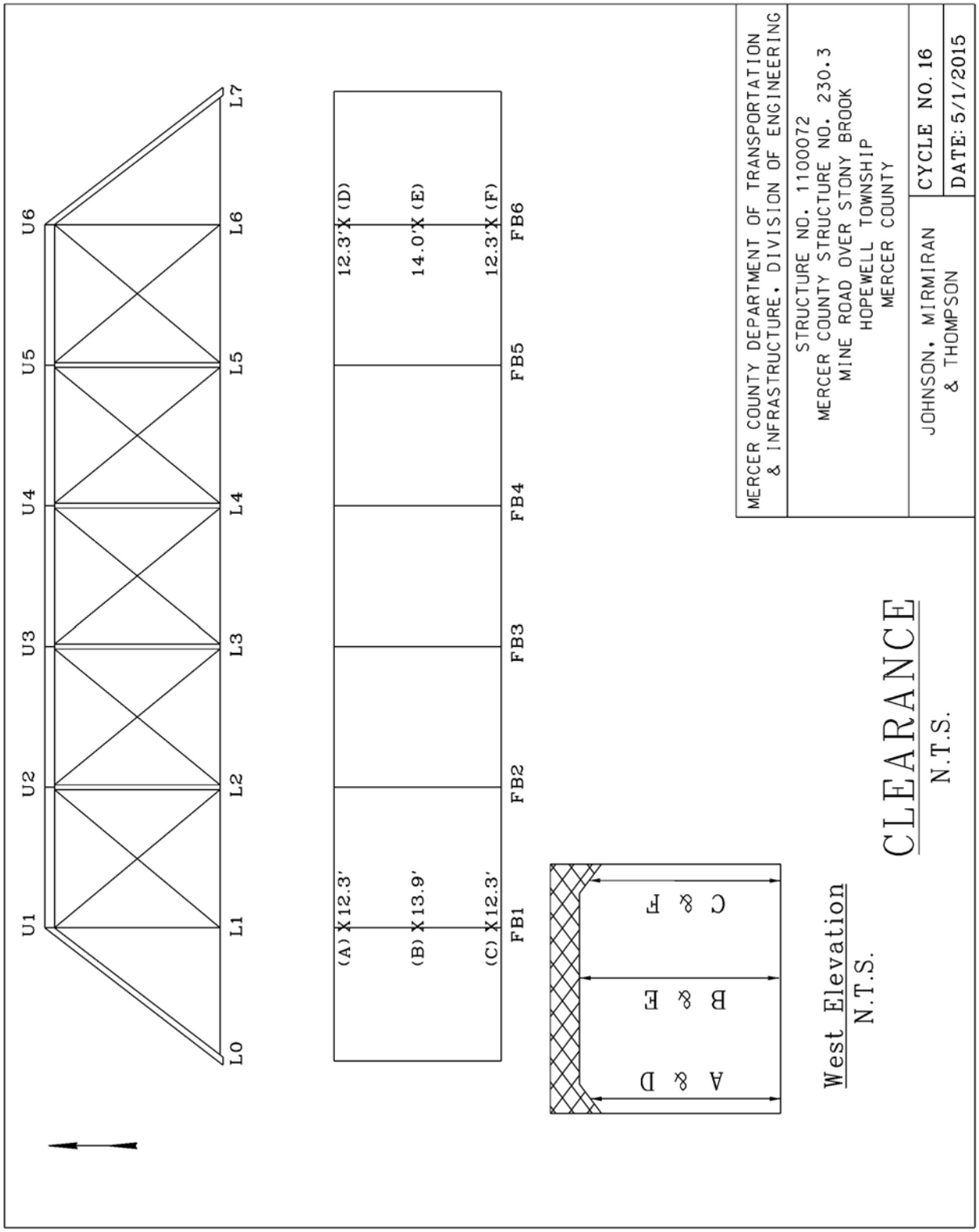

MERCER COUNTY DEPARTMENT OF TRANSPORTATION
& INFRASTRUCTURE, DIVISION OF ENGINEERING
STRUCTURE NO. 1100072
MERCER COUNTY STRUCTURE NO. 230.3
MINE ROAD OVER STONY BROOK
HOPEWELL TOWNSHIP
MERCER COUNTY
JOHNSON, MIRMIRAN & THOMPSON
CYCLE NO. 16
DATE: 5/1/2015
L0 L1 L2 L3 L4 L5 L6 L7
U1 U2 U3 U4 U5 U6
FB1 FB2 FB3 FB4 FB5 FB6
(A) X 12.3'
(B) X 13.9'
(C) X 12.3'
12.3'X (D)
14.0'X (E)
12.3'X (F)
A & D
B & E
C & F
West Elevation
N.T.S.
CLEARANCE
N.T.S.

Photo No: 16-01

Location:	South elevation, looking north.
Description:	General view.

Photo No: 16-02

Location:	North elevation, looking south.
Description:	General view.

Photo No: 16-03

Location:	West approach, looking east.
Description:	General roadway view. Note weight limit and clearance limit signs.

Photo No: 16-04

Location:	East approach, looking west.
Description:	General roadway view.

Photo No: 16-05

Location:	Channel thalweg, looking north.
Description:	General view upstream.

Photo No: 16-06

Location:	Channel thalweg, looking south.
Description:	General view downstream.

Photo No: 16-07

Location:	Superstructure and underside of deck, looking west.
Description:	General view. Note moderate laminar corrosion on the webs of floorbeams.

Photo No: 16-08

Location:	Vertical clearance warning sign of the west approach, looking east.
Description:	Broken post of sign 850 feet from bridge. Refer to Priority repair letter 1100072_20150501cy16_PR1_01.

Photo No: 16-09

Location:	Bottom chord of the north truss, looking west.
Description:	The outer bar section is slightly bent due to large trees washing downstream during flood event.

Photo No: 16-10

Location:	Bottom chord of the north truss connection to floorbeam FB1, looking southwest.
Description:	The inner bar has an area of section loss behind the guide block due to pack rust (yellow arrow). The outer guide block is cracked and bent due to pack rust (red arrow).

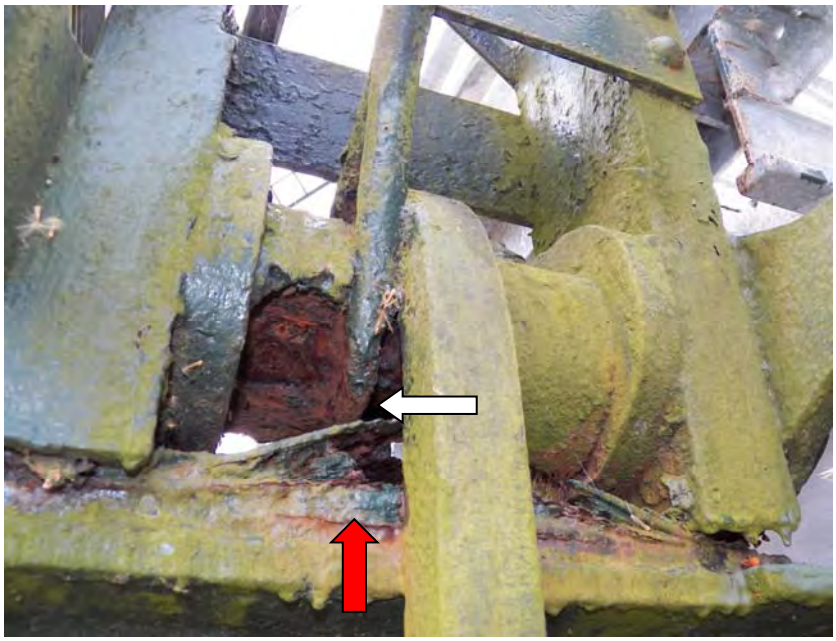


Photo No: 16-11

Location:	Bottom chord pin at L5 of north truss connection to floorbeam FB5, looking east.
Description:	The pin has an area of section loss due to pack rust below the protective sleeve. The counter-action rod has heavy section loss (white arrow). Note the severe pack rust and section loss of the shim plates on the top flange of FB5 (red arrow).

Photo No: 16-12

Location:	Bottom chord pin at L3 of south truss, looking west.
Description:	The pin has section loss due to pack rust which was previously below the protective sleeve (bent down to reveal the pin).

Photo No: 16-13

Location:	Top chord pin U1 of the south truss, looking west.
Description:	Moderate granular corrosion on the unpainted surfaces.

Photo No: 16-14

Location:	Top chord at U4 of north truss, looking northwest.
Description:	Moderate pack rust between the channel and the top plate at the top plate bolted splice connection.

Photo No: 16-15

Location:	East portal member near the south truss, looking south.
Description:	Moderate collision damage.

Photo No: 16-16

Location:	Floorbeam FB2 east face, looking west.
Description:	Heavy corrosion has caused section loss to the top flange with knife edging and a pin hole (red arrow).

Photo No: 16-17

Location:	Floorbeam FB1 at the north end, looking southeast.
Description:	Typical retrofit of floorbeams used for past re-construction. Beam depth cut down (coped) and flange widths cut down (coped) to accommodate the U-bolts. Bolted cover plate added on the bottom flange.

Photo No: 16-18

Location:	First bay from west, looking south.
Description:	Missing lateral bracing tie rod.

Photo No: 16-19

Location:	North east bearing, looking east.
Description:	Heavy corrosion with section loss on the eye bar and anchor bolt nut.

Photo No: 16-20

Location:	East masonry abutment, looking east.
Description:	Missing joint mortar (pointing).

Structure No.:	1100072	Route:	9011	Cycle No.:	16
Name:	Mine Road over Stony Brook			Insp. Date:	5/1/2015

Photo No: 16-21

Location:	Northwest masonry wingwall, looking southwest.
Description:	Missing joint mortar (pointing).

Photo No: 16-22

Location:	Special equipment.
Description:	Large ladder used for inspection, and MPT flagging set-up.

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

NEW JERSEY DEPARTMENT OF TRANSPORTATION
STRUCTURAL EVALUATION
FIELD NOTES
MERCER COUNTY

Inspectors: John Nettuno Name: Mine Road over Stony Brook
Crew Chief: John Petre PE
Temperature: 60ºF Weather: Mostly cloudy
Special Equipment Used: Large ladder (Photo 16-22)

RATINGS:

N Not applicable.
9 Excellent Condition.
8 Very Good Condition – no problems noted.
7 Good Condition – some minor problems.
6 Satisfactory Condition – some minor deterioration of structural elements.
5 Fair Condition – minor section loss to primary structural elements.
4 Poor Condition – advanced section loss to primary structural elements.
3 Serious Condition – seriously deteriorated primary structural elements.
2 Critical Condition – facility should be closed until repairs are made.
1 Imminent Failure Condition – facility closed. Study of repairs is feasible.
0 Failed Condition – facility is closed and beyond repair.

GPS COORDINATES			
@ SW corner			
N	**40°**	**22′ 26.29″**	**Lat.**
W	**74°**	**47′ 38.40″**	**Long.**

GENERAL

Type of Bridge: Single span riveted wrought iron pin connected Pratt through trusses with floorbeams and stringers.

Year Built: 1885 Year of Widening / Major Repairs: 2011

No. of Lanes: On 1 Under 0 (waterway)

Vertical Clearances: Over Deck (Item 53): Unlimited

Minimum Under (Item 54): N/A

Maximum Under (Item 10 pg 2): N/A

Horizontal Under-clearance: Total Horizontal Under-clearance: N/A

Right (Item 55B): N/A

Left (Item 56): N/A

Overall Physical Condition of Structure: Poor due to the superstructure condition

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

DECK

SI&A Item 58 Condition Rating: **7**

SPAN # Single

RATING	COMPONENT	REMARKS
7	Top of Deck Open steel grating panels (14) with a concrete end block at the west end ~~Wearing Surface~~	No significant defects (Minor wear)
8	Underside of Deck Open steel grating panels	No significant defects
N	Median	
7	Curbs (Galv. Steel channel) 6″ Both sides	No significant defects (Minor oxidation)
N	Sidewalks / Safetywalks	
8	Bridge Railing: W-Guide rail	No significant defects
N	Railings / Fencing	
7	Deck Joints:	No significant defects W: Foam filler with plastic cap (Plastic cap is broken and missing for full length.) E: Fiber material at Grid/Header interface.
N	Drains and Scuppers	
N	Light Stands	
N	Utilities	None supported by the superstructure or deck
8	Others: Headers At east only	No significant defects

Additional Remarks:

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

APPROACHES

SI&A Item BA Rating: **7**

SI&A Item 72 Rating: **6**

APPROACH West

RATING	COMPONENT	REMARKS
7	Approach Slab (1) @ 20 LF then B.C. Pavement	No significant defects
N	Approach Shoulder	
	Approach Roadway Vertical and Horizontal Alignment	Vertical: Level Horizontal: Tangent Moderate speed reduction required
8	Guide Rail Condition (W-beam)	No significant defects
N	Sidewalks/ Safetywalk	No significant defects
N	Curbs	No significant defects
7	Utilities	Overhead wires along the north side
7	Approach Roadway Embankment (masonry and concrete ret walls	No significant defects
7	Others: Cold joint at B.C./R.C.	No significant defects (Cold joint open 1/8” to 1/4")
	Others: Signs	The sign for vertical clearance has fallen (Photo 16-08). Refer to Priority Repair Letter 1100072_20150501cy16_PR1_01.pdf.

Additional Remarks: Priority Repair Quantities: Repair sign 1 crew day.

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

APPROACHES

SI&A Item BA Rating: **7**

SI&A Item 72 Rating: **6**

APPROACH East

RATING	COMPONENT	REMARKS
7	Approach Slab (1) @ 6 LF then B.C. Pavement	No significant defects (minor settlement of B.C. at R.C.)
N	Approach Shoulder	
	Approach Roadway Vertical and Horizontal Alignment	Vertical: 3% grade up to deck Horizontal: Tangent at intersection 20 feet away. Moderate speed reduction required
7	Guide Rail Condition (W-beam)	No significant defects (minor scrapes)
N	Sidewalks/ Safetywalk	No significant defects
7	Curbs Steel channels	No significant defects
7	Utilities	Overhead wires along the north side
7	Approach Roadway Embankment (masonry and concrete ret walls	No significant defects
7	Others: Cold joint at B.C./R.C. and Foam filler with plastic cap at header	No significant defects (Cold joint open 1/4” to 1/2") (Plastic cap is broken and missing for full length.)

Additional Remarks:

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

SUPERSTRUCTURE (TRUSS)

SI&A Item 59 Condition Rating: **4**

SPAN # Single

RATING	COMPONENT	REMARKS
6	Top Chord: Wrought iron Dbl. channels 6" x 1 ¾" x ¼" thk. with a top plate 12 3/8" x 3/8" thk.	Heavy laminar corrosion above bearing area on underside of the top face plate, moderate granular corrosion on members in areas where paint was not applied, and areas of moderate pack rust at the top plate bolted splice connections (Photos 16-13 and 16-14). Field welded angle to NW and SW end post channel bottom flanges near the bearings: No significant defects
5	Bottom Chord: Wrought iron Dbl. die forged eye bars 2"x 11/16"	Areas of section loss to the bars at the following locations: North: at L1 on the inner and outer bars behind the block guide; 1/8" deep x half height x 6" long (Photo 16-10). Outer bar is slightly bent due to impact by large tree washing downstream between points L5 and L7 (Photo 16-09). South: at L1 on the inner bar west of the block guide; 1" diameter "crater" area with 3/16" deepest at center x 1" long; and on the outer bar behind the guide 1/16" deep x half height x 1" long. Light pitting on bars throughout, is painted over. Moderate pitting on bars at L2-L3, is painted over.
7	Verticals: Wrought iron Laced Dbl. channel 5" x 1 11/16" columns at L2, L3, L4, and L5 and 7/8" round rod hangers at U1-L1 and U6-L6 with guide caps	No significant defects (Several bent lacing bars on each column. Guide caps on hanger rods are slightly bent due to tightened bolts.)
4	Diagonals: Wrought iron: Bars with loop-forged eyes at U1-L2, U2-L3, U5-L4, and U6-L5; teamed with "counter-action" 13/16" round rods with turnbuckles for adjustments	Bars: No significant defects Rods: Heavy section loss on the "eye" at the lower pins is visually assessed at 50% (Photo 16-11)
4	Lateral Bracing: Wrought iron Round threaded 7/8" rods	Missing one in west bay (Photo 16-18). Heavy corrosion with section loss of 50% at the NW and NE bearing attachments (Photo 16-19).
6	End Portals and Sway Bracing: Wrought iron Built-up angles and lacing	Minor dents due to collision impact at the west portal and the east portal (Photo 16-15)
4	Wrought iron Pins with protective casing. 2 ¼" diameter at face.	Bottom Chord Pins: All have heavy section loss due to pack rust below the metal protective sleeve (Photos 16-11 and 16-12). Top Chord Pins: No significant defects
7	Bearings: Wrought iron plates sit on stone masonry seat	No significant defects (Minor laminar corrosion on NW plate)

Additional Remarks: Protective Coating: Paint- minor paint peel throughout reveals previous layer. Some small locations of bare metal on end posts.

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

SUPERSTRUCTURE (Continued)

SI&A Item 59 Condition Rating: **4**

SPAN # Single

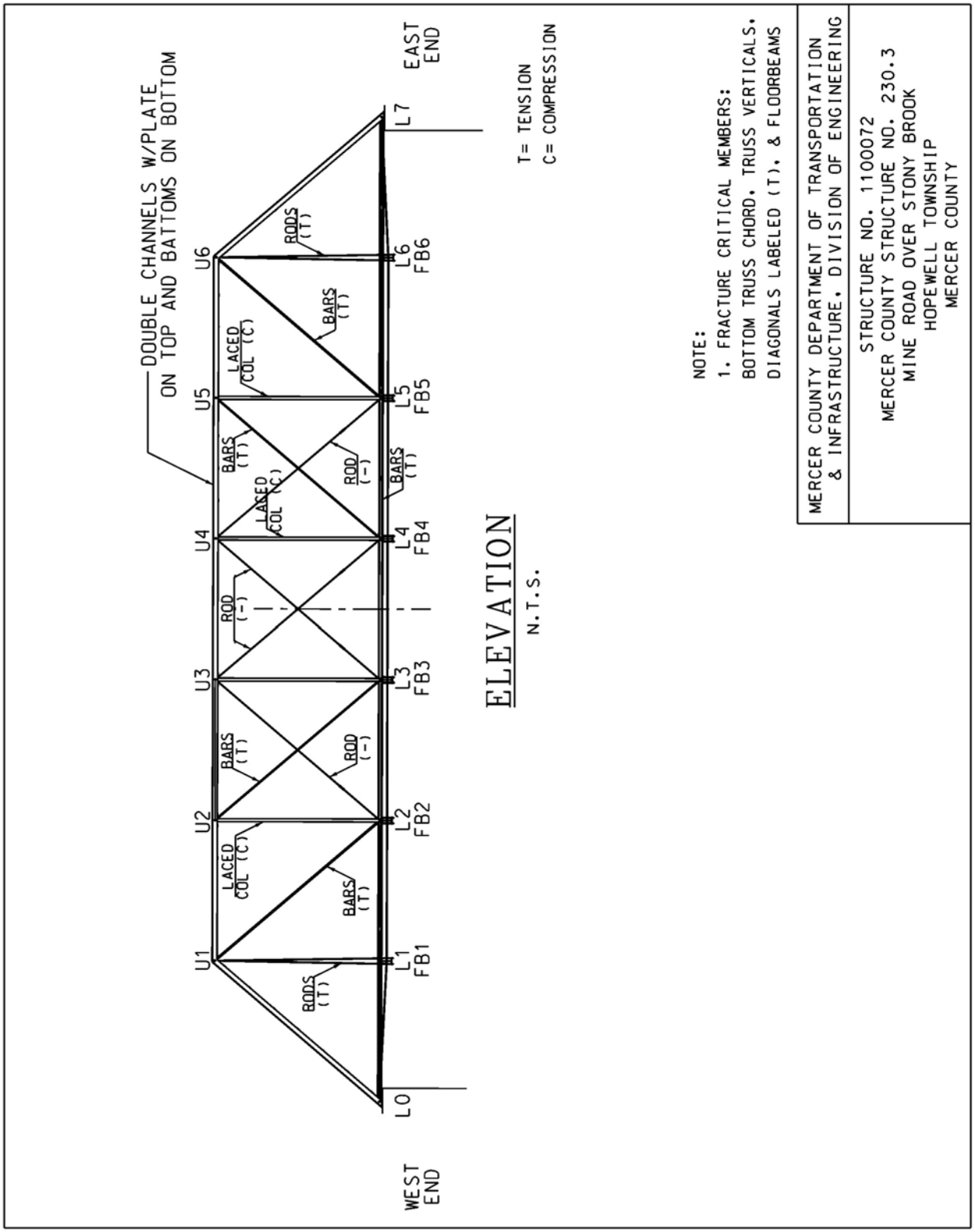
RATING	COMPONENT	REMARKS
5	Wrought iron Floorbeams (6) with bolted bottom flange cover plates 15" I-42.9# Called out on plan of 1955 (Bms. may be I-47.5# based on field measured dimensions) FB1 to FB6 from the west	FB1: Painted over areas of section loss and knife edging on the top flange with a remaining thickness at the edge of 1/8" between S3 to S5. FB2: Painted over areas of section loss and knife edging on the top flange with a remaining thickness at the edge of 1/8" between S3 to S5, with a pin hole near S4 (Photo 16-16) FB3: Painted over areas of section loss and knife edging on the top flange with a remaining thickness at the edge of 1/8" between S3 to S5. FB4: Painted over areas of section loss and knife edging on the top flange with a remaining thickness at the edge of 1/8" between S3 to S5. FB5: Painted over areas of section loss and knife edging on the top flange with a remaining thickness at the edge of 1/8" between S3 to S5. FB6: Painted over areas of section loss and knife edging on the top flange with a remaining thickness at the edge of 1/8" between S3 to S5. All Floorbeams: Areas of moderate laminar corrosion on the webs below old stringer locations and light spot corrosion on webs and bottom flanges (Photo 16-07).
4	Wrought iron pin bracket and shim plates at L2, L3, L4, and L5	Severe pack rust and laminar corrosion at all locations (Photo 16-11)
4	Wrought iron bottom chord block guides at L1 and L6	Severe corrosion and pack rust has caused section loss and cracking of the guides at all locations (Photo 16-10)
8	Galv. Steel Stringers (5) W8x28 S1 to S5 from the south	No significant defects
N	Bearings	Stringers sit on a steel plate on the bridge seat.
	Deflection and Vibration	Minor amounts observed at time of inspection
N	Others	

Additional Remarks: Protective Coatings (Paint):
Paint peel throughout reveals previous layer. Some locations of corroded bare metal.
Galvanizing- No significant defects

FATIGUE DETAILS

Estimated percentage of Large trucks in ADT = 1%

Category	Detail Description and Location
C	Detail 20: Coped or blocked flanges at the floor beams.
E	Detail 22: Net section of eye bars


DOUBLE CHANNELS W/PLATE
ON TOP AND BATTOMS ON BOTTOM
EAST END
WEST END
U1
U2
U3
U4
U5
U6
L0
L1 FB1
L2 FB2
L3 FB3
L4 FB4
L5 FB5
L6 FB6
L7
RODS (T)
BARS (T)
LACED COL (C)
ROD (-)
T= TENSION
C= COMPRESSION
ELEVATION
N.T.S.
NOTE:
1. FRACTURE CRITICAL MEMBERS:
BOTTOM TRUSS CHORD. TRUSS VERTICALS.
DIAGONALS LABELED (T). & FLOORBEAMS
MERCER COUNTY DEPARTMENT OF TRANSPORTATION
& INFRASTRUCTURE. DIVISION OF ENGINEERING
STRUCTURE NO. 1100072
MERCER COUNTY STRUCTURE NO. 230.3
MINE ROAD OVER STONY BROOK
HOPEWELL TOWNSHIP
MERCER COUNTY

Structure No.: 1100072 Route: 9011 Cycle No.: 16

Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

PAINT INSPECTION

*Environment: 1

Date of Last Painting: 2011

1. Rural or Industrial, Mild exposure
2. Industrial, Severe Exposure
3A. Marine, Mild Exposure
3B. Marine, Severe Exposure
*Ref. NJDOT Design Manual Sec. 1.24.19

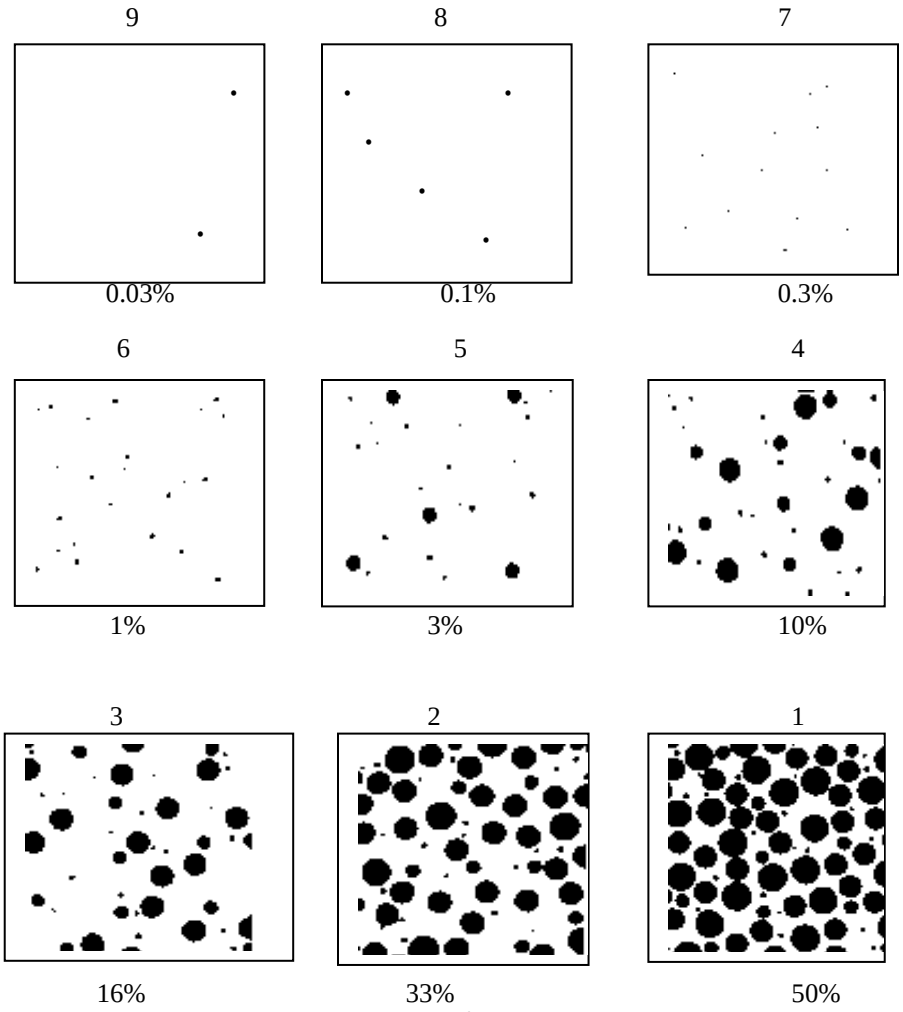


FIG. 1 Examples of Area Percentages

Notes: Blistered Paint areas are counted as rust

10 = 0% Rust
0 = 100% Rust

Use the closest rating to the actual field condition based on the average for the bridge. Indicate any areas of severe rusting in remarks.

For structures composed of weathering steel, this sheet should be used to rate the effectiveness of the iron oxide coating (see Appendix G from the state coding guide). For beam ends, use the controlling rating (paint or oxide coating).

INSPECTION RATINGS (0 THROUGH 10 OR N/A)

Top Chd. ~~Fascia Beam~~:	10	Fascia Bottom Flange:	10	[Floor] Beams Ends:	6
Bot. Chd. ~~Interior Beam~~:	10	Interior Bottom Flange:	10	Connections:	0
Bracing:	0	Substructure:	10	Railings/Fence:	10
Bearings:	4	Above Deck Superstructure	6		

Remarks 1:

Remarks 2:

TYPICAL FATIGUE DETAILS

13. Field Weld Repairs - Proper welding procedures may not have been used; testing of weld by non-destructive methods was usually not done, therefore, the possibility of large flaws exists. Check carefully on the main structural members (stringers, floorbeams, and girders).

14. Tack Welds - Check carefully on riveted members constructed in 1940's and 1950's as these welds were sometimes used to hold the plates together during riveting.

15. Plug Welds - Check at bolted connections on welded structures. These welds may have been used to fill-in incorrectly drilled holes (see sketch).

16. Backing Bars - These welds are possibly not full penetration. Check carefully on box girders if accessible and at butt (groove) welds made in the field.

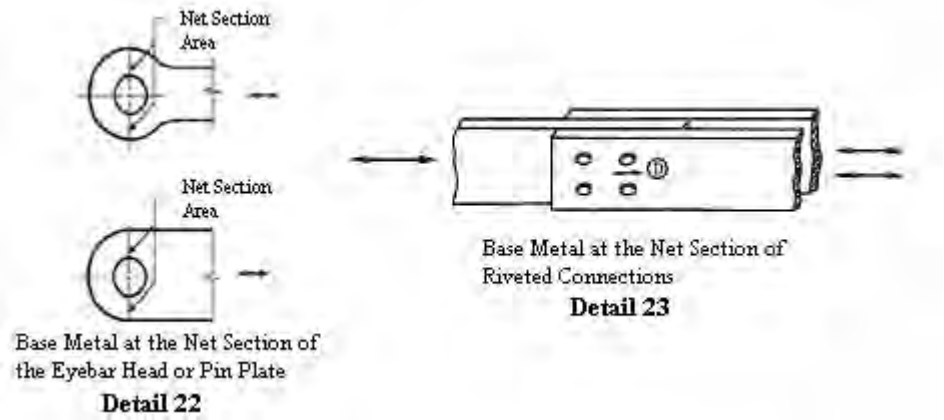
17. Details with 2 or 3 Intersecting Welds (Slot Welds) - Incomplete penetration of the second and third welds is possible.

18. Butt (Groove) Welds on Horizontal Web Stiffeners - NDT of the weld was not always required on the stiffener in the tension zone. If the weld is not good, this will be an "E" detail or worse which can exist in a high stress area (This would be the same as or worse than typical detail 3).

19. Detail Without Proper Welding Clearance - Poor welding can result if proper clearance for the welding rod is not maintained by the designer (such as a horizontal web stiffener placed too near the bottom flange of a girder; fillet weld at bottom of stiffener is difficult due to a lack of clearance for the welding rod).

20. Coped or Blocked Flanges - Check carefully when these details exist on main structural members (stringers and floorbeams). Coped flanges are a typical detail on movable spans.

21. Distortion (Bending) at Small Gaps - For typical details which exhibit damage due to this, see "Inspecting Steel Bridges for Fatigue Damage" (see sketches).



Base Metal at the Net Section of the Eyebar Head or Pin Plate

Detail 22

Base Metal at the Net Section of Riveted Connections

Detail 23

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

SUBSTRUCTURE

SI&A Item 60 Condition Rating: **6**

ABUTMENT West

RATING	COMPONENT	REMARKS
6	Breastwall (Stone masonry with R.C. pedestal)	Loss of joint mortar (50 SF) (typ. Photo 16-20)
-	Backwall (R.C.)	Not visible behind deck end block
7	Bridge Seat (Stone masonry with R.C. pedestal and steel plate	No significant defects
6	Wingwalls / Retaining Walls (Stone masonry with R.C. caps)	Both: Loss of joint mortar (15 SF) (Photo 16-21)
N	Embankment / Slope Protection	
8	Others / Footings / Waterway Probing	No exposed footing.

Additional Remarks: Split in stone at north end, below seat.

ABUTMENT East

RATING	COMPONENT	REMARKS
6	Breastwall (Stone masonry with R.C. pedestal)	Loss of joint mortar (50 SF) (Photo 16-20)
7	Backwall (R.C.)	No significant defects
7	Bridge Seat (Stone masonry with R.C. pedestal and steel plate	No significant defects (Cracked masonry blocks below NE and SE truss bearings)
6	Wingwalls / Retaining Walls (Stone masonry with R.C. caps)	Both: Loss of joint mortar (15 SF) (typ. Photo 16-21)
N	Embankment / Slope Protection	
8	Others / Footings / Waterway Probing	No exposed footing.

Additional Remarks: Split in stones at each end below seat.

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

SUBSTRUCTURE/SCOUR

SI&A Item 60 Condition Rating: **6**

ABUTMENT West

RATING	COMPONENT	REMARKS
		COUNTERMEASURES
	Description	None
N	Condition	
		PROBING/SCOUR
8	Findings	No scour
	Changes Since Prior Inspection	None
	Debris	None

Repair Quantities: None

ABUTMENT East

RATING	COMPONENT	REMARKS
		COUNTERMEASURES
	Description	None
N	Condition	
		PROBING/SCOUR
8	Findings	No scour
	Changes Since Prior Inspection	None
	Debris	None

Repair Quantities: None

Structure No.: 1100072 Route: 9011 Cycle No.: 16
Name: Mine Road over Stony Brook Insp. Date: 5/1/2015

WATERWAY/CHANNEL

SI&A Item No. 61: 7
SI&A Item No. 71: 6
Prioritization Category: 3
Scour Sufficiency Rating: 47.5

WATERWAY Stony Brook
SPAN(S) Single

RATING	COMPONENT	REMARKS
	FLOW CONDITIONS	
	Direction	North to south
	Magnitude	Water flow in 60 % of horizontal opening x 8″ average depth.
	Velocity	Moderate
	EMBANKMENTS	
7	Upstream	Stable heavy woods
7	Downstream	Stable heavy woods
N	Channel Countermeasures	
	CHANNEL MOVEMENT AND CHANGES	
	Horizontal Location	Meandering channel enters the opening at the east half.
	Cross Section	Thalweg below east ¼ point. Sand and stone bed
	Alignment	In line with the substructure units.
	Changes Since Previous Inspection	None
	Navigation Clearances	N/A
	Waterway Opening	Appears adequate for the observed flow. Flood debris on the bridge superstructure indicates that the waterway opening is inadequate for periods of high flow.
N	Other/Debris in Channel	None

Repair Quantities:

Structure No.:	1100072	Route:	9011	Cycle No.:	16
Name:	Mine Road over Stony Brook			Insp. Date:	5/1/2015

HIGHWAY SAFETY

Coding of SI&A Item 36: **0000**
1: Good
0: Not Good
N: Not Applicable

RATING		COMPONENT	REMARKS
0		Bridge Railing	2′-2″ W-beam guide rail carried from approaches attached to the trusses.
0	0	Transition to Bridge Railing	Required at all corners. Single element w-beam, un-stiffened, steel spacers and continues from the bridge. Typical at all corners. Non-standard due to: Single element w-beam, un-stiffened, steel spacers
	1	Curb / Sidewalk Terminations	Continuous curbs None exposed
0		Approach Guide Rails	Adequate length w-beam and spacing, with plastic/steel spacer blocks Non-standard due to: Steel spacer blocks.
0		Approach Guide Rail End Terminals	SW: None NE NW & SE: SRT Non-standard due to: none at the SW

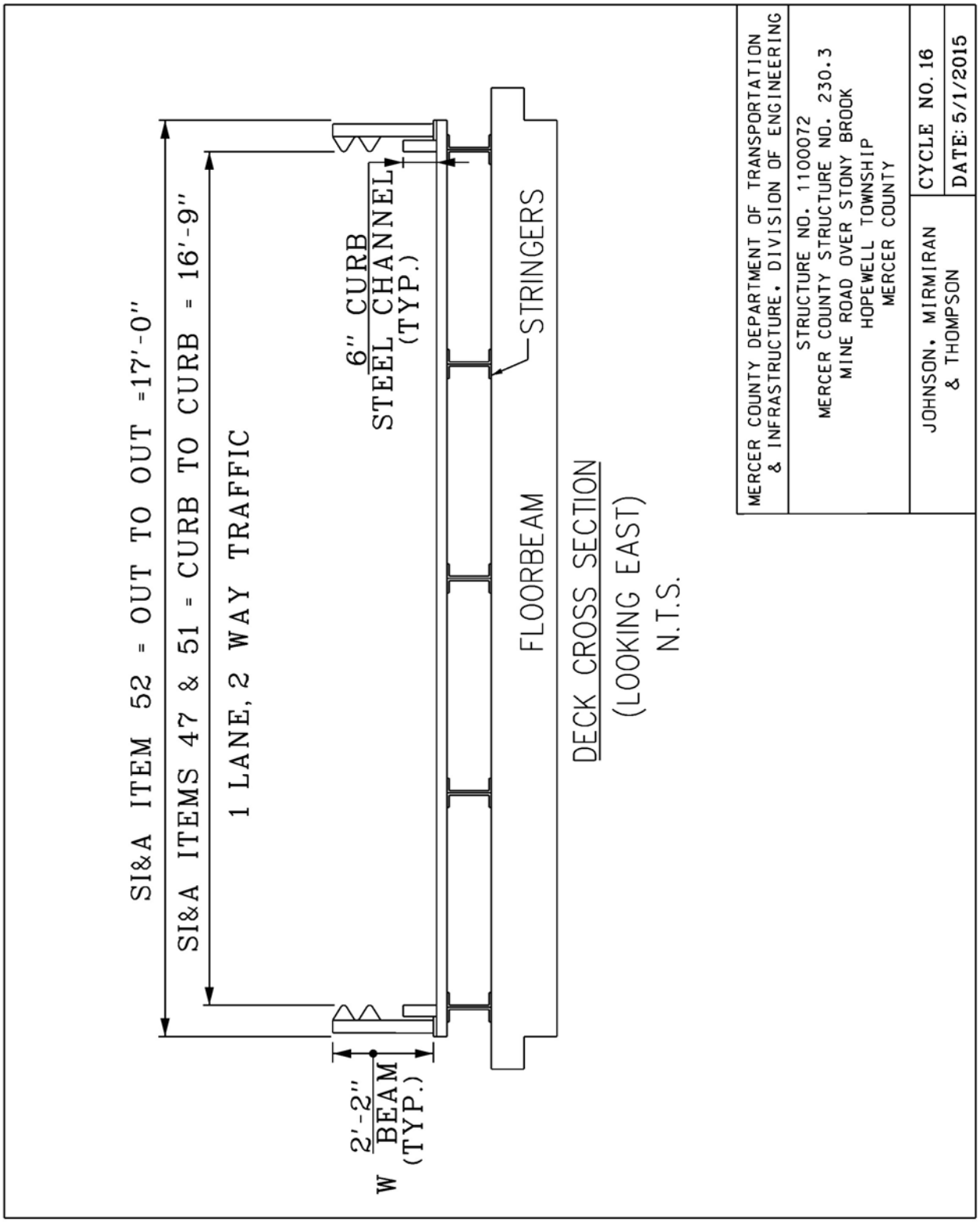
DECK GEOMETRY

SI&A Item 68 Rating: **2 (Table 2A)**

COMPONENT	REMARKS
Bridge Cross Section	Consistent with approaches and provides continuity. See deck cross section next page.
Adequacy of Lane / Shoulder Widths	Intolerable-Replace: 1 lanes, two-way traffic, no shoulders Curb to curb = 16.7′ 2015 Estimated ADT = 330
Vertical Clearance over Deck	12’-3” below end portals at the curb line at all four corners.

Posting for Load/ Speed / Clearance Restrictions*	The structure is posted for 4 Tons at the bridge and on Stony Brook Road. (Photo 16-03). The structure is posted for a 12’-0” vertical clearance restriction at the bridge and at the beginning of Mine road near NJ 31 and near Stony Brook Road (Photos 16-03). There is a “Road subject to Flooding” advisory sign at the west approach.

Place advance clearance and load posting signs on NJ 31 northbound and southbound to prevent large trucks from making the turn onto Mine road.


SI&A ITEM 52 = OUT TO OUT =17'-0"
SI&A ITEMS 47 & 51 = CURB TO CURB = 16'-9"
1 LANE, 2 WAY TRAFFIC
6" CURB
STEEL CHANNEL
(TYP.)
STRINGERS
FLOORBEAM
2'-2"
W BEAM
(TYP.)
DECK CROSS SECTION
(LOOKING EAST)
N.T.S.
MERCER COUNTY DEPARTMENT OF TRANSPORTATION
& INFRASTRUCTURE, DIVISION OF ENGINEERING
STRUCTURE NO. 1100072
MERCER COUNTY STRUCTURE NO. 230.3
MINE ROAD OVER STONY BROOK
HOPEWELL TOWNSHIP
MERCER COUNTY
JOHNSON, MIRMIRAN
& THOMPSON
CYCLE NO. 16
DATE: 5/1/2015

Structure No.:	1100072	Route:	9011	Cycle No.:	16
Name:	Mine Road over Stony Brook			Insp. Date:	5/1/2015

CLEARANCES

FEATURE ON STRUCTURE: Mine Road SI&A SHEET 1

Minimum Vertical Clearance (SI&A Item 10)	12.3’ below end portals at all four corners.
Total Horizontal Clearances (SI&A Item 47)	16.75’ rail to rail

CONTROLLING UNDERCLEARANCE DATA:	
Minimum Vertical Underclearance (SI&A Item 54)	NA
Minimum Vertical Underclearance (incl. shoulders) (SI&A Item DJ)	NA
Lateral Right (SI&A Item 55)	NA
Lateral Left (SI&A Item 56)	NA

WORK DONE HISTORICAL DATA

CYCLE NO.	YEAR	WORK DONE SUMMARY
16	2015	None
15	2013	Posted structure for 12'-0" vertical under-clearance at both corners of the bridge and at west approach roadway near intersection (NJ 31) and at both approach roadways of Stony Brook Road.
14	2011	New concrete slabs have been constructed at the both approaches and new bituminous concrete overlay has been placed beyond the concrete slab. New galvanized steel stringers and new steel open grid deck have been installed. Cleaned and painted the entire superstructure. A steel plate has been bolted to the bottom flange of all floorbeams. The voided area in the northwest wingwall has been filled with stone. The top of the northwest and southwest wingwalls have been reconstructed. New w-beam guide rail system across the structure and approaches has been installed. New SRT end terminals at northwest, northeast and southeast and boxing glove end terminals at southwest have been installed.
13	2009	Bituminous concrete patched areas along the south side of the west approach pavement.

Structure No.:	1100072	Route:	9011	Cycle No.:	16
Name:	Mine Road over Stony Brook			Insp. Date:	5/1/2015

The following reports, files and memos are associated with this document:

PRIORITY REPAIRS:

The following Priority Letter(s) have been included for this structure:
Each Priority Letter has been submitted as a separate PDF file.

PDF Filename(s):

1100072_20150501cy16_PR1_01.pdf

Appendix C

Community Input

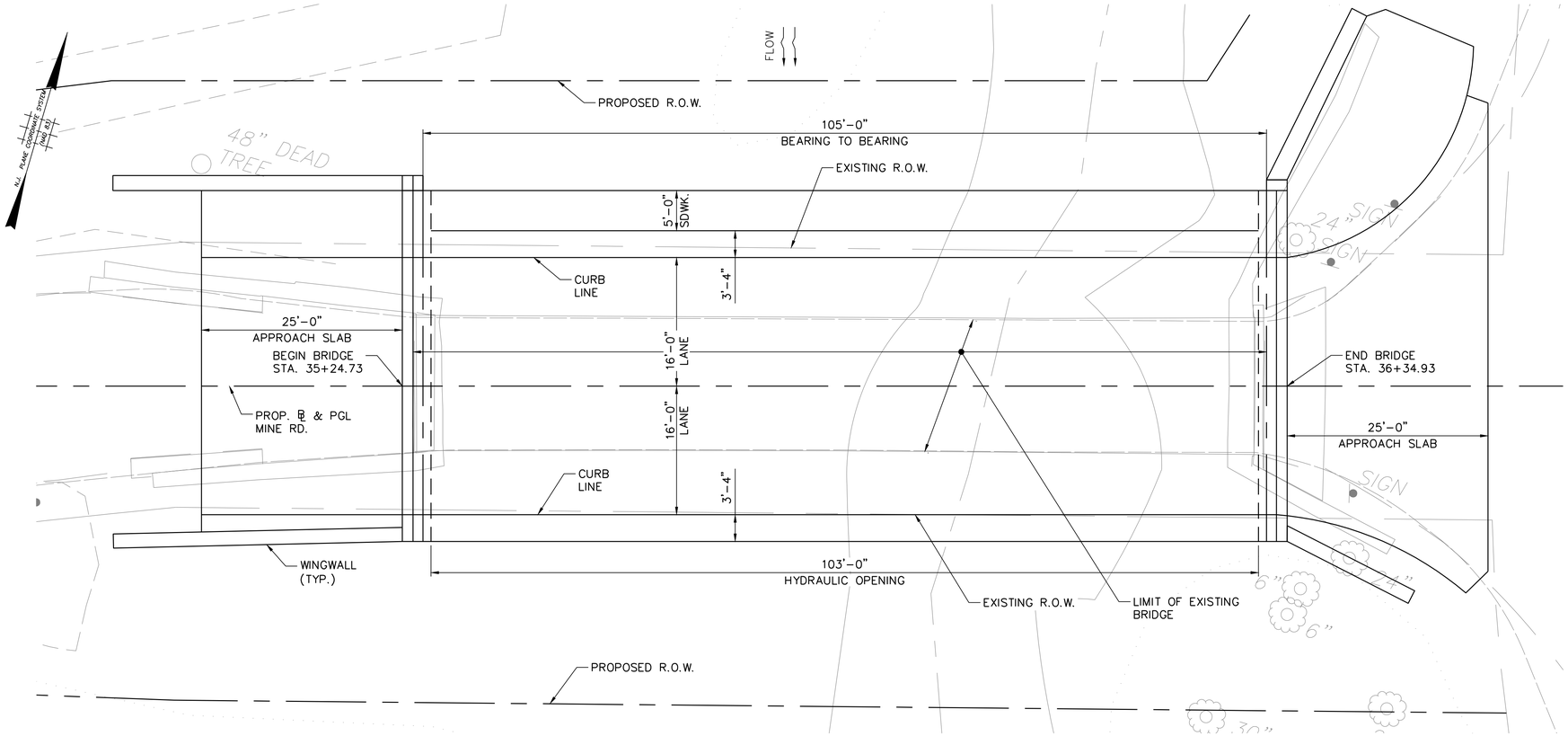
County received a phone call from a local resident, Jeff Cooper (609-213-3329) expressing the inconvenience caused due to the closure of bridge. Upon explanation of the reason for closure and procedure for re-opening the bridge, he expressed his concern to preserve the historical significance of the bridge.

Appendix D

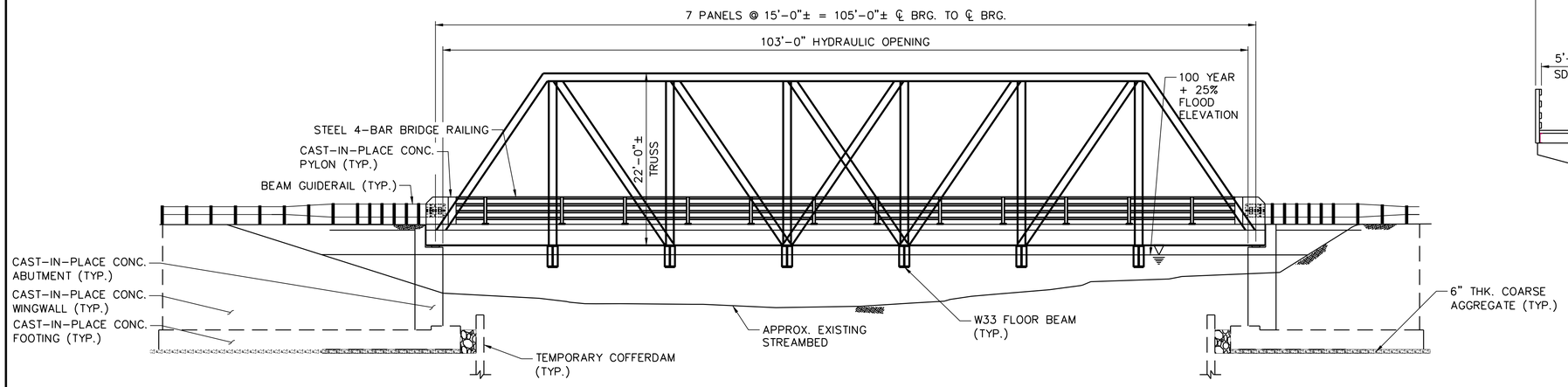
Police Accident Reports

As per verbal communication with Hopewell Police Department, there is no accident history for this bridge.

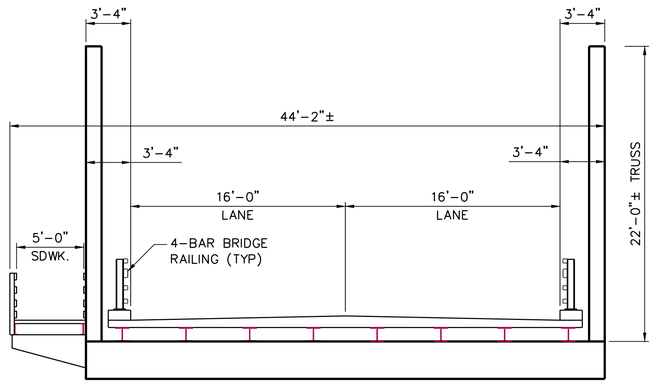
Appendix E



BRIDGE PLAN
1/8" = 1'-0"



SOUTH ELEVATION
1/8" = 1'-0"



TYPICAL SECTION (LOOKING EAST)
1/4" = 1'-0"

ALT 1 - PONY TRUSS

GENERAL NOTES:

1. DESIGN SPECIFICATIONS:

   2017 (8TH EDITION) AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIMS, AND AS MODIFIED BY SECTION 3 OF THE 2016 (6TH EDITION) NJDOT DESIGN MANUAL FOR BRIDGES AND STRUCTURES.

2. CONSTRUCTION SPECIFICATIONS:

   2007 NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION WITH CURRENT SUPPLEMENTARY SPECIFICATIONS, AS MODIFIED BY THE SPECIAL PROVISIONS.

3. LIVE LOADING:

   AASHTO HL-93 VEHICULAR LIVE LOADING OR PERMIT VEHICLE, WHICHEVER GOVERNS.

4. CONCRETE DESIGN STRESSES:

   A. DESIGN COMPRESSIVE STRENGTHS (f'c)

   CLASS A..... 4,000 PSI
   CLASS B..... 3,000 PSI

   B. CONCRETE STRUCTURE

   CLASS A.....DECK, APPROACH SLAB, ABUTMENT BACKWALLS, PYLONS AND SIDEWALK
   CLASS B.....ABUTMENTS, WINGWALLS AND FOOTINGS

5. STRUCTURAL STEEL:

   ASTM A709 GRADE 50

6. REINFORCEMENT STEEL:

   ASTM A615 (GRADE 60) FS = 24,000 PSI (EPOXY-COATED)

REV.	DATE	DRAWN BY	DESCRIPTION

IH ENGINEERS, P.C.
103 COLLEGE ROAD EAST
PRINCETON, NJ 08540

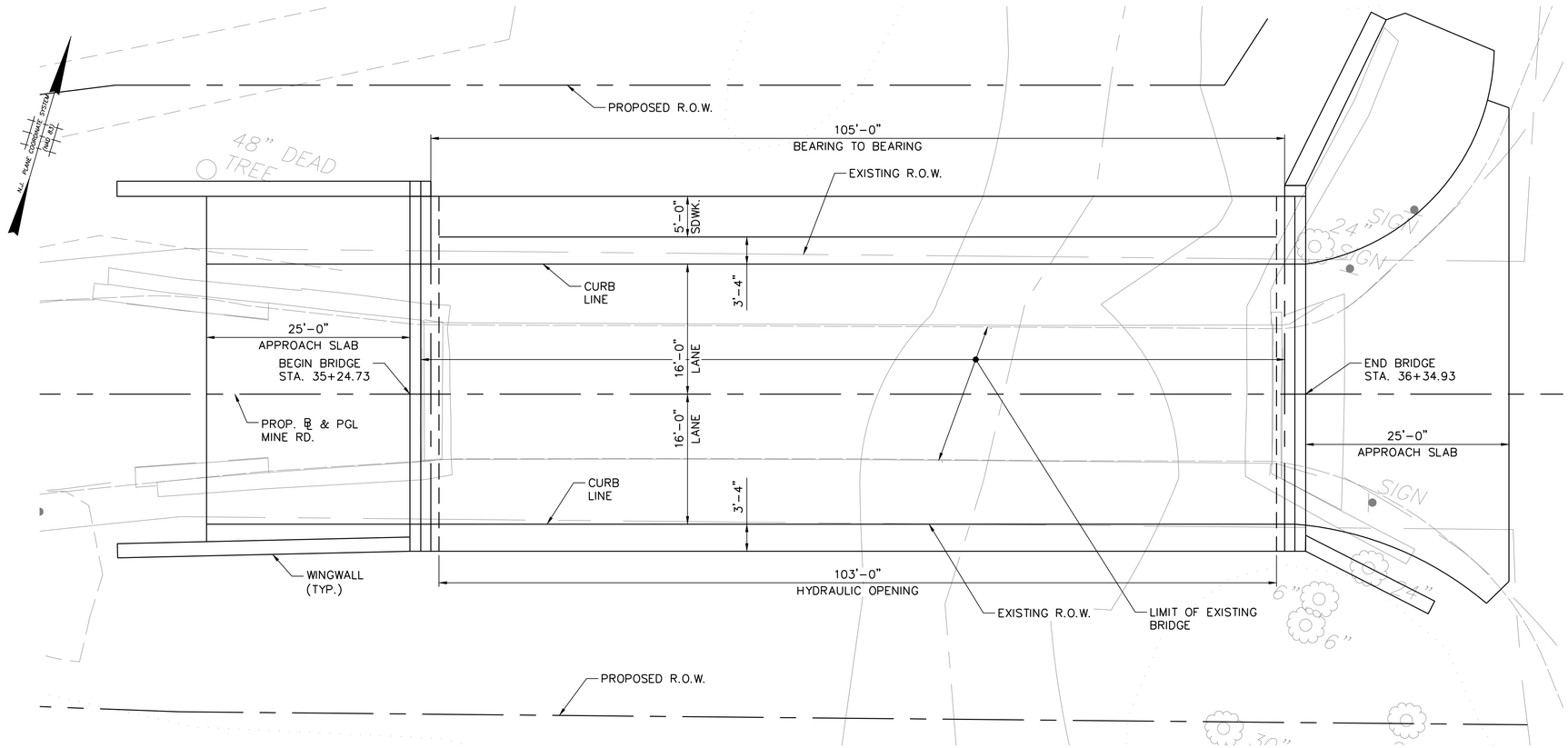
BRIDGE ALTERNATIVE 1
GENERAL PLAN AND ELEVATION

REPLACEMENT OF BRIDGE 230.3 (STRUCTURE 1100-072)
CARRYING MINE ROAD OVER STONY BROOK

HOPEWELL TOWNSHIP, MERCER COUNTY

SCALE: AS SHOWN	DATE: 7/8/18	JOB No. MER1217	SHEET No.

Wen-Jinn Chiou
PROFESSIONAL ENGINEER
N.J. LIC. NO. 24GE04707500



BRIDGE PLAN
1/8" = 1'-0"

GENERAL NOTES:

1. DESIGN SPECIFICATIONS:

   2017 (8TH EDITION) AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIMS, AND AS MODIFIED BY SECTION 3 OF THE 2016 (6TH EDITION) NJDOT DESIGN MANUAL FOR BRIDGES AND STRUCTURES.

2. CONSTRUCTION SPECIFICATIONS:

   2007 NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION WITH CURRENT SUPPLEMENTARY SPECIFICATIONS, AS MODIFIED BY THE SPECIAL PROVISIONS.

3. LIVE LOADING:

   AASHTO HL-93 VEHICULAR LIVE LOADING OR PERMIT VEHICLE, WHICHEVER GOVERNS.

4. CONCRETE DESIGN STRESSES:

   A. DESIGN COMPRESSIVE STRENGTHS (f'c)

   CLASS A.....4,000 PSI
   CLASS B.....3,000 PSI

   B. CONCRETE STRUCTURE

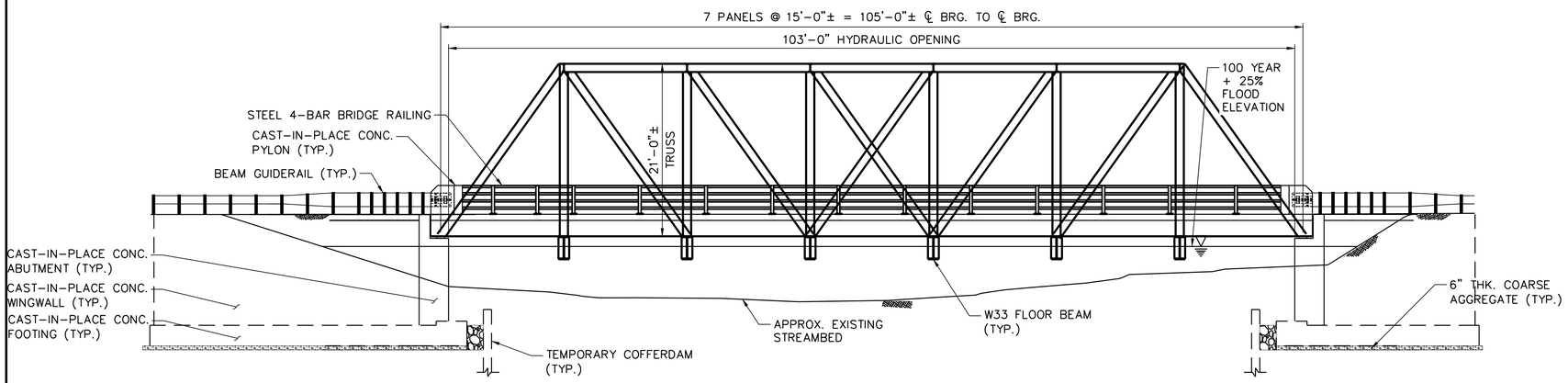
   CLASS A.....DECK, APPROACH SLAB, ABUTMENT BACKWALLS, PYLONS AND SIDEWALK
   CLASS B.....ABUTMENTS, WINGWALLS AND FOOTINGS

5. STRUCTURAL STEEL:

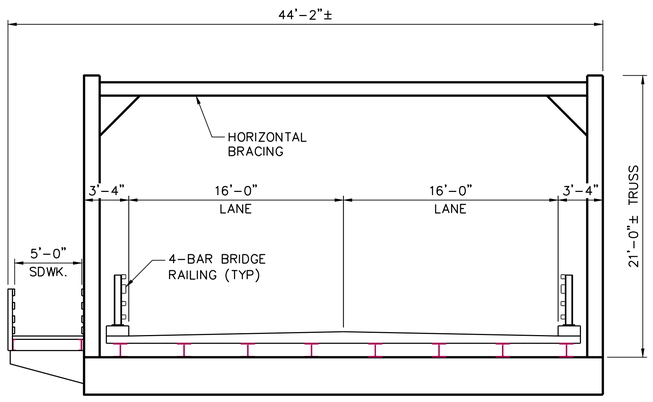
   ASTM A709 GRADE 50

6. REINFORCEMENT STEEL:

   ASTM A615 (GRADE 60) FS = 24,000 PSI (EPOXY-COATED)



SOUTH ELEVATION
1/8" = 1'-0"



TYPICAL SECTION (LOOKING EAST)
1/4" = 1'-0"

ALT 2 - THRU TRUSS

REV.	DATE	DRAWN BY	DESCRIPTION

IH ENGINEERS, P.C.
103 COLLEGE ROAD EAST
PRINCETON, NJ 08540

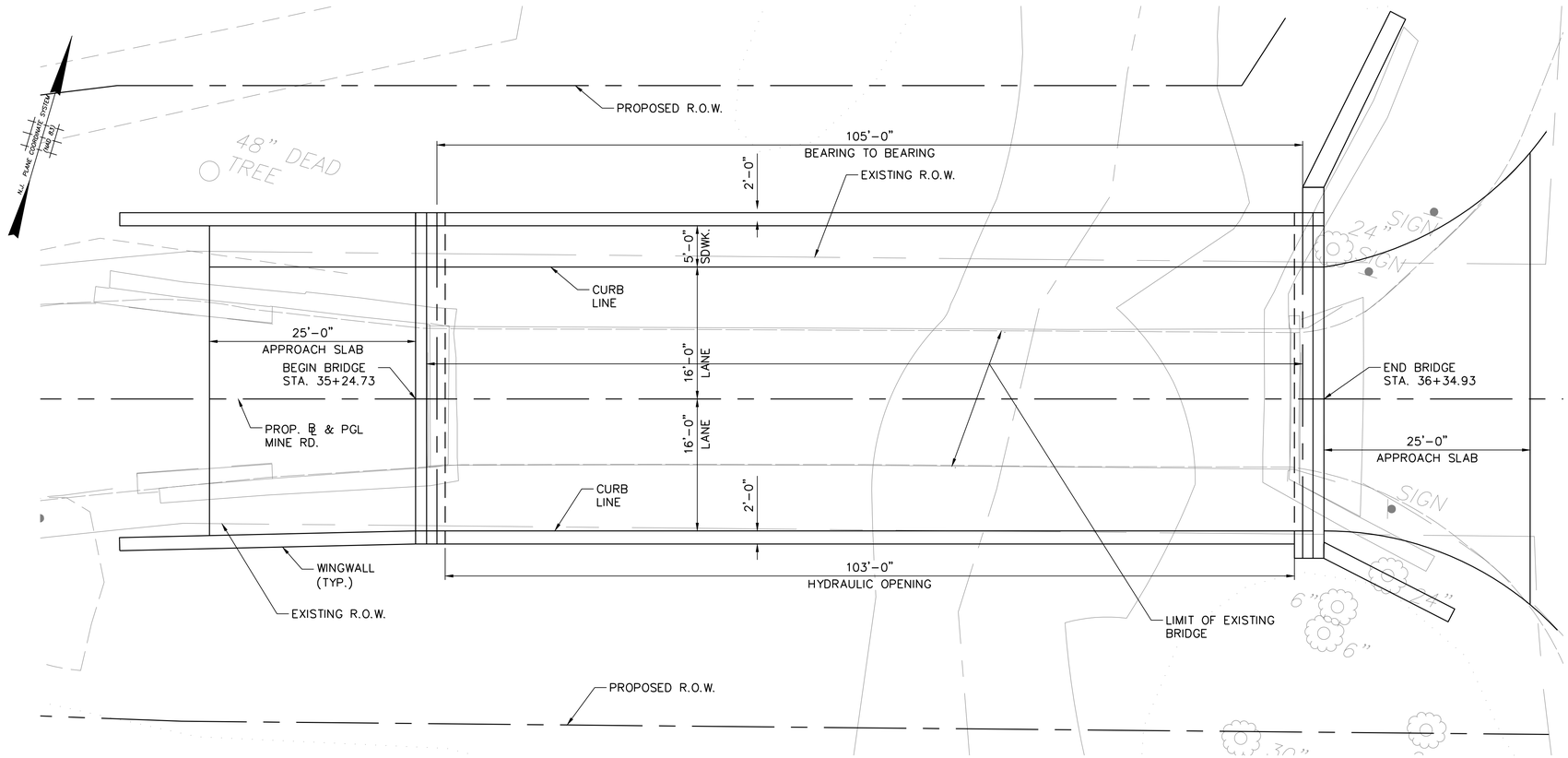
BRIDGE ALTERNATIVE 2 GENERAL PLAN AND ELEVATION

REPLACEMENT OF BRIDGE 230.3 (STRUCTURE 1100-072)
CARRYING MINE ROAD OVER STONY BROOK

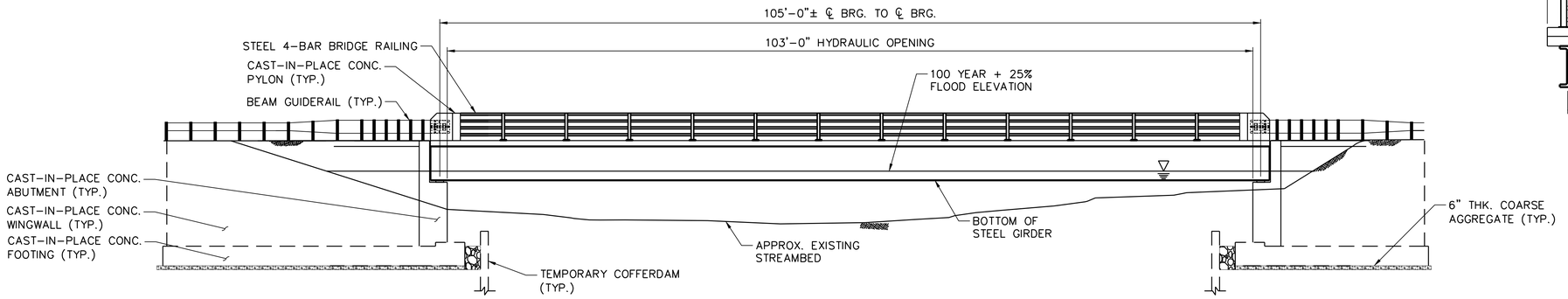
HOPEWELL TOWNSHIP, MERCER COUNTY

SCALE: AS SHOWN	DATE: 7/8/18	JOB No. MER1217	SHEET No.

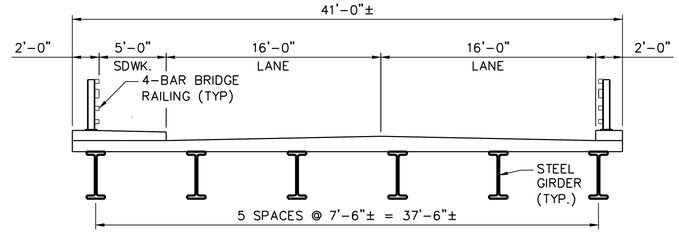
Wen-Jinn Chiou
PROFESSIONAL ENGINEER
N.J. LIC. NO. 24GE04707500



BRIDGE PLAN
1/8" = 1'-0"



SOUTH ELEVATION
1/8" = 1'-0"



TYPICAL SECTION (LOOKING EAST)
1/4" = 1'-0"

ALT 3 - CONVENTIONAL MULTI-GIRDERS

GENERAL NOTES:

1. DESIGN SPECIFICATIONS:

   2017 (8TH EDITION) AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIMS, AND AS MODIFIED BY SECTION 3 OF THE 2016 (6TH EDITION) NJDOT DESIGN MANUAL FOR BRIDGES AND STRUCTURES.

2. CONSTRUCTION SPECIFICATIONS:

   2007 NJDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION WITH CURRENT SUPPLEMENTARY SPECIFICATIONS, AS MODIFIED BY THE SPECIAL PROVISIONS.

3. LIVE LOADING:

   AASHTO HL-93 VEHICULAR LIVE LOADING OR PERMIT VEHICLE, WHICHEVER GOVERNS.

4. CONCRETE DESIGN STRESSES:

   A. DESIGN COMPRESSIVE STRENGTHS (f'c)

   CLASS A..... 4,000 PSI
   CLASS B..... 3,000 PSI

   B. CONCRETE STRUCTURE

   CLASS A.....DECK, APPROACH SLAB, ABUTMENT BACKWALLS, PYLONS AND SIDEWALK
   CLASS B.....ABUTMENTS, WINGWALLS AND FOOTINGS

5. STRUCTURAL STEEL:

   ASTM A709 GRADE 50

6. REINFORCEMENT STEEL:

   ASTM A615 (GRADE 60) FS = 24,000 PSI (EPOXY-COATED)

REV.	DATE	DRAWN BY	DESCRIPTION

IH ENGINEERS, P.C.
103 COLLEGE ROAD EAST
PRINCETON, NJ 08540

BRIDGE ALTERNATIVE 3
GENERAL PLAN AND ELEVATION

REPLACEMENT OF BRIDGE 230.3 (STRUCTURE 1100-072)
CARRYING MINE ROAD OVER STONY BROOK

HOPEWELL TOWNSHIP, MERCER COUNTY

SCALE: AS SHOWN	DATE: 7/8/18	JOB No. MER1217	SHEET No.

Wen-Jinn Chiou
PROFESSIONAL ENGINEER
N.J. LIC. NO. 24GE04707500

MERCER COUNTY BRIDGE NO. 230.3 - HBAA ALTERNATIVES COMPARISON MATRIX

PROJECT GOALS AND CONCERNS / ALTERNATIVES		A No Build	C Rehab as per SOI	D Modified Rehab	E-1 Pony Truss Bridge	E-2 Through Truss Bridge	E-3 Conventional Longitudinal Member System
STRUCTURAL/ TRAFFIC	Load capacity	Substandard	Substandard	Standard (HL-93/NJ Permit Trucks)	Standard (HL-93/NJ Permit Trucks)	Standard (HL-93/NJ Permit Trucks)	Standard (HL-93/NJ Permit Trucks)
	Weight Limit	4 Tons	4 Tons	None	None	None	None
	Lane width	Substandard	Substandard	Standard	Standard	Standard	Standard
	Alignment/ approach	Standard	Standard	Standard	Standard	Standard	Standard
	Overhead clearance	Substandard (12'-0")	Substandard (12'-0")	Standard (Unlimited)	Standard (Unlimited)	Standard (16'-0")	Standard (Unlimited)
	Speed Limit	35 mph	35 mph	35 mph	35 mph	35 mph	35 mph
	Safety	Substandard	Substandard	Standard	Standard	Standard	Standard
	Traffic flow	Stop	Stop	Stop	Stop	Stop	Stop
HISTORIC PRESERVATION	Truss bridge	No Change	No Change	Minor Alteration-Adverse Effect	Major Alteration-Adverse Effect	Major Alteration-Adverse Effect	Major Alteration-Adverse Effect
	Archaeological Resources	No Impact	No Impact	No Change	No Change	No Change	No Change
	Complies w/SOI Standards	N/A	Marginal	Marginal	No	Marginal	No
ENVIRONMENTAL	Freshwater Wetlands	No Disturbance	Temporary Disturbance	Major Disturbance	Minor Disturbance	Minor Disturbance	Major Disturbance
	Floodplain	No Encroachment	No Encroachment	Major Encroachment	Minor Encroachment	Minor Encroachment	Major Encroachment
	Permits (Flood Haz./Wetlands only)	None Required	Viable	Not Viable	Viable	Viable	Not Viable
LAND USE	Acquisitions/ Easements	No Change	No Change	Major	Minor	Minor	Major
COSTS	Construction Cost	$80,000	$500,000	$2.8 Million	$2.0 Million	$2.1 Million	$ 2.4 Million
CONSTRUCTION DURATION		1 month	5 months	24 months	18 months	18 months	22 months
DETOUR DURATION		1 month	5 months	18 months	14 months	14 months	16 months

Right-of-way acquisition costs are not included in the Construction Cost.
Construction costs are comparitive costs based on 2018 dollars.
For Permits, the viability of an alternative is for Flood Hazard Area and Wetlands conditions only. HPO's review during the NJDEP review is excluded; refer to SOI compliance.

Legend :

Structural / Traffic

Substandard - Alternative does not meet current AASHTO design criteria.
Standard - Alternative does meet current AASHTO design criteria.
Improved - Alternative improves existing substandard feature, but does not meet current AASHTO design criteria.

Historic Preservation

Yes - Alternative complies with Secretary of the Interior Standards, but may require a Memorandum of Agreement (MOA).
Marginal - Alternative nearly infeasible to comply with Secretary of the Interior Standards (SOI).
No - Alternative does not comply with Secretary of the Interior Standards.

Environmental Permits

Viable - Alternative proposes regulated activities where the issuance of flood hazard area and wetlands permits are feasible (note: if alternative is SOI non-compliant, then permit may not be viable).
Marginal - Alternative proposes regulated activities where the issuance of flood hazard area and wetlands permits are possible, but extensive mitigation required.
Not Viable - Alternative proposes regulated activities where the issuance of flood hazard area and wetlands permits are highly improbable.

Appendix F

WEN-JINN CHIOU, PE

Project Manager

EDUCATION
- MSCE, 1986 - NJ Institute of Technology
- BSCE, 1980 – Feng Chia University, Taiwan

PROFESSIONAL REGISTRATION
- Professional Engineer
  NJ 2007; NY 2007; PA 2008

CERTIFICATION & TRAINING
- Design of Post-Tensioned Elements in Bridge Structures-2005
- LRFD Steel Bridge Design-2004
- Seismic Design of Highway Bridges-2000

County, Old Trenton Road Bridge (#861.1) over Tributary to Stony Brook, NJ. (2014-2016) Project Manager for the roadway widening design and replacement of an existing culvert by 3-sided concrete box culvert, with an out to out width of 40'. Responsible for roadway plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, NJDEP FWW/FHA permit applications for wetland and riparian zone impact mitigation, detour plans and utility (aerial and UG) relocation accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, Replacement of Bridge #672.4 Carrying South Broad Street (CR672) over Doctors Creek. (2014-Present) Project Manager for the replacement of County Bridge No. 672.4 carrying South Broad Street over Doctors Creek which is a two span, simply supported, concrete encased, multi-steel stringer structure supported by a cast-in-place substructure on piles. It is ±66' long carrying 2 lanes of north/south traffic with a curb-to-curb width of ±40' and an out-to-out width of ±54 feet. The existing sidewalks along both sides of the bridge are 5'-8" wide with a 1'-4" balustrade.

Mercer County, Quaker Road Bridge (#330.2) over Stony Brook. (2010-2013) Deputy Project Manager for the design and replacement of an existing stone faced arch bridge with a single span 75' long prestressed concrete structure, with an out to out width of 42'. Responsible for structural design which included 11 precast, pre-stressed box beams, bearings, abutments, wingwalls and retaining walls on a pile supported foundation. *Project Awards: 2014 Distinguished Engineering Award from NJ Alliance for Action; 2016 Distinguished Engineering Award from the NJ Chapter of the American Council of Engineering Companies.*

Mercer County, Carnegie Road Bridge (#6-540.4) over Assunpink Creek. (2008-2011) Deputy Project Manager for the design and replacement of an existing through girder bridge with a single span 75' long prestressed concrete structure, with an out-to-out width of 41'. Responsible for structural design which included 10 precast, pre-stressed box beams, bearings, abutments, wingwalls and retaining walls on steel H-pile supported foundation.

Mercer County, Rosedale Road Bridge (#330.5) over Stony Brook. (2006-2009) Project Manager responsible for the design and replacement of an existing stone faced arch bridge with a single span 70' long prestressed concrete structure. Responsible for structural design including 13 precast, pre-stressed box beams, bearings, abutments, wingwalls and retaining walls on spread footings. Responsible for oversight of civil design such as approach roadway conceptual plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, permit applications for wetland and stormwater discharge impact mitigation, maintenance and protection of traffic (MPT) plans including detour route, right of way (ROW) documents, Green Acres mitigation, and utility accommodations. Context Sensitive Design was used due to the bridge's location within the Princeton Historic District and the final product bears a strikingly close resemblance the original structure. Portions of the original structure, such as stones and parapet caps, were salvaged for the new structure. *Project Awards: 2012 Honorable Mention for Bridge with Less Than $5M Total Construction Cost from ASHE Southern and North/Central Sections; 2011 Historic Preservation Award from Historical Society of Princeton; 2010 Engineering Excellence Award from the American Council of Engineering Companies; 2010 Honorable Mention for bridges with spans up to 75' from the Prestressed Concrete Institute; 2009 Grand Award from the NJ Chapter of the American Concrete Institute and the NJ Aggregate and Concrete Association.*

Mercer County, Quakerbridge Road Bridge (#6-540.7) over Assunpink Creek. (2006-2007) Deputy Project Manager responsible for the replacement of the original 3-span structure with a single span pre-stressed concrete structure, 76' long and 80' wide. Responsible for the design of 20 precast, pre-stressed box beams, bearings, abutments, wingwalls and retaining walls on a spread footing foundation. Also responsible for conceptual plan for the widening of the roadway and improvements to the adjacent intersections, supervision of field survey, hydraulic analysis, coordination with the County and Township, utility accommodations, permit applications, construction staging, maintenance and protection of traffic, guide rail, grading, stormwater management design, and construction support.

Somerset County, Wertsville Road Bridge over Tributary to the Neshanic River. (2011-Present) Project Manager for the replacement of the existing culvert consisting of two cement grouted stone abutments and a reinforced concrete slab with asphalt overlay. Responsible for preliminary and final design for a proposed three-sided culvert with cast-in-place wingwalls similar to the existing configuration. The roadway will carry two 11' lanes, two 4' shoulders, and two 1' thick parapets making it 32' wide out to out. Context Sensitive Design concepts may be employed, providing for the design of stone faced reinforced concrete to enhance the aesthetic appearance of the structure. Also responsible for oversight of the roadway widening design which is limited to connecting to and maintaining the existing two-lane roadway section, permit applications for wetland and stormwater discharge impact mitigation, and right of way (ROW) plans.

DAVID X. CHIU, PE

Civil/Utility Engineering

EDUCATION

- MSCE, 1989 - NJ Institute of Technology
- BSME, 1983 - University of Technology, Jilin, China

PROFESSIONAL REGISTRATIONS

- Professional Engineer: NJ, 1995; NY, 2000

CERTIFICATION & TRAINING

- Complying with New ADA Standards (2012)
- ASCE Project Management Professional Training (2011)
- NJDEP Storm water Management (2004)
- NJDEP Wetland and Stream Encroachment Permits (2002)
- HEC RAS Fundamentals (2002)
- Development Permits and Approvals For DOT, DEP, etc. (2001)
- TEAPAC Traffic Analysis Package (1996)

Mercer County, Old Trenton Road Bridge (#861.1) over Tributary to Stony Brook, NJ. (2014-2016) Civil Task Leader for the roadway widening design and replacement of an existing culvert by 3-sided concrete box culvert, with an out to out width of 40'. Responsible for roadway plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, NJDEP FWW/FHA permit applications for wetland and riparian zone impact mitigation, detour plans and utility (aerial and UG) relocation accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, South Broad Street Bridge (#672.4) over Doctor's Creek, NJ. (2013-2015) Project Manager for the design and replacement of an existing two-span bridge with a single span 72' long prestressed concrete structure, with an out to out width of 48'. Responsible for approach roadway conceptual plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, NJDEP FWW/FHA permit applications for wetland and storm water discharge impact mitigation, detour plans and utility (aerial and UG) relocation accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, Quaker Road Bridge (#330.2) over Stony Brook, NJ. (2010-2013) Project Manager for the design and replacement of an existing stone faced arch bridge with a single span 75' long prestressed concrete structure, with an out to out width of 42'. Responsible for approach roadway conceptual plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, NJDEP permit applications for wetland and storm water discharge impact mitigation, Maintenance and Protection of Traffic (MPT) plans including detour route, right of way (ROW) documents, and coordination items such as getting endorsement from Princeton Township Historic Preservation and utility accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, Quakerbridge Road Bridge (#6-540.7) over Assunpink Creek, NJ. (2007-2009) Project Manager for the design and replacement of an existing three span concrete deck slab bridge with a single span 76' long prestressed concrete structure. Responsible for conceptual plan for the widening of Quakerbridge Road as well as improvements to adjacent intersections, preliminary and final geometric design, intersection designs, signing and striping plans, grades and profile, guiderail design including length of need calculations, hydraulic design, permit applications for wetland and storm water discharge impact mitigation, maintenance and protection of traffic (MPT) plans, right of way (ROW) documents, and utility accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, Carnegie Road Bridge (#6-540.4) over Assunpink Creek, NJ. (2008-2011) Project Manager for the design and replacement of an existing through girder bridge with a single span 75' long prestressed concrete structure, with an out-to-out width of 41'. Responsible for approach roadway conceptual plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, NJDEP permit applications for wetland and storm water discharge impact mitigation, maintenance and protection of traffic (MPT) plans including detour route, right of way (ROW) documents, and utility accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, Rosedale Road Bridge (#330.5) over Stony Brook, NJ. (2006-2009) Deputy Project Manager/Civil Project Engineer for the design and replacement of an existing stone faced arch bridge with a single span 70' long prestressed concrete structure. Responsible for approach roadway conceptual plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, permit applications for wetland and storm water discharge impact mitigation, maintenance and protection of traffic (MPT) plans including detour route, right of way (ROW) documents, Green Acres mitigation, and coordination items such as getting endorsement from Princeton Township Historic Preservation and utility accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Somerset County, Wertsville Road Bridge over Tributary to the Neshanic River, NJ. (2011-present) Deputy Project Manager for the replacement of the existing culvert consisting of two cement grouted stone abutments and a reinforced concrete slab with asphalt overlay. The roadway width on top of the culvert is 16'-2". Responsible for oversight of the roadway widening which is limited to connecting to and maintaining the existing two-lane roadway section proposed for the culvert and providing standard pavement transitions to the approaches. Also responsible for NJDEP permit applications for wetland and storm water discharge impact mitigation, and Right of Way (ROW) plans.

FRANK YAO, PE

Structural Engineering

EDUCATION

- MSCE, 2008 - Rutgers School of Engineering
- BSCE, 2002 - Zhejiang University, China

PROFESSIONAL REGISTRATION

- Professional Engineer: NJ, 2014; PA, 2014; CA, 2012

DESIGN CODE FAMILIARITY

- AASHTO, ACI, IBC, ASCE 7, UBC, NDS, AISC

County, Old Trenton Road Bridge (#861.1) over Tributary to Stony Brook, NJ. (2014-2016) Project Engineer for the roadway widening design and replacement of an existing culvert by 3-sided concrete box culvert, with an out to out width of 40'. Responsible for roadway plan, preliminary and final geometric design, grades and profile, guiderail design including length of need calculations, hydraulic design, NJDEP FWW/FHA permit applications for wetland and riparian zone impact mitigation, detour plans and utility (aerial and UG) relocation accommodations. Hydraulic design was completed using TR-55, Hydro Flow/Hydrograph and HEC-RAS software.

Mercer County, Rehabilitation of Bridges 212.12 and 218.1 Carrying River Drive over Tributaries to the Delaware River, NJ. (2014-present) Project Engineer on this design for rehabilitation of Bridge No. 212.12 which is an 18'-6" long stone arch carrying 2 lanes of north/south traffic with a curb-to-curb width of 15' and rehabilitation of Bridge No. 218.1 which is a 12' long concrete and stone arch carrying 2 lanes of north/south traffic, with a curb-to-curb width of 23'-6". Both bridges are in the Titusville Historic District and require Context Sensitive Design. Both bridges are structurally deficient and closed to vehicular traffic. Structural design includes rehabilitation and improvements intended to open the structures to traffic while maintaining their historic appearance. Civil design includes the approach roadway conceptual plan, hydraulic analysis, permit applications for wetland and stormwater discharge impact mitigation, Maintenance and Protection of Traffic (MPT), preliminary and final geometric design, grades and profile, guiderail design including length of need calculations and right of way (ROW) documents.

Mercer County, Replacement of Bridge #672.4 Carrying South Broad Street (CR 672) over Doctors Creek, NJ. (2014-present) Project Engineer for the replacement of County Bridge No. 672.4 carrying South Broad Street over Doctors Creek which is a two span, simply supported, concrete encased, multi-steel stringer structure supported by a cast-in-place substructure on piles. It is ±66' long carrying 2 lanes of north/south traffic with a curb-to-curb width of ±40' and an out-to-out width of ±54'. The existing sidewalks along both sides of the bridge are 5'-8" wide with a 1'-4" Balustrade.

Mercer County, Quaker Road Bridge (#330.2) over Stony Brook, NJ. (2012) Structural Engineer responsible for the design and replacement of an existing stone faced arch bridge with a single span 75' long prestressed concrete structure, with an outtoout width of 42'. Responsible for structural design which included 11 precast, pre-stressed box beams, bearings, abutments, wingwalls and retaining walls on a pile supported foundation. *Project Award: 2014 Distinguished Engineering Award from NJ Alliance for Action.*

Hunterdon County, Cratetown Road (#C-26) over Prescott Brook, NJ. (2011-2016) Project Engineer for the replacement of a single span through truss bridge 40' in length and 16' wide with new concrete substructures on spread footings and a precast voided slab superstructure 40' long and 29'-2" wide. Responsible for preliminary and final design of the new substructure and superstructure, and construction support services including shop drawing review and requests for information (RFI).

Monmouth County, Reconstruction of Bridge MT-10 on Church Street over Comptons Creek, NJ. (2015-present) Structural Project Engineer for the replacement of Bridge MT-10 that carries Church Street over Comptons Creek. The project replaces a two span timber bridge (30' total length) built in 1949 that is structurally deficient and functionally obsolete. One quadrant of the project site includes a park that is Green Acres encumbered and required thorough investigation of property deeds and coordination with agencies to ensure the bridge replacement did not infringe on the Green Acres parcel. Structural alternatives were investigated that allowed the development of a single span bridge with two lanes and a curb to curb width of 33' that matches the approach roadways and with one sidewalk. The bridge, sidewalk and roadway approach plans were detailed to avoid the parkland. Drainage improvements were also coordinated between the County and the Township of Middletown. Design is anticipated to be completed by July 2017.

Somerset County, Replacement of County Bridge #H0814 Hawthorne Avenue over Tributary to Green Brook, NJ. (2014-present) Project Engineer for replacement of County Bridge No.H0814, which carries Hawthorne Avenue over a tributary to the Green Brook, in the Township of Bridgewater. Responsible for preliminary and final design for a proposed three-sided culvert with cast-in-place wingwalls similar to the existing configuration.

Somerset County, Wertsville Road Bridge over Tributary to the Neshanic River, NJ. (2011-2016) Project Engineer for the replacement of the existing culvert consisting of two cement grouted stone abutments and a reinforced concrete slab with asphalt overlay. Responsible for preliminary and final design for a proposed three-sided culvert with cast-in-place wingwalls similar to the existing configuration. The roadway will carry two 11' lanes, two 4' shoulders, and two 1' thick parapets making it 32' wide out to out. Context Sensitive Design concepts may be employed, providing for the design of stone faced reinforced concrete to enhance the aesthetic appearance of the structure. Also responsible for the roadway widening design which is limited to connecting to and maintaining the existing two-lane roadway section, permit applications for wetland and stormwater discharge impact mitigation, and Right Of Way (ROW) plans.

KISHORKANT SHAH

Hydraulic Engineering

EDUCATION

- MSCE, 1979 - Maharaja Sayajirao University of Baroda (MSU), India
- BSCE, 1976 - Maharaja Sayajirao University of Baroda (MSU), India

CERTIFICATION & TRAINING

- Army Corps of Engineers Computer Software, namely, HEC-RAS, HEC-1, HEC-2 & HEC-HMS
- NJ Stormwater Best Management Practice Manual
- NJDEP Flood Hazard Area Control Act Rules: The Overview
- NJDEP Flood Hazard Control Act and SWM Regulations
- NJDEP Regulations and NEPA documents
- NJDEP Stormwater Management
- NJDOT CADD Standards
- NJDOT Capital Project Delivery Process
- NJDOT Roadway Design Manual
- NJDOT Soil Erosion and Sediment Control Standards
- NJDOT Standard Specifications for Roadway and Bridge Construction

Mercer County, Bridge Replacement Maxwell Avenue Over Timber Run (Bridge No. 853.10), Mercer County, NJ. (2013-2014) Civil Engineer that prepared the hydrologic and hydraulics analysis which includes the bridge opening and scour analysis using HEC-RAS software to meet NJDEP requirements for the replacement for the Mercer County Bridge in Hightstown Borough.

Monmouth County, MT-10 Bridge Replacement, Township of Middletown, NJ. (2017-present) Senior Hydraulic Engineer that developed the drainage design and hydrologic and hydraulic analysis using HEC-RAS software for a Bridge carries Church Street over Compton Creek.

Cape May County, Improvements to Bayshore Road (CR603) from Sandman Boulevard to Fishing Creek Road, NJ. (2016-present) Drainage Design Task Leader responsible for Evaluating the existing storm drain system for its efficiency for disposal of stormwater and to eliminate the ponding on the roadway and adjacent properties. Also responsible for Storm Water Management and Soil Erosion and Sediment Control plans and certification documents. The project involves pavement resurfacing with a few areas of reconstruction, improvements to the roadway drainage, and ADA compliance. Realignment is required of Rosehill Road to be opposite the entrance to the ACME Shopping Plaza currently 100 ft. apart. Design prepared in accordance with the NJDOT Standard Specifications for Road and Bridge Construction, NJDOT and AASHTO Roadway Design Manuals, MUTCD, NJ State Highway Access Management Code and NJDOT Standard Roadway and Bridge Construction and Traffic Control Details.

Morris County Bridge No. 1400-150 Replacement, Morris County, NJ. (2007-2008) Civil Engineer that prepared the hydrologic and hydraulics analysis which includes the bridge opening and scour analysis using HEC-RAS software to meet NJDEP requirements for the replacement of Bridge No. 1400-150 on County Route 504 over the Pompton River.

DVRPC, Camden County Local Concept Development Study Kaighn Avenue (CR 607) over the Cooper River, Camden County, NJ. (2015-present) Senior Hydraulics Engineer providing professional consultant services to study NJ State Structure #043B006, Camden County 3B-6, under Camden County jurisdiction, in the Township of Pennsauken and City of Camden, carrying Kaighns Avenue (CR 607) over the Cooper River and flooding on Kaighns Avenue west of the structure. The major objective of the LCD Phase was to identify and compare reasonable alternatives for both the structure and roadway flooding, and strategies that address the requirements of the initial stages of the project delivery process. The LCD Phase developed the Preliminary Preferred Alternative and information necessary to successfully advance the project through the Local Preliminary Engineering, Final Design, and Construction Phases. Responsible for the drainage, hydraulic and storm water management elements for this LCD assignment including an assessment of the existing deficiencies and their relationship to drainage and flooding. The design was prepared in accordance with the NJDOT Standard Specifications for Road and Bridge Construction, NJDOT and AASHTO Roadway Design Manuals, NJDOT and AASHTO Bridge and Structures Manuals, MUTCD, NJDOT Standard Roadway and Bridge Construction and Traffic Control Details, and NJDOT CADD Standards.

NJDOT, NJ Route 47 over Nummytown Mill Pond Dam, Slope Reinforcement, Cape May County, NJ. (2015-present) Civil Engineer that prepared the permit documents to meet the, NJDEP Flood Hazard Control Act Rules, and NJDEP Stormwater Management Regulations including stream encroachment limits including developing construction plans, engineering estimates, specifications, and permit documents. This project is located on Route 47, mile post 5.24, Middle Township.

NJDOT, NJ Route 173 over Branch of Musconetcong River (A.K.A.) Tributary to West Portal Creek Culvert Replacement, Hunterdon County, NJ. (2015-present) Senior Hydraulic Engineer responsible for preparing the permit documents to meet the, NJDEP Flood Hazard Control Act Rules, and NJDEP Stormwater Management Regulations including stream encroachment limits. This project included design of a new three sided box culvert across Route 173, a reinforced concrete retaining wall, a prefabricated T-wall and a dual 48" RCP Culvert under a driveway in Bethlehem Township.

NJDOT, 3 Year Statewide General Engineering Services Task Order Agreement. (2015-present) Senior Hydraulic Engineer responsible for the development of construction plans, engineering estimates, specifications and schedules. Responsible for hydraulic elements for Task Order assignments. LSCD Task Orders include an assessment of the existing deficiencies and their relationship to drainage and flooding, scour analysis, alternative analysis and plan development utilizing Micro Station CADD software. Cost estimates are developed using Trns•port CES. Project Schedules are developed utilizing Primavera.

CULTURAL RESOURCE CONSULTANTS

LYNN ALPERT
SENIOR ARCHITECTURAL HISTORIAN (36 CFR 61)

YEARS OF EXPERIENCE:
With this firm:
2012-Present
With other firms: 1

EDUCATION:
MS 2012
University of Pennsylvania
Historic Preservation

BA 2006
Temple University
Art History, *Summa Cum Laude*

PROFESSIONAL TRAINING:
Advisory Council on Historic Preservation, Section 106 Essentials Training Course, August 2012

PROFESSIONAL ORGANIZATIONS:
Member of the Vernacular Architecture Forum

Member of the Pioneer America Society: Association for the Preservation of Artifacts and Landscapes

Member of the American Alliance of Museums

Professional Experience Summary:

Lynn Alpert's experience includes historical research and writing, architectural surveys, and architectural analysis. Ms. Alpert has worked on cultural resources surveys completed in accordance with Section 106 of the National Historic Preservation Act and other municipal and state cultural resource regulations. Ms. Alpert has drafted historic preservation nominations and is experienced in archival and historical research, and urban architecture. She has facilitated the completion of research and writing projects and has worked closely with municipal historic preservation groups and religious organizations. She exceeds the qualifications set forth in the Secretary of Interior's Standards for an Architectural Historian [36 CFR 61].

Representative Project Experience:

Bordentown-Chesterfield Road and Old York Road Intersection Improvements Project, Chesterfield Township, Burlington County, NJ (Sponsor: NJDOT) Architectural Historian for the intensive-level architectural survey conducted for proposed improvements to the intersection of Bordentown-Chesterfield Road (CR 528) and Old York Road (CR 660). The project involved field inspection and photographic documentation of the Sycamore Farms property, as well as historical research to aid in the completion of a New Jersey Historic Resource Survey Form. The project concluded that the property met National Register Criterion C as an intact and well-preserved example of a late eighteenth-century vernacular farmhouse. Based on the Criteria of Adverse Effect, it was concluded that the undertaking as proposed would not have an adverse effect on this historic property. This work was completed in accordance with Section 106 of the National Historic Preservation Act.

Sea Bright Development Project, Sea Bright Borough, Monmouth County, NJ (Sponsor: Trap Rock Industries, Inc.) Co-Architectural Historian for an intensive-level architectural survey performed in connection with the proposed Sea Bright Development project. The architectural survey included an assessment of integrity and historical significance. The project involved field inspection and photographic documentation of buildings, as well as historical research to aid in the completion of New Jersey Historic Resource Survey Forms. A potential historic district was examined as part of this project. This work was completed for the project's anticipated Coastal Area Facility Review Act Permit from the New Jersey Department of Environmental Protection-Land Use Regulation Program.

Railroad Avenue/Main Street Stormwater Improvements Project, Califon Borough, Hunterdon County, NJ (Sponsor: Califon Borough) Architectural Historian for an intensive-level architecture survey for the proposed Railroad Avenue/Main Street Stormwater Improvements project. The project involved field inspection and photographic documentation of a stone masonry channel and culvert system, as well as historical research to aid in the completion of a New Jersey Historic Resource Survey Form. The project concluded that the stone channel and culvert system is a contributing structure to the National Register-listed Califon Historic District. Based on the Criteria of Adverse Effect, it was concluded that the undertaking as proposed would have a conditional no adverse effect on this historic property.